

The Ship Appears to be Turning

Eli Beracha, Hilla Skiba, and Mark Hirschey

Abstract

Since early 2007, housing has experienced a prolonged slump in prices. This study investigates the state of housing markets across the United States as of June 2011 and finds that housing is undervalued in almost all markets. Two housing affordability measures (price-to-income ratio and mortgage payment-to-income ratio) show ownership is less costly today than during most of the nation's recent past. Additionally, a buy versus rent analysis suggests that ownership rather than renting is the preferable housing tenure choice from a financial standpoint in the majority of American real estate markets. These findings combine to indicate the presence of near term unprecedented opportunities for home ownership.

Housing was perceived as a sound and safe investment that provided high returns for the average American family prior to 2006. Property ownership was often held as the "American dream," supported at all levels of society. Statements such as "Don't throw your money away on rent," "Why rent when you can own?" and "Housing only appreciates" went virtually unchallenged as arguments in support of home ownership. But how much truth do these statements still hold after a prolonged slump in housing prices that started in 2007?

According to housing data provided by Shiller,¹ over the 121-year period spanning 1890 through 2010, the national Real Housing Price Index increased by a cumulative amount of approximately 20%, which translates to a 0.15% annual rate of appreciation in real terms. However, even though real housing appreciation in the long term has been nearly flat, housing price momentum contributes to noticeable price improvements and deteriorations in the short and medium terms. These persistent price trends cause housing to often deviate from its intrinsic value before reverting back to a price level that is consistent with fundamentals.

Gau (1984, 1987) and Case and Shiller (1989) were among the first to document that the price-trend behavior of the real estate market is relatively inefficient when compared with traditional financial markets. Specifically with regard to momentum, the same factors that have been shown to drive momentum in U.S. stocks and real estate investment trusts are prominent in the housing market (Jegadeesh and Titman, 1993; Chui, Titman, and Wei, 2003; Derwall, Huij, Brounen, and Marquering, 2009). These factors include, but are not limited to, illiquidity, inability to short sell, high transaction costs, barriers to entry, indivisibility, and asset uniqueness. Moreover, because most participants (buyers and sellers) in the residential real estate market are individuals with limited experience in housing transactions, they are more likely to exhibit overconfidence (Gervais and Odean,

2001), which is also shown to contribute to price momentum (Daniel, Hirshleifer, and Subrahmanyam, 1998; and Chui, Titman, and Wei, 2010). In a recent paper, Beracha and Skiba (2011) document that housing price momentum is present and contributing to price swings in the major metropolitan areas of the United States. Additionally, Beracha and Skiba illustrate the ability of potential homebuyers to forecast the relative strength of a particular city's residential real estate market by simply observing that market's recent performance.

Based on historical housing price data for the U.S. at aggregate and state levels, it is clear that positive momentum partially drove prices of homes higher for a long period of time in a bull market that began in 1995 and lasted until 2006. This long bull market was then followed by an unprecedented bear market, and (very similar to the recent boom period) the bust period extends to present day and is partially prolonged due most certainly to negative price momentum. Generally, price momentum makes returns more predictable over both medium- and long-term time windows. By realizing the gap between housing prices and intrinsic values, some potential homeowners may find opportunities to enter the market at the right time before the eventual reemergence of positive momentum in property prices. In the past, a contrarian approach to investing in traditional financial markets has proven to be profitable in the long term in momentum-fueled markets (DeBondt and Thaler, 1985; and Jegadeesh, 1990). Unfortunately, however, it is difficult for potential homeowners to capitalize on deviations from intrinsic value based on raw price changes alone due to high transaction costs and the high degree of uncertainty over the relative costliness of ownership.

The goal of this paper is to assess the present day relative costliness of homeownership, and thereby assist the millions of Americans currently facing a housing tenure choice. To accomplish this goal, this current work uses three different metrics to assess the cost of ownership at both the broad and regional market levels. A buy/rent decision analysis and two housing affordability measures (price-to-income and mortgage payment-to-per capita income) are employed to assess the relative costliness of ownership and the reasonableness of buying versus renting in residential markets around the country. The results indicate that housing markets have overcorrected since the 2006 peak. As a result, average housing across the majority of the U.S. is presently substantially underpriced relative to its historical values. Depending on the metric employed, the results from the analyses indicate that as of 2011, U.S. housing is on average underpriced by 14% to 47%. Housing underpricing also appears to be geographically widespread, even though the degree of underpricing varies greatly by location. Finally, in virtually all markets, ownership appears to be the current financially superior tenure choice based on current levels of needed property appreciation.

Summary of Recent Events and Motivation

The most recent housing boom period, in which home prices peaked in 2006, and the subsequent housing collapse serve as the most recent examples of the effects of pricing momentum in housing markets. The Housing Price Index from the Federal Housing Finance Agency (FHFA) indicates that U.S. housing on a national level climbed at an average real (nominal) annual rate of 5.11% (7.94%) in the five years leading up to the

end of the 2006. During that time, it is believed that “loose” lending practices and a general sense of optimism with regard to housing combined to keep prices steadily rising. Many potential homeowners became convinced that prices would never decline. This housing optimism was quickly replaced by a negative sentiment toward housing that started in early 2007. Between the beginning of 2007 and June 2011, U.S. housing prices declined nationally at an average annual real (nominal) rate of 6.22% (3.85%). Such a sharp and prolonged decline is unprecedented. In fact, according to the U.S. Census Bureau, the period from 2007 to mid-2011 is the only 54-month span in which the U.S. market has experienced nominal declines in housing prices and the most severe decrease in the rate of homeownership since the Great Depression.

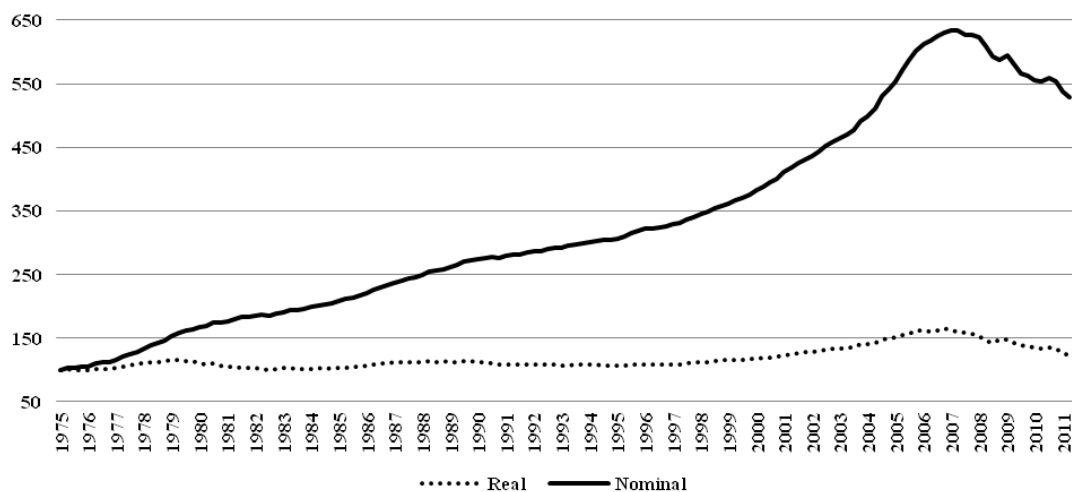
The price swings that U.S. housing experienced over the last 10 years is especially impressive, considering that these swings were largely driven by just a few states in which housing price changes were particularly large in magnitude. In California, Nevada, and Florida, cumulative housing price appreciation was 100.8%, 95.5%, and 103.5%, respectively, during the 2001:Q4 to 2006:Q4 time period. Between 2006:Q4 and 2011:Q2, prices in these states fell by a total of 36.8%, 53.3%, and 42.2%, respectively. In contrast, in states such as Texas, South Dakota, and Oklahoma, the cumulative price appreciation during the five years ending in 2006:Q4 ranged from 20% to 30%. In these states, from 2006:Q4 to 2011:Q2, housing prices only fell by an approximate total of 8%.

Academics and practitioners began to question whether the housing market had finally bottomed out as early as 2009. In particular, a study conducted by Leon (2009) on behalf of Standard & Poor’s provided a negative 2009 housing outlook, but predicted market pricing improvements starting in early 2010. In hindsight, this prediction and countless others did not fully reflect the severe effects of the “Great Recession” on the overall economy and on housing in particular. Housing prices have continued their downward spiral since 2009 through 2011, even in the presence of historically low mortgage rates. As of the end of 2011, raw housing prices have not shown any definite signs of recovery in most markets.

Medium-Term Trends

The general trend in the overall U.S. housing market during the 37 years from 1975 to 2011 is characterized by three bull-bear market cycles. Exhibit 1 shows the real and nominal price appreciations of the broad U.S. market from 1975:Q1 to 2011:Q2. The nominal index plotted in the figure is based on the U.S. Housing Price Index (HPI), which (as well as the rest of the housing price data employed for the analysis in this paper) is obtained from the FHFA. Since 1975, the FHFA has provided a quarterly Housing Price Index for the U.S. as a whole, as well as for eight geographical regions, 50 states, and nearly 400 metropolitan statistical areas (MSAs). These indices are based on repeated home sales for single-family homes. Thus, only conforming mortgage transactions provided by Freddie Mac and Fannie Mae are incorporated into the computation of the HPI. The nominal index in Exhibit 1 is normalized to 100 as of 1975:Q1, and the real HPI is generated from the nominal series by using the Consumer Price Index (CPI) provided by the Bureau of Labor Statistics (BLS).

Exhibit 1. Real and Nominal U.S. Home Price Index: 1975:Q1 to 2011:Q2



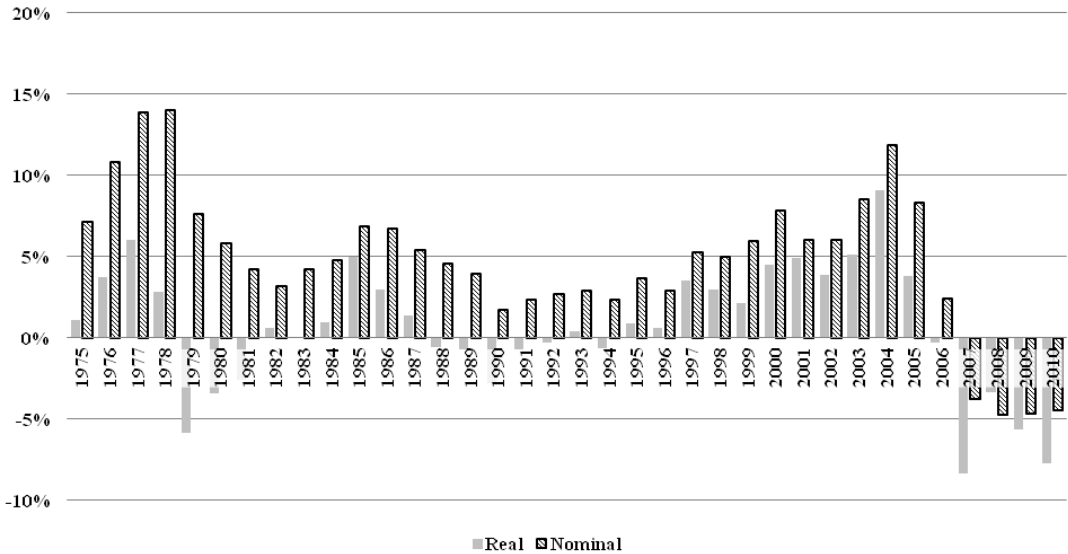
Sources: Nominal index (normalized to 100 as of 1975:Q1): U.S. Housing Price Index, provided by the Federal Housing Finance Agency; Real Housing Price Index generated from nominal index: Consumer Price Index, provided by the Bureau of Labor Statistics.

The histogram presented in Exhibit 2 displays the annual price changes of U.S. housing from 1975 to 2010. In nominal terms, the broad housing market did not experience a price decline during the 32 years spanning 1975–2006. However, housing prices depreciated in real terms from 1979 to 1981 and from the late 1980s to the early 1990s before an extended bull market that peaked in 2006. The value of the U.S. housing market has been declining in both real and nominal terms since 2007.

Exhibits 1 and 2 also provide a visual illustration that bull and bear housing markets are mostly uninterrupted and the transformation between up and down pricing trends is typically smooth and involves a “topping” or “bottoming” period that lasts for a considerable time period. This observation is consistent with the relative inefficiency of the housing market and its tendency to display price momentum, which is well documented in the real estate literature. This price-trend behavior, which does not exist in the more efficient financial markets, allows informed potential homeowners to time their purchases and capture at least a portion of the undervaluation of housing when it exists.

Exhibit 3 details the real price changes during the 1975–2011 time period, so that the price changes are shown separately for the three bull and three bear market cycles for the U.S., as well as the 50 states and the District of Columbia. The housing price changes are documented as percentages of real price changes and annual rate changes. The real price change is the real cumulative percentage change in housing prices during the corresponding bull or bear time period. The annual rate change is the real percentage change in housing prices during each period in annualized terms.

Exhibit 2. U.S. Housing: Annual Price Change: 1975–2010



Sources: Nominal price changes: U.S. Housing Price Index, provided by the Federal Housing Finance Agency; real housing price changes (generated from nominal price changes): Consumer Price Index, provided by the Bureau of Labor Statistics.

The sample average values for each time period (second to last row in Exhibit 3) are different from the values for the U.S. (first row in the table) because price changes of the U.S. are weighted averages based on the housing stock in each state, whereas the averages reported in this table are equally weighted. The last row of Exhibit 3 shows the percentage of states for which housing experienced a total positive or negative real price change during the corresponding bull or bear time period, respectively.

As Exhibit 3 shows, the bull-bear cycle from 1995 to 2011 (as of 2011:Q2) is longer, stronger in magnitude, and more widespread than the bull-bear cycles that spanned 1975–1984 and 1984–1995. The latest bull-bear cycle involved 100% and 98% (North Dakota being the lone exception) of the states, respectively. Also, the bull market that began in 1995 and lasted until 2006 yielded an average annual real price appreciation of 3.8%, despite its 12-year length, and was followed by a cumulative real price decline greater than 25% over the comparatively short period from 2007 to 2011.

Property Prices and Incomes per Capita²

Case and Shiller (2004) demonstrate that personal income alone explains more than 90% of average home prices at the state level, and they support the theory that housing appreciation should not exceed income growth over a long time period due to affordability constraints. However, Gyourko, Mayer, and Sinai (2006) show that housing price appreciation may deviate substantially from income growth levels in the short and

Exhibit 3. Real Price Changes during 1975:Q1 to 2011:Q2 Bull and Bear Cycles in U.S. Housing Markets

State	Bull: 1975:Q1–1979:Q1		Bear: 1979:Q1–1984:Q3		Bull: 1984:Q3–1989:Q4		Bear: 1989:Q4–1995:Q1		Bull: 1995:Q1–2006:Q4		Bear: 2006:Q4–2011:Q2	
	Real Price Change, %	Annual Rate, %	Real Price Change, %	Annual Rate, %	Real Price Change, %	Annual Rate, %	Real Price Change, %	Annual Rate, %	Real Price Change, %	Annual Rate, %	Real Price Change, %	Annual Rate, %
United States	15.38	3.64	-11.64	-2.22	11.83	2.15	-6.89	-1.14	54.95	3.80	-25.09	-6.22
Alabama	3.41	0.84	-20.75	-4.14	-2.33	-0.45	-1.87	-0.30	27.89	2.12	-14.47	-3.41
Alaska	6.76	1.65	11.38	1.98	-44.44	-10.59	19.40	2.88	43.28	3.11	-8.95	-2.06
Arizona	13.77	3.28	-10.45	-1.99	-9.56	-1.90	-3.45	-0.56	105.74	6.33	-50.72	-14.55
Arkansas	3.65	0.90	-12.23	-2.34	-11.52	-2.30	0.12	0.02	23.92	1.84	-13.54	-3.18
California	53.70	11.34	-4.18	-0.77	53.74	8.54	-26.19	-4.74	138.42	7.67	-43.46	-11.90
Colorado	28.77	6.53	-7.91	-1.49	-16.11	-3.29	19.67	2.91	48.27	3.41	-17.37	-4.15
Connecticut	16.85	3.97	-9.26	-1.75	54.85	8.69	-30.83	-5.73	61.96	4.19	-23.83	-5.87
Delaware	-15.92	-4.24	1.98	0.36	41.14	6.78	-15.75	-2.70	64.23	4.31	-24.37	-6.02
DC	43.99	9.54	-19.58	-3.89	46.93	7.61	-17.96	-3.12	152.15	8.19	-17.38	-4.15
Florida	1.80	0.45	-3.91	-0.72	-1.20	-0.23	-9.98	-1.67	118.28	6.87	-48.29	-13.63
Georgia	-11.88	-3.11	-5.10	-0.95	7.38	1.37	-9.33	-1.56	38.28	2.80	-26.25	-6.54
Hawaii	-1.51	-0.38	-1.07	-0.20	52.93	8.43	5.61	0.88	54.44	3.77	-24.18	-5.97
Idaho	9.24	2.24	-21.54	-4.31	-11.73	-2.35	19.23	2.85	50.50	3.54	-32.06	-8.23
Illinois	9.19	2.22	-23.96	-4.86	23.04	4.03	1.04	0.17	40.26	2.92	-25.51	-6.34
Indiana	10.82	2.60	-22.94	-4.63	7.15	1.32	1.90	0.30	13.81	1.11	-14.65	-3.46
Iowa	26.33	6.02	-29.79	-6.23	-4.24	-0.82	8.50	1.31	23.36	1.80	-9.62	-2.22
Kansas	13.93	3.31	-20.46	-4.08	-7.20	-1.41	-3.08	-0.50	26.78	2.04	-11.84	-2.76
Kentucky	11.71	2.81	-20.99	-4.19	5.14	0.96	2.15	0.34	23.02	1.78	-10.62	-2.46
Louisiana	27.70	6.30	-9.14	-1.73	-26.54	-5.71	2.97	0.47	41.93	3.02	-9.69	-2.24
Maine	59.98	12.46	-15.39	-2.99	44.51	7.26	-24.78	-4.45	69.44	4.59	-19.44	-4.69
Maryland	10.30	2.48	-10.79	-2.06	33.59	5.67	-13.31	-2.26	91.35	5.68	-31.16	-7.96
Massachusetts	2.67	0.66	11.92	2.07	51.16	8.19	-25.99	-4.70	89.14	5.57	-22.71	-5.56
Michigan	16.18	3.82	-28.39	-5.89	22.54	3.95	3.50	0.55	32.19	2.40	-33.15	-8.56

**Exhibit 3. Real Price Changes during 1975:Q1 to 2011:Q2 Bull and Bear Cycles in U.S. Housing Markets
(continued)**

State	Bull: 1975:Q1–1979:Q1		Bear: 1979:Q1–1984:Q3		Bull: 1984:Q3–1989:Q4		Bear: 1989:Q4–1995:Q1		Bull: 1995:Q1–2006:Q4		Bear: 2006:Q4–2011:Q2	
	Real Price Change, %	Annual Rate, %	Real Price Change, %	Annual Rate, %	Real Price Change, %	Annual Rate, %	Real Price Change, %	Annual Rate, %	Real Price Change, %	Annual Rate, %	Real Price Change, %	Annual Rate, %
Minnesota	23.95	5.51	-16.90	-3.31	0.18	0.03	-2.27	-0.37	70.36	4.64	-27.95	-7.02
Mississippi	-1.13	-0.28	-18.27	-3.60	-8.30	-1.64	-2.39	-0.39	29.33	2.21	-13.99	-3.29
Missouri	10.28	2.48	-18.59	-3.67	2.61	0.49	-5.61	-0.92	34.00	2.52	-17.96	-4.30
Montana	26.56	6.06	-14.98	-2.91	-15.08	-3.07	23.98	3.50	56.14	3.87	-14.27	-3.36
Nebraska	11.74	2.81	-17.99	-3.54	-8.95	-1.77	6.51	1.01	20.11	1.57	-11.11	-2.58
Nevada	33.79	7.55	-16.09	-3.14	1.30	0.25	0.50	0.08	85.30	5.39	-58.26	-17.65
New Hampshire	29.25	6.62	-12.85	-2.47	43.58	7.13	-33.06	-6.22	88.71	5.55	-25.96	-6.46
New Jersey	-0.18	-0.04	-2.17	-0.40	52.50	8.37	-22.62	-4.02	87.70	5.51	-26.11	-6.50
New Mexico	19.84	4.63	-2.34	-0.43	-11.02	-2.20	8.55	1.32	36.28	2.67	-19.17	-4.62
New York	-7.66	-1.97	5.83	1.04	46.92	7.60	-20.47	-3.60	76.22	4.94	-20.03	-4.85
North Carolina	3.65	0.90	-12.21	-2.34	9.71	1.78	-2.89	-0.47	30.05	2.26	-15.35	-3.64
North Dakota	9.89	2.39	-23.50	-4.75	-19.50	-4.05	1.69	0.27	28.46	2.15	2.35	0.52
Ohio	10.68	2.57	-23.80	-4.82	9.07	1.67	2.93	0.46	15.73	1.25	-19.61	-4.74
Oklahoma	27.15	6.19	-1.63	-0.30	-30.47	-6.69	-2.21	-0.36	24.48	1.88	-6.69	-1.53
Oregon	41.65	9.10	-28.88	-6.01	0.79	0.15	35.94	5.04	75.86	4.92	-30.07	-7.64
Pennsylvania	-2.25	-0.57	-15.11	-2.93	37.14	6.20	-12.66	-2.14	43.56	3.13	-15.11	-3.57
Rhode Island	12.91	3.08	-6.65	-1.24	75.89	11.36	-27.12	-4.94	91.68	5.69	-31.23	-7.98
South Carolina	-4.98	-1.27	-11.54	-2.20	6.76	1.25	-3.89	-0.63	37.33	2.74	-17.20	-4.11
South Dakota	-3.81	-0.97	-20.76	-4.14	-15.99	-3.26	12.00	1.83	30.90	2.32	-5.97	-1.36
Tennessee	2.32	0.57	-14.36	-2.78	10.09	1.85	-2.98	-0.48	29.19	2.20	-14.22	-3.35
Texas	20.89	4.86	-1.14	-0.21	-25.03	-5.34	-7.28	-1.20	24.31	1.87	-7.81	-1.79
Utah	28.53	6.48	-18.37	-3.62	-16.36	-3.34	32.78	4.64	45.06	3.22	-23.69	-5.83
Vermont	-3.81	-0.97	-13.73	-2.65	43.68	7.15	-18.08	-3.14	59.56	4.06	-12.93	-3.03
Virginia	-3.30	-0.83	-9.05	-1.71	25.82	4.47	-14.60	-2.49	79.93	5.13	-23.54	-5.79

**Exhibit 3. Real Price Changes during 1975:Q1 to 2011:Q2 Bull and Bear Cycles in U.S. Housing Markets
(continued)**

State	Bull: 1975:Q1–1979:Q1		Bear: 1979:Q1–1984:Q3		Bull: 1984:Q3–1989:Q4		Bear: 1989:Q4–1995:Q1		Bull: 1995:Q1–2006:Q4		Bear: 2006:Q4–2011:Q2	
	Real Price Change, %	Annual Rate, %	Real Price Change, %	Annual Rate, %	Real Price Change, %	Annual Rate, %	Real Price Change, %	Annual Rate, %	Real Price Change, %	Annual Rate, %	Real Price Change, %	Annual Rate, %
Washington	44.42	9.62	-18.17	-3.58	16.49	2.95	15.24	2.30	70.96	4.67	-27.22	-6.82
West Virginia	26.05	5.96	-23.36	-4.72	-8.88	-1.76	3.46	0.55	26.70	2.03	-13.90	-3.27
Wisconsin	18.01	4.23	-24.44	-4.97	1.67	0.32	12.09	1.84	38.32	2.80	-18.41	-4.42
Wyoming	34.25	7.64	-19.95	-3.96	-28.79	-6.26	21.49	3.16	58.65	4.01	-10.17	-2.36
Low	-15.92	-4.24	-29.79	-6.23	-44.44	-10.59	-33.06	-6.22	13.81	1.11	-58.26	-17.65
High	59.98	12.46	11.92	2.07	75.89	11.36	35.94	5.04	152.15	8.19	2.35	0.52
Median	11.71	2.81	-14.98	-2.91	2.61	0.49	-2.21	-0.36	43.56	3.13	-18.41	-4.42
Average	14.71	3.29	-13.21	-2.63	9.90	1.32	-1.95	-0.49	54.38	3.61	-20.76	-5.24
% States up (down) during bull (bear)	78% up		92% down		59% up		53% down		100% up		98% down	

Notes: The sources are nominal price changes: U.S. Housing Price Index, provided by the Federal Housing Finance Agency; real housing price changes (generated from nominal price changes): Consumer Price Index, provided by the Bureau of Labor Statistics.

medium terms. These authors also argue that a few “superstar” cities may surpass national income growth for extended periods mainly due to growth in the high-income population in these cities. The disconnect between income growth and housing price appreciation in the short and medium terms leads to fluctuation in the ratio between housing price and income (price-to-income ratio). Eventual mean reversion in the price-to-income ratio implies that housing prices are undervalued in areas where price-to-income is below historical averages and overvalued in areas where price-to-income is above historical averages.

In this work, two different data sources are used to determine the numerator of the price-to-income ratio for each point in time and location. First, the median home price for each state and the U.S. as a whole is extracted for the year 2000 from the National Association of Realtors (NAR) median home price series. The full-time series of median home prices is not employed because NAR’s median home price series does not control for changes in housing quality and size alterations that occur over time. Therefore, the HPI from the FHFA is used as a second alternative to derive housing prices over time in different locations based on the median home prices of 2000. Because HPI is an index that is based on repeated sales, it is free of quality or size biases. The HPI has been available with quarterly frequency since 1975. More formally, housing prices in time t in location i are computed as:

$$price_{t,i} = median_{2000,i} * (HPI_{t,i}/HPI_{2000,i}), \quad (1)$$

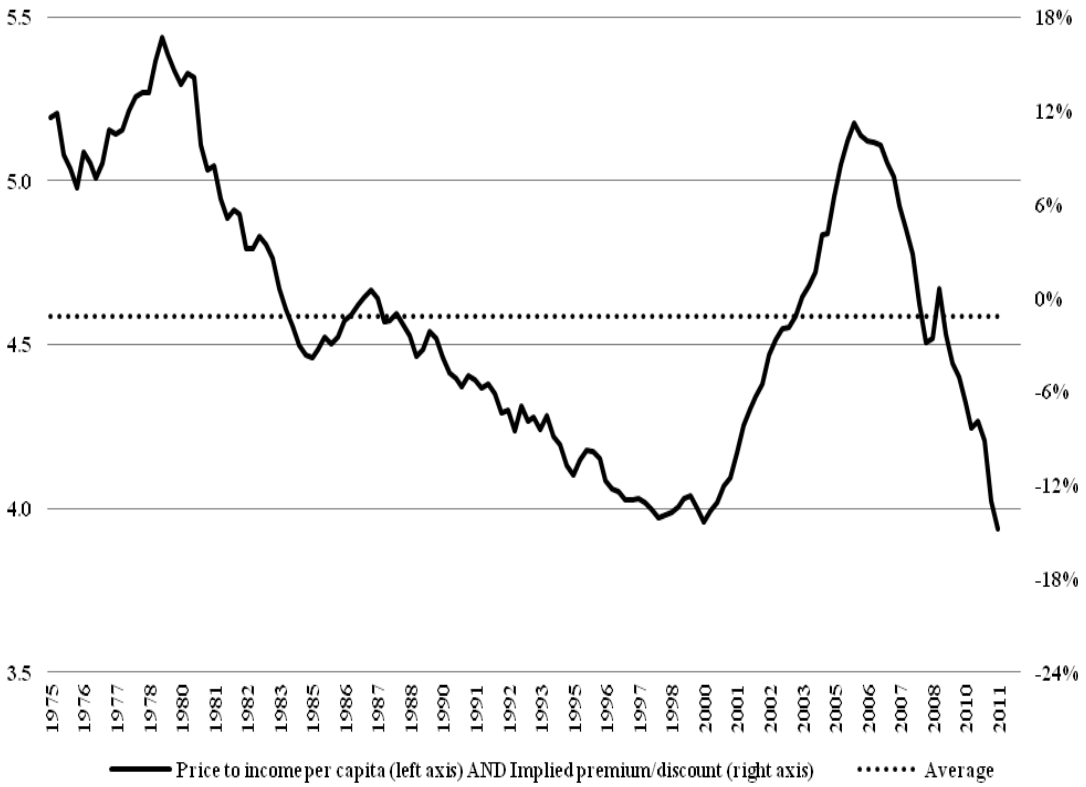
where $median_{2000,i}$ is the median home price for the year 2000 in location i , and $HPI_{t,i}$ is the Housing Price Index in time t in location i . The time series of income per capita from the Bureau of Labor Statistics is used as the income portion of the price-to-income ratio for the U.S. and each of the 50 states.

Exhibit 4 illustrates both the fluctuations in the U.S. price-to-income ratio over the 1975–2011 time period and the implied ratio of over- or underpricing in the housing market relative to the ratio’s average during this 37-year time frame. The implied over- or undervaluation is determined by comparing the price-to-income ratio to the average price-to-income observed during the examined period.

As of June 2011, U.S. housing is associated with a price-to-income ratio of 3.94, the lowest during the examined period. The average price-to-income ratio for the 1975–2011 period is 4.59, which implies a housing undervaluation of 14.2% as of June 2011. The two peaks of price-to-income correspond with 1979:Q2 and 2005:Q4. At these peaks, the ratios reached 5.44 and 5.17, resulting in implied overvaluations of 18.5% and 12.8%, respectively, relative to the historical average.

To examine the extent to which housing undervaluation in 2011:Q2 is widespread, the price-to-income ratio is calculated using each state’s home prices and per capita income for the 1975–2011 period. Exhibit 5 illustrates the level of over- or undervaluation in each state as of 2011:Q2 relative to the 1975:Q1–2011:Q2 average price-to-income ratio. This exhibit reveals that housing undervaluation in the U.S. is widespread and not driven by a handful of states. Exhibit 5 also highlights the fact that the magnitudes of housing undervaluation are often geographically clustered rather than random. Many of the most substantial discounts in housing appear to concentrate in the Midwest and the South.

Exhibit 4. U.S. Housing Price-to-Income Ratio and Implied Over- or Undervaluation: 1975:Q1 to 2011:Q2



Sources: Housing prices: National Association of Realtors and Federal Housing Finance Agency; income (per capita): Bureau of Labor Statistics.

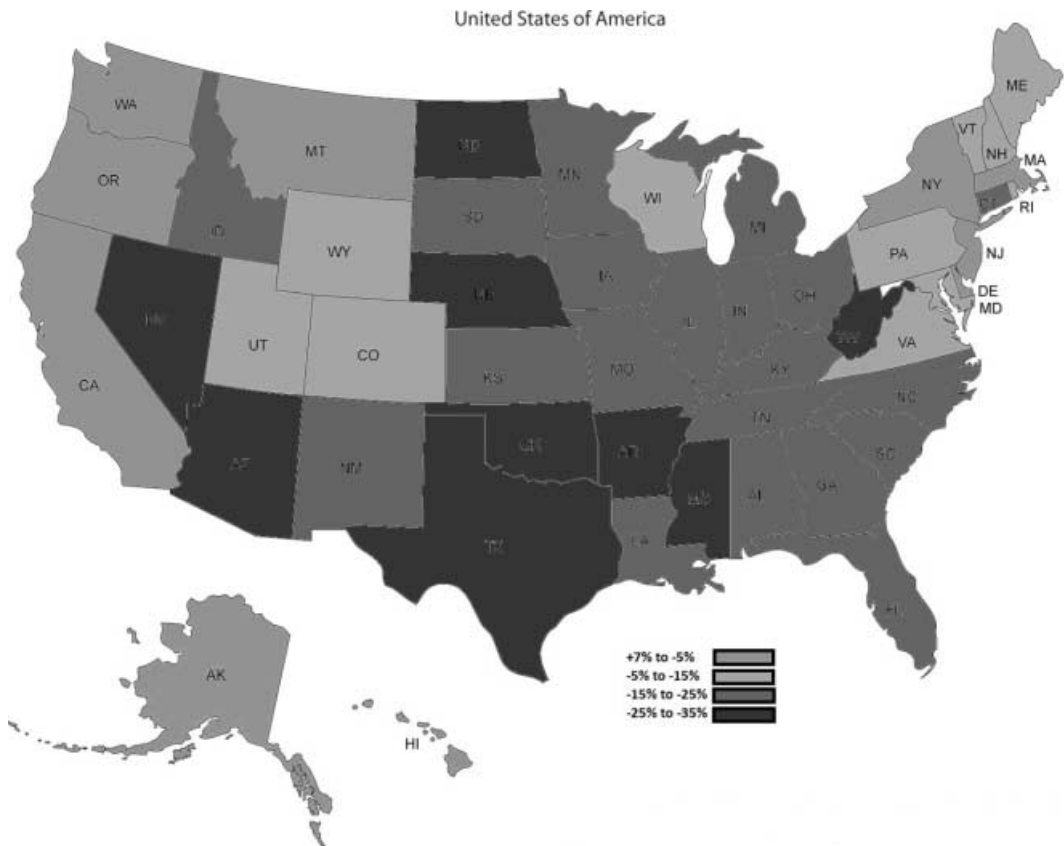
Mortgage Payment and Incomes per Capita³

Many homebuyers use financing to purchase their homes. Therefore, in this section an affordability metric that incorporates interest rates in addition to income is incorporated to determine the level of housing over- or underpricing. Payment-to-income ratios for the U.S. as a whole are estimated for each of the 50 states during the 37-year study period from 1975 to 2011. As with the price-to-income ratio, a payment-to-income ratio that is below its historic average signifies housing underpricing, and a ratio that is above its historic average indicates that housing is overpriced.

Housing prices are derived based on median home prices in the year 2000 from NAR and median prices are extrapolated as before (see equation (1)). To calculate the payment, a 20% down payment and 30-year fixed-rate financing at the average national rate (from Freddie Mac) at each point in time is assumed.

Exhibits 6 and 7 present the results of the mortgage payment-to-income ratio analysis. The results are similar to those of Exhibits 4 and 5 (i.e., the price-to-income analysis).

Exhibit 5. State-by-State Over- or Undervaluation in Terms of Housing Price-to-Income: 2011:Q2



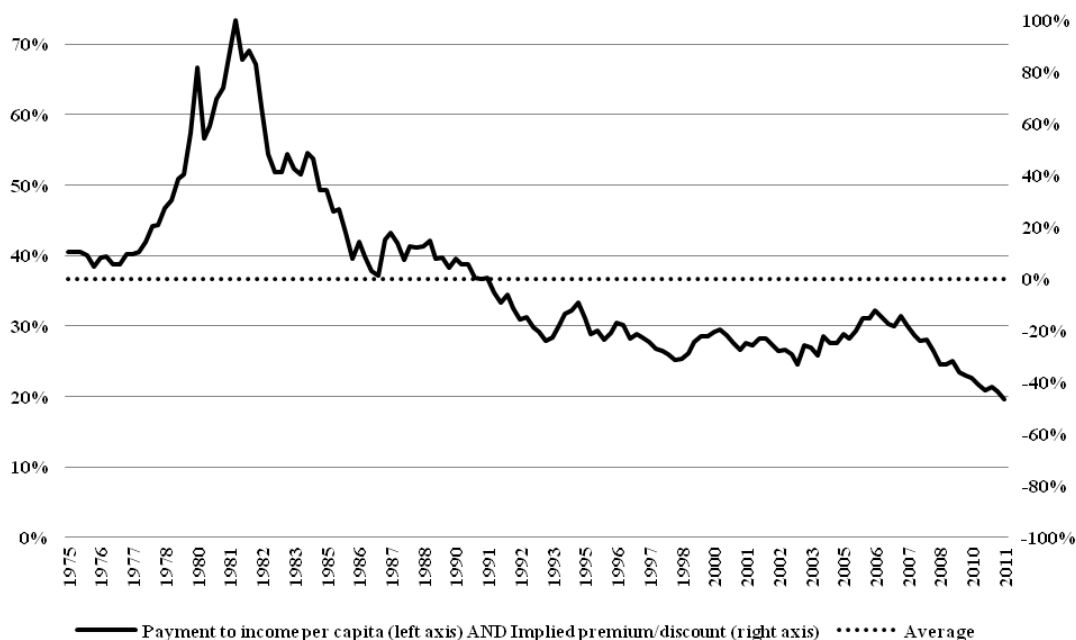
Sources: Housing prices: National Realtor Association and Federal Housing Finance Agency datasets; income (per capita): Bureau of Labor Statistics.

The implied over- or undervaluation is determined by comparing the payment-to-income ratio to the average payment-to-income observed during the examined period.

Underpricing evidence, as of 2011:Q2, is even more dramatic than that found for price-to-income. This is most certainly due to near record lows in 2011 mortgage rates. The national average 30-year fixed-rate mortgage during the second quarter of 2011 is 4.6%, as compared to the 9.1% historical average since 1975. In Exhibit 6, low interest rates combine with national income for a payment-to-income ratio of 19.6% (that is, 19.6% of per capita income is spent on mortgage payments) in 2011:Q2. By comparison, the payment-to-income ratio averages 36.7% during the 1975–2011 time period, implying that U.S. housing is undervalued by 46.6%, on average, as of mid-2011 based on mortgage payments.

Note that the peak in terms of payment-to-income ratio did not coincide with the most recent bull real estate market. Instead, the peak in terms of least affordable housing

Exhibit 6. U.S. Mortgage Payment-to-Income Ratio and Implied Over- or Undervaluation: 1975:Q1 to 2011:Q2

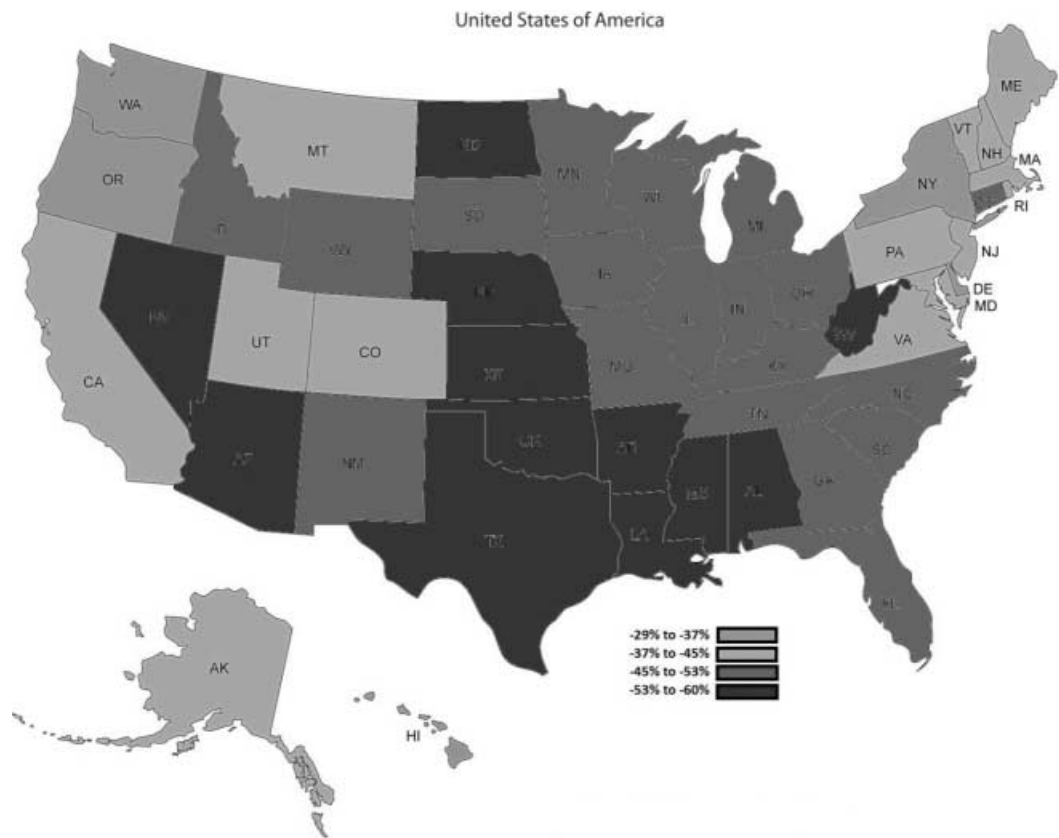


Sources: Thirty-year fixed mortgage rates: Freddie Mac; income (per capita): Bureau of Labor Statistics.

(payment-to-income ratio of 73.3%) occurred in 1981, when mortgage rates were substantially above their 1975–2011 average. In fact, according to the payment-to-income valuation measure, U.S. housing was slightly undervalued in terms of historical affordability during the 2006 peak. At that time, relatively low interest rates in historical terms offset high prices relative to income to produce a payment-to-income ratio of 32.2%. While somewhat controversial, the observation that housing in the U.S. was not overpriced even at the height of the most recent housing boom is consistent with findings from Himmelberg, Mayer, and Sinai (2005) and Smith and Smith (2006). This result and its implications are very intriguing. In particular, it may well be that the proximate cause of the collapse of the bubble in 2006 might well have been something other than extreme overpricing in housing. For example, it might well have been that the decline in the market was triggered by a housing oversupply or the significant presence of mortgage holders who could not consistently meet their debt service obligations. While this idea is worthy of investigation, it is, however, beyond the scope of this present work.

Exhibit 7 shows that the levels of payment-to-income ratios are below historical averages in all 50 states as of 2011:Q2. In states such as Nevada, Oklahoma, and Texas, underpricing exceeds 55%. As with the price-to-income measure, it appears that, as of 2011:Q2, some of the most undervalued housing is concentrated in the South and Midwest, and the lowest levels of underpricing are mainly in the Northeast and West.

Exhibit 7. State-by-State Over- or Undervaluation in Terms of Mortgage Payment-to-Income: 2011:Q2



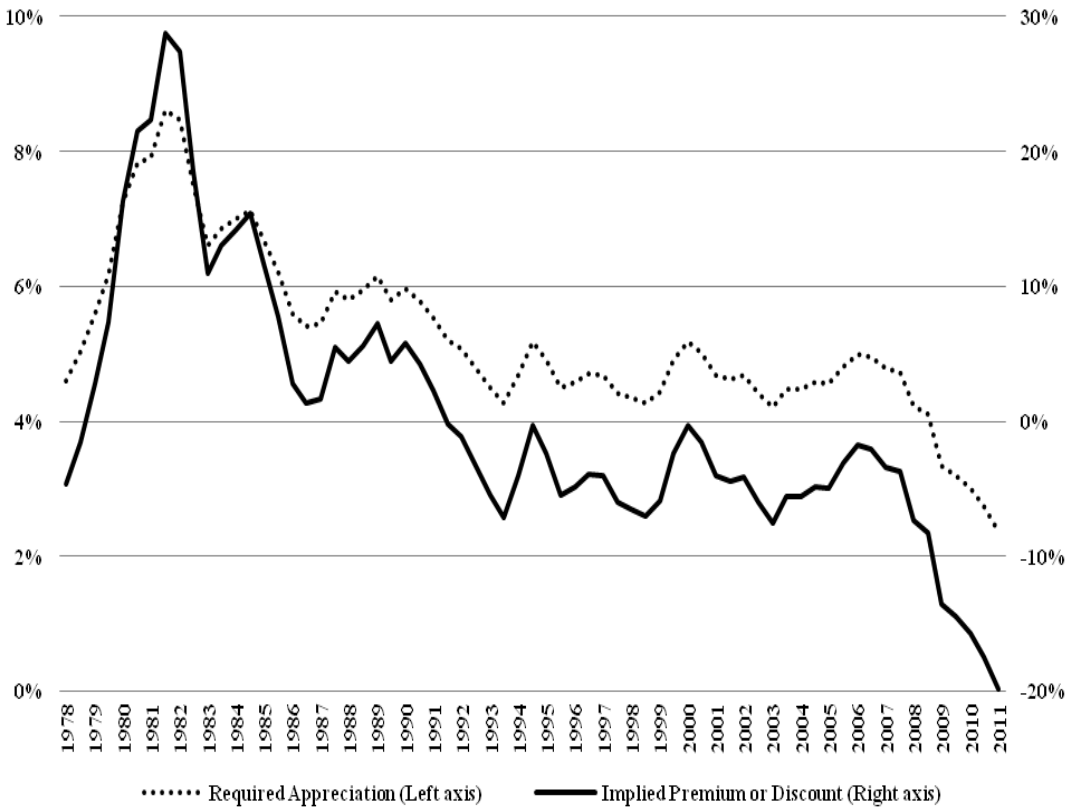
Sources: Thirty-year fixed mortgage rates: Freddie Mac; income (per capita): Bureau of Labor Statistics.

Buy versus Rent Decision Analysis

While both affordability measures clearly show that the costliness of ownership is at nearly unprecedented lows. It is not immediately clear that potential homeowners will now begin to buy in significant numbers to halt price declines. It might well be the case that tenure choice (buy vs. rent) is financially in favor of renting rather than buying. Said another way, renting may be preferable to ownership due a fundamental reset of the inputs that go into the buy versus rent decision. To that end, this work conducts a comprehensive buy versus rent analysis to further investigate where the U.S. housing market is in terms of the housing cycle.

Based on the model presented by Hennessey (2003) and the base case methodology and assumptions suggested by Beracha and Johnson (2012), a buy versus rent model is used to generate the housing price appreciation that is required, ex ante, by potential

Exhibit 8. U.S. Homeowner Required Appreciation and Implied Over- or Undervaluation: 1978:Q1 to 2011:Q2



Sources: See Appendix.

homebuyers to be financially indifferent between buying and renting a home. The model, assumptions, and data sources used in this buy versus rent analysis, are detailed in the Appendix.

Exhibit 8 displays the U.S. average ex ante rate of appreciation required by potential homeowners to be indifferent between buying and renting a home of equal quality (hereafter referred to as required appreciation), as well as its implied housing under- or overvaluation for the 1978:Q1 to 2011:Q2 period. A required appreciation rate that is higher (lower) than the historical average appreciation rate for the examined period implies that housing is overpriced (underpriced) at each particular point in time.

According to Exhibit 8, as of 2011:Q2, the required appreciation rate for the U.S. as a whole to make potential owners indifferent between buying and renting is 2.36%, compared with a historical average of 5.23% required appreciation during the 1978–2011 period. In this buy versus rent analysis, an eight-year holding period, 20% down payment, interest deductibility, housing maintenance, and other traditionally employed costs and benefits associated with owning relative to renting are employed.⁴ According to the analysis, U.S. housing is underpriced by 19.8% as of mid-2011—the greatest level of


Exhibit 9. Homeowners' Required Appreciation and Implied Over- or Undervaluation of U.S. Housing Markets

<u>City / Region</u>	<u>Average Required Appreciation Rate, %</u>	<u>2011:Q2 Required Appreciation Rate, %</u>	<u>Over- / Undervaluation, %</u>
(1)	(2)	(3)	(4)
United States	5.23	2.36	-19.85
South	4.76	2.08	-18.72
Midwest	4.98	2.38	-18.16
West	5.86	3.31	-17.71
Northeast	5.61	3.18	-16.99
Detroit	4.46	0.76	-25.05
Cleveland	4.69	1.42	-22.43
Chicago	5.37	2.43	-20.24
Dallas	4.21	1.40	-19.63
Kansas City	4.30	1.51	-19.51
Cincinnati	5.17	2.38	-19.37
Houston	3.66	0.98	-18.92
Atlanta	4.58	1.93	-18.56
Miami	4.71	2.07	-18.45
San Diego	5.68	3.11	-17.90
Minneapolis	4.12	1.75	-16.84
Los Angeles	6.34	4.05	-15.96
Denver	3.82	1.65	-15.57
St. Louis	4.49	2.32	-15.44
New York	6.30	4.13	-15.23
Milwaukee	5.05	2.96	-14.85
Pittsburgh	4.49	2.49	-14.33
San Francisco	6.19	4.19	-14.08
Boston	6.09	4.14	-13.76
Honolulu	6.81	4.94	-13.15
Philadelphia	4.95	3.12	-13.13
Seattle	4.81	3.12	-12.20
Portland	4.65	3.04	-11.70
Low	3.66	0.76	-25.05
High	6.81	4.94	-11.70

Note: See Appendix for sources.

underpricing observed during the 1978-2011 period. The highest level of overpricing (28.7%) coincides with the second half of 1981, when the required appreciation to housing was 8.6%. As with the payment-to-income ratio, it is again worth noting that housing does not appear to have been drastically overpriced during its 2006 peak and surrounding years according to the buy versus rent model. Himmelberg, Mayer, and Sinai (2005) and Smith and Smith (2006) employed cost of home ownership models that consider factors similar to the buy versus rent analysis in this paper. In both papers, the

authors reach a similar general conclusion regarding housing valuation near the peak of the most recent housing boom. However, as mentioned earlier, this result is beyond the scope of this paper.

To detect the breadth of the housing underpricing in 2011:Q2 based on the buy versus rent approach, in addition to the U.S. as a whole, the required appreciation for four geographic regions (West, Northeast, South, and Midwest) and 23 major U.S. cities is calculated. The results are reported in Exhibit 9. Columns (2) and (3) show the 1978–2011 average and 2011:Q2 annual required appreciation rates, respectively, for the 28 different geographic breakdowns. Column (4) reports the under- or overvaluation in percentage terms for each area relative to its past required appreciation that would make a potential buyer indifferent between owning and renting.

Exhibit 9 reveals that housing underpricing is indeed widespread across the U.S. The estimated undervaluation ranges between -11.7% (Portland) to $ms25.0\%$ (Detroit). The overall magnitude of the undervaluation according to the buy versus rent approach is higher than the undervaluation estimated by the price-to-income ratio, but lower than that for the payment-to-income ratio. Of the four major regions, the undervaluation seems to be the most prevalent in the South. However, average levels of undervaluation are similar in all regions, and fall into a narrow range of 17.7% to 18.7% . Thus, there appears to be strong evidence to suggest that buying is presently the preferred tenure choice, assuming past appreciation is a good predictor of future property appreciation rates.

Conclusion

Residential real estate markets around the country are currently experiencing unprecedented swings. In great part due to pricing momentum, the housing market in the U.S. has experienced five years of continuous and economically meaningful price declines in both real and nominal terms and was preceded by a roughly ten year bull market. These unprecedented times call for unique and timely examinations from unbiased academic research. Said another way, the market needs signals from those that do not have a stake in the outcome. In order to satisfy the timeliness criteria just outlined, this paper sacrifices some of the more traditional rigor found in most real estate academic pieces in favor of simple summary statistics and a straight forward buy versus rent analysis. The goal is to provide potential market participants with needed data on the present relative costliness of housing to better enable decision making.

This work calculates two affordability measures for both the country as a whole and its regional markets. Additionally, a buy versus rent analysis for both the nation as a whole, four geographically regions, and 23 major metropolitan areas is conducted to investigate the superior financial decision in terms of tenure choice. Combined these measures allow for a determination of the relative costliness of ownership and the superior tenure choice, on average. The results when combined provide needed information for the millions of potential home buyers currently facing a housing decision. The findings generally support the present existence of very high levels in housing affordability around the country and back ownership as the financially favorable tenure choice, assuming that long-term past property appreciation rates are indicative of future property appreciation rates.

While all three methods used in this paper's analysis illustrate that housing is underpriced in 2011, two of the three measures suggest that housing prices were not overvalued even before the 2007–2011 housing bust. This somewhat controversial finding is consistent with other studies conducted near the height of the housing boom (Himmelberg, Mayer, and Sinai, 2005; and Smith and Smith, 2006) and poses the possibility that the 2007–2011 decline in housing prices is rooted in reasons that are not necessarily valuation based. Whether market participants and policy makers have learned from the recent fluctuations in the housing market is yet to be seen. History teaches us that anger, guilt, and blame rather than careful analysis of the fundamental causes of a crash are likely to follow such an event (Taffler and Tuckett, 2008). Hence, similar experiences, at least in different asset classes, may well be likely. While this finding is noteworthy, it is beyond the scope of this present work.

Does all of this signal the end of the housing crisis? Will prices soon rebound? Has the housing market bottomed? Will the market continue to decline? These questions are tantalizing and tempting to answer at this point. Unfortunately, there is not enough evidence at this time to adequately answer all of these questions. However, some evidence concerning market conditions can be gleaned from the analysis. In particular, it now seems that a preponderance of the evidence supports the conclusion that the country's housing markets are at the bottom of the cycle and that prices should not fall much further, if at all.⁵ Said another way, the ship appears to be turning.

Appendix

Data Sources and Methodology for the Buy versus Rent Analysis

Data Sources

The rent-to-price ratios used for the buy versus rent analysis are based on a dataset constructed by Davis, Lehnert, and Martin (2008) for the stock of owner-occupied housing. These authors use a hedonic model to control for the size, age, number of bedrooms, and location of the property in order to improve the quality of the index. The authors provide rent-to-price ratios for the U.S. as a whole, its four geographical regions, and 23 major metropolitan areas for the 1978–2007 time period on a semiannual basis.⁶ The present paper uses the same method employed by Davis, Lehnert, and Martin to extrapolate their rent-to-price values until mid-2011. The extrapolation is based on the BLS rent indexes and home price indexes from the FHFA.

The average 30-year fixed mortgage rates are from Freddie Mac. The monthly mortgage rates reported by Freddie Mac are averaged over the first and second half of each year to arrive at an average mortgage rate with biannual frequency. The risk-free rate is obtained from Ken French's data library.⁷

Methodology

The buy versus rent valuation approach used in this paper is mostly based on the model and assumptions presented by Beracha and Johnson (2012). To determine the level of housing over- or undervaluation, the model first seeks to calculate the ex ante housing rate of appreciation required by the potential homeowner to be financially indifferent

between buying and renting a home of similar quality. Specifically, the potential homeowner's selling proceeds (SP) at the end of the holding period (HP) should equal the value of an investment portfolio (IP) held by a renter and seeded with money that would otherwise be used to purchase a home.

For the potential homeowner, the model assumes a 20% down payment, and the remainder is financed with a 30-year fixed rate mortgage quoted in the market at each point in time. Closing costs (CC) are assumed to be 2% of the purchase price, and the period the homeowner is expected to stay in the property is eight years, which is the average duration of U.S. homeownership. An owner pays 6% in selling expenses (SE) at the end of the eight-year holding period. The initial annual cost of property tax (PT) is set at 1.5%, and the combined cost of insurance and maintenance (IM) is set at 2% of the property value. These expenses increase at the same rate as local property appreciates during the eight-year holding period. For purposes of interest (i) and property tax deductibility, it is assumed that the homeowner pays a marginal tax rate (τ) of 25%. Symbolically, during each time period t , a potential homeowner incurs the following cash outflow (OF):

$$OF_t = IM_t + PT_t * (1 - \tau_I) + P_t + i_t * (1 - \tau_I), \tag{A1}$$

where P_t is the principal portion of the mortgage payment in time t . The expected homeowner's selling proceeds at the end the holding period are:

$$SP_{bp} = price_0 * (1 + A)^{bp} * (1 - SE) - MB_{bp}, \tag{A2}$$

where $price_0$ and A are the original purchase price and average percentage annual price appreciation of the property, respectively. MB_{bp} is the remaining mortgage balance at the end of the eight-year holding period after the principal reduction required by a traditional 30-year mortgage:

$$MB_{bp} = MB_0 - \sum_{t=1}^{bp} P_t. \tag{A3}$$

The investment portfolio held by a renter is assumed to be subjected to a 20% capital gain tax rate (τ_{CG}) and earns a rate of return (R) that is equal to the risk-free rate. The assumption of a risk-free rate of return is a suitable opportunity cost for homeowners who are planning to stay in the area for the long term, are not looking to upgrade or downgrade their homes, and therefore receive constant utility from their home. A different assumption about the return on the renter investment portfolio would alter the required homeowner housing appreciation rate, but will not materially affect the relative appreciation rate with respect to its long-term average. In addition to the initial seed money invested in the portfolio, at the end of each year the renter deposits an amount equal to the total homeowner's housing cash outflow minus the renter's annual rent in the investment portfolio. If the difference is negative, the renter withdraws rather than deposits that amount. Rent ($rent$) is assumed to grow at the same rate as home price appreciation (A). 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.

$$IP_{bp} = IP_0 + \left(\sum_{t=1}^{bp} (IP_{t-1} * R + OF_t - rent_0 * (1 + A)^t) * (1 - \tau_{CG}) \right), \quad (A4)$$

where:

$$IP_0 = price_0 - MB_0 + CC \quad (A5)$$

and

$$IP_t = IP_{t-1} * (1 + R) + OF_t - rent_0 * (1 + A)^t \quad \text{for } t > 0. \quad (A6)$$

The required housing appreciation is computed by equating equation (A4) to equation (A2):

$$SP_{bp} = IP_{bp}. \quad (A7)$$

Finally, once the required housing appreciation for each time period is found, the implied housing premium or discount is calculated with respect to the 1978–2011 average required appreciation, by using the eight-year holding period assumed by the model,

$$premium_t = (1 + A_t)^{bp} / (1 + \bar{A})^{bp} - 1, \quad (A8)$$

where a positive $premium_t$ value suggests housing overpricing and a negative value suggests underpricing in time t .

Endnotes

- ¹ Robert Shiller's housing data are available at <http://irrationalexuberance.com/>.
- ² The term price-to-income per capita is often abbreviated throughout this work as price-to-income.
- ³ The term mortgage payment-to-income per capita is often abbreviated throughout this work as payment-to-income.
- ⁴ See Beracha and Johnson (2012) and this work's Appendix for additional details.
- ⁵ Caveats to this prediction, if you can call it a prediction, of course include no surprises from venues such as a worsening in the presently sluggish job market, continued management of the country's debt crisis, and more settled overseas economies.
- ⁶ The data are available on Morris A. Davis' website: <http://morris.marginalq.com/>.
- ⁷ Ken French's data library is available on his website: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

References

- Beracha, E., and K.H. Johnson. Lessons from over 30 Years of Buy versus Rent Decisions: Is the American Dream Always Wise? *Real Estate Economics*, 2012, 40:2, 217–47.
- Beracha, E. and H. Skiba. Momentum in Residential Real Estate. *Journal of Real Estate Finance and Economics*, 2011, 43:3, 299–320.

- Case, K.E. and R.J. Shiller. The Efficiency of the Market for Single-Family Homes. *American Economic Review*, 1989, 79:1, 125-37.
- . Is There a Bubble in the Housing Market? *Brookings Papers on Economic Activity*, 2004, 2, 299-342.
- Chui, A.C.W., S. Titman, and K.C.J. Wei. Intra-industry Momentum: The Case of REITs. *Journal of Financial Markets*, 2003, 6:3, 363-87.
- . Individualism and Momentum around the World. *Journal of Finance*, 2010, 65:1, 361-92.
- Daniel, K., D. Hirshleifer, and A. Subrahmanyam. Investor Psychology and Security Market Under- and Overreactions. *Journal of Finance*, 1998, 53:6, 1839-85.
- Davis, M., A. Lehnert, and R. Martin. The Rent-Price Ratio for the Aggregate Stock of Owner-Occupied Housing. *Review of Income and Wealth*, 2008, 54, 279-84.
- DeBondt, W.F.M. and R.H. Thaler. Does the Stock Market Overreact? *Journal of Finance*, 1985, 40:3, 793-805.
- Derwall, J., J. Huij, D. Brounen, and W. Marquering. REIT Momentum and the Performance of Real Estate Mutual Funds. *Financial Analyst Journal*, 2009, 65:5, 24-34.
- Gau, G.W. Weak Form Tests of the Efficiency of Real Estate Investment Markets. *Financial Review*, 1984, 19:4, 301-20.
- . Efficient Real Estate Markets: Paradox or Paradigm. *Real Estate Economics*, 1987, 15:2, 1-12.
- Gervais, S. and T. Odean. Learning to Be Overconfident. *Review of Financial Studies*, 2001, 14:1, 1-27.
- Gyourko, J., C. Mayer, and T. Sinai. Superstar Cities. NBER Working Paper No. W12355, 2006.
- Hennessey, S. The Impact of Housing Choice on Future Household Wealth. *Financial Services Review*, 2003, 12, 143-1-64.
- Himmelberg, C., C. Mayer, and T. Sinai. Assessing High House Prices: Bubbles, Fundamentals and Misperceptions. *Journal of Economic Perspectives*, 2005, 9, 67-92.
- Jegadeesh, N. Evidence of Predictable Behavior of Security Returns. *Journal of Finance*, 1990, 65:3, 881-98.
- Jegadeesh, N. and S. Titman. Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency. *Journal of Finance*, 1993, 48:1, 65-91.
- Leon, K. Housing Recovery: Not Yet, but When? Standard & Poor's Equity Research, 2009.
- Smith, M.H. and G. Smith. Bubble, Bubble, Where's the Housing Bubble? *Brookings Papers on Economic Activity*, 2006, 1, 1-50.
- Taffler, R. and D. Tuckett. Phantastic Objects and the Financial Market's Sense of Reality: A Psychoanalytic Contribution to the Understanding of Stock Market Instability. *International Journal of Psychoanalysis*, 2008, 89:2, 389-412.

Eli Beracha, University of Wyoming, Laramie, WY 82070 or eberacha@uwyo.edu.
Hilla Skiba, University of Wyoming, Laramie, WY 82070 or hskiba@uwyo.edu.
Mark Hirschhey, University of Kansas, Lawrence, KS 66045.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.