

Lessons from Over 30 Years of Buy versus Rent Decisions: Is the American Dream Always Wise?

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Abstract

Home ownership is touted as the “American Dream”. It is credited with enhancing wealth, increasing civic pride, improving self-esteem, crime prevention, child development, and better educational outcomes, among other benefits. This paper does not dispute any of these claims. Instead, this study hypothesizes that crowding toward homeownership raises the price of homes above their fundamental value resulting in the purchase of a home becoming a contraindicated action. After setting the holding period to the average American’s tenure in a residence, renting (not buying) proves to be the superior investment strategy over most of the study period.

Introduction:

Homeownership is the “American Dream” (Matthews and Turnbull, 2007; Cauley, Pavlov, and Schwartz, 2007; Phillips and Vanderhoff, 2004; Painter and Redfearn, 2002; and Tu and Eppli, 1998, among many others). Homeownership is the most viable path to wealth creation for the majority of Americans (Engelhardt, 1994; Haurin, Hendershott, Wachter, 1996; and Rohe, Van Zandt, and McCarthy, 2002). Homeownership enhances civic pride and improves voter turnout (Rohe, McCarthy, and Van Zandt, 2002; and Dietz and Haurin, 2003). Homeownership contributes to better societal outcomes – less crime, a better familial environment, etc. (Haurin, Parcel, and Haurin, 2002). These and other similar statements go nearly unchallenged in both the public and academic press. The concept of homeownership seems entrenched in our national

psyche as an imperative and supported at the highest levels of government.³ The significant public policy efforts to enhance the percentage of homeownership combined with constant societal coercion towards homeownership (“why throw your money away on rent”) serve as casual proof of this statement. In fact, the strong inclination towards homeownership is so pervasive that in our daily lexicon home ownership has become homeownership.

Might there be some fallacy in this paradigm? Is there any evidence that does not support ownership? If so, what does that evidence suggest about future buy versus rent decisions? This paper seeks to investigate the efficacy of ownership and address these and other questions with a deceptively simply but straightforward analysis of the rent versus buy decision and what drives property pricing. In particular, financial arguments concerning the relationships between the rent-to-price ratio and property appreciation and the rent-to-price ratio and price volatility are combined with the national imperative to own to investigate the rent versus buy decision.

Two major findings evolve from the analysis. First, individuals, on average, were better off in economic terms to have rented for most of the years in the study period. This first result is strongly dependent upon fiscally disciplined individuals that, without fail, reinvest any residual savings from renting. Second, fundamental drivers now appear to be in place that favor homeownership over renting in the near term future.

While the first finding might seem to fly in the face of the homeownership paradigm (specifically wealth creation), it is reasonable to find that most individuals still preferred

³ For example, June is the National Homeownership Month (110 Congress, 2007).

homeownership during the sample period because ownership is in essence a self-imposed savings vehicle. Periodic mortgage payments (most typically monthly and amortizing) reduced any debt affixed to the residence and property appreciation, which occurred almost universally during this time period, allowed owners to take advantage of a levered appreciating asset in lieu non-wealth enhancing consumption spending. Said another way, while renting may have been wise, any extra savings from renting might be spent on non-wealth enhancing goods resulting in any benefits from renting versus owning disappearing in a cloud of consumption spending rather than savings.

The systematic bias towards homeownership in the U.S. helps explain the general upward trend in homeownership rates from 62.9% in 1965 to 67.4% in 2009 with a peak of 69.1% in 2005⁴. Rather than constantly evaluating whether owning is preferable to renting, the movement from renting to owning is almost exclusively a one way path that is correlated with levels of income and wealth (Xiao and Liu, 2007).⁵ Thus, and not surprisingly, homeownership self-selects to the wealthier individuals in society, while simultaneously absorbing a significant set of self-imposed savers that might otherwise spend income and wealth on non-wealth enhancing consumption. Therefore, the first finding is reconcilable with earlier works that tout the wealth enhancement attribute of homeownership.

⁴ U.S. Census Bureau: <http://www.census.gov/hhes/www/housing/hvs/historic/index.html>

⁵ According to Sinai (1997) less than 4% of owners ever transition back to renting and one third of those transition back to owning within 2 years.

The second finding might seem unwise to many given the recent crash in the real estate markets around the country. However, rent-to-price ratios now seem to be in place along with other fundamental drivers that favor ownership over renting in the near term future. Sections on a review of the extant literature, proposed hypothesis, data, methodology, results, and concluding remarks follow in order.

Literature review:

Potential homebuyers use “comps”⁶ as the conventional yardstick to estimate the value of their future residence. This approach is analogous to valuating a share of Microsoft at \$30 just because someone else recently paid \$30 for a Microsoft share. Advocates of the efficient market hypothesis can argue for the validity of this approach, but only if there are many market participants that continuously evaluate Microsoft based on its future expected cash flows. Case and Shiller (1989), and more recently Beracha and Skiba (2010), show that residential real estate markets are in fact predictable and therefore inefficient. The inefficiency of the residential real estate market underscores the notion that the “comps” approach only provides the buyer with a relative rather than absolute valuation. In other words, the “comps” approach can only help us decide whether to buy property A or property B, but it is useless in making a buy versus rent decision due to its inability to provide an estimate of value in absolute terms. Shiller (2007, 2008) argues that failure to value housing based on its fundamentals combined with future home prices optimism can lead to a feedback speculative-bubble where home prices are set well above their intrinsic value.

⁶ The recent sale prices of nearby homes with similar characteristics.

In contrast, some studies that seek to explain over- or under-valuation in the housing market use the price-to-income ratio as guidance (Case and Shiller, 2004; McCarthy and Peach, 2004; and Beracha and Hirschey, 2009). The price-to-income approach relies on the theory that home prices appreciate, at the very most, at the same pace as income growth over the long run. If homes appreciate faster than income growth, they become unaffordable unless a permanent deterioration in average house size and quality takes place (Shiller, 2007).⁷ Hence, it is reasonable to expect that in general the price-to-income ratio for urban areas to be mean reverting in nature, where above and below long-term average price-to-income ratios imply over- and under-valuation, respectively.

The rent-to-price ratio is also a common gauge in valuing residential real estate overtime (Martin, 2008). The rent-to-price ratio is similar to the dividend-to-price ratio in corporate equities and is expected to fluctuate within a narrow range because theory suggests that the total cost of homeownership equals to the cost of renting. However, while rent prices capture the vast majority of the total cost of renting, the total cost of homeownership is not so straight forward. More specifically, the price of property is not the total cost of homeownership. The total cost of ownership also includes varying factors such as maintenance, insurance, opportunity cost, property taxes, expected appreciation, buying and selling expenses and consideration of a different tax treatment from renting. Because home prices only represent a portion of the total

⁷ Gyourko, Mayer, and Sinai (2006) show that in some “Superstar Cities” home appreciation has exceed average income growth for an extended time period. This was possible because high-income populations outbid the poorer ones for the scarce space that is associated with these cities.

cost of home ownership, most of the rent-to-price volatility is embedded in the volatility of home prices rather than that of rents (Kim, 2008; and Verbrugge, 2006). This limits the ability of the rent-to-price ratio to serve as a single reliable home valuation measure.

The literature also includes studies that use more sophisticated methods to measure home values. Himmelberg, Mayer, and Sinai (2005) point out the inability of price-to-income and rent-to-price ratios to accurately reflect housing costs. Instead of these ratios, the authors apply the user cost of housing to estimate the level of over- or under-pricing in different U.S. residential markets. Verbrugge (2006) tests the standard Jorgensonian (frictionless) theory, according to which home user costs equal rents, finding a substantial divergence between the two persists for long periods of time⁸. These findings, however, do not imply unexploited arbitrage opportunity because of the presence of transaction costs. Smith and Smith (2006) investigate the relationship between long and medium term internal rates of return and homeownership. The authors compare internal rates of return with expected rates of return to determine housing over- and under-pricing. Interestingly, given the time period, the authors conclude that purchasing property at current market prices still appears to be a sound long-term investment strategy.⁹

To date, there does not appear to be any study that makes a long-term horse-race comparison between renting and owning. This present paper contributes to the literature by making such a comparison across different cities and geographical regions in the U.S. over a period of 32 years.

⁸ In an earlier study, Blackley and Follain (1996) also show divergence between user cost and rent.

⁹ With the advantage of hindsight, one wonders if this conclusion was influenced by the paradigm of homeownership; however, this is mere speculation and beyond the scope of this work.

Hypotheses:

Theoretically, it can be shown that the price of a home must equal the present discounted value of its expected utility and expected returns to housing. Emotionally, however, buying a home is often considered an integral part of “living the American dream”. Moreover, common wisdom advocates that owning a home is by far superior to “throwing your money away on rent”. This belief is further reinforced by governmental policy and segments of the U.S. tax code that reward homeownership. Additionally, after periods of meaningful appreciation, homebuyers appear to fear that home prices will soon climb to levels they cannot afford. This is consistent with the Shiller’s (2007, 2008) argument that a psychological feedback mechanism contributed significantly to the recent housing boom where prices elevated above their fundamental value.

Given the paradigm of homeownership and combining this predisposition towards owning with the fear of rising home prices, it can be argued that from the point of view of potential homebuyers, purchasing property seems preferable to renting despite low rent-to-price ratios that otherwise favor renting. As a result, potential homebuyers mostly ignore renting in favor of buying and do not consider the true cost of ownership. Such behavior is likely to cause home prices to rise above their fundamental rent value, which in turn makes renting highly preferable in economics terms. Therefore, it is hypothesized that when viewed across time renting property will trump purchasing property from a monetary point of view.

Data:

To identify rent-to-price ratios, this paper relies on a dataset constructed by Davis, Lehnert, and Martin (2008) for the stock of owner-occupied housing. This rent-to-price index is based on five micro datasets from the Decennial Censuses of Housing (DCH) surveys with price indexes for housing prices and rents between 1960 and 2000. To improve the quality of the index, Davis, Lehnert, and Martin use a hedonic model to control for the size, age, number of bedrooms and location of the property. The authors use rent and house price indices to interpolate rent-to-price ratios between the DCH surveys and to extrapolate them beyond the year 2000. These ratios are created for the U.S. as a whole, its four geographical regions, and 23 major metropolitan areas and available between 1978 and 2007 on a semiannual basis.¹⁰¹¹ According to the authors, this is the first publicly available dividend yield to owner-occupied housing in the aggregate United States over a long time period. In order to extend the rent-to-price indexes until the second half of 2009, this paper uses the same method employed by Davis, Lehnert, and Martin to extrapolate their rent-to-price values. The extrapolation is based on the Bureau of Labor Statistics (BLS) rent indexes and home price indexes from the Federal Housing Finance Agency (FHFA).

Home price indexes from the FHFA are also employed to calculate housing price appreciation and volatility. The average 30-year fixed mortgage rates are obtained from Freddie Mac and converted from a monthly to a six month average rate that was offered to borrowers during the

¹⁰ All 28 areas are listed in table 2.

¹¹ The data is available on Professor Morris A. Davis' website: <http://morris.marginalq.com/>

first and second half of each year.¹² Finally, the risk free rate and the broad stock market returns are obtained from Ken French's data library.¹³

Methodology:

Buy versus rent analysis – the model

For the purpose of buy versus rent analysis, a model is constructed simulating an individual that faces a buy versus rent decision at different times and locations.¹⁴ Under the scenario that the individual buys a home, the model calculates the sale proceeds the individual expects to receive at the time of disposition of the property. The model does not allow sale proceeds to turn negative due to severe housing depreciation because any rational homeowner is assumed to take advantage of the mortgage default option in these situations. If the individual rents a home, the model calculates the expected value of an investment portfolio funded with money that otherwise would be used for homeownership at the end of the holding period. Higher expected proceeds from sale compared with the expected value of the investment portfolio would suggest that the individual is better off buying a home. Conversely, if the expected proceeds from sale are lower than the expected future value of the portfolio, renting a home is recommended. More formally:

¹² As the length of this paper is significant, Summary Statistics traditionally reported are omitted in the interest of brevity. However, these statistics are available upon the request of the authors.

¹³ Dr. French's data library is available on his website:

http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

¹⁴ Typically, the term agent is used to represent actors in an economic model. This convention is abandoned here so as not to even remotely imply that real estate professional are involved in the model.

$$SP_{hp} < 0 \rightarrow SP_{hp} = 0 \quad (1)$$

$$SP_{hp} \geq 0 \rightarrow SP_{hp} = SP_{hp}$$

and

$$SP_{hp} > IP_{hp} \rightarrow \text{Buy} \quad (2)$$

$$SP_{hp} < IP_{hp} \rightarrow \text{Rent}$$

$$SP_{hp} = IP_{hp} \rightarrow \text{Indifferent}$$

where SP_{hp} is the expected property sale proceeds at the end of the holding period and IP_{hp} is the expected value of the investment portfolio at the end of the rent period. Thus, this piece does not seek to calculate the cost of ownership but rather to create a “horse race” between renting and owning by making a comparison between the value of an investment portfolio held by renters and the net selling proceeds collected by homeowners at the end of a holding period.

The model makes the following assumptions regarding the buy scenario. The individual uses a typical 20% down payment and the remaining balance is financed with a conventional 30-year fixed rate mortgage at the average market interest rate at the time of purchase. Additionally, following Verbrugge (2006), the individual pays closing costs¹⁵ of 2% of the purchase price with the original purchase of the property. The individual expects to hold the property for a period of 8 years¹⁶ and pays 6% selling fees at the end of the holding period.¹⁷ To further simulate

¹⁵ Closing costs include: discount points, mortgage initiation fees, appraisal, lawyer and recording fees.

¹⁶ According to Hansen (1998) the Census data shows that 8 years is the average home holding period in the U.S.

homebuyer conditions, the model allows the buyer to prepay the current mortgage and refinance once a year in the event that the after-tax benefits associated with refinancing exceeds the cost of refinancing.¹⁸ As per Himmelberg, Mayer, and Sinai (2005), during the holding period the individual annually faces property taxes of 1.5% of the property value and maintenance and insurance expenses of an additional 2%.¹⁹ The individual also anticipates that all expenses associated with owning the property (property tax, insurance and maintenance) will increase each year at a rate equals to the price appreciation of the property. Finally, the model assumes that the individual itemizes and is in the 25% marginal tax rate bracket. Symbolically, the sum of annual outflows (out-of-pocket expenses) for the individual from homeownership is:

$$OF_t = IM_t + PT_t * (1 - \tau_t) + P_t + i_t * (1 - \tau_t) \quad (3)$$

where OF_t is the sum of individuals cash outflows during year t , IM_t and PT_t are the cost of insurance plus maintenance and property tax at time t , respectively. P_t and i_t are the portions of the mortgage payment that go toward principal and interest during year t , and τ_t is the individual's marginal tax rate. The expected sum of the proceeds from sale at the end the holding period is calculated using:

¹⁷ For robustness, expected holding periods between 6 and 10 years are also examined, but the general results of this paper remain mostly unchanged. These results are not reported in this paper for brevity, but available upon request.

¹⁸ The benefit from refinancing is defined as the present value of the after-tax cash flows associated with the marginal interest rate decrease, given the remaining expected mortgage holding period and discounted at the new mortgage rate.

¹⁹ In a comment to Smith and Smith (2006), Mayer suggests a range of 2-3% for maintenance and capital expenditure.

$$SP_{hp} = Price_0 * (1 + G)^{hp} * (1 - SE) - MB_{hp} \quad (4)$$

where $Price_0$, G and SE are the original purchase price, average percentage annual price appreciation of the property, and selling expenses in percentage terms, respectively. The holding period in terms of years is defined as hp , and MB_{hp} is the mortgage balance at the end of the holding period calculated as:

$$MB_{hp} = MB_0 - \sum_{t=1}^{hp} P_t \quad (5)$$

where MB_0 is the original mortgage balance and the other parameters are as defined previously.

Alternatively, if the individual rents a home, the model assumes that initially, the individual seeds an investment portfolio with a sum equaling the total of the down payment and closing costs (CC) under the buy scenario. At the end of each year, the individual deposits into the portfolio an amount equals to the difference between out-of-pocket expense (OF_t) and the annual amount paid in rent. If the difference between the two happens to be negative, the individual withdraws rather than deposit that amount from the portfolio.²⁰ According to Himmelberg, Mayer and Sinai (2005) the opportunity cost associated with homeownership equals the risk free rate plus an additional risk premium to compensate for the higher risk of

²⁰ This deposit or withdrawal ensures a fair comparison between the final value of the investment portfolio value and the property's proceeds from sale.

owning versus renting. On the other hand, the authors point out that owning a home serves as a hedge against future rent changes, which eliminates much of the risk associated with owning compared to renting. This paper uses two different approaches to determine the rate of opportunity cost (R) associated with owning in order to span different types of homebuyers. The first approach simply assumes that the investment portfolio held by the renter earns risk free rate. This approach may be appropriate for homeowners that are not expecting to upgrade or downgrade their residence and expect to stay in the same geographical area. The risk free rate is appropriate for these homeowners because they receive constant utility from their home while they benefit from a hedge against future rent changes. The fact that they are not expecting to change their home quality removes the risk associated with the resale value of their home. The second approach assumes that the homeowner's opportunity cost (the return on the renter's investment portfolio) is the return on a portfolio with equal risk to a levered residence. Hereafter, this portfolio is referred to as a risk equal portfolio and it includes a different mix of stocks and risk free treasuries to match the risk associated with a levered residence in each particular location²¹. This approach is suited for homeowners who expect to change the quality of their residence. These homeowners do not fully benefit from the hedge associated with homeownership because the resale value of their current home relative to the cost of their future residence is material. Under both approaches, a 20% capital gain tax (τ_{CG}) on the portfolio is

²¹ Volatility of the broad stock market returns and home prices in each location during the 1978-2009 period are used to calculate the particular risk equal portfolio for each location. The risk equal portfolio includes a mix of stocks and risk free treasuries that yields the same 8-year standard deviation as the equity of a home purchased with 20% down payment.

applied and rent is expected to grow at the same rate as real estate appreciation (G)²². Mathematically, the expected value of the renter's investment portfolio (IP) at the end of the holding period is:

$$IP_{hp} = IP_0 + \left(\sum_{t=1}^{hp} (IP_{t-1} * R + OF_t - Rent_0 * (1 + G)^t) * (1 - \tau_{CG}) \right) \quad (6)$$

where

$$IP_0 = Price_0 - MB_0 + CC \quad (7)$$

and

$$IP_t = IP_{t-1} * (1 + R) + OF_t - Rent_0 * (1 + G)^t \quad \text{for } t > 0 \quad (8)$$

Here τ_{CG} represents the tax rate for capital gains and $Rent_0$ represents initial rents. All other notation is as defined earlier. The initial rent and purchase prices are derived from the rent-to-price indexes described earlier by setting the price to 100 and calculating the rent price by multiplying the rent-to-price ratio by 100 at time 0.

Equation (6) is of particular interest as it accounts for the homeowners benefit from a hedge against future rise in mortgage payment while receiving constant quality of housing. Renters, on the other hand, face uncertain future rents for a constant quality home. Since this piece seeks to make a “horse race” comparison between renting and owning, it is necessary to adjust either the rent or buy side for this accepted benefit from ownership. Accordingly, in order to account for

²² This assumption is made on the basis that over the long run purchase prices must be supported by rent prices, which implies that both grow at the same rate.

the hedge²³, rents are grown at G (annual appreciation rate of property) thereby reducing the benefit from renting at a rate equivalent the growth rate in property prices.

Buy versus rent decisions – Ex-ante

In order to make an ex-ante buy versus rent decision the individual is required to make a projection for future home price appreciation in the area considered during the expected holding period. If this projection rate is used in equations (4) and (6), SP_{hp} and IP_{hp} can be calculated and compared to formulate a decision.

This paper, however, does not seek to project future home price appreciation. Instead, the model presented earlier is used in order to find the price appreciation (G) needed to make the individual indifferent between buying and renting. This unique equilibrium value is hereafter referred to as the required appreciation rate and is calculated for each point in time and for different locations throughout the sample period. Finding the required appreciation rate is done by equating SP_{hp} to IP_{hp} ²⁴ and solving for G . Using the ex-ante required appreciation rate value at a particular time and location, the individual can make an informed decision of whether buying or renting is likely to be a better monetary decision based on the individual personal projection. Any future projection of annual home price appreciation, which exceeds the required appreciation rate, suggests that buying is preferred. Conversely, any projection that falls below the required

²³ Appreciation is extended to an anonymous reviewer who brought this initial oversight to our attention.

²⁴ The individual assumes that the opportunity cost during the holding period will be similar to the opportunity cost experienced over the 25 years leading to the ex-ante decision.

appreciation rate is associated with a rent recommendation. Hence, the lower the value of the required appreciation rate the higher the probability the individual will conclude that buying is preferred to renting and vice versa. To put the required appreciation rates in perspective, their values are compared with historical appreciation rates and with the actual appreciation rate that followed the ex-ante analysis. Mathematically and intuitively, the model implies that the value of the required appreciation rate is positively related to the opportunity cost and mortgage rates and inversely related to rent-to-price ratios.

Buy versus rent comparisons – Ex-post

While future projection of home price appreciation is required in order to determine ex-ante whether buying is preferred to renting, ex-post comparison can be done by observing past home appreciation. This means that in hindsight it can be determined whether buying was preferred to renting. Using the actual opportunity cost, refinancing opportunities and rent growth that occurred during the holding period the ex-post required appreciation rate is calculated for each point in time and location. This ex-post required appreciation rate is then compared with the actual rate home appreciation rates to reach an ex-post conclusion²⁵. For example, if the ex-post required appreciation rate at a specific point in time and location was 5% and the actual average annual appreciation rate during the following eight years was 4% (6%), with hindsight the individual was better off renting (buying). This comparison is made for the U.S. as a whole, its four regions by quadrant, and across 23 major metropolitan areas through time with semiannual

²⁵ Based on the 8-year holding period assumption associated with the model, hindsight buy versus rent decisions can only be made for the period on or before the second half of 2001.

time interval to provide evidence that supports or rejects the hypothesis that renting is mostly preferred to owning. Results indicating that during the sample period the average required appreciation rate was greater than the average actual appreciation would serve as evidence supporting the hypothesis that renting, from a monetary point of view, was preferred to owning. Similarly, results that show a higher number of periods where renting was preferred compared to the number of periods where buying was preferred would be consistent with the same hypothesis.

Finally, the ex-post value of the hypothetical investment portfolio is compared to the amount of proceeds from sale. Comparing these two values provides economic meaning to the monetary difference between buying and renting a home. This comparison is calculated for each eight-year holding period from 1978-1986 through 2001-2009 for the U.S. as a whole and its four regions by quadrant and is expressed as the value of the investment portfolio divided by the amount of sale proceeds.

Results:

Cross sectional analysis of buy versus rent in the present

Table 1 Panel A provides the results of the buy versus rent analysis associated with the second half of 2009 for each of the 28 areas included in the sample when the risk free rate is used as the opportunity cost. Column (2) reports the required appreciation rate, in annual percentage terms, which makes potential homeowners indifferent between buying and renting. For the U.S. as a

whole, the required appreciation rate is currently 3.62%. This implies that the average potential homebuyer in the U.S. should require appreciation of more than 3.62% annually during the next eight years in order to justify buying rather than renting a home. If the potential homebuyer believes that real estate appreciation in the U.S. is likely to be less than 3.62% annually during that period, renting is preferable to buying. As of the second half of 2009, the required appreciation rate ranges from a low of 2.09% for Detroit to a high of 5.64% for Honolulu. Among the regions, the required appreciation rate for the West is the highest with 4.49%, and it is lowest for the South at only 3.33%.

To put the present required appreciation rates in perspective, column (3) reports the historical 25-year average annual price appreciation for each area. Column (4) reports the difference between the required price appreciation and the average historical 25-year average, and column (5) shows the difference between the required appreciation rate and historical appreciation rates in terms of standard deviations. Out of the 28 areas considered, only Dallas has a required appreciation rate that is higher than the average return they experienced during the last 25 years. These results imply that if the average appreciation experienced during the past 25 years is a reasonable expectation for the future, buying is currently preferable to renting in most areas. However, for the 27 areas with past appreciation that exceeds the required price appreciation, the difference is never statistically significant at the 5% level. Overall, the relatively low and mostly negative values reported in columns (4) and (5) suggest that current housing prices in most areas are slightly below their fundamental rent value when historical long-term price appreciation is considered.

The same information reported in columns (3), (4), and (5) is reported in columns (6), (7), and (8), respectively when the historical price appreciation from the recent housing “boom” period is considered. According to column (7), the required appreciation rate is lower than the appreciation experienced during the “boom” period for all 28 areas. For 15 of the 28 areas the difference is statistically significant. These 15 areas include the U.S. as a whole and three out of the four U.S. regions. These results suggest that a much lower rate of appreciation compared to that of the housing boom is required to justify buying a home over renting. Overall, the results presented in Panel A mostly imply that as of the end of 2009, individuals who expect to maintain the same home quality in the future are likely to be better off owning rather than renting if their future price appreciation projections are based on past performance.

Figure 1 illustrates the relation between the current required appreciation rate and the average appreciation rate during the past 25 years in annual percentage terms. The clear positive relation between the past and required future price appreciation provides evidence that individuals generally expect areas that performed relatively well in the past to continue and perform well in the future and vice versa. While these results suggest that homeowners expect high appreciation to persist in areas that experienced high appreciation in the past, determining whether these expectations are reasonable is a separate issue that is beyond the scope of this paper.

Table 1 Panel B presents the same information reported in Panel A except that the opportunity cost used to calculate the required appreciation rate is the expected rate of return on a risk equal portfolio. Due to the higher expected return on the portfolio used by the individuals who rent rather than own, the required appreciation rate is higher than it is in Panel A. For the U.S. as a

whole, the required appreciation rate is 4.37% and ranges between 3.51% for Kansas-City to 8.08% for Honolulu. Compared with the appreciation rate experienced over the last 25-years, the current required appreciation rate is higher for U.S. as a whole, three out of its four regions and 19 out of the 23 cities included in the sample. The current required appreciation rate is still however, mostly lower than the appreciation rate experienced during the recent housing-boom period (columns 7 and 8). These results suggest that as of the end of 2009, individuals in most areas who expect to change the quality of their home in the future are likely to be better off renting rather than owning if their future price appreciation projections are based on past performance.

Time series analysis of buy versus rent

Figure 2 illustrates the geometric annual average appreciation rate for the U.S. and its four regions. The average annual rate is reported with semi-annual frequency for each rolling 8-year period spanning 1978-1986 to 2001-2009. The Northeast is the most volatile region in the sample with average 8-year appreciation ranging between -0.34% and 12.42% annually. For the U.S. as a whole the range is considerably smaller with a low of 2.67% and a high of 7.50%. This figure is provided in order to put in perspective the time series required appreciation rates derived from the model.

Figure 3 demonstrates the ex-ante required appreciation rate for the U.S. and its four regions from the first half of 1978 to the second half of 2009. The required appreciation rate is shown in percentage terms with semiannual intervals. Panel A includes the required appreciation rate

when the expected risk free rate is used as the opportunity cost and Panel B reports the required appreciation rate when the expected return on a risk equal portfolio is used. The average required appreciation rate for the U.S. during this time period is 5.70% and 6.36% for Panels A and B, respectively and reached a high of 8.87% and 9.47% at the second half of 1981. The lowest required appreciation rates for the U.S. are 3.72% and 4.35% when risk free and risk equal expected returns are used and are both associated with the second half of 2009. These observations imply that the current housing condition in the U.S. instigates the lowest price appreciation hurdle for homeowners since at least 1978.

It is important to note that while the model used to derive the required appreciation rates over time includes some constants, five variables are changing with time. Three of these variables include rent-to-price ratio, mortgage interest rate, and the expected return on the investment portfolio. The other two variables that change over time are the rate of rent growth and the growth rate of homeowner expenses, both of which are set to equal to the required appreciation rate. Generally speaking, the high required appreciation rates observed in the early 80s resulted from high mortgage rates that acted as a headwind for homeowners and high expected return on investment portfolio, which benefited renters. Additionally, at that time, renters enjoyed low rent-to-price ratio levels that were not observed again for 20 years. The low required rate of appreciation that is seen in the second half of 2009 is a result of historic low interest rates and expected return on investment coupled with an increasing rent-to-price ratio, which is a byproduct of the recent sharp decline in home prices. Table 2 compares the time series ex-ante required appreciation rate to the actual appreciation rate. On average, the required appreciation rate for the U.S. is higher than the actual appreciation rate that followed 71% of the time by an

average of 1.1% annually when the risk free rate is used as the opportunity cost. When the risk equal portfolio is used, the required appreciation rate for the U.S. is higher than the actual appreciation rate 79% of the time by an average of 1.7% annually. These results suggest that ex-ante homeowner expectations for price appreciation did not materialized on average, and given the expected opportunity cost renting was preferred to owning over 70% of the time between 1978 and 2009.

Figure 4 shows the ratio between the ex-ante required appreciation rates and mortgage rates through time. Because mortgage rates include inflation expectation, the ratio of required appreciation rate to mortgage rate serves as a proxy for inflation adjusted required appreciation rate. A glance at both Panel A and Panel B reveals that the ratio is generally increasing from the beginning of the sample period until the mid 2000s. The increasing required appreciation rate relative to mortgage rate suggests that expectations for price appreciation in real terms has increased until the height of the housing boom and reversed since then. The average ratio for the U.S. in Panel A (B) is 0.65 (0.74) with a high of 0.87 (1.02) in 2005 and a low of 0.50 (0.54) during the second half of 1981. Figure 4 also demonstrates the differences in the required appreciation rate between regions since mortgage rates are assumed to be equal across regions. The West carries the highest required appreciation rate during most of the period while the South is mostly associated with the lowest required appreciation rate.

Figure 5 provides an ex-post illustration of the buy versus rent analysis from a monetary point of view for individuals that moved into their home between the first half of 1978 and the second half of 2001 for an eight-year period. Unlike the ex-ante analysis, in the ex-post analysis the

actual rather than the expected risk free rate and return on a risk equal portfolio is used. Also, in the ex-post analysis the actual rent growth is included as well as opportunities for mortgage prepayment and refinancing. For the U.S. and its four regions, the figure shows the required appreciation rate at each point in time minus the actual appreciation rate accrued during the following eight-years holding period. Hence, a positive value signifies that the ex-post required appreciation rate was higher than the actual appreciation and suggests that renting was preferred to buying at that point in time. Following the same logic, a negative value suggests that buying was preferred to renting at that point in time. As summarized in Table 2, Panels A and B of Figure 5 show that when the U.S. as a whole is considered, renting was preferred to buying 65% and 75% of the time, respectively. On average, the annual required appreciation return was 1.03% and 2.04% higher than the actual appreciation when risk free and risk equal returns are considered. In retrospect, the period spanning the mid 1990s to the early 2000s was the only time frame in which buying was preferred to renting. This narrow time period is associated with homeowners that purchased a home just before the recent boom and sold it shortly before its sequential bust. However, because most homeowners never transfer back to be renters (Sinai, 1997), it seems unlikely that most homeowners, who benefitted from home appreciation during the boom period, avoided the subsequent housing collapse. The overall findings reported in Figure 5 are consistent with the hypothesis that homebuyers bid up home prices to levels that are, on average, higher than their fundamental rental value and caused renting to be the better monetary option during most of the 32-year period examined.²⁶

²⁶ With the exception of the Northeast region when risk free opportunity cost is considered. Under this scenario renting is preferred to owning only 42% of the time.

Figure 6 highlights the economic significance between buying and renting a home by showing the value of the hypothetical investment portfolio at the end of the holding period relative to the net proceeds from sale upon disposal of the property. A value of 1 signifies that the value of the portfolio equals the amount of proceeds from sale. A value of 2 (0.5), for example, would suggest that the value of the portfolio held by a renter is twice (half) as much as the sale proceeds captured by the homeowner at the end of the eight-year holding period. Similar to the results from Figure 5, the value of the investment portfolio exceeds the amount of proceeds from sale most of the time for the U.S. and its four regions. As it is reported in Table 2, for the U.S., on average, the value of the investment portfolio at the end of the eight-year holding period is 26% and 46% higher than the amount of sale proceeds when risk free and risk equal opportunity cost are employed in the analysis. According to the model, when risk free opportunity cost is considered, individuals that rented a home in the U.S. for eight years beginning in 1989 accumulated an investment portfolio valued 98% higher than the amount of proceeds from sale from a comparative purchase. On the other hand, the portfolio value of individuals that began renting at the beginning of 1999 accumulated 37% less total value than the comparative proceeds from sale over the same period. The most extreme difference between the value of the investment portfolio at the end of any eight-year holding period and the amount of sale proceeds from a comparative purchase occurred in the Northeast under the risk equal approach. For the Northeast region, the value of the investment portfolio would have been as high as 1699% above or as low as 57% below the amount of proceeds from sale if individuals rented their place of residence beginning at the second half of 1988 or the first half of 2001, respectively.

It is important to note the generally similar results between the ex-ante and ex-post scenarios. The similar analysis results imply that ex-post renting is mostly preferred to owning because real estate price appreciation were too low relative to expectations and not due to the difference between the actual and expected rent growth, interest rates and opportunity cost. Also worth noting is the fact that renting was preferred to owning during most of the time period examined regardless of whether risk free rate or return on risk equal portfolio was used as the opportunity cost. While the difference between the opportunity costs makes a difference on the margin, it does not sway the overall results.

Conclusion:

Ownership is virtually universally viewed as being the superior choice when whether to buy or rent residential property is being decided. Evidence suggests that ownership increases preferable societal outcomes and increases individual wealth (Engelhardt, 1994; Haurin, Hendershott, and Wachter, 1996; Rohe, McCarthy, and Van Zandt, 2002; Haurin, Parcel, and Haurin, 2002; and Dietz and Haurin, 2003, among others). In fact, there seems to be an almost national obsession with ownership, resulting in a paradigm that favors ownership.

This work challenges this homeownership paradigm. Specifically, arguments are made that link rent-to-price ratios with property growth rates and property price volatility to property appreciation rates needed to make an individual indifferent between buying and renting. Combining this logic with American's mania to own results in a crowding towards ownership resulting in significant periods during the recent past over which renting was the actual superior

financial decision. This result is conditional on an individual taking any residual money from renting and reinvesting at a rate equal to, or greater than, the risk free rate. Additionally, and perhaps surprisingly, conditions (historically low mortgage rates and relatively low rent-to-price ratios) now seem in place to favor future purchases.

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<Note to Editor, insert Tables and Figures where you deem most appropriate>

Table 1:
Ex-Ante Current Required Appreciation Rates Relative to Past Appreciation

Panel A:
Risk Free Opportunity Cost.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Area	RAR	Average 25 yrs	RAR – 25yrs	STD (RAR – 25yrs)	Average Boom	RAR - Boom	STD (RAR- Boom)
USA	3.62%	4.26%	-0.64%	-0.42	7.87%	-4.25%	-2.76
Midwest	3.62%	3.94%	-0.32%	-0.42	5.43%	-1.81%	-2.40
Chicago	3.89%	4.75%	-0.86%	-0.62	7.98%	-4.09%	-2.95
Cincinnati	3.49%	3.57%	-0.08%	-0.11	3.95%	-0.46%	-0.62
Cleveland	2.68%	3.36%	-0.68%	-0.52	3.24%	-0.56%	-0.43
Detroit	2.09%	3.61%	-1.52%	-0.53	3.26%	-1.17%	-0.41
Kansas City	2.70%	3.29%	-0.59%	-0.44	4.94%	-2.24%	-1.66
Milwaukee	4.11%	4.56%	-0.45%	-0.68	6.78%	-2.67%	-4.05
Minneapolis	3.26%	4.15%	-0.89%	-0.40	8.34%	-5.08%	-2.29
St. Louis	3.53%	3.73%	-0.20%	-0.15	6.42%	-2.89%	-2.22
Northeast	4.25%	5.03%	-0.78%	-0.24	9.87%	-5.62%	-1.72
Boston	4.91%	5.40%	-0.49%	-0.12	9.85%	-4.94%	-1.22
New York	5.10%	5.75%	-0.65%	-0.16	11.99%	-6.89%	-1.75
Philadelphia	4.05%	5.27%	-1.22%	-0.40	10.10%	-6.05%	-2.00
Pittsburgh	3.43%	3.91%	-0.48%	-0.68	4.85%	-1.42%	-2.00
South	3.33%	3.59%	-0.26%	-0.20	6.92%	-3.59%	-2.78
Atlanta	3.10%	3.31%	-0.21%	-0.16	4.95%	-1.85%	-1.39
Dallas	2.34%	1.97%	0.37%	0.19	4.02%	-1.68%	-0.88
Houston	2.28%	2.58%	-0.30%	0.18	4.99%	-2.71%	-1.68
Miami	3.40%	4.62%	-1.22%	-0.33	16.26%	-12.86%	-3.50
West	4.49%	4.77%	-0.28%	-0.13	11.08%	-6.59%	-3.03
Denver	2.88%	4.02%	-1.14%	-0.47	5.21%	-2.33%	-0.95
Honolulu	5.64%	5.99%	-0.35%	-0.07	12.43%	-6.79%	-1.34
Los Angeles	4.73%	5.50%	-0.77%	-0.15	15.87%	-11.14%	-2.13
Portland	4.38%	5.66%	-1.28%	-0.87	8.78%	-4.40%	-2.99
San Diego	3.80%	5.29%	-1.49%	-0.33	14.07%	-10.27%	-2.25
San Francisco	5.00%	6.48%	-1.48%	-0.40	11.09%	-6.09%	-1.65
Seattle	4.17%	6.06%	-1.89%	-1.26	9.33%	-5.16%	-3.44

Panel B:
Risk Equal Opportunity Cost.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Area	RAR	Average 25 yrs	RAR – 25yrs	STD (RAR – 25yrs)	Average Boom	RAR - Boom	STD (RAR- Boom)
USA	4.37%	4.26%	0.11%	0.07	7.87%	-3.50%	-2.27
Midwest	3.74%	3.94%	-0.20%	-0.26	5.43%	-1.69%	-2.24
Chicago	4.67%	4.75%	-0.08%	-0.06	7.98%	-3.31%	-2.38
Cincinnati	3.56%	3.57%	-0.01%	-0.01	3.95%	-0.39%	-0.53
Cleveland	3.64%	3.36%	0.28%	0.21	3.24%	0.40%	0.30
Detroit	4.22%	3.61%	0.61%	0.21	3.26%	0.96%	0.34
Kansas City	3.51%	3.29%	0.22%	0.16	4.94%	-1.43%	-1.06
Milwaukee	4.72%	4.56%	0.16%	0.24	6.78%	-2.06%	-3.12
Minneapolis	4.78%	4.15%	0.63%	0.28	8.34%	-3.56%	-1.61
St. Louis	4.17%	3.73%	0.44%	0.34	6.42%	-2.25%	-1.73
Northeast	6.52%	5.03%	1.49%	0.46	9.87%	-3.35%	-1.02
Boston	7.26%	5.40%	1.86%	0.46	9.85%	-2.59%	-0.64
New York	7.47%	5.75%	1.72%	0.44	11.99%	-4.52%	-1.15
Philadelphia	6.37%	5.27%	1.10%	0.36	10.10%	-3.73%	-1.23
Pittsburgh	3.52%	3.91%	-0.39%	-0.55	4.85%	-1.33%	-1.88
South	3.99%	3.59%	0.40%	0.31	6.92%	-2.93%	-2.26
Atlanta	4.11%	3.31%	0.80%	0.60	4.95%	-0.84%	-0.63
Dallas	4.47%	1.97%	2.50%	1.31	4.02%	0.45%	0.23
Houston	4.28%	2.58%	1.70%	1.02	4.99%	-0.71%	-0.42
Miami	5.73%	4.62%	1.11%	0.30	16.26%	-10.53%	-2.87
West	5.79%	4.77%	1.02%	0.47	11.08%	-5.29%	-2.43
Denver	5.13%	4.02%	1.11%	0.45	5.21%	-0.08%	-0.03
Honolulu	8.08%	5.99%	2.09%	0.41	12.43%	-4.35%	-0.86
Los Angeles	7.06%	5.50%	1.56%	0.30	15.87%	-8.81%	-1.68
Portland	6.73%	5.66%	1.07%	0.73	8.78%	-2.05%	-1.39
San Diego	6.01%	5.29%	0.72%	0.16	14.07%	-8.06%	-1.77
San Francisco	7.40%	6.48%	0.92%	0.25	11.09%	-3.69%	-1.00
Seattle	5.27%	6.06%	-0.79%	-0.53	9.33%	-4.06%	-2.71

Table 1 reports the required appreciation rate (RAR) as of the 2nd half of 2009, according to the model and assumptions described in the text. RAR is the annual appreciation rate potential homeowners must realize to be indifferent between buying and renting. Average 25yrs and Average Boom are the average annual appreciation occurred during the 25 years ending in Q4:2009 and 7 years ending in Q4:2006, respectively. RAR-25yrs and RAR-Boom represent the RAR minus the average appreciation each area experienced during the past 25 years and during the boom period, respectively. Finally, STD(RAR-25yrs) and STD(RAR-Boom) are associated with the number of standard deviations between the excess of RAR over the past 25 years and boom period appreciation and the average appreciation during that time. The RAR in Panel A is calculated using risk free rate as the opportunity cost. The RAR in Panel B is calculated using the rate of return on a risk equal portfolio as the opportunity cost.

Table 2:
Buy versus Rent: Results of Time-Series Analysis

Panel A:
Risk Free Opportunity Cost.

	<i>USA</i>	<i>Midwest</i>	<i>Northeast</i>	<i>South</i>	<i>West</i>
Ex-Ante % of Time RAR < AAR	70.83%	70.83%	45.83%	70.83%	70.83%
Ex-Post % of Time RAR < AAR	64.58%	64.58%	41.66%	62.50%	64.58%
Ex-Ante Annual Avg. RAR – AAR	1.14%	1.36%	-0.02%	1.60%	1.01%
Ex-Post Annual Avg. RAR – AAR	1.03%	1.30%	-0.22%	1.54%	0.91%
Ex-Post Average Portfolio Value / Sale Proceeds	1.2563	1.2992	1.6276	1.4424	1.2633

Panel B:
Risk Equal Opportunity Cost.

	<i>USA</i>	<i>Midwest</i>	<i>Northeast</i>	<i>South</i>	<i>West</i>
Ex-Ante % of Time RAR < AAR	79.17%	75.00%	58.33%	83.33%	81.25%
Ex-Post % of Time RAR < AAR	75.00%	66.67%	68.75%	72.92%	75.00%
Ex-Ante Average RAR – AAR	1.74%	1.46%	1.78%	2.13%	2.00%
Ex-Post Average RAR – AAR	2.04%	1.47%	4.85%	2.41%	2.60%
Ex-Post Average Portfolio Value / Sale Proceeds	1.4541	1.3301	3.6034	1.6417	1.5999

Table 2 summarizes the ex-ante and ex-post results for the buy versus rent analysis for the moving 8-year holding period spanning 1978-1986 to 2001-2009. The required appreciation rate (RAR) is calculated according to the model and assumptions described in the text and it is defined as the annual appreciation rate potential homeowners must realize to be indifferent between buying and renting. Actual appreciation rate (AAR) is obtained from Federal Finance Housing Agency (FHFA). The RAR in Panel A is calculated using risk free rate as the opportunity cost. The RAR in Panel B is calculated using the rate of return on a risk equal portfolio as the opportunity cost.

Figure 1:
Current Required Appreciation Rate versus Past Housing Appreciation

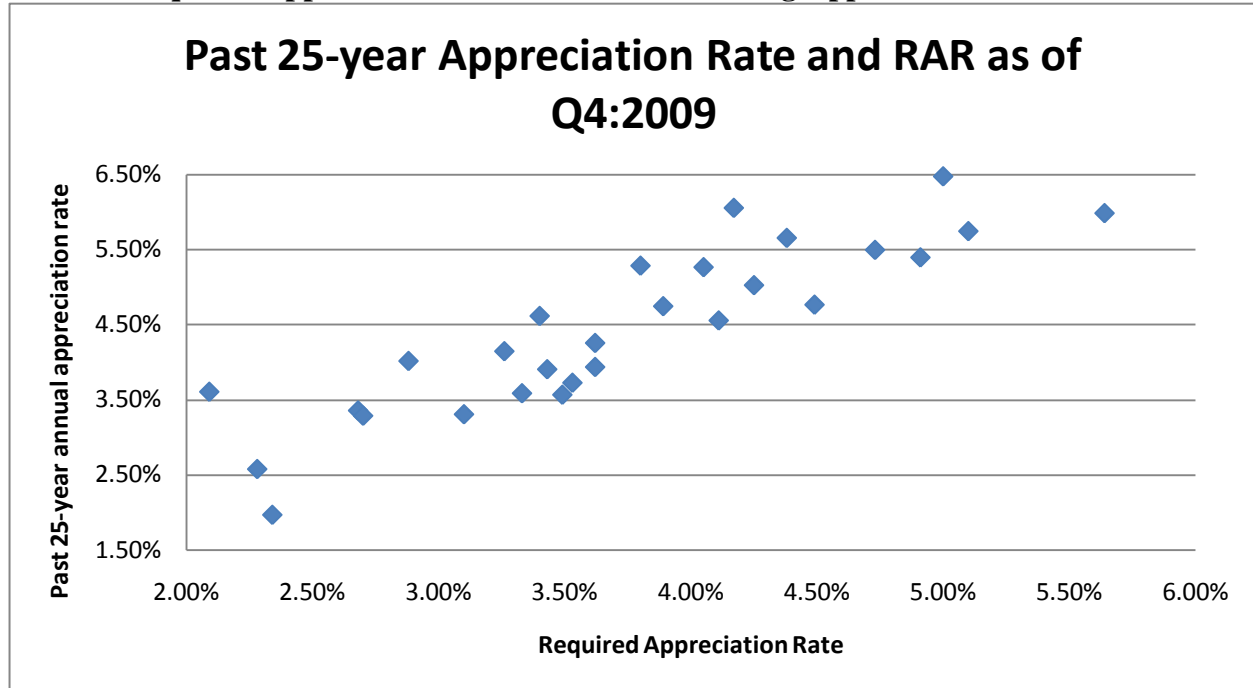


Figure 1: 25-year period of housing appreciation ends in Q4:2009. Required appreciation rate (RAR) are calculated as of the 2nd half of 2009, according to the model and assumptions described in the text. RAR is the annual appreciation rate potential homeowners must realize in order to be indifferent between buying and renting and is calculated using risk free rate as the opportunity cost.

Figure 2:
Housing Average Price Appreciation Rate

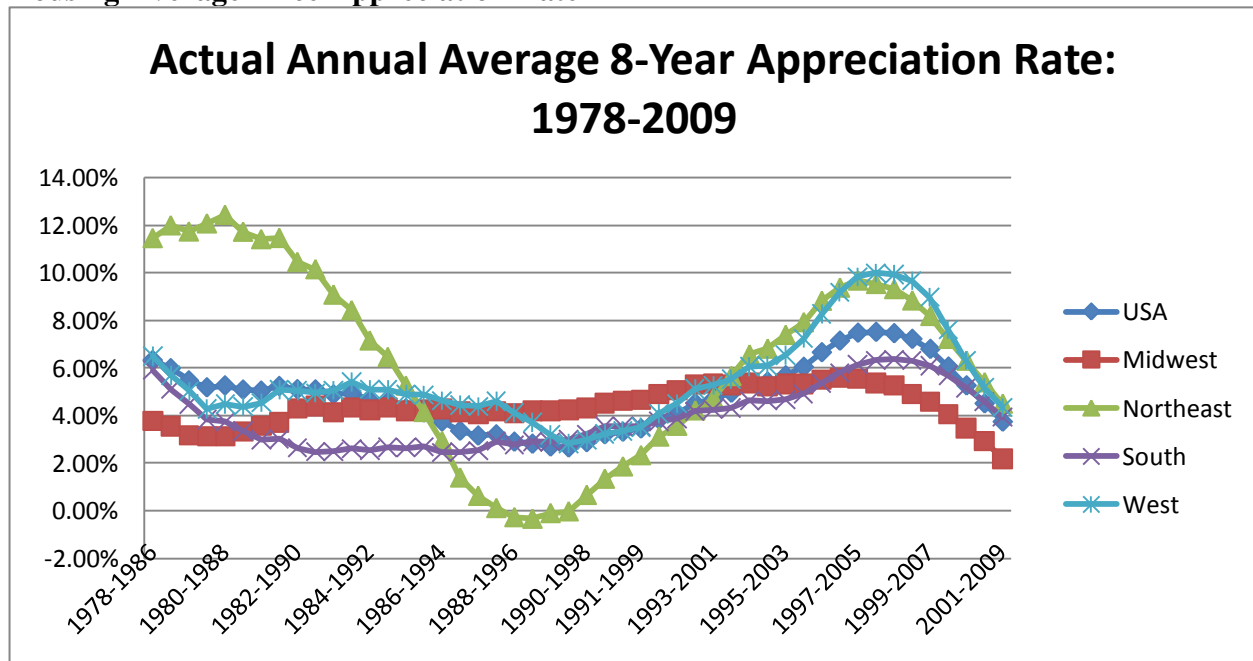
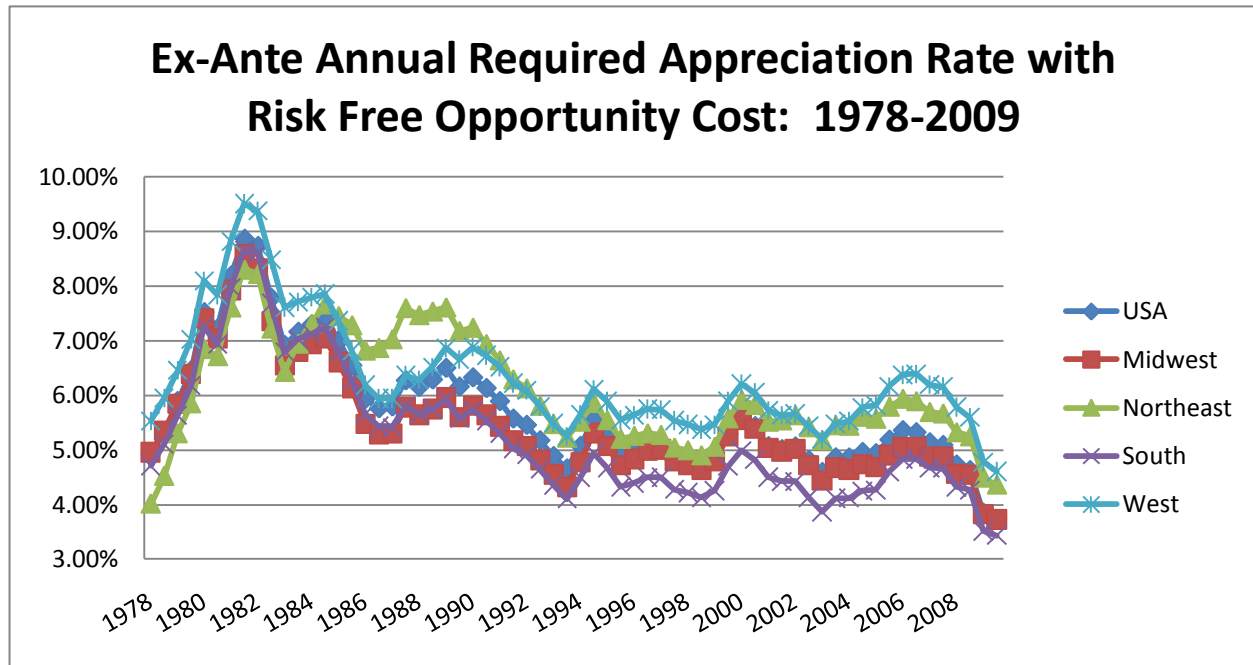


Figure 2: The geometric annual average return for each 8-year holding period is calculated from data obtained the Federal Housing Finance Agency (FHFA). The figure spans the 1978-2009 period with a semi-annual frequency.

Figure 3:
Ex-Ante Required Appreciation Rate: 1978-2009

Panel A:



Panel B:

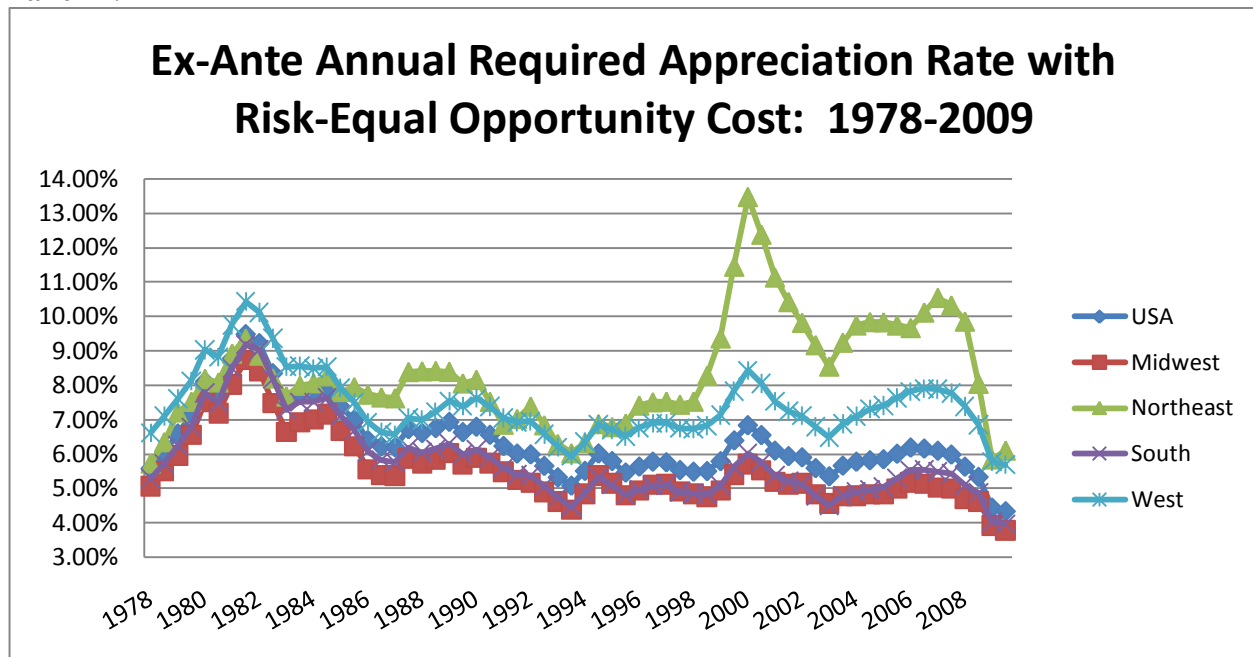
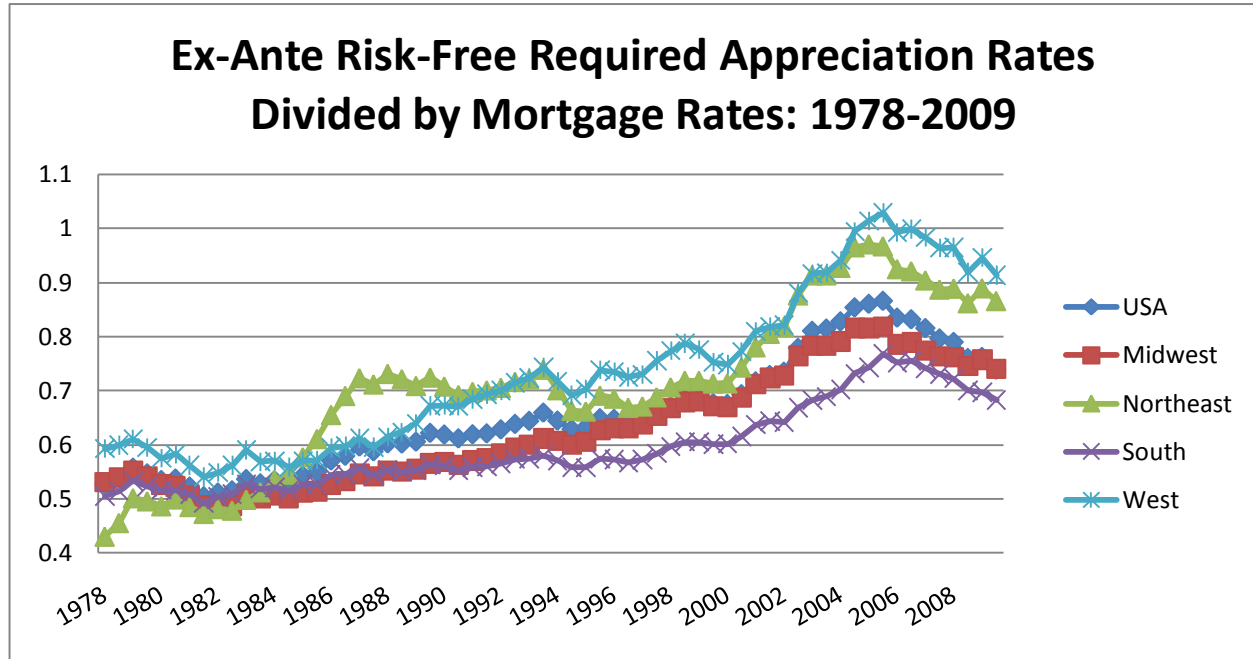


Figure 3: Required appreciation rates (RAR) are calculated semiannually between 1978 and the 2nd half of 2009 according to the model and assumptions described in the text. RAR is the annual appreciation rate potential homeowners must realize to be indifferent between buying and renting. The RAR in Panel A is calculated using risk free rate as the opportunity cost. The RAR in Panel B is calculated using the rate of return on a risk equal portfolio as the opportunity cost.

Figure 4:
Ex-Ante Required Appreciation Rates Relative to Mortgage Rates: 1978-2009

Panel A:



Panel B:

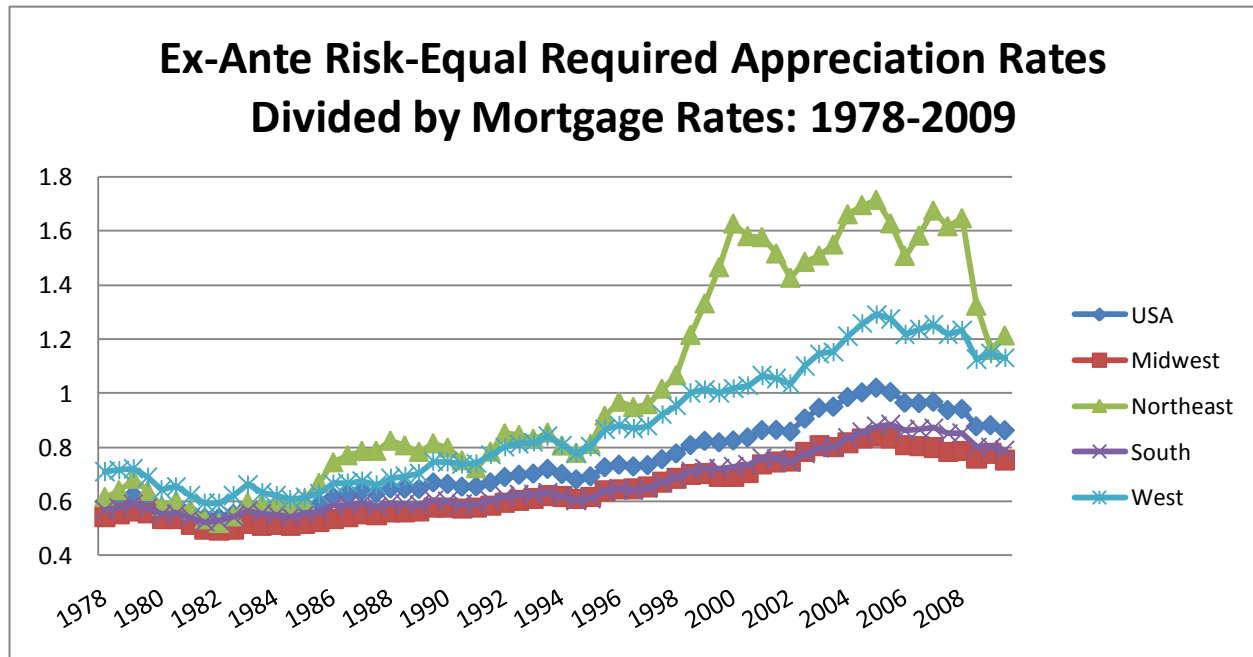
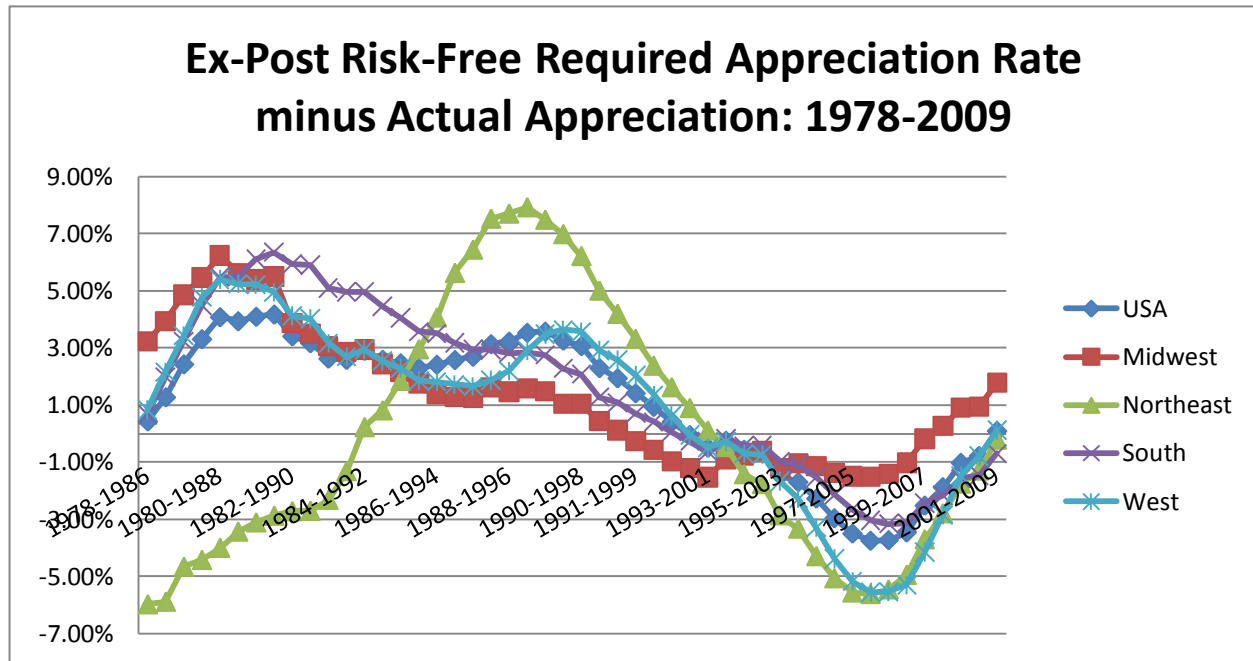


Figure 4: Required appreciation rates (RAR) are calculated semiannually between 1978 and the 2nd half of 2009 according to the model and assumptions described in the text and divided by the average 30-year mortgage rate. RAR is the annual appreciation rate potential homeowners must realize in order to be indifferent between buying and renting. The RAR in Panel A is calculated using risk free rate as the opportunity cost. The RAR in Panel B is calculated using the rate of return on a risk equal portfolio as the opportunity cost.

Figure 5:
Ex-Post Required Appreciation Rate minus Actual Appreciation Rates: 1978-2009

Panel A:



Panel B:

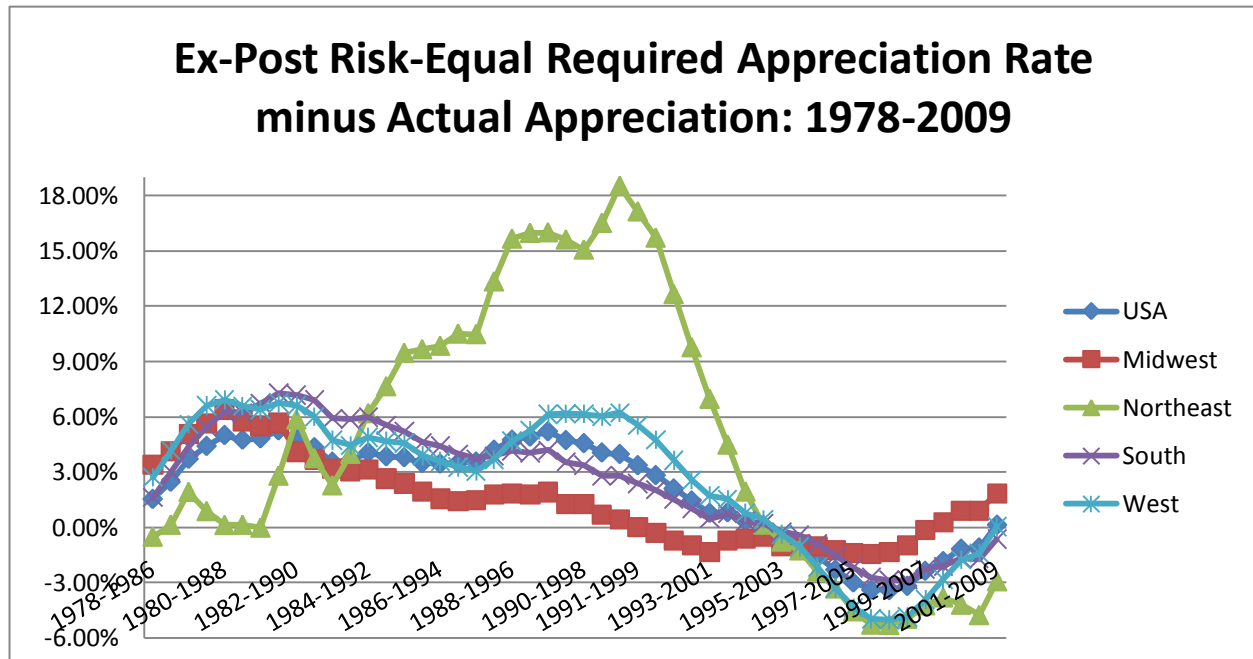
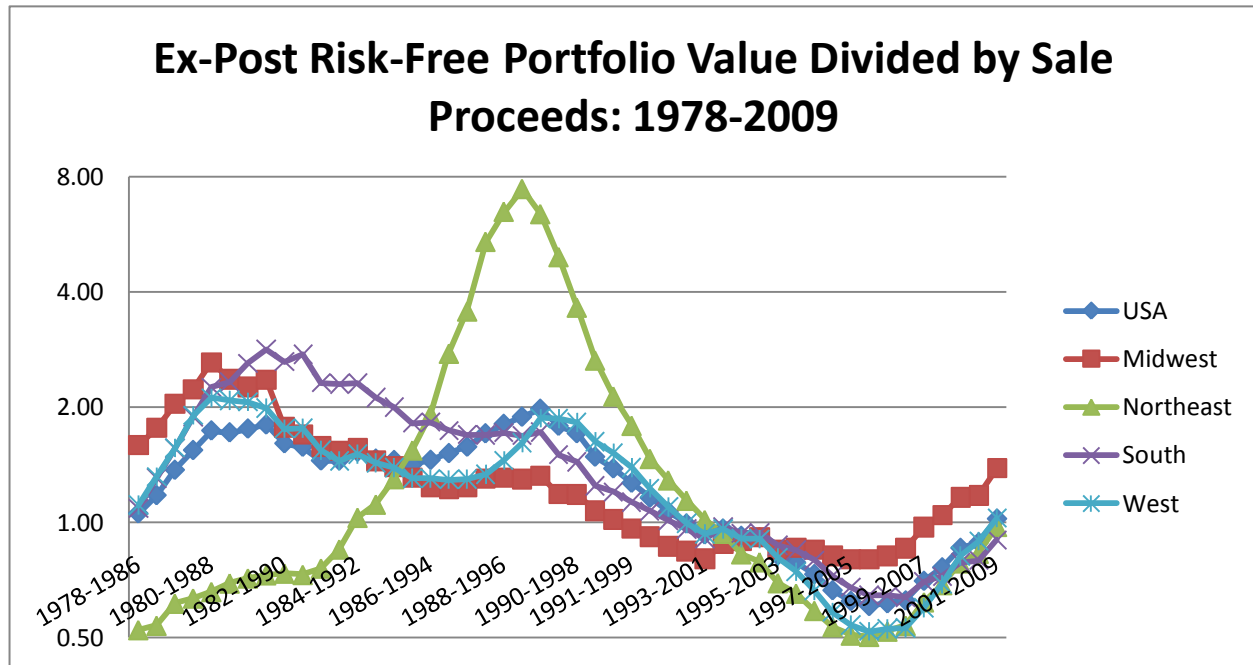


Figure 5: Required appreciation rate is the annual appreciation rate potential homeowners must realize to be indifferent between buying and renting and is calculated with semiannually frequency according to the model and assumptions described in the text. Actual housing appreciation is defined as the average annual housing appreciation occurred during the holding period (8 years) following each point in time and is obtained from the Federal Housing Finance Agency (FHFA). The RAR in Panel A is calculated using risk free rate as the opportunity cost. The RAR in Panel B is calculated using the rate of return on a risk equal portfolio as the opportunity cost.

Figure 6:
Ex-Post Portfolio Value Relative to Sale Proceeds: 1978-2009

Panel A:



Panel B:

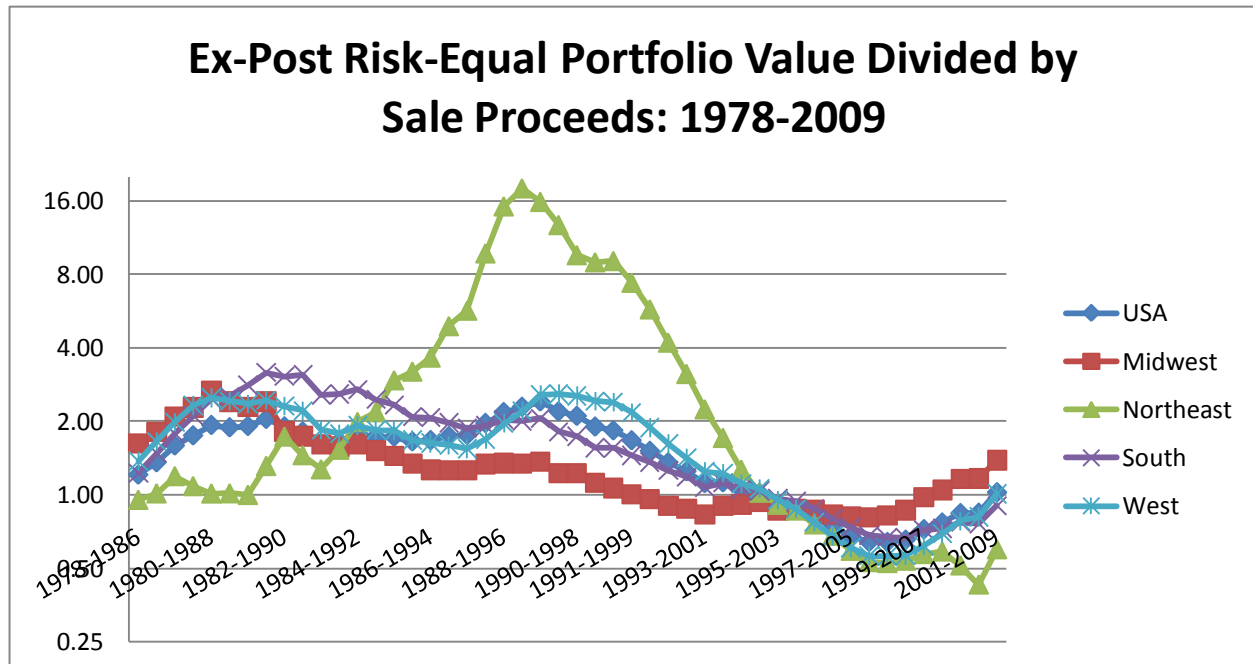


Figure 6 demonstrates the value of the hypothetical investment portfolio relative the amount of sale proceeds at the disposal a residential property purchased between 1978 and the 2nd half of 2001 and held for 8 years. The values of the investment portfolio and sale proceeds are calculated according to the model and assumptions described in the text. In Panel A the return on the portfolio is the risk free rate. In Panel B the return on the portfolio is the return on a risk equal portfolio.