JOINT CENTER FOR HOUSING STUDIES
of Harvard University

Asset Appreciation, Timing of Purchases and Sales, and Returns to Low-Income Homeownership

LIHO-01.6

Mark Duda and Eric Belsky
August 2001

Low-Income Homeownership
Working Paper Series

Joint Center for Housing Studies

Harvard University

Asset Appreciation, Timing of Purchases and Sales, and Returns to Low-Income Homeownership

Mark Duda and Eric S. Belsky

LIHO-01.6

August 2001

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

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

Abstract

Because home equity is low-income households' dominant form of wealth, an understanding of the price dynamics of the housing stock held by these owners and the timing of their purchases and sales is important for understanding the risk-return tradeoffs associated with their decision to buy homes. Asset appreciation enjoyed or depreciation suffered by individual owners depends, however, not only on price movements in the lower range of the house price distribution or in low-income neighborhoods. It depends also and importantly on the market timing of low-income purchases and sales and on the willingness and ability of low-income homebuyers to weather declines in home prices and the broader economic downturns that often accompany them. The only way to evaluate the shares of low-income homebuyers that sell at an inflation-adjusted price greater or lesser than the price they paid is to analyze linked purchase and sales information for individual low-income owners.

In this paper, we build upon and advance earlier efforts by using matched pairs of housing transactions in four MSAs for homes both purchased and sold between 1982 and 1999. We compare the returns (defined restrictively throughout as change in asset value net of transaction costs) earned by buyers of low-cost housing to those of other buyers. (Low-costs homes are defined as homes affordable to those earning 80 percent or less of the area median income under assumptions about mortgage terms and costs in the year of purchase.) Contrary to the general public perception that low-cost homeowners are more likely to experience real losses when they resell, our findings suggest that losses are generally less common and less severe among those who purchased homes that would have been affordable to low-income households at the time of purchase. Nevertheless, for all groups, real losses are remarkably common.

We also consider the market timing of sales decisions by looking at returns to low, middle, and high-cost homes in each area over different phases of the housing cycle. In almost all cases we find that low-cost owners are substantially more likely to sell at a profit during market upswings than owners of mid- and high-cost units. Owners of low-cost homes are also noticeably less likely to suffer losses when selling during market downturns. Finally, we examine how the home-price composition of purchases varies over different phases of the housing cycle in all four markets. During the 1980s and the early 1990s, low-cost homes comprised a larger share of purchases near the trough than during the peak, while high-cost owners accounted for a larger share of purchases near the peak and on the downslide. We present evidence that low-income buyers have been accounting for a growing proportion of all buyers at what now may be approaching peak prices in many areas, raising questions about the consequences of the recent surge in low-income homeownership on the distribution of returns.

Table of Contents

I. Introduction

Because home equity is low-income households' dominant form of wealth, an understanding of the price dynamics of the housing stock held by these owners and the timing of their purchases and sales is important for understanding the risk-return tradeoffs associated with their decision to buy homes. In an ideal world, such an understanding would precede and inform efforts to lift the homeownership rates of low-income people. In reality, however, our understanding of price dynamics and how they intersect with the timing of purchase and sales decisions of low-income owners is limited. Only a handful of studies to date have aimed at developing this understanding, and these studies have been lopsidedly focused on understanding price dynamics, not the intersection of these with timing of buying and selling. In particular, the study of price dynamics has focused on *average* appreciation rates of homes either located in low-cost or low-income neighborhoods, or the bottom of the price distribution (Pollakowski, *et al*. 1992; Delaney and Smith 199; Li and Rosenblatt 1997; Case and Shiller 1994; Case and Marynchenko 2001).

In fact, however, the asset appreciation enjoyed or depreciation suffered by individual owners depends not only on price movements in the lower range of the house price distribution or in low-income neighborhoods. It depends also and importantly on the market timing of low-income purchases and sales and on the willingness and ability of low-income homebuyers to weather declines in home prices and the broader economic downturns that often accompany them. The only way to evaluate the shares of low-income homebuyers that sell at an inflation-adjusted price greater or lesser than the price they paid is to analyze linked purchase and sales information for individual low-income owners. Ideally, these purchase and sales decisions would be examined using a panel so that the influence of repeated purchase and sales decisions on lifetime wealth accumulation could be observed. The importance of taking this approach is underscored by the fact that well over half of low-income mortgage borrowers are purchasing homes outside low-income census tracts, making evaluations of house price appreciation in these tracts ill-suited to capturing the actual experience of the majority of low-income borrowers (Duda and Belsky 2001). In addition, large shares of owners who sell homes repurchase another.

In this paper, we build upon and advance earlier efforts by using matched pairs of housing transactions in four MSAs for homes both purchased and sold between 1982 and 1999. We compare the returns (defined restrictively throughout as change in asset value net of transaction costs) earned by buyers of low-cost housing to those of other buyers. The impact of loan amortization on equity build up is not examined. Low-cost homes are defined

as homes affordable to those earning 80 percent or less of the area median income under assumptions about mortgage terms and costs in the year of purchase.

Contrary to the general public perception that low-cost homeowners are more likely to experience real losses when they resell, findings reported here suggest that losses are generally less common and less severe among those who purchased homes that would have been affordable to low-income households at the time of purchase. Nevertheless, for all groups, real losses are remarkably common.

While compelling, it is important to note that these results do not represent the eventual distribution of returns among all buyers in a given year because our data only capture owners who purchased their homes in 1982 or later *and* sold by 1999. Thus, no owners with holding periods longer than 18 years are examined and the number of observations declines sharply as holding periods rise. Because longer holding periods, which we cannot observe, are generally associated with more favorable financial outcomes, our truncated sample overstates the proportion of all owners who sell their homes for less than they bought them for. On the other hand, the results are an accurate reflection of these proportions among those with holding periods of less than nine years over the study period. Among these shorter-term holders, in three metropolitan areas the shortest-term holders (less than 2.5 years) incurred losses at an even lower frequency than medium-term holders (2.5 to 8.5 years).

We also consider the market timing of sales decisions by looking at returns to low, middle, and high-cost homes in each area over different phases of the housing cycle. In almost all cases we find that low-cost owners are substantially more likely to sell at a profit during market upswings than owners of mid- and high-cost units. Owners of low-cost homes are also noticeably less likely to suffer losses when selling during market downturns. Finally, we examine how the home-price composition of purchases varies over different phases of the housing cycle in all four markets. During the 1980s and the early 1990s, low-cost homes comprised a larger share of purchases near the trough than during the peak, while high-cost owners accounted for a larger share of purchases near the peak and on the downslide. We present evidence that low-income buyers have been accounting for a growing proportion of all buyers at what now may be approaching peak prices in many areas, raising questions about the consequences of the recent surge in low-income homeownership on the distribution of returns.

Though this study advances the literature by being the first to examine house price appreciation of individual owners, it has several limitations that render its conclusions and policy implications incomplete. As noted above, the most important of these is that we are looking only at relatively short holding periods and are unable to track a panel of low-income

homeowners across their life cycle. Since our data begin in 1982 and we can only track sales through 1999, we do not capture returns reaped by many long-term holders or by those who sell one home but buy and sell one or more others over their life cycle. In addition, since we restrict our analysis to the distribution of sales net of purchase prices for single turns at homeownership, the data used do not contain information on owners after they sold their homes. Some significant fraction of these sellers undoubtedly bought other homes and therefore ended up back in a home price cycle in the same MSA or somewhere else. In fact, one study finds that most home sellers over the age of 25 subsequently return to ownership (Berkovic and Zorn unpubl.). To the extent that many short-term holders of a single home repurchase, their returns are likely to more closely resemble those of long-term owners, although they incur additional transaction costs on their multiple moves.

The other principal limitation of the study is that it narrowly focuses on differences in purchase and resale prices. An ideal calculation of owners' returns would compare these returns to renting on an opportunity cost basis. Such a comparison would evaluate the costs of owning or renting under assumptions about how the initial equity investment in the home might have been otherwise invested (Pozdena 1988; Goodman 1998; Brueckner 1997; Gill and Haurin 1991).[1] Nor do we consider an owner's likely net equity at the time of sale because we lack specific information on initial downpayments and amortization schedules. Because forced savings are a significant potential benefit of homeownership and because they increase with holding period, including them would reduce the share of losses reported here, especially among those with longer holding periods.

Several other key caveats apply. First, we do not know owners' incomes so we must group units into affordability brackets based on loan terms and interest rates on typical mortgage instruments in each year. This leaves open the possibility that owners of low-cost housing are not low-income people, and could, in fact, be absentee landlords and/or real estate speculators. Second, our data are net of defaulted loans. Because defaults are more common on high LTV loans, which are used disproportionately by low-income borrowers, our analysis will likely understate the differences in outcomes between low- and middle-to-upper income buyers.[2] Third, we have data only for four MSAs, limiting the extent to which

[1] The user cost of capital equation for homeowners relates homeowners' after-tax expenditures on mortgage interest, property taxes, maintenance, insurance, transactions costs, and the opportunity cost of invested capital to gains made through house price appreciation and forced savings through equity paydown. Among other things, it depends crucially on the rate of return on an alternative investment for the downpayment and other equity capital that a comparable renter would have invested, which determines the opportunity cost of invested capital for owners.

[2] Results from the 1998 GSE public use database show that, while 14 percent of borrowers earning their area' median income or less had LTV ratios above 90 percent, only 11 percent of borrowers earning more than the area median had LTV's as large.

our results can be generalized to all U.S. housing markets. Fourth, we do not know the actual loan terms and types, and therefore assume all borrowers use the same fixed-rate instrument, though we know that LTV, debt-to-income ratios and other loan characteristics vary systematically by income and over time. Fifth, by focusing solely on financial returns to owners we ignore the non-investment benefits of housing, which may be quite substantial (DiPasquale and Glaeser 1999; Temkin and Rohe 1998). Sixth, we were unable to obtain detailed geography on the repeat sales so we are unable to draw conclusions about whether purchasers of low-cost homes in low-income areas fare better or worse than those purchasing low-cost homes in moderate and middle-income areas.

II. Previous Studies of Appreciation by Income and Price Range

Only a small number of studies have analyzed patterns of appreciation of houses at different points in the price spectrum. Pollakowski, Stegman, and Rohe (1992), employing a hedonic model to study five MSAs, found that low and moderately priced (those in the bottom two quintiles), single-family units fared as well as homes in the upper three-fifths of the value distribution over the 1979–1983 period.

Seward, Delaney, and Smith (1992) studied price changes for low-, medium-, and high-priced properties in St. Petersburg, Florida, and found that between 1973 and 1987 high-cost homes appreciated more quickly than others during expansions but that all three price classes depreciated at similar rates during the subsequent contraction. In contrast, Kiel and Carson (1990) found that homes at the low- and high-end of the distribution as of the beginning of their study period (1974–83) experienced higher rates of appreciation than those in the middle. Li and Rosenblatt (1997) found that local median home values were positively correlated with house price appreciation in two of the three California MSAs that they studied (Anaheim-Santa Ana and Los Angeles-Long Beach) between 1986 and 1990, but negatively correlated with it from 1990–94.

Case and Marynchenko (2001) examine the performance of housing submarkets in Boston, Chicago, and Los Angeles. After ranking zip codes into quintiles based on house price levels, they found that performance between the top and bottom quintile varied over different phases of the cycle and did not follow a consistent pattern from one market to the next. In Boston, indexes constructed for the lowest income quintiles gained most during the 1980s expansion but also lost the most in the subsequent contraction. After the market began to rise again, high-cost areas appreciated more quickly.[3] The story in Chicago was simpler, as

[3] Case and Mayer (1995) attribute the relatively weak performance of higher income markets during the run-up of the 1980s to a softening of demand for these homes as they were quickly priced out of the reach of all but the wealthiest buyers, and as the access to good schools in these places was devalued from buyers' perspective as

the lowest quintile outperformed the highest over the entire period the authors examined there (1987–99). In Los Angeles, indexes across all income quintiles appreciated at the same rate during the expansion. The high end was hit hardest during the following contraction but, as in Boston, also led the eventual recovery.

Smith and Ho (1996) attempted to reconcile seemingly conflicting results by relating the price differentials between high- and low-cost homes to monetary (widens price differentials) and fiscal (narrows differentials) shocks that affect market segments asymmetrically in the short run. Prices for high-cost homes are more sensitive to changes in inflation, working through expected house price changes and real user costs of housing, while lower-cost homes are more sensitive to changes in interest rates, income, and employment, all of which affect low-income buyers' ability to overcome income and wealth constraints to homeownership. Depending on which variables are ascendant during cycles contained in the period examined and the number of cycles in the period, different cost segments of the market will behave differently, causing the differences such as the ones observed by authors of the other studies.

Li and Rosenblatt (1997) note that if low-income buyers cannot afford high-cost homes and high-income buyers will not consider low-cost homes, distinct markets exist that can be subject, for example, to supply-side shocks that do not spill over to the other cost segment of the market. Further evidence for the notion of distinct markets comes from Case and Shiller (1994) who suspect that demand for low-cost housing by immigrants may have attenuated price declines in low-cost areas of Los Angeles when markets dropped in the early 1990s.

In sum, differences in the rates of appreciation and depreciation of low- and high-cost homes across metropolitan areas should not be a surprise. This is both because there are good reasons to believe these markets are segmented *and* that supply and demand conditions in each segment can vary by metro areas.

III. Data Sources

The data set used in this research contains information on the month, year, and price at purchase and sale for single-family homes bought 1982 or later and sold by the end of 1999 in Boston, Chicago, Denver, and Philadelphia. These data are the same raw inputs that are used to construct the Case, Schiller, and Weiss repeat sales indexes in these MSAs (Case and

---

enrollments declined over the period. Recoveries in enrollments combined with changes in the spatial distribution of employment in Boston combined to make higher-cost areas more attractive in the post-boom period.

Schiller 1987, 1989). Because only repeat sales are contained in the data set, any home bought during the study period but not also sold during it is excluded.

As a consequence, results reported on a year of sale basis do not include homes bought before 1982 and results reported on a year of purchase basis do not include homes sold after 1999 or purchased prior to 1982. Results therefore mostly focus on repeat sales with relatively short holding periods of less than nine years. Panel data from the American Housing Survey suggest that over the period 1985 to 1995, 35 percent of low-income homeowners who bought homes in 1984 or 1985, 43 percent of middle-income homeowners, and 47 percent of high-income homeowners moved within nine years (Figure 1). Although relatively large shares of homeowners apparently move within nine years, low-income owners are more likely to stay longer in their homes. On the other hand, a larger proportion of low-income than higher income owners who sold within nine years in the four MSAs studied sold again within the first few years.

Figure 1: Share of New Owners 1984-85 Moving Every Two Years

	Low-Income	Middle-Income	High-Income	Total
Moved by 1987	12.8	12.8	12.4	12.6
Moved by 1989	20.0	23.1	25.6	23.9
Moved by 1991	27.2	30.3	34.1	31.9
Moved by 1993	30.1	35.4	41.6	38.1
Moved by 1995	35.1	42.9	47.0	43.9

Source: *American Housing Surveys* 1985, 1987, 1989, 1991, 1993, and 1995.

Several data edits have been applied to eliminate suspect transaction pairs in which differences between the purchase and selling price seem likely to reflect things other than market-driven appreciation/depreciation of the unit. Bank sales, non-"arms-length" transactions, and pairs where the home's characteristics are known to have changed were all eliminated. The effect of eliminating bank sales likely overstates the proportion of low-cost homes that are sold above their initial value because the low downpayments more often associated with such homes probably lead to larger proportions of foreclosure sales. The effect of eliminating non-arms length transactions probably introduces no appreciable bias, while eliminating homes with known changes in characteristics may introduce a bias because homes most likely to have major additions and alterations may be spatially correlated with areas of more rapid price appreciation.

Records where losses exceeded 80 percent of the purchase price in real, transactions cost-adjusted terms, and homes that appreciated more than six times were dropped on the assumption that changes of this magnitude were unlikely to be driven by market movements alone.[4] Records where the property was purchased for less than $10,000 or purchased for less than $30,000 and then sold for more than four times the purchase price were also eliminated in an effort to delete records that reflected insurance purchases and work on homes affected by natural or human-caused disasters. After establishing a distribution of apparently market-driven transactions, we eliminated observations lying more than three standard deviations above and below the mean for their affordability class in each MSA. The screens for maximum appreciation, as well as the minimum purchase value, resulted in a heavy concentration of deletions among low-cost homes with rapid appreciation. On net, the filters employed likely attenuate the upward performance of low-cost housing, which in any case performs quite well relative to other housing types in the analysis presented here.

In order to classify properties in each MSA as affordable to borrowers at different income levels, conventional underwriting rules were applied. The maximum affordable home was derived by setting the maximum price at one that a family at 80 and 120 percent of median income could afford at 28 percent of their income and with a 10 percent downpayment. Wealth constraints were considered non-binding on all buyers up to a 10 percent downpayment. Monthly payments were based on the average effective interest[5] rate in the year of purchase, property tax and insurance rates in effect in 1990 as measured by the 1990 Census, and mortgage insurance rates on a loan with a loan-to-value ratio of 90 percent. Annual house price cutoffs therefore float to reflect changes in median income and interest rates in the year of purchase. Results are mostly reported for the difference between the real purchase and resale prices net of transaction costs. These transaction costs are conservatively set at six percent to reflect the customary real estate brokerage charges. They are therefore net of closing costs the owner paid when purchasing the home or any part of real estate and transfer taxes or buyer's closing costs that are sometimes paid by the seller. For a more detailed description of the affordability calculation methodology and annual MSA cutoffs, see Appendix A.

The share of units in each MSA classified as low-cost is a function of the affordability of homes for sale relative to local incomes. In high-cost Boston, only 12 percent of the repeat sales analyzed were classified as low-cost. In Chicago and Philadelphia 18 and

[4] The largest cyclical market-wide increase in prices experienced by any MSA in our study was Boston 1983-88 in which prices slightly more than doubled according to Freddie Mac's CMHPI.

[5] We use annual 30-year effective fixed-rate calculated from the commitment rate and points reported in Freddie Mac's Primary Mortgage Market Survey.

22 percent were classified as low cost, respectively. And in Denver, the most affordable of the MSAs, 30 percent were classified as low cost.

As noted above, the sample examined for this study is heavily weighted towards short-term holders. Long-term holders (more than 8.5 years) ranged from a low of 16 percent in Denver to a high of 23 percent in Chicago. In all four areas, the share of long-term holders was greater among purchasers of high-cost than low-cost homes.

IV. House Price Volatility in the Case Metropolitan Areas

The four metropolitan areas were selected because they represent different types of house price cycles. Boston was selected because house prices were especially volatile there over the study period. It is broadly representative of several, especially Northeastern and Western, metropolitan areas that had rather wide price swings during the 1980s and through the mid-1990s. Chicago was selected because it had mostly steadily increasing prices with periods of slower and faster growth. Philadelphia was selected because it had a tamer cycle than Boston but nonetheless had a strong upturn and a weaker downturn. Finally, Denver was selected because, while it had a strong downturn and a weaker upturn, it was out of phase with the other markets for much of the study period.

Figure 2: Selected Characteristics of Study Cases

	Boston	Chicago	Denver	Philadelphia
Median income	65.5	67.9	62.1	57.8
2Q2000 med. sales price	215	179	180	125
Share of homes afford. to median earner	44.5	56.3	51.3	66.9
PMSA pop. (millions)	3.30	8.01	1.98	4.95
Land area (thousand mi.^{2})	16.7	13.1	9.7	10.0

Note: Median income, median 2Q sales price, and share affordable to median earner are from National Association of Homebuilders' Housing Affordability Index. PMSA population is from Census Bureau July 1, 1999, estimate (as of 10/20/2000). Land area is from the Census Bureau's *1998 Annual Metro, City and County Data Book.*

To recap, Boston was the most cyclical of the four markets studied, followed by moderately-cyclical Denver and Philadelphia, and by Chicago which experienced slow but steady growth over the study period (Figure 3 below). Descriptive statistics on real returns upon resale as a share of real purchase price in each place confirm that that the distributions of low-, mid- and high-cost homes in Boston have larger standard deviations than those in the other markets (Figure 4).

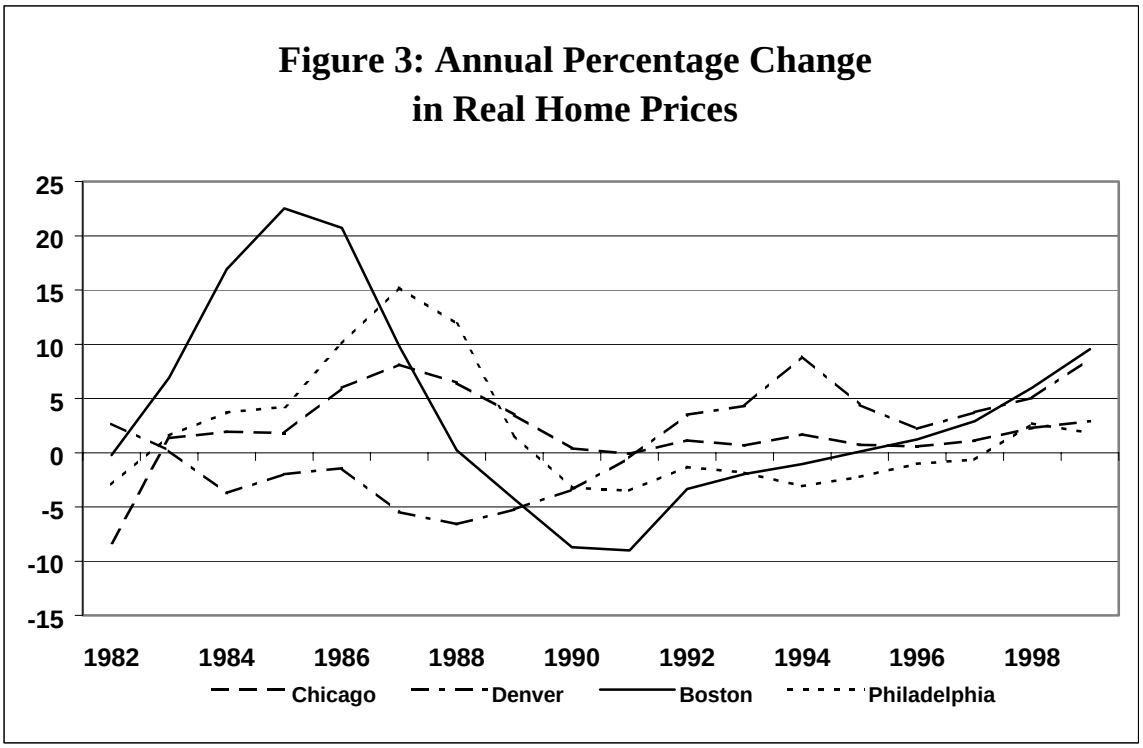

Figure 4: Ratio of Real Transaction Cost-Adjusted Sales and Purchase Prices

Philadelphia	Mean	Std. Dev	Chicago	Mean	Std. Dev
Low-cost	0.23	0.58	Low-cost	0.26	0.50
Mid-cost	0.01	0.25	Mid-cost	0.04	0.18
High-cost	-0.02	0.25	High-cost	0.01	0.19
Boston			**Denver**		
Low-cost	0.54	0.79	Low-cost	0.28	0.49
Mid-cost	0.19	0.42	Mid-cost	0.06	0.22
High-cost	-0.01	0.34	High-cost	-0.05	0.22

The standard deviations of low-cost homes and middle-cost homes are strikingly similar in each market except Boston. And while average returns upon resale of high-cost homes in Boston mirror those in the other markets (though the standard is deviation higher), average resale returns on Boston's low- and mid-cost homes far exceed those earned in the other three markets.

Comparing across low, middle, and high cost categories *within* metropolitan areas reveals that the market for low-cost homes is more volatile than that for units in other affordability classes, but also is more prone to real price appreciation. The contrast is most extreme in Boston where the average low-cost resale resulted in a doubling in value, while the average high-cost repeat sale barely sold above the purchase price net of transaction costs. It is important to remember when interpreting the standard deviations, that even after

the edits to remove extreme outliers, the higher standard deviations on low-cost homes are mostly driven by positive, not negative, outliers. Put another way, higher return volatility among low-cost homes was the result of greater variation in rates of house price appreciation at time of sale, not greater risk of downside declines.

V. Returns by Housing Affordability Class

The vast majority of sellers in the edited data set sold their homes for higher prices, in nominal terms, than they bought them for. But even without netting out transaction costs or deflating sales prices to account for general price inflation between the time of purchase and sale, not insubstantial shares of owners lost money. In other words, a significant share of home resellers had to come to the settlement table with a check in hand. In highly cyclical Boston nearly 23 percent of repeat sales resulted in nominal losses, while in steady Chicago, less than seven percent resulted in nominal losses (Figure 5). Adjusting for inflation and backing out transaction costs reveals that the timing of purchases and resales, combined with anemic real house price appreciation in many periods, to produce a bleak picture. Indeed, the share of repeat sales culminating in lower real sales than purchase prices net of transaction costs ranges from a high of nearly 57 percent in Philadelphia to a low of about 41 percent in Denver.

It is important to underscore, however, that these findings refer mostly to those who sell within 8.5 years and is weighted especially to those who sold in less than 5.5 years. If it were possible to observe all holding periods and with equal weight, it is possible that rates of loss for all repeat sellers could be as much as half as great as those reported here. Nonetheless, the results do reflect the experiences of large proportions of borrowers on at least a single turn of ownership because short holding periods are so common.

This bird's eye view of the distribution of losses and gains in home prices with and without inflation and transaction cost adjustments speaks volumes. Purchasing a home, especially on a single term of homeownership, is risky. The American Dream of homeownership may turn out to be just that for millions of owners, but for large shares it is not a fruitful investment unless sellers re-enter the market and are able to ride one or more waves of appreciation over their lifetimes. Ex-post information on the importance of home equity to net wealth among middle-aged and older owners suggests that indeed many who lose money once on homeownership offset that loss by buying again under more favorable circumstances (Joint Center for Housing Studies 2000). But for those who are unable to buy again or whose timing once again triggers a loss, homeownership can turn out to be less than its idealized billing.

Figure 5: Share of All Units Selling at a Loss by Year of Sales

	In Nominal Terms				In Real Transactions Cost-Adjusted Terms			
Sales Year	**Philadelphia**	**Boston**	**Chicago**	**Denver**	**Philadelphia**	**Boston**	**Chicago**	**Denver**
1982	*	*	*	*	*	*	*	*
1983	*	*	*	*	*	*	*	*
1984	*	8.1	*	*	*	24.9	*	*
1985	6.6	3.0	*	*	33.1	6.9	*	*
1986	3.4	1.5	3.6	38.8	12.8	2.6	28.9	78.2
1987	2.5	1.8	1.6	53.5	8.1	6.5	19.0	89.0
1988	2.6	4.1	1.6	69.0	8.2	17.3	17.7	92.9
1989	3.7	10.1	1.3	69.2	13.7	34.2	20.1	92.5
1990	8.0	25.5	1.8	58.1	27.1	52.5	24.3	89.6
1991	14.2	41.5	0.0	46.4	43.3	66.2	43.4	87.4
1992	18.6	45.2	8.3	26.1	53.9	70.5		78.7
1993	22.6	45.1	8.0	14.6	62.1	75.4	44.2	61.7
1994	22.7	40.7	8.0	7.0	65.9	74.6	46.9	39.1
1995	27.3	39.1	9.3	2.9	70.9	75.2	52.4	32.5
1996	29.0	31.5	6.4	2.9	76.8	74.2	57.3	32.5
1997	30.3	23.5	7.2	2.9	77.6	67.7	59.5	30.9
1998	27.3	13.3	6.2	1.8	78.1	49.7	55.9	22.5
1999	22.6	7.5	5.1	1.0	74.7	33.7	50.0	9.8
All years	**19.7**	**22.5**	**6.5**	**12.7**	**56.5**	**51.1**	**51.4**	**40.8**
Max year	30.3	45.2	9.3	69.2	78.1	75.4	59.5	92.9
Min year	2.5	1.5	0.0	1.0	8.1	2.6	17.7	9.8
Range	27.8	43.7	9.3	68.2	69.9	72.8	41.8	83.1

Note: Years with small numbers of observations are suppressed.

The concern of this paper is with both the level *and* relative performance of the low-cost home proxy for purchases by low-income homebuyers. At the most aggregate level, far smaller proportions of low-cost than other home purchases in all four metropolitan areas resulted in losses upon sale and significantly larger proportions resulted in gains (Figure 6). Despite the fact that relatively small absolute declines in home values could push real losses on low-cost homes beyond 10 percent of the purchase price, losses of this magnitude were *less* common for these owners than they were for owners of middle- and high-cost homes. In terms of price gains at the time of sale, low-cost units were more likely to be sold for a large real gain (greater than 50 percent of purchase price) than less affordable homes. Furthermore, buyers of homes bought at a price that those with incomes from 80 to 120 percent of median could afford in the year of purchase also consistently outperformed buyers of homes bought at prices that only those with over 120 percent of median could afford.

Results for Boston are especially dramatic, but it is important to keep in mind that, while low-cost affordability classes accounted for between 18 and 30 percent of repeat sales in the other three areas, in Boston they represented only 12 percent. Similarly, while mid-cost affordability classes accounted for between 26 and 34 percent of all repeat sales in the other

three cities, they accounted for only about 22 percent in Boston. Thus, findings on the performance of low- and mid-cost classes in Boston reflect only a relatively small component of the total market.

Figure 6: Real Transaction Cost-Adjusted Returns as a Share of Real Purchase Price by Affordability Class

	Loss		Gain				
	> 10%	**< 10%**	**.01-10%**	**10.01-25%**	**25.01-50%**	**Gain>50%**	**Total**
Philadelphia							
Low-cost	27.8	13.8	11.1	12.7	12.8	21.8	**22.2**
Mid-cost	37.6	19.3	12.8	14.1	11.6	4.6	**26.1**
High-cost	44.6	18.2	10.5	11.4	11.0	4.4	**51.7**
Total	**39.0**	**17.5**	**11.2**	**12.4**	**11.5**	**8.3**	**100**
Boston							
Low-cost	12.2	11.8	12.2	13.7	13.5	36.5	**12.0**
Mid-cost	22.0	17.9	14.1	12.8	12.1	21.2	**21.6**
High-cost	45.8	13.8	10.7	10.2	10.0	9.5	**66.4**
Total	**36.6**	**14.5**	**11.7**	**11.2**	**10.8**	**15.3**	**100**
Chicago							
Low-Cost	8.7	24.6	18.7	15.3	13.8	18.8	**18.4**
Mid-Cost	13.6	38.5	22.6	14.9	7.7	2.8	**32.6**
High-Cost	23.0	34.8	18.6	13.9	7.7	2.1	**49.0**
Total	**17.3**	**34.1**	**19.9**	**14.5**	**8.8**	**5.4**	**100**
Denver							
Low-Cost	13.0	7.6	14.3	23.2	22.3	19.5	**30.3**
Mid-Cost	18.8	18.8	24.3	23.5	11.5	3.1	**33.7**
High-Cost	38.1	22.6	18.1	13.8	5.8	1.6	**35.9**
Total	**24.0**	**16.8**	**19.1**	**19.9**	**12.7**	**7.6**	**100**

Buyers of low-cost homes in Boston fared extremely well, with less than one-quarter incurring real losses, and selling homes at real sales prices net of transaction costs in excess of 50 percent of the purchase price in more than one-third of all cases. The share of low-cost owners suffering real losses in Denver, where these owners made up more than 30 percent of repeat sellers over the study period, was well below the share of high-cost owners selling at a real loss, and even slightly lower than in Boston. In fact, the gap between the share of low-cost owners in Denver selling at a real loss and the share of high-cost owners doing so was fully 40 percentage points, and the gap was nearly as wide in Chicago. In, Philadelphia, the market where this measure was *closest*, 21 percentage points still separated the two groups. On the positive side, while low-cost owners everywhere were not able to match Boston's 37 percent share reaping real returns of 50 percent or more, about 20 percent did so across each of the other three markets.

Still, significant fractions of low-cost homeowners in all four markets were unable to sell their homes in real dollars for enough to cover even their transaction costs. Therefore,

while low-cost buyers did better than high-cost buyers, fully 42 percent of their repeat sales resulted in real losses in Philadelphia, 33 percent in Chicago, 24 percent in Boston, and 21 percent in Denver. And an unknown number resulted in foreclosure sales. From the perspective of lenders, purchasers of low-cost homes exposed the lenders to lower collateral risk but from the perspective of the owners themselves, the risks of earning a negative return on their homes were substantial.

VI. Market Timing and Returns

The superior performance of repeat sales of homes affordable to low-income people is striking. Two mechanisms could produce these results. One relates to market segmentation that leads to consistently superior asset inflation in low- versus high-cost homes and to the other persistent differences in the timing of purchases and resales of low-cost and high cost housing. Evidence suggests that both mechanisms played a role in each of the cases examined here.

With respect to the first mechanism, low-cost homes would have to consistently appreciate faster than other homes during upswings and/or decline less in slack markets to contribute to superior repeat sale returns for shorter-term low-income buyers. Looking at the distribution of house prices at the zip code level, Case and Marynchenko (2001) did find that homes in Boston located in zip codes with house values in the bottom quintile appreciated more rapidly during the expansion of the 1980s. However, these submarkets also lost value most rapidly when the overall market declined. Appreciation was greatest in Boston's higher priced markets during the recovery that followed. In Chicago the authors found that low-cost homes did best over a long expansion. No findings on differences in price movements by cost ranges have been published for Philadelphia or Denver. All told, the available evidence is inconclusive about the role played by differences in house price appreciation in the four study cities. The low-end did perhaps better in Boston than the mean-reverting house price process in that end would have suggested it should, and the low-end unambiguously benefited from persistently higher appreciation in Chicago.

Indeed, there is strong evidence that local markets are segmented by neighborhood characteristics and by home price range (Rothenberg *et al.* 1991; Smith and Ho 1996; Li and Rosenblatt 1997). More rapid appreciation of low-cost homes could reflect persistent supply constraints or demand growth in low-cost and low-income markets. Either factor would cause prices to rise faster in these markets as rising prices become the principal mechanism to bring markets into equilibrium. Less severe declines could reflect weaker demand contraction or more rapid supply contraction on the downside.

Another possible explanation for the superior performance of repeat sales of low-cost homes is that low-cost buyers are more likely than others to purchase at or near the bottom of house price cycles and to sell at or near the top, or before significant downturns, in home prices. It is not just general price changes in low-cost markets that drive individual returns in the market, in fact, but the specific timing of purchases and sales decisions made by low-cost homebuyers that makes a difference. Thus, both market timing and holding period could also play an important part in explaining the difference in returns to repeat sales. It is to these possible explanations that we now turn.

Many factors could lead to differences in timing of purchases and sales by buyers of low-cost homes. Those most likely to purchase low-cost homes (those with low incomes and wealth), for example, could get priced out of the market when it crests and rush into the market when it bottoms out, especially if the bottom and upturn are associated with generally lower interest rates. All else equal, these buyers are the most marginal and should thus enter markets when soft prices and lower interest rates allow them to do so. Those most likely to be able to bid prices higher as the market peaks are those with greater incomes and wealth, making them more apt to be over-represented among those buying at the top of cycles. Owners of higher cost homes may also be more likely to sell in a downturn for a variety of other reasons. For example, they may be better able to sustain a loss because they have a more diversified investment portfolio and be more willing to do so in order to move in search of employment in a downturn.

Evidence from the four case metropolitan areas reveals that timing of *purchase* is also a significant factor in the superior repeat sales performance of low-cost homes recorded in the mid 1980s through mid 1990s (Figure 7). In all four places, low-cost purchases by those who sold by 1999 were a smaller share of purchases at market peaks[6] than their average share for the entire study period. Regardless of when the peak occurred during the study period, these results hold. In fact, in especially Philadelphia, Boston, and Denver high-cost purchases tended to mass around peaks. Low-cost shares of purchases accounted for larger shares at the trough in all but Chicago.

The low-cost share of purchases by those who sold by 1999 during declines appears to have been related to the timing of the cycle in each city, however. In Boston and Philadelphia, where the period of decline coincided with the 1990s, low-cost purchase shares were higher during the decline. During Chicago's slower growth period of the 1990s, the same holds true. In Denver, however, where the period of decline coincided with the late 1980s, low-cost purchase shares were lower during it, suggesting something different about

[6] Phases are defined for each market simply as consecutive years of appreciation or depreciation, with the exception of Chicago, where we consider the entire 1983-99 period to be long expansion, despite a slight drop (1/10 of one percent) in 1991.

the low-cost market itself in Denver or the timing of the MSA's declining phase of the housing cycle.

Figure 7: Low-Cost Home Purchase as Share of Total Purchases by Stage of Housing Cycle (%)

	Low-cost	Mid-Cost	High-cost	Total
Stage in Cycle	**Philadelphia**			
Trough 1982-84	23.1	26.9	50.0	100
Runup 1985-88	20.2	26.8	53.0	100
Peak 1989-91	18.3	20.8	60.9	100
Decline 1992-96	25.8	29.1	45.2	100
Total 1982-96	**21.6**	**26.1**	**52.3**	**100**
	Boston			
Trough 1982-83	12.0	31.1	56.9	100
Runup 1984-87	4.6	13.9	81.5	100
Peak 1988-89	2.5	9.0	88.4	100
Decline 1990-93	16.7	31.5	51.8	100
Total 1982-93	**8.2**	**19.8**	**72.0**	**100**
	Denver			
Trough 1990-92	38.4	35.5	26.1	100
Runup 1993-95	39.2	34.0	26.8	100
Peak 1983-85	3.9	17.4	78.7	100
Decline 1986-89	23.0	39.6	37.4	100
Total 1983-95	**29.1**	**33.3**	**37.6**	**100**
Stage in Expansion	**Chicago**			
Trough 1983-85	8.4	27.6	64.0	100
Brisk growth 1986-89	14.3	31.3	54.4	100
Pause 1990-91	15.2	30.2	54.6	100
Slow growth 1992-97	25.0	36.5	38.5	100
Total 1983-97	**18.3**	**32.9**	**48.9**	**100**

Note: For purchasers who bought after 1982 and sold by 1999 only.

The fact that market timing is so important and generally worked more to the advantage of buyers of low-cost than high-cost homes in the areas studied in the 1980s and 1990s raises important questions about how low-cost homebuyers will fare relative to high-cost homebuyers in the next cycle. A hallmark of the 1990s is that low- and moderate-income home purchase loans, as a share of all home purchase loans, have been on the rise (Litan, Retsinas, Belsky, and White 2000). Through a combination of better outreach, rising incomes, moderate interest rates, and mortgage product innovations, the economy and mortgage finance industry have succeeded in producing more low-income homebuyers later in the cycle. While this has been trumpeted as a major accomplishment, and it is, its implications in the years ahead are uncertain. If home prices are at or near their peak for the

cycle in 1999 and 2000, the proportion of low-income borrowers who resell their homes for more than they bought them could rise relative to earlier periods when prices soften.

VII. Returns and Resale Timing

While the golden rule of real estate is often cited as location, location, location, an equally golden rule is timing, timing, timing. Indeed, the most serious losses incurred by mortgage lenders and insurers have been triggered by widespread defaults during price declines rather than the credit rating of the borrower. Figure 5, presented earlier, makes plain that an owner's likelihood of turning a profit is heavily dependent on the *year of sale*. In fact, the range between the largest and smallest shares of sellers losing money in real terms annually averaged 67 percentage points in the four MSAs and was as high as 83 percentage points in Denver. Furthermore the timing of purchase and sales decisions, as discussed above, is likely not independent of economic conditions.

Focusing on the time of sale rather than purchase, in Boston, the most volatile market, few homes sold at a real loss over the first upswing[7] (as rapid price appreciation quickly offset the transactions costs at resale) or at a real gain during the subsequent downturn (Figure 8). Resellers of low-cost homes fared much better than others regardless of the timing of their resale. Largely as a result of poor returns to high-cost homes, a majority of all units that sold in Boston over the study period sold for real, transactions cost-adjusted losses, including 58 percent that sold at losses during the ongoing recovery.

The distribution of real returns is skewed heavily in favor of low-cost units over virtually all housing cycle phases and markets. Even when prices decline, low-cost homes are substantially less likely to be sold at a real loss across all markets. This pattern is most pronounced in highly-volatile Boston where, despite a compounded price decline of 25 percent between 1989 and 1994, only one in five low-cost home sellers suffered real losses, against more than two-thirds of those who sold high-cost homes. Further, when the Boston housing market recovered during the mid to late 1990s, two-thirds of high-cost homes were still being sold at a loss, though only 29 percent of low-cost units sold between 1995–99 failed to turn a real profit.

[7] Defined simply as consecutive years of house price growth.

Figure 8: Percent of Sellers Selling at Losses by Real Transaction Cost-Adjusted Affordability Class and Housing Cycle Phase

	Philadelphia	Boston	Denver	Chicago
	Loss	Loss	Loss	Loss
UPSWING	**1983-89**	**1983-88**		
Low-cost	15.7	2.9		
Mid-cost	11.5	3.6		
HIgh-cost	13.7	12.4		
Total (percent)	**13.6**	**9.2**		
DOWNTURN	**1990-97**	**1989-94**	**1984-91**	
Low-cost	43.6	20.5	72.1	
Mid-cost	61.3	41.4	91.6	
High-cost	71.4	71.6	95.5	
Total (percent)	**63.1**	**64.3**	**88.6**	
UPSWING	**1998-99**	**1995-99**	**1992-99**	
Low-cost	58.6	29.3	13.3	
Mid-cost	83.3	52.5	30.5	
High-cost	81.0	68.3	51.9	
Total (percent)	**76.4**	**57.9**	**32.3**	
ENTIRE PERIOD	**1982-99**	**1982-99**	**1982-99**	**1982-99**
Low-cost	41.5	24.0	20.6	33.3
Mid-cost	56.9	39.8	37.6	52.1
High-cost	62.8	59.6	60.7	57.8
Total (percent)	**56.5**	**51.1**	**40.8**	**51.4**

Note: Market conditions determined using Freddie Mac's CMHPI, annual percentage change. Chicago had a downturn of one-tenth of one percent in 1991, but we consider the entire period an expansion. Though the Chicago market declined substantially in 1982, there are no sales recorded in our database that year.

VIII. Returns and Matched Market Timing of Purchases and Resales

Delving more deeply into the influence of market timing on the difference in real resale and purchase price, it is possible, using the data set constructed for this study, to examine how those purchasing at peaks and at troughs fared if they resold over the study period.

Figures 9A and 9B show the distributions of years held for buyers at the peak and trough of housing market cycles.[8] Since more than half of owners move within seven years (Goodman 1998) and our series last at least 11 years, we are likely capturing the outcomes for a majority of buyers in each case, though our results surely apply least well to very long term holders. In interpreting these figures, it should also be noted that losses are high for one-year holders[9] on the "trough" figures for two reasons. First, owners have had little time to experience enough appreciation to offset transaction costs. Second, the way that the trough is defined, it can include one or two years when prices were flat or still falling slightly at the end of the previous decline. Likewise, losses are lower for one-year holders at the "peak" because they may have caught the tail end of the preceding upswing. In short, the results for one-year holders are caused by factors different from those driving the rest of the series and caution should be exercised in interpreting them.

Overall, the share of buyers experiencing real asset inflation in excess of transaction costs depends heavily on the housing cycle, though this effect is clearly less pronounced where the cycle itself is mildest. Therefore, in the most cyclical market, Boston, buyers who purchased homes at the trough of the cycle and held them through at least one year of the upswing were unlikely *ever* to sell at a real loss, even when the market declined in the early 1990s. Real losses as a share of those who purchased homes in the trough were also relatively infrequent, regardless of holding period, in steadily appreciating Chicago, but did not shrink as much as they did in Boston, where rapid increases immediately put those who bought just before the trough was reached back into the black. The fact that the share of Philadelphia's owners that bought in the trough and suffered real losses was notably higher than in Boston for sellers holding beyond 10 years reflects the fact that price increases there were not as substantial during the 1980s run-up, even though the Philadelphia market did not fall as far as Boston in the 1990s. Denver has enjoyed an expansion throughout the 1990s. This lengthy period of price increases, coming on the heels of the energy industry-induced regional recession of the 1980s, has virtually eliminated real losses for trough purchasers reselling in the latter part of the 1990s.

Outcomes are reversed for buyers at the peak, as real losses mount and persist for those who enter homeownership at the top of the cycle. This is particularly true in Boston, which suffered a severe price decline, as well as in Denver and Philadelphia. As might be expected, those buying near the end of Chicago's period of most rapid growth, which was not

[8] For Chicago, we define the trough as the three years of slow growth following 1982's 8.3% decline in home prices. Chicago's "peak" is defined as the years 1991 and 1992 when prices dropped 0.1% and rose 1.1% respectively.

[9] Holding periods are rounded to the nearest year and all holds less than 1.5 years are considered one year. Additionally, the final year, which really represents only six months.

followed by a real decline in house values, did not fare as badly as peak buyers in the other markets. The trend in Denver, the only market where the peak occurs early enough for us to follow what happened to past-peak sellers for more than a decade, was for the share enduring losses to climb and subsequently abate. The abatement did not happen, however, until well over a decade after the end of the peak, further indicating the persistence of real losses in cyclical markets for those who get in near the top of the cycle.

For the most part, disaggregating by affordability class (Figures 9A and 9B) produces results similar to those presented elsewhere in the paper. Losses in Boston, for example, were less common throughout the holding period distribution for low-cost than on high-cost home purchases during both trough and peak. The differences are much more striking following the peak, however. More than 95 percent of high-cost homes bought at the top of the market sold to date were sold at a real loss while the share losing money on low-cost homes is only one-third and barely reaches 50 percent in the worst years. In steady Chicago, the share losing money was similar across affordability classes for homes bought in the trough but much lower for low- than for high-cost owners that purchased near the "peak." Interestingly, though overall results showed Chicago's post-peak performance besting that of Boston, this result appears to have been driven by mid- and high-cost homes (which make up a large share of all homes purchased during the peak in each place).

In Denver, real losses following both the trough and peak are much less common on low-cost than on high-cost homes. The same is true in Philadelphia following the peak, but after the trough, smaller shares of high-cost homes were sold at a real loss in every year for which we have data. One possible explanation is that prices rose more rapidly in both places for low-cost homes during the upturn and contracted less during the downturns.

Figure 9A: Percent of Buyers Purchasing Homes at the Peak of Local Housing Markets and Selling at a Real Loss by Holding Period

Years Held	Philadelphia1982-84		Boston1982-83		Denver 1990-92		Chicago1983-85	
Low-cost	Loss Percent of Purchasers By Holding Period		Loss Percent of Purchasers By Holding Period		Loss Percent of Purchasers By Holding Period		Loss Percent of Purchasers By Holding Period	
1	22.0	6.0	12.1	6.6	49.8	17.7	16.2	3.6
2	22.0	9.5	5.9	8.7	22.1	10.8	19.0	4.0
3	15.0	10.7	1.3	14.8	10.1	13.1	18.6	4.1
4	16.0	11.8	1.3	15.2	5.5	14.7	20.8	5.1
5	14.0	9.8	0.4	9.7	3.5	13.6	18.0	4.8
6	17.1	7.5	0.0	7.9	2.2	11.8	12.5	3.1
7	19.8	6.0	0.9	4.4	1.3	10.5	6.3	3.1
8	20.5	4.9	4.9	3.3	0.8	5.5	22.4	4.7
9	22.6	4.6	4.6	3.5	0.3	2.3	24.5	5.1
10	35.8	4.6	7.1	3.3	**14.2**	**100.0**	20.0	5.3
11	31.4	5.0	11.5	4.1			9.3	9.3
11	31.4	5.0	11.5	4.1			9.3	9.3
12	31.3	4.4	17.1	4.2			18.6	13.4
13	42.7	3.8	15.9	3.3			12.6	16.0
14	47.9	4.5	7.5	3.2			10.3	9.3
15	45.5	3.9	9.9	3.6			12.9	6.7
16	45.2	2.0	4.8	3.3			12.5	2.3
17	17.4	0.9	8.0	1.0			**15.5**	**100.0**
	24.0	**100.0**	**4.9**	**100.0**				

Figure 9A: Percent of Buyers Purchasing Homes at the Peak of Local Housing Markets and Selling at a Real Loss by Holding Period (continued)

Mid-cost								
	Loss Percent of Purchasers By Holding Period		Loss Percent of Purchasers By Holding Period		Loss Percent of Purchasers By Holding Period		Loss Percent of Purchasers By Holding Period	
1	46.8	3.1	28.0	3.9	64.4	9.5	43.1	1.7
2	25.3	7.7	9.1	8.1	25.1	11.1	33.6	3.4
3	14.3	12.0	0.8	15.2	11.9	14.7	29.3	6.0
4	5.9	12.7	0.3	14.2	8.2	16.4	24.8	5.9
5	4.3	11.1	1.3	9.8	4.5	14.7	18.4	5.7
6	3.1	9.0	0.2	7.4	3.1	12.8	30.8	3.4
7	5.5	6.5	1.4	5.3	1.9	11.6	23.7	3.3
8	6.0	5.5	3.3	4.7	0.8	6.4	14.1	5.0
9	11.1	4.9	6.5	4.5	0.3	2.8	23.6	6.3
10	19.2	5.0	12.2	4.4	**13.3**	**100.0**	20.8	6.0
11	24.0	4.6	16.1	4.8			17.6	9.3
12	25.2	4.2	19.1	3.7			17.3	11.3
13	32.4	3.9	19.8	3.6			16.3	14.3
14	44.6	3.5	17.3	3.2			16.9	10.2
15	47.1	3.7	13.6	3.7			16.4	6.0
16	49.1	1.9	6.8	2.5			21.6	2.2
17	64.9	0.6	7.1	1.1			**20.5**	**100.0**
	16.9	**100.0**	**6.7**	**100.0**				
High-cost								
	Loss Percent of Purchasers By Holding Period		Loss Percent of Purchasers By Holding Period		Loss Percent of Purchasers By Holding Period		Loss Percent of Purchasers By Holding Period	
1	51.7	3.7	41.6	3.0	76.1	10.2	48.8	2.6
2	25.9	9.0	12.1	6.4	41.4	11.1	26.5	4.7
3	13.5	12.6	2.9	12.0	26.0	14.1	19.2	7.3
4	4.7	12.1	1.0	11.4	21.8	15.3	8.1	6.9
5	3.6	10.8	1.0	8.9	19.2	15.4	5.1	6.7
6	4.2	7.6	1.5	7.5	15.4	13.3	6.9	4.0
7	5.2	6.1	2.3	5.8	8.0	11.0	7.2	3.5
8	6.4	6.2	5.7	5.6	7.0	6.5	10.8	4.1
9	11.0	5.4	7.0	6.1	2.3	3.0	7.9	5.4
10	14.1	4.8	9.1	5.9	**25.8**	**100.0**	9.7	4.9
11	19.3	4.1	10.4	5.9			14.0	7.8
12	23.6	4.1	14.7	5.0			15.5	10.4
13	27.8	4.0	15.8	4.3			19.0	12.5
14	27.4	3.7	12.8	4.2			13.9	10.9
15	27.3	3.4	10.4	3.9			14.7	6.0
16	19.5	1.8	9.4	3.1			17.0	2.4
17	16.9	0.7	6.6	1.0			**14.5**	**100.0**
	14.5	**100.0**	**7.4**	**100.0**				
All Homes								
	Loss Percent of Purchasers By Holding Period		Loss Percent of Purchasers By Holding Period		Loss Percent of Purchasers By Holding Period		Loss Percent of Purchasers By Holding Period	
1	40.5	4.0	30.8	3.7	59.1	12.8	43.7	2.4
2	24.8	8.8	10.2	7.2	28.3	11.0	27.5	4.3
3	14.0	12.0	1.9	13.3	15.0	13.9	21.7	6.7
4	7.6	12.2	0.8	12.7	10.7	15.5	13.1	6.4
5	6.0	10.7	1.0	9.3	8.2	14.4	9.2	6.3
6	6.7	7.9	0.9	7.5	6.2	12.6	13.2	3.8
7	8.6	6.2	1.9	5.5	3.3	11.0	11.6	3.4
8	9.1	5.7	4.9	5.0	2.5	6.1	12.9	4.4
9	13.5	5.1	6.7	5.3	0.9	2.7	14.1	5.6
10	20.3	4.8	9.7	5.1	**16.9**	**100.0**	14.1	5.3
11	23.8	4.4	12.0	5.3			14.6	8.3
12	25.9	4.2	16.0	4.5			16.3	10.9
13	32.4	3.9	16.9	4.0			17.5	13.3
14	37.2	3.8	13.3	3.8			14.5	10.6
15	37.3	3.6	11.4	3.8			15.0	6.1
16	33.9	1.9	7.9	2.9			17.8	2.3
17	28.1	0.7	7.0	1.0			**16.3**	**100.0**
	17.3	**100.0**	**6.9**	**100.0**				

Notes: holding period are rounded to nearest year so 3 year hold actually = 2.5-3.49 year hold. 0-1.49 year = 1 year.

Figure 9B: Percent of Buyers Purchasing Homes at the Trough and Selling at a Real Loss by Holding Period

Years Held	Philadelphia 1989-91		Boston1988-89		Denver 1983-85		Chicago1990-91	
Low-cost	**Loss Percent of Purchasers By Holding Period**		**Loss Percent of Purchasers By Holding Period**		**Loss Percent of Purchasers By Holding Period**		**Loss Percent of Purchasers By Holding Period**	
1	18.0	12.0	12.3	25.3	17.6	12.6	15.7	2.9
2	34.7	9.0	20.4	9.0	29.7	5.1	23.6	6.2
3	48.4	9.5	23.3	5.5	42.6	6.5	17.1	10.5
4	55.6	10.4	28.9	8.3	57.8	6.3	27.5	13.5
5	59.3	12.1	36.6	7.5	54.5	6.1	31.6	15.3
6	64.1	11.9	52.1	8.8	44.2	6.0	31.7	17.5
7	69.4	12.3	48.6	6.4	75.7	5.1	32.3	17.4
8	72.8	11.4	44.9	9.0	73.7	5.3	27.9	12.3
9	70.4	7.7	52.6	7.0	51.1	6.5	34.2	4.4
10	69.3	3.7	52.8	6.6	57.6	8.2	**28.4**	**100.0**
11	**55.3**	**100.0**	47.2	6.6	46.3	7.5		
12			**33.4**	**100.0**	30.8	7.2		
13					23.9	6.4		
14					19.5	5.7		
15					0.0	3.6		
16					7.7	1.8		
					40.4	**100.0**		
Mid-cost								
	Loss Percent of Purchasers By Holding Period		Loss Percent of Purchasers By Holding Period		Loss Percent of Purchasers By Holding Period		Loss Percent of Purchasers By Holding Period	
1	64.0	3.7	37.0	7.5	54.9	4.5	35.3	1.4
2	80.3	7.0	65.1	6.4	68.7	4.6	47.6	6.4
3	86.8	9.7	84.9	6.4	86.5	5.5	50.4	10.5
4	89.6	11.3	85.4	7.4	91.3	5.7	49.6	10.6
5	91.6	13.4	90.3	10.0	93.9	6.1	58.5	15.4
6	92.5	13.3	94.3	10.7	96.0	6.2	64.3	19.0
7	93.3	14.9	93.1	10.3	97.9	7.4	65.1	17.3
8	93.6	13.2	95.3	11.9	95.1	7.6	61.2	13.2
9	92.9	9.5	92.4	11.5	91.1	7.7	57.8	6.3
10	92.5	4.0	92.1	12.3	86.9	8.3	**58.2**	**100.0**
11	**89.9**	**100.0**	87.7	5.4	76.7	8.8		
12			**85.6**	**100.0**	67.5	8.7		
13					54.0	6.7		
14					34.1	6.5		
15					34.1	4.3		
16					14.8	1.7		
					76.0	**100.0**		

High-cost								
	Loss Percent of Purchasers By Holding Period		**Loss Percent of Purchasers By Holding Period**		**Loss Percent of Purchasers By Holding Period**		**Loss Percent of Purchasers By Holding Period**	
1	85.7	4.4	76.5	4.2	75.4	1.6	65.7	1.1
2	92.1	8.4	93.9	6.5	90.9	3.8	71.3	5.9
3	93.5	11.1	97.7	8.1	95.8	6.4	74.1	9.2
4	94.0	11.9	97.8	10.0	98.9	7.0	67.2	9.8
5	95.7	12.0	98.1	11.8	97.9	7.3	75.4	13.4
6	97.1	12.0	98.2	11.6	98.4	7.4	81.0	18.6
7	95.6	13.8	97.6	11.4	98.0	8.0	79.7	18.5
8	95.7	13.4	97.7	11.3	96.9	8.3	67.4	15.5
9	96.2	9.1	96.1	11.1	92.2	9.1	61.8	8.0
10	97.1	3.8	90.9	9.5	87.2	8.5	**73.6**	**100.0**
11	**94.8**	**100.0**	91.3	4.4	85.6	8.1		
12			**95.5**	**100.0**	77.6	7.1		
13					68.6	6.4		
14					59.0	5.5		
15					52.0	3.8		
16					44.7	1.6		
					86.7	**100.0**		

Figure 9B: Percent of Buyers Purchasing Homes at the Trough and Selling at a Real Loss by Holding Period (continued)								
All Homes								
	Loss Percent of Purchasers By Holding Period		**Loss Percent of Purchasers By Holding Period**		**Loss Percent of Purchasers By Holding Period**		**Loss Percent of Purchasers By Holding Period**	
1	56.4	5.6	63.3	5.0	57.8	2.5	41.9	1.5
2	78.5	8.3	88.5	6.5	83.4	4.0	56.4	6.1
3	84.8	10.5	95.2	7.9	92.2	6.2	57.2	9.8
4	86.7	11.5	95.5	9.7	96.3	6.8	54.3	10.6
5	88.2	12.3	96.5	11.5	95.9	7.1	62.8	14.3
6	90.2	12.3	96.9	11.5	96.3	7.2	68.8	18.5
7	90.8	13.8	96.5	11.2	97.4	7.8	68.5	18.0
8	91.6	13.0	96.4	11.3	96.0	8.1	60.5	14.3
9	91.4	8.9	95.0	11.1	90.8	8.8	58.0	6.9
10	91.2	3.8	90.3	9.7	86.0	8.4	**62.0**	**100.0**
11	**86.5**	**100.0**	89.2	4.5	82.5	8.2		
12			**93.0**	**100.0**	73.8	7.4		
13					64.2	6.5		
14					52.6	5.7		
15					46.7	3.9		
16					37.6	1.6		
17					**82.9**	**100.0**		

Notes: holding period are rounded to nearest year so 3 year hold actually = 2.5-3.49 year hold. 0-1.49 year = 1 year.

IX. Conclusion

The findings presented in this paper illustrate that homeowners frequently sell homes for less than they bought them for in nominal terms and that especially large shares of them resell after experiencing real house price appreciation insufficient to even cover transaction costs. This perspective dramatically underscores the risks associated with purchasing a home. Equally important, people purchasing homes that were initially in the price ranges that low-income households could afford experienced significantly greater price appreciation and significantly lower risks of losses upon resale in the four metropolitan areas studied. Thus, while homeownership is risky for all, it was relatively less so for at least for those who bought low-cost homes after 1982 and sold them by 1999 in each of the places studied.

The superior performance upon resale of purchasers of low-cost homes in the cities studied was attributable both to different house price cycles for their homes and the timing of their purchases and sales. Price appreciation in the low-end of the market was generally sharper in the upturns, and it appears deflation was more modest in the downturns in at least some of the cities studied. In addition, in all of the cities, owners of low-cost homes were less likely to purchase at the top of the market, and owners of high-cost owners more likely to do so. Perhaps this reflects the fact that as prices and interest rates rise towards the cyclical peaks, low-income owners are priced out of the market. In addition, at least in the places studied, purchasers of low-cost homes selling within 8.5 years or less were more apt to buy towards the bottom of cycles and then sell on the upside of the same cycle.

These findings have important policy implications. First, more work needs to be done to help low-income homebuyers and providers better understand the risks associated with homeownership. Second, recent improvements to mortgage finance systems and the strength of the economy, that have enabled the proportion of loans to low-income borrowers for home purchase to rise more or less continuously over this homeownership boom may leave more of these borrowers vulnerable to downturns than in previous cycles. Third, and related to the second implication, timing of purchases and sales is essential to the returns realized or the losses suffered by low-income and other owners. Housing providers especially need to educate potential borrowers of the risks of buying late in an expansion. Fourth, because a significant fraction of those purchasing low-cost properties resell their home at real prices below the purchase price, it is important to help owners that might suffer a loss to either weather downturns or to jump immediately back into homeownership so they can ride subsequent waves of appreciation.

Having reached these conclusions, it is important to reiterate that the data sets and methods used to reach them have limitations. Among the most important of these limitations, these findings are derived from repeat sales of mostly short-term owners (less than 8.5 and especially less than 5.5 years) and in only four metropolitan areas. As such, they likely greatly exaggerate the proportion of all owners who experience real losses on a single turn of homeownership, although over these shorter holding periods those holding longer term did not necessarily do better than those selling even within 2.5 years (Figure 10). In addition, they are based on price (and associated estimated mortgage costs) as a proxy for borrower incomes. They are also net of defaulted loans, and these may vary systematically with purchase price ranges. Furthermore, they examine real price appreciation net of transaction costs only and hence do not compare the cost of owning to the alternative of renting. To the extent that renters are faced with the possibility of repeated rent increases but owners are better able to stabilize their housing expenditures, owning may still prove the more attractive option (especially for those putting little or no money down so not forgoing other investment opportunities). Finally, they examine only single turns of homeownership, but we know that large shares of resellers purchase a home immediately or shortly after selling their previous home.

Figure 10: Percent of Homeowners Selling for Less than Purchase in Real Dollars Net of Transaction Costs by Holding Period and Affordability Class of Unit

	Low-Cost	Mid-Cost	High-Cost
Philadelphia	**Loss**	**Loss**	**Loss**
Less than 2.5 yr.	26.9	50.5	58.6
2.5-5.49 yr.	41.4	55.4	61.7

5.5-8.49 yr.	51.7	62.5	69.6
Boston			
Less than 2.5 yr.	22.7	35.6	44.2
2.5-5.49 yr.	24.8	38.0	53.6
5.5-8.49 yr.	27.6	46.6	72.6
Chicago			
Less than 2.5 yr.	32.0	63.1	66.2
2.5-5.49 yr.	40.6	61.8	63.4
5.5-8.49 yr.	31.2	48.3	63.6
Denver			
Less than 2.5 yr.	30.7	50.6	65.6
2.5-5.49 yr.	11.7	30.2	55.9
5.5-8.49 yr.	13.1	31.7	57.7

These limitations suggest at least the need for the following areas for future research:

- Studies that follow complete cohorts of purchasers rather than truncating them so that they contain only shorter-term holders;
- Studies of the lifetime chances of earning positive returns from homeownership;
- Comparative studies of the ex-post cost of owning and renting;
- Studies of other metropolitan areas;
- Studies based on known low-income buyers rather than price-based proxies for them; and
- Studies that take into account the actual mortgage terms and products of low-income buyers as well as some of their demographic characteristics.

Until more is known about the relative risks and rewards of owning, rather than renting, for low-income homeowners, it is difficult to judge whether efforts to boost low-income homeownership are likely to be effective asset-building strategies. Certainly, forced savings in the form of amortization over the life of the loan is likely to lead to asset accumulation for low-income owners who hold their loans to term or pay them off. However, it is equally clear that if the past is prolog, many low-income homeowners will sell for a loss at least once in their lives, and that other investments have more attractive risk-return profiles than housing. Efforts to support low-income homeownership, however, might equally be justified for the greater control it affords those who want to own a home over their housing conditions and its potential to insulate families from rent inflation.

Appendix: Calculating Affordability Limits

In order to subdivide our data into homes that were affordable to low-, middle-, and high-income buyers, we calculated the highest cost home that would be affordable to buyers earning 80 and 120 percent of the area median income in each MSA in each year. Because the limits are a function of the terms of the loan itself, assumptions about the specific financing instrument had to be made. We chose a 30-year fixed-rate loan because it is the closest thing to a "standard" loan over the entire period.

In order to calculate the maximum affordable unit, we assume that buyers put 10 percent down and can devote no more than 28 percent of their income to housing expenses (property taxes, insurance, and mortgage payment). Since everything else is known, we use the following formula to calculate the share available for principle and interest after paying property taxes and hazard insurance.

(1) $RI = P(XI)/LK + H(XI)/LK + XI$

Where:
L = loan to value ratio (90% by assumption)
K = mortgage constant[10] (annual for 360-payment, fixed-rate loan)
R = maximum housing expense-to-income ratio (28% by assumption)
P = median property tax as share of house value (by MSA—1990 census)
H = median property hazard insurance as share of house value (by MSA—1990 census)
I = annual area median income[11]
X = principle and interest payment-to-income ratio
Solving for *X* yields:

(2) $X = LKR/(P+H+LK)$

The maximum affordable unit for low- and middle-income borrowers can then be calculated as:

(3a) $Limit_{LI} = (.8I*X)/K$

and

(3b) $Limit_{MI} = (1.2I*X)/K$

Figure 11 shows these limits in each MSA for each year.

[10] The mortgage constant is calculated on a 30-year, fixed-rate loan at the effective interest rate for that year from Freddie Mac's Primary Mortgage Market Survey (PMMS). The effective rate calculation has a 10-year refinance assumption built in, so that points are spread over 10 years rather than the 30-year life of the loan. The mortgage constant is calculated by: $K = \{i/[1-(1/(1=I)^n)]\}$ where *i* is the interest rate and *n* is the number of payment periods (here 360).

[11] HUD estimate for 1984, 1986–89, 1991–1999. Census figure (1992 MSA definitions) for 1990. 1982–83 are 1984 HUD estimates deflated by CPI-UX. 1985 is 1986 HUD estimate deflated by CPI-UX.

Figure 11: Maximum Price of Homes Affordable to Low- and Middle-Income Buyers

	Philadelphia		Boston		Chicago		Denver	
Year	**LI Max**	**MI Max**	**LI Max**	**MI Max**	**LI Max**	**MI Max**	**LI Max**	**MI Max**
1982	31,160	46,739	37,035	55,552	35,999	53,998	78,242	117,363
1983	38,065	57,097	45,493	68,239	42,315	63,473	43,738	65,606
1984	38,034	57,051	45,385	68,078	42,151	63,227	43,676	65,514
1985	44,547	66,821	51,604	77,407	48,066	72,098	48,486	72,729
1986	52,974	79,461	61,768	92,651	59,267	88,901	57,803	86,705
1987	55,848	83,772	67,844	101,766	60,367	90,550	63,369	95,053
1988	59,704	89,556	73,934	110,901	63,690	95,535	69,158	103,736
1989	62,028	93,041	81,069	121,603	68,633	102,950	69,257	103,885
1990	73,271	109,906	84,589	126,883	73,254	109,881	71,491	107,237
1991	76,766	115,150	98,164	147,246	78,279	117,418	79,560	119,339
1992	82,593	123,890	107,365	161,047	94,206	141,309	87,946	131,920
1993	101,344	152,016	117,832	176,748	106,044	159,066	103,162	154,744
1994	92,932	139,398	107,741	161,612	95,575	143,363	98,901	148,352
1995	97,273	145,910	115,712	173,567	106,698	160,047	102,497	153,746
1996	102,902	154,353	124,506	186,759	107,843	161,765	113,207	169,810
1997	128,219	192,328	133,560	200,340	115,564	173,346	118,960	178,440
1998	140,527	210,790	143,417	215,126	126,744	190,116	128,454	192,680
1999	142,001	213,001	143,754	215,630	129,896	194,843	129,812	194,718

References

Ambrose, B.W. and W.N. “Goetzmann. Risks and Incentives in Underserved Mortgage Markets.” (unpubl.) 1996.

Archer, W.R., D.H. Gratzlaff, and D.C. Ling. “Measuring the Importance of Location in House Price Appreciation.” *Journal of Urban Economics* 40 (1996): 334–53.

Berkovic, J. and P. Zorn. “Households that Never Own: An Empirical Analysis Using the American Housing Survey.” (unpubl.)

Boehm, T.P., H.W. Herzog, Jr., and A.M. Schlottmann. “Intra-Urban Mobility, Migration, and Tenure Choice.” *Review of Economics and Statistics* (1991).

Brueckner, J.K. “Consumption and Investment Motives and the Portfolio Choices of Homeowners.” *Journal of Real Estate Finance and Economics* 15, no. 2 (1997): 159–80.

Case, K. and M. Marynchecnko. “Home Price Appreciation in Low- and Moderate-Income Markets.” Joint Center for Housing Studies Working Paper (2001).

_____ and C. Mayer. “Housing Price Dynamics within a Metropolitan Area.” *Regional Science and Urban Economics.* 26 (1996): 387–407.

_____ “The Housing Cycle in Eastern Massachusetts: Variations among Cities and Towns.” *New England Economic Review* (March/April 1995).

_____ and R. Shiller. “A Decade of Boom and Bust in the Prices of Single Family Homes: Boston and Los Angeles: 1983–1993.” *New England Economic Review* (March/April 1994).

_____. “The Efficiency of the Market for Single Family Homes.” *American Economic Review*. 79, no. 1 (1989): 125–37.

_____. “Prices of Single Family Homes Since 1970: New Indexes for Four Cities.” *New England Economic Review* (September/October 1987): 45–56.

Crone, T.M. and R.P. Voith. “Risk and Return within the Single-Family Housing Market. *Real Estate Economics.* 27, no. 1 (1999): 63–78.

Croew, D. “Household Changes and Mobility.” *Housing Economics* 1994:11–13.

DiPasquale, D. and E. Glaeser. “Incentives and Social Capital: Do Homeowners Make Better Citizens?” *Journal of Urban Economics* 45 (1999): 354–84.

Duda, M. and E. Belsky. “Low-Income Homebuyers and Their Housing Choices.” Joint Center for Housing Studies Working Paper (2001).

Engelhardt, G. V. “House Prices, Equity, and Household Mobility. (unpubl.) 1998.

Gill, H.L. and D.R. Haurin. “User Cost and the Demand for Housing Attributes.” *ARUEA Journal* 19, no. 3 (1991): 383–95.

Goodman, J. “The Costs of Owning and Renting Housing: 1985–1995.” (unpubl. manuscript), 1998.

Gyourko, J. and R. Voith. “Local and National Component in House Price Appreciation.” *Journal of Urban Economics*. 32 (1992): 52–69.

Horne, D., Li, Y, and D. Rosenblatt. “Segregation and Returns to Housing.” (unpubl.) 1996.

Joint Center for Housing Studies. 2000. *The State of the Nation’s Housing 2000.*

Kiel, K.A. and R.T. Carson. “An Examination of Systematic Differences in the Appreciation of Individual Housing Units.” *Journal of Real Estate Research*. 5, no. 3 (1990): 301–17.

_____ and J.E. Zabel. “House Price Differentials in U.S. Cities: Household and Neighborhood Racial Effects.” *Journal of Housing Economics*. 5 (1996): 143–65.

Li, Y. and E. Rosenblatt. “Can Urban Indicators Predict Home Price Appreciation?” *Real Estate Economics*. 25, no. 1 (1997): 81–104.

Litan, R., N. Retsinas, E. Belsky, and S. White-Haag. *The Community Reinvestment Act After Financial Modernization: A Baseline Report.* U.S. Dept. of the Treasury (2000).

Malpezzi, S., G.H. Chun, and R.K. Green. *Real Estate Economics.* 26, no. 2 (1998): 235–74.

Nadler, J., G. Raab, K. Rosenberg, and J. Forde. “Mapping Default Zones. *Mortgage Banking* (Oct. 1993): 127–35.

Ozanne, L. and T. Thibodeau. “Explaining Metropolitan House Price Differences.” *Journal of Urban Economics* 13 (1983): 51–66.

Pollakowski, H.O., M.A. Stegman, and W. Rohe. “Rates of return on Housing of Low- and Moderate-Income Owners.” Joint Center for Housing Studies Working Paper 92–4 (1992).

Pozdena, R.J. *The Modern Economics of Housing.* New York: Quorum Books, 1988.

Rothenberg, J., G.C. Galster, R.V. Butler, and J.R. Pitkin. *The Maze of Urban Housing Markets*. Chicago: University of Chicago Press, 1991.

Scanlon, E. “Homeownership and Its Impacts: Implications for Housing Policy for Low-Income Families.” Washington University: Center for Social Development Working Paper 96–2 (1996).

Seward, J.A., C.J. Delaney, and M.T. Smith. “An Empirical Analysis of Housing Price Appreciation in a Market Stratified by Size and Value of the Housing Stock.” *Journal of Real Estate Research*. 7, no. 2 (1992): 195–205.

Simons, R. A, R.G. Quercia, and I. Maric. “The Value Impact of New Residential Construction and Disinvestment on Residential Sales Price.” *Journal of Real Estate Research* 15, nos. 1/2 (1998):147–61.

Smith, L.B. and M.H.C. Ho. “The Relative price Differential between Higher and Lower Priced Homes.” *Journal of Housing Economics*. 5 (1996): 1–17.

Temkin, K. and W.M. Rohe. “Social Capital and Neighborhood Stability: An Empirical Investigation.” *Housing Policy Debate* 9, no. 1 (1998).