
A NEW LOOK AT THE HOME OWNERSHIP DECISION

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Prospective home buyers should consider several factors that favor the decision to rent rather than buy. Discussed here are the factors that influence the decision and the impact of changes in those factors. Also provided is an illustration of the effects using both national and regional house price and rent indexes.

Should you rent or buy your domicile? . . . The question has not changed, but answering it involves an increasingly complex cost-benefit analysis in which both costs and benefits are influenced by financial and non-financial factors. Although non-financial factors such as pride of ownership and community belonging continue to favor home ownership, the financial rules of thumb that were applied with great success in the past are no longer operative.

From a financial perspective, demographic, economic, and societal changes have fundamentally altered the tenure choice decision of prospective home buyers. Many of the changes now favor renting over buying. Although non-financial factors continue to be important, and may even dominate the home ownership decision, the changes in the financial aspects of the decision nevertheless have important implications for policymakers and prospective home buyers. This manuscript re-examines the financial aspects

of the residential rent-buy decision, recognizing the new character of the decision-making environment.

There is a rich literature concerned with the tenure choice decision, a large part of which focuses on the determinants of total housing demand, mobility, the characteristics that distinguish home buyers from renters, and housing attributes that distinguish a house selected by a renter from one selected by an owner. Goodman (1988) is a good recent example of such work. These studies typically concentrate on the consumption aspect of housing. Other articles examine the investment aspect of housing, especially in a portfolio context [Webb and Rubens (1986), Goetzmann (1993)], but pay little attention to the housing services associated with the asset. The closest antecedents to this article are Mills (1990), Peiser and Smith (1985), and Johnson (1981), which also employ discounted cash flows to measure the effects of specific changes in the decision-making environment on the decision to rent or buy.

The housing asset has both a consumption and an investment component, but the criteria for evaluation are the same as for other prospective investments: holding period, expected return, and perceived risk. Here we discuss the factors that influence the decision to rent or buy, and analyze the impact of changes in those factors using data from the 60s and 70s as a basis with which to compare data from the more recent past. The consumption aspect of housing is incorporated into the analysis by allowing rental rates for comparable housing to proxy for the opportunity cost of housing services by the home owner.

A DISCOUNTED CASH FLOW MODEL FOR THE RENT-BUY DECISION

While the housing asset has both consumption and investment components, the decision to rent or buy is an investment decision. By making an equity investment, home owners participate in the gains and losses accruing to changes in housing prices in the area. Government attempts to encourage home ownership by allowing home owners to enjoy certain tax benefits such as deductibility of mortgage interest and property taxes. In addition, recent changes in tax law permit most home owners to exclude from taxation capital gains realized on the sale of the home. Renters forgo these investment benefits, but face a more certain, less risky, stream of after-tax cash flows.

Two decision models are available for the prospective home owner: a rule of thumb, and a discounted cash flow approach. Both of these models involve assumptions about differential costs of owning versus renting and about the resident's length of tenure. Both also assume that the decision maker is in a financial position such that he/she is able to choose, *i.e.* the down payment associated with home ownership is not a binding constraint.

The basic rule of thumb can be stated as follows: "Buy if you will be in the home long enough for price appreciation to cover buying and selling costs, otherwise rent." This rule is overly simplistic, but there is much to be said for simplicity that works. And the model has served the prospective home buyer in the United States very well until quite recently.

The more sophisticated tenure choice model uses discounted after-tax cash flows as the basis for the decision. Initial costs, regular periodic outlays, and terminal cash flows of home ownership are compared with those of renting. The differential cash

flows are then discounted to the present, and the analysis yields a net present value of the decision. A major benefit of the net present value approach is its consideration of the time value of money. This is important for the rent-buy decision because large cash flow differentials occur at the very beginning (down payment) and at the very end (capital gain or loss from sale) of the holding period. To apply the discounted cash flow model, key assumptions must be made about the periodic and reversionary after-tax cash flows, the length of the holding period, and the discount rate. A description of the discounted cash flow model in the context of tenure choice is included as an appendix.

A CHANGED DECISION-MAKING ENVIRONMENT

The viability of existing models for the tenure choice decision is questionable in the economic environment of the 90s. In particular, the real estate and labor markets, as well as the society that includes these markets, have undergone substantial shifts. Tax laws affecting home ownership have changed as well. The changes, and how they affect the decision-making rules are discussed below.

Changes in Residential Markets

One very important change in the decision-making process is the relatively recent recognition that house prices can go down as well as up. Except for some isolated instances, nominal house prices have trended upward throughout the nation from the end of World War II to the beginning of the 1980s. Since then, a rolling recession has resulted in significant declines in house prices in the oil states, the Northeast, and more recently California. As a result of the experience, the housing asset is no longer viewed as an investment that only goes up in value.

The entire basis of the rule-of-thumb model is price appreciation during the holding period. If prices are expected to decline during the holding period, the decision maker using the heuristic rule is likely to choose to rent rather than buy for any assumed tenure period because the transaction costs of buying and selling the home will not be covered.

Less predictable house price trends have a similar but more subtle effect on the decision maker employing a discounted cash flow model. As with the rule of thumb model, acknowledging the possibility of price depreciation affects the expected returns of home ownership. But the discounted cash flow model also accounts for the increased riskiness of those returns. Greater uncertainty leads

to choosing a higher discount rate, which decreases the importance of equity reversion in the tenure choice, especially for long tenure periods. For risk averse investors, the possibility of loss is avoided more intently than the possibility of an equal gain is sought. The net effect is for discounted cash flow decision makers, on average, to choose renting over buying in volatile housing markets.

Those who have experienced the downward variability of housing prices firsthand are especially likely to make the decision to rent at the next opportunity. Their respect for the riskiness of the housing asset has grown while their funds available for an equity investment in housing have shrunk.

Changes in Tax Law

An important change in the decision-making process between renting or buying a residence is the way gains from sale of a residence are taxed. Under prior law (Internal Revenue Code Sections 1034 and 121), taxation of capital gain from the sale of a residence was deferred only if the seller purchased a new home of equal or greater value than the old home. This is commonly known as the Section 1034 "rollover" provision. If a new home was not purchased, or if the new home was of lesser value than the old, some or all of the gain was taxed as a capital gain in the year of sale. An additional feature of prior law was the so-called "once in a lifetime" exclusion allowed by Section 121. Under this provision, taxpayers 55 years and older could choose to permanently exclude from taxation up to \$125,000 of gain from the sale of a residence. However, this exclusion could be taken only once in the taxpayer's lifetime. Gains in excess of \$125,000 could continue to be deferred under the rollover provisions of Section 1034. Losses on the sale of a residence were considered to be personal in nature, and, as with most other personal losses, were not deductible.

In periods of price appreciation, prior law not only provided a strong incentive for prospective investors to invest in a home as a way to defer taxation of gains, but also provided an incentive for current home owners to extend their tenure as home owners by "trading up" each time they sold a principal residence. This is because gains on the sale of the home could be deferred as long as the taxpayer was trading up to homes with a higher price. In addition, up to \$125,000 of the cumulative, lifetime gain could be permanently excluded when the taxpayer neared retirement and would most likely choose to "downsize" the home.

Many of the changes now favor renting over buying. Although non-financial factors continue to be important, and may even dominate the home ownership decision, the changes in the financial aspects of the decision nevertheless have important implications for policymakers and prospective home buyers.

In periods of housing price variability, prior law also provides incentives for home owners to extend their tenure as home owners. Even in periods of declining prices, as long as there was some amount of gain that would be realized on the sale of the home, the rollover provisions of Section 1034 provided incentives for home owners to retain their investment in a residence as a way to defer the payment of tax on the gain. Thus, prior law provided incentives to extend home ownership tenure.

The Taxpayer Relief Act of 1997 was passed on August 7, 1997, and significantly changed the way gains on the sale of a residence are taxed. The rollover provisions under Section 1034 were repealed, and the \$125,000 exclusion under Section 121 was modified. Although taxpayers can no longer defer gains on home sales by purchasing a new home of equal or greater value, under the new law, married home owners are allowed to permanently exclude up to \$500,000 (\$250,000 for single taxpayers) of gain. Furthermore, the exclusion is available each time the taxpayer sells a principal residence, but, in general, cannot be used more frequently than every two years. Gains in excess of \$500,000 cannot be rolled over, but are taxed as capital gains in the year of sale. As under prior law, losses are not deductible.

The new law has important policy implications. In periods of price appreciation, the new law appears to make home ownership all the more attractive because most gains can now be permanently excluded. However, in periods of price variability, the effect of the new law may be to shorten the length of tenure. As an example, consider a home owner who has experienced price appreciation in prior years, but now experiences price decline during a period of price variability. Under prior law, as long as a gain would be realized upon sale of the residence, the home owner had incentive to

continue to own a home as a way to defer tax on the gain. Under the new law, the home owner no longer has the incentive to continue tenure as a home owner. This is because the old residence can be sold and the gain (up to \$500,000) will not be taxed. Furthermore, if prices continue to decline, the taxpayer has no other incentives to reinvest. Thus, in periods of price variability, the new law allows home owners to "cut their losses" through sale of the home without having to pay tax on the gain or invest in another residence. This has the effect of shortening the length of tenure.

Changes in the Market for Labor

Global competition and the "right sizing" of American corporations is having profound effects on labor markets in the United States. The two most apparent effects are shorter labor contracts and vastly different perceptions regarding job security.

Employment arrangements whereby one works for one company over an entire career, commonplace in the 50s and 60s, are now relics of the past. Independent contractor agreements, contract labor, and temporary employment contracts that do not tie the employer, or the employee/contractor, to long-term commitments are now the norm. This permits companies to respond more flexibly to changes in the market for their products by expanding or contracting the labor force. It also allows workers to earn the market price for their services by changing jobs frequently. In the context of the tenure choice decision, the effect of shorter, more flexible labor contracts is a reduction in the expected length of tenure for the home owner or renter. Even in an appreciating market, the shorter the holding period, the lower the probability that prices will have risen enough to cover the six percent to seven percent selling cost of a home. And the sooner selling costs occur, the less they are discounted for a net present value decision.

Perhaps as important as the reduction in expected holding period is that the threat of unemployment is more keenly felt by a larger and more diffuse segment of the population. Reduced job security influences expectations about duration of tenure, the effects of which have already been discussed. Job security also impacts the way home owners regard their down payment. For many, the down payment on a home represents the largest single commitment of financial resources. It seems reasonable that decision makers with increased uncertainty surrounding their job prospects will be less willing to commit these resources to an

investment asset that is not only riskier than other alternatives, but also highly illiquid.

Clearly, recent trends in labor markets affect both the expected length of tenure and the certainty with which length of tenure can be assessed. Increased mobility implies that the decision point for renting or buying will be reached by families more frequently, and the underlying cause for increased mobility, shorter and less secure labor arrangements, implies that the decision, when reached, will more likely be to rent than to buy.

Societal Changes

Family formation and growth are the primary reasons for buying a first home and for trading up to larger homes during the life cycle. One societal trend with the potential for a significant effect on this pattern is the tendency for families to form later, and to stay together less, than in the past. Family dissolution not only affects the motivation for home ownership. It also has important implications for the affordability of a home for the increasingly common single earner households.

Some of the effects of societal changes are already being seen in home ownership rate statistics. While the overall rates have remained stable, the composition by age group has changed dramatically. Between 1973 and 1992, home ownership rates declined from 23.4 percent to 14.3 percent for the under 25 age group; from 51.4 percent to 42.5 percent for those between 25 and 34; and from 70.7 percent to 65.5 percent for the 35 to 44 age group. Home ownership rates have risen for the more settled groups, from 75.9 percent to 77.1 percent for those aged 45 to 64, and from 69.8 percent to 77.3 percent for those over 65.

MEASURING THE EFFECTS OF CHANGES

Careful analysis is not necessary to understand that lower expected returns, greater perceived risk, and a shortened length of tenure expectation all work to make the residential investment less attractive. In the current environment, families faced with the decision are more likely than in the past to rent. The difficulty is not in determining the direction, but rather in assessing the magnitude of the altered attitudes toward home ownership. The home ownership rate does not exhibit sufficient variation to serve as a useful statistic, partly because a relatively small proportion of families are in a position to change their tenure status during any given time period, and partly because of the tendency of home owners

to continue choosing ownership at subsequent decision points.

We approach the problem by recognizing that the probability of choosing to buy is directly proportional to the probability that residential investment will be seen as a positive net present value project. We first use historical data for housing prices, rents, and mortgage rates to measure the *ex post* net present value of the decision to buy for a number of assumed holding periods. We then compare recent outcomes with those of earlier periods. The historical data is then used as the basis for numerical simulations aimed at measuring the changes in the probability that net present value for a given holding period will be positive.

Data and Empirical Results

To calculate the net present value of the purchase decision, time series data are needed for rental rates, mortgage yields, and home prices. Also required are assumptions regarding the level of down payment, terms of the mortgage loan, the cost of property taxes, insurance and maintenance, and the marginal tax rate of the prospective home buyer.

We use the series of mortgage yields on fixed rate mortgages disseminated by the Federal Home Loan Bank Board to calculate amortization and periodic interest payments. These yields incorporate discount points and assume a 10-year holding period for the loan. In computing net present values, we allow for refinancing by the home owner whenever mortgage yields fall by more than one percent. We assume that the initial loan is a 30-year, constant payment, fixed rate mortgage for 80 percent of purchase price, and that any refinanced loan is at the new rate, but for the remaining term and for the outstanding balance on the existing loan at the time of refinancing. For each holding period, these assumptions permit calculation of periodic interest payments, and the mortgage balance at equity reversion.

Because reassessments are infrequent in most jurisdictions, property taxes vary little during most reasonable holding periods. Also, the costs of insuring and maintaining the home are relatively low and constant except for some discontinuous lumps. We assume a constant annual rate of two percent for property taxes and 0.5 percent for insurance and maintenance. As to the tax shield provided by interest and property tax expenses, we assume other deductible expenses of the home owner are sufficient to surpass the

standard deduction. A marginal tax rate of 28 percent is used.

Two assumptions are made with respect to equity reversion. First, selling costs of seven percent are employed to reflect the typical six percent sales commission plus one percent in other closing costs. Second, the sale of the home is assumed not to be a taxable event. Quite commonly, capital gains will be below the threshold for taxability.

Data from the 60s and 70s

To represent the U.S. house price experience prior to 1980, we use national data from the Federal Home Loan Bank Board covering the period 1967 through 1982. The price index constructed from these data confirms the relatively steady upward march in residential real estate values across the country. To construct a comparable property rent index for this period, we assumed rent during the first period of the data series to be in equilibrium, equating that first period's rent with the periodic after-tax cash flows from buying. We then allowed rental rates to follow the path suggested by the Consumer Price Index Residential Rent Component. *Figure 1* displays the resulting rent index alongside an index of house prices for the period.

Data from the 80s and 90s

Data from two metropolitan areas, Baton Rouge, Louisiana, and Hartford, Connecticut, are used to represent the more volatile price change experience of the 80s and 90s. These markets are good examples because they each demonstrate exactly opposite price paths over the period of study. Baton Rouge experienced a period of price decline followed by a period of price appreciation, and Hartford experienced a period of price appreciation followed by a period of price decline. Although these two cities may not be typical of all real estate markets, many other markets experienced similar price patterns. In addition, these two markets certainly are more typical of current housing markets than the steady upward trend experienced in the 60s and 70s. Home price appreciation has peaked in many areas and price depreciation, albeit at different times in different places, is occurring.

For these localities, constant quality house price indexes are formed using disaggregate data on home sales transactions. For Hartford, rents for comparable housing were obtained directly by using the median listed rental rate for all three bedroom houses for rent on the last Sunday of each quarter during the period. In Baton Rouge, the rent

series was pieced together using data from three bedroom duplex and fourplex rentals and an index of three bedroom apartment rentals. The paths of prices and rents in Hartford, Connecticut, and Baton Rouge, Louisiana, are shown in Figures 2 and 3.

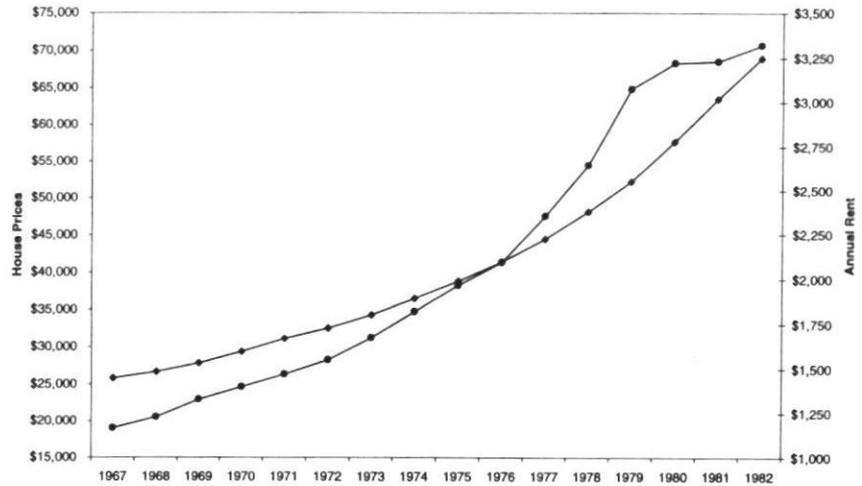
Empirical Results

Tables 1, 2, and 3 provide some evidence of the effect of changing factors on the net present value of home ownership. These tables record the *ex post* result of a decision to own given the historical path of home prices, rental rates, and mortgage rates. Each row contains all possible results for a holding period of a given length. For example, the first row contains all one-year holding periods within the span of each data series.

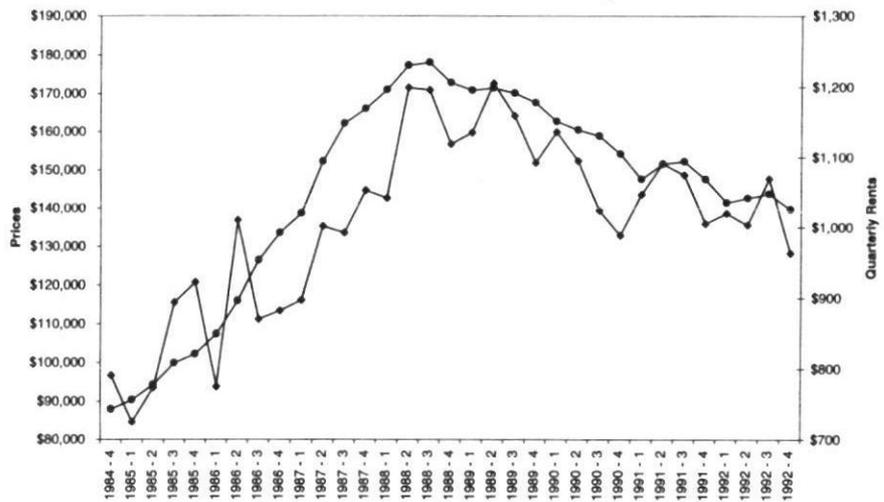
The two panels of each table report the results for an assumed five percent and 15 percent discount rate respectively. Net present values are shown rather than internal rates of return, as the positive or negative outcomes better represent the binary financial choice of the decision maker to own or not own. However, since values rather than returns are shown, the reader should not attach importance to the relative magnitudes of the analysis, as each value is the result of a different level of equity investment. Instead, attention should focus only on the sign of the result, positive or negative.

Table 1 bears out the profitable, low-risk nature of the housing investment in the 60s and 70s. All tenure periods of at least five years have a positive outcome at both assumed discount rates. Even more impressive, until 1978 any holding period greater than one year was sufficient to achieve a positive return on equity. The

**Figure 1 - Housing Prices & Rents
National Data - Annual**



**Figure 2 - Housing Prices & Rents
Hartford, Connecticut - Quarterly Data**



**Figure 3 - Housing Prices & Rents
Baton Rouge, Louisiana - Quarterly Data**



Table 1

Net Present Value of Home Ownership															
1967 - 1982: National Data															
Holding Period In Years	5% Assumed Discount Rate														
	Beginning Year of Holding Period														
	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
1	723	1349	424	213	349	1200	1330	839	151	2646	2749	4833	-2678	-6531	-5336
2	3417	3367	2350	2207	3350	4601	4619	3567	5445	8474	11183	7110	-3614	-6303	
3	5379	5284	4328	4980	6570	7785	7384	8644	11015	16547	13539	6699	-2702		
4	7242	7245	7043	7964	9583	10467	12377	13982	18723	18830	13325	8024			
5	9145	9904	9956	10757	12119	15268	17610	21354	20914	18663	14756				
6	11710	12747	12683	13100	6674	20295	24772	23471	20773	20061					
7	14448	15408	14977	17370	21446	27157	26922	23365	22120						
8	17011	17653	19102	21850	27966	29242	26946	24675							
9	19176	21639	23425	28000	29938	29300	28311								
10	22996	25808	29334	29821	29980	30634									
11	26990	31485	31117	29809	31238										
12	32417	33229	31151	30957											
13	34098	33304	32288												
14	34187	34426													
15	35271														
Holding Period In Years	15% Assumed Discount Rate														
	Beginning Year of Holding Period														
	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
1	330	875	-11	-233	-139	605	672	163	-526	1697	1684	3465	-3572	-7151	-6063
2	2270	2174	1237	1056	1956	2936	2844	1834	3276	5695	7735	4081	-5256	-7661	
3	3338	3183	2316	2714	3856	4692	4224	4970	6590	10647	8026	2419	-5380		
4	4162	4054	3720	4224	5272	5775	6883	7702	10754	10632	6366	2136			
5	4870	5213	4999	5334	6117	7986	9199	11194	10617	8956	5933				
6	5836	6272	5933	5966	7956	9910	12180	10961	9052	8377					
7	6718	7036	6454	7476	9557	12424	11929	9503	8455						
8	7348	7446	7741	8792	11681	12136	10615	8898							
9	7674	8527	8862	10573	11377	10934	10049								
10	8588	9467	10390	10253	10285	10389									
11	9382	10766	10092	9255	9770										
12	10489	10480	9207	8767											
13	10222	9686	8767												
14	9515	9282													
15	9149														

negative results for holding periods beginning in 1978 and later stem from the leveling off of home appreciation in conjunction with historically high mortgage rates; rates exceeded 10 percent for the first time in 1979.

Tables 2 and 3, reporting *ex post* results of home ownership for Hartford, Connecticut, and Baton Rouge, Louisiana, respectively, provide a sharp contrast to the earlier national experience. The price paths of residential real estate for these two metropolitan areas were almost mirror images of each other. In Hartford, prices rose rather precipitously through 1988 before experiencing a gradual decline. In Baton Rouge, prices reached a nadir in 1989, but have since made a full recovery. Reflecting an experience common in most parts of the country, both cities saw price declines as well as appreciation during the eight-year period from 1985 to 1992.

Looking at Tables 2 and 3, the most immediate and striking observation is that there are quite a few more negative signs than was the case with the national data. In fact, only at the assumed discount rate of five percent does home ownership appear to be, *ex post*, a wise investment in most cases. For this rate, 27 of 36 holding periods yield positive results in Hartford, while this is true in 23 of 36 cases in Baton Rouge. However, at a 15 percent discount rate, home ownership has a positive net present value only nine of 36 times in Hartford (short holding periods with sharp price increases in the early 80s), and only six of 36 times in Baton Rouge (short holding periods with sharp increases in rent in the early 80s, and short holding periods with sharp increases in housing prices in the late 80s and early 90s). Additional analysis at a 25 percent discount rate resulted in a positive net present value for home ownership only three times in Hartford and

Table 2

Net Present Value of Home Ownership 1985 - 1992: Hartford Data								
Holding Period In Years	5% Assumed Discount Rate Beginning Year of Holding Period							
	1984	1985	1986	1987	1988	1989	1990	1991
1	4337	14885	13462	-10156	-14704	-18596	-9481	-9963
2	64677	81081	16391	-13781	-24119	45762	48664	
3	74492	74269	11519	-21272	32156	32357		
4	68839	62725	3799	24326	21151			
5	59301	50220	910	15272				
6	48980	42823	-1688					
7	42867	36592						
8	37718							
Holding Period In Years	15% Assumed Discount Rate Beginning Year of Holding Period							
	1984	1985	1986	1987	1988	1989	1990	1991
1	-842	6465	3859	-15656	-19137	-21743	-14016	-14070
2	24427	31237	-3041	-22218	-27869	9766	9137	
3	14235	11538	-10445	-27183	-8753	-10422		
4	2957	-1642	-15375	-16051	-20289			
5	-4587	-9537	-17152	-22646				
6	-9106	-13432	-18089					
7	-11335	-15598						
8	-12575							

Table 3

Net Present Value of Home Ownership 1985 - 1992: Baton Rouge Data								
Holding Period In Years	5% Assumed Discount Rate Beginning Year of Holding Period							
	1984	1985	1986	1987	1988	1989	1990	1991
1	-7144	-8131	-8319	-4333	-1790	-2941	-3674	2951
2	31256	28471	-6598	-3918	1097	33308	42936	
3	24729	24331	-5772	-1228	29142	36754		
4	21330	20470	-3170	22526	31964			
5	18159	18903	-1613	24855				
6	16875	17160	3316					
7	15445	18750						
8	16756							
Holding Period In Years	15% Assumed Discount Rate Beginning Year of Holding Period							
	1984	1985	1986	1987	1988	1989	1990	1991
1	-9534	-10199	-10139	-6975	-4876	-5943	-6613	-1795
2	6743	5449	-10456	-8866	-5795	10924	13656	
3	-4306	-4327	-10978	-9040	2426	3470		
4	-9893	-10074	-10769	-3842	-1840			
5	-13178	-13046	-10875	-6280				
6	-14876	-14860	-10530					
7	-15913	-15655						
8	-16368							

never in Baton Rouge (these results are not included in Tables 2 and 3, but are available from the authors).

The results in Table 2 are primarily a reflection of price change in the Hartford area. Residential rental rates appeared to stay in step with housing prices—a benefit to home owners who locked in relatively

low mortgage payments early in the period. The rapid price appreciation in the early 80s produced an uncustomary result: short holding periods beginning in 1984, 1985, and 1986 fared better than longer holding periods. This finding has important policy implications. Part of the reason that short holding periods fared better is related to the new tax law. Whereas the old law required the rollover of the gain into another home to avoid taxation, the new law allows taxpayers to get out of the housing market completely, and still avoid taxation on the capital gain. Thus, the new law makes the decision to leave the home ownership market more attractive than before. If the objective of policymakers is to use tax incentives to encourage home ownership, then, in periods of price volatility, the new law falls short.

It was extremely difficult during the study period to make money through residential investment in Baton Rouge, a fact revealed in Table 3. Home owners there benefited from relatively low house prices relative to rental rates on comparable properties, but the price path between 1984 and 1988 was hardly conducive to capital gain. Price appreciation in the latter part of the period improved results for short, late holding periods, but the overall financial experience from home ownership in Baton Rouge was dismal. Again, the new tax law provides little incentive for home ownership in periods of declining prices.

CONCLUSIONS

This study has addressed the impact of economic, demographic, and societal changes on tenure choice. The changes hold two major implications for the discounted cash flow method of analyzing residential investment decisions:

- 1). Discount rates will be higher; and
- 2). Expected holding periods will be shorter.

Both of these implications argue against ownership because they highlight two fundamental ways owning differs from renting. Owning involves a high entry cost, the down payment, that is prized more dearly under higher discount rates. As contrasted with renting, owning also involves a high exit cost, primarily the sales commission, that is prized more dearly than the shorter the holding period.

An *ex post* comparison between the recent past, 1984 to 1992, and the more distant past, 1967 to 1982, confirms the effects of many important changes on the financial wisdom of residential investment. At any given discount rate, and for any given holding period, home ownership was more financially rewarding in the earlier period. Moreover, the more volatile, and sometimes negative path of housing prices justifies a higher discount rate, just as changing labor markets justify an abbreviated expected holding period. Making these adjustments to the assumptions underlying the discounted cash flow model merely widens the gap between the recent past and the "good old days" of home ownership. In light of recent experience, as individuals reach the decision point for renting or buying their residence, they are more likely now than in the past to rent. This observation should be important for policymakers when considering tax law changes. Although the new law regarding exclusion of capital gains appears to make home ownership more attractive, in periods of price volatility, the new law actually may cause home owners to shorten their tenure as home owners.

Do these results mean that families will cease to buy homes? . . . Of course not. First of all, owning and renting are complementary components of total housing demand, and therefore compete with each other. Increased desirability of renting allows landlords to raise rents, an action that makes ownership more desirable. In residential housing markets, just as in other competitive markets, the prices of competing products rise and fall until equilibrium is re-established at a new level. Secondly, while owning and renting are close substitutes for housing services, they are not perfect substitutes. Variety of supply is much greater in the market for house sales, and in many cases, it is not possible for the decision maker to find a closely comparable, or even suitable, rental property. These potential renters become home owners by default. Thirdly, although recent tax law changes may not have the desired effect, federal, state, and local governments will continue to encourage home ownership through tax policies and financing programs. It is unlikely that these entities, which clearly see home ownership as a desirable behavior, would permit any long-term substantial drift toward renting. Finally, the tool for analyzing the decision is only a financial tool. While well-equipped to deal with differential cash flows, the discounted cash flow model is woefully inept at incorporating into the decision framework non-financial factors. Pride of ownership and a sense of community belonging, may,

in fact, dominate the strictly financial considerations. It must be kept in mind that owning a home remains, after all, the "American Dream."

Still, the results provide important information to policymakers and to the prospective home owner. Stated quite simply, the risk and return characteristics and the tax consequences of the housing asset have changed, and this study provides evidence of the direction and impact of those changes. Since equity in one's home is the largest single component in the typical family's portfolio of wealth, new information about the expected performance of that investment deserves at least the same attention as information regarding the other assets and securities that comprise the portfolio.

APPENDIX

The Discounted Cash Flow Model

As applied to the home ownership decision, the discounted cash flow model is:

$$NPV_E = -(P-D) + \sum_{t=1}^T \frac{ATCF_t}{(1+k)^t} + \frac{ATER}{(1+k)^T} \quad (1)$$

The net present value of the home owner's equity, NPV_E , is equal to the sum of the cash flows resulting from a decision to own, discounted back to the time of the residential investment. The initial cash outlay for the home owner is the down payment, represented by the price of the home, (P), less the amount of mortgage debt, (D).

The periodic costs, $ATCF_t$, are made up of the difference, after-taxes, of owning as opposed to renting. If we assume that property taxes, insurance, and maintenance are fully impounded into the monthly lease payments, then the after-tax cost of renting is simply the monthly rental rate, (R). Correspondingly, the home owner's after-tax periodic costs of housing consumption are interest (I); property taxes (PT); and insurance and maintenance (IM), less the tax shield afforded by the deductibility of interest and property taxes. We can express this as:

$$ATCF_t = R_t - (I_t + PT_t)(1 - \tau) - IM_t \quad (2)$$

This puts the periodic cash flows in an opportunity cost context. If the monthly outlays for renting are greater than for owning, the difference shows up as a cash inflow for owning. Note that only the interest portion of the monthly mortgage payment is considered. The principal portion of the payment

is recaptured by the home owner/borrower at loan termination.

The terminal cash flow for the home owner, then, is simply the price (P) less the mortgage balance (MB) at time (T), less selling costs (SC).

$$ATER_t = P_t - MB_t - SC_t \quad (3)$$

Capital gains taxes can be realistically ignored, as recent changes in tax law allow permanent exclusion of capital gain from the sale of a residence.

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