DETERMINANTS OF RETURNS TO HOMEOWNERSHIP: COUNTY LEVEL ANALYSIS FROM 1999 TO 2009

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ABSTRACT

This paper uses U.S. Census data to analyze returns to homeownership at the county level from 1989 to 1999. We calculate returns to homeowners for 3,133 counties in the U.S., over the ten year period. We find the vast majority of counties have significantly positive returns to homeownership over the period. We also find returns are widely dispersed across different areas of the country, but the highest returns are in U.S. Census division 7, which includes Arkansas, Louisiana, Oklahoma and Texas. We also find the percentage of renters in the county is positively related to returns to homeowners and the population of the counties impacts returns, with higher returns in more rural counties.

INTRODUCTION

Homeownership has always been an integral part of the 'American Dream.' Homeownership has been attributed to building stronger communities. Most people dream of owning their own home and people take pride in becoming homeowners.

At the macro level, the housing industry has always been a major contributor to economic growth. Its impact on the overall U.S. economy was made quite demonstrably evident over the last decade or so. The housing sector was the major driver that helped us pull out of the dot com crash of 2000 and 2001. It also was the primary tipping point for the crash of 2008. Many economists have argued that a robust, sustaining recovery will not take place without a housing sector that is once again growing and creating jobs. With the Case-Shiller index recently showing the first signs of life since the housing crash (it ended the second quarter of 2012 with positive annual growth for the first time since summer, 2010), there appear to be hopeful signs on the horizon.[1]

Over the last few years, the causes of the housing crisis (especially at the national level) have been discussed and debated extensively in the popular press. However, there is a paucity of empirical research that examines the returns to homeownership at the local level over this 'unusual' period. With that in mind, we analyze the returns to homeownership at the county level for the 1999 – 2009 period. While there is quite a significant variation of returns across the

3,133 counties examined, most returns are positive and quite significant. We further examine the determinants of these returns using a variety of socioeconomic and demographic factors. We find geographic location, population density, percent of renters in the county, and the availability of vacant houses for sale to be factors that significantly affect the returns. We also examine the mortgage lending practices, but don't find subprime lending to be a factor that affects the returns during this period.

The next section of the paper reviews the existing literature and provides the motivation for our paper. The data sources and methodology used are described next. Findings and a discussion of our results follow. The final section contains our conclusions and recommendations for further research.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Given the importance of the housing sector—both to the individuals and to the broad economy—much research has focused on the risk and return in the housing market. Articles in the popular press have analyzed the rent versus buy decision with a focus on 'breakeven horizon.' Using data crunched by Zillow, CNNMoney recently reported results for ten major cities in the U.S.[2] The article defines breakeven horizon as, "the length of time a new homebuyer would have to own their home before it would make better financial sense to buy, rather than rent?" In Boston, New York, Los Angeles, and San Francisco, homes were expensive enough that it would generally make sense to rent—in spite of the rents being high as well. In the other 6 cities (Chicago, Dallas, Philadelphia, Washington D.C., Miami and Atlanta) the decision leaned towards buying since the breakeven horizons were well under 3 years. While a number of studies have utilized nationwide data; quite a few others have focused on regional market data. Using data for four large metropolitan areas, Case and Shiller (1990) demonstrate that price changes are a function of factors such as construction costs and changes in adult population.

Rose (2006) analyzes the investment value of home ownership. The author calculates the returns based on cash outflows needed to purchase a home. She incorporates tax savings, differences in cash flows for buying versus renting and assumes a 5% annual home price appreciation. She concludes that home investment may be one of the best long-term investments. Cannon, Miller, and Pandher (2006) conduct a cross-sectional risk-return analysis that covers the metropolitan housing market. Using zip code level housing data for 155 urban MSAs for the 1995-2003 period, they find that housing returns are positively related to volatility and price level. They further find that median income, gross rent and population density have positive impact on returns whereas managerial employment has negative—unemployment rate and percent owner occupied are not significant. In an attempt to use a multifactor asset pricing model to explain metropolitan-specific housing returns for MSAs, Case, Cotter, and Gabriel (2011) examine a more recent period from 1985 – 2007. Using 151 MSAs, they find a strong

relation between MSA specific house price returns and market risk, and only limited significance for size, idiosyncratic risk, and momentum in the determination of MSA housing returns.

Almost all studies in this area indicate a strong need for us to better understand the variation across different markets as returns on housing investments vary considerably across regions. Chinloy and Cho (1997), for example, find that the correlation between returns on housing in different cities can be very low or negative. Each Metropolitan Statistical Area (MSA) has unique characteristics that impact the returns to homeowners. Factors like the MSA's population growth, the growth of the labor market in the MSA, the supply of rental property, and the level of new housing construction vary across different regions. Additional factors that influence the price levels and appreciation rates of homes in an area, including property and income tax rates, also have distinctive local or statewide characteristics. These significant differences in economic and demographic characteristics and the low correlation of housing returns across cities point to the need for analysis at localized level. Brown and Chhachhi (2007) examine returns of 208 MSAs over the 1989-1999 period. They find a significant difference in returns to homeowners across MSAs, with the highest returns in the North Central United States. They also find income growth and percentage of renters in the MSA impact the returns to homeowners. Similarly, Jud and Winkler (2002) use MSA level data to investigate the factors that impact real housing price appreciation. They find population growth, real changes in income, construction costs, and interest rates influence real housing price appreciation.

In a later study, Jud and Winkler (2005) analyze the return and risk on a single-family, owner-occupied housing at the MSA level. A homeowner who purchased a home in the first quarter of 1978 and held it through the fourth quarter of 2001 would (with no leverage) have earned a compound annual return of 11.81%. Furthermore, they found that returns as well as risk varied widely among the 42 MSAs examined—in some cases as much as three fold.

In a recent study, Goetzmann et al. (2012) argue that sharp increases in housing prices in the early 2000s had tremendous impact on mortgage lending. Using 2006 Home Mortgage Disclosure Act (HMDA) data they find significant positive correlation between 2006 mortgage applications and home price increases between 2000 and 2005 for both prime and subprime mortgages. Their results indicate that in MSAs with greater past home price growth, the demand for prime and subprime mortgages was higher and the applicant pool was riskier. Hung and Tu (2008) examine the factors that led to tremendous price appreciation in single family housing in California during 2000-2005. They report that, after taking into account socioeconomic and demographic factors, extensive use of alternative mortgage products played a pivotal role in the housing price boom in California.

As expected, a lot of recent articles and studies have examined the role subprime lending played in the extraordinary housing boom of the early 2000s that was followed by an equally remarkable housing crash that began in 2007 and one that is still reverberating through the sector and the economy as a whole. Brooks and Simon (2007) conclude that many subprime borrowers

had high credit scores and would have qualified for more conventional products with better loan terms. They further argue that these creditworthy borrowers are more likely to stick with the loan and have not defaulted yet. In a very timely study, Wheaton and Nechayev (2007) examine the causes of home price increases over 1998 – 2005. They argue that the growth rate in excess of that implied by economic fundamentals, such as growth in population, income growth and decline in interest rates may be due to large demand for second/investment homes and the emergence of various, new mortgage instruments. While they find some statistical association, they also warn against inferring too strong a causal relationship between these new instruments and formation of the housing bubble.

The primary question that is addressed in our work is the following: "What kind of returns could a homeowner have expected to earn during the 1999 – 2009 period?" How attractive an investment is housing for a long-term investor? While recognizing that the results of our work cannot be used to draw conclusions for a short-term investor, our intent is to examine the returns over a decade long holding period. Our paper extends the work of earlier studies such as Jud and Winkler (2002), Brown and Chhachhi (2007), and others, by measuring the returns to homeownership for 3,133 counties in the United States from 1999 – 2009. Most of the earlier work in this area (including Jud and Winkler (2005)) has been done at the MSA level. Over time, however, the constitution of MSAs change, in many cases quite dramatically. In addition, there are typically somewhat fairly significant variations within large MSAs. These variations cannot be picked up by studies that consolidate data at the MSA level. For example, one of the cities studied in the recent CNNMoney article is the Boston metropolitan area.[2] The breakeven horizon was as low as two years in the town of Lawrence but as high as a decade in suburbs like Concord and Brookline within the same MSA.

We believe examining the returns to homeownership at the county level will allow us to develop keener and more precise insights. Furthermore, most of the studies that have examined the returns to homeownership at the national level have done so for the periods prior to 2002. While a few recent studies (for example, Wheaton and Nechayev (2007) and Goetzmann et al., (2012)) incorporate data going as far as 2005, we know of no comprehensive, nationwide studies that exist in this area that extend the data period to include not only the boom (early 2000s) but also a significant portion of the subsequent bust (late 2000s). As policy decisions affecting homeownership are debated in Washington D.C. and beyond, insights from the first decade of the century are essential. Finally, the role of subprime lending in the housing boom and subsequent crash has been extensively discussed and debated in the popular press as well as political circles. Our study examines the role of subprime lending, at the county level, in returns to homeownership during this period.

DATA SOURCES AND METHODOLOGY

Data

Most of the data used in this paper comes from the U.S. Census Bureau. Data for 2000 comes from the 2000 Decennial Census. Data for 2010 comes from the 2010 Decennial Census or the 2010 American Community Survey.[3] Mortgage rates come from the 30 year conventional loan rate monthly data published by the Economic Research Division of the Federal Reserve Bank of St. Louis.[4] Data on subprime lending by county in 2005 was collected from Dataplace.org.[5]

Homeownership Returns

The median home price for 1999 and for 2009 for each county is used to estimate the changes in the value of the residence over the ten year period. The analysis assumes a home is purchased at the median home price with a 20 percent downpayment and a 30 year mortgage. The initial interest rate on the mortgage is 7.91%. This was the average 30 year conventional loan rate in December, 1999. We also assume an initial transaction cost of two percent of the 1999 home price. The analysis assumes the remaining loan balance is refinanced in January, 2004 at a rate of 5.88%. This was the average 30 year conventional loan rate in December, 2003. The refinancing is based on the assumption that a rational homeowner will refinance whenever interest rates drop by two percent or more. Given our ten year original holding period, no further refinancing is assumed. The transaction cost at the time of refinancing is assumed to be 1.5 percent of the mortgage balance being refinanced.

In order to simulate real-life homeownership, we collect and incorporate all the variables in the return calculations that would impact a 'real' homeowner. Real estate taxes are collected for each county in 1999 and 2009 and we use the average of these taxes as cash outflows each year. Annual property insurance and maintenance costs are assumed to be 1.5% of the market value of the property.

In addition to incorporating 'typical' homeownership expenses listed below, we also explicitly include rental cost in our analysis. Specifically, we argue that in the absence of homeownership, the investor would have to rent a similar residence in the same county. Thus, we include an imputed rental cash flow each year. This is based on median contract rent in 1999 and 2009. We use these two numbers to calculate an annualized growth rate over our ten year holding period window and subsequently use this growth rate to adjust the rental cost for each year. Specifically, our cash flows for each year and after-tax internal rate of return for the ten year holding period are computed as follows (the equation below is based on the work of Miller and Sklarz (1989) and Jud and Winkler (2005), among others):

$$0 = \frac{ICO_0}{(1+r)^0} + \sum_{t=1}^{n} \frac{ACF_t}{(1+r)^t} + \frac{TCF_n}{(1+r)^n}$$

where:

r = The after-tax IRR
ICO_0 = The initial cash outflow at time 0, based on a 20 percent downpayment.
ACF_t = Annual cash flow in period t, where:
$ACF_t = IR_t - PP_t - IP_t (1 - T) - PT_t (1 - T) - IM_t$
IR_t = Imputed rent in period t
PP_t = Annual principal payment in period t
IP_t = Annual interest payment in period t (the initial mortgage is assumed
T = Income tax rate
PT_t = Property tax in period t
TCF_n = The terminal cash flow at time n, where:
$TCF_n = SP (1 - 0.06) - MB_n$
SP = Sales Price (.06 is assumed to be real-estate selling fees)
MB_n = Mortgage balance in period n

As discussed above, the interest and principal payments in years 1 – 4 are based on the 30 year conventional mortgage at 7.91%. At the end of year 4, the principal balance is refinanced at 5.88%. The interest and principal payments in years 5 – 9 are then based on the 30 year conventional mortgage at the new, lower rate.

We also take into account the tax benefits of owning a home—i.e., tax deductibility of interest and real estate taxes. Two internal rate of return calculations are performed for each county. The first assumes the homeowner receives no tax benefit. The other assumes a marginal tax rate of 35 percent.[6] The 0 percent and 35 percent calculations show the range of returns based on the minimum and maximum tax deduction.

The returns calculated under the assumption of 0% marginal tax bracket not only include people who are truly paying no income taxes but, perhaps more importantly, include homeowners who are choosing the standard deduction (as opposed to itemizing) on their Federal filing. This decision could be based on any number of factors, such as low value of the home (and thus, lower interest amount), availability, or lack thereof, of other deductions (such as living in a low or no state income tax state), impact of Alternative Minimum Tax, etc.

DETERMINANTS OF RETURNS

We conduct an ordinary least squares (OLS) regression using the internal rates of return as dependent variables and omitting any variables that are used to calculate the returns. The

selection of independent variables to use in our model is based on previous research in this area, including the work of Jud and Winkler (2005), Cannon, Miller and Pandher (2006), Brown and Chhachhi (2007) and Goetzmann et al (2012).

Jud and Winkler (2002, 2005) and others find home values and returns to homeownership vary across different regions of the country. We use the nine divisions set by the U.S. Census Bureau.[7] We use eight dummy variables to represent divisions 1-7 and division 9. The default division is division 8. The states in each division are shown in Table 1. States in the default division are Arizona, Colorado, Idaho, New Mexico, Montana, Utah, Nevada and Wyoming.

Table 1: States Included in Each Census Division

Divison	States
1	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
2	New Jersey, New York, Pennsylvania
3	Indiana, Illinois, Michigan, Ohio, Wisconsin
4	Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
5	Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina , South Carolina, Virginia, West Virginia
6	Alabama, Kentucky, Mississippi, Wisconsin
7	Arkansas, Louisiana, Oklahoma, Texas
8	Arizona, Colorado, Idaho, New Mexico, Montana, Utah, Nevada, Wyoming
9	Alaska, California, Hawaii, Oregon, Washington

We include the percentage of occupied units that are occupied by renters. If a high percentage of properties are rental properties, that may be an indication that occupants prefer to rent and there may not be as many potential homeowners. On the other hand, a high number of renters can be seen as potential homeowners, since most people rent prior to purchasing a home. Previous studies find a higher percentage of renters in an area to be negatively associated with home price appreciation and returns to homeownership.

Articles in the popular press and some recent research point to vacancy rates as a reason for falling home prices. We use the percentage of housing units that are vacant and for sale in each county as of the last American Community Survey prior to the 2010 Decennial Census as our vacancy variable.

Miller and Pandher (2006) and Goetzmann et al (2012) find population density is a significant variable in explaining home price movements. We split our counties into quintiles based on population and create a dummy variable for the quintile with the highest population and a second dummy variable for the quintile with the lowest population. We compare the top 20 percent of counties and the bottom 20 percent of counties to the remaining 60 percent to see if the size of the county is significant in determining returns to homeownership.

Finally, we include the percentage of home purchase loans in 2005 that were originated as subprime loans for each county in our sample. Subprime lending has been discussed in numerous research studies and, likely, in every major business-related media outlet in the United

States over the past few years. Subprime lending is a popular scapegoat for the housing bubble and subsequent bust. Brooks and Simon (2007) point to 2005 as the peak year for subprime lending. While our review period for returns starts prior to the emergence of subprime lending and ends after the bust, we include this variable to determine if the long run return to housing is significantly impacted by subprime lending activity.[8]

FINDINGS

Returns to Homeowners

We compute returns to homeownership based on a ten year holding period for 3,331 counties in the U.S. In addition to the IRR calculations, we calculate the net present value (NPV) of housing investments (at a discount rate of 7%) for each county under two assumptions: (1) no tax benefits to homeownership, and (2) homeowners receive the maximum 35 percent tax benefit.[9] Selected return information is shown in Tables 2-5.

Assuming no tax benefits from homeownership, the highest rates of return are in Terrell County, Texas (53.01 percent). The next nine highest counties have returns ranging from 38.21 percent to 40.83 percent (Table 2). Five of the top ten county returns are in Texas. No other state has more than one county in the top ten in returns.

Table 2: Best and Worst County Returns Assuming No Tax Benefit (Ret0)

County	Return	NPV@7%
Top 10 County Returns		
Terrell County, Texas	53.01%	$26,810
Wade Hampton Census Area, Alaska	40.83%	$36,003
Blaine County, Nebraska	40.32%	$28,364
King County, Texas	40.12%	$124,748
Slope County, North Dakota	40.00%	$24,752
Winkler County, Texas	38.68%	$20,271
Reeves County, Texas	38.65%	$15,828
Emporia City, Virginia	38.32%	$192,920
McDowell County, West Virginia	38.31%	$16,008
Hall County, Texas	38.21%	$19,830
Bottom 10 County Returns		
County	Return	NPV@7%
Livingston County, Michigan	-6.83%	(55,473)
Oakland County, Michigan	-6.51%	(51,294)
Hinsdale County, Colorado	-6.13%	(68,528)
Thomas County, Kansas	-5.36%	(18,576)
Macomb County, Michigan	-5.13%	(35,156)
Robertson County, Kentucky	-5.08%	(14,204)
Pitkin County, Colorado	-5.05%	(156,443)

Table 2: Best and Worst County Returns Assuming No Tax Benefit (Ret0)		
County	Return	NPV@7%
Geauga County, Ohio	-4.83%	(52,288)
Lapeer County, Michigan	-4.79%	(36,073)
Banner County, Nebraska	-4.63%	(17,134)

The lowest returns are in Livingston County, Michigan with a return of -6.83 percent. Oakland County, Michigan has the second lowest return (-6.51 percent) followed by Hinsdale County, Colorado (-6.13 percent). Four of the ten counties with the lowest returns from homeownership (assuming no tax benefit) are in Michigan.

Table 3 shows the highest and lowest returns to homeownership assuming the maximum 35 percent tax benefit for interest expense and real estate taxes. Most of the counties listed for the best and worst returns assuming no tax benefit remain on the list assuming a 35 percent tax benefit. Terrell County, Texas returns increase to 62.75 percent. Other counties on the best returns list have returns ranging from 46.24 percent to 49.39 percent. The worst returns under this assumption are in Hinsdale County, Colorado with a return of -1.14 percent. Only three of the 3,133 counties have negative returns assuming a 35 percent marginal tax benefit.

Table 3: Best and Worst County Returns Assuming 35% Marginal Tax Rate (Ret35)		
County	Return	NPV@7%
Top 10 County Returns		
Terrell County, Texas	62.75%	$30,637
Blaine County, Nebraska	49.39%	$33,442
Reeves County, Texas	49.33%	$19,817
Wade Hampton Census Area, Alaska	49.10%	$41,549
Winkler County, Texas	48.13%	$24,633
Slope County, North Dakota	47.60%	$28,296
Hall County, Texas	47.37%	$26,713
Cochran County, Texas	47.05%	$24,449
King County, Texas	46.29%	$134,060
McDowell County, West Virginia	46.24%	$18,808
Bottom 10 County Returns		
County	Return	NPV@7%
Hinsdale County, Colorado	-1.14%	($40,402)
Pitkin County, Colorado	-0.004%	($90,797)
Livingston County, Michigan	-0.003%	($27,674)
Oakland County, Michigan	0.005%	($23,280)
Geauga County, Ohio	1.14%	($24,290)
Lapeer County, Michigan	1.52%	($15,816)
Robertson County, Kentucky	1.61%	($6,046)
Banner County, Nebraska	1.86%	($7,169)

Table 3: Best and Worst County Returns Assuming 35% Marginal Tax Rate (Ret35)		
County	Return	NPV@7%
Macomb County, Michigan	2.02%	($13,571)
Delaware County, Ohio	2.21%	($6,801)

We also calculate the highest and lowest NPV under the assumptions of (1) no tax benefit and (2) a marginal tax benefit of 35 percent. The results of the NPV analysis are reported in Tables 4 and 5. Two census areas in Virginia lead the way with the highest NPVs. Emporia city, Virginia had a NPV of $192,920 assuming no tax benefit and an NPV of $205,885 assuming a 35 percent tax benefit. Fairfax city, Virginia has an NPV of $151,512 with no tax benefit and an NPV of $183,254 assuming a 35 percent tax benefit. Five of the top 10 returns using the NPV analysis are in Virginia with another in the District of Columbia.

Table 4. Highest NPV Counties*		
County	NPV w/no Tax Benefit	NPV w/35% tax benefit
Emporia City, Virginia	$192,920	$205,885
Fairfax City, Virginia	$151,512	$183,254
King County, Texas	$124,748	$134,060
Kauai County, Hawaii	$99,430	$127,390
Franklin City, Virginia	$95,550	$109,933
Maui County, Hawaii	$90,859	$122,030
District of Columbia, DC	$87,276	$109,335
Manassas Park City, Virginia	$81,658	$101,639
Monroe County, Florida	$80,345	$109,442
Prince William County, Virginia	$76,617	$100,673
*NPV calculation uses a 7 percent required rate of return.		

Table 5. Lowest NPV Counties*		
County	NPV w/no Tax Benefit	NPV w/35% tax benefit
Pitkin County, Colorado	($156,443)	($90,797)
Hinsdale County, Colorado	($68,528)	($40,402)
Marin County, California	($58,919)	$10,869
Santa Clara County, California	($56,219)	$3,244
Livingston County, Michigan	($55,473)	($27,674)
Geauga County, Ohio	($52,288)	($24,290)
Oakland County, Michigan	($51,294)	($23,280)
Delaware County, Ohio	($50,023)	($20,510)
San Mateo County, California	($47,566)	$14,891
Elbert County, Colorado	($45,722)	($13,275)
*NPV calculation uses a 7 percent required rate of return.		

The lowest NPV is in Pitkin County, Colorado with an NPV of -$156,443 with no tax benefit and -$90,797 with a 35 percent marginal tax benefit. The ten counties with the lowest NPVs come from four different states. Three of the lowest NPV counties are in Colorado, three are in California, two are in Ohio and two are in Michigan. All of the bottom 10 NPVs are negative when assuming no tax benefit. The three counties in California on the bottom 10 NPV list have positive NPVs when we assume a 35 percent marginal tax benefit.

Regression Results

The results of our regression models are shown in Tables 6 and 7. Table 6 shows the results of the regression model with the returns with no tax benefit as the dependent variable. Returns to homeownership are strongly influenced by the location of the county. We use dummy variables to represent the different divisions used by the U.S. Census Bureau.[7] The states in each U.S. Census Division are listed in Table 1.

Table 6. Regression Results Dependent Variable: IRR w/no tax benefit

Variable	Parameter Estimate	t Value	P-value
Intercept	0.08228	13.98	<.0001
Division1	0.00843	1.26	0.2091
Division2	-0.01241	-2.45	0.0144
Division3	-0.04011	-10.60	<.0001
Division4	-0.00279	-0.80	0.4257
Division5	0.03846	10.85	<.0001
Division6	0.01353	3.46	0.0005
Division7	0.06406	17.34	<.0001
Division9	0.01428	2.94	0.0033
RentPct	0.04118	3.22	0.0013
PctVac	-0.42512	-2.28	0.0229
Top20	-0.00990	-4.07	<.0001
Bot20	0.02318	9.64	<.0001
PropSub	0.01136	0.86	0.3895

The dummy variables for divisions 2 and 3 are negative and statistically significant and the dummy variables for divisions 5-7 and 9 are positive and statistically significant. Divisions 1 and 4 are the only divisions where returns are not significantly different from the default division (division 8). Division 1 is located in the New England area, while Division 4 is located in the upper Midwest. The two divisions that have negative returns relative to the default division include New Jersey, New York, Pennsylvania, Indiana, Illinois, Michigan, Ohio and Wisconsin. Counties in these states, on average, have significantly lower returns to housing over the period than any of the other divisions.

All other divisions have returns to homeowners that, on average, are significantly higher than the default division. The highest returns are in division 7, where average returns are 6.4 percent higher than the default division. Division 7 consists of Arkansas, Louisiana, Oklahoma and Texas. Returns in division 5 are also quite high compared to the default region (3.8 percent higher).

While the Census division of the counties is a significant element in determining returns to homeownership, we find the percentage of renters in the county, the percentage of vacant homes that are for sale, and the county population variable is also statistically significant in explaining returns to homeownership.

The most surprising result is the parameter estimate for the percentage of renters in a county, which is positive and statistically significant. This indicates that returns to homeowners are higher in counties that have a higher percentage of occupants that are renters rather than owners. This is contrary to the relationship that most experts would expect. In fact, some municipalities are setting limits on the percentage of units that can be occupied by renters due to a concern about the deterioration of neighborhoods and home values.

There are two plausible explanations for this relationship. First, more renters in an area means there are more potential homeowners. Market developments from 2008 through 2009 made it more likely that people would move from renting to buying a home. As home prices dropped rapidly from their 2005-2007 prices and mortgage rates reached all time lows, the opportunity to move from renting to owning a home may have resulted in increased demand for homes that were on the market near the end of our review period. The second reason is that areas with a high proportion of renters might have very high rental rates. Since we use an imputed rent as a cost savings in our calculation, the higher rental rate would lead to a higher return to homeownership in those markets with high imputed rental values.

The percentage of vacant homes for sale is statistically significant and negative. This is the expected result. More vacant homes for sale in an area means the supply of housing is high, which leads to lower home prices.

The population variables that we use are dummy variables for counties with the highest and lowest populations. Counties that are in the top quintile in population are represented by the top20 dummy variable while counties in the bottom quintile in population are represented by the bot20 dummy variable. Both variables are statistically significant. High population areas are associated with lower returns to homeownership, while more rural counties have significantly higher returns to homeownership. The bottom 20 percent of counties by population have 2.3 percent higher returns, on average, than the average returns for the 20^{th} to 80^{th} percentile counties. Returns in counties in the top quintile in population are, on average, about one percent lower than the average returns for the 20^{th} to 80^{th} percentile counties.

Finally, the variable that measures the subprime lending activity in each county is the proportion of home purchase loans in 2005 that are classified as subprime loans. This variable is

not statistically significant. Based on our findings, subprime lending does not play a role in the returns to homeowners with holding periods from 1999 – 2009.

Table 7 shows the results of the regression model with the returns assuming the investor is in the 35 percent marginal tax bracket and itemizes deductions. The only differences in the regression results compared to the regression assuming no tax benefit is in the Census divisions. All of the variables that are significant in the first regression are also significant in this regression except the dummy variable for Division 2. Division 2 is negative and statistically significant assuming no tax benefit but is insignificant assuming borrowers fully itemize and are in the 35 percent tax bracket. Also, Division 4 is insignificant in the first regression and is positive and significant in the second regression.

Table 7. Regression Results Dependent Variable: IRR w/35% tax benefit

Variable	Parameter Estimate	t Value	P-value
Intercept	0.13294	22.05	<.0001
Division1	0.01130	1.64	0.1003
Division2	0.00070	0.13	0.8934
Division3	-0.02721	-7.02	<.0001
Division4	0.00810	2.26	0.0240
Division5	0.04300	11.85	<.0001
Division6	0.02040	5.10	<.0001
Division7	0.07683	20.31	<.0001
Division9	0.01154	2.32	0.0205
RentPct	0.05401	4.12	<.0001
PctVac	-0.61553	-3.22	0.0013
Top20	-0.01196	-4.80	<.0001
Bot20	0.02788	11.32	<.0001
PropSub	0.01306	0.97	0.3340

The changes to returns in Divisions 2 and 4 indicate returns to homeownership in these divisions are highly dependent on the tax deductibility of interest and real estate tax payments. Counties in these divisions have significantly higher deductions, on average, because the level of home prices is significantly higher.

CONCLUSIONS

Returns to homeowners vary widely depending on the location of the county. Using the Census divisions to separate the counties into divisions, we find strong evidence that returns are much greater in some divisions than others. Interestingly, the divisions that have the highest

returns are not all in the same area of the country. Nor are the divisions with the lowest returns. For example, in our first regression, divisions 1 and 2 have lower average returns than the other divisions. The geography of those divisions ranges from Pennsylvania and New York to Michigan and Wisconsin. Returns are more similar in Wisconsin and New York than in New York and Connecticut. We also conclude that returns to homeownership are much higher in the south, especially in Division 7, which consists of Arkansas, Louisiana, Oklahoma and Texas.

We find the percentage of renters in a county is positively related to returns to homeownership. This is somewhat confounding based on the current belief most experts have that higher rental occupancies usually mean lower home prices. Our theory is that this could be the result of higher imputed rent in these areas or there could be pent up demand for homeownership. If either is the case, it would explain why the percentage of renters could be positively related to the returns to homeownership. Further research is needed to examine this somewhat counterintuitive result.

The population variables are also significant in explaining the variation in returns across counties. Counties that are among the largest 20 percent by population have lower average returns, while counties that are among the smallest 20 percent by population have significantly higher average returns.

There is a strong need for additional research on the returns to homeownership. Our review period had significant home price changes as the housing bubble emerged, and ultimately, popped. Returns to homeowners for the period, 1999 to 2009, were overwhelmingly positive. However, it is unlikely that buyers purchasing their homes at the height of the bubble will experience positive returns to homeownership anytime in the near future.

ENDNOTES

1 *Http://www.Standardandpoors.com/Indices/Sp-Case-Shiller-Home-Price-Indices/En/Us/?Indexid=Spusa-Cashpidff--P-Us----*

2 *Http://Money.Cnn.Com/Gallery/Real_Estate/2012/09/06/Buy-Rent-Cities/Index.Html*

3 *Http://Factfinder2.Census.Gov/Faces/Nav/Jsf/Pages/Index.Xhtml*

4 *Http://Research.Stlouisfed.Org/Fred2/Series/Mortgage30us?Cid=114*

5 *Http://Www.Dataplace.Org/*

6 During Most Of This Period, There Were Six Different Marginal Tax Rates: 10, 15, 25, 28, 33, And 35%. The Highest And The Lowest Rates Shown In This Study Provide A Broad Picture Of How The Returns Vary With Tax Rates. Results For Other Tax Rates Are Qualitatively Similar To What Is Shown In This Paper And Are Available From Authors Upon Request.

7 *Http://Www.Census.Gov/Geo/Www/Us_Regdiv.Pdf*

8 For those investors who invested during the housing bubble, long-term returns will certainly be impacted. In this study, we are focused on the returns for investment during the period from 1999-2009.

9 Discount rate of 7% was, somewhat arbitrarily, used for NPV calculations. Seven percent is the approximate average of the two mortgage rates used in our study—7.91 and 5.88%. The NPV analysis is done solely to add another dimension to our paper. While a different discount rate would, indeed, lead to different NPVs, our regression results are based on more rigorous Internal Rate of Return calculations.

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