
The Determinants of Home Price Appreciation in the Community Advantage Secondary Mortgage Market Demonstration Program

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Abstract

In an early analysis of homes purchased in a national pilot called the Community Advantage Program (CAP), homes purchased between 1998 and 2002 are found to have appreciated on paper at a median annual rate of 5.4% between the time of purchase and spring 2003. This is less than the national house price appreciation index of 7.0% (covering 1998-2003) but higher than other types of investments such as the Dow Jones Index (2.78% annual growth rate over the same time period) and the average rate on a 6-month CD (4.34% over the same time period). This impressive performance holds across different regions and states, with Community Advantage homes outperforming the 1998-2003 statewide averages in 4 of the 10 states with a substantial number of Community Advantage homes

These robust price increases mean that there have been even greater annual returns to initial homeowner equity due to the leveraging power of very low down payments. The median increase in net housing wealth of the Community Advantage homeowners is \$17,492. Returns have been particularly impressive for the lowest-income borrowers. Borrowers with less than \$20,000 in annual household income at the time of purchase had a median down payment of \$1,790 and have experienced a median equity increase of \$24,724. Price and equity appreciation rates for African Americans are solid but are about 10 percent lower than for whites. Homes owned by borrowers with blemished credit also realized significant gains. These preliminary findings illustrate the powerful wealth creation potential of homeownership for low- and moderate-income families through initiatives like the Community Advantage program.

Several local factors (mostly measured at the zip-code level) are found to relate to price appreciation rates. Appreciation rates are greater for lower-priced properties. The mean interest rate and mean unemployment rate since purchase are negatively associated with price appreciation. The median value of houses in the zip code and the homeownership rate are positively associated with price appreciation. Finally, while black homeowners fared less well than whites, we found no association between appreciation and the racial composition of the zip code once other variables were controlled for.

Introduction

Home equity is a significant source of household wealth, especially for those in the lower reaches of the income distribution (Belsky and Calder 2004, 14). This is why consumer advocates and policy makers celebrate the achievement of a record number of homeowners during the 1990s (U.S. Census Bureau 2002, Table 15). Despite a declining economy that dipped briefly into recession in 2000–2001, historically low interest rates have propelled the national homeownership rate to a record high 67.4 percent in 2002, with impressive gains by low- and moderate-income families (LMI), minorities, and nontraditional households. Between 1993 and 1997, for example, the number of home loans to families with incomes at or below 80 percent of median increased by 38 percent, compared with 27 percent for loans to higher income families (Quercia, McCarthy, and Wachter 2003). For a roughly similar period (1994–2001), minorities accounted for 40 percent of the national net gain in homeowners, even though they account for just 25 percent of all households (Joint Center for Housing Studies 2002, 14). Similarly, between 1997 and 2002—when the homeownership rate for all households increased by 3 percent—householders under age 25 enjoyed a 30 percent increase, including a 58 percent gain for families headed by females under 25 (U.S. Census Bureau 2002, Table 15).

In addition to historically low interest rates, growth among these latter groups was accelerated by an aggressively supportive public policy environment that contributed to the widespread introduction of “affordable” mortgage products during the latter part of the 1990s featuring flexible underwriting—including low down payments, higher debt ratios, and reduced cash reserves—combined with the use of nontraditional means of verifying creditworthiness (Quercia et al. 2002, 352). For example, home purchase loans requiring down payments of 5 percent or less were nearly four times (15 percent) more common in 2001 than in 1990 (4 percent) (Joint Center for Housing Studies 2002, 18). Freddie Mac’s *Alt 97* mortgage, which is targeted to buyers with little savings but good credit, features 3 percent down, with only part of the up-front cash having to come from the borrower’s own resources.¹ Underscoring the potential impact of these new mortgage products, Quercia, McCarthy, and Wachter (2003) estimate that the *Alt 97* mortgage has increased “the relative probability of homeownership for young households by 27.1 percent, for black households by 21 percent, and for center city households by 15 percent.”

While home ownership is not just about building wealth, because of its significant potential to generate large returns on small amounts of invested capital, its role in helping families secure their financial futures is too important to ignore (Belsky and Calder 2004, 8) Using data from the Panel Survey of Income Dynamics, Di, Yang, and Liu (2003, 12), for example, estimated that “the total net wealth on average in 1999 of owners in 1984 is 2.2 times that of renters in 1984, controlling for incomes and demographics.”

Despite these dramatic findings, other researchers are less positively disposed toward housing as an investment good. For the period 1985-1995, Goodman, for

¹ Fannie Mae’s *Flexible 100* mortgage allows for no down payment but does require a contribution of 3 percent to the closing costs.

example, found that “when all the costs of owning and renting are considered, a majority of families that bought a home in the mid-1980s would have saved money by renting comparable housing” (cited in Di, Yang, and Liu 2003, 6). Relative to alternative investments, Goetzmann and Spiegel found home appreciation rates from 1990-1999 to be much lower than the returns on stocks, bonds, and mortgage-backed securities (cited in Di, Yang, and Liu 2003, 6). From a portfolio analysis perspective “Hurst, Luoh and Stafford found that the share of wealth a household held in home equity in 1984 had a negative relationship with total wealth in 1994, but that the share held in stocks had a positive relationship (cited in Belsky and Calder 2004, 8). For a similar period, but using different metrics, Marjammaa found that “the average stockholder earned \$23,000 in the stock market during the past decade, while the average homeowner earned \$44,000 in home equity (cited in Di, Yang, and Liu 2003, 4).”

Although nominal home prices have never declined on a year-to-year basis since the National Association of Realtors began tracking sales data in 1968, Di, Yang, and Liu (2003, 3) remind us that “national measures of home price appreciation have little practical meaning to an individual homeowner because he invests in a single asset instead of a national index, and this asset cannot be diversified..”

Dueling researchers and conflicting findings notwithstanding, Americans have historically held an enormous amount of their collective wealth—a staggering \$7.6 trillion in 2002—in their homes. For all households, home equity accounts for an average of 21 percent of net household wealth—but for all homeowners the share is close to 50 percent. Housing’s relative importance in household portfolios has grown considerably since the high-tech meltdown in 2001, when stock portfolios lost \$1.4 trillion in value (Joint Center for Housing Studies 2003, 6). With housing outperforming the rest of the economy, home equity grew by more than \$405 billion in 2001-2002, raising the share of “stock-holding homeowners with more home equity than stock wealth from 60.5 percent in 2001 to an estimated 66 percent in 2002” (Joint Center for Housing Studies 2003, 6).

Home equity has been especially important for those with lower incomes, where the median net wealth of owners in the lowest income quintile was \$68,000 in 2001, while that of similarly situated renters was only \$500 (Joint Center for Housing Studies 2003, 7). Among these owners, home equity accounted for 80 percent of net wealth in 2001, compared to 48 percent for owners in the middle quintile and 26 percent in the highest quintile (Belsky and Calder 2004, 14).

“For all homeowners, home equity represented 42% of their net wealth. But for lower income and minority households, home equity represented four-fifths (80%) of their net wealth. And for moderate-income, African American, and Hispanic households, home equity represented more than one-half of their net wealth” (Consumer Federation of America 2003, 2).

Despite the importance of home equity to net household wealth, Case and Marynchenko (2001) remind us of the significance of timing and where in the local real estate cycle a family enters the market. In their local studies of low-income homeowners in Chicago, Boston, and Los Angeles, these researchers found homeownership to be “an

excellent vehicle for asset accumulation since the early 1980s in Boston, since 1987 in Chicago, and since 1995 in all three cities. They also found, however, that significant periods of decline have led to substantial losses for low-income households in Boston and to periods of substantial negative equity for low-income households in Los Angeles” . This is why, for example, McCarthy, Zandt, and Rohe conclude that “homeownership offers much better financial security for wealthy owners than for low- and moderate-income and minority owners” partly because “lower-income and minority households hold more housing than is optimal in portfolio wealth, exposing them to higher risk” (cited in Di, Yang, and Liu 2003, 7).

This paper describes the asset building potential of house price appreciation of an innovative homeownership partnership that has enabled home ownership for more than 25,000 credit-worthy low-income, low-wealth individuals who may not be effectively served by the conventional market. Through access to the proprietary valuation model that the Federal National Mortgage Association (Fannie Mae) uses to value the homes securing its mortgage portfolio, we are able to estimate the paper equity accrued by thousands of families who have bought homes under a demonstration program launched by Fannie Mae the , and a North Carolina-based community development financial institution.

We proceed as follows: First, we describe CAP. Next, we set the stage for the empirical analysis that follows by reviewing the literature on the wealth-building potential of homeownership, with particular emphasis on lower income families. Our estimates of the paper equity accumulated by CAP homeowners are disaggregated by household type, race and ethnicity, and credit history, and are benchmarked against statewide appreciation rates and metropolitan price changes in individual housing markets in which there has been sufficient CAP activity to permit such analyses. While much of the paper is descriptive, providing appreciation rates for different groups of buyers, and for various locations, we also model price changes in the final empirical section, controlling for important differences in market conditions. We conclude the paper with a discussion of the policy significance of our findings.

The Community Advantage Secondary Market Demonstration Program (CAP)

The goal of CAP is to provide tangible evidence to lenders, policy makers, and the secondary mortgage market that low-wealth borrowers are “bankable,” and that Fannie Mae (and, by implication, the Federal Home Loan Mortgage Corporation, or Freddie Mac) can significantly expand their purchase of affordable housing loans without compromising either their balance sheet or safety and soundness concerns. With a Ford Foundation grant to underwrite a significant portion of the credit risk, the Center for Community Self Help in North Carolina purchases affordable mortgages such as Community Reinvestment Act (CRA) loans from participating lenders and sells them to Fannie Mae while retaining full recourse, which satisfies Fannie Mae’s charter issues and balance sheet concerns. These loans could not otherwise be readily sold in the secondary market because of their perceived higher risks. CAP mortgage products feature flexible underwriting and typically include one or more of the following features: low or no down

payment, higher debt-to-income ratios, approval of borrowers with spotty credit records or no established credit, and waivers of private mortgage insurance and the usual requirement that a borrower have at least two months of loan payments available as a cash reserve at the time of closing.

Participating banks and thrifts originate and service the loans under contract with Self-Help. Though not quite national in scope, CAP's geographic reach is impressive, with the 26 participating lenders testing innovative loan products in 47 states and the District of Columbia. Because the program originated in Self-Help's home state, North Carolina lenders have originated 34 percent of all CAP loans, with lenders in California accounting for 18 percent and those in South Carolina a distant third, at 5 percent (Map 1). Virginia, Ohio, and Oklahoma each account for about 4 percent of all loans in our 1998–2002 sample. While approximately 20 percent of the borrowers live in non-metropolitan areas, there are 21 Metropolitan Statistical Areas (MSA) where lenders have collectively originated at least 200 loans (Map 2).

The data used in this paper were collected as part of the authors' multi-year evaluation of CAP. The goals of the evaluation are to assess the replicability of the CAP model, the performance of more than a dozen innovative mortgage products designed to expand mortgage lending, and the social and wealth impacts of homeownership. A core element of our research design is a five-year panel survey of more than 3,700 CAP borrowers, and a comparison group of low-income renters whose housing and other circumstances we are also tracking.

Who are the Homeowners?

By most definitions, CAP borrowers are as nontraditional as the loans they secured to buy their homes. Compared with borrowers whose conforming first mortgage loans were purchased by Fannie Mae and Freddie Mac in 2000, CAP homeowners are 5 times more likely to be African American, 2.5 times more likely to be Hispanic, more than 4 times more likely to have incomes below 60 percent of area median, more likely to be single females, and more than twice as likely to be under 30 years of age (Table 1). More importantly, 35 percent of all CAP families had blemished credit, reflected in credit (FICO) scores of less than 660. Moreover, over 4 percent of all borrowers—including 11 percent of all Hispanic buyers—had no credit score but were still approved for a mortgage loan (Table 2).

Using data from our baseline survey of over 3,500 CAP homeowners, we can look at the family and employment situations of these borrowers in greater detail. As a rule, CAP families have strong commitments to the work force, with two wage earners in more than three quarters of all sampled households with married couples or partners. Sixteen percent of all borrowers and 10 percent of all spouse/partners that work hold more than one job, including part-time, weekend, and evening work. Ninety-six percent of our surveyed borrowers work at least full time (35 or more hours per week) and almost 30 percent average at least 50 hours of paid work per week.

Despite the fact that our interviews were conducted in the midst of the economic slowdown, we found low unemployment rates among all borrowers (3.2 percent) at the

time, although much larger numbers of borrowers (20 percent) and their spouses/partners (59.3 percent) had experienced at least one spell of joblessness lasting a week or more since closing on their loans (Table 3).² Because a greater percentage of surveyed black households (63 percent) than whites (43 percent) consist of single heads of household (with or without children) and just one wage earner (not shown), African Americans in the CAP program are more sensitive to even modest declines in the economy and more likely to experience declines or slower growth in income during an economic slowdown.

Thus, for example, while the median income of white CAP borrowers increased by nearly 18 percent, from \$31,000 to \$36,500 between 6 months and 24 months after closing, the median income of black households increased by just 8 percent, from \$30,500 to around \$32,900. This means that the relative income deficit of blacks, which was just \$500 at closing, grew seven-fold in two years or less. While this makes homeownership a more challenging financial commitment for many minorities, especially those with just one wage earner, it also magnifies the potential importance of home ownership as a means of accumulating wealth and purchasing in areas with high appreciation potential. Whether blacks are as likely as whites to live in high-appreciation markets is a topic we now turn to in greater detail.

The Wealth-Building Potential of the Community Advantage Program

While many empirical studies of house price dynamics use commercially available property sales data to generate price change information, we use a proprietary valuation model to estimate current market values. As part of its participation in the CAP partnership, in October 2003 Fannie Mae provided then-current market-value estimates from its automated valuation model (AVM) for all properties in the Community Advantage program. We use these estimated market values to compute “paper” gains or losses experienced by CAP home buyers.

Data used in the AVM includes repeat sales information, public tax records, and property characteristics. Currently, AVM employs four different underlying models, a reconciliation model to come up with the best value estimate in case of multiple model predictions where valuations vary, and a confidence score model to rank-order prediction accuracy at the property level.³

Because of its use in risk management, AVM is also examined annually by Fannie Mae’s regulator, the Office of Federal Housing Enterprise Oversight (OFHEO), which has consistently awarded high grades in regulatory audits. We use AVM to estimate the market value of each CAP property as of a single date—September 30, 2003—to calculate our price changes for homes purchased between January 1, 1998 and December 31, 2002. Thus, the term of ownership can vary from 9 months to 33 months.

² Post-purchase joblessness among spouses includes those who are not in the labor force.

³ Because of substantially higher mean and median rate and variance of price appreciation for the least reliable confidence category, we chose to omit those loans from our analysis.

To compare the experiences of CAP buyers to market averages, we use OFHEO's House Price Index (HPI), which is published on a quarterly basis and tracks average house price changes in repeat sales or refinancings on the same single-family properties. OFHEO's index is based on analysis of data obtained from Fannie Mae and Freddie Mac from more than 23 million repeat transactions over the past 28 years. The HPI reflects price movements on a quarterly basis of sales or refinancings of single-family homes whose mortgages have been purchased or securitized by Fannie Mae or Freddie Mac (Office of Federal Housing Enterprise Oversight 2003, 2).

The two variables of primary interest in this paper are the price appreciation rate of the property and the equity appreciation rate for the borrower. The price appreciation rate is the annual appreciation rate (compounded monthly) calculated using actual purchase price at origination, the AVM-estimated value in October 2003, and the number of months between purchase and October 2003. The equity appreciation rate is the annual appreciation rate (compounded monthly) using the borrower's equity at time of origination, the equity as of October 2003 calculated as AVM-estimated value less current unpaid mortgage balance, and the number of months between purchase and October 2003. For loans with a loan-to-value (LTV) ratio greater than 100 (12.1 percent of loans), initial equity was set at \$500, which is the typical minimum buyer contribution required by most lenders for high LTV Community Advantage loan products.

Data on loan characteristics come from 21,497 CAP loans to LMI borrowers that were originated between January 1, 1998, and December 31, 2002, and that Self-Help purchased from participating lenders as part of the Community Advantage Program. These loans had a median original principal of \$79,500. These loans constitute about 78 percent of the more than 27,500 loans that make up the CAP historical book of business. There were too few pre-1998 loans in our database to estimate vintage effects, while 2003 purchases had too little time to show any market effects. Another source of data, which we use in the final section for modeling price changes, is the 2000 Census. Because the lowest-level of geography used in the AVM model is zip code, we used ZCTA-level Census data generated by software and data purchased from Geolytics, Inc. (Geolytics 2002). Finally, data on the Dow Jones Index, monthly 6-month CD rates, monthly 10-year T-Bill rates, and monthly county-level unemployment rates were obtained from various sources (as cited).

For each loan, the data include a full set of loan characteristics, some borrower characteristics, and the complete payment history from the time that Self-Help purchased the loan. The loans database is being compiled as part of the authors' on-going multi-year evaluation of the Community Advantage Program that is designed to (1) measure loan performance by tracking delinquency, default, and foreclosure rates over the critical first five years of the mortgage term; (2) document the social and economic impacts of homeownership on borrowers; and, to the extent practicable, (3) assess the impacts of CAP on neighborhood conditions and housing market dynamics. As part of the evaluation, we have begun to build the Community Advantage Panel Survey, a 5-year examination of over 3,500 CAP homeowners. Some of the descriptive data cited above are from our baseline interviews of panel members.

Gains Are Significant and Widespread, but Not Universal

During a period in which the Dow Jones Index rose by just 2.78 percent a year and CD rates averaged 4.33 percent a year, based on AVM estimates as of September 30, 2003, CAP families who bought their homes between 1998 and 2002 enjoyed an average annual appreciation rate of 5.4 percent⁴ (Graph 1). This is close to the long-run average annual increase in nominal house prices of 6.3 percent for the country as a whole for the period 1968-2001 (Di, Yang, and Liu 2003, 4). Overall, the median “paper” gain for all CAP owners was \$16,433, while fewer than 2 percent of all homes fell below their original purchase price (Table 4). Just over 5 percent of all CAP buyers fared worse than the Dow, while 26 percent experienced gross returns that were below those they might have earned from investing in CDs (Table 5).

Timing is Important. Generally, the absolute change in price increases with length of ownership, with the median increase in price the highest for families who bought their homes in 1998 (\$20,198), and lowest for those who bought in 2002 (\$14,204). More recent borrowers have bought homes during a time of generally higher appreciation rates—annualized percentage gains for families who closed on their homes in 2001 and 2002 are greater than gains for those who bought between 1998 and 2000—but over time, their experiences may become more similar to those who bought in earlier times. Nevertheless, 98 percent of all CAP families who bought their homes between 1999 and 2001 outperformed the Dow, while only 83 percent who bought in 2002, as the stock market recovered, had annualized returns above the Dow (Table 5).

Conversely, only about half of all families who bought in the early years of the program, between 1998 and 2000, saw the prices of their homes grow at faster rates than the CD rate. As interest rates plummeted in 2001 and 2002, at least 90 percent of CAP homes outperformed the CD index.

So Is Geography. As expected, value gains varied significantly across the country, with the greatest average gains, of at least 13 percent a year, experienced by CAP families in Maryland, California, and Florida. The smallest increases, all under 4 percent a year, were in North Carolina, South Carolina, and Mississippi (Table 6 and Graph 2). In three of the ten states with the greatest number of CAP loans—California, Virginia, and Florida—Community Advantage families experienced gains that exceeded average statewide increases in home prices by significant margins (Graph 3).

On a more localized basis, price gains were highest in Los Angeles and Riverside, California, and in metropolitan Washington, DC, where advances of CAP family homes outpaced metropolitan increases (Graph 4). In these hot metro markets, median annual appreciation rates for CAP homes were 16 percent or higher.

⁴ To estimate changes in the Dow Jones Index, we took the Dow value on January 1, 1998, and September 30, 2003, and calculated the appreciation rate (on an annual basis, compounded monthly). The CD annualized rate of return from January 1998 through September 2003 assumes a 6-month CD purchase in January 1998 and rolled over every six months at the national average CD rate in that month (CD rates downloaded from <http://mortgage-x.com/general/indexes/default.asp>).

But Not Everybody Wins. While prices rose on the vast majority of all CAP homes, just under 2 percent lost value. Disproportionately large numbers of families in three of the fifteen states with the largest number of CAP borrowers experienced paper losses, including almost 6 percent in Texas, 3.6 percent in Tennessee, and 3.2 percent in Ohio. From a vintage standpoint, the worst year so far has been 2002, where 4 percent of all homes bought that year fell in price, but this number will probably decline over time.

Leverage Turns Relative Losers into Winners. Because of exceptional leverage—most CAP loans required very modest amounts of upfront cash—average returns to initial equity exceed overall value increases by wide margins. This means that most families whose homes appreciated more slowly than either the Dow or the CD composites saw their initial equity investments grow at far faster rates than either of these benchmarks. Across all CAP families, the average annual increase in initial equity was nearly 70 percent; the increase exceeded 90 percent in three states and 100 percent in four states (Graph 5).

In absolute terms, CAP homeowners gained a median \$17,500 in housing wealth (current home value minus outstanding mortgage balance minus initial down payment). CAP homeowners in California enjoyed median gains in housing wealth of nearly \$84,000; in Maryland, more than \$56,000; in Illinois, about \$33,000; and in Virginia, \$32,000 (Table 7).

Families with Spotty Credit Fared Well. Significantly, households with blemished credit or no credit history—who might not have been able to qualify for a prime mortgage loan were it not for CAP—as well as those who missed one or more mortgage payments during their relatively brief period of ownership also enjoyed significant gains. The median annual equity appreciation rate for homeowners who had no credit score was 89 percent, while for those with a FICO score of 620 or less enjoyed an annual median increase in initial equity of 64 percent a year, compounded monthly (Table 8 and Graph 6).

Regardless of delinquency history, families experienced annual median equity gains of about 70 percent. These findings suggest that if they can gain a foothold in the homeownership market, even families with spotty credit histories or who are new to the credit system can build substantial assets through homeownership. For families who fall behind in their payments and skirt with default, these results suggest that there is usually significant accumulated equity in homes to allow for preventive servicing and creative approaches to help families keep their homes, if their defaults are due to temporary setbacks.

Minority Gains Lag but Are Still Impressive. Perhaps the most positive findings are those related to the paper gains experienced by minorities who were able to buy a home through the Community Advantage Program. However, consistent with other research (Di, Yang, and Liu 2003, 5; Ambrose and Goetzmann 1996, 4), we also find that black-owned homes appreciated about 10 percent less a year, at the median, than houses owned by whites (Graph 7). These differences translate into lower annual equity

appreciation rates: 57 percent for black CAP borrowers compared with 66 percent for whites CAP participants.

Due largely to their concentration in hot markets like California, Hispanic and Asian buyers experienced much greater annual gains in wealth than did whites. The median annual price appreciation rate for Hispanics was 13.7 percent and for Asian/Pacific Islander 11.8 percent, which correspond to median annual equity appreciation rates of 89 percent and 68 percent, respectively.

With minority homeownership rates on the rise—from 42 percent in 1990 to 48 percent in 2003—experiences like those reported in this paper might help to further trim the wealth deficit that has been narrowing in recent years. According to the Consumer Federation of America and BET.com (2003, 1), from 1989 to 2001, “the ratio of median black household wealth to median U.S. household wealth rose from 9.1% to 22.1 .

Home Equity in Household Wealth

Our future plans include collecting detailed wealth data for a subsample of our panel of CAP homebuyers, which will enable us to determine the role of home equity in household wealth. At this time, however, the best we can do is to relate our estimates of household wealth to gross household income at the time of loan closing. Throughout our study period, homeownership appears to have been a solid investment for all income groups, including those with the most modest incomes. Homebuyers with incomes of less than \$20,000 experienced a median increase in “paper equity” of almost \$25,000; just \$2,000 less than the gain enjoyed by families with incomes between \$40,000 and \$50,000 (Graph 9).

Including California loans, the median increase in home equity for the lowest income families amounted to about 1.4 times household income at the time of origination, while for families with incomes of \$50,000 or more, equity gains amounted to 86 percent of household income. While excluding California reduced gains for both groups, reductions were proportionately greater for the highest income families (Tables 9 and 10).

A Note on Prepayment

We noted earlier that one of the limitations of this paper is that our methodology only permits us to measure paper gains and losses, since our price data are estimates of market value rather than actual sales prices. Another methodological limitation that we will correct in a later version of this paper is that while all price estimates are as of September 30, 2003, more than 6,000 CAP loans included in our analysis were actually prepaid or terminated prior to that date (Table 11).⁵ This means that an unknown number of families might not have actually accrued the full gains (or losses) in housing wealth that we estimate. From an analytical perspective, the good news is that we find no difference in the median annual appreciation rate of active and prepaid loans, with just one exception. However, the market values of the small number of homes on which a

⁵ Because of time and resource constraints, we were unable to run the AVM separately for each prepaid loan marking to market all house values on their respective loan termination dates.

CAP mortgage was foreclosed did increase more slowly than all other loans: 7 percent of foreclosed homes lost value compared with less than 2 percent of all active and other prepaid or terminated loans.

Putting it All Together: Modeling Price Appreciation

Thus far, we have described price trajectories for various homebuyer groups, and estimated price changes and paper gains and losses in home equity. In this final analytic section, we attempt to model the appreciation process and identify the relationship between price appreciation and neighborhood characteristics, defined at the zip-code level. While our multivariate models of the price appreciation rate fit comfortably within an established empirical literature, among the unique elements of this work is that our entire sample consists of low- and moderate-income homeowners, with greater concentrations of women and minority buyers than most similar analyses (see, for example, Ambrose and Goetzmann 1996, 4; Oliver and Shapiro 1997; Kim 2000, 9; Case and Marynchenko 2001, 7). The exclusion of high income homeowners from our database limits the generalizability of our findings to the lower end of the income distribution. This is also a strength of our work, since there is little empirical analysis of the experiences of this important population.

As indicated above in our descriptive analysis, we examined both price and equity appreciation. In our multivariate models, we focus only on the price appreciation rate. Because of the highly skewed distribution of the price appreciation rate, the dependent variable in the models is defined as:

$$y_i = \ln(1 + r_i)$$

where r_i is the annual appreciation rate for home i .

The goal of our models is to investigate the impact of local characteristics (here defined at the level of zip code) on house price appreciation. We use a mix of fixed-effects and random-effects models to try to capture as much local variation in price appreciation as possible. In addition, all of our models use fixed effects to control for differences due to loan origination year (i.e., year of purchase and length of tenure), the reliability of the AVM estimate (a variable provided by Fannie Mae), and their interaction. Further, estimation of separate error variances for each level of reliability is required because the variation in appreciation rates increases as the reliability of the current value estimates declines. Unfortunately, due to computational difficulties, these separate variances were only added to the final model. We estimate the following series of models:

$$\text{Model 1: } y_{ij} = \alpha_O O_{ij} + \alpha_R R_{ij} + \alpha_{O,R} O_{ij} R_{ij} + e_{ij}$$

$$\text{Model 2: } y_i = \alpha_O O_{ij} + \alpha_R R_{ij} + \alpha_{O,R} O_{ij} R_{ij} + \alpha_Z Z_{ij} + e_{ij}$$

$$\text{Model 3: } y_i = \alpha_O O_{ij} + \alpha_R R_{ij} + \alpha_{O,R} O_{ij} R_{ij} + \alpha_Z Z_{ij} + \beta_m X_{mij} + e_{ij}$$

$$\text{Model 4: } y_{ij} = \alpha_O O_{ij} + \alpha_R R_{ij} + \alpha_{O,R} O_{ij} R_{ij} + \gamma_k C_{ki} + \beta_m X_{mij} + v_j + e_{iR} R_{ij}$$

Where i subscripts individual properties ($i=1$ to N_j); j subscripts the zip code the property is located in ($j=1$ to J) and:

$\alpha_O O_{ij}$ is a set of fixed effects for the origination years (1998-2002);

$\alpha_R R_{ij}$ is a set of fixed effects for the AVM reliability scores (scores=1 to 4);

$\alpha_{O,R} O_{ij} R_{ij}$ is a set of fixed effects for the interaction of origination year and reliability;

$\alpha_Z Z_{ij}$ is a set of fixed effects for zip code (i.e. a dummy variable for each zip code);

$\beta_m X_{mij}$ is a set of independent variables (X_{mij} for $m=1$ to M and all i,j) with fixed coefficients (in this case X is a mix of property-level, county-level, and national-level variables);⁶

$\gamma_k C_{ki}$ is a set of zip-code-level characteristics (C_{ki} , for $k=1$ to K and $j=1$ to J) with fixed coefficients that replace the fixed effects for zip-code in Model 4;

e_{ij} is a random error term, normally distributed with a mean of 0 and a variance of σ^2 ;

$e_{iR} R_{ij}$ is a set of reliability-specific random error terms—that is, separate error variances (σ^2_R) for each of the 4 levels of reliability; and,

v_j is a random effect for zip code with a mean of 0 and a variance of τ .

Model 1 serves as a baseline model and controls only for appreciation differences by origination year, the reliability of the AVM estimate, and their interaction. Model 2 assesses the extent to which price appreciation varies across zip codes. Using fixed effects for zip codes absorbs the maximum amount of variance in price appreciation due to local variations.

In Model 3 we add variables to help explain variation in price appreciation that is not captured by the zip-code level differences. Ideally, we would enter a larger number of characteristics of the individual homes but our choices are limited due to data availability (e.g. number of bedrooms is missing for a large portion of the data). We include the purchase price of the property to capture differences among properties when purchased. The reason for including this variable is that empirical studies have found that, other things equal, lower priced houses tend to appreciate at faster rates than higher-priced properties (Case and Mayer 1995, 3, 7, 9-10).

⁶ For the sake of notational simplicity, we assign measures based on 10-year T-Bill rates to the “property-level” variables although these are in fact characteristics of the month in which the property was purchased.

We also include the mean of the 10-year T-bill rate between the month of purchase and October 2003 to proxy macroeconomic conditions and the state of the housing market.⁷ A sustained period of low interest rates over the study period should have a positive effect on price appreciation, since lower mortgage interest rates will increase homeownership demand. Because of the historically low interest rates that we have experienced over the past few years, we recognize that this can lessen the generalizability of our results.

We also add to Model 3 the mean of the county unemployment rate between the month of purchase and October 2003 to account for local economic conditions.⁸ High local unemployment is likely to lower homeownership demand. Our *a priori* expectations are based on the proposition that because CAP borrowers are more likely than those with higher incomes to live in low- and moderate-income neighborhoods, these places might be more hard hit by economic downturns, which should depress house prices.

Finally, Model 4 provides a substantive assessment of the local variation in price appreciation rates by replacing the fixed effects for zip code with a set of zip-code-specific variables, plus a random effect for zip code.⁹ Using 2000 Census data, we include three broad sets of zip-code-level characteristics for local housing attributes, demographics, and other relevant factors. We recognize that Model 4 will explain less of the variation in price appreciation than Model 3 because the array of zip-code-level characteristics will not explain all of the local variation that exists, while the random effect will not absorb as much variation as the fixed effects. Nevertheless, Model 4 will provide a greater substantive explanation of local factors affecting price appreciation than any of the preceding models.

For local housing characteristics, we include the zip code's homeownership rate, median house value, and median housing age. Areas with high levels of homeownership and high median house values are generally considered among the most desirable neighborhoods in which to live, which should increase property values. Median housing age could have either a negative or positive impact on appreciation, depending upon how "trendy" a neighborhood is, whether there is significant demand for older homes to renovate, etc., which is dependent upon the neighborhood's type of housing, location, and demand.

Among the ZIP-LEVEL demographic variables included in Model 4 are the percent of the population that is below poverty, the mean unemployment rate over the

⁷ Historical T-bill rates were downloaded from the "Data Buffet" at economy.com on June 13, 2004 (Economy.com 2004). The original source is the Federal Reserve Board.

⁸ Historical monthly county-level unemployment rates, non-seasonally adjusted, were downloaded from the "Data Buffet" at economy.com on June 13, 2004 (Economy.com 2004). The original source is the Bureau of Labor Statistics.

⁹ As presented, Model 4 is a trimmed model. Other zip-level variables in the full model included the percent of housing units with incomplete kitchen and/or plumbing, percent of crowded housing units, percent of population without a high school diploma, percent of population with a college degree, and percent of the population receiving some public assistance. None were significant, and they were removed due to concerns with collinearity and model estimation time.

study period, the percent of the population that is African American and Hispanic, and population density in 2000. Other things equal, we would expect higher local poverty and unemployment rates to be associated with lower price appreciation rates. The empirical literature also suggests that, other things equal, appreciation rates are lower in high-minority neighborhoods (Ambrose and Goetzmann 1996, 4; Kim 2000, 9). Whether or not this relationship will hold when all households in the sample have low- and moderate-incomes is an open question.

In an attempt to assess the potential impact of other neighborhood demographic characteristics, we also include the percent of the population that is foreign-born and the percent that are single parents. Because of the large Hispanic immigrant population among CAP buyers, we include the interaction of percent Hispanic with percent foreign born. Finally, we include population density for exploratory reasons, with no a priori expectations of sign. Finally, the model includes a dummy variable for properties located in California because of the exceptionally high appreciation rates that CAP homeowners have experienced in that state.

Models 1 through 3 are standard linear models, estimable using ordinary least squares OLS. Model 4 can be estimated using a mixed linear model (to capture the random effect of zip code). Mixed linear models use a maximum-likelihood estimator to estimate models with both fixed and random effects and can estimate the type of heteroscedasticity captured in the reliability-specific error terms (see e.g. McCulloch and Searle 2000). We used SAS v.8 PROC MIXED to estimate these models (SAS Institute 2000; Littell et al. 1996).

We limit our data for the models to properties located in zip codes that have at least 5 total Community Advantage properties (after removing observations with missing data).¹⁰ This created a sample size of 11,524 properties in a total of 821 zip codes. To assess the impact of the 5-property cutoff, we re-estimated Model 4 limiting the data to properties in zip codes with at least 10 and at least 20 CAP loans and obtained substantively similar results.

Model Results

Frequencies, means, and standard deviations for the substantive model variables are presented in Table 12. A natural log transformation was performed on several variables because they had highly skewed distributions. While it is not our purpose to fully describe the neighborhoods in which CAP properties are located, Table 12 contains several numbers worth highlighting. Sampled CAP properties had an average purchase price of about \$93,000 and are in zip codes with about average homeownership and poverty rates and above average minority presence relative to the nation as a whole. CAP communities also have significant levels of foreign-born residents.

¹⁰ Kreft and DeLeeuw (1998, 119-126) survey simulation studies addressing the issue of power in mixed linear models. They report that for data with 150 macro-units with 5 micro-units each, the model has a power of .90 for detecting cross-level effects. They also report that variance component estimates show no bias with 300 or more macro-units. The data used for our model consists of 11,524 properties in 821 zip codes.

We summarize the results of our models in Table 13. As mentioned earlier, Model 1 includes only the control variables for year of origination, the AVM reliability index, and the interaction of the two. These control variables account for 19 percent of the local variation in estimated appreciation rates.¹¹ We present two other measures of model fit, Akaike's Information Criterion (AIC) and Bayes' Information Criterion (BIC). These measures are most useful in comparing the fit of two models with the main difference between the two measures being that BIC penalizes more heavily for degrees of freedom. Smaller values (or in this case negative values of larger magnitude) are better. Finally, Wald F-tests show that each set of control fixed effects is statistically significant (not presented).

Model 2 adds fixed effects for zip codes. This model allows us to assess how much local variation there is, after controlling for origination year and AVM reliability. The zip code fixed effects are statistically significant overall and explain an additional 36 percent of the variation in estimated appreciation rates, raising the explanatory power of our price change model to 55 percent. Comparing the fit of Model 2 to Model 1, the AIC shows a marked improvement but the BIC is actually a bit worse, suggesting that although the overall fit is better, this model is not parsimonious. The fixed effects for origination year, the AVM reliability index, and their interaction remain significant.

Model 3 adds the natural log of the purchase price, the mean of the 10-year T-bill rate between time of purchase and the third quarter of 2003, and the mean county-level unemployment rate over the same period. We will discuss these variables in more detail in Model 4, but all three are significant and these variables explain an additional 9 percent of the variation, raising the model's explanatory power to 64 percent. Both the AIC and the BIC improve slightly compared to Model 2.

Model 4 removes the zip code fixed effects and replaces them with zip-level Census variables (which have fixed effects) and a random effect for zip code. As explained above, we know before estimation that this model will explain less of the total variation than Model 3, however it provides us with insight as to which local characteristics drive price appreciation for low-income borrowers.

Detailed results for Model 4 are presented in Table 14.¹²

The natural log of the purchase price has a significantly negative impact, which means that the lowest-priced houses are, on average and controlling for other variables in the model, appreciating at a faster rate.

The mean of the monthly 10-year T-bill rates between purchase and October 2003 has a significant negative effect as we'd expect. Higher interest rates make it harder for people to buy homes, leading to lower demand and thereby lower appreciation rates. The mean county-level unemployment rate between purchase and October 2003 also has a significant negative effect, as expected.

¹¹ The R^2 is approximated as the square of the correlation between the predicted value and the observed value of the dependent variable.

¹² See footnote 10.

Focusing on the zip-code-level measures, consistent with many other studies, we find that appreciation is higher in areas with high levels of homeownership and high median house values (Case and Marynchenko 2001, 7, 9-10). High neighborhood house values raise appreciation rates, but given that relative price gains are greater for lower priced properties, the results confirm the adage that it is better to own the lowest-priced house in the neighborhood than the highest-priced house. In this sample, older neighborhoods are also appreciating at slightly faster rates.

In the Community Advantage sample, the relationship between price appreciation and the race and ethnicity of the local population is not straightforward after controlling for other neighborhood characteristics. Contrary to much previous research (Ambrose and Goetzmann 1996, 4; Kim 2000, 9) the percent of the population in the zip code that is African American does not have a significant effect on price appreciation

To assess price appreciation in Hispanic neighborhoods, we included the interaction of the percent of the population that is Hispanic and the percent of the population that is foreign born. The former has a significant and negative effect while the interaction term has a significant and positive effect. This means that properties located in zip codes with a high percentage of Hispanic population, and a low percentage of foreign-born population, experienced lower appreciation rates. One plausible explanation for this is that second- or higher-generation Hispanic neighborhoods are appreciating at a slower rate than first-generation Hispanic neighborhoods. The percent of the population that is foreign born also has a significant positive effect on price appreciation even in zip codes with a low percentage of Hispanic population.¹³

As expected, the poverty rate in the zip code is negatively associated with price appreciation and is significant. The population density was not significant.

It will be recalled that Model 4 also included a control for California properties, which, as expected, was strongly positive and significant. It included a random effect for zip code and allowed for separate error variances for each level of the AVM reliability index. A chi-square test shows that these terms significantly improve the fit of the model. The fixed effects for origination year, the AVM reliability index, and their interaction were all significant.

Model 4 explains about 60 percent of the variation in price appreciation (Table 13), nearly as much as Model 3. This suggests that the zip-level characteristics (and the dummy variable for California) included in the model capture nearly all of the local variation, though the significant random effect of zip code means that significant unexplained local variation remains. Comparing the fit of Model 4 to that of Model 3, the AIC shows a solid improvement and the BIC shows a substantial improvement, so both tests suggest that this is a more parsimonious model and is preferred to Model 3.

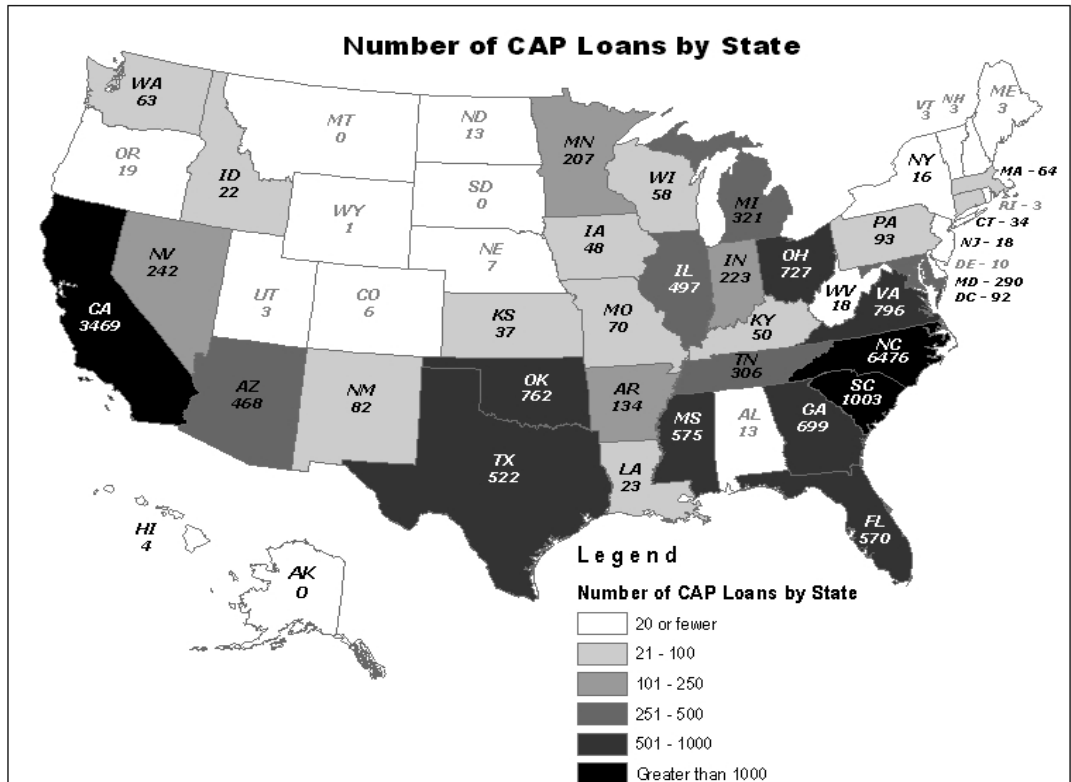
¹³ Without the interaction of Hispanic and foreign born, the percent of the population that is Hispanic does not have a significant effect, while the percent of the population that is foreign born has a positive and significant effect.

Conclusions

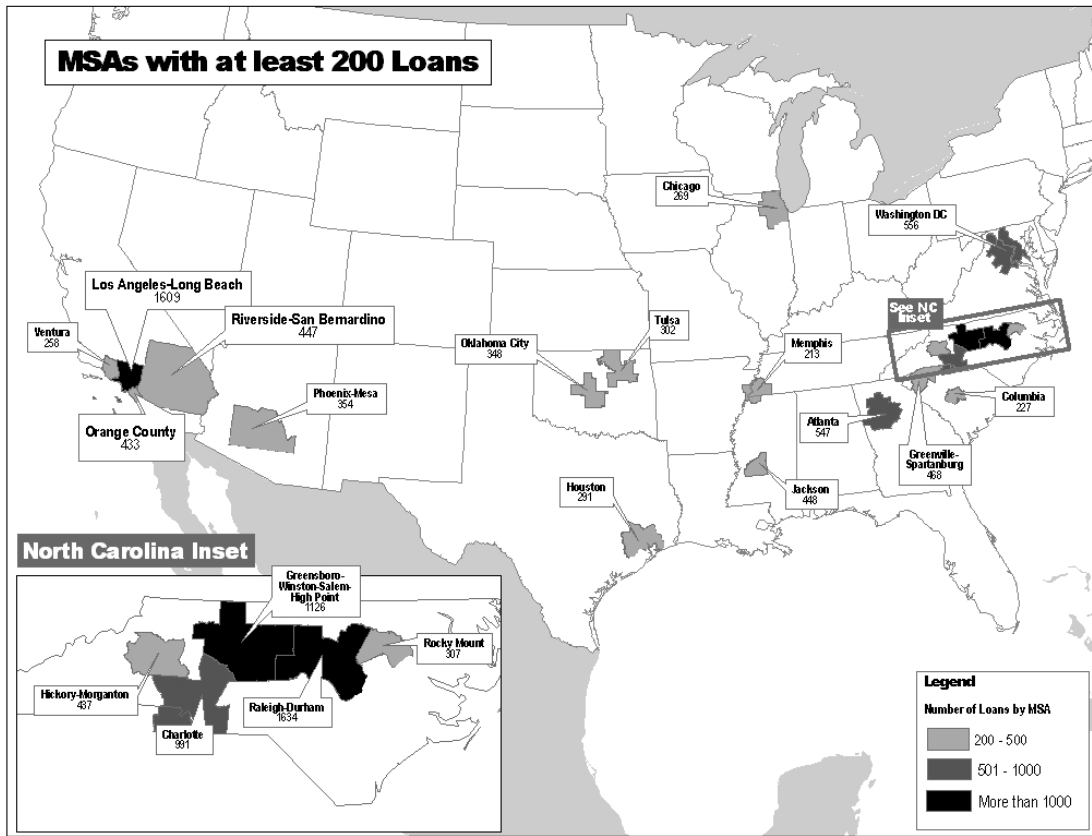
Over time, we will be able to substitute actual sales data for estimated price changes and collect detailed data on CAP family assets through in-home wealth surveys and refine and extend this analysis. However, based on our preliminary analysis, we can report that the vast majority of CAP families realized substantial gains in paper wealth as a result of their transition from renting to owning. While gains were lower for blacks than whites, the concentration of Hispanic and Asian buyers in rising California housing markets helped these minority families to realize near triple-digit annual increases in equity appreciation. Our analysis also found that families with spotty credit records, or no established credit history at all, accrued significant gains in gross wealth, which underscores the importance of preparing more of these families to gain a foothold in the homeownership market. Controlling for national and local economic conditions over the study period, and local housing market characteristics such as homeownership rate and racial make-up, we are able to explain about two thirds of the variation in estimated price appreciation experienced by CAP homeowners.

While there are many caveats and qualifications that surround these early analyses—including that our end prices are estimates and not the result of actual sales, and that the interest rate environment throughout the study period was especially favorable—we find no evidence in our work to suggest that national housing policy should reduce its emphasis on homeownership as a vehicle for potential wealth accumulation by low- and moderate-income families. Indeed, we would argue the contrary position. Our ongoing evaluation of the Community Advantage Program suggests that prudent efforts to expand the array of affordable mortgage products to underserved populations and housing markets should continue unabated.

Map 1

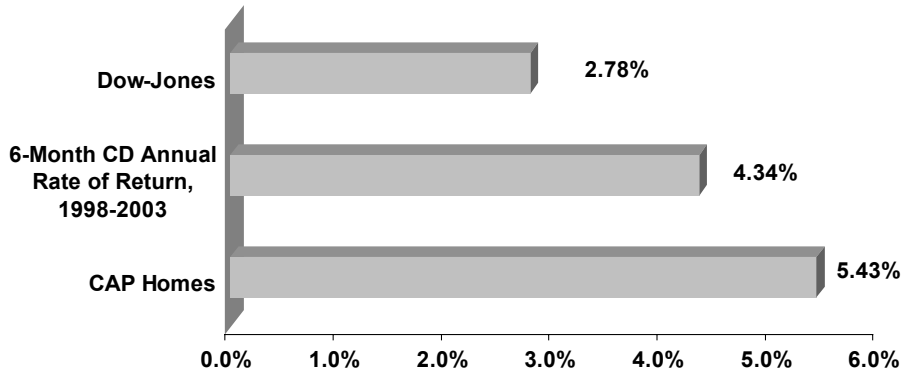


Map 2



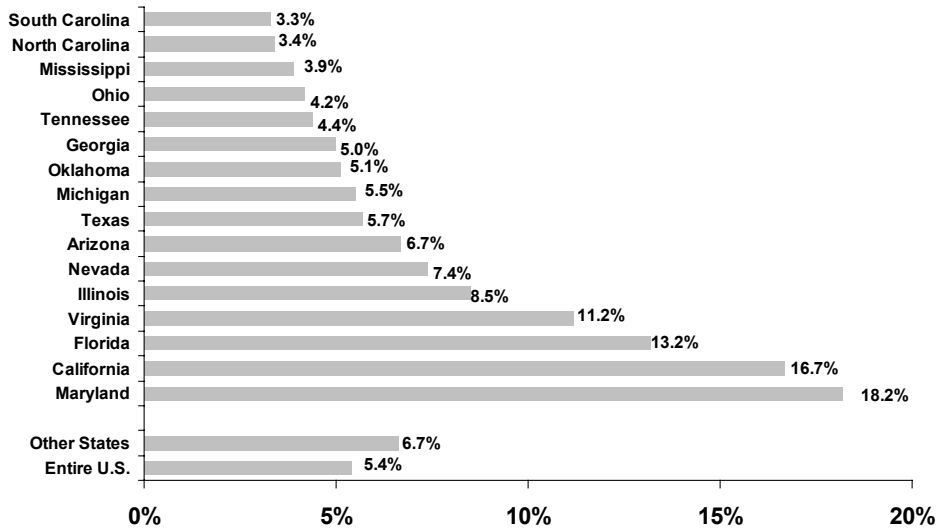
Graph 1

Median Annual Change in Home Price vs. Rates of Return for Other Investments, 1998-2003



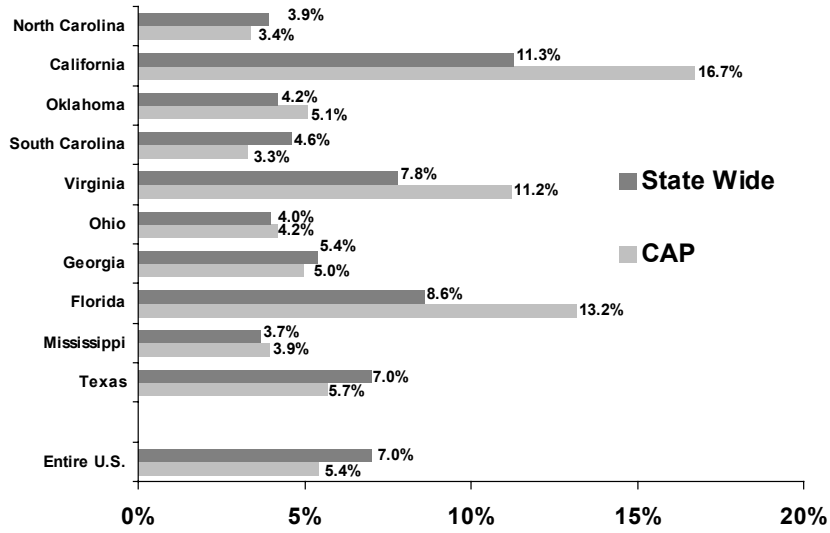
Graph 2

Median Annual Appreciation Rate in Price of Homes
Purchased Between 1998 & 2002



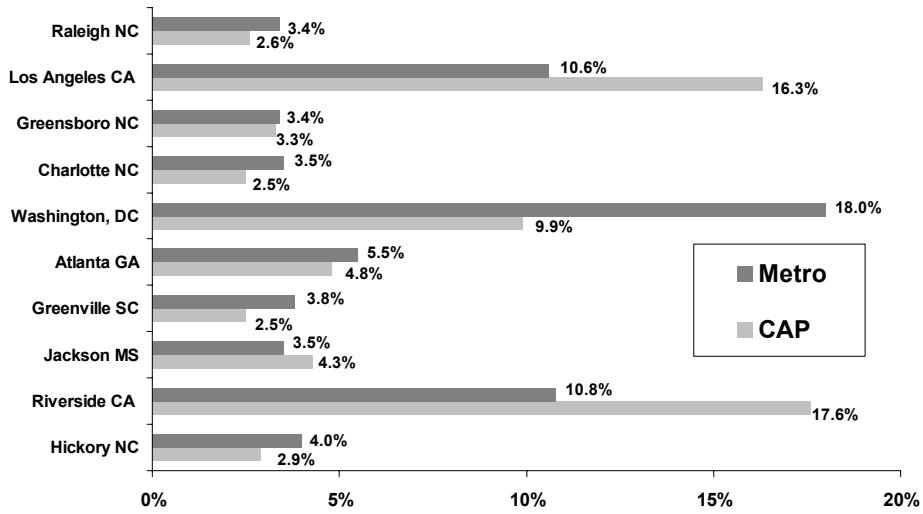
Graph 3

Median Appreciation Rates for CAP Homes and State Index,
Top 10 CAP States, 1998-2003



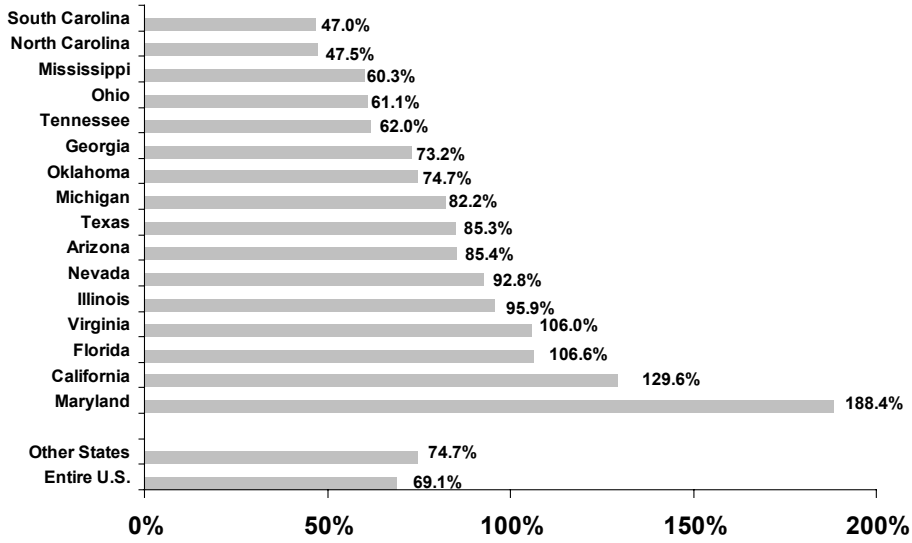
Graph 4

Median Appreciation Rates for CAP Homes and Metro Index,
Top 10 CAP Metro Areas, 1998-2003



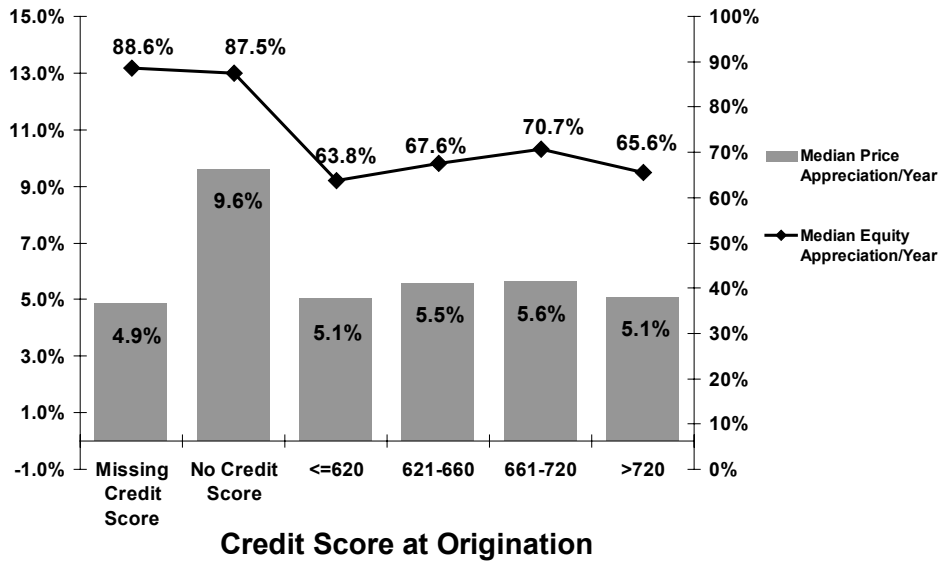
Graph 5

Median Annual Appreciation Rate of Initial Equity,
by State, 1998-2003



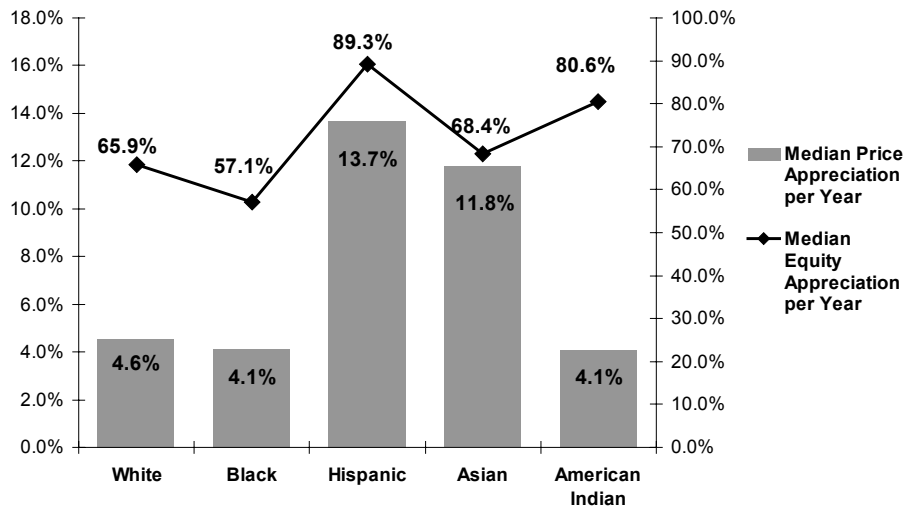
Graph 6

Median Annual Price & Equity Appreciation Rates,
by Credit Score at Origination, 1998-2003



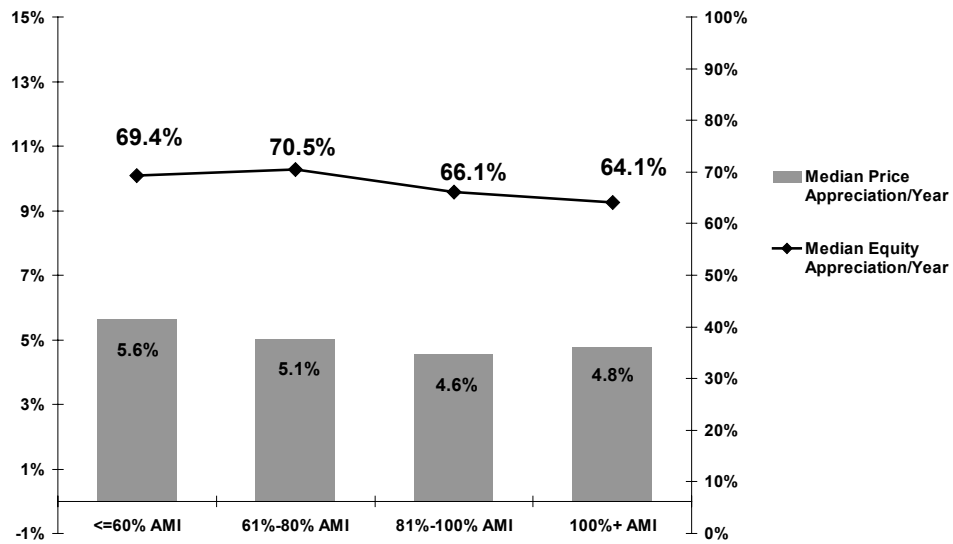
Graph 7

Median Annual Price & Equity Appreciation Rates,
by Race & Ethnicity, 1998-2003



Graph 8

Median Annual Home Price & Equity Appreciation Rates,
by Household Income, 1998-2003



Graph 9

Origination Equity and Current Equity by Income
CAP Loans Originated 1998-2002

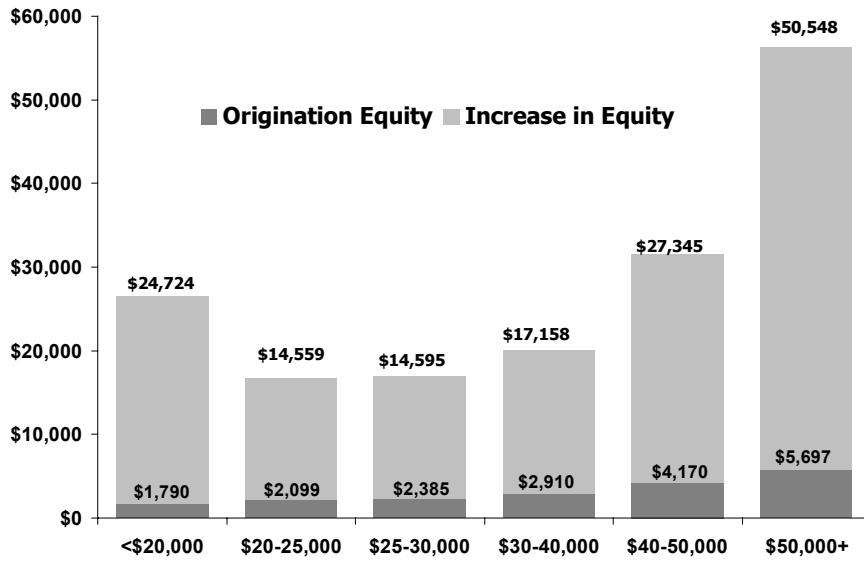


Table 1
 Community Advantage Loans Originated 1998 through 2002
 Compared with Conforming Loans Bought by Fannie Mae and Freddie Mac in 2000

	Self-Help	Fannie Mae	Freddie Mac
Race/Ethnicity			
White	51.9%	81.5%	84.3%
Black	19.9%	4.0%	3.9%
Hispanic	20.7%	7.2%	5.9%
Other	7.5%	7.3%	5.9%
Income			
60% AMI [†] or lower	50.9%	11.6%	12.2%
61-100% AMI	45.7%	28.2%	28.8%
Over 100% AMI	3.4%	60.2%	59.0%
Single Women	26.9%	17.8%	17.8%
Age			
Less than 30 years old	38.9%	15.4%	14.0%
30-39 years old	32.1%	29.7%	25.9%
40 years or older	29.0%	41.2%	34.7%

Fannie Mae and Freddie Mac data are for purchases in 2000.

Source: Self-Help Community Advantage, HUD Housing Finance Working Paper, HF-015, May 2002, and authors' calculations

[†] AMI is Area Median Income, i.e. median income of the MSA or State for non-MSA areas

Table 2
 Community Advantage Loans
 Race/Ethnicity by Credit Score, as of August 2003

	Missing	No Score	<=620	621-660	661-720	720+
Race/Ethnicity						
White	5.2%	2.7%	10.9%	18.1%	30.2%	32.9%
Black	8.3%	2.5%	31.4%	25.1%	20.6%	12.1%
Hispanic	7.6%	11.3%	15.7%	18.5%	28.5%	18.4%
Other	3.9%	7.9%	11.3%	15.3%	32.9%	28.8%
Total	6.3%	4.6%	16.1%	19.4%	28.1%	25.4%

Source: Self-Help Community Advantage, and authors' calculations

Table 3
 Community Advantage Loans
 Employment Status of Borrowers and Spouses for Loans Purchased before
 January 1, 2003

Number of Interviews: 3,727	
	Percent
Post-Purchase Employment History*	
Current Unemployment (Borrower)	3.2%
Current Unemployment (Spouse)	6.4%
Currently >1 Job (Borrower)	16.0%
Currently >1 Job (Spouse)	10.5%
Any Unemployment since Purchase (Borrower)	20.0%
Any Unemployment since Purchase (Spouse)	59.3%
Currently Work Full-Time (Borrower)	95.8%
Currently Work >=50 Hours per Week (Borrower)	27.8%
Two-Wage Earner Households (among Married/Partnered Households)	75.1%

Source: Self-Help Community Advantage, Community Advantage Panel Survey and authors' calculations.

* These estimates are based on data collected as part of the baseline survey of the Community Advantage Panel Survey, a 5-year study of 3,727 CAP borrowers.

Table 4
House Price Appreciation, 1998-2002
By Year of Origination
CAP Loans, as of September 2003

	N	Change in Value (\$)	Change in Value (%)	Annual Appreciation Rate	% with Negative Value Change
All	19,163	16,433	19.7	5.43	1.65%
1998	3,218	20,198	25.3	4.29	0.71%
1999	3,112	18,660	22.4	4.81	1.00%
2000	4,610	12,666	15.7	4.50	1.30%
2001	5,388	17,079	19.4	7.62	1.50%
2002	2,835	14,204	13.7	9.27	4.27%

Source: Self-Help, Fannie Mae, authors' calculations
Reported values are medians, except in the last column. The Annual Appreciation Rate is compounded monthly.

Table 5
House Price Appreciation Rates Compared to Dow-Jones and CD Rates
By Origination Year
CAP Loans, as of September 2003

	Below Dow-Jones		Below CD Rates	
	N	%	N	%
All	994	5.2	5,051	26.4
1998	397	12.3	1,570	48.8
1999	11	0.4	1,252	40.2
2000	10	0.2	1,474	32.0
2001	91	1.7	472	8.8
2002	485	17.1	283	10.0

Source: Self-Help, authors' calculations
For each CA property, the appreciation rate is compared to (1) the appreciation in the Dow-Jones Index between the month of origination and Sept 30, 2003 and (2) the value of a 6-month CD purchased in the month of origination and rolled over every 6 months through Sept 2003.

Table 6
House Price Appreciation, 1998-2002
For Selected States
CAP Loans, as of September 2003

	N	Change in Value (\$)	Change in Value (%)	Annual Appreciation Rate	% with Negative Value Change
All	19,163	16,433	19.7	5.43	1.6%
MD	290	58,438	40.7	18.16	0.3%
CA	3,469	83,981	59.6	16.70	0.1%
FL	570	26,079	30.4	13.16	1.4%
VA	796	34,928	36.9	11.23	0.5%
IL	497	29,943	28.4	8.50	0.2%
AZ	468	13,557	15.4	6.65	2.6%
NV	242	21,902	21.0	7.42	2.1%
TX	522	12,895	16.5	5.70	5.2%
MI	321	13,693	17.0	5.52	0.3%
OK	762	9,958	13.8	5.10	0.9%
GA	699	15,556	15.8	4.99	1.9%
TN	306	9,086	12.8	4.38	3.6%
OH	727	7,688	11.0	4.19	3.2%
MS	575	8,920	13.2	3.94	0.2%
NC	6,476	11,554	14.2	3.38	2.5%
SC	1,003	10,269	13.7	3.29	1.7%
Other States	1,440	16,268	18.9	6.65	1.3%

Source: Self-Help, Fannie Mae, authors' calculations

Reported values are medians, except in the last column. The Annual Appreciation Rate is compounded monthly.

States are in descending order of price appreciation rate.

Table 7
Equity Appreciation, 1998-2002
By Year of Origination and Selected States
CAP Loans, as of September 2003

	N	Current Housing Wealth (\$)	Change in Housing Wealth (\$)	Annual Appreciation Rate* (%)	% with Negative Equity Change
All	11,971	22,890	17,492	69.1	1.2%
MD	130	62,763	56,733	188.4	0.0%
CA	2030	96,530	83,889	85.4	0.0%
FL	316	34,689	27,640	95.9	1.6%
VA	449	35,764	31,579	92.8	0.7%
IL	268	37,277	33,241	85.3	0.4%
AZ	310	18,592	15,283	92.6	2.9%
NV	153	30,577	22,209	61.1	2.0%
TX	255	19,833	13,827	73.2	2.0%
MI	154	13,854	11,066	106.0	0.0%
OK	664	9,874	11,498	129.6	0.6%
GA	323	19,922	16,588	74.7	0.6%
TN	258	13,136	10,638	62.0	3.1%
OH	493	9,159	7,234	106.6	2.8%
MS	513	12,861	10,477	60.3	0.2%
NC	4,190	18,365	14,172	47.5	1.6%
SC	607	15,715	12,901	47.0	0.7%
Other States	858	17,883	14,839	82.2	1.2%

Source: Self-Help, Fannie Mae, authors' calculations

Reported values are medians, except in the last column. The Annual Appreciation Rate is compounded monthly.

* For loans with an LTV of 100 or greater, a \$500 downpayment was assumed. States are in descending order of equity appreciation rate.

Table 8
House Price & Equity Appreciation, 1998-2002
By Urban and Rural Location, Credit Score and Delinquency History
CAP Loans, as of September 2003

	Price Appreciation			Equity Appreciation		
	N	Annual Price Appreciation Rate	% with Negative Value Change	N	Annual Equity Appreciation Rate*	% with Negative Equity Change
Urban	11,430	6.34	1.8%	6,604	67.2	1.3%
Rural	6,106	4.16	1.5%	4,075	66.3	0.9%
Credit Score						
Missing Credit Score	1,212	4.87	3.7%	802	88.6	3.3%
No Credit Score	885	9.61	1.7%	647	87.5	1.4%
<=620	3,082	5.05	1.5%	2,331	63.8	1.0%
621-660	3,725	5.54	1.5%	2,456	67.6	1.0%
661-720	5,383	5.61	1.3%	3,153	70.7	0.8%
>720	4,876	5.10	1.6%	2,503	65.6	0.1%
Worst Delinquency						
Never Delinquent	15,810	5.32	1.4%	10,410	69.6	1.0%
30 Days Delinquent	820	4.96	1.5%	601	73.8	1.2%
60 Days Delinquent	234	4.77	0.0%	187	67.2	0.0%
90 Days Delinquent	773	4.03	3.8%	694	69.6	3.4%

Source: Self-Help, Fannie Mae, authors' calculations

Reported rates are medians. The appreciation rates are compounded monthly.

* For loans with an LTV of 100 or greater, a \$500 downpayment was assumed.

Table 9
 Median Equity Change to Income Ratio
 By Raw Income
 CAP Loans, as of September 2003

Income	N	Equity Change to Income Ratio
Less than \$20,000	1,704	1.38
\$20,000-24,999	2,157	0.65
\$25,000-29,999	2,425	0.53
\$30,000-39,999	3,677	0.50
\$40,000-49,999	1,298	0.61
\$50,000 or more	675	0.87

Table 10
 Equity Change to Income Ratio
 By Raw Income
 CAP Loans, as of September 2003
 Excluding California Loans

Income	N	Equity Change to Income Ratio
Less than \$20,000	1,504	1.09
\$20,000-24,999	1,952	0.59
\$25,000-29,999	2,178	0.49
\$30,000-39,999	2,990	0.41
\$40,000-49,999	918	0.36
\$50,000 or more	370	0.37

Table 11
House Price Appreciation, 1998-2002
By Prepayment and Foreclosure Status
CAP Loans, as of September 2003

	N	Annual Appreciation Rate	% with Negative Value Change
Active Loans	12,210	5.38	1.9%
Prepaid Loans	6,604	5.72	0.9%
Foreclosed Loans	144	3.98	7.6%
Returned	295	3.88	2.7%

Source: Self-Help, Fannie Mae, authors' calculations
Reported values are medians, except in the last column. The Annual Appreciation Rate is compounded monthly.

Table 12
 Descriptive Statistics for Mark-to-Market Mixed Models
 11,524 Community Advantage Properties in 812 Zip Codes
 Loans Originated 1998-2002, Appreciation Through Q3 2003

Dependent Variable	Mean	SD	Percent
$\ln(1 + \text{appreciation rate})$	0.0828	0.086	
Property-Level Variables			
Purchase Price [†]	\$92,792	\$41,465	
National/Regional Economic Characteristics			
Mean of 10-Year TBill Rate between Purchase and Oct 2003	4.74	0.34	
Mean County-Level Unemployment Rate between Purchase and Oct 2003	5.25	1.65	
Zip-Level Characteristics			
Housing			
Homeownership Rate	63.13	13.99	
Median House Value [†]	\$10,986	\$4,500	
Median Housing Age	31.53	10.99	
Demographics			
Percent African-American [†]	22.97	21.77	
Percent Hispanic [†]	16.26	23.24	
Percent Foreign Born [†]	12.30	13.80	
Percent Single Parent Families	16.53	6.43	
Poverty and Other Characteristics			
Percent Below Poverty	14.51	7.66	
Population Density in 000s [†]	2.78	4.18	
Categorical Variables			
Origination Year			
1998			21.2%
1999			18.1%
2000			25.2%
2001			23.9%
2002			11.6%
AVM Reliability Score			
1 = Highest Reliability			9.2%
2			14.4%
3			43.4%
4 = Lowest Reliability			33.1%
California			19.2%

Source: Community Advantage, Fannie Mae, 2000 Census, economy.com and authors' calculations

[†] Variable is logged in the model

Table 13
 Appreciation Rates as a Function of Property and Zip-Level Characteristics
 Summary of Model Results
 Community Advantage Loans Originated 1998-2002
 Appreciation Through Q3 2003

	R ^{2†}	Akaike's Information Criterion	Bayes' Information Criterion
Model 1	.190	-26,163	-26,009
Model 2	.553	-31,376	-25,259
Model 3	.643	-33,967	-27,828
Model 4	.601	-36,077	-35,894
N = 11,524 properties in 812 Zip Codes			

Source: Community Advantage, Fannie Mae, 2000 Census, economy.com and authors' calculations
 All models include fixed effects for Origination Year, AVM Reliability Score, and their interaction. Model 2 also includes a fixed effect for Zip Code. Model 3 adds the natural log of property value and the mean and standard deviation of the 20-year TBill rate between purchase and October 2003. Model 4 replaces the fixed effect for Zip Code with zip-level characteristics and a random effect for Zip Code.

† The R² is approximated as the square of the correlation between the predicted value and the observed value of the dependent variable.

Table 14
 Appreciation Rates as a Function of Property and Zip-Level Characteristics
 Fixed and Random Effects Model Results
 Community Advantage Loans Originated 1998-2002
 Appreciation Through Q3 2003

Variables	Model 4
Property-Level Variables	
<i>ln</i> (Purchase Price)	-0.0723**
National/Regional Economic Characteristics	
Mean of 10-Year TBill btw Purchase and Oct 2003	-0.0246**
Mean County-Level Unemployment Rate btw Purchase and Oct 2003	-0.0069**
Zip-Level Characteristics	
Housing	
Homeownership Rate	0.0009**
<i>ln</i> (Median House Value)	0.0260**
Median Housing Age	0.0010**
Demographics	
<i>ln</i> (Percent African-American)	0.0030
<i>ln</i> (Percent Hispanic)	-0.0160**
<i>ln</i> (Percent Foreign Born)	0.0090*
<i>ln</i> (Percent Hispanic) * <i>ln</i> (Percent Foreign Born)	0.0063**
Percent Single Parent Families	0.0024**
Poverty and Other Characteristics	
Percent Below Poverty	-0.0014**
<i>ln</i> (Population Density in 000s)	-0.0004
Geographic Identifier	
California	0.0920**
N = 11,524 properties in 812 Zip Codes	

Source: Community Advantage, Fannie Mae, 2000 Census, economy.com and authors' calculations
 Model includes fixed effects for Origination Year, AVM Reliability Score, and their interaction, all statistically significant. The model also includes a random effect for Zip Code and the AVM Reliability Score, both statistically significant.

* -- p<.05; ** -- p<.001

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