

Cash is King?
Sales Price Submarket and Foreclosure Effects

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Abstract

Hedonic price tests on over one-half million home sale transactions show that buyers using cash realize price discounts relative to conventional mortgage financing transactions. Further examination, however, reveals that cash discounts are confined to lower priced homes. Cash buyers pay premiums for higher priced homes. Buyers relying on FHA/VA pay premiums for lower priced homes and discounts for higher priced homes. We also document important differences in results for foreclosed versus non-foreclosed properties. Our results highlight the importance of examining a large and diverse sample in which wide separation in housing prices can be observed and for which proper controls can be implemented.

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I. Introduction

Home financing choice has significant pricing implications for both buyer and seller. For example, Asabere, Huffman and Mehdian (1992) find that all-cash transactions are free of risk premiums and offer a price discount that compensates for the absence of uncertainties associated with mortgage transactions.¹ They also find that all-cash transactions significantly reduce the time required to reach closing relative to mortgage deals. As a result, all-cash sales buyers avoid paying present value premiums, and sellers avoid the “opportunity cost of waiting for funds.” Using a sample of 319 comparable row home dwelling units, they find that home sales involving all-cash transactions are sold at a 13% price discount.

Studies on FHA and VA pricing often focus on mortgage choice and financing cost capitalization effects. Pennington-Cross and Nichols (2000), Berkovec, Kogut, and Nothaft (2001), Rosenthal, Duca, and Gabriel (1991) find that buyer credit history affects the choice of FHA/VA/conventional financing, but Goodman and Nichols (1997) find that these effects may be temporary, usually lasting less than one year. In a recent paper, Asabere and Huffman (2008) argue that in order to offset the additional financing costs, FHA/VA borrowers might make bids that are lower than for a conventional borrower. Sellers may be likely to accept a low bid early in an attempt to minimize high opportunity costs. They examine the effects of FHA and VA mortgage financing on home prices. Supporting their hypothesis, they find price discounts of 2 to 4% for VA and FHA financings relative to conventional financing.

¹ Also see Ferreira and Sirmans (1989); Bible and Crunkelton (1983); Claurette (1984); Rosen (1984); Sirmans, Smith and Sirmans (1983); Smith, Sirmans and Sirmans (1984)).

Studies also show that foreclosed properties sell at discounted prices relative to non-foreclosed properties. Shilling, Benjamin, and Sirmans (1990), Forgey, Rutherford and VanBuskirk (1995), Harding and Wolverton (1996), and Pennington-Cross (2006) find that foreclosed properties sell at discounts ranging from 22% to 24%. None of these studies distinguish across different methods of financing.

The objective of our paper is to examine the robustness of pricing effects of financing across sales price submarkets while controlling for foreclosure effects. We examine a large cross-section of residential properties (over half million transactions) over a long and recent time period (1999-2007). We assign the properties to sales price submarket quartiles, and use a dummy variable to control for foreclosures.

The full sample results of our hedonic model indicate that Cash/FHA/VA financings are associated with significant sale price discounts compared to conventional mortgage financed properties, with some variation in magnitudes when we control for foreclosures. However, we find that results differ noticeably across sales price submarkets and between foreclosed and non-foreclosed properties within sales price submarket. Specifically, for FHA/VA financings, we find significant *premium* prices are paid in the lowest price submarket. This may be explained by the recent use of seller down-payment assistance programs. In general, a down-payment assistance program can involve the seller providing cash to the buyer for a down payment, but not directly. Federal housing regulations prohibits a direct cash transfer and, usually, sellers will gift money to a third party non-profit that will gift the money to the buyer. Typical amounts are three to six percent of the homes selling costs. It is hypothesized that home sellers inflate the price of their house to account for the

gift money and buyers pay the higher price knowing they will receive the down-payment assistance in return.² Small discounts are found for FHA/VA financed sales in the second quartile, and large discounts are found for the top two quartiles (upper half) representing sales prices ranging from \$145,001 to \$2,000,000 (approximately 5% discounts for both FHA and VA). These results are particularly interesting because FHA/VA financings are skewed heavily toward lower priced homes.

Much of our discussion focuses on the importance of cash and whether cash purchases can be made at discounts relative to conventional mortgage financed purchases. Our initial full sample results indicate that buyers using cash pay a 4.2% discount. Upon further examination, however, we find that cash transaction discounts are restricted primarily to the lowest price submarket. In the lowest sales price quartile, cash transactions are made with a 10.8% discount, more in line with the results provided by Asabere, Huffman and Mehdian (1992). Very small differences are found for the middle quartiles. In the highest priced quartile, however, properties financed with cash sell at a premium of 4.2%.³ Therefore, our results indicate that cash is king over lower priced segments, but not over the entire

² Marcie Geffner, writing on Bankrate.com, August 1, 2008 in an article titled "Down payment assistance bites the dust" indicates that down payment assistance terminated Oct. 1, 2008. The ban is part of the Housing and Economic Recovery Act of 2008. Prior to this ban, Geffner states: the FHA had argued "that sellers' "donations" result in artificially inflated house prices and that homebuyers who use such assistance are more likely to default on their loans. Two federal government reports in 2005 concluded that these programs made homeownership more expensive for homebuyers who used them."

³ One possible psychological explanation for the price premium for cash in the top quartile compared to the discount in the lower quartiles is that in lower priced properties buyers with cash are looking for a deal and, in higher priced properties, individuals with cash are looking for a better match. There is probably more homogeneity of housing among lower price properties so individuals have more choice of similar products and probably more heterogeneity (fewer substitutes) among higher priced homes, so buyers seeking a better match might have to pay a higher price. Cash permits buyers to obtain the home they want more easily.

region of home segments.

Our results also confirm large discounts (over 20%) for foreclosed versus non-foreclosed properties. These results are in line with earlier foreclosure effects studies. But, a key question centers on if foreclosure transactions affect the FHA/VA/Cash discount pricing relative to conventional foreclosure transactions. In other words, should tests of pricing effects be controlled for foreclosure events? After imposing a foreclosure dummy variable in our tests, we find that the full sample FHA/VA price discounts increase approximately 1%, and that the cash price discount falls 1.5%. Therefore, we conclude that hedonic pricing analysis of discounts and premiums of alternative financing methods should control for foreclosure events. Most earlier studies do not impose controls for foreclosure transactions.

We also examine results after segmenting the sample into foreclosure and non-foreclosure subsamples. For the full sample FHA/VA, we find significant discounts are realized in the non-foreclosure sample (i.e., relative to conventional mortgage non-foreclosure transactions), but that premiums are paid in the foreclosure sample (i.e., relative to conventional mortgage foreclosure transactions). Cash transactions are made at a discount in both subsamples. After further segmenting the samples into below and above median sales prices, we find that FHA/VA premiums for foreclosed properties are confined to the lower priced half. Cash transactions took place at a discount in both halves. Therefore, among the higher priced foreclosure sales, FHA/VA/Cash transactions traded at a discount relative to conventional mortgage transactions.

Our paper is organized as follows. Section II contrasts the conventional, FHA, and

VA loan processes. The methodology and data are explained in Sections III and IV, respectively. The empirical results are discussed in Section V, and concluding remarks are made in Section VI.

II. Conventional, FHA, and VA loan process

For conventional mortgages, all terms of loans, including loan-to-value ratio, interest rate (or ARM terms), and the payment-to-income ratios, are negotiated between borrower and lender. Typically, the maximum loan amount will be 80 percent of the value of the properties being purchased. Conventional mortgages are neither insured nor guaranteed by government entities. If the borrower defaults on the loan, both the lender and borrower may incur losses. The borrower absorbs losses to the extent of any equity, and, if losses exceed the amount of borrower equity, then the lender also will incur a loss. Regulations governing the operation of savings institutions generally require that equity of at least 20 percent of value must be provided by the borrower. Therefore, such losses must exceed 20 percent of the original property value before the lender would suffer a loss. Because of the equity requirements, a conventional mortgage protects the lender against some portion of the potential loan loss.

Conventional mortgage loans can be insured by private institutions. In this case, lenders may be willing to grant a loan request in excess of 80 percent of property value if the borrower purchases mortgage insurance to protect the lender against default risk. However, typically only the amount of the loan in excess of 80 percent of the value is covered under the mortgage insurance policy.

An FHA mortgage is a loan insured by the Federal Housing Administration. The FHA does not provide loans but, rather, provides default risk insurance for the lender. FHA

transactions are made with higher loan-to-value ratios than conventional uninsured loans, and the FHA accepts the risk of borrower default. Consequently, FHA traditionally has maintained strict qualification procedures. Regulations put loan maximums on FHA insured mortgage loans that may not be sufficient for borrowers who want to purchase higher-priced properties. FHA borrowers are likely to have lower incomes and purchase properties in lower price ranges (Bruergeman and Fisher, 2004, Hendershott, LaFayette and Haurin, 1997) so they do not exceed the FHA maximum loan limits.

The FHA will insure a beginning amount of about 97% of an acceptable price, plus allowable closing costs and the upfront FHA premium (see Asabere and Huffman (2008)). Currently, FHA premiums are charged 1.5% of the insured amount upfront, plus 0.5% of the outstanding balance paid annually. Also, because of the higher LVRs compared to conventional mortgages, FHA insured loans typically are associated with higher monthly payments, all else equal.

VA loans are guaranteed by the Department of Veterans Affairs (VA) and are available to qualified veterans only (Bruergeman and Fisher, 2004). The VA provides guarantees that compensate lenders for losses on loans made to veterans. Like the FHA, the VA does not originate mortgage loans. Unlike the FHA, the VA provides a loan guarantee, not default insurance. All losses incurred by VA are paid by the U.S. government. VA loans offer default guarantees that require no premium and, unless VA limits are exceeded, a 100% LVR (Asabere and Huffman 2008). The VA requires the payment of a funding fee of about 2% by the borrowers.

In general, compared to conventional mortgage borrowers, FHA and VA borrowers

can obtain higher LVRs. However, in exchange for higher LVRs, borrowers must pay additional financing costs. FHA borrowers must pay insurance premiums, and VA borrowers must pay funding costs.

III. Methodology

Following Asabere and Huffman (2008), we estimate a hedonic pricing model to examine the pricing effect of FHA/VA/Cash relative to conventional financing:

$$LSP = \alpha_0 + \beta_1FHA + \beta_2VA + \beta_3CASH + \sum_{\beta_4}^n X_{ij} + \varepsilon \quad (1)$$

$$LSP = \alpha_0 + \beta_1FHA + \beta_2VA + \beta_3CASH + \beta_4FORCLOSURE + \sum_{\beta_5}^n X_{ij} + \varepsilon \quad (2)$$

Where:

α_0 = constant

LSP = Logarithm of sale price of the house;

FHA = FHA mortgage underwriting dummy variable;

VA = VA mortgage underwriting dummy variable;

$CASH$ = Property is purchased with cash;

$FORCLOSURE$ = Foreclosure dummy variable (equal to one if it is a foreclosure property and zero for others); and

$\sum_{\beta_5}^n X_{ij}$ = A set of variables including the physical characteristics and a set of dummy

variables to control for location and quarter of sale.

ε = error term

All models include controls for location and quarter of sale. There are 84 location dummy variables and 36 quarterly dummy variables for quarter of sale. We do not provide empirical results in the tables for these variables in the interest of space and brevity.

We estimate the following four versions of the equations:

Model 1:

We estimate equation (1) on the full sample without a control for foreclosure sales. Results of this model will provide a good comparison with prior studies, most of which do not control for foreclosures.

Model 2:

We estimate equation (2) on the full sample which includes a control for foreclosure sales to determine how controlling for foreclosures impacts the financing coefficients. This is the model that should be used if foreclosures are not excluded from the sample.

Model 3:

We exclude all foreclosure sales from the full sample and estimate equation (1). These tests will provide results for typical property financings.

Model 4:

We estimate equation (1) solely on the 42,279 foreclosure sales. These results will indicate how financing impacts the selling price of foreclosures, and if results differ between foreclosure and non-foreclosure subsamples.

Table 1 provides definitions of the variables included in the analysis. We also split the full sample into four quartiles based on the sales prices. We then estimate the two equations on the full sample, and on each quartile. The quartile tests will help indicate if the pricing effect of FHA/VA/Cash is consistent across the submarkets.

Most of our tests are run over large numbers of observations. We control for the large sample sizes by using Bayesian statistics. For example, as the sample size grows, standard

errors fall, and t -statistics rise. The lower standard errors lead to greater statistical power (rejecting a false null hypothesis), but leave the size of the test (probability of rejecting a true null hypothesis) unchanged. Bayesian statistics can be used to calculate the posterior odds of the null hypothesis, thereby adjusting the size of the test for the large sample size. For example, with a sample size of 552,281, Bayesian posterior odds will favor rejection of the null hypothesis when the t -statistic exceeds 3.64 in absolute value, which nearly all of our test statistics exceed. Please see appendix for the derivation of the appropriate critical value.

IV. Description of Data

Our sample is obtained from the MLS for the Dallas/Fort Worth Metroplex over 1999-2007. Observations were deleted from the sample if information was missing for the variables used in the study. Also, all sales less than \$50,000 or larger than \$2,000,000 were excluded from the sample, resulting in a sample of 552,281 observations. We created price quartile submarkets with sales priced from \$50,000-\$106,000 for quartile 1, from 106,001-\$145,000 for quartile 2, from \$145,001-\$208,500 for quartile 3, and from \$208,501-\$2,000,000 for quartile 4. The mean sales price for the full sample is \$184,691, for quartile 1 is \$84,079, quartile 2 is \$125,585, quartile 3 is \$171,638, and quartile 4 is \$358,896. Table 2 provides descriptive statistics for the full sample and the quartiles. Of interest, foreclosures comprise 7.7% of our data, with the majority occurring in the lowest priced quartile. The average square feet is 2,183, and, as expected, the lowest quartile has the lowest average square feet and the highest quartile has the highest square feet. This trend is similar for most variables, with the exception of age, tenant, and vacant, which have the largest values in the lowest price quartile and the smallest values in the highest priced quartile.

Table 3 provides a breakdown of FHA, VA, Cash and Conventional financing for the full sample, and for each sales price quartile subsample. In the full sample, 17.4% of the properties are financed by FHA, 2.3% by VA, 7.6% by cash, and the remaining 72.7% are financed using conventional mortgages. The percentage of transactions comprising conventional mortgages rises with quartile (from 53% in quartile 1 to 91% in quartile 4). Very few FHA/VA transactions fall in quartile 4; less than 1% of the quartile 4 sample. In contrast, cash transactions occur most often in quartiles 1 and 4.

Table 4 reports the arithmetic means and differences in means versus conventional mortgages for each financing type. Differences in means for prices for FHA/VA/Cash versus conventional financing are significantly negative, suggesting, without imposing transaction matching controls, that properties financed by FHA/VA/Cash are sold at a discount relative to conventional financing transactions. A large percentage of cash transactions are used to purchase foreclosed properties (16.9% of all cash transactions). FHA properties are the smallest (1638 square feet) and sell at the lowest price (average = \$109,422). Conventional financed houses are the largest (2,320 square feet), and sell at the highest prices (average = \$203,208). Cash financed properties sell at an average price of \$194,117 with average size of 2,174 square feet.

Table 5 reports arithmetic means for each type of financing, along with differences in means for FHA versus VA, FHA versus cash, and VA versus cash. Properties financed by cash sell at significant higher prices than properties financed either by FHA or VA methods (\$84,695 higher than FHA and \$56,817 higher than VA).

Table 6 provides arithmetic means and differences in means for foreclosure and

non-foreclosure sales. There are 42,278 foreclosure sales in our sample. Foreclosure properties sell for significantly lower prices, on average, compared to non-foreclosure properties (\$118,158 versus \$190,207). Among FHA/VA/Cash alternatives, FHA is the most popular among non-foreclosure properties (17.9%) and cash is the most popular option for foreclosure properties (16.7%).

V. Empirical Results

V.1. Pricing Effects without Controlling for Foreclosure Sales

Table 7 reports results from equation (1) without controlling for foreclosure sales. All three key coefficients are significantly negative: -2%, -3.4%, and -4.2% for FHA, VA, and Cash, respectively. These results are consistent with those reported by Asabere, Huffman and Mehdian (1992) and Asabere and Huffman (2008), indicating that there are significant price discounts for FHA, VA, and cash sales relative to conventional mortgage financed sales.⁴

A key question of our study centers on the robustness of results across sales price submarkets. We answer this question by running separate tests of equation (1) across observations within each quartile. Results reported in Table 7 clearly show that sales price effects change systematically across quartiles. Pricing coefficients move monotonically downward for FHA and VA transactions. FHA and VA price premiums of 2.4% and 3.3%, respectively, are paid for the lowest priced homes. This is a very important result because, as shown earlier in Table 2, FHA/VA transactions comprise approximately 38% of the lowest price submarket. Discounts are paid for FHA and VA transactions in the remaining three quartiles, but we note there are very few FHA/VA transactions in the highest price submarket

⁴ Variance inflation factors for all key variables are well within acceptable ranges (see Belsley, Kuh, and Welsch (1980) for a discussion of VIFs). So, multicollinearity is not present in our tests.

(0.8% of quartile 4). We note that with sample sizes represented by our quartile subsamples, the Bayesian posterior odds will favor rejection of the null hypothesis when the t -statistic exceeds 3.44 in absolute value.

In stark contrast to the FHA/VA results, the cash pricing coefficient moves monotonically upward from quartile 1 to quartile 4. Low priced homes paid with cash are bought with a 10.8% discount relative to low priced homes financed with conventional mortgages. The discount quickly falls to 0.7% in quartile 2 and disappears altogether in quartile 3 (coefficient very close to zero). High priced homes (quartile 4) paid by cash are bought with a 4.2% premium relative to high priced homes financed with conventional mortgages.⁵

These findings emphasize the importance of segmenting the housing market when drawing inferences about the pricing of alternative financing transactions relative to conventional mortgage transactions. One size does not fit all.

V.2. *Pricing Effects Controlling for Foreclosure Sales*

We estimate equation (2), controlling for foreclosure sales, and report the results in Table 8. Consistent with previous studies, our tests show that the foreclosure discount (price of foreclosed properties versus price of non-foreclosed properties, after controlling for property characteristics) is 20.6% in the full sample. Our tests show that the magnitude of the foreclosure discount is nearly three times larger in the outer quartiles (14.3% for quartile 1 and 16.2% for quartile 4) relative to the middle quartiles (5.9% for quartile 2 and 4.7% for

⁵ We also ran tests after splitting the upper quartile in half to see if the premium results for the cash transactions were driven by high priced outliers. For transactions below the median in the fourth quartile, cash premiums of 5.19% are paid. For transactions above the median in the fourth quartile, cash premiums drop to just 0.48%.

quartile 3).

The estimated pricing coefficients from the full sample for FHA, VA, and cash are significantly negative. Results imply significant price discounts for FHA, VA and cash transactions to conventional mortgage transactions. However, we note that controlling for foreclosure events matters. Compared to Table 7, that does not control for foreclosure sales, estimated price discounts for FHA and VA are larger (3% versus 2% for FHA and 4.2% versus 3.4% for VA). Estimated price discounts for cash transactions are smaller (2.7% versus 4.2%). Therefore, while the foreclosure controls do not change the general results that FHA/VA/Cash transactions sell at discounts relative to conventional mortgage transactions, the magnitudes of the estimated discounts are clearly affected.

Submarket results show similar patterns to those discussed in Table 7; namely that estimated coefficients change monotonically from the lowest price to highest price submarkets. Once again, coefficient estimates are affected after controlling for foreclosure events, but the effects are confined to the lowest priced submarket (which is where foreclosures tend to occur more often). The lowest priced submarket FHA/VA transaction premiums are smaller (1.5% versus 2.4% for FHA and 2.1% versus 3.3% for VA), and the cash transaction discount is smaller (8.9% versus 10.8%). Results for the remaining three quartiles are virtually unchanged. These findings highlight the importance of controlling for foreclosure events within lowest price submarkets.

V.3. *Pricing Effects Excluding Foreclosure Sales*

Table 9 provides the results of tests on equation (1) after excluding all 42,278 foreclosure observations. As expected, results are nearly identical to those in Table 8 that

tested all observations while controlling for foreclosures. The only noticeable difference appears for cash transactions for the full sample and for the lowest price submarket, in which the cash discount falls from 2.7% and 8.9%, respectively, in Table 8 to 1.2% and 8.3%, respectively, in Table 9.

These results make sense for two reasons. First, most foreclosures occur in the lowest price submarket; number of foreclosures across the four quartiles are 18,252 for the first quartile, 9,376 for the second quartile, 4,626 for the third quartile, and 2,981 for the fourth quartile. Second, of the three alternative financing methods, cash transactions comprise the largest percentage of foreclosures in the lowest price submarket. Percentages of foreclosures financed with cash equal 22.9% in quartile 1, 8.7% in quartile 2, 7.8% in quartile 3, and 10.7% in quartile 4.

V.4. Pricing Effects for Foreclosure Sales

Table 10 provides the results from tests of equation (1) on the foreclosure sample only. We define two submarkets in this sample: low priced submarket (below the foreclosure sales price median), and high priced submarket (above the foreclosure sales price median). We know from Table 6 that foreclosures sell at lower prices, and are smaller and older than non-foreclosed properties, emphasizing the importance of our property characteristic matching controls. The purpose of these tests is to compare the pricing effects of foreclosure sales (Table 10) with the non-foreclosure sales (Table 9).

The contrasts are striking. Whereas in Table 9 we found FHA/VA transaction discounts (3.3% and 4.4% discounts) for the non-foreclosure sample, we now find FHA/VA transaction premiums for the foreclosure sample (2% and 4.2% premiums). Submarket tests

indicate that the FHA/VA premiums are confined to the lower price foreclosure submarket, but recall that most FHA/VA transactions fall in the lower priced submarket, so we should not place too much emphasis on the upper priced foreclosure submarket results. Cash transaction discounts increase dramatically from 1.2% for non-foreclosures to 9.9% for foreclosures.

V.5. Summary of Regression Results

Table 11 provides a summary of our regression results. Discounts are paid in all full samples, with the exception of the foreclosure sample in which borrowers relying on FHA/VA paid premiums relative to conventional mortgage transactions. Stark differences are observed between FHA/VA versus cash when examining the submarkets. In particular, in the lowest price submarkets, borrowers using FHA and VA paid premiums, while buyers using cash paid discounts. These results are particularly noteworthy because most FHA/VA transactions fall in the lower priced submarkets. The lowest price submarket FHA/VA premiums were largest within the foreclosure sample. The cash transaction discounts were very large and economically meaningful across all lowest price submarkets, ranging from 8.3% to 14.3%. In the highest price submarket, we find FHA/VA mortgage discounts and cash transaction premiums, although we emphasize once again there are not many high priced FHA/VA transactions. In contrast to the non-foreclosure results, homebuyers using cash pay a discount for high-priced foreclosed properties (3.7% discount versus 4.5% premium).

V. Conclusions

Is cash king in the housing market? The answer is a resounding yes and maybe so. Our results show that buyers that use cash pay discounts relative to conventional mortgage

financing for homes falling in the lowest priced home submarket (lowest quartile). Cash buyers pay premiums for higher priced homes. If we accept that buyers who pay cash in the top quartile are intent on obtaining the match they want and are willing to overpay to obtain that match, then we could argue that cash remains king. It appears that the exception to this rule applies to foreclosed properties in which cash buyers pay discounts regardless of price, but we note that most foreclosures are lower priced properties. Our results highlight the importance of examining a large and diverse sample in which wide separation in housing prices can be observed and for which controls can be implemented. While our results indicate cash buyers often pay discounts, we find that this result is confined primarily to the lower priced submarkets. So, yes, cash is king, for the lower priced submarket and may be king overall if obtaining what you want is the criteria instead of obtaining a discount. Otherwise, cash is not king across all home price submarkets.

We also examined FHA and VA backed transactions. We find that both financing types are associated with discounts for all but the lowest priced submarket, which is all the more interesting by noting that fairly large percentages of lower priced homes are purchased using FHA and VA. We suggested that DAP, which the FHA has argued leads to "artificially inflated houses prices," may account for this result.

Foreclosure properties appear to be best purchased with cash or conventional financing. Buyers using FHA/VA pay premiums for lower priced foreclosed properties, whereas cash buyers of foreclosed properties pay discounts regardless of price.

Appendix⁶ Bayesian Posterior Odds

As the sample size increases, the standard error likely falls. This is especially relevant if the sample size is very large as they are in our tests. Consequently, the test statistics (e.g., estimated t-statistics) are likely to be large. So, the probability of rejecting a false null hypothesis (statistical power) increases as the sample size increases, but the probability of rejecting a true null hypothesis (the significance level or size of the test) remains unchanged. Mann (1994) suggests the use of posterior odds to adjust the size of the test for large samples.

Define $P(H_0|\hat{\gamma})$ as the probability that the null hypothesis is true, given the vector of parameter estimates (i.e., the coefficient estimates in our model) and $P(H_1|\hat{\gamma})$ as the probability that the alternative hypothesis is true, given the vector of parameter estimates. And, define $P(\hat{\gamma}|H_0)$ as the probability of deriving the estimated values in $\hat{\gamma}$, conditional on the null hypothesis being true and $P(\hat{\gamma}|H_1)$ as the probability of deriving the estimated values in $\hat{\gamma}$, conditional on the null hypothesis being false. According to Bayes' rule, the posterior odds ratio equals the product of the prior odds ratio and the Bayes factor (the ratio of the posterior probabilities):

$$\text{Posterior Odds} = \frac{P(H_0|\hat{\gamma})}{P(H_1|\hat{\gamma})} = \frac{P(H_0)}{P(H_1)} \cdot \frac{P(\hat{\gamma}|H_0)}{P(\hat{\gamma}|H_1)} \quad (\text{A.1})$$

The Bayesian decision rule is to choose H_0 if the posterior odds exceeds one (e.g., that $P(H_0|\hat{\gamma}) > P(H_1|\hat{\gamma})$). As explained by Mann (1994), Jeffreys (1947) argues for the use of Cauchy priors and shows for equal prior odds for large samples that the posterior odds ratio

⁶ We thank Steve Mann for these explanations and for the references provided in our Appendix.

is:

$$\text{Posterior odds} = \exp\left[\frac{1}{2}\ln(n) - \frac{1}{2}t^2\right] \quad (\text{A.2})$$

where t is the test statistic for testing the null hypothesis. In our case, the null hypothesis is that the parameter equals zero. The test statistic is the t -statistic. For a posterior odds equal to one and $n = 552,000$, t equals 3.64:

$$1.0 = \exp\left[\frac{1}{2}\ln(552,281) - \frac{1}{2}t^2\right]$$

$$\ln(1) = \frac{1}{2}\ln(552,281) - \frac{1}{2}t^2$$

$$t = [\ln(552,281) - 2\ln(1)]^{0.5}$$

$$t = [13.22 - 2(0)]^{0.5} = 3.64$$

Therefore, to reject the null hypothesis with a sample size of 552,281, the estimated t -statistic must exceed 3.64 in absolute value. Similarly, if n falls in the 135,820 – 140,133 range (our four quartiles), $t = 3.44$.

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Table 1. Description of Variables

Variable	Definition
List Price	List price of the property
Sales Price	Contract sales price of the property
FHA Loan	Dummy variable (1,0) for FHA financing
VA Loan	Dummy variable (1,0) for VA financing
Cash	Dummy variable (1,0) if the property is paid by cash
Conventional loan	Dummy variable (1,0) for conventional financing
Foreclosure	Dummy variable (1,0) for foreclosed the property
# of Photos	Number of photographs published for the house on the MLS
Virtual Tour	Dummy variable (1,0) if a virtual tour is provided
Open House	Dummy variable (1,0) for open house
House Tour	Dummy Variable (1,0) for tour of homes (broker or public)
Log(sqft)	Log of square footage of the property
Agex	Age of the property in unit of 10 years
Agex-Squared	Squared of Agex
# Dining	Number of dining rooms
# Living	Number of living rooms
# Bathrooms	Number of bathrooms
Pool (yes/no)	Dummy variable (1,0) if the property has a pool.
# Fireplaces	Number of fireplaces
Lgt1hac	Land greater than one half acre
Tenant	Dummy variables (1,0) if the property is occupied by tenant
Vacant	Dummy variables (1,0) if the property is vacant

Table 2. Descriptive Statistics: Means for the Full Sample and Quartile Subsamples

	Full Sample	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Price at low end of sample/quartile	\$50,000	\$50,000	\$106,001	\$145,001	\$208,501
Price at high end of sample/quartile	\$2,000,000	\$106,000	\$145,000	\$208,500	\$2,000,000
Number of Observations	552,281	138,572	140,133	135,820	137,756
Variable Name					
Sales Price	184,691	84,079	125,585	171,638	358,896
FHA loan (yes=1)	0.174	0.351	0.247	0.091	0.002
VA loan (yes=1)	0.023	0.026	0.033	0.028	0.006
Cash (yes=1)	0.076	0.100	0.059	0.063	0.081
Conventional loan (yes=1)	0.727	0.524	0.661	0.818	0.911
Foreclosure	0.077	0.171	0.073	0.037	0.024
# of Photos	3.391	2.283	3.230	3.689	4.374
Virtual Tour (yes=1)	0.028	0.005	0.017	0.030	0.059
Open House (yes=1)	0.034	0.011	0.025	0.038	0.062
Tour of homes (for broker or public)	0.062	0.012	0.028	0.055	0.154
Square Feet	2,183	1,406	1,800	2,286	3,250
Log (Square Feet)	7.615	7.226	7.478	7.714	8.049
Agex (Age/10)	1.940	3.036	1.797	1.389	1.527
Agex Squared	7.094	12.299	5.679	4.411	5.941
# of Dining Areas	1.587	1.146	1.516	1.805	1.886
# of Living Areas	1.772	1.249	1.449	1.880	2.521
# of Bathrooms	2.364	1.811	2.093	2.349	3.213
Pool (Yes=1)	0.150	0.040	0.085	0.148	0.329
# of Fireplaces	0.916	0.584	0.875	0.973	1.235
Lgt1hac (land greater than one half acre)	0.132	0.105	0.103	0.122	0.198
Tenant (1 if tenant occupied, 0 otherwise)	0.020	0.038	0.018	0.012	0.011
Vacant (1 if vacant, 0 otherwise)	0.347	0.447	0.339	0.323	0.277

Table 3. Percentage Breakdown of FHA, VA, Cash & Conventional Financing for the Full Sample and Quartile Subsamples

	Full Sample	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Price at low end of sample/quartile	\$50,000	\$50,000	\$106,001	\$145,001	\$208,501
Price at high end of sample/quartile	\$2,000,000	\$106,000	\$145,000	\$208,500	\$2,000,000
Number of Observations in sample/quartile	552,281	138,572	140,133	135,820	137,756
Percentage of the sample					
FHA	17.38%	35.05%	24.75%	9.13%	0.22%
VA	2.33%	2.57%	3.30%	2.79%	0.64%
CASH	7.56%	10.01%	5.86%	6.30%	8.05%
CONVENTIONAL	72.74%	52.37%	66.09%	81.78%	91.09%
Number of observations					
FHA	95,961	48,574	34,681	12,399	307
VA	12,857	3,562	4,629	3,788	878
CASH	41,727	13,867	8,212	8,556	11,092
CONVENTIONAL	401,736	72,569	92,611	111,077	125,479
Sum of Percentages	100%	100%	100%	100%	100%
Sum of number of observations	552,281	138,572	140,133	135,820	137,756

Notes: In DFW, the FHA limit was \$271,050 as of 3/5/2008, \$261,609 in 2002, \$218,849 in 2001. The VA Limit was \$417,000 with 0% down January 2006.

Table 4. Means for Types of Financing, and Differences in Means for Conventional versus FHA, VA and Cash

	FHA	VA	Cash	Conv	Conventional versus FHA		Conventional versus VA		Conventional versus Cash	
	95961	12857	41727	401736	95,961	FHA	12,857	VA	41,727	Cash
					401,736	Conv	401,736	Conv	401,736	Conv
					(FHA mean minus		(VA mean minus		Cash mean minus	
					Conventional mean)		Conventional mean)		Conventional mean)	
	<u>Means</u>	<u>Means</u>	<u>Means</u>	<u>Means</u>	<u>Mean diff</u>	<u>t-stat</u>	<u>Mean diff</u>	<u>t-stat</u>	<u>Mean diff</u>	<u>t-stat</u>
Sales Price	109,422	137,300	194,117	203,208	-93,786	-190.00	-65,908	-48.10	-9,091	-11.10
Foreclosure	5.01%	3.33%	16.88%	7.47%	-2.46%	-26.87	-4.14%	-17.72	9.41%	66.46
# of Photos	2.126	2.668	3.568	3.698	-1.572	-120.00	-1.029	-30.32	-0.130	-6.66
Virtual Tour (yes=1)	0.87%	1.73%	2.68%	3.25%	-2.38%	-40.33	-1.52%	-9.62	-0.57%	-6.31
Open House (yes=1)	1.93%	2.44%	3.43%	3.78%	-1.85%	-28.29	-1.34%	-7.87	-0.35%	-3.58
Tour of homes(broker or public)	2.00%	2.75%	6.96%	7.23%	-5.23%	-60.49	-4.48%	-19.48	-0.27%	-2.00
Square Feet	1,638.31	1,994.70	2,174.05	2,319.66	-681.34	-220.00	-324.96	-40.07	-145.61	-30.84
Log (Square Feet)	7.366	7.558	7.602	7.678	-0.312	-240.00	-0.120	-35.95	-0.076	-39.03
Agex (Age/10)	2.207	1.577	2.268	1.854	0.353	54.29	-0.277	-16.88	0.414	43.45
Agex Squared	7.710	4.631	9.046	6.822	0.888	20.81	-2.192	-20.14	2.224	34.84
# of Dining Areas	1.364	1.577	1.531	1.646	-0.282	-150.00	-0.069	-15.01	-0.115	-43.35
# of Living Areas	1.396	1.632	1.699	1.874	-0.478	-170.00	-0.242	-31.96	-0.175	-40.20
# of Bathrooms	1.972	2.211	2.337	2.466	-0.494	-190.00	-0.255	-36.08	-0.129	-31.38
Pool (yes=1)	7.23%	12.13%	12.56%	17.22%	-9.99%	-77.69	-5.08%	-15.09	-4.65%	-24.23
# of Fireplaces	0.732	0.888	0.906	0.962	-0.230	-120.00	-0.074	-15.72	-0.056	-20.43
Lgtlhac (yes=1)	9.08%	11.78%	16.65%	13.86%	-4.78%	-39.72	-2.09%	-6.75	2.79%	15.55
Tenant (yes=1)	2.93%	2.03%	2.04%	1.72%	1.21%	24.35	0.31%	2.68	0.32%	4.78
Vacant (yes=1)	35.65%	30.98%	40.40%	33.99%	1.66%	9.97	-3.01%	-7.09	6.41%	26.23

Table 5. Means for Types of Financing, and Difference in Means for FHA versus VA, FHA versus Cash, and VA versus Cash

	FHA	VA	Cash	Conv	FHA versus VA		FHA versus Cash		VA versus Cash	
	95961	12857	41727	401736	12,857	VA	41,727	Cash	41,727	Cash
					95,961	FHA	95,961	FHA	12,857	VA
					(VA mean minus		(Cash mean minus		(Cash mean minus	
	FHA	VA	Cash	Conv	FHA mean)		FHA mean)		VA mean)	
	<u>Means</u>	<u>Means</u>	<u>Means</u>	<u>Means</u>	<u>Mean diff</u>	<u>t-stat</u>	<u>Mean diff</u>	<u>t-stat</u>	<u>Mean diff</u>	<u>t-stat</u>
Number of observations	109,422	137,300	194,117	203,208	27,878	83.14	84,695	130.26	56,817	32.69
Foreclosure	5.01%	3.33%	16.88%	7.47%	-1.68%	-8.36	11.87%	73.60	13.55%	39.64
# of Photos	2.126	2.668	3.568	3.698	0.542	20.19	1.442	79.00	0.899	24.50
Virtual Tour (yes=1)	0.87%	1.73%	2.68%	3.25%	0.87%	9.40	1.81%	26.21	0.95%	6.07
Open House (yes=1)	1.93%	2.44%	3.43%	3.78%	0.51%	3.89	1.50%	16.75	0.99%	5.56
Tour of homes (for broker or public)	2.00%	2.75%	6.96%	7.23%	0.75%	5.61	4.96%	46.40	4.21%	17.67
Square Feet	1,638.31	1,994.70	2,174.05	2,319.66	356.38	81.15	535.74	141.01	179.35	20.07
Log (Square Feet)	7.366	7.558	7.602	7.678	0.192	76.55	0.236	129.68	0.044	11.79
Agex (Age/10)	2.207	1.577	2.268	1.854	-0.630	-40.40	2.226	5.84	0.691	36.67
Agex Squared	7.710	4.631	9.046	6.822	-3.080	-32.68	1.336	19.89	4.415	34.01
# of Dining Areas	1.364	1.577	1.531	1.646	0.213	42.33	0.167	52.79	-0.046	-8.41
# of Living Areas	1.396	1.632	1.699	1.874	0.236	42.76	0.304	79.72	0.067	8.58
# of Bathrooms	1.972	2.211	2.337	2.466	0.240	58.76	0.365	108.17	0.126	16.57
Pool (Yes=1)	7.23%	12.13%	12.56%	17.22%	4.90%	19.49	5.33%	32.14	0.43%	1.29
# of Fireplaces	0.732	0.888	0.906	0.962	0.156	34.53	0.174	56.59	0.018	3.16
Lgt1 hac (yes=1)	9.08%	11.78%	16.65%	13.86%	2.70%	9.85	7.57%	40.90	4.87%	13.36
Tenant (yes=1)	2.93%	2.03%	2.04%	1.72%	-0.90%	-5.79	-0.89%	-9.45	0.01%	0.07
Vacant (yes=1)	35.65%	30.98%	40.40%	33.99%	-4.67%	-10.419	4.75%	16.792	9.42%	19.2858

Table 6. Means for Foreclosure and Non-Foreclosure Sales and Differences in Means

Variable Name	Foreclosure versus Non-Foreclosure		(Foreclosure mean minus non-foreclosure Mean diff)	t-stat
	Foreclosure Means	Non-Foreclosure Means		
Number of observations	42,278	510,003		
Sales Price	118,158.60	190,206.80	-72,048.20	-96.97
FHA loan (yes=1)	11.37%	17.87%	-6.51%	-33.98
VA loan (yes=1)	1.01%	2.44%	-1.42%	-18.67
Cash (yes=1)	16.66%	6.80%	9.86%	74.07
Conventional loan (yes=1)	70.96%	72.89%	-1.92%	-8.54
# of Photos	2.78	3.44	-0.66	-35.61
Virtual Tour (yes=1)	0.21%	2.97%	-2.76%	-33.33
Open House (yes=1)	0.23%	3.66%	-3.44%	-37.51
Tour of homes (for broker or public)	0.23%	3.66%	-3.44%	-53.94
Square Feet	1,929.89	2,203.66	-273.77	-61.24
Log (Square Feet)	7.50	7.62	-0.12	-64.58
Agex (Age/10)	2.07	1.93	0.14	14.85
Agex Squared	7.15	7.09	0.06	0.94
# of Dining Areas	1.39	1.60	-0.21	-78.98
# of Living Areas	1.56	1.79	-0.23	-54.89
# of Bathrooms	2.20	2.38	-0.18	-46.18
Pool (Yes=1)	9.39%	15.48%	-6.09%	-33.72
# of Fireplaces	0.82	0.92	-0.11	-40.30
Lgt1hac (land greater than one half	11.95%	13.29%	-1.34%	-7.84
Tenant (1 if tenant occupied, 0	0.18%	2.11%	-1.93%	-27.53
Vacant (1 if vacant, 0 otherwise)	85.39%	30.49%	54.91%	239.48

Table 7. Full Sample Regression Results with No Controls for Foreclosure Sales

	Complete		Quartile 1		Quartile 2		Quartile 3		Quartile 4	
Observations	552,281		138,572		140,133		135,820		137,756	
Price Range	\$50,000 – 2,000,000		(\$50,000- 106,000)		(\$106,001- 145,000)		(\$145,001- 208,500)		(\$208,501- 2,000,000)	
Variable	β	t-value	β	t-value	β	t-value	β	t-value	β	t-value
FHA	-0.020	(-7.906)	0.024	(8.755)	-0.008	(-11.99)	-0.047	(-30.76)	-0.055	(-4.802)
VA	-0.034	(-12.96)	0.033	(10.85)	-0.002	(-1.596)	-0.0163	(-10.49)	-0.094	(-16.30)
CASH	-0.042	(-9.602)	-0.108	(-38.23)	-0.007	(-6.741)	+0.000	(0.840)	0.042	(13.06)
Foreclosure	-	-	-	-	-	-	-	-	-	-
# of Photos	0.008	(10.60)	0.010	(13.58)	0.002	(9.351)	0.002	(4.692)	0.001	(1.363)
Virtual Tour	0.040	(10.55)	0.047	(9.489)	0.012	(6.572)	0.011	(5.938)	0.027	(5.828)
Openhouse	0.034	(10.32)	0.040	(10.58)	0.011	(8.562)	0.004	(3.214)	0.008	(2.434)
House Tour	0.137	(22.44)	0.059	(11.86)	0.023	(12.60)	0.021	(11.85)	0.046	(10.98)
Log(sqft)	0.763	(104.1)	0.314	(53.68)	0.238	(55.00)	0.240	(47.57)	0.824	(76.85)
Agex	-0.107	(-53.29)	-0.055	(-33.52)	-0.036	(-37.87)	-0.032	(-29.79)	-0.085	(-26.04)
Agex-Squared	0.012	(39.23)	0.004	(20.53)	0.004	(27.26)	0.004	(22.99)	0.012	(24.16)
# Dining	0.003	(0.974)	0.023	(10.03)	0.013	(15.70)	-0.000	(-0.0762)	-0.050	(-16.73)
# Living	-0.018	(-7.602)	-0.008	(-2.897)	-0.003	(-3.649)	-0.003	(-2.955)	-0.024	(-9.452)
# Bathrooms	0.098	(50.66)	0.045	(20.62)	-0.017	(-15.39)	0.010	(9.731)	0.061	(29.97)
Pool (yes/no)	0.086	(40.41)	0.025	(13.37)	0.027	(32.33)	0.031	(39.87)	0.066	(27.01)
# Fireplaces	0.069	(20.16)	0.023	(13.41)	0.007	(6.010)	0.009	(2.220)	0.090	(35.75)
Lgtlhac	0.094	(33.68)	-0.003	(-1.214)	0.017	(14.85)	0.029	(25.18)	0.103	(31.70)
Tenant	-0.051	(-16.87)	-0.043	(-14.01)	-0.013	(-7.554)	-0.018	(-7.942)	-0.041	(-6.187)
Vacant	-0.063	(-12.26)	-0.053	(-10.40)	-0.013	(-9.092)	-0.014	(-6.814)	-0.030	(-5.994)
R-squared	0.872		0.498		0.333		0.307		0.753	

Table 8. Full Sample Regression Results with Controls for Foreclosure Sales

Variable	Complete Sample		Quartile 1		Quartile 2		Quartile 3		Quartile 4	
	β	t-value	β	t-value	β	t-value	β	t-value	β	t-value
Observations	552,281		138,572		140,133		135,820		137,756	
Price Range	\$50,000 - 2,000,000		(\$50,000-106,000)		(\$106,001-145,000)		(\$145,001-208,500)		(\$208,501-2,000,000)	
FHA	-0.030	(-16.40)	0.015	(10.91)	-0.009	(-18.18)	-0.048	(-31.27)	-0.055	(-4.877)
VA	-0.042	(-19.03)	0.021	(11.39)	-0.004	(-3.541)	-0.017	(-10.80)	-0.094	(-16.46)
CASH	-0.027	(-9.460)	-0.089	(-34.86)	-0.006	(-5.858)	0.002	(1.167)	0.043	(13.81)
Foreclosure	-0.206	(-32.61)	-0.143	(-35.22)	-0.059	(-19.65)	-0.047	(-17.06)	-0.162	(-23.44)
# of Photos	0.005	(8.940)	0.006	(20.92)	0.002	(7.936)	0.002	(3.974)	0.001	(0.975)
Virtual Tour	0.033	(9.013)	0.027	(6.251)	0.009	(5.028)	0.010	(5.155)	0.024	(5.167)
Openhouse	0.027	(8.641)	0.027	(8.449)	0.009	(6.960)	0.004	(2.580)	0.006	(1.805)
House Tour	0.134	(23.23)	0.051	(11.77)	0.023	(12.36)	0.021	(11.57)	0.043	(10.64)
Log(sqft)	0.763	(111.4)	0.347	(70.81)	0.253	(93.34)	0.245	(46.99)	0.831	(79.21)
Agex	-0.101	(-55.56)	-0.059	(-34.60)	-0.037	(-41.19)	-0.031	(-28.64)	-0.082	(-25.87)
Agex-Squared	0.012	(41.18)	0.004	(22.37)	0.004	(28.02)	0.004	(22.43)	0.011	(23.98)
# Dining	-0.003	(-2.026)	0.019	(20.63)	0.012	(17.53)	-0.001	(-0.763)	-0.051	(-17.60)
# Living	-0.020	(-10.21)	-0.010	(-10.25)	-0.003	(-5.885)	-0.003	(-3.035)	-0.024	(-9.742)
# Bathrooms	0.098	(52.06)	0.046	(25.75)	-0.016	(-14.86)	0.011	(10.14)	0.060	(30.51)
Pool (yes/no)	0.090	(44.23)	0.031	(17.10)	0.029	(36.77)	0.032	(41.82)	0.067	(28.06)
# Fireplaces	0.072	(19.95)	0.025	(19.99)	0.009	(5.813)	0.010	(2.308)	0.090	(36.36)
Lgtlhac	0.093	(36.78)	-0.004	(-2.229)	0.018	(16.74)	0.029	(25.84)	0.103	(31.77)
Tenant	-0.056	(-21.12)	-0.046	(-21.19)	-0.014	(-7.832)	-0.018	(-8.056)	-0.041	(-6.174)
Vacant	-0.032	(-8.627)	-0.022	(-16.13)	-0.005	(-5.126)	-0.010	(-4.603)	-0.018	(-3.536)
Adj R-squared	0.880		0.559		0.357		0.314		0.756	

Table 9. Regression Results for Non-Foreclosure Sale Sample

	Complete Sample		Quartile 1		Quartile 2		Quartile 3		Quartile 4	
Observations	510,003		114,914		129,866		130,804		134,419	
Price Range	\$50,000 -9,999,999		(\$50,000-106,000)		(\$106,001-145,000)		(\$145,001-208,500)		(\$208,501-2,000,000)	
Variable	β	t-value	β	t-value	β	t-value	β	t-value	β	t-value
FHA	-0.033	(-18.82)	0.011	(10.66)	-0.010	(-19.41)	-0.048	(-31.35)	-0.055	(-4.714)
VA	-0.044	(-19.97)	0.019	(10.22)	-0.004	(-4.238)	-0.017	(-10.82)	-0.096	(-16.61)
CASH	-0.012	(-5.101)	-0.083	(-27.78)	-0.004	(-3.654)	0.002	(1.716)	0.045	(14.18)
Foreclosure	-	-	-	-	-	-	-	-	-	-
# of Photos	0.005	(7.515)	0.006	(19.03)	0.002	(6.536)	0.001	(3.620)	0.001	(0.731)
Virtual Tour	0.032	(8.840)	0.026	(5.817)	0.008	(4.825)	0.010	(5.047)	0.023	(5.092)
Openhouse	0.026	(8.387)	0.027	(8.659)	0.009	(6.923)	0.003	(2.496)	0.006	(1.677)
House Tour	0.127	(23.72)	0.050	(11.95)	0.022	(12.10)	0.020	(11.27)	0.041	(10.00)
Log(sqft)	0.777	(110.5)	0.342	(93.03)	0.258	(95.53)	0.249	(45.45)	0.835	(78.35)
Agex	-0.099	(-53.48)	-0.053	(-38.64)	-0.037	(-39.23)	-0.032	(-28.25)	-0.082	(-25.42)
Agex-Squared	0.012	(40.06)	0.004	(22.42)	0.004	(26.76)	0.004	(22.48)	0.011	(23.69)
# Dining	-0.006	(-3.978)	0.019	(18.89)	0.012	(16.90)	-0.001	(-1.357)	-0.052	(-17.75)
# Living	-0.021	(-10.65)	-0.011	(-10.60)	-0.003	(-6.186)	-0.003	(-3.235)	-0.025	(-9.680)
# Bathrooms	0.097	(49.28)	0.051	(35.32)	-0.017	(-15.53)	0.010	(9.178)	0.061	(29.96)
Pool (yes/no)	0.089	(41.50)	0.028	(14.65)	0.028	(35.92)	0.032	(41.51)	0.067	(27.50)
# Fireplaces	0.072	(18.83)	0.023	(20.67)	0.009	(5.185)	0.011	(2.272)	0.090	(35.71)
Lgtlhac	0.096	(38.87)	-0.001	(-0.587)	0.018	(16.35)	0.030	(25.39)	0.103	(31.25)
Tenant	-0.059	(-21.86)	-0.048	(-22.64)	-0.014	(-8.061)	-0.019	(-8.128)	-0.043	(-6.414)
Vacant	-0.035	(-8.939)	-0.026	(-17.49)	-0.006	(-5.268)	-0.011	(-4.640)	-0.018	(-3.560)
Adj. R-squared	0.879		0.549		0.362		0.317		0.758	

Table 10. Regression Results for Foreclosure Sample

Observations	Complete Sample		Below Mean		Above Mean	
	42,278		21,150		21,128	
Variable	β	t-value	β	t-value	β	t-value
FHA	0.020	(5.626)	0.045	(10.42)	-0.015	(-3.668)
VA	0.042	(5.309)	0.074	(7.377)	0.003	(0.338)
CASH	-0.099	(-21.40)	-0.083	(-20.12)	-0.037	(-6.693)
Foreclosure	-	-	-	-	-	-
# of Photos	0.009	(8.177)	0.004	(7.525)	0.008	(7.015)
Virtual Tour	0.079	(2.679)	0.103	(2.236)	0.060	(2.206)
Openhouse	0.038	(1.506)	0.028	(-0.612)	0.033	(1.578)
House Tour	0.181	(3.778)	0.065	(1.918)	0.141	(3.571)
Log(sqft)	0.615	(66.27)	0.321	(20.57)	0.581	(39.00)
Agex	-0.123	(-31.70)	-0.079	(-26.93)	-0.092	(-16.62)
Agex-Squared	0.012	(18.83)	0.006	(16.87)	0.010	(9.639)
# Dining	0.023	(8.238)	0.016	(4.926)	-0.000	(-0.0213)
# Living	-0.004	(-1.178)	-0.009	(-3.496)	-0.009	(-2.675)
# Bathrooms	0.101	(23.44)	0.034	(8.094)	0.113	(33.35)
Pool (yes/no)	0.113	(26.95)	0.045	(10.30)	0.095	(20.49)
# Fireplaces	0.056	(9.563)	0.032	(7.758)	0.073	(17.87)
Lgtlhac	0.046	(4.909)	-0.021	(-4.023)	0.084	(8.924)
Tenant	0.082	(3.223)	0.042	(2.266)	0.078	(2.356)
Vacant	0.005	(0.757)	-0.000	(-0.163)	0.007	(0.970)
Adj. R-squared	0.841		0.511		0.787	

Table 11. Summary of Regression Results

	Complete Sample		Quartile 1		Quartile 2		Quartile 3		Quartile 4	
Observations	552,281		138,572		140,133		135,820		137,756	
Price Range	\$50,000 – 2,000,000		(\$50,000- 106,000)		(\$106,001- 145,000)		(\$145,001- 208,500)		(\$208,501- 2,000,000)	
Variable	β	t-value	β	t-value	β	t-value	β	t-value	β	t-value
Model 1: Complete sample with foreclosure sales, but we do not include a dummy variable for foreclosures.										
FHA	-0.020	(-7.906)	0.024	-8.755	-0.008	(-11.99)	-0.047	(-30.76)	-0.055	(-4.802)
VA	-0.034	(-12.96)	0.033	-10.85	-0.002	(-1.596)	-0.0163	(-10.49)	-0.094	(-16.30)
CASH	-0.042	(-9.602)	-0.108	(-38.23)	-0.007	(-6.741)	0	-0.84	0.042	-13.06
Foreclosure	-	-	-	-	-	-	-	-	-	-
R-squared	0.872		0.498		0.333		0.307		0.753	
Model 2: Complete sample with a dummy variable for foreclosure sales.										
FHA	-0.030	(-16.40)	0.015	-10.91	-0.009	(-18.18)	-0.048	(-31.27)	-0.055	(-4.877)
VA	-0.042	(-19.03)	0.021	-11.39	-0.004	(-3.541)	-0.017	(-10.80)	-0.094	(-16.46)
CASH	-0.027	(-9.460)	-0.089	(-34.86)	-0.006	(-5.858)	0.002	-1.167	0.043	-13.81
Foreclosure	-0.206	(-32.61)	-0.143	(-35.22)	-0.059	(-19.65)	-0.047	(-17.06)	-0.162	(-23.44)
R-squared	0.88		0.559		0.357		0.314		0.756	
Model 3: All foreclosure sales are excluded from this sample.										
FHA	-0.033	(-18.82)	0.011	-10.66	-0.010	(-19.41)	-0.048	(-31.35)	-0.055	(-4.714)
VA	-0.044	(-19.97)	0.019	-10.22	-0.004	(-4.238)	-0.017	(-10.82)	-0.096	(-16.61)
CASH	-0.012	(-5.101)	-0.083	(-27.78)	-0.004	(-3.654)	0.002	-1.716	0.045	-14.18
Foreclosure	-	-	-	-	-	-	-	-	-	-
R-squared	0.879		0.549		0.362		0.317		0.758	
Model 4: The sample includes only 42,279 foreclosure sales.										
	Complete Sample		Below Median		Above Median					
FHA	0.020	-5.626	0.045	-10.42	-0.015	(-3.668)				
VA	0.042	-5.309	0.074	-7.377	0.003	-0.338				
CASH	-0.099	(-21.40)	-0.083	(-20.12)	-0.037	(-6.693)				
Foreclosure	-	-	-	-	-	-				
R-squared	0.841		0.511		0.787					