Effect of Foreclosure Status on Residential Selling Price

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Abstract. **Real estate professionals believe that foreclosed houses sell at a discount. This article empirically investigates whether foreclosed houses sell at a discount. A sample of 2,482 residential transactions in Arlington, Texas is used in a hedonic pricing model to test this hypothesis. The results indicate that foreclosed properties sold at a 23% discount.**

Introduction

The belief exists that foreclosed properties sell for less than their market value. In the residential brokerage community, evidence of this perception can be substantiated by certain properties that are advertised as "foreclosure sales." The intent of this paper is to empirically investigate whether houses designated with foreclosure status by a Multiple Listing Service (MLS) sell at a discount, and to empirically determine the discount when compared to non-foreclosure status properties in the same local market.

Literature Review

Appraisers realize that sellers of foreclosed properties typically accept a lower value based on a short marketing time to reduce their holding costs. To adjust for this, appraisers estimate a fair market value for a property assuming a short marketing time to calculate the net realizable value. The difference between market value and net realizable value is equal to the liquidating discount. This is the amount that the seller is willing to give up in order to have a short marketing time (Shilling et al., 1990).

The most complete definition of market value is: "the most probable price, as of a specified date, in cash, or in terms equivalent to cash, or in other precisely revealed terms, for which the specified property rights should sell after reasonable exposure in a competitive market under all conditions requisite to fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, and assuming that neither is under undue duress" (AIREA, 1989). This definition assumes that there is a "reasonable" exposure in a competitive market. In addition, the definition of market value used by most federal financial institutions, including the FDIC and RTC, was established under the Financial Institutions Reform, Recovery and Enforcement Act of 1989 (FIRREA). It specifically requires that a reasonable time be allowed for exposure in the open market (*Federal Register*, 1990).

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In contrast, the definition of net realizable value is the value of the property to a particular investor that is based on the amount realized from its sale adjusted for selling expenses (Shilling et al., 1990). In order to calculate the net realizable value for a foreclosed property, an appraiser must first establish a probable price given a short marketing time period and then adjust for carrying costs (Shilling et al., 1990).

Shilling et al. (1990) developed a model for calculating net realizable value for distressed properties. Their empirical test of the model using a sample of sixty-two residential condominium units sold in Baton Rouge, Louisiana in 1985 indicate that the discount on distressed properties is approximately 24%.

This paper is related to Shilling et al. (1990) in that we empirically estimate the discount on distressed property. However, this research is concerned with foreclosed single-family homes that are sold by individuals and by financial institutions through a Multiple Listing Service (MLS). The estimate of the discount found in this research can be used in the model specified by Shilling et al. (1990) to estimate the net realizable value expected for single-family homes sold through an MLS.

Models and Hypotheses

The following hypothesis was tested using a hedonic pricing model:

   Ho: Foreclosure status houses do not sell at a discount, when compared to
            non-foreclosure residential sales.
   Ha: Foreclosure status houses do sell at a discount.

Hedonic pricing theory postulates that the value of a house is a function of both its quantitative and qualitative attributes (Edmonds, 1984). This theory can be tested by using a multiple regression model, where:

$$Sale\ Price\ of\ a\ House = f\ (Xi,\ Yi,\ Zi)\ , \qquad (1)$$

where

Xi = vector of quantitative factors such as bedrooms, baths, size
       and age,
Yi = vector of qualitative factors such as neighborhood quality,
Z = 1, if property was a foreclosure,
    = 0, if otherwise.

Linear and log-linear models were estimated.

The Data

The sample data consists of residential transactions sold and closed in Arlington, Texas, between July 1991 and January 1993. The data was obtained through the Multiple Listing Service's Property Sold (MLS) for the city of Arlington. The 2,482

Exhibit 1
Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
SP	92715.8300	50814.9800	10800	560000
CARG	1.8904	.4734	0	5
POOL	.1635	.3699	0	1
NLEVEL	1.1825	.3913	0	1
BEDR	3.2828	.5444	1	6
BATH	2.0777	.5556	1	6
TSQFT	1877.7940	641.4254	428	8347
FIRP	.9391	.4488	0	3
AGE	14.9020	10.0340	0	92
ROOF	.1385	.3455	0	1
FOUND	.0439	.2049	0	1
CASH	.0741	.2620	0	1
FHA	.2900	.4538	0	1
VA	.0664	.2491	0	1
FORECLOS	.1128	.3164	0	1
ZIP	76012.7600	122.5545	76004	76018
MAPSCO	90.0801	12.1489	5	1251
AREA	5.1434	2.0275	2	15

N = 2,482

Source: derived by authors from the sample data

transactions represented approximately 86% of all the sales within the city of Arlington except for those not reported through the MLS. The other 14% of the sales reported through the MLS had incomplete information for the variables used in the analysis.

Of the 2,482 sample sales, 11.28% were foreclosure sales. The properties varied considerably in age and construction quality. The average age of the sample was approximately fifteen years with a range from zero to seventy-two years. The properties ranged in size from 420 square feet to 5,240 square feet with an average of 1,877 square feet. The sale price average was $92,715. Additional descriptive statistics of the sample data are provided in Exhibit 1.

Empirical Results

To examine the impact of foreclosure status on sale price, a linear and a log-linear multiple regression model with the following form was used:

$$SP = f \, (CARG, \; POOL, \; NLEVEL, \; BEDR, \; BATH, \; TSQFT, \\ FIRP, \; AGE, \; ROOF, \; FOUND, \; CASH, \; FHA, \; VA, \qquad (2) \\ FORECLOS, \; ZIP, \; MAPSCO, \; AREA) \, ,$$

$$Ln \ (SP) = f \ (CARG, \ POOL, \ NLEVEL, \ BEDR, \ BATH, \ TSQFT,$$
$$FIRP, \ AGE, \ ROOF, \ FOUND, \ CASH, \ FHA, \ VA, \qquad (3)$$
$$FORECLOS, \ ZIP, \ MAPSCO, \ AREA),$$

where:

SP = sale price;
$Ln(SP)$ = natural logarithm of sales price;
$CARG$ = number of parking spaces available in the garage;
$POOL$ = 1, if property has a pool, = 0, otherwise;
$NLEVEL$ = number of stories/levels in the house;
$BEDR$ = number of bedrooms in the house;
$BATH$ = number of bathrooms in the house;
$TSQFT$ = total number of square feet in the house;
$FIRP$ = number of wood-burning fireplaces;
$INTRATE$ = interest rate at which the house was financed;
AGE = number of years since the house was constructed;
$ROOF$ = 1, if the roof is wood or tile; = 0, if the roof is composite;
$FOUND$ = 1, if foundation is a pier and beam; = 0, if foundation is a slab;
$CASH$ = 1, if a cash purchase; = 0, otherwise;
FHA = 1, if FHA financing was used; = 0, otherwise;
VA = 1, if VA financing was used; = 0, otherwise;
$FORECLOS$ = 1, if property was a foreclosure; = 0, otherwise;
ZIP = address zip code;
$MAPSCO$ = location of the property based on the MAPSCO number for the given area;
$AREA$ = area # as assigned by the MLS.

Column 1 of Exhibit 2 contains the regression results for the linear model. The model explains about 83% of the variation in the sale prices of houses in the sample. Most of the variables in the model were significant at the 5% level of confidence. The significant variables included: the existence of a swimming pool, number of bathrooms, total square footage, age, roof type, type of financing (FHA and VA), and whether the property was a foreclosure. These results indicate that pools, bathrooms, square footage, and roof type have a positive association with the sale prices of houses in the sample. Age, type of financing and foreclosure sales have a negative association with sales price.

The result that is most important for this study is the relationship between the *FORECLOS* variable and the sale prices of houses in the sample. The parameter estimate for *FORECLOS* showed that, holding all other variables constant, foreclosed properties sold for an average of $15,038.40 less than other houses in the sample. The resulting *t*-statistic and *p*-value indicate that this parameter estimate is significantly different from zero at a 1% level.

Column 2 in Exhibit 2 contains the regression results for the log-linear model. This model explains more than 85% of the variation in the sale prices of houses in the sample data. Several of the variables in this model were also found to be significant at

Exhibit 2
Regression Results
Linear and Log-Linear Models

	Linear Model $R^2 = .8310$ Adjusted $R^2 = .8298$ F-ratio $= 712.49$ N $= 2,482$		Log-Linear Model $R^2 = .8594$ Adjusted $R^2 = .8584$ F-ratio $= 885.71$ N $= 2,482$	
Variable	Coefficient	t-test	Coefficient	t-test
INTERCEPT	−129874.00	−.50	11.1770	4.90
CARG	3245.44	2.88	.0720	7.33
POOL	8924.50	7.30	.1037	9.72
NLEVEL	4219.89	3.34	−.0272	−2.46
BEDR	−6014.42	−5.62	−.0269	−2.88
BATH	10711.29	8.62	.0829	7.65
TSQFT	51.41	39.60	.0004	37.25
FIRP	5493.32	4.27	.0666	5.93
AGE	−681.42	−10.21	−.0138	−23.70
ROOF	13213.52	9.47	.0738	6.06
FOUND	13364.94	5.67	.0774	3.77
CASH	−692.02	−.41	−.1646	−11.04
FHA	−6706.91	−6.60	−.0645	−7.27
VA	−7036.17	−4.04	−.0577	−3.80
FORECLOS	−15038.40*	−10.95	−.2278*	−19.02
ZIP	1.86	.54	−.0000	−.15
MAPSCO	−243.48	−3.44	−.0027	−4.47
AREA	−360.71	−.80	−.0158	−4.04

*significant at .01, two-tailed test
Source: derived by authors from the sample data

the 5% level. The parameter estimate for *FORECLOS* in the model indicates that foreclosed properties in the sample sold for an average of 23% less than other houses in the sample. The resulting *t*-statistic and *p*-value indicate that this parameter estimate is also significantly different from zero at a 1% level. The results of these two models indicate that the null hypothesis can be rejected and that foreclosed houses do sell at a discount in the Arlington market.

Collinearity among variables in a hedonic pricing model could cause bias in the resulting coefficients. If the *FORECLOS* variable is highly correlated with any other variables in the model, it could be a problem to perform hypothesis testing. Thus, we attempted to determine if the results were biased due to multicollinearity.

A correlation matrix of the variables was calculated and analyzed to determine if the *FORECLOS* variable was highly correlated with any other variables in the model. The correlation matrix is available on request. It shows that the *FORECLOS* variable is not highly correlated with any other independent variables in the model. This indicates that the parameter estimate for the *FORECLOS* variable is not influenced by collinearity.

We also tested for multicollinearity using a rule of thumb associated with the variance inflation factor (VIF) developed by Neter et al. (1990). They state that a variable with a VIF above 10 or a mean VIF significantly above one suffers from severe multicollinearity. The largest single VIF is 3.12 and the mean VIF is less than 1.6 indicating that multicollinearity does not appear to be a concern.

Summary and Conclusions

The purpose of this work was to empirically test whether foreclosed houses sold for a discount compared to non-foreclosed houses in the same local market. Using a hedonic pricing model, linear and log-linear functional forms were used to test the hypothesis. The regression results indicated that the null hypothesis was rejected and that foreclosure status houses do sell at a discount of approximately 23% of the average sale prices of houses in the sample. This finding is consistent with the 24% discount found by Shilling et al. (1990).

The results of this study indicate that foreclosure sales should not be used as comparable sales for the appraisal of non-foreclosure properties unless an adjustment is made. The amount of the adjustment probably varies across markets since it depends upon the local supply and demand conditions. If these discounts are measurable and predictable, then foreclosure sales could be used as comparable sales after an appropriate adjustment.

Additionally, using the empirical estimate of the discount and the model specified by Shilling et al. (1990), brokers are provided with additional information that allows them to set a listing price for the property, taking into consideration the liquidity requirements of the seller.

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