

# Is Renting Better? A Review of the Home Ownership Decision amid Increasing Risk

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## Abstract

There has always been an avid debate on the merits of owning versus renting a residence. There is a commonly accepted sentiment that owning a home is a wise investment. However, this sentiment is often unproven or supported with non-substantial evidence. The scholarly literature on the buy versus rent decision has conflicting results. Further, recent events in the US residential real estate market suggest increased asset riskiness which may have a dramatic effect on home ownership. Our research uses a capital budgeting model, similar to the lease versus buy analysis, with the output being the present value of buying instead of renting. The present value model includes the difference in cash flows between buying and renting for two standardized holding periods. A key contribution of the paper is a more accurate estimate of required return on equity, the discount rate in our present value model. As real estate values have recently demonstrated greater risk and the capital structure of homeowners may be highly leveraged, the cost of equity is higher than often suggested. The benchmark model uses point estimates for each variable with subsequent models including scenario analysis for key variables. The results suggest buying is better, in the benchmark model as well as scenarios allowing rents, home appreciation, mortgage rates and required return to vary. However, most scenarios show negative present values are possible, which contrasts the historic view that home ownership always has a positive return.

## I. Introduction

Real estate is perhaps the most commonly held investment asset in the world. Some suggest, ‘buy land, they aren’t making any more of it.’ For many, the housing decision is the largest financial planning decision they will make. Beracha and Johnson (2012) suggest, ‘the concept of homeownership seems to be entrenched in our national psyche as an imperative, and it is supported at the highest levels of government.’ This intuition, commonly stated, is based on substantial scholarly research suggesting real estate (RE) displays low risk with returns between equity and debt. However, the results are conflicted as the literature simultaneously documents that RE data is unique and inconsistent with most financial models. The literature further provides clear indication of RE risks that are often unidentified and unmeasured. The recent RE downturn has provided an opportunity expected by many academics. As the data now suggest less optimistic returns and more risk in home ownership, newer research has allowed improved estimates of risk and return. In addition, there is much recent research on real estate risk suggesting higher levels of standard risk as well as additional risk premiums unique to real estate. These improved estimates now allow better decisions in regards to buying and renting as the risk and return of RE are two key variables in the decision

The capital budgeting replacement analysis compares two similar ‘projects’ by finding the present value of the difference in their cash flows. Applying this model and solving for the net present value (NPV) of buying instead of renting provides a measure of determining if, and when, buying is more optimal than renting for obtaining residential services. The model assumes the cash flows of buying have the same risk as the cash flows of renting. This is currently an area of research and is discussed in the literature review. The flexibility inherent in renting

allows for easier adjustments to economic shocks, and thus the renter may have less downside risk.

Although home ownership is a complex asset including many factors beyond simply financial, the analysis for this paper is only financial with the goal of providing decision makers objective financial information. The common view is that owning a home is a better financial decision due to appreciation, low interest rates and the tax deductibility of interest. However, many academics feel the risks of home ownership are understated and the financial advantages are often overstated.

The paper proceeds with a literature review on the buy versus rent decision as well as a review of the literature on residential real estate risk and return. This is followed by a discussion of the methodology. The results of the model are discussed and the conclusion includes the paper summary.

## **II. Literature Review**

One popular research area involves the time series of rents and home prices. These data are often combined as either the rent-price ratio or its inverse, the price to rent ratio. We discuss several papers examining these ratios followed by several papers considering the rent versus buy decision before turning to other studies with a stronger personal finance focus.

Davis, Lehnert, and Martin (2008) present a clear summary of the US experience from 1960 to 2006. The rent-price ratio was quite stable for the first 36 years, ranging between 5 percent and 5.5 percent. It declined rapidly after 1995, reaching a low of 3.5 percent by the end of 2006. Gallin (2008) finds that the rent-price ratio helps predict changes in real housing prices but there is little predictive power for changes in real rents.

Campbell, Davis, Gallin, and Martin (2009) perform an analysis for each of 28 housing markets in the US: 23 metropolitan areas, 4 census regions, and the national market. Such an approach is potentially more useful than the Davis et al. US-wide study, since there are large differences across local markets. Campbell et al. show that rent-price ratios were roughly stable in most markets from 1975 to 1996, but declined precipitously during 1997-2007. Nevertheless, their two main findings are largely robust to the time period. Changes in expected future housing premia are an important source of volatility in rent-price ratios. This volatility is dampened by covariances among expected future premia, rent growth, and expected future real risk-free rates.

Ayuso and Restoy (2006) use an intertemporal asset pricing model as the foundation for their empirical work. Their study examines three countries: Spain, the UK, and the US. They compute rents from the corresponding components of the consumer price index. According to their model, overvaluation in the early 2000s was more excessive in Spain and the UK than in the US, with price-rent ratios around 30% above equilibrium in the UK, 20% in Spain, and 10% in the US. Brunnermeier and Julliard (2008) decompose the price-rent ratio into a rational component and an implied mispricing. They observe that a reduction in inflation can fuel run-ups in housing prices causing upward pressure on housing prices when inflation declines.

Duca, Muelbauer, and Murphy (2011) contend that most US house price models break down in the mid-2000s because of the omission of exogenous changes in mortgage credit supply. They find that incorporating a measure of credit conditions into house price-to-rent ratio models yields stable long-run relationships, more precisely estimated effects, reasonable speeds of adjustment and improved model fits.

Grochulski (2011) models the risk of home ownership on the decision to purchase housing services. The model studies the tradeoff between homeownership and renting, using a volatile resale value and the costs of upkeep as the primary variables in the model. The model shows for the average household, absent of tax advantages, renting is usually better than homeownership. Sinai (2011) suggests risks associated with renting are often overlooked. Renters face volatility in the total cost of obtaining housing, changes in housing costs after a move and a high correlation between income and rents. However, renters are generally able to absorb housing cost rent more effectively. Sinai concludes improvements in housing access may be improved through strategic subsidies to renters and increasing use of long-term rental contracts.

Voicu and Seiler (2013) develop a mathematical model deriving the optimal rent versus buy decision. The results using futures data without inclusion of real estate appreciation or real estate risk premia suggest renting is preferred over buying. These results support the conclusions of Beracha and Johnson (2012). However, Beracha, Skiba and Hirschey (2012) review home price data from 2007 through 2011 and find housing is currently undervalued in most markets. Using home price to income and mortgage payment to income shows housing is more affordable than most historic time periods.

We conclude the literature on buying versus renting with three studies from the personal financial planning literature. Waggle and Johnson (2003) examine the impact of the single-family home on portfolio decisions. They advocate including the family home and any related financing in the portfolio along with the traditional components of stocks and bonds. The incremental contribution of their study is the specific example of a mean-variance utility function. The main point about including housing in the family asset mix was made five years earlier by Reichenstein (1998).

Hennessey (2003) provides a financial model that can be used to analyze the impact on future household wealth. A key assumption is that if a household does not purchase a home, the funds will be invested in a diversified portfolio of common stocks. If stock returns are high relative to house price appreciation, there is a huge opportunity loss for investing in a house rather than stocks. Based on various world markets and starting dates from several points in the 20<sup>th</sup> century, Hennessey assumes an average annual stock return of 12.5%. This far exceeds the annual change in the median prices of single-family homes over 1980-2001, 4.2% in the US and 2.5% in Canada. With these parameter values, renting is the best financial option, especially for Canadians. After 40 years, a Canadian household's wealth is about \$5 million higher if they choose renting rather than owning. A further point not noted by Hennessey is that the wealth differential is even greater if individuals accept more modest accommodations as renters than they would as owners. Some people buy the largest house they can afford, and are then faced with additional costs from higher utility bills and buying fancier furniture.

The literature on the risk and return of real estate is more developed; following are several key papers. Francis and Ibbotson (2009) compare the risk and return of real estate with other investments during the 1978 to 2008 time period. They describe real estate as heterogeneous which leads to illiquidity, high transaction costs and high search costs. Additionally, real estate is characterized by asymmetric information that may be misused. They indicate the statistical evidence on physical real estate suggests high and positive serial correlations, downward biased standard deviations and downward-biased cross correlation coefficients which may lead to naïve conversations on the appeal of investing in physical real estate. This is a common academic argument, but the literature falls short of clear evidence, only suggestions that the data and results are inaccurate. Furthermore, Francis and Ibbotson do not explicitly consider some of the costs and risks affecting individual homeowners, such as property taxes, insurance, maintenance and home improvements, and mortgage financing costs. Home ownership appears more attractive when such costs and risks are ignored.

MacKinnon (2008) reviews housing in a strategic asset allocation model. Using Case-Shiller quarterly data, MacKinnon calculates risk, return and Sharpe ratios with data up to 2006, the market peak. The data ignores rents, but suggests a very low correlation with equities. Comparing real estate to eleven other investments, MacKinnon concludes real estate has low risk and low return with the fourth best Sharpe ratio of the assets compared.

Lin and Vandell (2007) develop several risk premiums that may explain some of the excess returns often found in real estate. Time on market (TOM) is a measure of the average time to sell an asset. In financial markets, we assume liquid assets that sell instantaneously. TOM implies a risk which increases with the additional time it takes for transaction completion. The risk multiplier developed in their paper justifies larger values for standard deviation and therefore beta and required return.

### **III. Methodology**

The capital budgeting model of the buy versus rent decision includes the estimation of cash flows and a discount rate. The cash flows for the rental analysis are simply the amount of rent paid. The cash flows included for the buy analysis include the initial cost of the home purchase, the gross price when the home is sold, sale transaction costs, mortgage payment (principle and interest), taxes, insurance, and maintenance. For the time zero cash flow, an initial purchase price of \$100,000 is chosen to standardize the analysis. Subsequent annual cash flows include mortgage payments, rent, taxes, insurance and maintenance. The terminal year cash flow includes the appreciated sale price as well as transaction costs of 7% (realtor's commission which is deducted from the proceeds). The NPV is calculated for five and ten year holding periods using both no leverage (that is, the homeowner paid all cash for the house) and 80% debt to value (that is, the homeowner has a mortgage with a 20% down payment).

Annual cash flows are divided into mortgage payments, including interest and principle, and the remaining cash flows which are summarized as net operating cash flows. A 30-year mortgage interest rate of 4% is used as the benchmark, with a scenario analysis including values between 3% and 9%. Poterba and Sinai (2008) suggest an average gross rental rate of 8.5%. Maintenance is estimated at 1.0%, taxes at 2.0% and insurance at 0.5%. Net operating cash flow is equal to gross rents minus the expenses of ownership. A benchmark net operating cash flow

of 5% is based on gross rents of 8.5% and ownership expenses of 3.5%. However, gross rents of 10% and ownership expenses of 5% would result in the same net operating cash flow value. A scenario analysis allowing net operating cash flow values to range from 2% to 8% is presented in Table 3 in the next section.

Table 1 provides the results on historic residential risk and return from Wolf, Yang, and Domian (2013). They use a CAPM based model with Case Shiller data to estimate annual returns for the ten cities in the primary composite index from 1987 to 2011. Only the results for the 10-City Composite Index are provided in Table 1. The beta is calculated using the standard deviation and correlation resulting from the data. The levered beta is calculated with the Hamada equation using taxes of 30% and a Debt to Equity ratio of 4 (80%/20%). The risk free rate is estimated by the long term treasury rate of 1.99% provided by the St. Louis Federal Reserve. The time on market multiplier is 1.44 consistent with an average time on market of twelve months. The capital budgeting model includes interest in the mortgage cash flows and uses required return on equity as the discount factor. Based on the historical data, benchmark estimates of required return on equity are 4% for unlevered equity and 6% for levered equity. Table 5 in the next section presents a scenario analysis including values for unlevered equity ranging from 4% to 7%, and levered equity ranging from 6% to 9%. Return estimates from Wolf, Yang, and Domian (2013) are used to determine a benchmark real estate appreciation estimate. Based on the historic performance, real estate appreciation of 3% is used in the capital budgeting model, and Table 2 in the next section presents results of a scenario analysis including real estate appreciation values ranging from 0% to 6%. After estimating the historic risk and return, the NPV of buying versus renting will be estimated.

**Table 1: Risk Measures Including a Leveraged Required Return with Time on Market (TOM) Premium**

<b>Case Shiller, 10-City Composite Index Risk Measure</b>	<b>1987 – 2006</b>	<b>1987 – 2011</b>	<b>1987 – 2011 (w/TOM 12 mths)</b>
Standard Dev., $\sigma$	0.07	0.09	0.13
Beta, $\beta$	-0.11	0.13	0.19
Req'd Rtn., $K_s$	1.38%	2.72%	3.03%
$K_s$ , Hamada eq.		4.89%	6.15%
$\sigma$ (S&P 500) = 0.18	$K_r$ (long term Treasury rate) = 1.99%		TOM mult. = 1.44

#### IV. Results

Table 1 presents estimates of required return on residential real estate using the Case Shiller data for the stated time periods. The Case Shiller ten city index is used and the data are annual. The unlevered required return is based on the market model, as discussed in the

methodology section. The levered required return uses the Hamada beta assuming leverage of 80%. The final estimate of levered required return also includes a market risk premium from Lin and Vandell (2007). The premium is a multiplier that applies to the calculated standard deviation. The multiplier is based on the number of months estimate to sell; for this example, twelve months time-on-market led to a multiplier of 1.44.

Table 1 suggests statistics on the real estate home price index consistent with the literature, including a low standard deviation, a very low beta and therefore a very low unlevered required return. It suggests unlevered asset returns to be 6.3% for 1987 – 2006 and 3.6% for 1987 – 2011. On an unlevered basis, these returns are high. Comparing the 1987-2006 statistics to 1987-2011, we see that the recent downturn in housing caused a 50% increase in standard deviation, a correlation moving from negative to positive, a beta moving from slightly negative to slightly positive and a doubling of the required return from 1.38% to 2.72%.

The four remaining tables show NPVs, calculated for capital structures with either no debt or 80% debt, and for both 5 and 10 year holding periods. These are presented as scenario analyses, with each table examining the impact of changing one of the variables.

Table 2 considers the impact of different values of RE appreciation. Along with the benchmark 3% from the historical average, we show appreciation values ranging from 0 to 6%. Not surprisingly, homeowners enjoy large positive NPVs, relative to renting, when home values appreciate at a 6% annual rate. And it is clear from the trends across the columns that even small declines in RE values (negative appreciation rates) will produce negative NPVs for home ownership.

**Table 2: The Buy vs Rent NPV over various values of real estate appreciation**

Appreciation	0%	2%	<b>Benchmark 3%</b>	4%	6%
No Debt					
NPV <sub>5 years</sub>	-1,252	7,682	12,406	17,308	27,666
NPV <sub>10 years</sub>	3,252	20,761	30,640	41,316	65,500
80% Loan/Value					
NPV <sub>5 years</sub>	909	8,909	13,138	17,527	26,799
NPV <sub>10 years</sub>	5,732	20,152	28,280	37,084	56,929

Table 3 examines values of net operating cash flows ranging from 2% to 8% of home value. At the higher values, renting is more expensive and thus there is a greater advantage of owning rather than renting.

**Table 3: The Buy vs. Rent NPV over various values for Net Operating Cash Flows**  
 Net Operating Cash Flows = Rent – (Maintenance + Taxes + Insurance)

Net Operating Cash Flow	2%	4%	<b>Benchmark 5%</b>	6%	8%
No Debt					
NPV <sub>5 years</sub>	-1,607	7,735	12,406	17,077	26,418
NPV <sub>10 years</sub>	3,276	21,519	30,640	39,761	58,004
80% Loan/Value					
NPV <sub>5 years</sub>	145	8,807	13,138	17,470	26,132
NPV <sub>10 years</sub>	4,030	20,197	28,280	36,364	52,530

The benchmark mortgage interest rate used in our analyses is 4%. In Table 4, we consider the possibility of a lower 3% rate, and higher rates of 5%, 7%, and 9%. While home ownership becomes less attractive at higher interest rates, there is still a positive NPV relative to renting. The no-debt case is not shown in Table 4 since it is unaffected by the mortgage interest rate.

**Table 4: The Buy vs. Rent NPV over various values for mortgage rate**

Mortgage Rate	3%	<b>Benchmark 4%</b>	5%	7%	9%
NPV <sub>5 years</sub>	15,214	13,138	11,032	6,743	2,381
NPV <sub>10 years</sub>	31,604	28,280	24,848	17,716	10,313

When cash flows are generally positive, a standard result in capital budgeting is that the NPV decreases as the discount rate increases. We explore this in Table 5 by varying the required return on equity. For the no debt case, the benchmark required return of 4% is raised to 5%, 6%, and 7%. For the 80% loan/value case, the benchmark required return is 6% and it is raised as high as 9%.

**Table 5: The Buy vs. Rent NPV over various values for required return**

No debt Req'd Rtn	<b>Benchmark 4%</b>	5%	6%	7%
NPV <sub>5 year</sub>	12,406	7,696	3,320	-747
NPV <sub>10 years</sub>	30,640	20,742	11,917	4,043
80% Loan/Value Req'd Rtn	<b>Benchmark 6%</b>	7%	8%	9%
NPV <sub>5 years</sub>	13,138	11,684	10,326	9,057
NPV <sub>10 years</sub>	28,280	24,381	20,888	17,754

## **V. Summary**

Estimates of the NPV of buying versus renting are consistently positive in our analysis suggesting, even with the higher recent risk estimates, home ownership is more valuable than renting. Using estimates of risk and return that include leverage and a time on market premium provide values more consistent with academic intuition and demonstrate levels of risk that are higher than previous research. Although these updated risk and return estimates do not alter the buy versus rent decision in most scenarios, the results show home ownership holds a clear probability for loss, even in absence of a real estate crisis. During 2007-2011 millions of home sellers experienced significant losses with some losing their homes to foreclosures or short sales.

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