PRICE DISCOUNTS ASSOCIATED WITH FORECLOSURES AND SHORT SALES IN SACRAMENTO COUNTY

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Department of Public Policy and Administration

Abstract

of

PRICE DISCOUNTS ASSOCIATED WITH FORECLOSURES AND SHORT SALES IN SACRAMENTO COUNTY

by

Madison Buccola

Citizens of the United States are still suffering from the long-term effects of the 2008 mortgage crisis. Today, homeowners who cannot meet their financial obligations are being encouraged through public policy and the private marketplace to choose a short sale over foreclosure. This thesis compares the price discount associated with foreclosures with that of short sales in Sacramento County, California from September to December of 2016. I compare the selling price discount of foreclosure to that of short sale to identify the magnitude of benefit in choosing short sale over foreclosure. My Ordinary Least Squares regression analysis shows that foreclosure status (short sale) commands a 19.3% (12.4%) decrease in home selling price at the 99% confidence level. The data comes from the Multiple Listing Service (MLS) database and the 2010 U.S. Census. The values derived from the regression indicate that short sales are a better financial option for distressed sellers than foreclosure.

_____, Committee Chair
Nuriddin Ikromov

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Date

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TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

Chapter 1

INTRODUCTION

Foreclosure and short sales are two financial options available to homeowners who are behind on their mortgage payments and/or own a home that is worth less than the outstanding balance on the mortgage. In both circumstances, the owner must part with the home; however, the timeline and other consequences are different for the foreclosure and short sale processes. Foreclosure is a legal procedure in which the mortgage lender attempts to recover a home loan balance through either forced sale of the asset or regaining ownership of the property. A short sale is the sale of a property when the homeowner is in foreclosure, but before the property is offered at public auction. The lender must agree to accept less than the amount owed on the property under a short sale.

Both foreclosure and short sale are long term effects of the U.S. subprime mortgage crisis of 2008. Public policy addressing the mortgage crisis widely encourages distressed homeowners facing foreclosure to work with banks to facilitate a short sale of their properties. Short sales are considered a healthier option than foreclosure because they generate a relatively smaller, negative impact on credit. This paper will seek to compare the own-home selling price discount associated with foreclosures versus short sales in order to quantify the benefit in choosing short sale over foreclosure.

The purpose of this section is to describe the nature and prevalence of distressed sales in the United States. First, I will explain major historical events and public policy decisions leading up to the subprime mortgage crisis of 2008. Next, there is a discussion of the long-term effects associated with the mortgage crisis, including foreclosures and short sales. Lastly, this section will identify the aspects of foreclosure and short sale as they relate to the specific marketplace of Sacramento County, California.

A Brief History of the Mortgage Crisis

Researchers have identified several contributing factors to the foreclosure crisis of 2008, such as growth in secondary mortgage markets, expansionary mortgage access policies, exotic mortgage products, and predatory lending practices (Immergluck and Smith, 2006). The roots of the 2008 U.S. mortgage crisis can be traced back to public policies of the 1930's when the federal government took action to increase home ownership. After the creation of the secondary mortgage market, federal legislation—including both regulation and deregulation—continued to promote the extension of mortgage credit to lower income borrowers. Subprime loans and predatory lending practices became commonplace, and when the housing bubble burst, home prices plummeted, leading to widespread mortgage delinquencies and foreclosures. This section describes the involvement of both the federal government and the private sector in the complex historical process leading up to the mortgage crisis of 2008.

Expansion of the Mortgage Market

During the 1930's, the federal government worked to increase homeownership after the Great Depression. The National Housing Act of 1934 created the Federal Housing Administration (FHA)—later part of the Department of Housing and Urban Development, or HUD—and the Federal Savings and Loans Insurance Corporation (FSLIC) to make mortgages and housing more affordable. In 1938, Congress established the Federal National Mortgage Association (Fannie Mae) to provide local banks with federal funds for mortgage loan financing. Fannie Mae purchased FHA-insured mortgage loans in the secondary market, pooled them together, and sold them to investors as mortgage-backed securities (MBS). This process increased liquidity for lenders, allowed them to underwrite more mortgages, and ultimately induced greater home sales. In 1968, Fannie Mae transformed into a Government Sponsored Entity with private shareholders. In 1970, the Federal Home Loan Mortgage Corporation (FHLMC), or Freddie Mac, was created

to create competition for Fannie Mae and further expand the secondary mortgage market.

Federal Regulation

Soon after the creation of Freddie Mac, the federal government continued in its quest to increase the national homeownership rate through the passage of the 1977 Community Reinvestment Act (CRA). This legislation encouraged lending institutions to meet the needs of low- and moderate-income citizens. In 1992, the U.S. Department of Housing and Urban Development (HUD) was authorized to administer Affordable Housing Goals for Fannie Mae and Freddie Mac. These goals aimed to increase lending to low-income citizens and in underserved geographic regions by setting a minimum annual percentage-of-business requirement for the GSE's loan purchases. In 1993, HUD required that at least 30% of the mortgages acquired by the GSE's had to have been made to borrowers who were at or below the median income level where they lived. HUD continued to raise these quotas until 2008, when more than 55% of the loans purchased were required to serve low- to mod- income buyers (Wallison, 2011).

Federal Deregulation

Federal deregulation further expanded the mortgage market by making it easier for lenders to give loans to low-and moderate-income buyers. The Depository Institutions Deregulation and Monetary Control Act of 1980 abolished state usury laws, allowing lenders to charge higher interest rates to higher risk buyers. The Alternative Mortgage Transaction Parity Act of 1982 preempted state laws preventing banks from writing loans other than conventional, fixed rate mortgages. This legislation enabled loans such as adjustable rate mortgages (ARM), option ARMs, interest-only mortgages, and loans with balloon payments, which were widely originated for low- to mod- income buyers. Tax reform further increased the appeal of real estate investment and encouraged mortgage debt. In 1986, the Tax Reform Act eliminated tax incentives for interest on consumer loans except mortgages, increasing the attractiveness of

mortgage debt (Pennington-Cross, 2006). The Taxpayer Relief Act of 1997 increased capital gains exclusion from $125,000 to $500,000 per couple, creating an incentive for couples to invest in real estate such as second homes.

The federal government also promoted the purchasing of mortgage backed securities through changes in capital requirements and regulation of investment activities. In the late 1980's, the Basel capital requirements allowed commercial banks to hold less capital for a given volume of mortgages than for an equal volume of MBS. These rules were later amended in 2001, giving certain privately issued, highly rated MBS the same low-risk credence as GSE-issued mortgage backed securities (Michel, 2015). These federal regulations incentivized private firms and lending institutions to securitize, rather than to hold, their mortgages. Additionally, the Gramm-Leach-Bliley Act of 1999 repealed the Glass-Steagall Act, thereby allowing commercial banks to also participate in investment banking. The overall effect of federal deregulation was to enable lending institutions to take greater risks.

Subprime Loans and Predatory Lending Practices

Increased profits associated with greater risk taking, along with immense pressure stemming from federal "Affordable Housing" quotas, led to widespread use of subprime loans and predatory lending practices. Lending institutions who sold their mortgages to Fannie Mae and Freddie Mac were incentivized to reduce their underwriting standards for borrower income, employment history, down payments, credit ratings, assets, property Loan-to-Value, and debt servicing ability. The Federal Reserve did not use its authority to supervise both lending institutions and mortgage underwriters during this time, while federal deregulation further incentivized securitization and repackaging of subprime loans.

Subprime loans are those given to borrowers classified with credit ratings, savings, or income levels that do not satisfy the minimum requirements for a conventional loan. Since

subprime borrowers are considered higher-risk, lenders charge a higher interest rate on these loans. Common forms of subprime loans include those with adjustable rates, “zero interest”, teaser introductory rates, and negative amortization. Low interest rates and lower monthly payments enabled borrowers to purchase beyond their ability to repay the loans. Even though subprime borrowers were unlikely to meet their financial obligations, lending institutions could simply transfer the risk by selling these mortgages in the secondary market to Fannie Mae and Freddie Mac.

In addition to subprime loans, predatory lending practices also became commonplace during this time. Predatory lending involves unethical, deceptive, or fraudulent activity during loan origination. Predatory lenders aggressively market credit to prospective borrowers who cannot afford the credit on the terms being offered. These lenders often originate “liar loans”, which do not require income verification, and “NINJA” (No Income, No Job, No Assets) loans to approve mortgagees who otherwise would not qualify. Predatory lenders make loans based on the collateral value of a borrower’s property without regard for the borrower’s ability to repay the loan; if the borrower defaults or forecloses, the lender likely profits. Therefore, refinances and home equity loans are also appealing to predatory lenders, since they increase the properties’ collateral and widen the lender’s safety margin. Unfortunately, many of the people who were subject to predatory lending ended up defaulting in the mortgage crisis.

Economic Effects of the Mortgage Crisis

With pressure and flexibility delegated from the government to make more mortgage loans, banks flooded the markets with capital. As the demand for mortgages grew, interest rates dropped substantially. The Federal Reserve lowered the federal funds rate eleven times in 2001, from 6.5% to 1.75%, then to 1% in 2003. These rate reductions decreased the cost of lending while federal legislation encouraged greater lending to low- and moderate- income borrowers.

Junk securities were given AAA ratings by credit rating agencies, and more subprime loans flooded the marketplace. Investors, recognizing high-yield mortgage-backed securities, took greater risks. The housing bubble grew, depressing delinquencies and defaults.

As house prices increased, borrowers who could not make their mortgage payments simply refinanced their homes or sold without a loss. From 2004 to 2006, the Federal Reserve attempted to slow inflation and control the economy by increasing the federal funds rate from 1% to 6.25%. This greatly increased the cost of lending, especially for loans indexed to the federal funds rate, such as short-term ARM loans. Subprime ARM borrowers were disproportionately affected by the interest rate increase and saw their payments skyrocket during this time.

From 2006 to 2011, house prices fell rapidly by approximately 34% (Blomquist, 2017). This steep decline in house prices, along with tightening of credit and increasing unemployment rate, led to an unparalleled wave of mortgage defaults, many of which resulted in foreclosure (Wassmer, 2011). The widespread and deep effects of foreclosure have become a public policy concern, with legislative responses for reform from both federal and state governments. However, one decade later, the nation continues to suffer from impacts of the 2008 mortgage crisis.

Public Policy Addressing the Mortgage Crisis

To determine the appropriate public policy solution to the mortgage crisis, it is critical to consider how distressed sales affect markets, politics, and experts. Munger's Triangle is a model which conveys the interaction and conflict between these three roles and describes potential forms of public policy solutions. The three points of the triangle represent opposing forces (experts, markets, and politics) while the legs represent conflict between those forces. The leg between politics and experts deals with "institutional" problems that arise due to differences in information, values, and institutional design. The leg between markets and experts deals with "efficiency" problems arising from too concentrated a market structure, public goods,

externalities, and information asymmetry. The leg between politics and markets deals with "equity" problems that arise due to externalities and income and resource distribution.

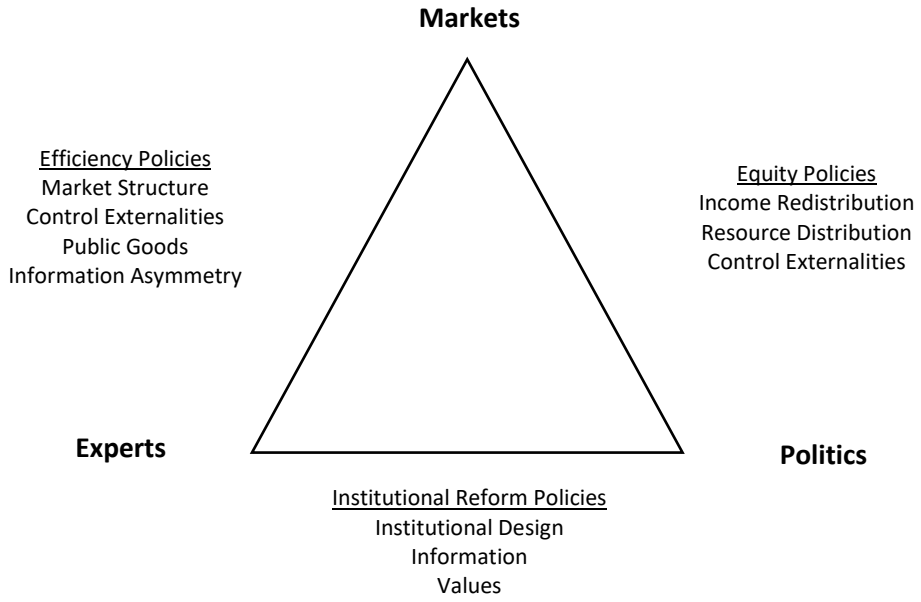

Figure 1: Munger's Triangle

The foreclosure crisis warrants public intervention based on the "efficiency" and "equity" sides of Munger's triangle. It is an "efficiency" problem because foreclosure is a form of market failure, whereby there is a net social loss to society due to an inefficient allocation of goods and services in the free market. Foreclosures produce negative externalities, adversely affecting people who are not directly involved in the foreclosure transaction. Research suggests that foreclosures exert downward pressure on neighboring property values, lowering property tax revenue for local government and widespread negative economic effects (Wassmer, 2011). On the other hand, foreclosure crisis is also an "equity" problem because subprime loan defaults disproportionately affected low- to mid-income borrowers. Due to the negative externalities and spillover effects produced by foreclosures, lower-income neighborhoods were hit harder by the foreclosure crisis than others (Wassmer, 2011). Over the last decade, both "efficiency" and "equity" public policy efforts have been taken to address the foreclosure crisis.

Federal Programs and Legislation

The earliest federal legislation to address the subprime mortgage crisis and restore confidence in Fannie Mae and Freddie Mac was the Housing and Economic Recovery Act (HERA) in 2008. This act created the Federal Housing Finance Agency (FHFA), which put Fannie Mae and Freddie Max under conservatorship in 2008. HERA also permitted the FHA to guarantee up to $300 billion in new 30-year fixed rate mortgages for subprime borrowers. Several subtitle acts under HERA provided additional relief to borrowers through changes in tax credits (Housing Assistance Tax Act), FHA loan limits (FHA Modernization Act), and mortgage loan originator licensing and registration (Secure and Fair Enforcement for Mortgage Licensing Act). HERA also provided emergency assistance for the redevelopment of foreclosed homes.

In 2009, federal efforts to reduce the negative effects of foreclosure continued with the Making Home Affordable (MHA) mortgage relief program. The Home Affordable Refinance Program (HARP) assisted eligible borrowers who sold their mortgage to Fannie Mae or Freddie Mac to refinance their homes. The Home Affordable Modification Program (HAMP) helped eligible borrowers to reduce their monthly mortgage payments. The Home Affordable Alternative Foreclosure Program (HAFA) provides alternatives to foreclosure—short sale or deed-in-lieu of foreclosure—to eligible borrowers. HAMP expired in 2016 and HARP expired in 2018.

In addition to these programs, the federal government attempted to address the mortgage crisis through increased regulation of the financial market. In 2010, the Dodd-Frank Wall Street Reform and Consumer Protection Act established the Financial Stability Oversight Council (FSOC) to determine the systematic importance of certain financial market utilities, as well as regulate certain nonbank financial companies. In addition, this act grants power to the Securities and Exchange Commission (SEC) to monitor risky derivatives, hedge funds, credit rating agencies, while the Consumer Financial Protection Bureau oversees credit reporting agencies,

payday and consumer loans, and credit and debit cards. The rollback of Dodd-Frank, also known as the Economic Growth, Regulatory Relief, and Consumer Protection Act (2018) eased regulations for banks with assets from $100 million to $250 billion.

State Programs and Legislation

Immediately after the crisis, two foreclosure protection laws were passed in California. Research estimates that the California Foreclosure Prevention Laws prevented 250,000 California foreclosures, representing a 20% reduction. In 2008, SB 1137 required that mortgage lenders make a good faith effort to notify homeowners, either in person or via telephone, 30 days before initiating foreclosure. SB 1137 also required that the lender provide information to the borrower about HUD counselors and maintain the exterior of the property. It is estimated that this law prevented 10,000 foreclosures in the first three months that SB 1137 was in effect (Gabriel, Iacoviello, & Lutz, 2017). However, this bill only affected properties purchased from 2003-2007, and expired in 2013.

The California Foreclosure Prevention Act (CFPA) extended the process of foreclosure by 90 days, unless the lender demonstrates that it has a comprehensive loan modification program designed to keep borrowers in their homes. Loan modifications included interest rate reductions, extension of amortization periods, deferral of a portion of the principal, and/or reduction of the principal. In addition to multiple criteria, the borrower was eligible for the additional 90 days if they had obtained the loan between January 1, 2003 and January 1, 2008. Lenders who failed to offer loan modification options to distressed borrowers were required to wait 90 days before filing a notice of sale. The CFPA was in effect from June 2009 through January 1, 2011.

More recently, Governor Brown signed the Short Sale Law (SB458) to expand anti-deficiency protection for second lien residential mortgages. After escrow closes on a short sale, second lien holders are prohibited from suing a homeowner for the remaining balance of a loan,

such as a second mortgage or Home Equity Line of Credit (HELOC). The State of California also reinstated and amended the Homeowner Bill of Rights (HBOR) on January 1, 2019 to protect borrowers pursuing foreclosure prevention alternatives (i.e. loan modifications). HBOR prohibits dual tracking and prevents lenders from foreclosing on properties where pending foreclosure alternative applications exist. HBOR also requires that, before recording a notice of default, large servicers inform borrowers of their rights pertaining to foreclosure protections, interest rates, and copies of their legal documents.

Alternative Solutions

Both federal and state legislation suggests that foreclosure remains a major public policy concern. However, researchers emphasize that appropriate solutions should not be limited to restrictions on exotic subprime contracts associated with high default rates (Ferreira & Gyourko, 2015). Through analysis of panel data from 1997 to 2012, Ferreira and Gyourko (2015) find that the economic cycle is of greater importance in the crisis than housing conditions, initial buyers, and mortgage regulation. With the economic cycle playing such a large role, regulatory policies are much more challenging. Although they do not provide a specific recommendation, Ferreira and Gyourko (2015) communicate that the foreclosure crisis was widespread and systemic, resulting in lasting economic effects.

Research conducted by Daren Blomquist (2017) provides evidence of a backlog of "legacy foreclosures" in California. Blomquist (2017) finds that efforts to prevent inappropriate bank repossessions have slowed the foreclosure process, resulting in the backlog. Legacy foreclosures are those with home loans originated between 2004 and 2008. Capital Public Radio (2017) reports that 60% of all loans actively in foreclosure in California at the end of 2016 were legacy foreclosures. In Sacramento County, 59% of the loans were actively in foreclosure. Below are two graphics illustrating these statistics.

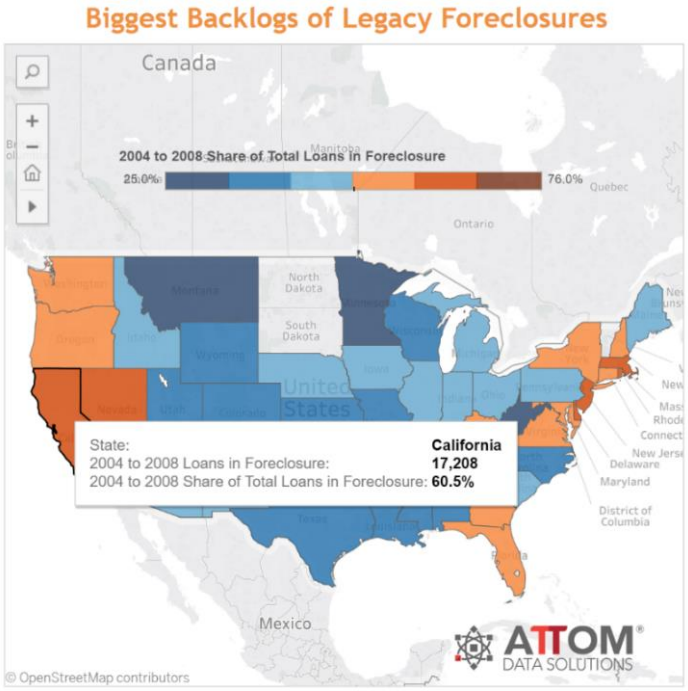

Figure 2: Foreclosure Backlog in California

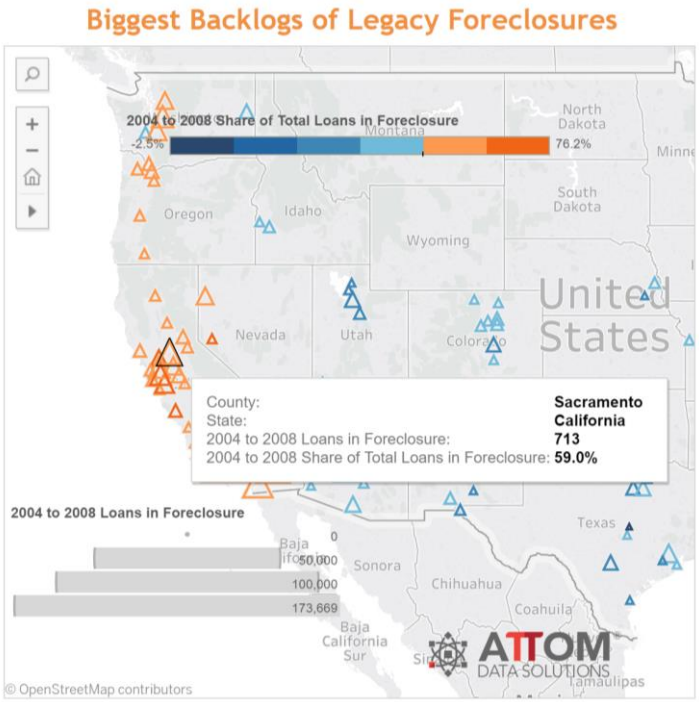

Figure 3: Foreclosure Backlog in Sacramento County

Daren Blomquist (2017) also states that foreclosures typically sell at discounted prices. In 2017, he reports the price discount associated with foreclosures as 15.8%. Blomquist (2017) further explains that the correlation between home prices and foreclosure status is due to a variety of factors. The purpose of this thesis is to investigate the own-home price effect of foreclosure on home prices within Sacramento County. Additionally, because public policy efforts to reduce foreclosure often consider short sale as a better alternative, I will extend my analysis to investigate the own-home price effect of short sale.

This master's thesis seeks to quantify the magnitude of economic benefit associated with choosing short sale over foreclosure in Sacramento County. Chapter 2 provides an overview of existing research on the negative price discount associated with residential home price when the home is a foreclosure at time of sale. Chapter 3 discusses the methodology used, including a discussion of the model, variables, and data set. Chapter 4 presents the results of my regression analysis and discusses the differences between observed and expected results. Chapter 5 summarizes the own-home price effect associated with foreclosure and short sale, recommendations for public policy, and implications for future research.

Chapter 2

LITERATURE REVIEW

The purpose of this literature review is to present existing research on the discount associated with residential home price when the home is foreclosure at time of sale. I explore the literature to better understand the approach I should use for my own regression analysis of the relationship between foreclosures and home selling prices, and to offer a base of comparison of previous findings to my own. The literature review is divided into three themes: (1) Hedonic Pricing Model; (2) Categories of Variables Used in Hedonic Regression Analyses; and (3) Results of Hedonic Regression Studies. I conclude the review by summarizing significant findings and discussing how the literature informs my examination of foreclosure and home selling prices.

Hedonic Pricing Model

A common method for quantifying the relationship between home selling price and the several explanatory variables thought to determine it is the hedonic pricing model. The hedonic model uses regression analysis to isolate the effect of a specific independent variable on the dependent variable while controlling for other factors. The theoretical basis of this model explains that the comparison of explicit prices of differentiated products, along with the quantity of characteristics associated with those products, reveals implicit prices of specific attributes (Owusu-Ansah, 2012). The literature presents the selling price of a home as a heterogenous product with a unique combination of structural, location, and neighborhood characteristics. Therefore, robust sets of explanatory variables are included in hedonic models to identify the marginal effect of housing attributes on selling price. Throughout the literature, the log-linear functional form of hedonic regression allows for conversion of a regression coefficient into a percentage change in selling price following a one-unit change in an independent variable (Wassmer, 2011).

The literature reveals that researchers recognize several methodological concerns associated with regression models (whether they are hedonic or not). This section describes how previous studies implement controls for three common methodological concerns: endogeneity bias, heteroskedasticity, and omitted variable bias.

Methodological Concerns

Endogeneity bias is one methodological concern raised in analysis of foreclosure discounts using hedonic regression models. An independent variable is endogenous when changes in that variable are related to other factors that influence the dependent variable. Awareness of both direct and indirect effects of foreclosure on price via marketing time motivates Clauretie and Daneshvary (2009) to address the endogenous relationship between selling price and marketing time. They include "time on the market" as an explanatory variable in their model to reduce endogeneity bias (Clauretie and Daneshvary, 2009). Campbell, Giglio, and Pathak (2009) acknowledge the endogenous relationship between foreclosures and selling price—homeowners are more likely to foreclose if they have negative equity in their home, which is more likely as house prices fall. To reduce endogeneity bias, Campbell et al. (2009) compare the effects of foreclosure before and after each sale.

Researchers who utilize hedonic regression also incorporate controls for heteroskedasticity, a condition where the residual values, or errors, calculated from the regression are codependent. Home selling prices are impacted by improvements, which are likely completed as houses age; however, these changes are not recorded in the datasets utilized during regression analysis. To reduce heteroskedasticity resulting from renovations to older homes, Ihlanfeldt and Mayock (2014) include age of the structure in their explanatory variables. Campbell et al. (2009) include variables for renovations and Wassmer (2011) includes "Years Since Remodeled". However, heteroskedasticity can only be truly corrected for with the use of robust standard error

corrections. Wassmer (2011) notes that heteroskedasticity is expected when predicting home prices in relation to structural explanatory variables. He acknowledges the presence of heteroskedasticity in his model and includes appropriate corrections using robust standard errors.

Foreclosure is likely correlated with unobserved property and location characteristics, as well as the local market trend in housing prices (Harding, Rosenblatt, and Yao, 2008). Unobserved effects may lead to omitted variable bias. To avoid this, Campbell et al. (2009) include neighborhood-year fixed effects to control for market shocks that may affect property values, such as rising unemployment. Ihlanfeldt and Mayock (2014) use monthly fixed effects to account for the seasonality of property markets. To better isolate the effect of foreclosure on home selling price, Clauretie and Daneshvary (2009) expand their explanatory variables to control for property condition, transaction type, and vacancy status.

Categories of Variables Used in Hedonic Regression Analysis

Hedonic pricing models incorporate a wide variety of variables that likely influence home selling prices. Throughout the literature, researchers include several categories of variables, although their studies range in scope and concentration on specific characteristics. Structural, or property, characteristics include features of the home, such as square footage and number of bedrooms. Location, or geographical, characteristics describe the neighborhood in which the property is located. Market characteristics provide information on activity within the selling environment and include variables such as days on the market. Of greatest interest in these studies are variables to measure foreclosure activity. The following subsections provide detailed descriptions for each category of variables observed in previous studies.

Property Characteristic Variables

Structural descriptions of houses are provided through real estate databases, such as the Multiple Listing Service. These physical characteristics are relevant indicators of the value of a

home, as they have similar effects on selling price across geographic locations. Property characteristic variables include measures such as square footage, number of bedrooms, and lot size. Forgey, Rutherford, and VanBuskirk (1994) recognize these as "quantitative" explanatory variables. Clauretie and Daneshvary (2009) extend property characteristics to include property condition and occupancy status to better control for the effect of foreclosure on housing price. Springer (1996) includes a measure of tenancy in his property variables. He incorporates the dummy variable "relocated" into his model, with "1" indicating that the seller has been transferred or otherwise relocated.

Location Variables

The inclusion of detailed geographic variables significantly improves the results of hedonic models (Immergluck and Smith, 2006). Location variables include measures of neighborhood demographics, such as average education and income levels. Additionally, ZIP codes are often recoded as "dummy variables", or numerical variables for subgroups of the sample, to represent geographic differences in demographic composition, median income levels, crime rates, and other factors that may influence house selling prices and foreclosure rates (Carroll, Clauretie, & Daneshvary, 1997; Wassmer, 2011). Wassmer (2011) extends his consideration of location effects on selling price to include measures of membership to neighborhood associations and community service districts.

Time and Market Characteristic Variables

The environment in which a home is sold has significant influence on selling price. Variables which describe market characteristics are utilized throughout the literature, including measures of time on the market and quarter during which homes are sold. To account for the seasonality of property markets, Springer (1996) includes season of the listing and housing price time trend, while Campbell et al. (2009) and Ihlanfeldt and Mayock (2014) incorporate monthly

fixed effects. Ihlanfeldt and Mayock (2014) also compare transactions which occur within the same year to account for neighborhood fixed effects.

Real Estate Owned Variables

The measure of foreclosure is of utmost importance to this research. Several studies include indicators of foreclosure status in their regression analyses (Forgey et al., 1994; Springer, 1996; Clauretie and Daneshvary, 2009, Ihlanfeldt and Mayock, 2014). Ihlanfeldt and Mayock (2014) use data on "distressed" sales to construct the real estate owned (REO) stock used as their measure of foreclosure. Specifically, they look at active real estate owned stock in areas around foreclosure sales. Real estate owned properties are the foreclosure measure used by Rogers (2010), Campbell et. al. (2009), and Wassmer (2011). Uniquely, Carroll et al. (1997) identify HUD-foreclosure sales and commercial bank foreclosure sales. The use of different measures of foreclosure likely contributes to the variance in magnitude of foreclosure discount. Most research fails to analyze the effect of short sale on selling price. Ihlanfeldt and Mayock (2014) include regression results for both foreclosure and short sales in their article, reporting a short sale discount of 11.2%. Due to the limited analysis on short sale discounts throughout the literature, I analyze own-home price effects of both foreclosure and short sale in my regression analysis.

Results of Hedonic Regression Studies

Hedonic regression models are used to investigate the effect of foreclosure on own-home selling price. These hedonic models are also used to examine own-home price discounts for short sale properties; however, there is limited research on short sales presented in the literature. Therefore, my research includes an analysis of the price discounts associated with foreclosure and short sale homes. The literature provides three explanations for the existence of foreclosure discounts: (1) liquidity discount, (2) lower average property condition or quality, and (3) systematic differences in property characteristics. Controlling for key property and neighborhood

characteristics, a statistically significant foreclosure discount may be attributed to differences in property condition or liquidity. Recent research builds upon previous studies to analyze the effects of foreclosure discounts during different fluctuations of the housing market. Although most researchers utilize comparable log-linear forms of the hedonic regression model, there is significant variation amongst reported foreclosure discounts.

Explaining Foreclosure Discounts

One explanation for the existence of foreclosure discounts is that sellers of foreclosed properties accept lower prices to reduce marketing time, thereby decreasing holding costs (Frame, 2010). To analyze the effect of seller motivation on transaction price and marketing time, Springer (1996) studies single family home sales in Arlington, TX from 1989-1993. Controlling for property vacancy and relocation of seller, Springer (1996) finds that foreclosures sell faster and at **4-6% discount**. However, his study does not account for the endogeneity of time on the market, property condition, or cash sales. Forgey, Rutherford, and VanBuskirk (1994) also study single family residential sales in Arlington, TX from 1991 to 1993 and report a foreclosure **discount of 23%**. They provide evidence of a cash discount for foreclosures, which may reduce buyers' uncertainty and save on certain closing costs. However, this study incorrectly includes ZIP codes as continuous variables, thereby generating inaccurate results.

Clauretie and Daneshvary (2009) suggest that lenders are willing to accept lower prices for foreclosures due to a greater need for liquidity; however, they also discuss that foreclosed homes are, on average, of lower quality. Another explanation for the existence of foreclosure discounts is that distressed homeowners who anticipate foreclosure are less likely to maintain their properties. Clauretie and Daneshvary (2009) find that nonowner (especially vacant) homes, which are expected to be of lower quality, and that houses rated "poor" or "fair" have larger foreclosure discounts. They report a distressed sales **discount of 9.7%** through comprehensive

analysis of sales in Clark County, NV from 2004 to 2007 with controls for property and neighborhood characteristics, occupancy status, property condition, time on the market, and cash sales. However, their model only measures hedonic characteristics for 2007.

Controlling for Property and Neighborhood Characteristics

Statistically significant foreclosure discounts are observed when explanatory variables include key structural and spatial characteristics. Controlling for neighboring homes in foreclosure, Campbell et. al., (2009) find a foreclosure **discount of 28%** using a dataset from 1987-2009 with residential sales in Massachusetts. Ihlanfeldt and Mayock (2014) explore the variance of foreclosure spillover effects across different neighborhood types. They report a foreclosure discount of 21% for single family transactions in South Florida from 1999 through 2011. However, their model does not control for occupancy status, cash sale, or property condition. Carroll et al. (1997) find that, after controlling for non-foreclosed properties located in proximity to foreclosures, the foreclosure discount nearly disappears. They conclude that foreclosures **sell at discount between .17% and 2.58%** due to either unobserved property or neighborhood characteristics; however, their discounts are no longer statistically significant.

Recent Research on Foreclosure Discounts

Recent research focuses on the effects of foreclosure on home prices during fluctuations of the housing market. Rogers (2010) reports that the marginal impact of foreclosure is larger in a competitive housing market compared to a declining market. He finds a foreclosure **discount of 27%** in St. Louis County, MO. from 1996-2007 (Rogers, 2010). During a period of abnormally high foreclosure rates, Wassmer (2011) reports a **discount of 14.56%**. He measures sales in Sacramento County during the "foreclosure crisis" from January 2008 to June 2009. Although his study incorporates robust explanatory variables, and corrects for heteroskedasticity and spatial autocorrelation, Wassmer (2010) does not account for occupancy status or cash sale in his model.

Conclusion

Throughout the literature, there is significant evidence provided on the negative effect of foreclosure on home selling price ranging from .17% to 50% discount. To estimate the foreclosure discount, most researchers utilize the log-linear functional form of the hedonic price model, often with controls for endogeneity, heteroskedasticity, and omitted variable bias. Previous hedonic regression analyses incorporate robust sets of structural, location, and market characteristic variables to isolate the effect of foreclosure on selling price. Despite these similarities, explanations for the existence of foreclosure discounts and the magnitudes of these discounts vary throughout the literature. I build upon previous studies to analyze the existence and magnitude of price discounts for foreclosure and short sale single-family properties in Sacramento County. I utilize the log-linear hedonic regression model to most appropriately estimate the effect of foreclosure and short sale status on selling price. I incorporate proper methodological controls, including robust standard errors to account for heteroskedasticity in my regression model. Lastly, I expand the categories of explanatory variables by including interaction terms to better isolate the effect of foreclosure or short sale on housing price.

Chapter 3

METHODOLOGY

Model

This section provides a description of both broad and individual factors within the regression model, the reasons for selecting the variables used in this analysis, and the expected direction of the effect of each variable. The regression model is influenced by the literature review and includes similar variables to those used in previous studies. The paragraphs below will explain my theoretical model and the variables included in my regression analysis.

Variables

The purpose of this study is to estimate the influence of foreclosure (and short sale) status on the selling price of a home; therefore, my dependent variable is "selling price". The literature has identified four broad categories of factors that are expected to cause variation in the selling price of a home: property, location, time and market, and foreclosure characteristics. The specific independent variables I utilize to represent these four broad factors in my theoretical model are described below. The regression results of interest will explain the degree to which foreclosure (and short sale) influence the selling price of a home, controlling for other factors.

Theoretical Model

My theoretical model is:

Log (Selling Price) = f (Property Factors, Location Factors, Selling Environment Factors, Real Estate Owned Factors),

where

Property Factors = f (Age, Bedrooms, Full Bathrooms, Half Bathrooms, Home Square Feet in 1000's, Lot Square Feet in 1000's, One Story Dummy, No Garage Dummy, No Fireplace Dummy, Sewer Dummy, Remodeled Dummy; Brick Exterior Dummy, Other

Exterior Dummy, Siding Cement Exterior Dummy, Siding Lap Exterior Dummy, Siding Vinyl Exterior Dummy, Shingle Exterior Dummy, Stucco Exterior Dummy, Stone Exterior Dummy, Wood Exterior Dummy; Comp Shingle Roof Dummy, Flat Roof Dummy, Metal Roof Dummy, Other Roof Dummy, Other-Attach Roof Dummy, Rock Roof Dummy, Shake Roof Dummy, Slate Roof Dummy, Tar & Gravel Roof Dummy, Tile Roof Dummy, Wood Shake Roof Dummy; A-Frame Style Dummy, Colonial Style Dummy, Contemporary Style Dummy, Cottage Style Dummy, Mediterranean Style Dummy, Other Style Dummy, Ranch Style Dummy, Spanish Style Dummy, Tudor Style Dummy, Victorian Style Dummy)

Location Factors = f (Covenant Restriction Dummy, Horse Property Dummy, Set of 50 Zip Code Dummies)

Selling Environment Factors = f (Days on Market 100s, September Sale Dummy, October Sale Dummy, November Sale Dummy, December Sale Dummy)

Real Estate Owned Factors = f (Foreclosure Dummy, Short Sale Dummy).

Property Factors

The first broad category of explanatory variables includes property characteristics. These characteristics are contained within the Multiple Listing Service data. As discussed in the literature review, the home selling price is influenced by factors such as: age of the home; square footage of home and lot; number of bedrooms and bathrooms; and presence of a garage or fireplace. Newer homes usually sell at a premium; therefore, a lower age is often associated with a higher price. The age of a home is expected to have a negative coefficient in my regression model because it represents an inverse relationship between age and home selling price. I anticipate a positive effect on price for one-story homes because homeowners do not have to climb up and down stairs as they would in a two-story home.

Furthermore, I expect the following independent variables to positively influence home price: square footage of home and lot; number of bedrooms; number of bathrooms; number of full and half bathrooms; updates and remodels; connection to sewage systems; garages; fireplaces. Property characteristics also include information about the materials used in construction of the home. My model includes information on the exterior type (brick, siding cement, siding lap siding vinyl, shingle, stucco, stone, wood, other); roof type (comp-shingle, metal, flat, rock, shake, slate, tar and gravel, tile, wood shake, other, other-attach); and style of the home (A-Frame, colonial, contemporary, cottage, Mediterranean, ranch, Spanish, Tudor, Victorian, other).

The base model for my regression analysis is a contemporary style home with a comp-shingle roof and wood exterior. Compared to the base home, I expect brick siding, slate roof, and Victorian style to have the largest, positive impacts on selling price. Descriptions of each property characteristic variable and the expected direction of its effect on selling price are included in Table 1 of Appendix A.

Location Factors

Another broad category of explanatory factors includes variables which represent location. Each location characteristic within this model is provided by the Multiple Listing Service (MLS) database. The creation of "dummy variables" enables regression software to identify whether a home belongs to a covenant restriction district (or not), is a horse property (or not), and lies within a specific zip code (or not). Covenants, Conditions, and Restrictions (CC and R's) are often associated with property owners who want to retain their home value. Therefore, CC and R's are likely to exert positive effect on selling price of a home. Homes with horse property contain land suitable for horses or other livestock animals, which likely increases the selling price of the home. Furthermore, each zip code reflects a different geographic region within Sacramento County and my model includes fifty zip code dummies. The zip code 95758 is set as

the base for my regression model. I do not identify the directional effect of location on home selling price due to limited information on differences between zip codes within the Multiple Listing Service dataset.

Time and Market Factors

The time and market characteristics within my theoretical model are: (a) the number of days the property was listed on the market and (b) the month during which the sale occurred. The 2016 Multiple Listing Service dataset includes home sales from the months of September, October, November, and December. Each of the months are converted into "dummy variables" and represent whether a home was sold in September (or not), October (or not), etc. The month of December is the base category for my theoretical model. The month during which the property was sold may explain why the property remained listed on the market for a longer period. The number of days on the market has a negative effect on home price, as properties that sell quickly usually indicate substantive quality.

Real Estate Owned Factors

The key explanatory variables are two dummy variables created for (a) foreclosure and (b) short sale. Real estate owned characteristics are expected to have a negative influence on home selling price. Foreclosure status is indicative of the homeowner's inability to pay the mortgage and sell the property. Short sale is an alternative to foreclosure and is indicative of the property selling for less than the value of the mortgage. These characteristics were included in the Multiple Listing Service data and are incorporated into the model to account for the conditions surrounding the home sale transaction.

Conclusion

Table 1 in Appendix A contains the variable names, descriptions, and expected effects on selling price. The expected effect column in Table 1 is assigned (+), (-), or (?) for each variable to

indicate a positive, negative, or unknown direction of the effect, respectively. I did not analyze the expected effects of each zip code on home selling price, so zip code dummy variables are not included in Table 1. One limitation of this study is the inability to assess the expected impact of zip code location on home selling price due to limitations of the dataset. Future research could develop greater understanding of the differences between zip codes to best estimate the expected effect of a specific location on selling price.

Data

Data Used

This section includes a discussion of the data utilized in my regression model. The data source used in this analysis is the 2016 Multiple Listing Service dataset provided by my colleague, Erin Stumpf. Erin Stumpf is a licensed realtor in Sacramento and works for Coldwell Banker Residential Brokerage. The Multiple Listing Service data includes home sales from September-December of 2016. This dataset includes information related to the real estate transaction, such as financial data, property characteristics, geographic location, and timelines of 6,166 property sales throughout Sacramento County. Table 2 in Appendix B summarizes the total number of sales, total number of distressed sales (short sales and foreclosures) for each city and zip code within Sacramento County. Table 2 also includes the median sales price of all sales, distressed sales, and non-distressed sales for each city and zip code.

Data Analysis

Out of 6,166 total sales in Sacramento County in the final quarter of 2016, 291 (5%) were distressed sales. This percentage demonstrates that, although Sacramento County has recovered significantly from the foreclosure crisis, the region is still experiencing lasting effects. Of those distressed sales, 154 (53%) were foreclosures and 137 (47%) were short sales. Figure 4 shows the location of distressed sales in Sacramento County sold between September-December of 2016.

The cities with the highest proportion of distressed sales relative to total sales were Sloughhouse (100%), Walnut Grove (33%), and Courtland (25%). It is important to note that these areas did not have many total sales; therefore, their proportion of distressed relative to total sales is much higher than areas with greater total sales. Several areas within Sacramento show high proportions of distressed sales: 95841 (11%); 95815, 95828, and 95823 (8%). Citrus Heights, North Highlands, Orangevale, and Rio Linda had greater total sales and relatively high proportions of distressed sales—about 8%.

When looking at the median sales prices, it is evident that distressed home prices, on average, are lower than non-distressed home prices. The median sales price of all 6,166 sales in Sacramento County was $317,000. The median sales price of all distressed (non-distressed) sales was $234,700 ($320,000).

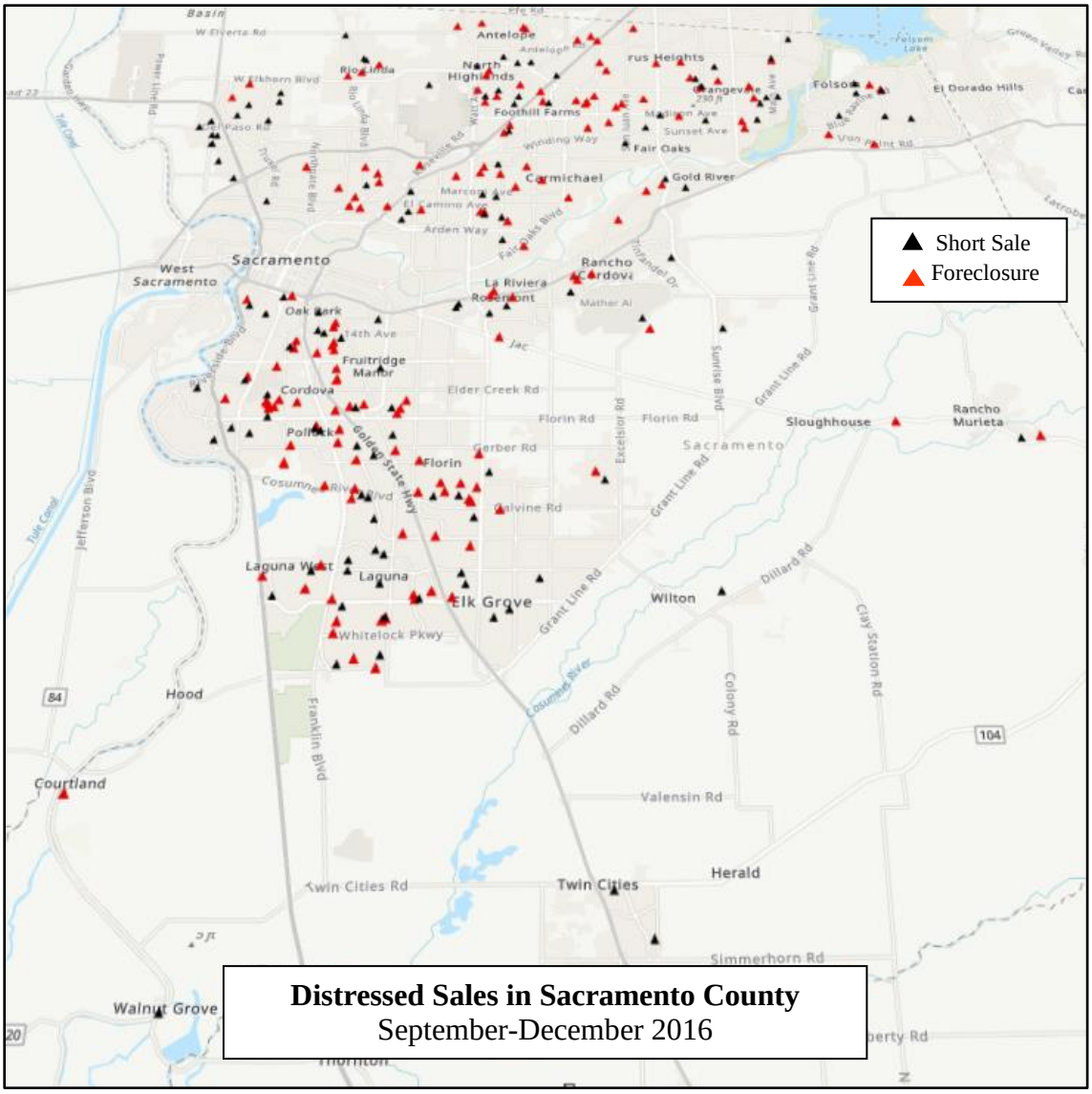

Figure 4: Distressed Sales in Sacramento County

Table 1 in Appendix A provides information regarding variables used in the regression analysis and evaluates the influence of independent variables on home selling price. Table 1 includes a description of each explanatory variable, the expected effect of each explanatory variable on home selling price, and justification for each expected effect. The base model for my regression is a contemporary style home, sold during the month of December, with a comp-shingle roof, wood siding—these categories have "N/A" expected effects and are described as

"BASE" in Table 1. This table includes several "dummy variables" that I created as proxies for qualitative facts in my regression model.

Table 3 in Appendix C provides descriptive statistics for each independent variable, including the mean, standard deviation, minimum, and maximum values. For dummy variables, the maximum is 1 and the minimum is 0.

Table 4 in Appendix D presents simple correlation coefficients between explanatory variables. These correlations are reported to illustrate the interaction between various characteristics of a home. Correlations that are statistically significant suggest that the relationship between the variables is not random. Correlation coefficients that are closer to the absolute value of 1 (either 1 or -1) represent a greater correlation. Negative correlation coefficients indicate that the variables move in opposite directions, while positive coefficients indicate that the variables move in the same direction.

Regression Analysis

To test my hypothesis that foreclosure and short sale status have negative effects on selling price, I utilize Ordinary Least Squares (OLS) regression models. This section presents the regression results of four different OLS functional forms, as well as results of various tests to detect statistical disturbance. Using the STATA program, I run the following forms of regression: Linear-Linear, Linear-Quadratic, Log-Linear, and Log-Log. The results of the four regressions are reported in Tables 5-7 in Appendix E.

Each regression reports robust standard errors to account for possible heteroskedasticity, which occurs when the residual values calculated from the regression are codependent (Wassmer, 2011). Heteroskedasticity is likely to occur in relation to size variables (such as lot or home square footage) when predicting home selling prices; if present, heteroskedasticity will produce biased regression estimates. I conduct further testing for heteroskedasticity in my final model

using the Breusch-Pagan statistical test and include appropriate corrections.

For the OLS regression, I begin with the linear-linear (Lin-Lin) functional form. At the .10 level of significance, I found 65 statistically significant variables and the results are presented in Appendix E, Table 5. Regression coefficients for my key explanatory variables, dummy variables for foreclosures and short sales, are statistically significant at the .01 level. However, regression coefficients for several property characteristics, including age of the home, lot size, and dummies for fireplace and sewer are not statistically significant. The R-Squared value of the Lin-Lin regression is .8082 which indicates that the model explains 80.82% of the data's variability around the mean.

Next, I run the Linear-Quadratic functional form and list the results in Table 6 of Appendix E. This form includes the squared terms of continuous (non-dummy) variables. For continuous variables, I included both unaltered and squared values in my initial run; Squared terms for full-bathrooms and half-bathrooms were not statistically significant and omitted from the secondary run. The variable for age of the home was statistically significant at the .01 level, unlike in the Lin-Lin regression. The foreclosure and short sale variables are statistically significant at the .01 level. In total, there are 77 statistically significant variables in the Lin-Quad regression form at the .10 level. The R-squared value for the Linear-Quadratic model is .8261 which indicates that the model explains 82.61% of the data's variability around the mean.

Next, I run the Log-Linear (Log-Lin) functional form and list the results in Table 7 of Appendix E. This form includes the dependent variable in logged form, while all independent variables remain unaltered. At the .10 level of significance, there are 66 statistically significant variables. The key explanatory variables for foreclosure and short sale are statistically significant at the .01 level. The R-Squared value for the Log-Lin model is .8276 which indicates that the model explains 82.76% of the data's variability around the mean.

Finally, I run the Log-Log functional form and list the results in Table 7 of Appendix E. This form of regression includes the dependent variable and continuous independent variables in logged form, while dichotomous independent variables remain unaltered. At the .10 level of significance, there are 54 statistically significant variables. The key explanatory variables for foreclosure and short sale are statistically significant at the .01 level. The R-Squared value for the Log-Log model is .8830, which indicates that the model explains 88.30% of the data's variability around the mean.

According to Benoit (2011), the use of logged variables in OLS equations allows for characterization of non-linear relationships, as well as interpretation of regression coefficients as percentage change in the dependent variable. Throughout the literature, the Log-Lin form is prevalent, as it is easy to interpret the coefficients as the proportionate change in price resulting from a unit change in the value of the characteristic. Furthermore, the Log-Lin model, unlike Log-Log models, can handle dummy variables for characteristics that are either present or absent (1 or 0). Because my research aims to estimate and compare the discount associated with foreclosure and short sales, both of which are dummy variables, the optimal functional form for my regression is Log-Lin. In this model, the dependent variable (selling price) is in log form, while the independent variables remain unaltered. The characteristics of a home are regressed against its selling price to produce and estimation of the marginal contribution of each attribute to its selling price, while holding all other attributes in the model constant.

After selecting the Log-Linear regression form, I conducted tests for heteroskedasticity and multicollinearity. The presence of heteroskedasticity is observed when the error terms do not have a constant variance. To test for this, I conducted the Breusch-Pagan test and the results are included in Appendix F, Table 8. These results show a large chi-squared value for my regression

model, which indicates the presence of heteroskedasticity. I include robust standard errors to account for this effect.

To test for multicollinearity, I perform an analysis of the Variance of Inflation Factors (VIF). The VIF measures the magnitude of inflation in the variance for each independent variable, and these results are listed in Appendix F, Table 9. A VIF value greater than 5 indicates the existence of multicollinearity. None of the VIF values for my data are greater than 5, so I do not correct for multicollinearity.

Next, I generate interaction variables to examine if there are special combinations of independent variables that create a unique effect on my key explanatory variable. The presence of a significant interaction indicates that the effect of one independent variable on home selling price is different at different values of the other independent variable. For my regression analysis, I examine the effect of zip code on selling price of foreclosed homes (versus non-foreclosed homes) and short sale homes (versus non-short sale homes) Therefore, I create 50 interaction variables to represent the interaction between zip code and foreclosure status, as well as 50 interaction variables to represent the interaction between zip code and short sale status. After running each set of interaction variables separately, I find that (a) eleven interaction terms for zip codes and foreclosures are statistically significant at the 10% level, and (b) one interaction term for zip codes and short sales is statistically significant at the 10% level. After incorporating these statistically significant interactions, my model produces 68 statistically significant regression coefficients. I will discuss the magnitude of my regression findings in the following section.

Chapter 4

RESULTS

The purpose of this study—to examine the impact of foreclosure and short sale status on home selling price using regression analysis—has been established in previous sections. In this final section, I present the final regression results. Table 10 in Appendix G lists statistically significant explanatory variables, at the 99% level of confidence, from largest positive influence to largest negative influence. In this section, I compare the estimated direction and magnitude of influence according to the regression results to the expected direction and magnitude discussed earlier in this paper. I also provide a discussion on what my regression results indicate regarding my research question. Lastly, I describe how my results compare to those of previous studies.

My Research Results

My theoretical model includes a dependent variable, selling price of the home, and several broad categories of explanatory variables: property, location, selling environment, and real estate owned characteristics of homes. Through review of several regression-based studies and analysis of my own findings, I find that both foreclosure and short sale status have negative impacts on property values. My regression analysis shows that foreclosure status (short sale) commands a 19.3% (12.4%) decrease in home selling price at the 99% confidence level. The model is corrected for heteroskedasticity by calculating robust standard errors. Future research could expand upon this study with a time series or multiple sale regression to be more inclusive concerning trends in the housing market.

Location Characteristics

Statistically significant variables associated with the largest effects on home selling price are location characteristics, including the zip code dummies and interaction variables. Compared to the base zip code 95758, these location effects range from a large premium of 58.5% in home

selling price to a large discount of 41.2% in home selling price. These results indicate that some zip codes within Sacramento County are valued higher than others; this is not surprising, as researchers have established location as an important determinant of property values. Across the literature, it is recognized that foreclosures located in areas with higher crime rates and lower income levels have larger discount rates than those located in safer, higher income areas (Immergluck & Smith, 2006; Sumell, 2009). Therefore, it is critical to discuss locational differences in magnitude of foreclosure price discounts, as well as identify where foreclosures and short sales are concentrated.

Using data from the U.S. Census Bureau, I find that the median household income for Sacramento County was $60,239 at the end of 2016. Using my data of home sales from September-December of 2016, I identify several areas with high proportions of foreclosures to total sales. The South Sacramento area (95823), with 10 foreclosures and 8 short sales, had a median income level of $37,468 during this time, which was significantly lower than the county average. The Florin area (95828) experienced the greatest number of foreclosures (13) during this time and had a median income level of $40,959. However, Florin only contained 4 short sales. Across my dataset, the lowest income neighborhoods contained high numbers of distressed sales. In general, foreclosures appeared to be more common in lower income areas, while short sales were more prevalent in higher income areas.

However, my research also demonstrates that areas with relatively higher income and home values were impacted by foreclosure and short sale at the end of 2016. The Laguna area (95758) had a higher median household income ($85,556) relative to the county average, but 8 foreclosures and 8 short sales were reported. Folsom (95630) had a median income of $106,718, much higher than the county level, but 7 short sales and 4 foreclosures still occurred. This suggests that income levels are not the only factors which contribute to differences in foreclosure

and short sale prevalence across different regions. To develop a comprehensive understanding of the pervasiveness of distressed sales in different areas, it is critical to consider property characteristics, as well as time and market trends.

Property Characteristics

Property characteristics are associated with both positive and negative impacts on home selling price. An additional 1,000 square feet of space increases the home selling price by 33.8%, and horse properties are associated with a 20.9% increase. Compared to the base home—a contemporary style house with a comp-shingle roof and wood exterior—the following variables demonstrate large statistically significant, positive effects on home prices: homes with slate (10.9%) or rock roofs (10.6%), and Victorian (9.9%) and Tudor (8.5%) style homes. Surprisingly, one-story homes are associated with an 8.9% increase in selling price; this may be explained by greater analysis of homeowner preferences and calls for additional analyses of qualitative data and demographic information. Other property characteristics display negative price effects, including homes without fireplaces (-4.0%) or garages (-14.5%). The number of bedrooms shows a 2.1% decrease in selling price; this may be the result of an inconsistency in realtor reporting of actual number of bedrooms versus possible number of bedrooms and calls for further analysis.

According to my regression, time and market characteristics are not large determinants of house selling prices. Although days on the market was statistically significant, the impact on home selling price was negligible. These results likely reflect the limitations of the dataset, which only included home sales during four months of the year 2016. Future research should expand time and market characteristics, as well as gather a larger quantity of data, to better account for the impact of marketing time on home selling prices in Sacramento County.

My two key explanatory variables display negative effects on home selling price: foreclosures are associated with a 19.3% decrease in selling price and short sales are associated

with a 12.4% decrease. Therefore, the results of my analysis confirm both my hypothesis and the findings reported in the literature review. I am confident that my data appropriately fits the statistical model used in my regression analysis because the R-squared value is .8285. As mentioned previously, this value indicates that the model explains 82.85% of the data's variability around the mean. My analysis includes interaction terms to control for effects between zip codes and distressed sales, such as foreclosures and short sales. Six (half) of these interaction terms are statistically significant in my final regression results, which suggests different effects on home selling price for foreclosures and short sales located in different zip codes.

Conclusions

The results of my regression analysis indicate that location and property characteristics have significant influence on home selling price. I find that, generally, foreclosures are more prevalent in lower income zip codes, while short sales are more common in higher income levels. I will discuss this pattern and implications for public policy further in Chapter 5. In addition to income levels, property characteristics and market trends are shown to have significant effects on home selling price. In the following section, I will compare these findings to those of previous studies.

Results Comparison to Previous Studies

Throughout the research, it is widely recognized that the price discount associated with distressed sales depends heavily on unique locational characteristics; therefore, results are not necessarily generalizable. However, it is critical to compare the results of my research to similar studies to identify similarities and acknowledge differences. In Chapter Two of this thesis, I reviewed the literature and found that the negative price discount associated with foreclosure ranges from .17% to 50%. In this section, I provide further analysis of these studies to compare locational and temporal effects on regression results. First, I compare regression results for

specific variables which reoccur broadly throughout the literature. Second, I analyze the differences over time within the Sacramento region. Lastly, I compare my results, which are based on a post-recession housing market, to studies of foreclosure sales before and during the recession.

Across the Literature

Although the foreclosure discount varies widely across the literature, there is some consistency in the direction and magnitude of coefficients for property characteristic variables. Age of the home tends to have a negative effect on price (Aroul & Hansz, 2014; Forgey et al., 1994; Rogers, 2010; Springer, 1996). Single story homes tend to sell at a premium, with regression results ranging from 3-9% increase in home selling price (Aroul & Hansz, 2014; Clauretie & Daneshvary, 2009; Forgey et al., 1994; Rogers, 2010; Wassmer, 2011). Features such as garages and fireplaces consistently generate positive impacts on home selling price in different regions and also retain their value over time. Across the literature, garages increase home selling price by 3-15% and fireplaces boost home selling price by 3-13% (Aroul & Hansz, 2014; Clauretie & Daneshvary, 2009; Forgey et al., 1994; Springer, 1996; Wassmer, 2011). The results of my research are consistent with the findings described above.

Differences in reported regression coefficients for these variables likely represent variations in homeowner preferences across regions and over time. For instance, in suburban or rural areas, people are more likely to commute to work using a car; therefore, they would probably pay more for homes with garages. In the case of amenities such as fireplaces, location and climate likely dictates the magnitude of the price effect; homebuyers in colder climates will likely pay more for a home with a fireplace than those in warmer areas. Furthermore, property characteristics related to the exterior siding of a home, roof type, and style of home largely depend on popular styles and trends associated with the time period in which the house is sold.

These features also depend on the individual preferences of homebuyers, so the magnitudes of price effects associated with these variables vary widely throughout the literature.

The Sacramento Region

To better understand regional changes over time, I compare my regression results with a very similar study conducted by Robert Wassmer. Using a dataset of Sacramento County sales between January 2008 and June 2009, Wassmer (2011) reports a foreclosure discount of 15.74%. This is lower than the 19.3% reported in my research; however, my study separates foreclosures and short sales, while Wassmer's does not. This comparison suggests that the price discount associated with foreclosures in Sacramento County has increased over time. I believe that this increase may be attributed to differences in location of foreclosures and market conditions.

In 2016, I find that Sacramento County foreclosures were not as widespread and concentrated in lower income neighborhoods. Lower income areas are generally associated with higher rates of crime and vacancy; therefore, foreclosures in these areas were likely subject to vandalism and deterioration. Furthermore, the end of 2016 represents a stable housing market period with increased availability of non-distressed homes. With fewer foreclosures on the market—and concentrated in lower income areas—homebuyers were probably less willing to purchase foreclosed home. Lenders seeking to dispose of foreclosed properties responded and became willing to accept lower prices for these homes. These factors provide an explanation for the observed increase in the foreclosure discount in Sacramento County from 15.74% to 19.3%.

The Great Recession: Before, During, and After

To further understand the impact of housing market conditions on foreclosure discounts, I utilize three studies which occur before, during, and after the Great Recession. My study represents a post-recession period of home sales, while Wassmer's covers the recession period (2008-2009). A similar study was conducted by Clauretie and Daneshvary (2011) with a focus on

foreclosures during a pre-recession time period. Using a dataset of single-family sales in Las Vegas, Nevada during 2004-2007, they report a 10.5% discount for foreclosure sales. This dataset captures sales which occurred during the "boom" period from 1999-2006, where housing prices appreciated from 5% to more than 10% per year (Chang & Li, 2014). In this seller's market, with a plentiful supply of homes and buyers willing to pay higher prices, lenders were not compelled to sell foreclosures at a significant discount. Furthermore, there were likely not as many foreclosures compared to during and after the recession.

Alternatively, when the housing market began to fall and foreclosures started flooding the market, lenders became willing to accept less for a foreclosure sale. This explains the relatively higher discount of 15.74% during 2008-2009 reported by Wassmer. Improvement in the housing market and decrease in the amount of foreclosures on the market from 2009 to 2016 likely explains lenders' willingness to accept less for the occasional foreclosure property without detriment to their portfolios. Furthermore, with the rise in alternatives to foreclosure such as short sales, I believe that foreclosures became even less desirable for home buyers, pushing the discount level to 19.3% as reported in my research.

Differences in the foreclosure discount before and after the Great Recession indicate significant economic differences between the two periods. According to research by Chang and Li (2014), before the housing boom, the foreclosure discount increased from 3-4%, versus 10-12% in the post-boom period. This suggests that the underlying cause of foreclosures in the Great recession is different than before. While the pre-boom foreclosures were likely caused by collateral issues, such as underappreciation of property, the post-boom foreclosures were triggered by the quality of the loans in the subprime mortgage crisis (Chang & Li, 2014). Therefore, I believe it is critical to understand the roots of recent foreclosures in order to create appropriate policy solutions.

Chapter 5

CONCLUSION

The results of my analysis demonstrate that there is a large price discount associated with both foreclosures and short sales in Sacramento County and that the discount varies by zip code. My research suggests that foreclosures sold at 19.3% discount, while short sales sold at 12.4% discount. Because the short sale discount is smaller in magnitude than the foreclosure discount, this research supports public policy efforts to encourage foreclosure alternatives. However, recent literature suggests that short sales are not as prevalent as researchers would expect. My data shows that foreclosures represent a slight majority (53%) of distressed sales in Sacramento County. In this section, I will discuss (a) the differences between foreclosure and short sale, (b) the prevalence of short sales, (c) recommendations for public policy, and (d) implications for future research.

Foreclosure Versus Short Sale Discounts

Although the literature on price discounts associated with foreclosure versus short sale is limited, I have identified several studies which indicate a smaller discount for short sales relative to foreclosures. According to my research, there is a 6.9% difference between the price discount associated with foreclosures (19.3%) and short sales (12.4%). Similarly, Aroul and Hansz (2014) report a 7% difference between the foreclosure discount (21%) and short sale discount (14%) for homes sold in Fresno, California between 2006-2010. Clauretie and Daneshvary (2011) study sales in Las Vegas between December 2007 and December 2008, and report a discount of 5.6% for short sales, 10.3% for foreclosures, and 13.5% for REO properties; this results in price differences ranging from 4.7% to 7.9% depending on the measure of "foreclosure". Finally, Calvin Zhang (2019) studies distressed sales from 2004-2013 and finds that short sales sold from 9.2% to 10.5% higher than foreclosures.

Overall, I believe that differences in price discounts associated with distressed sales are largely due to differences in location and time periods of the studies. The local housing market in each of these studies are different; therefore, the results are not generalizable to other markets. Regional differences in demographics, climate, and local market trends are among the many variables which likely impact home selling price. Studies of foreclosure discounts also range in the length of time analyzed—some focus on sales during very narrow time period, while others cover a much broader period.

Furthermore, I believe that the Great Recession created a significant and unique impact on house prices and the quantity of distressed sales. Therefore, I believe that the comparison of pre-recession studies to those which cover the recession or post-recession market is extremely complex. Although differences in magnitude of price discounts are likely affected by these factors, the research clearly demonstrates that short sales consistently sell at a lower discount relative to foreclosures.

Foreclosure Versus Short Sale Prevalence

My research reveals that, although short sales are associated with higher selling prices, foreclosures are slightly more prevalent than short sales. These results are echoed throughout the literature, leaving myself and other researchers to speculate why short sales are underutilized. In this section, I will compare the processes and outcomes of foreclosures and short sales. Then, I will discuss the benefits of each alternative from the perspectives of the borrower and lender.

Timelines and Financial Impact

Foreclosures and short sales are similar in that they are both financial options for distressed homeowners. Both also generate a negative impact on the borrower's credit score, credit report, and prospects of getting a loan. However, they differ substantially in the duration and extent of financial consequences. On average, a foreclosure takes 17-36 days shorter than a

regular, non-distressed sale, while a short sale takes 18 days longer (Clauretie and Daneshvary, 2011). In California, the most common form of foreclosure (non-judicial) is relatively quick compared to the duration of a short sale. In a non-judicial foreclosure, the lender does not have to ask permission of the courts to sell the property in order to recover losses incurred from a delinquent mortgage loan. On the other hand, short sales can take up to one year to close; this includes the time needed for the borrower and lender to reach an agreement, for the property to be advertised (2-3 months), for the lender to approve an offer, and for the sale to close.

Contrary to popular belief, the impact of foreclosures on credit score is similar to that of short sales (Zhang, 2019). According to FICO, borrowers with good credits score may realize a drop of 100 points or more if their home is lost to foreclosure. For borrowers with excellent credit, the impact is even greater, reducing credit scores by up to 160 points. Short sales have a similar effect on credit scores, with negative impacts ranging from 100-150 points. In both cases, the amount that a borrower's credit score drops depends on their credit history—the higher the credit score, the greater the drop in points. Both foreclosures and short sales remain on a borrower's credit report for as long as seven years; however, it takes much longer to recover from a foreclosure than from a short sale. Obtaining another mortgage after foreclosure usually takes about 5-7 years, while purchasing after a short sale only takes two years (Zhang, 2019). Based on the access to future credit, short sale represents a healthier alternative to foreclosure.

Distressed Sales from the Lender's Perspective

Gerardi and Li (2016) find that there is little benefit to lenders in choosing short sale over foreclosure because, with foreclosure, the lender can put the house on the market quickly and recover their losses. Foreclosures have a shorter marketing period relative to short sales, which allows lenders to minimize holding costs such as maintenance, property taxes, and insurance (Gerardi & Li, 2016). The lender is also motivated to dispose of properties as quickly as

possible because of the implicit cost associated with holding a mortgage loan that is not generating revenue. Therefore, a rational lender seeking to minimize costs and maximize profits would likely choose foreclosure over short sale.

To maximize the recovery of their losses, lenders are typically more reluctant to pursue foreclosure alternatives. Adelino, Gerardi, and Willen (2010) find that between 20-50% of modified mortgages result in delinquency within six months after modification. Borrowers who are likely to redefault on their loans have little incentive to maintain the property, effectively reducing the lender's recovery in foreclosure (Adelino, et al., 2010). The risk of redefault and associated costs dissuades lenders from pursuing loan modifications and foreclosure alternatives. Furthermore, if the lender expects prices to fall, they will likely choose to foreclose immediately and maximize the sales price, rather than postpone until the borrower redefaults when house prices are lower (Foote, Gerardi, & Willen, 2008). Overall, for the lender, I believe that higher profitability associated with foreclosure contributes to the lack of short sale transactions.

Distressed Sales from the Borrower's Perspective

From the borrower's perspective, foreclosure and short sale have similar costs—loss of a home and negative credit score impact—but very different benefits. With foreclosure, borrowers can remain in the home without making payments for the duration of the foreclosure process. For the distressed borrower, this immediate benefit likely outweighs long-term benefits associated with short sale, such as ability to obtain another mortgage sooner (Zhang, 2019). In the short-term, short sales appear to be complicated and time consuming. Short sales involve extensive paperwork and documentation, which is used by lenders to either approve or deny borrowers' requests for a short sale. The process becomes even more complicated when there are multiple loans involved in a transaction (which is often the case), because the servicer for each loan must approve the short sale. Servicers of junior liens are likely more reluctant to approve a short sale,

since they will not be able to recover their losses until the first lien is completely repaid.

Conclusions

The results of my research and those of previous studies indicate a smaller selling price discount for homes sold in short sale compared to foreclosure. Since both sellers and lenders are better off when distressed homes are sold at higher prices, the very existence of foreclosures seems puzzling at first. The benefits of foreclosures to lenders and borrowers often outweigh the higher selling price associated with short sales. Lenders are motivated to recover the greatest amount of money in the shortest amount of time. Borrowers who choose foreclosure over short sale may enjoy the immediate benefit of remaining in their home during foreclosure without payment, or want to avoid the complicated, timely, and uncertain short sale process. Developing an understanding of lender and borrower perspectives will better inform the development of policy to decrease foreclosures and encourage foreclosure alternatives.

Policy Recommendations

Due to the long-lasting effects of the mortgage crisis, the public policy approach to mortgage defaults has been largely reactive. Loan modifications and other foreclosure alternatives have proven moderately successful; however, I believe changes to these existing mechanisms informed by empirical research would significantly enhance their success. Furthermore, I believe it is critical to take preventative measures to avoid residential mortgage default. In this section, I will discuss potential policy solutions to decreasing and preventing distressed sales.

Foreclosure Alternatives

For foreclosure alternatives to be successful, they must be more attractive than foreclosure for both the borrower and the lender. From the borrower's perspective, the foreclosure option effectively reduces the market value of their home below the discounted value of future mortgage payments (Foote, et al., 2008). Therefore, policies that lower the mortgage

payments, such as loan modifications, should make foreclosure less attractive to the borrower. From the lender's perspective, a foreclosure alternative must increase the expected recovery on the loan (Foote, et al., 2008). However, lenders usually suffer a financial loss when they agree to loan modifications and forbearance periods. While loan modifications present benefits to the borrower in the form of reduced payments, they are costly for the lender. To encourage loan modifications, government should consider incentivizing lenders to provide these alternatives and and/or provide greater forgiveness of debt for homeowners with negative equity and underwater mortgages (Wassmer, 2011).

Another alternative to foreclosure is forbearance, which involves a temporary suspension of mortgage payments. This option is less attractive to borrowers than loan modification because it only alters the timing of repayment, not the amount owed. However, this option could be successful if utilized at the appropriate time—when price appreciation is high. When prices are expected to rise, forbearance periods allow homeowners to borrower against future house price gains (Foote, et al., 2008). Forbearance during these time periods may be more palatable to lenders seeking to maximize the recovery of their losses; even if the borrower redefaults after forbearance, the house has appreciated in value, and the lender may receive a higher sell price.

Expanded forbearance allows the borrower to refinance their existing mortgage with a new loan that is insured by the government. Repayment of the new loan and the difference between the loans is not required until a later date, and interest does not accrue on the difference. Potential loss to the lender in expanded forbearance is limited to the difference between the two loans. Although expanded forbearance is attractive to both borrowers and lenders, it presents great risk to the insuring government entity. Lenders may be incentivized to provide the riskiest loans for government insurance while retaining the lowest risk loans (Foote, et al., 2008).

While loan modification, forbearance, and expanded forbearance provide alternatives to

foreclosure, the results are mixed as to their effectiveness in reducing foreclosures. I believe this justifies consideration of additional policy solutions at both the local and state government levels.

Local Government Solutions

A high concentration of foreclosures in a particular area can create significant consequences for the surrounding neighborhood and locality, such as increased blight and crime, and lower property values (Kingsley, Smith, & Price, 2009). Property values are directly tied to property tax revenue, which is a significant source of funding for local government services; therefore, high rates of foreclosure severely impact the ability of local jurisdictions to provide services to those residents. Jurisdictions should consider targeting resources to neighborhoods with high foreclosure rates in order to maximize the benefits of policy solutions and the provision of services for distressed borrowers.

Through my research, I found that the greatest negative price effects of foreclosure occur in lower income areas. These neighborhoods typically contain a large volume of vacant—often abandoned—foreclosures that are subject to vandalism and neglect (Lin, Rosenblatt, &Yao, 2009). Some researchers suggest increasing protection of vacant foreclosures in lower income areas characterized by a high concentration of foreclosures. Local governments, such as cities, could also impose maintenance regulations on real estate owners of vacant properties within the jurisdiction (Sumell, 2009). Through greater monitorization of foreclosures in lower-income areas, I believe local government can effectively reduce the negative impact of vacant foreclosures on surrounding areas, thereby improving the livability of these communities.

The results of my research also indicate the lower income neighborhoods have a lower prevalence of short sales relative to foreclosures. I believe local government should work to educate lower income residents on the costs of foreclosure and the benefits of foreclosure alternatives, such as short sales. This could be accomplished directly through public outreach

within lower income communities, followed by the provision of online tools and resources for avoiding foreclosure and/or seeking assistance. Local governments could also promote renting in these areas, encouraging borrowers to take financial risk more sizeable to their income levels. These efforts would complement the increase in affordable rental housing evident in the Sacramento region and throughout the state over the last several years.

Furthermore, I believe that local government should work to increase their involvement in foreclosure prevention. In addition to directing distressed homeowners to federal resources offered by the Housing and Urban Development Department (HUD), localities could provide funding to support HUD-approved counseling agencies that assist homeowners in applying for loan modifications and/or arranging other foreclosure alternatives (DiNapoli, 2016). Local governments can also support legal agencies that provide foreclosure defense to victims of predatory or dishonest lending behaviors that put them at risk of foreclosure (DiNapoli, 2016). To maximize the use of limited government resources, these foreclosure prevention programs should be targeted toward the most affected and vulnerable populations.

I believe there is an opportunity for Sacramento County, as well as other local governments, to take a more active role in decreasing and preventing foreclosures. Local governments should identify the most vulnerable populations within their communities and work vigorously to assist them in avoiding mortgage default. Jurisdictions with adequate funding should be encouraged to increase financial assistance to their distressed residents. Local governments with limited funding should still be encouraged to help their residents financially, perhaps through partnerships with other agencies or private companies.

State Government Solutions

At the state level, solutions to the foreclosure problem involve significant changes to legislation. Some researchers have suggested streamlining the foreclosure process to reduce

vacancies, thereby preventing deterioration and vandalism (Immergluck & Smith, 2006). To prevent additional foreclosures from occurring, some researchers encourage the creation of land banks to return vacant, abandoned, or tax-foreclosed properties to productive use (DiNapoli, 2016). These entities are designed transfer distressed property to owners who will maintain or redevelop them, thereby eliminating blight and increasing property values. One successful model of this system is the Michigan state land bank, where previously vacant properties were redeveloped into affordable housing and single-family homes; however, Michigan's success is attributed to previous reform of foreclosure laws that reduced the time period of foreclosing on vacant, tax-delinquent properties. Therefore, I believe it is critical to analyze the existing foreclosure laws when developing and implementing innovative policy solutions.

In addition to addressing the current stock of foreclosures, it is also imperative to prevent additional distressed sales. Policymakers could provide rewards to lenders for supporting foreclosure prevention programs and offering anti-predatory lending programs (Immergluck and Smith, 2006). Wu (2018) finds that high down payment requirements are shown to be effective in lowering mortgage default rates and recommends increasing the down payment requirement to traditional levels of 10-20%. Using higher down payment requirements has been shown to be more effective at preventing default than pressuring distressed borrowers with credit exclusionary periods (Wu, 2018). Policymakers may even consider legislation to limit the amount of time that borrowers are excluded from the credit markets after foreclosure, as this is shown to be a relatively ineffective prevention method.

Future Research

The identification of legacy foreclosures and other distressed sales across the Sacramento region warrant the need for further research to inform public policy approaches. Future research may expand the regression model to incorporate demographic information, which would provide

greater understanding of homeowner preferences in Sacramento County. Furthermore, sales data could be added to the existing dataset, allowing for a greater understanding of the impact of foreclosure and short sale on property values over time. Alternatively, this study could be extended to investigate the external effects of distressed sales on surrounding property values using Geographic Information Systems (GIS) technology and a concentric rings approach. Developing a greater understanding of the impact of foreclosures and short sales on the Sacramento region will provide for more informed and enhanced policy solutions.

Appendix A

Variable Descriptions and Expected Effects

Table 1: Variable Descriptions and Expected Effects

Variable	***Description***	***Expected Effect on Sell Price***	***Justification***
	Property Characteristics		
Age	Age of house in 2016	-	Newer homes sell at premium; Inverse relationship between age and selling price.
Bedrooms	Numbers of bedrooms	+	Larger homes have more bedrooms.
BathroomsFull	Number of full bathrooms	+	Larger homes have more full bathrooms.
BathroomsHalf	Number of half bathrooms	+	Larger homes have more half bathrooms.
HomeSqFt1000s	Square footage of home size in thousands	+	Larger homes have more square footage.
LotSizeSqFt1000s	Square footage of lot size in thousands	+	Larger homes often have larger lot sizes.
Dummy_OneStory	Equals one if the house is a one-story	-	Larger homes are often two-story.
NoGarageDummy	Equals one if the house does not have a garage	-	Less appealing to prospective buyers—drives price down.
NoFireplaceDummy	Equals one if the house does not have a fireplace	-	Less appealing to prospective buyers—drives price down.
SewerDummy	Equals one if the sewer is in and connected	+	More appealing to prospective buyers—drives price upward.
Dummy_RemUpd	Equals one if the house has been remodeled or updated	+	Improvements increase home value.
Dummy_ExtBRCK	Equals one if the exterior is brick	+	Durable, aesthetically appealing, and expensive.
Dummy_ExtOTHR	Equals one if the exterior is other	?	
Dummy_ExtSDCE	Equals one if the exterior is siding cement	+	Durable, low-maintenance, and requires special installation
Dummy_ExtSDNG	Equals one if the exterior is siding lap	+	Common material. Aesthetically appealing.
Dummy_ExtSDVN	Equals one if the exterior is siding vinyl	-	Inexpensive; likely doesn't increase home value.
Dummy_ExtSHNG	Equals one if the exterior is shingle	-	Requires regular maintenance; subject to insect and weather damage.
Dummy_ExtSTCO	Equals one if the exterior is stucco	+	Common on newer homes, which often sell at premium.
Dummy_ExtSTON	Equals one if the exterior is stone	+	Durable, requires little maintenance, and is one of the most expensive siding materials.
Dummy_ExtWOOD	Equals one if the exterior is wood	N/A	BASE
Dummy_RfCMPS	Equals one if the roof is comp shingle	N/A	BASE
Dummy_RfFLAT	Equals one if the roof is flat	-	Vulnerable to weather damage; require greater maintenance
Dummy_RfMETL	Equals one if the roof is metal	+	Durable and aesthetically appealing.
Dummy_RfOTHR	Equals one if the roof is other	?	
Dummy_RfOTSA	Equals one if the roof is other-attach	?	

Dummy_RfROCK	*Equals one if the roof is rock*	+	*Durable and aesthetically appealing.*
Dummy_RfSHAK	Equals one if the roof is shake	-	Vulnerable to weather damage; require greater maintenance
Dummy_RfSLAT	Equals one if the roof is slate	+	Durable and aesthetically appealing.
Dummy_RfTARG	Equals one if the roof is tar & gravel	+	Durable and aesthetically appealing.
Dummy_RfTILE	Equals one if the roof is tile	+	Durable and aesthetically appealing.
Dummy_RfWDSH	Equals one if the roof is wood shake	-	Vulnerable to weather damage; require greater maintenance
Dummy_StyleAFRM	Equals one if the style is a-frame	-	Popular style for prefabricated home, which usually has lower selling price.
Dummy_StyleCOLN	Equals one if the style is colonial	+	Popular. Often large home.
Dummy_StyleCONT	Equals one if the style is contemporary	N/A	BASE
Dummy_StyleCOTG	Equals one if the style is cottage	-	Often considered “cozy” because of smaller size.
Dummy_StyleMEDI	Equals one if the style is Mediterranean	+	Unique and usually expensive.
Dummy_StyleOTHR	Equals one if the style is other	?	
Dummy_StyleRNCH	Equals one if the style is ranch	-	Usually simple, one-story home.
Dummy_StyleSPAN	Equals one if the style is Spanish	+	Unique and usually expensive.
Dummy_StyleTUDR	Equals one if the style is Tudor	+	Unique and usually expensive.
Dummy_StyleVICT	Equals one if the style is Victorian	+	Unique and usually expensive.
	Location Characteristics		
Dummy_CCandRs	Equals one if has covenants, conditions, and restrictions	+	Property owners want to retain home value in these areas.
Dummy_HrsProp	Equals one if the property is a horse property	+	Usually larger lot size and additional land.
	Time and Market Characteristics		
DaysMarket	Days on the market from listing date to selling date	-	Home of substantive quality sells quickly (shorter marketing time).
Dummy_SEPT	Equals one if month of sale is September	?	
Dummy_OCT	Equals one if month of sale is October	?	
Dummy_NOV	Equals one if month of sale is November	?	
Dummy_DEC	Equals one if month of sale is December	N/A	BASE
	Real Estate Owned Characteristics		
Dummy_Frclsr	Equals one if the sale is a foreclosure	-	Indicates that previous homeowner could not pay mortgage.
Dummy_ShrtSl	Equals one if the sale is a short sale	-	Property sells at lower value than existing mortgage.

Appendix B

Data Analysis

Table 2: Sacramento County Sales, Sept.-Dec. 2016

City/Zip	Total Sales	Distressed Sales	Short Sales	Frcls	Median Sales Price (All Sales)	Median Sales Price (Distressed)	Median Sales Price (Non-Distressed)
Antelope							
95843	251	10	6	4	$ 305,000	$ 281,000	$ 306,000
Carmichael							
95608	239	8	1	7	$ 363,800	$ 270,000	$ 369,500
Citrus Heights							
95610	164	6	2	4	$ 316,000	$ 265,000	$ 319,975
95621	178	14	5	9	$ 275,000	$ 232,500	$ 277,000
Courtland							
95615	4	1	0	1	$ 192,500	$ 145,000	$ 240,000
Elk Grove							
95624	261	11	7	4	$ 367,000	$ 305,000	$ 369,950
95757	260	10	4	6	$ 425,000	$ 468,750	$ 423,500
95758	343	16	8	8	$ 340,000	$ 284,500	$ 340,000
Elverta							
95626	16	1	1	0	$ 256,000	$ 225,000	$ 260,000
Fair Oaks							
95628	203	9	5	4	$ 409,250	$ 334,699	$ 415,000
Folsom							
95630	310	11	7	4	$ 478,750	$ 399,000	$ 482,500
Galt							
95632	123	2	2	0	$ 300,000	$ 360,000	$ 300,000
Gold River							
95670	47	1	1	0	$ 433,000	$ 418,000	$ 434,000
Herald							
95638	9	0	0	0	$ 551,000	$ -	$ 551,000
Hood							
95639	1	0	0	0	$ 168,000	$ -	$ 168,000
Isleton							
95641	4	0	0	0	$ 395,000	$ -	$ 395,000
Mather							
95655	27	2	1	1	$ 315,000	$ 312,650	$ 315,000
North Highlands							
95660	120	9	4	5	$ 215,000	$ 205,000	$ 217,000
Orangevale							
95662	155	13	7	6	$ 329,500	$ 290,000	$ 336,000

Rancho Cordova								
95670	191	5	2	3	$ 272,000	$ 230,000	$ 274,500	
95742	91	1	1	0	$ 388,000	$ 505,000	$ 387,750	
Rancho Murieta								
95683	41	2	1	1	$ 467,000	$ 362,500	$ 469,500	
Rio Linda								
95673	71	6	3	3	$ 263,000	$ 176,250	$ 265,000	
Sacramento								
95811	4	0	0	0	$ 495,000	$ -	$ 495,000	
95814	2	0	0	0	$ 667,450	$ -	$ 667,450	
95815	95	8	2	6	$ 177,000	$ 98,832	$ 179,500	
95816	65	0	0	0	$ 470,000	$ -	$ 470,000	
95817	80	5	3	2	$ 305,000	$ 140,300	$ 310,000	
95818	84	5	3	2	$ 474,750	$ 334,950	$ 475,000	
95819	87	0	0	0	$ 505,000	$ -	$ 505,000	
95820	195	9	3	6	$ 235,000	$ 150,000	$ 238,250	
95821	138	9	4	5	$ 295,000	$ 234,000	$ 300,000	
95822	218	14	4	10	$ 239,950	$ 193,723	$ 245,000	
95823	225	18	8	10	$ 246,000	$ 223,000	$ 248,000	
95824	77	4	1	3	$ 190,500	$ 140,000	$ 195,000	
95825	63	2	1	1	$ 280,000	$ 182,450	$ 290,000	
95826	165	8	4	4	$ 286,000	$ 252,613	$ 288,000	
95827	74	4	1	3	$ 270,000	$ 220,750	$ 273,000	
95828	217	17	4	13	$ 259,000	$ 235,000	$ 259,400	
95829	146	3	2	1	$ 345,000	$ 530,000	$ 345,000	
95830	6	0	0	0	$ 812,500	$ -	$ 812,500	
95831	122	4	3	1	$ 400,000	$ 343,500	$ 400,500	
95832	42	2	0	2	$ 232,656	$ 176,250	$ 242,606	
95833	153	2	2	0	$ 280,000	$ 227,000	$ 280,500	
95834	111	6	5	1	$ 333,235	$ 399,500	$ 332,000	
95835	231	9	7	2	$ 356,622	$ 315,000	$ 359,450	
95838	143	3	0	3	$ 205,000	$ 105,000	$ 206,000	
95841	44	5	2	3	$ 268,500	$ 239,500	$ 275,000	
95842	120	7	5	2	$ 250,000	$ 186,500	$ 250,000	
95864	127	6	3	3	$ 425,000	$ 273,650	$ 432,000	
Sloughhouse								
95683	1	1	0	1	$ 580,000	$ 580,000	$ -	
Walnut Grove								
95690	3	1	1	0	$ 371,000	$ 256,000	$ 435,500	
Wilton								
95693	19	1	1	0	$ 544,500	$ 635,000	$ 537,250	

Appendix C

Descriptive Statistics

Table 3: Descriptive Statistics

	Variable Name	***Mean***	***Standard Deviation***	***Min***	***Max***
Dependent Variable	SellingPrice	347244.5	149490.5	40000	2900000
Property Factors	Age	69.78414	252.167	0	2016
	Bedrooms	3.324197	0.7501208	0	8
	BathroomsFull	2.050438	0.6323675	0	6
	BathroomsHalf	0.215537	0.4155438	0	3
	HomeSqFt1000s	1.721936	0.6619509	0.432	9.213
	LotSizeSqFt1000s	87.99909	6138.068	0	481991.4
	Dummy_OneStory	0.705806	0.4557165	0	1
	NoGarageDummy	0.020759	0.1425881	0	1
	NoFireplaceDummy	0.221051	0.4149884	0	1
	SewerDummy	0.882744	0.3217511	0	1
	Dummy_RemUpd	0.487512	0.4998846	0	1
	Dummy_ExtBRCK	0.004541	0.0672395	0	1
	Dummy_ExtOTHR	0.011028	0.1044431	0	1
	Dummy_ExtSDCE	0.001622	0.0402421	0	1
	Dummy_ExtSDNG	0.049303	0.2165167	0	1
	Dummy_ExtSDVN	0.023354	0.151037	0	1
	Dummy_ExtSHNG	0.005352	0.0729668	0	1
	Dummy_ExtSTCO	0.435453	0.4958563	0	1
	Dummy_ExtSTON	0.001135	0.0336772	0	1
	Dummy_ExtWOOD	0.134609	0.3413333	0	1
	Dummy_RfCMPS	0.600876	0.4897581	0	1
	Dummy_RfFLAT	0.005028	0.0707326	0	1
	Dummy_RfMETL	0.008596	0.0923202	0	1
	Dummy_RfOTHR	0.007785	0.0878936	0	1
	Dummy_RfOTSA	0.00146	0.0381801	0	1
	Dummy_RfROCK	0.000162	0.012735	0	1
	Dummy_RfSHAK	0.020435	0.1414932	0	1
	Dummy_RfSLAT	0.001135	0.0336772	0	1
	Dummy_RfTARG	0.000973	0.0311815	0	1
	Dummy_RfTILE	0.327765	0.4694368	0	1
	Dummy_RfWDSH	0.008271	0.0905764	0	1
	Dummy_StyleAFRM	0.037139	0.189118	0	1
	Dummy_StyleCOLN	0.004217	0.0648041	0	1
	Dummy_StyleCONT	0.183101	0.3867806	0	1

	Dummy_StyleCOTG	*0.053195*	*0.2244402*	*0*	*1*
	Dummy_StyleMEDI	0.0253	0.1570476	0	1
	Dummy_StyleOTHR	0.016218	0.1263231	0	1
	Dummy_StyleRNCH	0.227214	0.4190658	0	1
	Dummy_StyleSPAN	0.005514	0.074058	0	1
	Dummy_StyleTUDR	0.006812	0.0822572	0	1
	Dummy_StyleVICT	0.000811	0.028467	0	1
Location Factors	Dummy_CCandRs	0.849822	0.3572752	0	1
	Dummy_HrsProp	0.011028	0.1044431	0	1
	ZipDummy95608	0.038761	0.1930404	0	1
	ZipDummy95610	0.026598	0.1609169	0	1
	ZipDummy95615	0.000649	0.0254638	0	1
	ZipDummy95621	0.028868	0.167449	0	1
	ZipDummy95624	0.042329	0.2013548	0	1
	ZipDummy95626	0.002595	0.0508779	0	1
	ZipDummy95628	0.032923	0.1784482	0	1
	ZipDummy95630	0.050276	0.218531	0	1
	ZipDummy95632	0.019948	0.1398333	0	1
	ZipDummy95638	0.00146	0.0381801	0	1
	ZipDummy95641	0.000649	0.0254638	0	1
	ZipDummy95655	0.004379	0.0660332	0	1
	ZipDummy95660	0.019462	0.1381518	0	1
	ZipDummy95662	0.025138	0.1565564	0	1
	ZipDummy95670	0.038437	0.1922634	0	1
	ZipDummy95673	0.011515	0.1066959	0	1
	ZipDummy95683	0.006649	0.0812787	0	1
	ZipDummy95690	0.000487	0.0220541	0	1
	ZipDummy95693	0.003081	0.0554294	0	1
	ZipDummy95742	0.014758	0.120594	0	1
	ZipDummy95757	0.042167	0.2009857	0	1
	ZipDummy95758	0.055628	0.2292198	0	1
	ZipDummy95811	0.000649	0.0254638	0	1
	ZipDummy95814	0.000324	0.0180085	0	1
	ZipDummy95815	0.015407	0.1231753	0	1
	ZipDummy95816	0.010542	0.1021384	0	1
	ZipDummy95817	0.012974	0.113173	0	1
	ZipDummy95818	0.013623	0.1159297	0	1
	ZipDummy95819	0.01411	0.1179526	0	1
	ZipDummy95820	0.031625	0.1750139	0	1
	ZipDummy95821	0.022381	0.1479305	0	1
	ZipDummy95822	0.035355	0.1846909	0	1

	ZipDummy95823	0.03649	0.1875222	0	1
	ZipDummy95824	0.012488	0.1110581	0	1
	ZipDummy95825	0.010217	0.1005712	0	1
	ZipDummy95826	0.02676	0.1613933	0	1
	ZipDummy95827	0.012001	0.1088999	0	1
	ZipDummy95828	0.035193	0.1842823	0	1
	ZipDummy95829	0.023678	0.152057	0	1
	ZipDummy95830	0.000973	0.0311815	0	1
	ZipDummy95831	0.019786	0.1392752	0	1
	ZipDummy95832	0.006812	0.0822572	0	1
	ZipDummy95833	0.024814	0.155569	0	1
	ZipDummy95834	0.018002	0.132969	0	1
	ZipDummy95835	0.037464	0.1899101	0	1
	ZipDummy95838	0.023192	0.1505241	0	1
	ZipDummy95841	0.007136	0.0841792	0	1
	ZipDummy95842	0.019462	0.1381518	0	1
	ZipDummy95843	0.040707	0.1976268	0	1
	ZipDummy95864	0.020597	0.1420418	0	1
Time and Market Factors	Time and Market Factors				
	DaysMarket	76.60282	54.10643	0	919
	Month Dummies				
	Dummy_SEPT	0.268083	0.442997	0	1
	Dummy_OCT	0.254136	0.4354095	0	1
	Dummy_NOV	0.235161	0.4241335	0	1
	Dummy_DEC	0.242621	0.4287024	0	1
Real Estate Owned Factors	Distressed Sale Dummies				
	Dummy_Frclsr	0.024976	0.1560636	0	1
	Dummy_ShrtSl	0.022219	0.1474058	0	1

Appendix D

Correlation Coefficients for Explanatory Variables

Table 4: Simple Correlation Coefficients for Explanatory Variables

	Age	***Bedrooms***	***BathroomsFull***	***BathroomHalf***	***HomeSqFt1000s***	***LotSqFt1000s***	***Dummy_OneStory***
Age	1.0000						
Bedrooms	-0.0176	1.0000					
BathroomsFull	0.0324**	0.6354***	1.0000				
BathroomsHalf	0.1062***	0.1468***	0.0049	1.0000			
HomeSqFt1000s	0.0431***	0.6642***	0.7369***	0.2873***	1.0000		
LotSqFt1000s	-0.0031	0.0116	0.0194	-0.0066	0.0240*	1.0000	
Dummy_OneStory	-0.0814***	-0.4408***	-0.4838***	-0.4771***	-0.5328***	0.0084	1.0000
NoGarageDummy	0.0176	-0.0826***	-0.1231***	-0.0646***	-0.0966***	-0.0018	0.0665***
NoFireplaceDummy	0.2050***	-0.1688***	-0.2081***	-0.0280**	-0.2423***	-0.0068	0.0738***
SewerDummy	-0.009	-0.0266**	-0.0251**	-0.0099	-0.0504***	0.0037	0.0036
Dummy_RemUpd	-0.0884***	-0.0305**	-0.0804***	-0.0928***	-0.1078***	-0.0124	0.1127***
Dummy_ExtBrick	0.0351***	-0.0131	-0.0206	-0.0118	0.0171	-0.0009	0.0066
Dummy_ExtOther	0.0025	-0.0332***	-0.0404***	-0.0025	-0.0418***	-0.0011	0.0034
Dummy_ExtSDCE	-0.0035	-0.0228*	-0.0223*	-0.0112	-0.0144	-0.0005	0.0172
Dummy_ExtSDNG	-0.0253**	-0.0405***	-0.0134	-0.0082	-0.0485***	-0.0029	0.0139
Dummy_ExtSDVN	-0.0013	-0.0525***	-0.0820***	-0.0337***	-0.0856***	-0.0019	0.0621***
Dummy_ExtSHNG	-0.0041	-0.0021	-0.0305**	-0.0167	-0.0137	-0.0009	0.0327**
Dummy_ExtSTCO	0.0698***	0.1197***	0.1115***	0.0475***	0.1314***	0.0143	-0.1099***
Dummy_ExtSTON	-0.004	0.0047	0.0049	-0.0059	-0.0002	-0.0004	0.0112
Dummy_ExtWOOD	-0.0415***	-0.1008***	-0.0735***	-0.0262***	-0.1031***	-0.005	0.0555***
Dummy_RfCMPS	-0.0347***	-0.2473***	-0.3440***	-0.1925***	-0.4385***	-0.0155	0.3307***
Dummy_RfFLAT	0.1384***	-0.0674***	-0.0456***	0.0293**	-0.0429***	-0.0009	-0.0296**
Dummy_RfMETL	0.0041	-0.0004	0.0204	-0.006	0.0305**	-0.0012	-0.0131
Dummy_RfOTHR	-0.0093	0.0060	0.0104	0.0340***	0.0181	-0.0011	0.0005
Dummy_RfOTSA	-0.0042	0.0005	0.0037	0.0108	0.0025	-0.0002	-0.0033
Dummy_RfROCK	-0.0007	0.0115	0.0191	-0.0066	0.0251**	-0.0001	0.0082
Dummy_RfSHAK	-0.0163	0.0079	0.0265**	0.0327**	0.0563***	-0.0018	-0.0476***
Dummy_RfSLAT	0.0320**	-0.0017	0.0202	0.0057	0.0229*	-0.0004	-0.0099
Dummy_RfTARG	-0.0031	0.0142	0.0057	0.0088	0.0315**	-0.0004	0.0087
Dummy_RfTILE	0.0221*	0.2615***	0.3497***	0.1750***	0.4225***	0.0181	-0.3241***
Dummy_RfWDSH	-0.0115	0.0321**	0.0267**	0.0130	0.0454***	-0.0011	-0.0196
Dummy_StyleAFRM	-0.0271**	0.0043	-0.0089	-0.0173	-0.0339***	-0.0026	-0.0068
Dummy_StyleCOLN	-0.0055	0.0319**	0.0146	0.0265**	0.0293**	-0.0008	-0.0514***
Dummy_StyleCONT	-0.0348***	0.0883***	0.1565***	0.0915***	0.1500***	-0.0062	-0.2042***

	Age	Bedrooms	BathroomsFull	Bathrooms Half	HomeSqFt 1000s	LotSqFt 1000s	Dummy_ OneStory
Dummy_StyleMEDI	0.0722***	0.1135***	0.1358***	0.0631***	0.1608***	-0.0020	-0.0932***
Dummy_StyleCOTG	0.0446***	-0.2258***	-0.2418***	-0.0551***	-0.1727***	-0.0031	0.0864***
Dummy_StyleOTHR	0.0547***	0.0181	0.0263**	0.0137	0.0332***	-0.0015	-0.0524***
Dummy_StyleRNCH	-0.0323**	-0.0920***	-0.1100**	-0.1108***	-0.1366***	-0.0066	0.2753***
Dummy_StyleSPAN	0.0214*	0.0321**	0.0599***	0.0035	0.0671***	-0.0009	-0.0384***
Dummy_StyleTUDR	0.0153	-0.0253**	-0.0035	0.0187	0.0499***	-0.001	-0.0634***
Dummy_StyleVICT	0.0045	0.0029	-0.0203	-0.0011	0.0026	-0.0004	-0.0191
Dummy_CCandRs	-0.0071	0.0843***	0.1233***	0.0618***	0.1061***	0.0049	-0.1090***
Dummy_HrsProp	-0.0137	0.0206	0.0382***	0.0312**	0.0886***	0.0009	0.0102
DaysMarket	0.1382***	0.1031***	0.1176***	0.1031***	0.1776***	-0.0023	-0.1231***
Dummy_SEPT	-0.0198	-0.0112	-0.0077	-0.0064	-0.0034	0.0210*	0.0035
Dummy_OCT	0.0046	-0.0015	0.0177	0.0047	0.0165	-0.0074	-0.0074
Dummy_NOV	-0.0267***	0.0035	-0.0007	0.0041	0.0043	-0.0071	-0.0012
Dummy_DEC	0.0422***	0.0096	-0.0092	-0.0022	-0.0176	-0.0072	0.0051
Dummy_Frclsr	-0.0167	-0.0027	-0.0308**	-0.0005	-0.0211*	-0.0020	0.0121
Dummy_ShrtSl	-0.0103	-0.0006	0.0176	-0.0146	0.0013	0.0845***	0.0007

	NoGarage Dummy	***NoFireplace Dummy***	***Sewer Dummy***	***Dummy_ RemUpd***	***Dummy_ ExtBrick***	***Dummy_ ExtOther***	***Dummy_ ExtSDCE***
NoGarageDummy	1.0000						
NoFireplace Dummy	0.1363***	1.0000					
SewerDummy	-0.0035	-0.0112	1.0000				
Dummy_RemUpd	0.0400***	-0.0254**	0.0206	1.0000			
Dummy_ExtBrick	0.0071	0.0105	-0.0054	0.0017	1.0000		
Dummy_ExtOther	0.0609***	0.0186	-0.0581***	-0.0346***	-0.0071	1.0000	
Dummy_ExtSDCE	0.0224*	0.0174	0.0147	0.0010	-0.0027	-0.0043	1.0000
Dummy_ExtSDNG	0.0194	0.0014	0.0155	0.0402***	-0.0154	-0.0240*	-0.0092
Dummy_ExtSDVN	0.0151	0.0496***	-0.0171	0.0211*	-0.0104	-0.0163	-0.0062
Dummy_ExtSHNG	0.0049	-0.0230*	-0.0147	0.0174	-0.0050	-0.0077	-0.0030
Dummy_ExtSTCO	-0.0361***	0.0713***	0.0100	-0.1138***	-0.0593***	-0.0927***	-0.0354***
Dummy_ExtSTON	-0.0049	0.0169	0.0123	0.0057	-0.0023	-0.0036	-0.0014
Dummy_ExtWOOD	0.0792***	0.0052	-0.001	0.0289**	-0.0266**	-0.0416***	-0.0159
Dummy_RfCMPS	0.0861***	0.1054***	-0.0273**	0.2324***	-0.0090	0.0068	0.0246*
Dummy_RfFLAT	0.0701***	0.0671***	0.0188	-0.0097	0.0293**	0.0145	-0.0029
Dummy_RfMETL	0.0111	-0.0200	0.0012	0.0217*	-0.0063	0.007	-0.0038
Dummy_RfOTHR	0.0259**	0.0106	-0.0193	-0.0421***	0.0215*	0.1143***	-0.0036
Dummy_RfOTSA	-0.0056	0.0103	-0.0257**	-0.0118	-0.0026	0.1180***	-0.0015
Dummy_RfROCK	-0.0019	-0.0068	0.0046	-0.0124	-0.0009	-0.0013	-0.0005
Dummy_RfSHAK	-0.0210*	-0.0548***	-0.0008	-0.0124	0.0073	-0.0043	-0.0058
Dummy_RfSLAT	-0.0049	-0.0180	-0.0326**	-0.0232*	-0.0023	-0.0036	-0.0014
Dummy_RfTARG	-0.0045	-0.0041	-0.0048	0.0112	-0.0021	0.0465***	-0.0013

	NoGarage Dummy	*NoFireplace Dummy*	*Sewer Dummy*	*Dummy_ RemUpd*	*Dummy_ ExtBrick*	*Dummy_ ExtOther*	*Dummy_ ExtSDCE*
Dummy_RfTILE	-0.0992***	-0.0930***	0.0365***	-0.2393***	-0.0266**	-0.0506***	-0.0196
Dummy_RfWDSH	-0.0133	-0.0357***	-0.0112	-0.0067	0.1004***	-0.0096	-0.0037
Dummy_StyleAFRM	0.0015	-0.0033	0.0103	0.0161	-0.0005	-0.0125	0.0134
Dummy_StyleCOLN	-0.0095	-0.0105	0.0004	0.0116	-0.0044	0.0171	-0.0026
Dummy_StyleCONT	-0.0366***	-0.0450***	0.0279**	-0.0591***	-0.0195	-0.0139	-0.0191
Dummy_StyleCOTG	0.0871***	0.1210***	-0.0012	0.0450***	0.0377***	0.0234*	0.0264**
Dummy_StyleMEDI	-0.0162	-0.0261**	-0.0023	-0.0683***	-0.0109	-0.0071	-0.0065
Dummy_StyleOTHR	-0.0007	0.0028	-0.0410***	-0.0250**	-0.0087	0.0848***	-0.0052
Dummy_StyleRNCH	-0.0138	-0.0473***	-0.0225*	0.1014***	-0.0194	-0.0091	0.0070
Dummy_StyleSPAN	-0.0108	0.0237*	-0.0137	-0.0113	0.0275*	-0.0079	-0.003
Dummy_StyleTUDR	0.0018	-0.0251**	0.0241*	0.0376***	0.1410***	-0.0087	-0.0033
Dummy_StyleVICT	0.0358***	0.0397***	0.0104	0.0064	-0.0019	-0.0030	-0.0011
Dummy_CCandRs	-0.0439***	-0.0835***	0.1050***	-0.0641***	-0.0526***	-0.0208	-0.0056
Dummy_HrsProp	0.0609***	0.0074	-0.2415***	0.0275**	-0.0071	0.0186	-0.0043
DaysMarket	0.0308**	0.0374***	-0.0328**	-0.0813***	0.0076	0.0108	-0.0146
Dummy_SEPT	-0.0034	-0.0198	0.0044	-0.0123	-0.0082	-0.0008	0.0211*
Dummy_OCT	0.0169	0.0275**	0.0055	0.0179	0.0049	0.0204	-0.0050
Dummy_NOV	-0.003	-0.0272**	-0.013	0.0108	-0.0033	-0.0146	-0.0128
Dummy_DEC	-0.0108	0.0194	0.0028	-0.0161	0.0068	-0.0054	-0.0040
Dummy_Frclsr	-0.0087	0.0199	-0.0806***	-0.1166***	-0.0108	0.0329***	-0.0065
Dummy_ShrtSl	-0.0065	-0.0140	0.0071	-0.0722***	-0.0102	-0.0054	-0.0061

	Dummy_Ext SDNG	*Dummy_ExtS DVN*	*Dummy_ExtS HNG*	*Dummy_ExtS TCO*	*Dummy_ExtST ON*	*Dummy_ExtW OOD*	*Dummy_RfC MPS*
Dummy_Ext SDNG	1.0000						
Dummy_Ext SDVN	-0.0352***	1.0000					
Dummy_Ext SHNG	-0.0167	-0.0113	1.0000				
Dummy_Ext STCO	-0.2000***	-0.1358***	-0.0644***	1.0000			
Dummy_Ext STON	-0.0077	-0.0052	-0.0025	-0.0296**	1.0000		
Dummy_Ext WOOD	-0.0898***	-0.0610***	-0.0289**	-0.3464***	-0.0133	1.0000	
Dummy_ RfCMPS	0.0938***	0.0953***	0.0371***	-0.2894***	-0.0020	0.1778***	1.0000
Dummy_ RfFLAT	-0.0056	-0.0110	-0.0052	0.0116	-0.0024	0.0123	-0.0872***
Dummy_ RfMETL	0.0031	-0.0028	0.0172	-0.0322***	-0.0031	0.0250**	-0.1142***
Dummy_ RfOTHR	-0.0031	-0.0137	-0.0065	-0.0220*	-0.0030	0.0137	-0.1087***
Dummy_ RfOTSA	-0.0087	0.0222*	-0.0028	-0.0250**	-0.0013	-0.0026	-0.0469***

	Dummy_ExtSDNG	*Dummy_ExtSDVN*	*Dummy_ExtSHNG*	*Dummy_ExtSTCO*	*Dummy_ExtSTON*	*Dummy_ExtWOOD*	*Dummy_RfCMPS*
Dummy_RfROCK	-0.0029	-0.002	-0.0009	0.0145	-0.0004	-0.0050	-0.0156
Dummy_RfSHAK	0.0201	-0.0147	0.0051	-0.0806***	-0.0049	0.0404***	-0.1772***
Dummy_RfSLAT	-0.0077	-0.0052	0.0635***	-0.0005	-0.0011	0.0008	-0.0414***
Dummy_RfTARG	-0.0071	-0.0048	-0.0023	-0.0169	-0.0011	0.0029	-0.0383***
Dummy_RfTILE	-0.1032***	-0.0943***	-0.0465***	0.3602***	0.0072	-0.2106***	-0.8568***
Dummy_RfWDSH	0.0123	-0.0023	0.0178	-0.0405***	-0.0031	0.0217*	-0.1121***
Dummy_StyleAFRM	-0.0091	-0.0077	-0.0027	0.0005	-0.0066	-0.0197	0.0025
Dummy_StyleCOLN	-0.0148	0.0231*	-0.0048	-0.0218*	-0.0022	0.0183	-0.0032
Dummy_StyleCONT	0.0065	-0.0371***	-0.0232*	0.0731***	0.0214*	-0.0307**	-0.1930***
Dummy_StyleCOTG	0.0495***	0.0256**	0.0222*	-0.0668***	-0.008	0.0399***	0.1386***
Dummy_StyleMEDI	-0.0367***	-0.0181	-0.0118	0.1064***	-0.0054	-0.0605***	-0.1555***
Dummy_StyleOTHR	-0.0114	-0.0114	-0.0094	-0.0092	-0.0043	0.0058	-0.0107
Dummy_StyleRNCH	0.0052	0.0366***	0.0292**	-0.1694***	0.0047	0.0277**	0.1898***
Dummy_StyleSPAN	-0.0170	-0.0115	-0.0055	0.0539***	-0.0025	-0.0294**	-0.0645***
Dummy_StyleTUDR	-0.0189	-0.0128	0.0210*	-0.0171	-0.0028	-0.0153	0.0232*
Dummy_StyleVICT	0.0198	-0.0044	-0.0021	-0.0135	-0.0010	0.0222*	0.0232*
Dummy_CCandRs	-0.0070	-0.0522***	-0.0189	0.0304**	0.0142	-0.0231*	-0.1452***
Dummy_HrsProp	0.0190	0.0454***	0.0135	-0.0426***	-0.0036	0.0221*	0.0258**
DaysMarket	0.0221*	-0.0215*	-0.0177	0.0322**	0.0010	-0.0140	-0.0524***
Dummy_SEPT	0.0025	0.0010	-0.0042	-0.0006	0.0013	0.0080	0.0073
Dummy_OCT	-0.0194	-0.0113	-0.0224*	-0.0010	0.0135	0.0164	-0.0141
Dummy_NOV	0.0080	0.0105	0.0327**	0.0051	0.0040	-0.0092	-0.0088
Dummy_DEC	0.0092	0.0002	-0.0052	-0.0034	-0.0191	-0.0159	0.0155
Dummy_Frclsr	-0.0028	0.0097	-0.0117	0.0062	-0.0054	0.0069	0.0562***
Dummy_ShrtSl	0.0216*	-0.0015	-0.0111	0.0008	-0.0051	0.0276**	0.0015

	Dummy_Rf FLAT	*Dummy_Rf METL*	*Dummy_Rf OTHR*	*Dummy_Rf OTSA*	*Dummy_Rf ROCK*	*Dummy_Rf SHAK*	*Dummy_Rf SLAT*
Dummy_RfFLAT	1.0000						
Dummy_RfMETL	-0.0066	1.0000					
Dummy_RfOTHR	-0.0063	-0.0082	1.0000				
Dummy_RfOTSA	-0.0027	-0.0036	-0.0034	1.0000			
Dummy_RfROCK	-0.0009	-0.0012	-0.0011	-0.0005	1.0000		
Dummy_RfSHAK	-0.0103	-0.0134	-0.0128	-0.0055	-0.0018	1.0000	
Dummy_RfSLAT	-0.0024	-0.0031	-0.0030	-0.0013	-0.0004	-0.0049	1.0000
Dummy_RfTARG	-0.0022	-0.0029	-0.0028	-0.0012	-0.0004	-0.0045	-0.0011
Dummy_RfTILE	-0.0496***	-0.0650***	-0.0618***	-0.0267**	-0.0089	-0.1009***	-0.0235*
Dummy_RfWDSH	-0.0065	-0.0085	-0.0081	-0.0035	-0.0012	-0.0132	-0.0031
Dummy_StyleAFRM	-0.014	-0.0183	-0.0076	0.0150	-0.0025	-0.0041	-0.0066
Dummy_StyleCOLN	0.0308**	-0.0061	-0.0058	-0.0025	-0.0008	0.0260**	-0.0022

	Dummy_RfFLAT	*Dummy_RfMETL*	*Dummy_RfOTHR*	*Dummy_RfOTSA*	*Dummy_RfROCK*	*Dummy_RfSHAK*	*Dummy_RfSLAT*
Dummy_StyleCONT	0.0375***	-0.0077	-0.0085	-0.0181	-0.0060	0.0028	-0.0035
Dummy_StyleCOTG	0.0036	-0.0064	-0.0128	-0.0091	-0.0030	-0.0240*	0.0135
Dummy_StyleMEDI	-0.0115	-0.0150	-0.0143	-0.0062	-0.0021	-0.0233*	0.0559***
Dummy_StyleOTHR	0.009	0.0159	0.0325**	0.0624***	-0.0016	0.0359***	-0.0043
Dummy_StyleRNCH	-0.0221*	0.0417***	0.0092	0.0198	0.0235*	0.0092	-0.0183
Dummy_StyleSPAN	-0.0053	-0.0069	-0.0066	-0.0028	-0.0009	-0.0108	-0.0025
Dummy_StyleTUDR	-0.0059	0.0350***	0.0151	-0.0032	-0.0011	0.0298**	-0.0028
Dummy_StyleVICT	-0.002	-0.0027	-0.0025	-0.0011	-0.0004	-0.0041	-0.001
Dummy_CCandRs	-0.0215*	-0.0100	-0.0144	0.0042	0.0054	0.0094	0.0007
Dummy_HrsProp	-0.0075	-0.0098	0.0083	-0.0040	-0.0013	0.0177	-0.0036
DaysMarket	0.0367***	-0.0133	0.0264**	-0.0156	0.0142	0.0390***	0.0183
Dummy_SEPT	-0.012	-0.0088	-0.0036	0.0056	-0.0077	-0.0124	-0.0095
Dummy_OCT	-0.0152	0.0062	0.0161	-0.0028	-0.0074	-0.0027	0.0135
Dummy_NOV	0.0038	-0.0019	-0.0100	-0.0012	-0.0071	0.0172	-0.0073
Dummy_DEC	0.0240*	0.0047	-0.0028	-0.0018	0.0225*	-0.0015	0.0034
Dummy_Frclsr	-0.0114	-0.0149	-0.0024	-0.0061	-0.0020	-0.0011	-0.0054
Dummy_ShrtSl	-0.0107	-0.014	-0.0134	-0.0058	-0.0019	0.0560***	-0.0051

	Dummy_ RfTARG	*Dummy_ RfTILE*	*Dummy_ RfWDSH*	*Dummy_ StyleAFRM*	*Dummy_ StyleCOLN*	*Dummy_ StyleCONT*	*Dummy_ StyleCOTG*
Dummy_RfTARG	1.0000						
Dummy_RfTILE	-0.0218*	1.0000					
Dummy_RfWDSH	-0.0029	-0.0638***	1.0000				
Dummy_StyleAFRM	0.0214*	0.0090	-0.0179	1.0000			
Dummy_StyleCOLN	-0.0020	-0.0241*	0.0493***	-0.0128	1.0000		
Dummy_StyleCONT	-0.0013	0.2019***	-0.0062	-0.0930***	-0.0308**	1.0000	
Dummy_StyleCOTG	0.0158	-0.1378***	-0.0216*	-0.0466***	-0.0154	-0.1122***	1.0000
Dummy_StyleMEDI	-0.0050	0.1823***	-0.0147	-0.0316**	-0.0105	-0.0763***	-0.0382*
Dummy_StyleOTHR	-0.0040	-0.0131	-0.0117	-0.0252**	-0.0084	-0.0608***	-0.0304**
Dummy_StyleRNCH	-0.0169	-0.2104***	-0.0025	-0.1065***	-0.0353***	-0.2567***	-0.1285***
Dummy_StyleSPAN	-0.0023	0.0693***	-0.0068	-0.0146	-0.0048	-0.0353***	-0.0176

	Dummy_ RfTARG	*Dummy_ RfTILE*	*Dummy_ RfWDSH*	*Dummy_Style AFRM*	*Dummy_Style COLN*	*Dummy_Style CONT*	*Dummy_Style COTG*
Dummy_ StyleTUDR	-0.0026	-0.0452***	-0.0076	-0.0163	-0.0054	-0.0392***	-0.0196
Dummy_ StyleVICT	-0.0009	-0.0199	-0.0026	-0.0056	-0.0019	-0.0135	-0.0068
Dummy_ CCandRs	-0.0014	0.1668***	-0.0318**	-0.0111	-0.0357***	0.0769***	-0.0824***
Dummy_ HrsProp	-0.0033	-0.0340***	0.0075	-0.0207	-0.0069	-0.0299**	-0.0181
Days Market	0.0281**	0.0285**	0.0333***	0.0184	0.0304**	0.0023	-0.0313**
Dummy_ SEPT	-0.0071	0.0025	0.0013	-0.0027	0.0171	-0.0025	0.0164
Dummy_ OCT	-0.0063	0.0106	-0.0163	0.0154	-0.0092	0.0030	-0.0089
Dummy_ NOV	0.0195	0.0039	0.0254**	-0.0139	-0.0066	-0.0025	-0.0053
Dummy_ DEC	-0.0055	-0.0172	-0.0099	0.0009	-0.0018	0.0020	-0.0027
Dummy_ Frclsr	-0.0050	-0.0520***	-0.0031	-0.0259**	-0.0104	-0.0113	-0.0055
Dummy_ ShrtSl	-0.0047	-0.0138	0.0348***	0.0402***	-0.0098	0.0083	-0.0357***

	Dummy_Style MEDI	*Dummy_Style OTHR*	*Dummy_Style RNCH*	*Dummy_Style SPAN*	*Dummy_Style TUDR*	*Dummy_Style VICT*	*Dummy_ CCandRs*
Dummy_Style MEDI	1.0000						
Dummy_Style OTHR	-0.0207	1.0000					
Dummy_Style RNCH	-0.0874***	-0.0696***	1.0000				
Dummy_Style SPAN	-0.0120	-0.0096	-0.0404***	1.0000			
Dummy_Style TUDR	-0.0133	-0.0106	-0.0449***	-0.0062	1.0000		
Dummy_Style VICT	-0.0046	-0.0037	-0.0154	-0.0021	-0.0024	1.0000	
Dummy_ CCanRs	0.0446***	-0.0251**	-0.0581***	-0.0055	-0.0425***	-0.0199	1.0000
Dummy_ HrsProp	-0.0071	-0.0013	0.0873***	-0.0079	0.0101	-0.0030	-0.0904***
DaysMarket	0.0860***	0.0167	-0.0362***	0.0239*	0.0116	0.0142	-0.0228*
Dummy_SEPT	0.0121	-0.011	0.0065	0.0044	-0.0012	-0.0172	0.0177
Dummy_OCT	-0.0158	0.0047	-0.0267**	-0.0032	0.0151	0.0095	0.016
Dummy_NOV	-0.0065	-0.0016	0.0078	0	-0.0134	-0.0024	-0.0099
Dummy_DEC	0.0100	0.0082	0.0127	-0.0013	-0.0009	0.0105	-0.0247*
Dummy_Frclsr	-0.0125	0.0288**	0.0422***	-0.0119	-0.0133	-0.0046	0.0033
Dummy_ShrtSl	-0.0033	-0.0194	-0.0213*	-0.0112	-0.0125	0.0344***	0.0202

	Dummy_HrsProp	*DaysMarket*	*Dummy_SEPT*	*Dummy_OCT*	*Dummy_NOV*	*Dummy_DEC*	*Dummy_Frclsr*
Dummy_HrsProp	1.0000						
DaysMarket	0.0372***	1.0000					
Dummy_SEPT	-0.0078	-0.0536***	1.0000				
Dummy_OCT	0.0133	-0.0087	-0.3533***	1.0000			
Dummy_NOV	-0.0073	0.0078	-0.3356***	-0.3237***	1.0000		
Dummy_DEC	0.0018	0.0566***	-0.3425***	-0.3304***	-0.3138***	1.0000	
Dummy_Frclsr	-0.0069	0.0429***	0.0134	-0.0194	-0.0030	0.0088	1.0000
Dummy_ShrtSl	-0.0159	0.3135***	-0.0242*	0.0080	0.0150	0.0020	-0.0241*

	Dummy_ShrtSl
Dummy_ShrtSl	1.0000

**** = 99% confidence, ** = 95% confidence, *= 90% confidence.*

Appendix E

Regression Results

Table 5: Lin-Lin Regression Results

Linear-Linear

OLS Regression	**OLS**		**With Robust Variance Estimate**	
Variable	**Coefficient**	**Standard Error**	**Variable**	**Coefficient**
Age	4.022451	3.580029	4.022451	4.196438
Bedrooms	-22891.13***	1660.103	-22891.1***	2923.232
BathroomsFull	20053.73***	2421.547	20053.73***	3988.225
BathroomsHalf	15394.08***	2623.255	15394.08***	4326.494
HomeSqFt1000s	178350.3***	2523.172	178350.3***	9611.385
LotSizeSqFt1000s	-0.0965135	0.138213	-0.09651***	0.024829
Dummy_OneStory	45236.2***	2718.184	45236.2***	3964.044
NoGarageDummy	-43295.14***	6171.023	-43295.1***	6434.901
NoFireplaceDummy	2190.137	2318.455	2190.137	2558.709
SewerDummy	398.1085	2768.163	398.1085	3120.141
Dummy_RemUpd	21872.43***	1800.407	21872.43***	1775.201
Dummy_ExtBRCK	61873.8***	12865.45	61873.8*	34747.72
Dummy_ExtOTHR	-6531.476	8333.355	-6531.48	7462.338
Dummy_ExtSDCE	-12322.05	21006.86	-12322.1	16415.42
Dummy_ExtSDNG	2486.658	4038.856	2486.658	5040.4
Dummy_ExtSDVN	-5853.599	5727.681	-5853.6	4286.569
Dummy_ExtSHNG	-1719.804	11658.8	-1719.8	10336.68
Dummy_ExtSTCO	-770.974	1943.631	-770.974	1909.132
Dummy_ExtSTON	-366.3402	25061.21	-366.34	24749.98
Dummy_RfFLAT	9815.062	12197.72	9815.062	14461.42
Dummy_RfMETL	21051.29**	9248.993	21051.29**	9975.515
Dummy_RfOTHR	27558.37***	9778.401	27558.37*	15889.63
Dummy_RfOTSA	-2991.799	22355.48	-2991.8	27547.3
Dummy_RfROCK	22730.81	66223.51	22730.81**	11361.6
Dummy_RfSHAK	35341.22***	6101.965	35341.22***	10897.87
Dummy_RfSLAT	11355.21	25643.16	11355.21	11182.63
Dummy_RfTARG	52639.54*	27168.93	52639.54	62014.6
Dummy_RfTILE	5436.242**	2675.464	5436.242*	3026.885
Dummy_RfWDSH	7742.661	9473.082	7742.661	15495.23

Linear-Linear

OLS Regression	**OLS**		**With Robust Variance Estimate**	
Variable	**Coefficient**	**Standard Error**	**Variable**	**Coefficient**
Dummy_StyleAFRM	-7271.092	4529.407	-7271.09**	3171.092
Dummy_StyleCOLN	-2530.929	13118.5	-2530.93	15206.61
Dummy_StyleCOTG	-1288.873	4269.245	-1288.87	5341.167
Dummy_StyleMEDI	10897.06*	5550.872	10897.06*	6126.008
Dummy_StyleOTHR	18291.74***	6796.222	18291.74*	9888.635
Dummy_StyleRNCH	-7151.146***	2244.129	-7151.15***	2140.784
Dummy_StyleSPAN	-19704.43*	11475.88	-19704.4	17817.43
Dummy_StyleTUDR	60249.19***	10791.5	60249.19***	21638.26
Dummy_StyleVICT	44891.64	31710.11	44891.64*	23870.16
Dummy_CCandRs	1639.263	2470.729	1639.263	2488.899
Dummy_HrsProp	90593.66***	9584.585	90593.66***	17823.3
DaysMarket	-43.5965**	17.34245	-43.5965**	20.12396
Dummy_SEPT	-1739.607	2380.435	-1739.61	2305.187
Dummy_OCT	1166.968	2405.726	1166.968	2361.748
Dummy_NOV	-1681.475	2453.841	-1681.48	2406.715
Dummy_Frclsr	**-54457.76*** **	5519.462	**-54457.8*** **	4906.441
Dummy_ShrtSl	**-41520.92*** **	6140.782	**-41520.9*** **	6716.655
ZipDummy95608	24862.92***	5819.189	24862.92***	7107.439
ZipDummy95610	-13007.13**	6427.644	-13007.1***	4444.496
ZipDummy95615	-58331.3*	34077.31	-58331.3*	31403.53
ZipDummy95621	-11004.75*	6287.789	-11004.8***	4025.749
ZipDummy95624	-9961.041*	5486.453	-9961.04**	4435.367
ZipDummy95626	-18591.2	17183.11	-18591.2**	9460.909
ZipDummy95628	28360.19***	6033.037	28360.19***	6164.574
ZipDummy95630	91228.11***	5232.006	91228.11***	4856.975
ZipDummy95632	-16042.81**	7048.062	-16042.8***	4982.022
ZipDummy95638	65396.15***	23595.29	65396.15**	29439
ZipDummy95641	11342.72	33601.07	11342.72	18337.99
ZipDummy95655	-46641.56***	13326.7	-46641.6***	11498.63
ZipDummy95660	-32079.26***	7366.903	-32079.3***	5188.772
ZipDummy95662	23933.86***	6596.022	23933.86***	4878.318
ZipDummy95670	-12982.13**	5697.551	-12982.1***	4031.841
ZipDummy95673	-29406.48***	8956.748	-29406.5***	8733.28
ZipDummy95683	16337.65	11071.78	16337.65	15453.84
ZipDummy95690	20793.96	40138.83	20793.96	36812.83
ZipDummy95693	93583.35***	16908.55	93583.35***	29220.63

Linear-Linear

OLS Regression	OLS		With Robust Variance Estimate	
Variable	**Coefficient**	**Standard Error**	**Variable**	**Coefficient**
ZipDummy95742	-29957.4***	7950.142	-29957.4***	6473.08
ZipDummy95757	-31293.39***	5629.973	-31293.4***	6145.526
ZipDummy95811	157340.8***	34252.81	157340.8***	38082.55
ZipDummy95814	147438.5***	47089.05	147438.5**	60951.09
ZipDummy95815	-47274.77***	8037.684	-47274.8***	6781.055
ZipDummy95816	210050.8***	9472.62	210050.8***	13460.77
ZipDummy95817	58632.95***	8650.659	58632.95***	9520.605
ZipDummy95818	194142.3***	8493.38	194142.3***	12714.46
ZipDummy95819	265268.4***	8297.592	265268.4***	15199.78
ZipDummy95820	-6215.27	6415.457	-6215.27	5788.199
ZipDummy95821	-3273.56	6891.357	-3273.56	5375.513
ZipDummy95822	3089.868	5981.833	3089.868	6274.532
ZipDummy95823	-47173.57***	5817.417	-47173.6***	3972.102
ZipDummy95824	-43742.42***	8585.474	-43742.4***	5620.875
ZipDummy95825	19547.81**	9246.989	19547.81	14903.37
ZipDummy95826	-9758.806	6472.945	-9758.81**	4086.375
ZipDummy95827	-22017.13**	8605.729	-22017.1***	5279.911
ZipDummy95828	-36637.85***	5887.865	-36637.9***	3815.847
ZipDummy95829	-7664.345	6612.043	-7664.35	5285.408
ZipDummy95830	161778***	27730.09	161778**	68676.97
ZipDummy95831	32856.51***	7140.743	32856.51***	6568.496
ZipDummy95832	-57565.61***	10855.51	-57565.6***	6035.439
ZipDummy95833	-14650.48**	6481.3	-14650.5**	5966.131
ZipDummy95834	-25197.01***	7280.48	-25197***	5141.033
ZipDummy95835	-23309.8***	5692.268	-23309.8***	4020.733
ZipDummy95838	-48297.32***	6898.728	-48297.3***	4584.554
ZipDummy95841	-31550.75***	10686.22	-31550.8***	5863.379
ZipDummy95842	-23358.51***	7210.411	-23358.5***	4371.476
ZipDummy95843	-27635.86***	5509.65	-27635.9***	3541.776
ZipDummy95864	152218.1***	7207.092	152218.1***	17760.62
R-Squared		0.8082	0.8082	
Adjusted R-Squared		0.8052	-	
Number of Sig. Variables		62	65	

**** = 99% confidence, ** = 95% confidence, *= 90% confidence.*
Note: Standard errors corrected for heteroskedasticity

Table 6: Lin-Quad Regression Results

Linear-Quadratic

OLS Regression	**With Squared Terms**		**With Significant Squared Terms**	
Variable	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**
Age	-455.417***	118.613	-478.7802***	110.9167
AgeSquared	0.2273565***	0.0583795	0.238491***	0.0546513
BathroomsFull	-4824.513	3240.705	20704.88***	3409.618
BathroomsFullSquared	41395.3***	12945.08	*omitted*	
BathroomsHalf	19670.58	19908.13	14740.02***	3669.238
BathroomsHalfSquared	-6828.632	20669.66	*omitted*	
Bedrooms	44025.84***	10781.21	50028.48***	11922.31
BedroomsSquared	-8679.515***	1647.004	-9605.978***	1807.603
DaysMarket	-91.18509***	30.5288	-88.43996***	30.45039
DaysMarketSquared	0.1135021**	0.0549795	0.1069235*	0.0551197
HomeSqFt1000s	75844.61***	14430.35	80693.24***	15082.59
HomeSqFt1000sSquared	19566.24***	3334.341	18322.19***	3413.522
LotSizeSqFt1000s	775.064***	158.282	776.7663***	157.7561
LotSizeSqFt1000sSquared	-0.0016082***	0.0003284	-0.0016117***	0.0003273
Dummy_OneStory	35219.54***	3908.995	36668.51***	3637.064
NoGarageDummy	-33831.42***	6348.2	-33917.74***	6367.537
NoFireplaceDummy	-3234.334	2108.38	-3468.861*	2102.69
SewerDummy	1403.459	2980.947	1508.879	2981.415
Dummy_RemUpd	23266.35***	1770.686	23349.1***	1748.125
Dummy_ExtBRCK	66516.1*	34175.8	66177.54*	34398.79
Dummy_ExtOTHR	-13277.14*	7408.1	-13935.02*	7409.894
Dummy_ExtSDCE	-13698.07	14912.26	-13236.67***	14584.76
Dummy_ExtSDNG	2613.694	4762.314	2572.152***	4731.999
Dummy_ExtSDVN	-4340.487	4227.647	-4403.637***	4211.741
Dummy_ExtSHNG	2366.021	9237.231	2001.748***	9159.973
Dummy_ExtSTCO	-1073.52	1892.385	-1203.463***	1893.717
Dummy_ExtSTON	4596.878	26583.95	5357.844***	26042.71
Dummy_RfFLAT	5555.972	13064.65	5794.459***	13256.03
Dummy_RfMETL	23808.98**	10223.05	23764.47**	10369.1
Dummy_RfOTHR	27557.25*	14507.5	29439.19**	13948.02
Dummy_RfOTSA	-13497.79	18443.6	-12361.69	18250.82
Dummy_RfROCK	23609.45**	9237.428	22928.21**	9389.903
Dummy_RfSHAK	32116.08***	8363.114	32213.79***	8365.822
Dummy_RfSLAT	6203.701	10841.49	6319.358	11138.48
Dummy_RfTARG	50610.03	63078.76	52941.15	64199.06
Dummy_RfTILE	5694.989**	2745.224	5594.979**	2739.068
Dummy_RfWDSH	10175.55	14874.3	10424.36	14989.3
Dummy_StyleAFRM	-7152.341**	2966.282	-7116.789**	2974.821

Linear-Quadratic

OLS Regression	With Squared Terms		With Significant Squared Terms	
Variable	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**
Dummy_StyleCOLN	-718.3204	16754.93	-601.3533	16435.01
Dummy_StyleCOTG	3251.974	5287.592	2597.51	5303.643
Dummy_StyleMEDI	8502.705	5609.306	7856.05	5664.818
Dummy_StyleOTHR	13601.78	8848.243	13718.06	8670.895
Dummy_StyleRNCH	-5412.336***	2047.616	-5469.072***	2044.822
Dummy_StyleSPAN	-17152.82	16261.55	-18029.4	16479.6
Dummy_StyleTUDR	59124.34***	22173.22	59161.21***	22010.63
Dummy_StyleVICT	52350.97**	23707.78	52212.85**	23277.56
Dummy_CCandRs	1965.478	2503.133	1929.633	2504.585
Dummy_HrsProp	39822.26**	18246.73	39841.17**	18075.07
Dummy_SEPT	-2036.043	2218.225	-2016.157	2213.913
Dummy_OCT	421.6657	2246.859	443.1489	2251.724
Dummy_NOV	-1649.166	2310.285	-1647.392	2312.393
Dummy_Frclsr	**-52826.67*** **	4870.064	**-53260.09*** **	4862.122
Dummy_ShrtSl	**-42149.85*** **	6378.148	**-42223.22*** **	6468.825
ZipDummy95608	33371.84***	6643.617	33182.9***	6693.779
ZipDummy95610	-8221.783*	4340.625	-8219.455*	4368.296
ZipDummy95615	-50794.89**	25670.93	-49283.34*	25577.2
ZipDummy95621	-10557.9***	3686.953	-10744.33***	3675.586
ZipDummy95624	-7101.149*	4188.588	-7059.107*	4191.608
ZipDummy95626	-17644.86*	9665.689	-18780.05**	9440.829
ZipDummy95628	35661.3***	5417.901	35551.4***	5401.519
ZipDummy95630	93179.65***	4038.604	92852.94***	4049.246
ZipDummy95632	-18045.43***	4852.345	-17848.2***	4892.679
ZipDummy95638	-145029.7**	66127.31	-146007.5**	66100.84
ZipDummy95641	15668.85	25690.38	14557.4	27455.3
ZipDummy95655	-46092.99***	12057.78	-45107.39***	11807.15
ZipDummy95660	-31079.5***	4866.623	-32416.83***	4909.525
ZipDummy95662	26790.12***	4518.098	26506.09***	4495.676
ZipDummy95670	-9327.077**	3970.126	-9494.18**	3985.653
ZipDummy95673	-40277.62***	8945.55	-40953.59***	8856.726
ZipDummy95683	18347.17	14674.09	17977.57	14724.85
ZipDummy95690	47949.13	40873.19	47101.61	38683.24
ZipDummy95693	-17879.78	41437.16	-19456.09	41508.19
ZipDummy95742	-24175.93***	5968.533	-24986.26***	6010.241
ZipDummy95757	-24914.77***	5479.724	-26145.14***	5384.724
ZipDummy95811	192544.7***	27570.81	190730.7***	27825.14
ZipDummy95814	206046***	42857.68	194302.1***	50111.7
ZipDummy95815	-40210.82***	6586.73	-41312.92***	6645.232
ZipDummy95816	238555.6***	13410.53	236881.9***	13368.51
ZipDummy95817	76160.4***	10305.11	75462.61***	10331.4

Linear-Quadratic

OLS Regression	With Squared Terms		With Significant Squared Terms	
Variable	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**
ZipDummy95818	221380***	12981.9	221784.8***	12986.5
ZipDummy95819	286115.1***	15779.41	284641.2***	15847.48
ZipDummy95820	2641.51	6021.065	850.4507	6061.408
ZipDummy95821	9686.674*	5553.105	8378.886	5573.489
ZipDummy95822	10495.51	6692.644	9784.679	6679.537
ZipDummy95823	-48371.2***	3532.096	-48134.19***	3527.949
ZipDummy95824	-41298.99***	5367.872	-43041.93***	5355.471
ZipDummy95825	35328.7**	14774.53	34882.96**	14831.6
ZipDummy95826	-6735.316*	3924.3	-6064.69	3882.799
ZipDummy95827	-22760.16***	4984.56	-22624.98***	4966.553
ZipDummy95828	-37992.68***	3549.542	-37658.06***	3573.787
ZipDummy95829	-7756.93	4755.295	-7786.589	4793.124
ZipDummy95830	90014.4**	45811.15	89624.23*	46386.2
ZipDummy95831	44848.36***	6152.179	44666.4***	6136.491
ZipDummy95832	-60716.6***	5506.686	-60572.23***	5472.355
ZipDummy95833	-15593.44***	5681.672	-15377.65***	5694.805
ZipDummy95834	-22533.3***	4922.833	-22783.88***	5040.405
ZipDummy95835	-19505.24***	3722.44	-19646.01***	3736.183
ZipDummy95838	-48190.13***	4329.289	-48946.04***	4293.542
ZipDummy95841	-26650.2***	5797.735	-26300.08***	5762.044
ZipDummy95842	-27805.44***	3838.813	-27819.03***	3861.177
ZipDummy95843	-27521.36***	3237.514	-27455.84***	3247.639
ZipDummy95864	158440.8***	16655.35	157192.4***	16685.08
R-Squared	0.8261		0.8261	
Adjusted R-Squared	0.8232		-	
Number of Sig. Variables	70		77	

**** = 99% confidence, ** = 95% confidence, *= 90% confidence.*
Note: Standard errors corrected for heteroskedasticity

Table 7: Log-Lin and Log-Log Regression Results

OLS Regression	**Log-Linear**		**Log-Log**	
Variable	**Coefficient**	**Robust Standard Error**	**Coefficient**	**Robust Standard Error**
Age	0.0000268**	1.13E-05	0.0009952	0.0033278
Bedrooms	-0.021485***	0.0044996	-0.105161***	0.0274889
BathroomsFull	0.066241***	0.0071941	0.1784132***	0.0274505
BathroomsHalf	0.053153***	0.0071238	0.135571	0.0978769
HomeSqFt1000s	0.3384408***	0.0091611	0.5995852***	0.0294608
LotSizeSqFt1000s	5.31E-08	5.12E-08	0.1270935***	0.0127088
Dummy_OneStory	0.0884216***	0.0072048	0.057246***	0.013609
NoGarageDummy	-0.1432297***	0.0212088	-0.044729	0.109468
NoFireplaceDummy	-0.0401308***	0.0060103	0.0191157	0.0119468
SewerDummy	0.0029282	0.0074976	0.0224782**	0.0110199
Dummy_RemUpd	0.0664314***	0.004268	0.0475857***	0.0084541
Dummy_Frclsr	**-0.1965259*** **	0.0152564	**-0.168257*** **	0.0256726
Dummy_ShrtSl	**-0.1203961*** **	0.0183053	**-0.157028*** **	0.0271385
Dummy_CCandRs	0.0009828	0.0062038	0.0267896*	0.0138834
Dummy_HrsProp	0.2045648***	0.0327649	0.0230299	0.0434991
DaysMarket	-0.0002123***	0.0000481	-0.004544	0.0077773
Dummy_ExtBRCK	0.0629285	0.0569462	0.1303796	0.0858233
Dummy_ExtOTHR	-0.0165279	0.022589	0.0007769	0.033081
Dummy_ExtSDCE	-0.0423476	0.0711244	-0.024219	0.0175021
Dummy_ExtSDNG	-0.0035449	0.0099869	-0.032831*	0.0192448
Dummy_ExtSDVN	-0.020903	0.0148355	-0.011633	0.030762
Dummy_ExtSHNG	0.0436576*	0.0248767	0.1337607*	0.0788835
Dummy_ExtSTCO	-0.0026478	0.0046003	-0.003209	0.0087829
Dummy_ExtSTON	0.0178831	0.0793643	**0**	**(omitted)**
Dummy_RfFLAT	-0.0258978	0.0535229	0.0997071**	0.0459786
Dummy_RfMETL	0.0763793***	0.0268867	0.0056674	0.0490688
Dummy_RfOTHR	0.0523821*	0.0274125	0.053734	0.037821
Dummy_RfOTSA	-0.0146707	0.083311	0.0869117	0.0599599
Dummy_RfROCK	0.1060002***	0.0158186	**0**	**(omitted)**
Dummy_RfSHAK	0.0653313***	0.0175973	0.0417462	0.0289032
Dummy_RfSLAT	0.1088437**	0.0528342	0.1953729***	0.036297
Dummy_RfTARG	0.010336	0.0645995	0.2042709***	0.0389579
Dummy_RfTILE	0.0488405***	0.0056618	0.045455***	0.0109992
Dummy_RfWDSH	0.0271472	0.0237517	-0.006114	0.0307707
Dummy_StyleAFRM	-0.0121272	0.0088985	0.0117198	0.0133784
Dummy_StyleCOLN	0.0064786	0.0345725	0.0142905	0.0387637
Dummy_StyleCOTG	0.0077402	0.0143907	0.0081526	0.0360081
Dummy_StyleMEDI	0.0182467*	0.0105706	0.0236453	0.0175571
Dummy_StyleOTHR	0.0038482	0.0170757	0.0457796**	0.0226921
Dummy_StyleRNCH	-0.007237	0.0051956	-0.018225	0.015475

OLS Regression	Log-Linear		Log-Log	
Variable	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**
Dummy_StyleSPAN	-0.0230563	0.0306332	0.0281483	0.043776
Dummy_StyleTUDR	0.085708**	0.0357743	-0.014436	0.0535555
Dummy_StyleVICT	0.0986051**	0.0499979	0.1410123**	0.0575318
Dummy_SEPT	-0.0069429	0.0055785	-0.0104	0.0109959
Dummy_OCT	0.0028824	0.0055112	0.0000756	0.0099207
Dummy_NOV	-0.0062722	0.0056949	0.0032095	0.0103745
ZipDummy95608	0.0643684***	0.0129038	0.028253	0.0267639
ZipDummy95610	-0.0389879***	0.0113134	-0.116381***	0.0267557
ZipDummy95615	-0.3734179**	0.1646101	-0.291303***	0.0557471
ZipDummy95621	-0.0672147***	0.0097682	-0.088724***	0.0267485
ZipDummy95624	-0.0131445	0.0087643	-0.03238**	0.0160252
ZipDummy95626	-0.0914948***	0.0331149	-0.066979**	0.0261746
ZipDummy95628	0.088567***	0.0118365	0.0745157***	0.0212158
ZipDummy95630	0.2215603***	0.0085174	0.228171***	0.0157817
ZipDummy95632	-0.0553948***	0.0122974	-0.145469***	0.0304033
ZipDummy95638	0.2040708***	0.0615336	-0.120692	0.1040477
ZipDummy95641	0.0805998	0.0862713	0.0341494	0.0344227
ZipDummy95655	-0.0839151***	0.0186641	-0.158328***	0.0276398
ZipDummy95660	-0.2106509***	0.0146989	-0.174558***	0.051111
ZipDummy95662	0.0697477***	0.0115305	0.0195019	0.0233497
ZipDummy95670	-0.0589877***	0.0106637	-0.012162	0.0250198
ZipDummy95673	-0.1171735***	0.0244303	-0.240452***	0.0512809
ZipDummy95683	0.0841587***	0.0284924	0.0878339*	0.0451731
ZipDummy95690	0.1403876***	0.0940631	0.1965798***	0.0350786
ZipDummy95693	0.222679***	0.0636918	-0.121029**	0.0507036
ZipDummy95742	-0.0187839	0.0131268	-0.059694***	0.0183926
ZipDummy95757	-0.0229951**	0.0110667	-0.021346	0.0180743
ZipDummy95811	0.4604659***	0.0762415	0.5786024***	0.093854
ZipDummy95814	0.3043172	0.2184202	0	(omitted)
ZipDummy95815	-0.3499261***	0.0321352	-0.124045	0.0916408
ZipDummy95816	0.4958191***	0.0240916	0.5775568***	0.0538433
ZipDummy95817	0.1224569***	0.0342957	0.0984124	0.1366167
ZipDummy95818	0.4671704***	0.0207061	0.5938397***	0.0404559
ZipDummy95819	0.5859206***	0.017441	0.6217988***	0.055871
ZipDummy95820	-0.1343564***	0.0207125	-0.073566	0.0547535
ZipDummy95821	-0.0303387**	0.0150477	-0.057796	0.0376784
ZipDummy95822	-0.0745752***	0.0180552	-0.041419	0.0440833
ZipDummy95823	-0.2063282***	0.0105408	-0.167915***	0.0242503
ZipDummy95824	-0.2999259***	0.0163715	-0.158426***	0.0391714
ZipDummy95825	-0.0200422	0.0367335	0.255061***	0.0758905
ZipDummy95826	-0.0592192***	0.0105615	-0.037779*	0.0210761
ZipDummy95827	-0.1042508***	0.0137887	-0.083065**	0.0351791

OLS Regression	Log-Linear		Log-Log	
Variable	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**
ZipDummy95828	-0.1586993***	0.0127748	-0.122778***	0.0185502
ZipDummy95829	-0.0081953	0.011284	-0.036502*	0.0219041
ZipDummy95830	0.1571181***	0.0720758	0.2823113***	0.0490432
ZipDummy95831	0.1120806***	0.0126444	0.0750801***	0.0255974
ZipDummy95832	-0.2409495***	0.0126636	-0.185401***	0.0189044
ZipDummy95833	-0.0784858***	0.0127113	-0.038594*	0.0220056
ZipDummy95834	-0.0583877***	0.0115633	-0.02721*	0.0164838
ZipDummy95835	-0.0360234***	0.0081103	-0.01201	0.0139213
ZipDummy95838	-0.2991038***	0.0177181	-0.171897***	0.0225143
ZipDummy95841	-0.1057404***	0.0191827	-0.099776**	0.0408895
ZipDummy95842	-0.1612184***	0.0151161	-0.215567**	0.0868546
ZipDummy95843	-0.0839309***	0.0081022	-0.09109***	0.0156664
ZipDummy95864	0.2282981***	0.0250875	0.2987758***	0.0435321
R-Squared	0.8276		0.8830	
Adjusted R-Squared	0.8249		0.8739	
Number of Sig. Variables	66		54	

**** = 99% confidence, ** = 95% confidence, *= 90% confidence.*
Note: Standard errors corrected for heteroskedasticity

APPENDIX F

Statistical Test Results

Table 8: Breusch-Pagan Test for Heteroskedasticity

Breusch-Pagan Test	
chi2(95)	3215.94
Prob > chi2	0.0000

Table 9: VIF Test for Multicollinearity

Variable	***VIF***	***1/VIF***
HomeSqFt1000s	3.98	0.251224
BathroomsFull	3.33	0.300007
Dummy_RfTILE	2.24	0.446246
Bedrooms	2.2	0.454291
Dummy_OneStory	2.17	0.459806
ZipDummy95630	1.85	0.53993
ZipDummy95757	1.81	0.551194
ZipDummy95608	1.79	0.559373
ZipDummy95820	1.79	0.559744
ZipDummy95822	1.73	0.57823
ZipDummy95624	1.73	0.578401
ZipDummy95670	1.71	0.583639
ZipDummy95843	1.69	0.589971
ZipDummy95823	1.69	0.59307
BathroomsHalf	1.68	0.59359
ZipDummy95828	1.67	0.599361
ZipDummy95835	1.66	0.603973
ZipDummy95628	1.64	0.609025
Dummy_SEPT	1.58	0.63419
ZipDummy95621	1.57	0.636683
Dummy_OCT	1.56	0.642717
ZipDummy95826	1.55	0.646776
Dummy_NOV	1.54	0.650455
ZipDummy95838	1.53	0.654581
ZipDummy95610	1.52	0.659859
ZipDummy95864	1.51	0.661464
ZipDummy95662	1.51	0.661959
ZipDummy95821	1.47	0.679213
ZipDummy95660	1.47	0.681424
ZipDummy95833	1.44	0.694346
ZipDummy95829	1.44	0.694786

Variable	*VIF*	*1/VIF*
Dummy_HrsProp	1.43	0.698341
ZipDummy95842	1.42	0.702995
ZipDummy95831	1.41	0.709502
ZipDummy95818	1.4	0.715531
ZipDummy95815	1.39	0.719981
ZipDummy95817	1.38	0.724231
ZipDummy95632	1.38	0.726726
ZipDummy95819	1.36	0.736913
ZipDummy95834	1.34	0.747684
ZipDummy95816	1.33	0.754085
Dummy_ExtSTCO	1.32	0.757776
ZipDummy95693	1.32	0.758232
NoFireplaceDummy	1.31	0.760818
Dummy_StyleCOTG	1.31	0.764256
ZipDummy95742	1.3	0.767849
ZipDummy95673	1.29	0.772627
ZipDummy95824	1.29	0.776387
Dummy_StyleRNCH	1.25	0.797301
DaysMarket	1.25	0.798423
ZipDummy95827	1.24	0.80372
ZipDummy95825	1.23	0.816248
Dummy_Frclsr	1.22	0.820023
ZipDummy95832	1.18	0.848333
Dummy_ShrtSl	1.17	0.85364
Age	1.15	0.865975
Dummy_StyleVICT	1.15	0.86633
ZipDummy95638	1.15	0.869217
Dummy_RemUpd	1.15	0.870675
ZipDummy95683	1.15	0.871636
ZipDummy95841	1.15	0.872257
ZipDummy95655	1.14	0.880595
SewerDummy	1.13	0.88545
Dummy_StyTUDR	1.12	0.895706
ZipDummy95690	1.11	0.9009
Dummy_CCandRs	1.11	0.904397
NoGarageDummy	1.1	0.911045
Dummy_ExtOTHR	1.09	0.918209
Dummy_ExtSDNG	1.09	0.921091
ZipDummy95626	1.08	0.923589
Short95693	1.08	0.927548
ZipDummy95811	1.08	0.927981
Dummy_StylMEDI	1.08	0.928811
Foreclose95832	1.07	0.935727

Variable	*VIF*	*1/VIF*
ZipDummy95615	1.07	0.937348
Dummy_ExtSDVN	1.06	0.943114
Dummy_ExtBRCK	1.06	0.943327
ZipDummy95830	1.06	0.944001
Foreclose95818	1.06	0.945708
Dummy_RfSHAK	1.06	0.945712
Dummy_RfSLAT	1.06	0.946591
Dummy_RfFLAT	1.05	0.948326
Foreclose95655	1.05	0.950107
Foreclose95864	1.05	0.950638
Foreclose95843	1.05	0.951308
Foreclose95817	1.05	0.954242
Dummy_Sty~HR	1.05	0.9547
Dummy_RfOTHR	1.05	0.955205
Dummy_RfWDSH	1.04	0.958724
Foreclose95670	1.04	0.959026
Foreclose95842	1.04	0.95932
Dummy_StyleAFRM	1.04	0.96202
ZipDummy95641	1.04	0.964324
Dummy_RfMETL	1.03	0.968102
Dummy_RfOTSA	1.03	0.968563
Dummy_ExtSHNG	1.03	0.975456
Dummy_StyleCOLN	1.02	0.976755
Dummy_StyleSPAN	1.02	0.977217
Foreclose95834	1.02	0.980329
LotSizeSqFt1000s	1.02	0.98081
Foreclose95831	1.02	0.981639
ZipDummy95814	1.02	0.981699
Foreclose95829	1.02	0.981911
Dummy_RfTARG	1.02	0.983583
Dummy_ExtSDCE	1.01	0.98786
Dummy_ExtSTON	1.01	0.991065
Dummy_RfROCK	1.01	0.992573
Mean VIF	1.34	

APPENDIX G

Statistically Significant Variables

Table 10: Statistically Significant Variables from the Log-Lin Form

Variable	Coefficient*
ZipDummy95819	0.585
ZipDummy95816	0.495
ZipDummy95818	0.470
ZipDummy95811	0.460
Short95693	0.370
HomeSqFt1000s	0.338
Foreclose95831	0.263
ZipDummy95864	0.229
ZipDummy95630	0.222
Dummy_HrsProp	0.209
ZipDummy95638	0.201
ZipDummy95693	0.201
ZipDummy95830	0.155
Foreclose95842	0.146
Foreclose95843	0.138
ZipDummy95817	0.132
ZipDummy95831	0.110
Dummy_RfSLAT	0.109
Dummy_RfROCK	0.106
Dummy_StyVICT	0.099
Dummy_OneStory	0.089
ZipDummy95628	0.088
Dummy_StyTUDR	0.085
ZipDummy95683	0.083
Dummy_RfMETL	0.077
ZipDummy95662	0.070
Dummy_RemUpd	0.066
BathroomsFull	0.066
Dummy_RfSHAK	0.065
ZipDummy95608	0.064
BathroomsHalf	0.053
Dummy_RfOTHR	0.052
Dummy_RfTILE	0.049
Dummy_ExtSHNG	0.043
Dummy_StylMEDI	0.018

Variable	Coefficient*
Age	0.000
DaysMarket	-0.000
Bedrooms	-0.021
ZipDummy95757	-0.023
ZipDummy95821	-0.030
ZipDummy95835	-0.036
ZipDummy95610	-0.039
NoFireplaceDummy	-0.040
ZipDummy95632	-0.056
ZipDummy95670	-0.058
ZipDummy95834	-0.058
ZipDummy95826	-0.059
ZipDummy95621	-0.067
ZipDummy95655	-0.074
ZipDummy95822	-0.075
ZipDummy95833	-0.078
ZipDummy95843	-0.086
ZipDummy95626	-0.092
ZipDummy95827	-0.104
ZipDummy95841	-0.106
ZipDummy95673	-0.118
Dummy_ShrtSl	**-0.124**
ZipDummy95820	-0.135
NoGarageDummy	-0.145
ZipDummy95828	-0.159
ZipDummy95842	-0.164
Dummy_Frclsr	**-0.193**
ZipDummy95823	-0.206
ZipDummy95660	-0.211
ZipDummy95832	-0.242
Foreclose95655	-0.269
ZipDummy95838	-0.299
ZipDummy95824	-0.300
ZipDummy95815	-0.350
ZipDummy95615	-0.374
Foreclose95817	-0.412

**99% Confidence Level*

APPENDIX H

Literature Reviewed

Table 11: Literature Reviewed

Authors	***Focus of Research***	***Data***	***Methodology***	***Key Explanatory Variables***	***Sample Characteristics***	***Measure of Foreclosure***	***Foreclosure Discount***
Campbell, Giglio, and Pathak (2009)	Forced sales and house prices.	*Data Years:* 1987-2009 *Data Source(s):* Warren Group	*Ordinary Least Squares (OLS) Hedonic Regression; Natural log of selling price. With census tract year effects, month dummies.*	*Property characteristics; dummies for renovations, condominiums, and winsorization of characteristics.*	*Sample:* Single Family (SF), Multi-Family (MF), and Condominium sales transactions in Massachusetts. N = 1,831,393	REO properties	-0.260* 26% decrease in own-home selling price
Carroll, Clauretie, and Neill (1997)	Effect of foreclosure status on residential selling price.	*Data Years:*1990-1993 *Data Source(s):* Microscan	*Hedonic Regression; Natural log of selling price.*	*Property characteristics; Prevailing mortgage interest rate at time of sale; ZIP dummies; Dummy variables for HUD and commercial bank foreclosures.*	*Sample:* SF sales transactions in Las Vegas, NV. N=1,974	HUD Foreclosures and Bank-Owned Foreclosures	Statistically insignificant regression coefficient.
Clauretie and Daneshvary (2009)	Stigma and proxy effects of foreclosure .	*Data Years:* Nov. 2004 - Nov. 2007. *Data Source(s):* Greater Las Vegas Association of Realtors (GLVAR) Center for Business and Economic Research at University of Nevada, Las Vegas	*OLS Hedonic Regression; Natural log of house selling price; Generalized Spatial Two-stage Least Squares (GS2SLS) to correct for endogeneity of TOM and spatial autocorrelation.*	*Physical and neighborhood characteristics, TOM, property condition, occupancy status, cash/mortgage sale, foreclosure status.*	*Sample:* SF sales transactions in Las Vegas, NV. N= 9,800	Foreclosure Status	-0.105* 10.5% decrease in own-home selling price
Forgey, Rutherford, and VanBuskirk (1994)	Effect of foreclosure status on residential selling price.	*Data Year:* July 1991-Jan.1993 *Data Source(s):* Arlington MLS	*Hedonic Regression; Log-linear, sale price of house as function of quantitative and qualitative attributes.*	*Quantitative factors (number of bedrooms, baths, size, age…), Qualitative factors (neighborhood quality), Foreclosure dummy variable.*	*Sample:* SF foreclosed units in Arlington, TX. N=2,482	Foreclosure Status	-.2278* 22.78% decrease in own-home selling price

Authors	***Focus of Research***	***Data***	***Methodology***	***Key Explanatory Variables***	***Sample Characteristics***	***Measure of Foreclosure***	***Foreclosure Discount***
Ihlanfeldt and Mayock (2014)	Variance of foreclosure spillovers across neighborhood types.	*Data Years*: Jan. 1, 1999 through Nov. 31, 2011. *Data Source(s):* DataQuick transaction history database	*Natural log of selling price with neighborhood-year fixed effects and monthly fixed effects.*	*Structural variables (e.g. bedrooms and bathrooms), Indicators of distressed sale (foreclosure or short sale); active REO stock in ring k at time of sale.*	*Sample:* SF sales transactions in South Florida Metropolitan Statistical Area (MSA): Broward, Miami-Dade, and Palm Beach counties. N=627,913	Foreclosure Status and active REO stock	-0.209* 20.9% decrease in own-home selling price
Rogers (2010)	Neighborhood effects of foreclosure.	*Data Years:* 1996-2007 *Data Source(s):* St. Louis County Recorder of Deeds; St. Louis County Assessor	*Natural log of sales price with yearly dummies for time of sale. Adjustment for autocorrelation (nearest-neighbors spatial weight).*	*Structural characteristics, Spatial characteristics.*	*Sample:* SF sales transactions in St. Louis County, MO. N=98,828	Foreclosures and REO properties	-0.270* 27% decrease in own-home selling price
Springer (1996)	Single-family housing transactions: seller motivations, price, and marketing time.	*Data Year:* 1989-1993 *Data Source(s):* Arlington MLS	*Natural log of selling price; Selling price model and Time-on-the-market model.*	*Property characteristics (physical features and tenancy), Market factors (season of sale and housing price time trend), and Seller characteristics (foreclosure, vacancy, and relocation).*	*Sample:* SF sales transactions in Arlington, TX. N=2317	Foreclosure Status	-0.0373* 3.73% decrease in own-home selling price
Wassmer (2011)	External effects of residential home foreclosure.	*Data Year:* Jan. 2008 to June 2009 *Data Source(s):* Multiple Listing Service	*OLS Hedonic regression, natural log of selling price; Two-Stage Least Squares Regression (accounts for spatial autocorrelation).*	*Property, Location, Selling Environment, and Real Estate Owned Characteristics.*	*Sample:* SF home sales in the Sacramento (CA) Area. N=35,822	REO properties	-0.1574* 15.74% decrease in own-home selling price

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