THE IMPACT OF MORTGAGE FORECLOSURE ON HOUSING PRICES AND HOMEOWNERSHIP IN CHARLOTTE, NORTH CAROLINA

by

Thomas Morey Ludden

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Approved By:

____
Dr. Owen Furuseth

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Dr. Heather Smith

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Dr. Qingfang Wang

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Dr. Stephen Billings

ABSTRACT

THOMAS MOREY LUDDEN. The impact of mortgage foreclosure on housing prices and homeownership in Charlotte, North Carolina. (Under the direction DR. OWEN FURUSETH)

At the end of the last century, the U.S. housing market was volatile. The average price of housing increased by 50 percent, while the national rate of loans entering foreclosure was 0.3 percent. Across the nation, local housing markets displayed uneven gains in housing prices as foreclosure impacted neighborhoods differently. The scope and varying contexts surrounding foreclosure activity between 2003 and 2007 present an opportunity to expand the core knowledge of housing studies. What is largely absent from the current housing analysis is the geographical impact of the contemporary mortgage distress on housing prices and ownership. This research examines the impact of foreclosure on housing prices and homeownership at the neighborhood level analyzing concentration, proximity and length of foreclosure while controlling for the temporal, neighborhood and housing characteristics. The empirical analysis of the issue used local data and contextual templates from Charlotte, North Carolina.

The research findings indicate that proximity to and proportion of foreclosures in a neighborhood had the greatest negative impact on housing prices in neighborhoods with housing valued at less than $250,000. The length of foreclosure was shown to have a negative impact on housing prices in the lowest valued housing neighborhoods. The length of foreclosure also negatively impacted home ownership rates. Other findings revealed that structural, neighborhood, and distance variables influenced home ownership rates.

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CHAPTER 1: INTRODUCTION

For many American households, buying and maintaining a home is part of the American dream. Besides the intangible aspects of homeownership such as security and building a place for family, homeownership has traditionally provided the opportunity for households to build wealth. Real estate represents the largest asset for many American households. Indeed, with the increase in housing values in the past 10 years, many American households experienced a large jump in their overall wealth. On average, housing values increased almost 50 percent between 1998 and 2007 from $148,000 to $218,000 (Fernald 2008).

At the end of the last century, owning your home became a reachable goal by more American households as incentives by government, non-profit organizations and financial institutions removed economic barriers to homeownership. The Department of Housing and Urban Development and state housing programs provided funding to assist would-be homebuyers earning low and moderate incomes with down payment assistance and closing costs (Galster, Aron and Reeder 1999). Non-profit, community assistance organizations provided opportunities for many low-income households to own a home through sweat equity in lieu of a larger down payment and low interest mortgages. However, the biggest increase can be attributed to the changing loan practices by financial institutions. With the restructuring of the mortgage markets, many low and middle-income households no longer had to rely on government programs or non-profits to own a home. Mortgage companies and real estate agents provided an easy avenue to home ownership through complex loan products that offset higher borrower risks with increased costs and delayed payment options. These products were commonly referred to as subprime mortgages. While the term is descriptive, increasingly it has come to represent a negative even sinister flaw in the home financing industry.

Between 1993 and 2004, the rate of homeownership increased in the US from 63 to 69 percent of all occupied housing units (US Census, 2007). This increase, translated into nearly 6.6 million new households living in owner-occupied housing. In large part, the jump in homeownership was linked to the combination of federal homeownership initiatives and innovative, but risky mortgage and financing schemes.

During this same period, housing prices were accelerating at a rapid pace. Consider, that between 1975 and 2000 existing home sale prices grew one percent annually. Adjusted for inflation, sales prices moved from $124,000 to $148,000. But, between 2000 and 2006, the annual sales price of existing homes grew from $148,000 to $218,000 or an annual six percent increase adjusted for inflation (Fernald 2008).

Beyond the individual economic benefits to home owners, higher rates of homeownership were valued by community leaders and local government leaders for the positive impacts on neighborhoods, including social-family, crime, and economic improvements. While rising housing values and homeownership have provided multiple benefits to lower and middle-income households and the communities in which they reside, the collapse of the subprime mortgage market during the past decade has erased much of the improvement (Barth et al. 2009).

Metropolitan Scale Difference in Housing Value Change

Since 2001, housing values across the United States have varied widely. The change in housing prices has differed across different regions as well as metropolitan areas. In the Southeast, housing price increases have been fueled by the population growth experienced by the region over the past 30 years. The Southwest also experienced similar growth pressures which have resulted in a boom in housing production.

The housing industry has been especially robust in the metropolitan areas of the Sunbelt. However, the growth in housing in these metro areas also resulted in local real estate bubbles. With the increase in housing prices, investors within and outside metro areas invested heavily, spurring excessive demand that outpaced the supply of the local construction industry. Prices rose dramatically. But as phantom demand subsided, the overheated construction/real estate industry imploded. By the end of 2008, oversupply, a contracted credit market, and investor retreat led to sharp drops ("the bubble burst") in Sunbelt housing markets.

Table 1 presents a 20 city single-family housing price change metric (Case-Shiller Index) produced by Fiserv, a privately held financial services firm, and published by Standard and Poor's (S&P). The tool is widely used in the financial industry for trend information in futures trading. The monthly generated index is based on repeat sales data of existing homes to show the year over year change in housing prices. The methodology for this index was developed by Karl Case and Bob Shiller in the 1980's while researching the Boston housing market and is widely referred to by their names. The

Table 1: Year over Year Housing Price Change, December 2010-2011

City	Year-over-year change
Chicago	-6%
Tampa	-4%
Charlotte	-4%
Portland, Ore.	-4%
Las Vegas	-3%
Atlanta	-3%
Detroit	-3%
Miami	-3%
Seattle	-3%
Dallas	-3%
Phoenix	-2%
Cleveland	-2%
Denver	-2%
Minneapolis	-1%
New York	+0%
Boston	+0%
U.S. 20-city index	**+1%**
Los Angeles	+4%
Washington, D.C.	+4%
San Diego	+5%
San Francisco	+6%

Source: New York Times, SP/Case Shiller

information provides a useful tool to track housing price trends over time and offers a real time snapshot of local housing markets (Benner 2009).

Between December 2010 and December 2011[1], the 20 city average experienced a slight 0.6 percent increase in housing values. Among the weakest metro markets, Chicago led the list with a 6 percent decline. In the top five, Charlotte has lost 4 percent over the past year along with Portland, Oregon and Tampa. Other metro areas in the top ten in housing price declines included Atlanta with a 3 percent decline. Although Charlotte and Atlanta did not experience an overinflated real estate market, they have been affected by the national downward trend in housing values. Their economies were linked to the service and financial sectors which have been high growth areas in the New South over the past 20 years. During the current economic recession and accompanying restructuring of the financial sector, however, they have experienced unprecedented economic challenges.

Two other metros with 3 percent declines were Las Vegas and Miami. They were the largest real estate markets in states that were frequently highlighted in the popular media as suffering the largest drops in housing, Nevada and Florida. Detroit was also a city in the top ten decline. In the case of this Michigan city, it has been particularly hard hit by the recession, shedding a large proportion of its manufacturing jobs, and depressing the local housing market.

At the other end of the scale were cities where the housing market has continued to enjoy sustained values. The California housing markets such as San Francisco, San

[1] The December 2010 S&P/Case Shiller index data was accessed from the nytimes.com website in February 2011 when this section was compiled and written. The data is released every month with a two month lag time for data collection.

Diego, and Los Angeles were appreciating. Although these areas have some of the highest priced housing markets in the nation, these markets were not subject to artificial demand as in some Sunbelt and Southwest cities. The Washington, D.C. metro area has also improved recently as single-family housing demand has begun to outpace supply (Theologis 2010).

Denver and Dallas have also had housing price declines, but were not linked with large appreciating housing markets. The economies of these two cities were originally linked with the oil and gas economy and have recently diversified their economies and have managed to maintain viable housing markets. However, in the past both cities' housing markets have been impacted by the volatility in the energy sector.

A longer trend in the housing market in the United States is illustrated in Figure 1. The figure displays year over year change in the housing prices beginning in 2001. The data distribution offers a dramatic portrayal of the collapse in housing values across the American housing market. For the first five years of the decade, housing prices climbed an average 10 percent annually. These increases were maintained until the beginning of 2006. But, by the start of 2007, the price hikes changed to drops. The declines increased through 2008 and only began to level off in 2009. The overall prices increased during 2010.

The Case Shiller trend findings correlated with the overall tightening of the financial markets as the national foreclosure crisis grew. In the process, lending practices were scrutinized, credit rules squeezed, and those borrowers who were fueling the higher housing prices could no longer qualify for the larger loans. Essentially, the housing bubble began to deflate in 2006, and only started to rebound in late 2009.

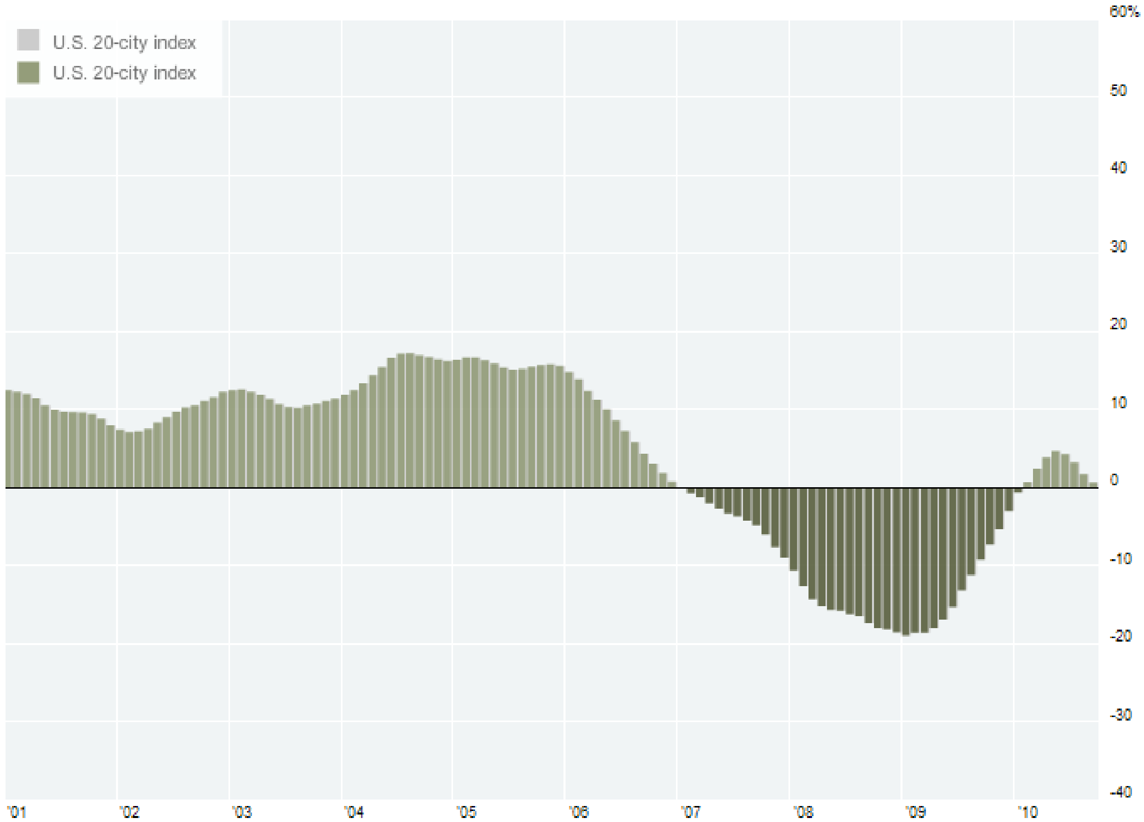

Figure 1, U.S. 20-city Index Sources: S&P/Case-Shiller; NYTimes.com

A review of city-level housing markets for this period show the range of the housing bubble affects. The rise in housing prices in Phoenix, Las Vegas and Miami (Figures 2, 3, and 4) between 2001 and 2007 were remarkable. Annual price jumps often exceeded 20 percent. The underlying drivers of this inflation were high rates of population expansion, as well as, speculative investors. When the bubble burst, all three cities experienced price declines that have also exceeded the US average from 2007 through 2009.

Figures 5 and 6 offer parallel data for Denver and Dallas, but illustrate a different pattern. The housing price growth in these cities was less dramatic and tended to be lower than the US average. Ultimately, the price drop experiences in Denver and Dallas were less than those experienced elsewhere. Differences between local economies, growth

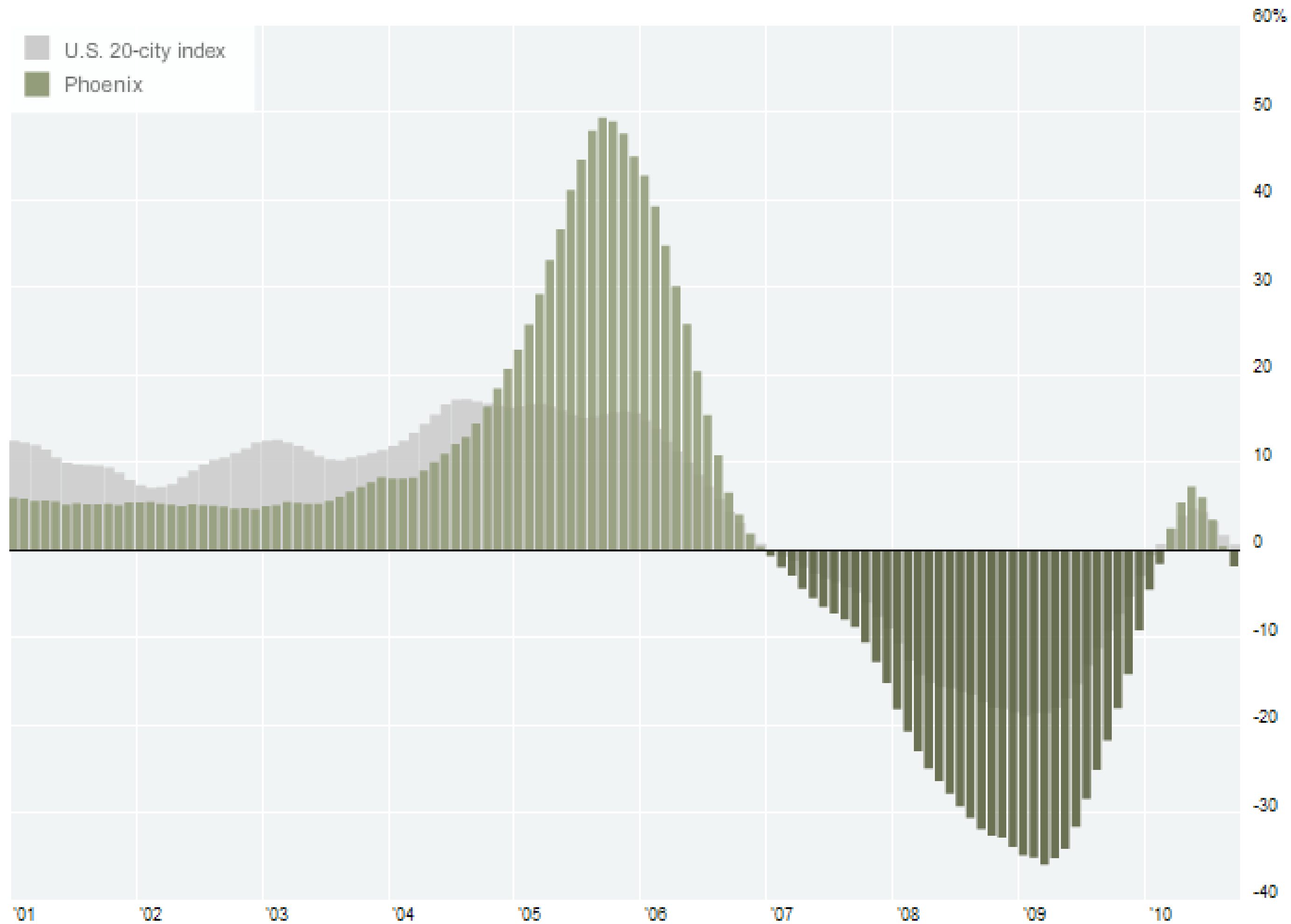

Figure 2. Phoenix, AZ Housing Price Change, 2001-2010 Source: S&P/Case Shiller; NYtimes.com

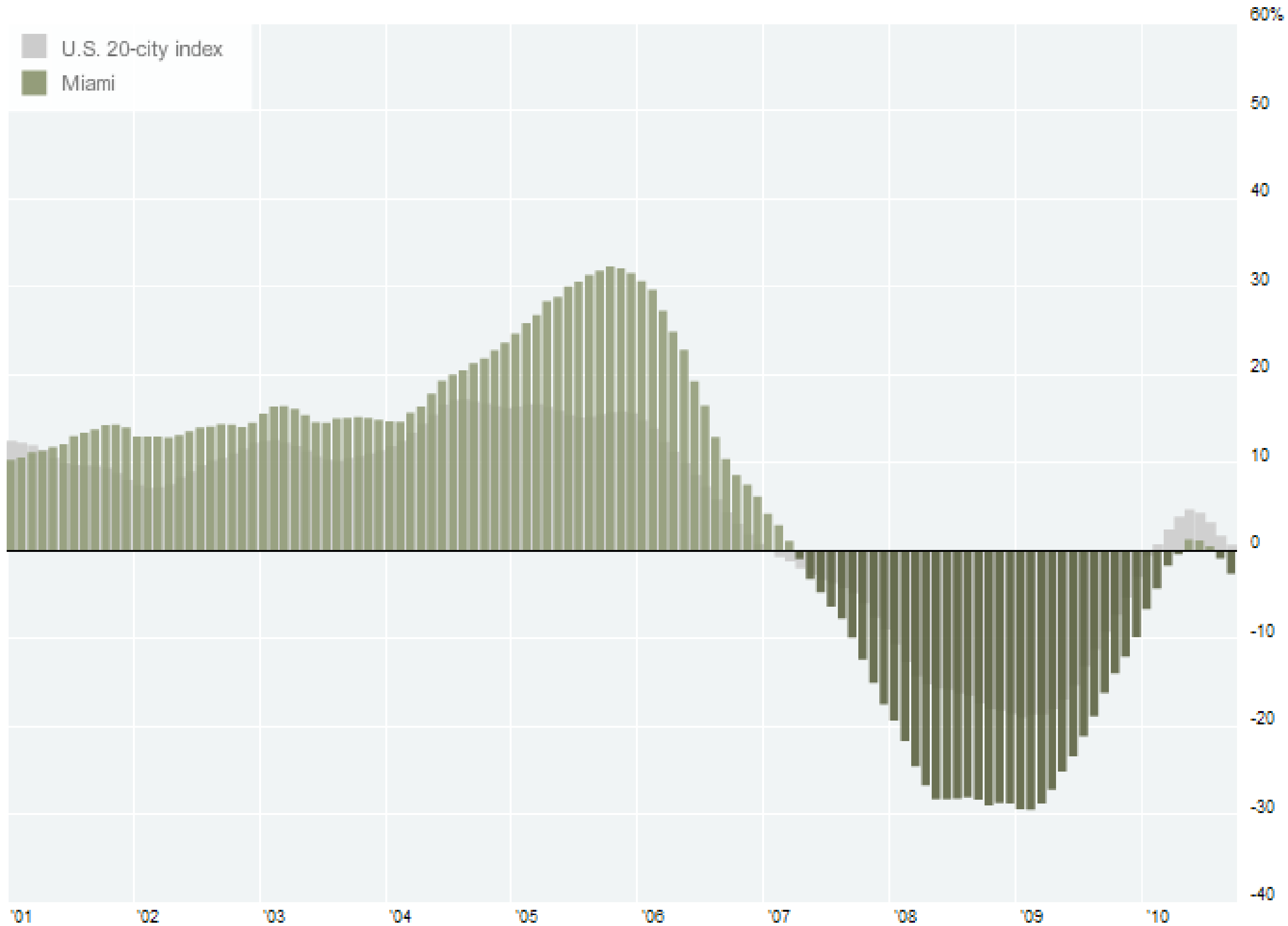

Figure 3. Miami, FL Housing Price Change, 2001-2010 Source: S&P/Case Shiller; NYtimes.com

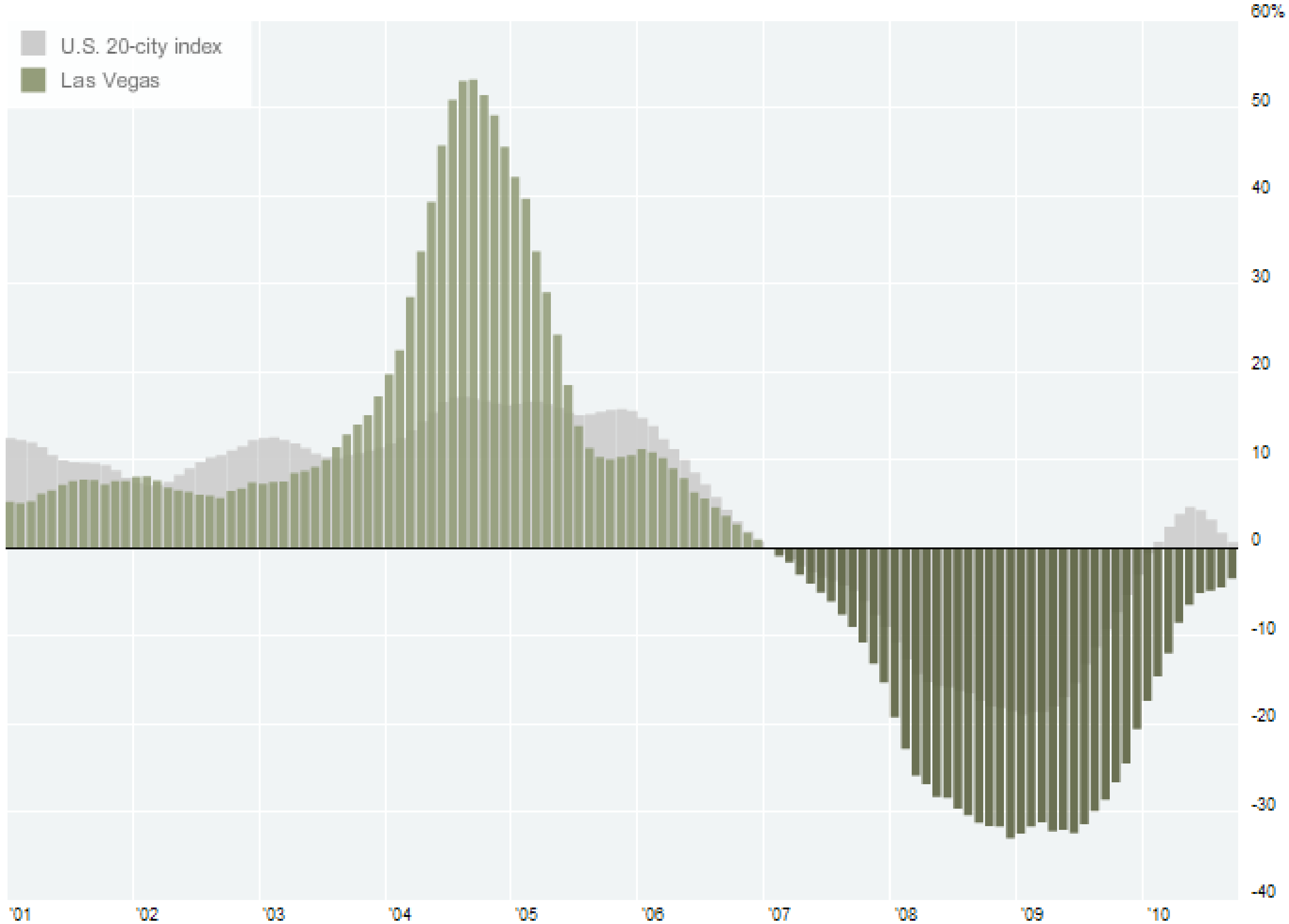

Figure 4. Las Vegas, NV Housing Price Change, 2001-2010 Source: S&P/Case Shiller; NYtimes.com

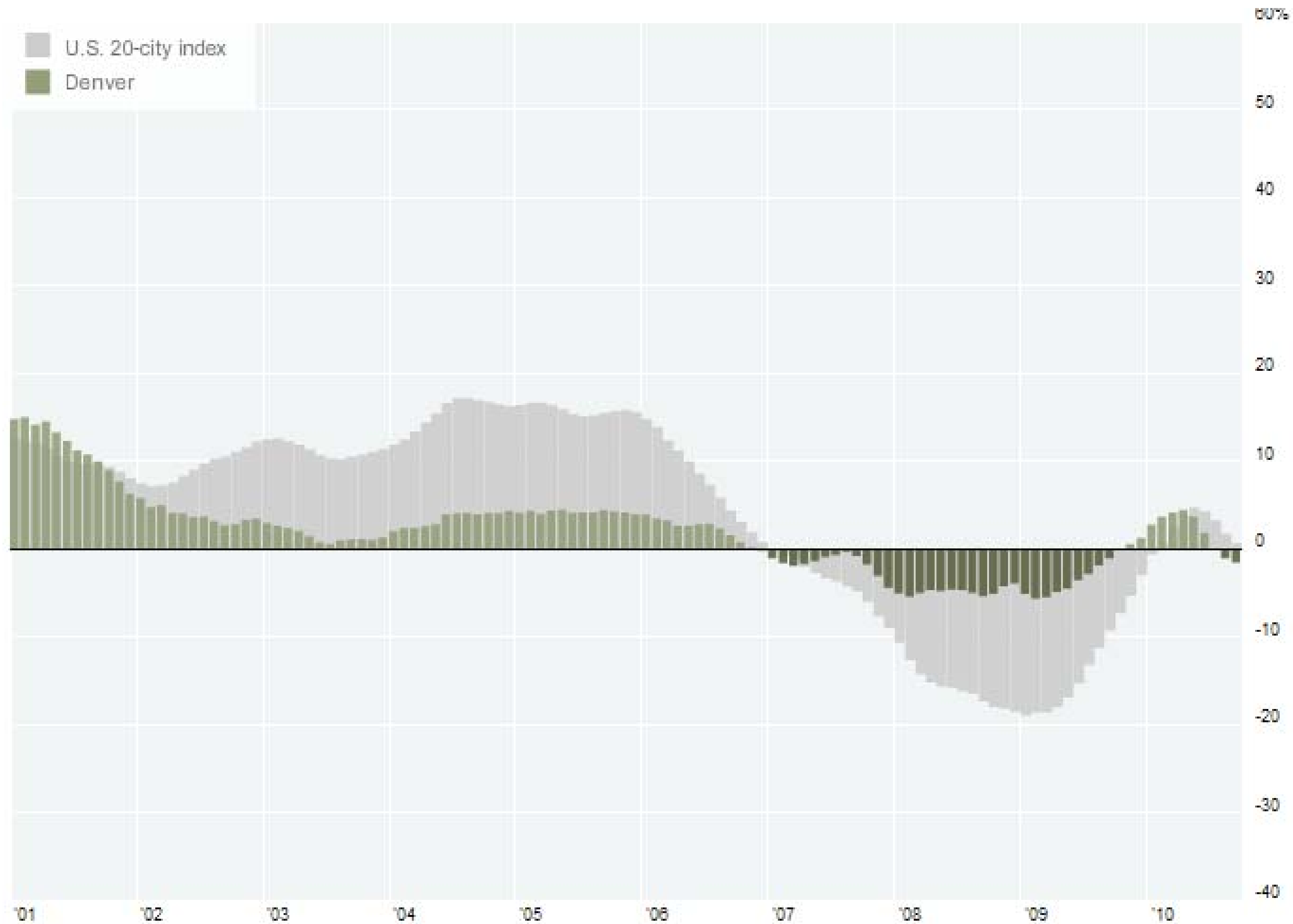

Figure 5. Denver, CO Housing Price Change, 2001-2010 Source: S&P/Case Shiller; NYtimes.com

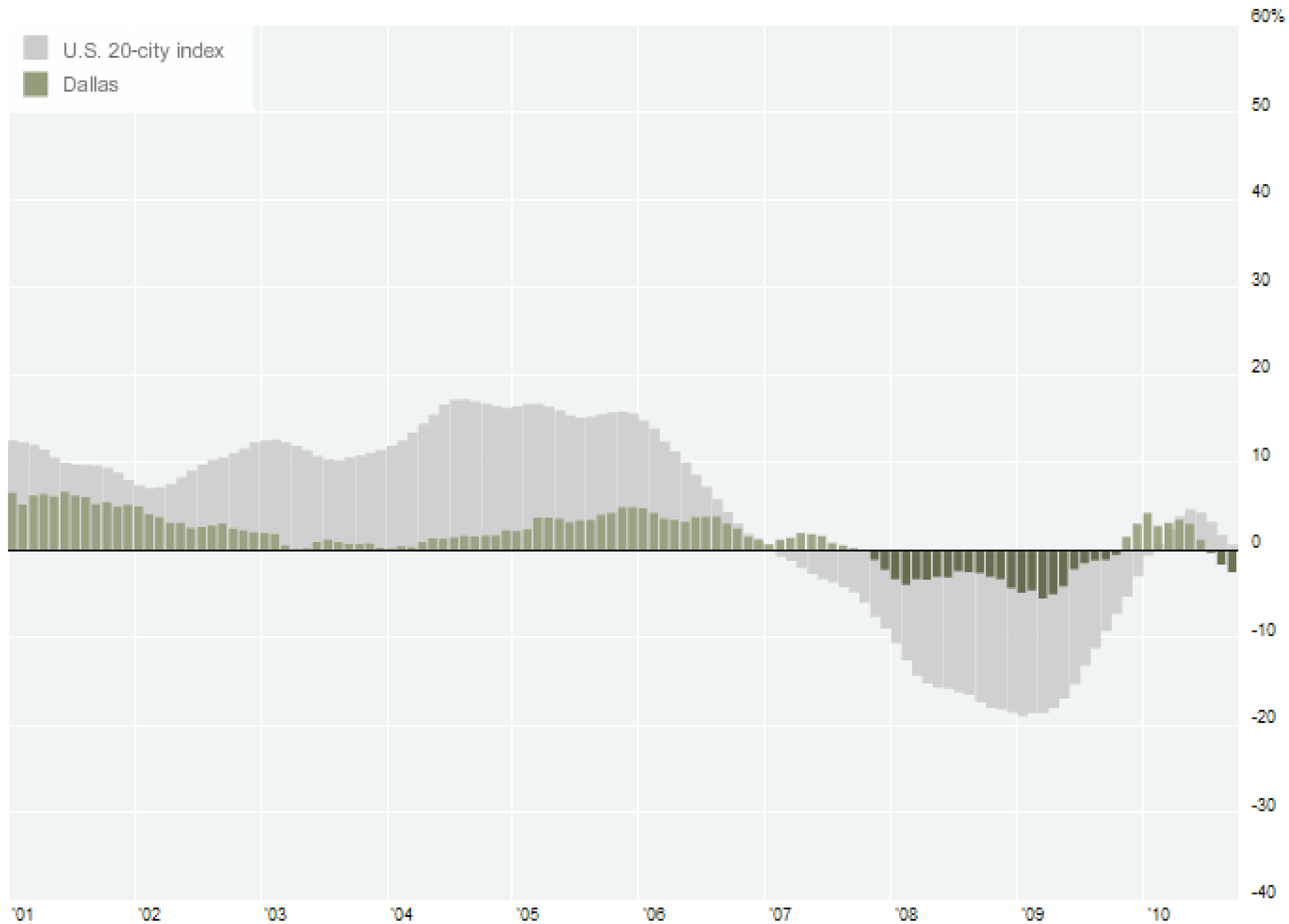

Figure 6. Dallas, TX Housing Price Change, 2001-2010 Source: S&P/Case Shiller; NYtimes.com

patterns, and housing construction industry offer insights into the differential. The economy in Texas and Colorado follows different cycles. They were originally centered on oil, natural gas, and agriculture, but have since diversified. The economies now include more service sector industries such as finance, education, and healthcare. These metro areas also have experienced lowered unemployment compared to the national average since the downturn of the economy in 2008 (Bureau of Labor Statistics, 2010).

Finally, Atlanta and Charlotte were similar Sunbelt cities (Figures 7 and 8). Both have experienced sustained population growth. However, the two cities did not experience the hyper growth in housing prices as Florida, Arizona, and Nevada. The development in these two cities was driven more on internal demand rather than external speculative investment. Atlanta and Charlotte experienced modest growth in housing prices, more in line with Denver and Dallas. Likewise, their housing price drops were not as great in these over-inflated housing markets. But, they had larger prices drops than Denver and Dallas. The price drops in these cities also occurred later than the rest of the country. Atlanta did not register any year of year price drops until the end of 2007 and Charlotte did not show any decline until the beginning of 2007. One potential explanation was that their diverse service economies experienced the economic slowdown much later than other Sunbelt metros where housing speculation and construction sectors had a larger impact.

Foreclosure

In 2000, the US Census (2000) reported that there were approximately 70 million owner-occupied housing units in the United States. Roughly, 70 percent had some type of mortgage financing, or about 49 million units. Nationwide, approximately 150,000

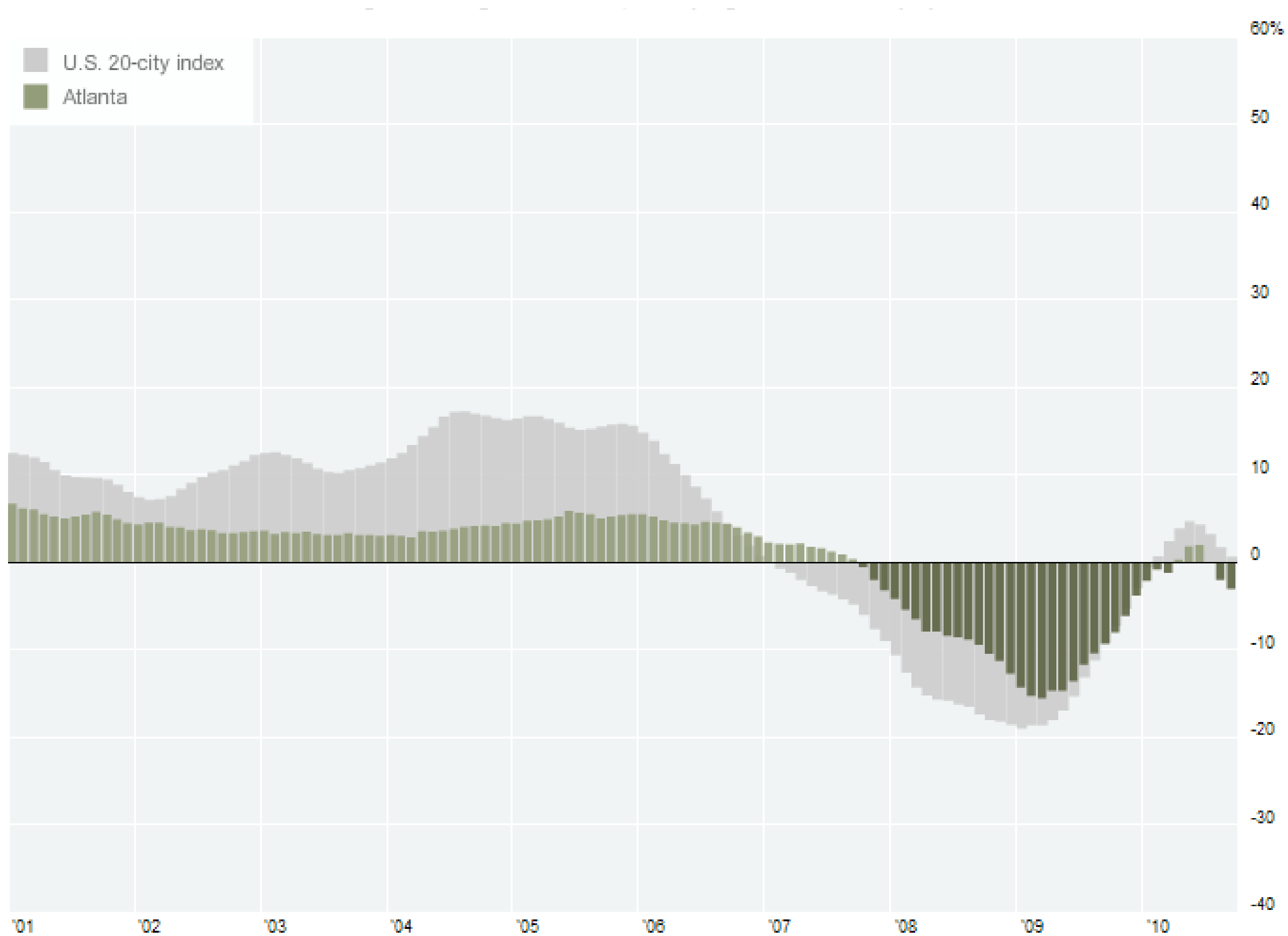

Figure 7. Atlanta, GA Housing Price Change, 2001-2010 Source: S&P/Case Shiller; NYtimes.com

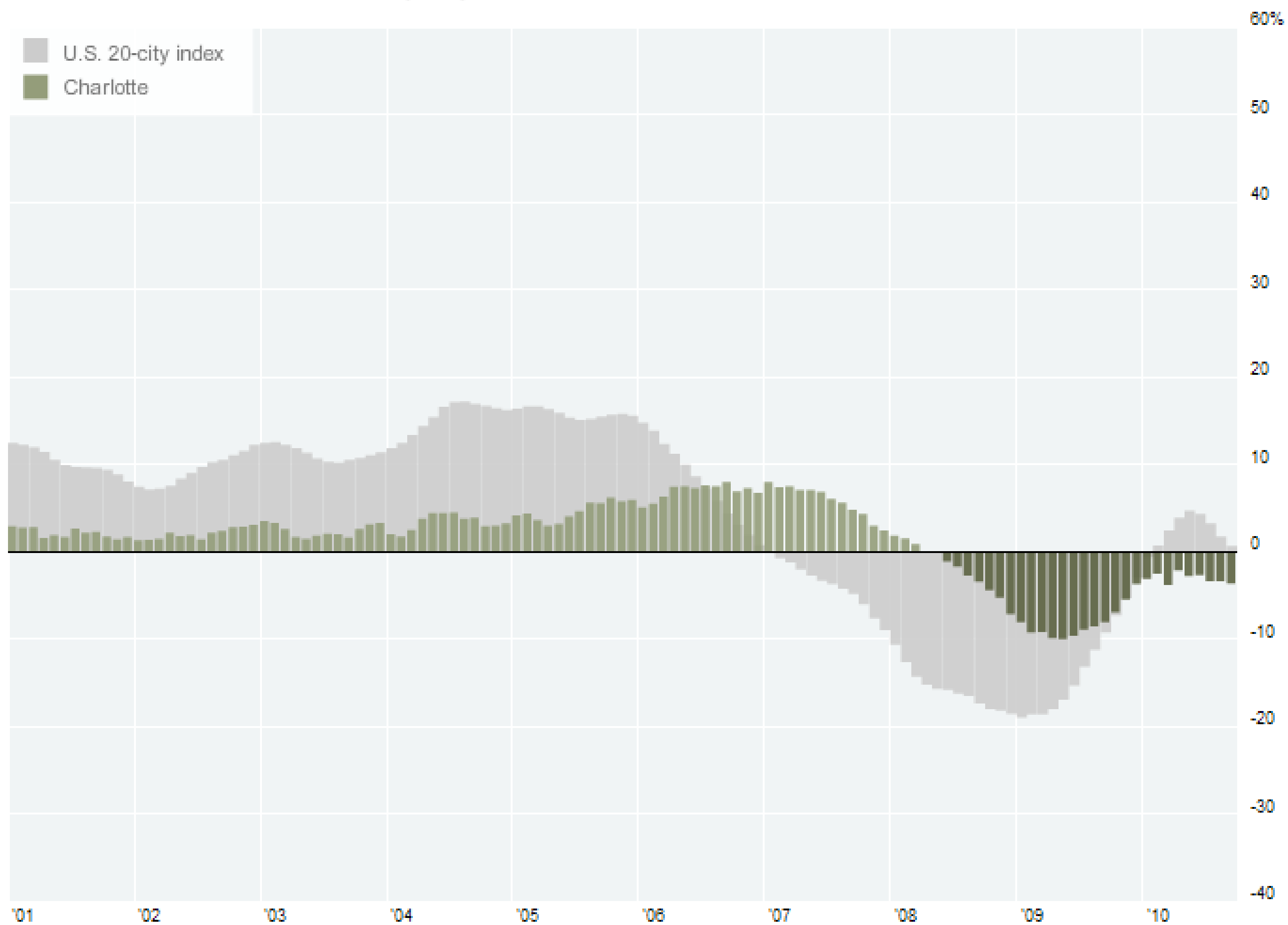

Figure 8. Charlotte, NC Housing Price Change, 2001-2010 Source: S&P/Case Shiller; NYtimes.com

mortgaged properties were entering foreclosure in 2000. Between 2000 and 2006, the rate of loans entering foreclosure remained around 0.3 percent, but other troubling changes in the housing market began to unfold. By 2007, the national average price of existing housing dropped from the previous year. In August 2006, for example, the average price of new housing in was $317,000. However, only three years later it had declined to $257,000 (US Census, 2010).

With the drop in housing values, the number of homeowners with mortgages that exceeded the market value grew rapidly. These properties were labeled "underwater." In real world terms, this means that a homeowner would lose money if she/he needs to sell the property. Beyond the collapse in real estate values, the development and marketing of new exotic mortgage products contributed to the rise in foreclosures. Alternative mortgage products, especially interest-only loans were especially destructive in contributing to weakening real estate markets. With this type of mortgage, borrowers only paid interest on the principal balance during the early years of the loan period. The underlying attractiveness of these mortgages was predicated on a growing home equity and robust economic conditions that would allow loan holders to offer higher premiums as the mortgage matured. Ultimately, however, the combination of rising mortgage payments and dropping housing prices at the beginning of the century resulted in a national cascade of households defaulting on their mortgages and losing their homes to foreclosure. By 2007, the number of foreclosures increased dramatically, reaching approximately 1.1 percent of all single family, condominium or townhomes units or about 1,000,000 housing units.

Although the reasons for home foreclosures were complex, there were clear regional differences in the severity of foreclosures across the U.S. As seen in Figure 9, higher rates of foreclosure filings occurred in the West, Florida, and the Midwest. Lower rates of foreclosure filings occurred in the Great Plains as well in the Appalachian and New England regions. Fundamentally, the geographical variations were heavily affected by regional economic differences, the interstate and international of investment capital, and the degree of speculative development.

While the collapse of regional or statewide mortgage home mortgage markets inflicted significant costs, the impact of mortgage foreclosure was most visible and impactful at a smaller geographical scale. Local governments have faced declining tax revenues, increased housing code compliance costs and police, fire and other service costs due to vacant structures. But, the most direct affects were perhaps at the neighborhood scale. Stories in the news media suggested that neighborhoods were differentially affected. Anecdotally, in lower income neighborhoods the loss of owner-occupied households and drop in property values seemed to be more debilitating than the impacts in higher income neighborhoods. In turn, the structural effects of foreclosure appear to have translated into differences in neighborhood quality of life. Indeed, these questions around the localized impact of housing foreclosure were key to the research in this dissertation.

Within the neighborhood or subdivision once a mortgage foreclosure occurred, the householder was removed from the property. While the loss of home was likely traumatic for the individual, the house was a durable good and continues to exist. In an environment where housing values were declining and foreclosures were increasing, the

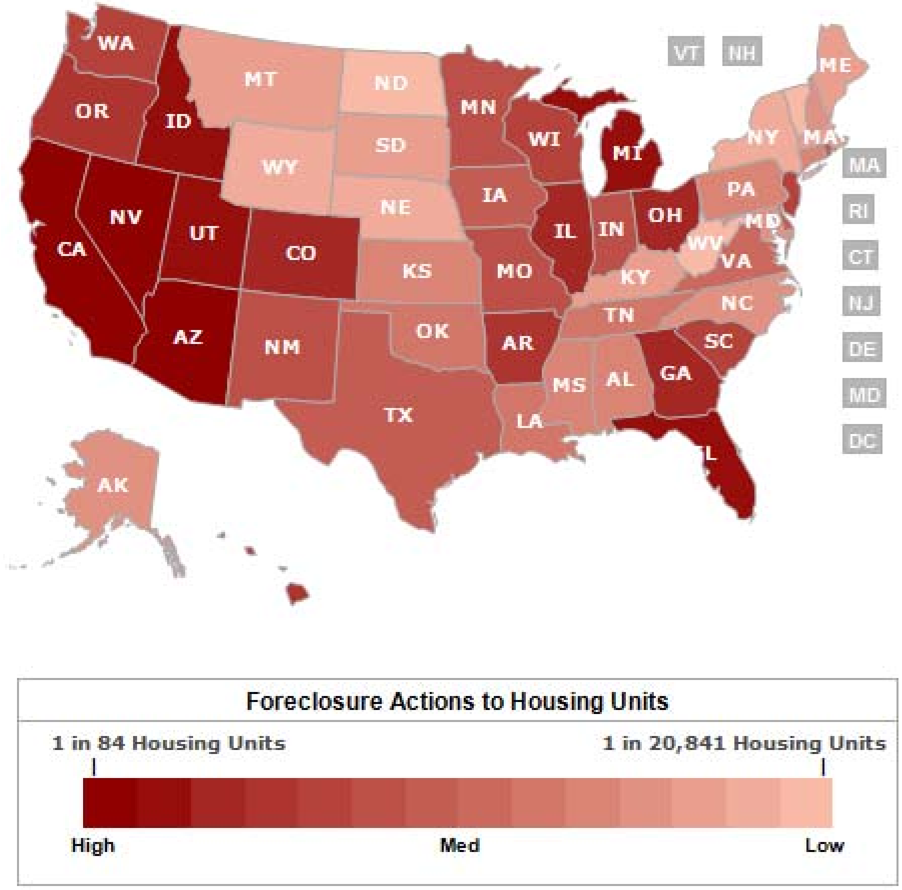

Figure 9. Foreclosures by State, 2010 Source: RealtyTrac.com, 2010

negative externality impacts of the surrounding neighborhood were likely significant. How does the number and concentration of foreclosed properties impact home prices? And, at what level can a neighborhood sustain an emptying of homes or a churning of occupants? This research project examined these questions.

The scope and varying contexts surrounding recent mortgage foreclosure activity presented an opportunity to expand the core knowledge of housing studies. Previous housing research focused on the affects of homeownership rates on neighborhood conditions (Galster 1981, Galster et al. 1999, Grover 2006, Mackin 1997, Rohe, Van Zandt and McCarthy 2002). The preponderance of the literature found that higher levels of homeownership enhance neighborhood quality of life measures including economic, social, crime, and physical conditions. At the core, the higher levels of owner occupied residences make a neighborhood more attractive.

The current collapse of the US housing market was unprecedented and largely unstudied. A review of the existing literature offered analyses of housing foreclosure at a regional or citywide scale. Little attention had been given to the impacts of mortgage foreclosure at a neighborhood level. This research project examined the impact of foreclosure on neighborhood single family properties. What were the impacts of vacant single family foreclosed properties on homeownership and the value of surrounding real estate? Were the accounts in the popular media that foreclosures devastate the economic and social fabric of the neighboring homeowners accurate or hyperbole? This research used primary data from Charlotte, North Carolina to examine these questions. Because this analysis was empirical, my findings were limited to one community. Nonetheless, this research did offer insights to the geography and urban studies research. In particular, it provided analyses into the effects of home foreclosure at a detailed scale not available in other studies. Moreover, the Charlotte study area provided a Sunbelt setting where a robust suburban housing market has been impacted differentially by housing market value.

CHAPTER 2: US HOUSING COLLAPSE: CONTEXTUAL AND POLICY FRAMEWORK

During the 1990's, the US financial markets began to evolve in ways that radically changed the way US housing was financed; and that may ultimately have contributed to the housing market bust and financial market meltdown of 2008. This section will provide a brief overview of the types of mortgages used to finance home purchases. The mortgage background offers the basis for explaining the expanded opportunities of subprime lending and the rise in mortgage foreclosure and fraud. The impacts of these phenomena will be discussed in the overall collapse of the US housing market.

Traditional approaches to assisting low and middle-income home builders were structured around providing down payment assistance and low-interest loans to low-income households. Participants were usually required to attend classes and training sessions to prepare them for homeownership (Van Zandt and Rohe 2006). Among the most progressive strategies for helping low-income families acquire homes was Habitat for Humanity. The Habitat model offered standard assistance, but also required the commitment of sweat equity from participants. By contributing time to help build other people's time as well as their own, participants can build credit towards the down payment for their own home.

During the 1990's, the federal government pursued a housing policy to increase the national homeownership rate. One critical tool in this goal was partnering with commercial banks to expand the opportunity for homeownership to lower wealth households that did not qualify for traditional mortgages. Figure 10 illustrates the different types of mortgages available to the consumer public.

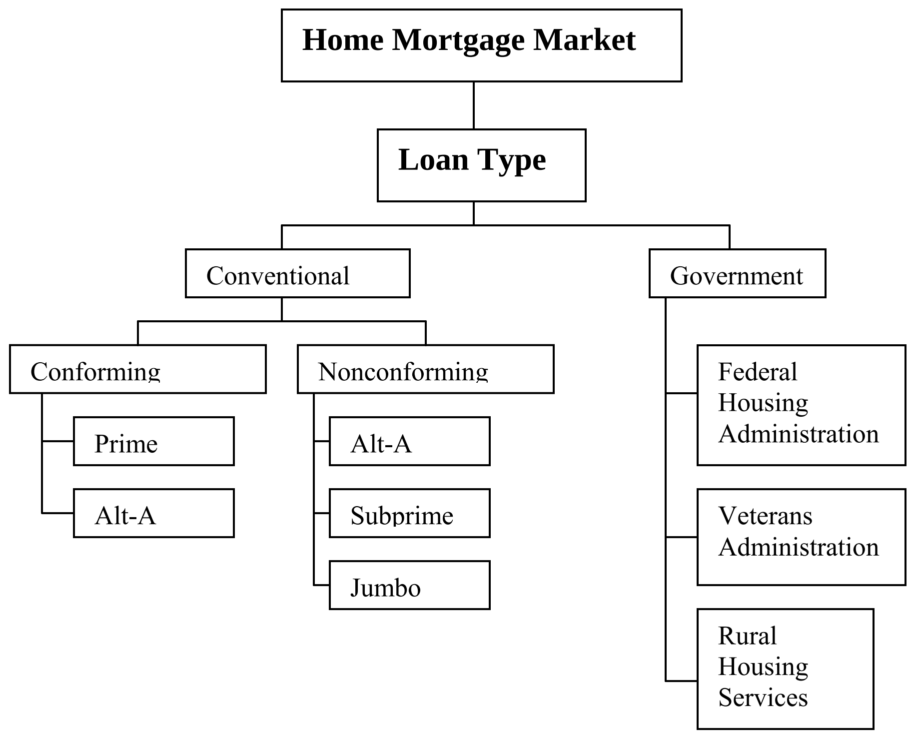

Figure 10. Type of Loans Available in the Mortgage Source: Barth

Mortgages were divided into two categories: Conventional and Government. Government backed loans from the Federal Housing Administration (FHA) and the Veterans Administration (VA) offer more stringent financial requirements and documentation in order to conform to government regulations. These agencies directly granted the loans and also guaranteed them. Conventional mortgages were broken into two categories: conforming and nonconforming. Conforming loans lent by commercial institutions had the same requirements of government loans so the Federal National Mortgage Association (Fannie Mae) or the Federal Home Loan Mortgage Corporation (Freddie Mac) purchased the mortgages. This process freed up capital for commercial lending institutions to originate more mortgages. Nonconforming loans were sold off to other commercial institutions or kept in their own portfolios.

Both conforming and nonconforming loans had variants according to the credit worthiness of the borrower. Typically, conforming loans were classified as prime included households with unblemished credit records, or Alt-A loans with households with no credit history or undocumented income. Nonconforming loans included borrowers who had a good credit record, but needed a jumbo loan, that is, a loan that exceeded the maximum amounts that Fannie Mae and Freddie Mac would purchase. The remaining borrowers encompassed either subprime or Alt-A categories and fell outside the requirements of conforming loans. In addition, all loan types, either conforming or nonconforming had fixed or variable rate interest. Fixed rate mortgages were based on interest rates that do not change, while variable rate mortgages changed dependent on a prevailing interest index. The nonconforming loans will be discussed in more detail as they relate to mortgage foreclosure.

Prior to the 21st century, there had been local housing booms that resulted in spectacular gains in housing prices. But generally the housing bubble would burst and prices would fall back to more reasonable levels. In the midst of these housing busts, new homeowners and speculators ended up owning properties that were potentially worth less than their mortgage. Nonetheless, the price declines did not usually exceed 10 to 15 percent of the total housing values. In growing and robust real estate markets, housing busts were temporary and owners would soon show evidence of having positive equity in their homes. Most critically, foreclosure was usually not a consequence of a local housing bust. Most homeowners had fixed rate mortgages and were still able to meet their financial obligations (Immergluck 2008).

Mortgage Foreclosure

In current reporting on housing markets, the terms mortgage defaults and foreclosure were commonly used as interchanging descriptions. There was, however, a major difference between the terms. A mortgage default simply means multiple missed mortgage payments according to the terms of the loan. This resulted in the lender seeking repayment of the entire loan by selling the house at auction. There were many avenues the owner could take to prevent the house from being sold at auction. The most common was to declare bankruptcy, which did not change the terms of the mortgage, but provided the opportunity for the owner to restructure their debts in order to fulfill their mortgage obligations. However, if no preventative actions were taken, foreclosure occurred once the property was sold to someone else or the lender took possession of the property if the bid price was not high enough (Taylor 2010).

As housing prices dropped across the country, many foreclosure auctions ended with the lender taking possession of the property. Increasingly, the mortgages exceeded the current value of the house and the bid prices were lower than the current mortgages on the house. Once the bank took possession of the house in a foreclosure process, the owners were required to vacate, and the house was usually sold at auction or through a real estate agent. In most cases, these mortgages were either backed by private mortgage insurance (PMI), or there was sufficient equity in the house that the resale of the house covered the costs of the mortgage and transaction costs (Seidenberg 2008). Following the closing of the home after an auction or when the lender had taken possession of the house, the property was then considered foreclosed.

Subprime Lending

As the financial requirements for homeownership loosened in the 1990's and 2000s, a larger pool of new home purchasers qualified for new mortgage products. These high risk mortgages, requiring much lower or no down-payments, were labeled as subprime mortgages. The terminology was derived from the mortgage interest rate that was not based on the prime interest rates used most often for the basis for most mortgage rates. Rather, the interest rates were higher to account for lower credit scores, the low or no down-payment, and increased risks of the borrower. While providing higher interest loans to lower income households sounds predatory, these loans provided easier access for many households denied access to homeownership in the past (Crossney 2010). In turn, households who were able to purchase modest homes at fixed subprime rates were more likely to enjoy the benefits of homeownership and increase their overall wealth (Agarwal et al. 2007).

Between 1993 and 2003, the number of subprime loans across the US ranged between 2 and 8 percent of mortgage originations. However, the proportion increased substantially since 2003, and by 2006 exceeded 18 percent of the mortgage originations. Indeed, setting the stage for future problems (Fernald 2008). In contrast, by 2008, the proportion of subprime loans had contracted to 1 percent of originations (Barth et al. 2009).

In particular, subprime loans structured around variable rates proved to be most problematic for the homeowner. Variable interest loans were based on the prime interest rate that changed monthly. Typically, at the start of the loan period, the interest rate was lower than fixed rate mortgages. The lower costs of variable interest mortgages were attractive to home buyers with budget constraints. In an environment where housing values were climbing and overall economic conditions were robust, variable rate mortgages were manageable and enhanced homeownership opportunities. But with housing market downturns, variable rates mortgages proved to be a problem for some subprime mortgage holders who were unable to keep up with their rising interest payments. In general, before 2002, the number of defaults under these programs did not prove to be a problem for the housing and financial markets as the foreclosed housing stock was quickly absorbed by other investors. However, as lending practices began to tighten after 2007 and foreclosures began to increase faster rate than they could be absorbed (Gerardi, Shapiro and Willen 2007). The supply of housing for sale including those already foreclosed quickly exceeded the demand for housing and housing prices dropped accordingly.

Exotic Mortgages

During the early years of the 21st century, increasingly complex and market oriented housing finance products were developed. The new brand of mortgages was commonly called exotic mortgages. They were especially successful in high cost housing markets. For example, in the Northeast and the West where median housing prices topped $500,000 and purchaser incomes requirements exceeded $100,000, mortgage providers marketed “teaser rates” for subprime and other mortgages. The term teaser rates or hybrid loans referred to mortgage rate schedules that were artificially low for the first one to three years of the mortgage so as to make the mortgage payments affordable (Barth et al. 2009). Exotic mortgages were critical to maintaining robust real estate markets in communities with high demand and rapidly appreciating home prices. The buyers and lenders assumed that rising home equity would allow homeowners to refinance before the teaser rates expired. As the real estate bubble began to collapse, home owners could not refinance and the teaser rates expired. Too often, mortgage payments increased substantially and foreclosure followed (Barth et al. 2009).

Another type of exotic mortgage product, Alt-A loans, were introduced during this time. These were a bit different than subprime mortgages, as the interest rates were based on the prime interest rates, but the terms of the loan were structured differently. One type of Alt-A mortgage is an interest-only loan. The borrower was required to pay only the interest on the loan. Interest-only loans enabled borrowers to enter more expensive markets without paying both interest and principal on the mortgage. There were significant advantages and risks to this product. For homebuyers who were likely to sell their house within five years, they were able to capture the tax benefits of owning a home. They would realize gains in housing prices without having to pay extra to towards the principal of the loan. For those who wanted to stay longer in their homes, there was a need to refinance their existing home into a new mortgage after five years or pay reset mortgage payment to recoup the missing principal payments. The underlying assumption for this group of mortgages was that escalating and growing equity of housing values would permit favorable terms on the loans (Immergluck 2008).

Another exotic mortgage category is the variable mortgage payment option. This product allowed borrowers to pay less than the interest payment on mortgages, while increasing the principal. The no documentation loan was another product. Under this arrangement, buyers with variable income could obtain mortgages without having to prove their income sources. Borrowers simply had to state what their income was on the application in order to qualify for the mortgage (Barth et al. 2009).

Finally, the no down payment mortgage was widely marketed. This product was most prevalent with new housing. At first glance, this type of mortgage seemed to offer seller financing to homebuyers without putting money down. In real terms, however, sellers provided the down payment, but “reimbursed” in higher costs to the buyer at closing. Once the real costs to buyers were factored into expenses, the no down payment option adversely impacted home buyers future attachment to the house. Since the homeowner has no financial stake in the house, the homeowner viewed the house as an investment in economic terms rather as home for the purposes of maintaining a stable environment for the household.

The no down payment mortgage was popular and especially attractive to first time home buyers, with lower incomes. These real estate buyers were heavily invested in ‘starter subdivisions’, mass produced lower cost single family residential tracts. The Windy Ridge development in Charlotte drew national attention as prototypic of this type of mortgage collapse and resultant impacts (Geller 2011). Thus, the impacts of this product were magnified during the housing bubble. Indeed, as the values of low cost homes dropped or home buyers could not afford their payments, home owners abandoned their mortgages without losing large sums of money. In fact, media reports indicated that as mortgage expenses increased and housing prices dropped, many homeowners owed more than their house was worth. Subsequently, the homeowner would walk away from a purchase, and rent a similar home in another neighborhood (Lowenstein 2010).

Mortgage Fraud

Mortgage fraud created a whole class of homeowners who were more likely to lose their homes to foreclosure. Broadly speaking mortgage fraud was usually categorized into two groups. One form of mortgage fraud centered on a borrower providing false information on a mortgage loan application. The motive was to own a home. The perpetrator fully expects to meet the mortgage payments. The second category was mortgage fraud for profit. This illegal activity included a mortgage broker, appraiser, real estate agent and home buyer. Fundamentally, all or some of these players provide false information in order to extract money from housing transactions (Fulmer 2010).

Fraud for Housing

When prospective homeowners provided false information on a loan application in order to buy a home, they were at risk for defaulting on their mortgage. With the weakening of lending requirements over the past decades, some prospective homeowners resorted to no-documentation loans or “liar” loans in order to obtain financing. In general, this meant that homeowners exaggerated their incomes in order to quality for mortgages they could not afford. During the 21^{st} century real estate boom, there were extensive anecdotal reports of real estate professionals teaching or recruiting low wage home buyers how to qualify for mortgages (Fulmer 2010). Attracted by the opportunity to own a home or make profits in real estate, schemes were widespread. As housing markets experienced strong growth and rapidly rising home values, the risk of fraud detection and foreclosure was marginalized. But as the US housing market deflated, these activities created individual and community wide negative impacts (Fulmer 2010).

Fraud for Profit

Widely covered by the media during the collapse of the housing market were accounts of mortgage fraud for profit. One widespread scam played out with developers working with real estate agents, appraisers, mortgage brokers, and closing agents to arrange overvalued real estate and excessive mortgage loans. Operationally, a real estate agent arranged for buyers who were willing to purchase homes at inflated prices with cooperating home builders. If the home buyer did not have sufficient income for a loan, the mortgage broker altered the application in order for the loan to be approved. The arrangement worked out well for those who were paid as the result of selling and closing the inflated mortgages. For example, the Charlotte region was the site of an ongoing federal investigation where perpetrators stole $7.3 million from lenders. Participants were drawn from California, Virginia as well as the local area. The current investigation and trial were the latest in the series of mortgage fraud cases in the Charlotte area during the past several years (Hopkins 2010).

Another scenario was also played out with mortgage refinancing. Homeowners who wanted to capture home equity were victimized by predatory lenders. In these cases, refinancing plans included excessive fees were tacked onto these loans eliminating financial advantages to home owners and structuring the loan that jeopardized their ability to repay the mortgage and losing the home to foreclosure (Fulmer 2010).

Macro-level Mortgage Financial Meltdown

In the current global financial market place, most banks and lenders have changed their practices with respect to how they manage their mortgage portfolios. They no longer maintain their mortgages. Rather, mortgages were bought and sold to financial institutions who packaged them into bonds or other financial instruments that were sold to other investors. While the mortgage has been sold to investors, the mortgage servicing companies still managed the mortgage. Although they may not actually own the loan, they received fees for managing the mortgage payments and related escrow accounts.

The practice of purchasing mortgages and bundling them into larger and diverse financial instruments for sale to other investors created another potential problem. Mortgage brokers had no incentive to make sure that the loans were sound. As long as the information provided by the borrower secured the loan, the mortgage was packaged and offered to an investor. The broker made money from closing the loan, and the lender made money from the sale of the mortgage, and the investor assumed the risk and potential costs of foreclosed real estate.

Summary / Conclusions

Taken alone, the array of weak or illegal mortgage practices discussed in this section were not responsible for the 21st century US housing financing crisis. However, the market excesses and fraud added another layer of complexity to the problem. Even in the recessionary environment, individual homeowners, who were unable to meet their mortgage obligations, received very little assistance from the mortgage servicing companies. Since they do not own the loan, these firms did not have any incentive to assist loan holders. Unlike consumer loans, mortgages were not easily changed and homeowners do not have many options once they defaulted on their mortgage. During the housing boon period, a homeowner could potentially sell a house or refinance in order to fulfill the obligation of the mortgage. With the recent housing market collapse and the structure of new mortgage rules, most homebuyers were left with few choices. For example, refinancing may have required pre-payment penalties that exceeded the equity of homes. In some instances, homeowners may not be aware that second mortgages were included with the first mortgage. Since most of these homeowners who defaulted on their mortgage were unable to meet their current obligations, they were not likely to have the funds to refinance into mortgages they could afford (Fulmer 2010).

As noted earlier, housing market failures were attributable to a variety of individual, community, and regional components. Given the recency and evolving scope of home foreclosures, a fuller understanding and explanation was only beginning to emerge in the research literature at the time this project was underway (Foote, Gerardi and Willen 2008, Gerardi and Willen 2008, Hardin Iii and Wolverton 1996, Immergluck and Smith 2006, Daneshvary et al, 2011).

CHAPTER 3: LITERATURE REVIEW

In order to contextualize and better understand the relationships between foreclosures, homeownership, and housing prices, theoretical and empirical research in urban geography, economics, and urban planning offer critical guidance. This chapter presents a review of the literature. The discussion is organized into three sections. Part I presents a summary of theoretic and empirical foundations from urban geography relevant to questions of urban growth, housing markets and suburbanization. Part II looks at the literature surrounding the impacts of homeownership on households and neighborhoods. Finally, Part III reviews of the research surrounding neighborhood effects and housing prices. Recent work reporting on the intersection between urban housing markets and foreclosure is especially relevant to this study.

Urban Geography: American Housing Market and Neighborhood Change

A clear understanding of housing markets in the US is not possible without situating housing within urban geography and metropolitan change processes. Research has shown that as metropolitan areas develop, the housing stock around the center city ages, and market forces have pushed housing development further away from the center city (Alonso 1964). During the initial post-World War II period, new residential development outside the central metropolitan area accelerated. Attractive mortgage terms made homeownership more affordable. Transportation networks fostered greater access to lower cost land at greater distances from the center city. Suburban amenities such as open space, lower taxes, and larger and newer housing enhanced the demand to move out of the center city (Muth 1969).

One of the most dramatic changes in the American housing market following World War II was the economics of homeownership. The growth of new housing was fueled by the liberalization of housing finance provided by the Federal Housing Agency (FHA) and Veterans Administration (VA). With the development of the Federal National Mortgage Association ("Fannie Mae") just prior to World War II, the country experienced a significant growth in mortgage lending in the 1940's. Financial institutions could originate mortgage loans and then sell them to Fannie Mae. Loan terms also became more accommodating. Households could borrow larger sums and pay it off over a longer period of time. Down payments decreased from 50 percent to 10 percent; and VA loans often required no down payments. Loan periods increased from 3 years to 30 years. Mortgages could be refinanced to lower interest rates if they dropped. The cumulative impact was a dramatically changed mortgage market. It was now possible for middle-income households to buy housing with loan payments that were less than rent.

In the post-World War II economic boom, developers were able to leverage these new lending practices along with the expanding transportation infrastructure to build massive housing stock in the open spaces that surrounded the formerly compact cities (Weiss 1989). The expansion of the interstate system through and around center cities meant living outside the center city was possible with relatively little change in commuting times for automobile owners. The impact on cities was profound. Research in the New York City area found, for example, that a highway passing through the metropolitan area reduced its population about 18 percent and increased the demand for housing in the surrounding suburbs (Baum-Snow 2007).

Another crucial factor affecting the suburbanization trends was the age of American housing stock. As pre-World War II urban housing aged and deteriorated, maintenance costs increased and the value and desirability of this housing stock declined. With the combination of increased transportation access and newer housing options (Harris, Tolley and Harrell 1968), the processes of neighborhood filtering was more critical (Bruechner 1977). Neighborhood filtering refers to a downward spiral wherein older housing becomes less desirable, passed over as higher income and more mobile households are attracted to newer housing opportunities. In turn, the older housing was occupied by lower income populations (Brown 1985, Guest 1974, Harrison 1974, MacDonald 1985). In cities with active immigrant streams, these housing units were also likely to be occupied by the newest arriving immigrant groups. Ultimately, the filtering process led to neighborhood renewal as urban areas restructure and areas with older housing were subject to gentrification.

Shifting socio-economic status in neighborhood populations provides evidence for the ecological model of neighborhood changes. The Chicago School model suggests the demographic drivers for the ecological model were linked to the aging of the housing stock (Park 1925, Kain and Apgar 1979, Sternlieb and Hughes 1974). At its core this model posits that as new housing was added to a metropolitan area, the population demographics of existing older neighborhoods begin to change (Sternlieb and Hughes 1974). Since World War II, Americans have traditionally been moving to newer housing away from the center city (Kain and Apgar 1979). The new housing was centered around edge cities and other subcenter areas around the center city (Anas 1998). In turn, this opens up inner city housing options for lower income households (Ingram and Kain 1973). The filtering process has allowed for new populations to move into areas once considered unaffordable (Sternlieb and Hughes 1974).

In addition to the aging of the housing stock, the demographic characteristics of the residential housing market were impacted by economics and discrimination (Cutler, Glaeser and Vigdor 1999, King 1978). Across the U.S. housing market, the price of housing was influenced by neighborhood socio-economic status. Since non-white Americans have traditionally earned lower household incomes, minority households have been more concentrated in areas with lower cost housing and less desirable housing options (Fischer 2004). In addition to housing segregation based upon economic status, racial or ethnic discrimination in employment and social relations extended to property rights and homeownership.

Racially based discrimination has played a significant role in the American housing market (King 1978). On the government side, FHA began in 1934, provided the majority of housing finance until the 1950s. During that time, FHA systematically used administrative practices to maintain the social and racial makeup of neighborhoods. In practical terms, most of the FHA money went towards moving white households to the suburbs (Squires and O'Connor 2001). In addition, the FHA promoted the usage of restrictive covenants that prevented white homeowners selling their homes to non-white homeowners (Kimble 2007). While these restrictive covenants were deemed illegal by the Supreme Court in 1948 (Squires and O'Connor 2001), FHA had defined neighborhoods based on race and determined which areas lenders could provide financing for home purchase and improvement (Kimble 2007). This practice called, “redlining”, was a widely accepted practice among mortgage lenders. The term redlining was derived from lender maps, where areas of inner-cities with higher proportions of minorities were outlined in red on maps. In lender’s decision making, these target areas would not receive approval for home mortgage loans or home equity loans. With few options for improvement or new building, the housing in redlined areas would not be improved nor replaced. Lacking funds for improvements, redlined neighborhoods would be noticeably more deteriorated than other parts of the city. As a result, housing sales in the discriminated area were adversely affected, from both financing and marketing perspectives.

When these overt discrimination practices were removed with the passage the Fair Housing Act of 1968 and the Equal Credit Opportunity Act in 1974, more subtle ways of discrimination were practiced by some real estate agents. For example, there was persistent evidence that, minority households were consistently steered toward existing minority neighborhoods (Galster 1990, Ondrich, Ross and Yinger 2001, Minerbrook 1993). Taken together, social practices; supporting government and corporate housing policies; and classic economic behavior have resulted in segregated housing markets widespread across the United States.

The degree of housing segregation in a city or metropolitan area has also been shaped by the history of suburban housing development. In the Northeast and Midwest, where the majority of housing stock was built before 1970, hyper-segregated inner cities have developed (Massey 1989). In the older urban metropolitan regions, the traditional sorting process was marked by sharp demographic differences. As the white population moved out to the suburban ring, the population inner-city neighborhoods became less diverse.

In contrast, in the South and West, the recent large scale housing development and population migration has resulted in less segregated cities (Massey 1988, Wyly and Hammel 2004). Moreover, The sorting processes in the newer western and southern metros, post 1980's, was more closely related to economics as opposed to race. Housing segregation was also impacted by neighborhood level characteristics rather than inner-city versus suburban differences. Specifically in Southern cities and towns, adjacent neighborhoods may display very different racial characteristics based upon the historical roots of the neighborhood. It was not uncommon, for example, for wealthy, white, large lot neighborhoods to be adjacent to low wealth, black, and small lot neighborhoods. The proximity occurs as a result of historical employer-laborer relationships (Rogers and Rogers 1996).

Classic neighborhood change models and housing segregation do not, however, account for all the variability in the complex urban housing markets. Clearly, other variables were impacting urban housing structure beyond urban geography. In particular, the age of housing, and the demographics of the residents were important factors. For instance, the urban restructuring processes that dominated housing supply and characteristics in the Northeast and the Midwest were less important to understanding housing conditions in the South and West. The Sunbelt housing markets over the past 30 years have produced new patterns of residential geography that do not adhere to the traditional models of neighborhood change.

One important example of this regionalism is gentrification. While gentrification has traditionally been a phenomenon that was strongly represented in Northeast and Midwest cities, the trend in some southern cities did not involve the usual process. The classic gentrification model was initiated by "urban pioneers" who settle in low wealth inner city neighborhoods and initiated the process of housing rehabilitation and economic revitalization. In parts of the South, however, who viewed gentrification was a tool for business development. This was the case in Charlotte's Fourth Ward where gentrification was prompted by the corporate interests (Smith and Graves 2005). Clearly, the traditional gentrification has taken place in large southern cities, notably Atlanta and Dallas. But, gentrification did not occur at the same level as Northeastern and Midwestern cities. One explanation for this divergence posits that recency of urbanization in Southern cities and the lesser degrees of segregation, the areas of traditional gentrification in the central cities were less defined (Wyly and Hammel 2004).

Another significant difference in the South was incipient immigrant settlement. With the emerging Hispanic hypergrowth across the South during the last decades of the 20th century, newcomers did not settle in the traditional inner-city locations. Rather, the Latino immigrants concentrated in the mature suburbs. In terms of Charlotte, North Carolina, they have concentrated in the numerous multi-family housing units that line the transportation corridors (Smith and Furuseth 2004).

New suburban developments in Southern cities have followed both the traditional development model, but with twists. Along with the large lot development in distant suburbs, small lot and smaller sized housing development have also grown up along the suburban fringe. A popular term for these starter home developments was "vinyl villages", referring to the low cost plastic siding materials used by home builders. From a financial perspective, these developments have been heavily capitalized by sub-prime mortgages. As a part of this framework, developers utilized incentives to allow many households to move in with little or money down. Ultimately, many of these developments began to show the first signs of the foreclosure crisis (Paulsen 2009, Crouch 2005, Appelbaum 2006).

Taken together, the experience of Sunbelt cities are representations and models for informing the pattern of foreclosure activity in Mecklenburg County. In turn, the classic urban settlement geography from the pre World War II and earlier neighborhood filtering processes reported in research sites like Chicago and New York has less significance.

Impacts of Homeownership

For many American households in the last half of the 20th century, buying and owning a home was a goal that required years of saving and planning. The generic framework was straightforward. Homeownership meant a 20 percent down payment plus closing costs before a bank would be willing to lend the money to first time home-buyers. The critical gap to achieving the "American Dream" was the large down payments. These significant upfront costs were a barrier for many low-income households who were unable to save the money required for a down payment and other transaction costs related to purchasing a home (Goodman 1988, Henderson and Ioannides 1983).

The financial barriers also translated into longer rental periods for households. That is to say, even middle-income households who could meet income requirements for loans had to delay purchases while saving for the down payments. This was especially relevant in high priced housing markets in the Northeast and West. For existing homeowners, the high down payment barrier was also a powerful incentive to avoid mortgage failure, or risk losing their initial investment. Indeed, a bank foreclosure for many middle class homeowners translates into a financial wipeout.

Benefits of Homeownership

Despite the challenges and risk, home ownership emerged as a principal tenet of financial security and economic success in the US. In turn, a wide array of empirical literature and professional research studies sustain this ethos with support for the benefits of homeownership. These data attribute positive gains to individuals, neighborhoods, and overall communities.

At a fundamental level, households living in owner-occupied housing showed significantly higher rates of wealth. Indeed, traditionally homeowners have enjoyed a strong tax benefit. With a deduction for mortgage interest, homeowners have a reduced tax liability compared to households who pay similar costs in rent. Along with the mortgage deductions, the potential increase in housing value provided an opportunity for low and high income households to accumulate equity in their property. In a study of home buyers across the U.S., researchers found that low-income households experienced net-worth increases of almost $25,000 with down payments as low as $1800. The study period between 1998 and mid 2003 indicated that housing values increased in at about 5.5 percent a year (Stegman, Quercia and Davis 2007).

The social benefits of homeownership are broad and widely researched. These advantages include more stable home environments, positive outcomes for school aged children, enhanced psychological health, increased civic engagement, and lower rates of crime (Rohe et al. 2002). One caveat, the literature suggested that social benefits may be the result of homeowner characteristics. Thus, proving causality was challenging (Coulson 2002).

The stable home environment associated with homeownership correlated with reduced household mobility. Underlying this relationship was the large financial investment and transaction cost, homeowners were more tied to a location than renters (Rohe et al. 2002). The stable home environment also fostered social ties within the neighborhood (Sampson, Raudenbush and Earls 1997).

Enhanced educational outcomes were also found in neighborhoods with higher homeownership rates (Galster 2007). Children living in an owner-occupied households achieved higher test scores (Haurin, Parcel and Huarin 2002) and were less likely to drop out of school (Aaronson 2000, Green R.K. and White 1997). Moreover, they were twice as likely to go to college (Harkness and Newman 2003). Children living in owner-occupied homes were less likely to present behavioral problems (Haurin et al. 2002). In addition, they were less likely to give birth as an unmarried teenager (Harkness and Newman 2003).

Homeownership and improved psychological health were linked according to national surveys. Homeowners report that they were happier and have a higher self-esteem (Rossi 1996). But, importantly, positive psychological impacts were only present when the homeowner was note behind on their mortgage payments and not experiencing any financial stress related to housing (Rohe et al. 2002).

From a community engagement perspective, homeowners were more likely to be involved in their local community. This connection was displayed in community improvement activities and voting behavior (Rossi 1996). Specifically, homeowners were 13 percent more likely to know local politicians, and 16 percent more likely to vote in local elections (DiPasquale 1999). According to researchers, elevated engagement probably had an economic rationale. Simply stated, homeowners were interested in maintaining their investment. They believed that local politics and neighborhood conditions affected property values and equity in their homes (Rohe et al. 2002).

Other research suggests that homeownership influenced the crime rate, with communities that had higher than average rates of homeownership experiencing lower than average rates of both property and violent crime (Alba 1994). In Chicago, a study suggested that the aggravated assault rate was lower in neighborhoods with higher proportions of homeowners (Sampson et al. 1997). The preponderance of research on housing and crime suggested that homeowners were less likely to experience both violent and property crime than renters (Dietz 2003).

Neighborhood and Housing Externalities

The utility or value of residential real estate was impacted by a variety of factors. Among the most powerful were the in situ characteristics of the property. Basically, homes that offered more space, amenity values or a prized location had higher value. In the world of residential real estate, bigger homes, larger lots, and affluent neighborhoods command higher values.

Beyond these dimensions, location in space and proximity to other housing and services played a significant role in establishing residential property value. From a theoretical perspective, fundamental spatial concepts discussed by Nystuen (1963) such as distance and connection frame property valuation. In turn, they were expressed in the key spatial constructs of accessibility and neighborhood. Quoting Tobler's famous 'first law of geography, everything was related to something else, but near things were more related than distant things' (Tobler 1970). Therefore, any changes to the quality of housing and services were more likely to impact housing in closer proximity and had less of an impact as the distance increased.

Externalities or spillover effects models were developed to assess these geographical differences surrounding housing (Lynch and Rasmussen 2004, Quigley 1985). Structurally, externalities were classified into nuisances and amenities. Nuisances refer to impacts that negatively impact property values. They included a physical element such as a trash dump (Hite et al. 2001) or a contextual characteristic, like violent crime, that is experienced in a neighborhood (Tita, Petras and Greenbaum 2006). As the nuisance becomes more significant, that is, combined with other externalities or its geographical proximity was closer, the impacts on home values were exacerbated.

The term amenities referred to positive externalities. They included enhanced individual real estate values or improved collective housing values. They can also be place specific. For example, a park within walking distance of a home was considered an amenity, especially for families (Hendon 1971). Amenities may be contextual, for instance, housing located in neighborhoods in top performing school zones. Operationally as amenities increased or were sited within walking distance, housing prices were higher compared to house without the amenity (Nechyba 1998).

A broad set of literature documents the economic impacts of externalities on housing values. Among the foci of these studies were empirical investigations looking at the impacts of increased transportation options, school quality, proximity to public housing and crime. Most recently, the impacts of foreclosure have attracted increased research attention.

The externality effects of a wide array of transportation options and access to mass transit have been examined. Housing located within walking distance of train stations and light rail transit stops have been shown to have higher rates of property value appreciation than similar properties farther away (Bowes 2001, Lin 2002, Kahn 2007). Empirical research by Bowes (2001) in Atlanta found that property value appreciation was more significant with stations farther away from the center city and in neighborhoods with higher incomes. In Chicago, residential property values adjacent to rail stations experienced a 20 percent increase relative to properties located one-half mile away (Lin 2002). Related work found that neighborhoods originally designed to provide access to public transportation by sidewalks had higher appreciation of residential property values than neighborhoods designed to access public transportation by car (Kahn 2007).

School choice and quality have framed a number of studies arguing the positive relationship between school quality and housing prices. Research in Boston showed that parents were willing to pay 2.5 percent more for housing if the choice yielded for a 5 percent increase in their children’s test scores (Black 1999). In Shaker Heights, Ohio, a change in school assignment from neighborhood schools resulted in a drop of housing values of 9.9 percent (Bogart and Cromwell 2000). In Charlotte, the changing school assignment system back to neighborhood schools resulted in an increase in housing prices in border neighborhoods of up to 10 percentage points with an increase of one standard deviation of test scores (Kane, Staiger and Reigg 2005). Taken together, the body of research suggested that areas with better schools, determined by higher test scores have either higher cost housing or housing prices that appreciate faster than areas with lower test scores.

Land use and infrastructure design have been shown to have disparate impact on housing desirability. Empirical research by Song (2004) in Portland, Oregon, showed mixed used developments had positive relationships with housing prices. Specifically, if real estate developments had a combination of residential and non-residential development, the value of single family houses was enhanced. However, if single family homes were located in close proximity to multi-family housing then real estate prices were depressed (Song 2004). Other variables in the Portland research such as proximity to bus stops and nearness to major roadways resulted in lower prices from homebuyers.

In contrast the effects of open space and access to recreation on housing prices were more generally positive. In Rancho Bernado, California, for example, golf courses increased the value of adjacent housing by 5 percent (Grudnitski and Do 1997). While in the Charlotte area, single family homes increased in value by $3,200 if they were within a mile of a greenway (Campbell and Munroe 2007).

Crime and housing prices have also been examined frequently and tested at various geographic levels. In Jacksonville, Florida, housing prices in high crime neighborhoods were 39 percent lower than similar houses in other neighborhoods (Lynch 2001). Research in Columbus, Ohio, capitalized the cost of crime into the price of housing. When the violent crime rate declined in high crime neighborhoods, the average housing price increased by $40,000. Moreover, $15,000 was attributed to the change in violent crime (Tita et al. 2006). In New York City, as crime dropped in high crime neighborhoods, about one-third of the upward change in housing prices was attributed to the change in crime (Schwartz, Susin and Voicu 2003).

Foreclosure Research

In the wake of this decade's foreclosure epidemic, the popular media raised questions surrounding the relationships between foreclosures, homeownership and housing prices (Leinberger 2008, Gerardi and Willen 2008, Powell and Roberts 2009). In particular, the dominant theme in the media was that foreclosure was nationally pervasive and aspatial. That is to say, foreclosure activity affected all parts of the country and all types of neighborhoods equally. When looking at the impacts of foreclosure, the media story has been that the loss of homeownership produces negative spillovers well beyond the effect on the homeowners. Unfortunately, owing to the lack of consistent national foreclosure data sets only modest research had directly examined these assumptions (Hammel, 2008).

Nonetheless, a growing body of research has looked at the relationship of predatory lending, subprime loans, and foreclosures (Newman, 2008). In the Washington DC metro areas, for example, research showed that lower middle class and working class neighborhoods were targeted for subprime loans even though householders could qualify for prime rate loans. These same neighborhoods were historically overlooked by the mainstream lenders (Wyly, 2006). Indeed by 2006, mortgage default rates in low-income and minority neighborhoods, with higher rates of subprime lending, were growing rapidly (Belsky, 2008).

Work by Kaplan (2008) in Cuyahoga County, Ohio, showed evidence of "reverse redlining" in inner city neighborhoods. His analyses found that neighborhoods that were once excluded from traditional redlining practices were suddenly the object of predatory lending practices of subprime mortgage opportunities. Analyzing the 2007 shifts in Cleveland's foreclosures from inner-city neighborhoods to the suburbs, Kaplan uncovered an interesting dichotomy in the causes of foreclosures. Specifically, foreclosure in inner-city neighborhoods was a result of subprime lending standards, while foreclosure in outer ring suburbs resulted from households buying too much house (Kaplan, 2008).

One structural shift in the lending market relating to neighborhood pattern of foreclosures was a bifurcation of the mortgage market. In particular, Wyly (2004) reported that professional investors gentrifying inner city neighborhoods were likely to receive traditional mortgage products, while existing property owners in the same neighborhoods were targeted by lenders providing subprime mortgage options.

In Minneapolis, foreclosure activity in low-income minority neighborhoods was linked to investor activity. Empirical research by Crump (2008) found that renters were being evicted after outside investors abandoned their property and homes were sold at auction. The work suggests that low income renter households were not immune from the neighborhood scaled impacts of foreclosure.

In line with other neighborhood externality effects, a growing body of scholarship has begun to focus on the impact of foreclosure activity. Broadly speaking, increasing foreclosure rates have been linked to elevated levels of crime, code enforcement violations, along with a decline in housing prices (Immergluck and Smith 2006). Recent work in New York City found that residential property sales located within 1000 feet of a foreclosure filing sold for 3.9 percent less than those greater than 1000 feet from a foreclosure (Schuetz, Been and Ellen 2008). In Chicago, the drop in property values as the result of a foreclosure within a one-half mile ranged from 1.2 percent to 8.7 percent (Lin, Rosenblatt and Tao 2009). In Las Vegas, the drop in market sale prices as the results of foreclosure within a one-half mile ranged from 1 to 2 percent while controlling for the macro-level housing market crash since 2007 (Danshvary 2011).

Although the empirical research on the impacts of foreclosure was recent and modest, relative to other externality-related studies, one inference from the data was that foreclosure activity may be the catalyst for long term neighborhood change. Consider that in Chicago, evidence showed that 16 of the city's 77 low and moderate income owner occupied neighborhoods suffered 42 percent of the citywide foreclosure filings between 2000 and 2007. The impact of geographically concentrated foreclosures suggests a new process of neighborhood turnover. This phenomenon is called the "Foreclosure Effect" (Ashton, 2008).

Locally, the Windy Ridge neighborhood in suburban Northwest Charlotte had become a nationwide poster case for the geographically clustered foreclosure neighborhoods in greenfield sites. Observational evidence for Windy Ridge since 2003 reported that as widespread foreclosure occurred in this community, the negative economic and social changes were rapid and cumulative. Indeed, in some heavily impacted suburban started home communities in Mecklenburg County, the number of owner-occupied housing declined from 80 percent to below 30 percent in a 12 month period[2]. Anecdotally, as the number or concentration of vacant houses increased, the

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[2] Data extracted from Mecklenburg County Property Records from 2003-2007.

processes associated with long term neighborhood decline emerged in short time frames. In particular, suburban neighborhoods were victim to the crime and code enforcement problems associated with low-income inner-city neighborhoods (Taylor 2010).

With the increase in foreclosure activity across many American cities, it is important to better understand the impacts on housing prices and homeownership at the neighborhood level. During the past seven years, foreclosure activity in Charlotte and Mecklenburg County has emerged as a significant public policy issue. Indeed, in 2009 the US Department of Justice (DOJ) sponsored a two day national research focused conference focused on empirical research around foreclosure and crime. Charlotte was selected as the meeting site. In choosing Charlotte, the DOJ conference organizers noted the rapidly growing scale of foreclosure in Charlotte-Mecklenburg, and posited that Charlotte was prototypic of the new urban phenomenon – suburban focused foreclosure (DOJ 2009).

CHAPTER 4: RESEARCH HYPOTHESIS, METHODOLOGY, AND DATA

Single family housing foreclosures have negative impacts that transcend the personal tragedy to the homeowner. Commentators speak in broad terms about the impact on surrounding residential home owners, neighborhood and communities. But quantified effects are absent. This research is designed to address this gap in understanding. The research plan proposed in this study posits that a significant association existed between foreclosure activity, housing prices and homeownership in Charlotte, North Carolina.

Through this analytical lens, this study examines the spatial dynamics of the relationships between foreclosure activity and the surrounding geography. While this research is empirical and therefore lacks direct transferability to other urban areas, it does provide a unique assessment of the neighborhood level impacts of single family housing foreclosure.

Mortgage Foreclosure Activity and Housing Prices

In order to assess the strength of the relationships, a series of hypotheses were tested using geographical and temporal constructs. A core assumption of the study was that mortgage foreclosures activity created a negative pricing externality on surrounding residential properties. Four hypotheses were tested in line with this assumption.

Hypothesis #1 - As the proportion of foreclosures in a residential community increased, the housing sale prices for other homes in the community were adversely affected.

Hypothesis #2 - The market sale price of a residential property was adversely impacted by the close proximity to existing foreclosed housing units.

Hypothesis #3 - The longer the average time period of mortgage foreclosed residential properties in a neighborhood, the more severe the negative price impact upon neighborhood residential units.

Hypothesis #4 - The market sale of a residential property was influenced by the structural attributes of the individual property, neighborhood quality of life characteristics, temporal, and locational elements.

Mortgage Foreclosure and Homeownership

The research plan also posited that residential foreclosure in a neighborhood had a negative impact on homeownership, that is, housing was less likely to be owner occupied in the community with higher incidents of foreclosure. Four hypotheses have been constructed to assess this assumption.

Hypothesis #5 - As the proportion of foreclosures in a residential community increased, the level of homeownership was adversely influenced.

Hypothesis #6 - Homeownership was adversely impacted by the close proximity to existing or recently foreclosed housing units.

Hypothesis #7 - The longer the average time period of mortgage foreclosure in the neighborhood, the more severe the negative impact upon residential homeownership.

Hypothesis #8 - Homeownership was influenced by the structural attributes of the individual property, neighborhood quality of life characteristics and locational elements.

Mortgage Foreclosure and Housing Prices Methods

The proposed methodology for explaining the impact of foreclosures on housing prices was a hedonic price model (Bastian 2002) using regression statistics. Fundamentally, the model assumed that the price of residential real estate depends upon the internal characteristics of the product and external factors affecting the utility of the home. The model was used to test Hypotheses #1 through #4. The dependent variable was housing sales price. The independent variables of the model were expressed in terms of their strength in explanatory power. If a particular independent variable had a large positive or negative value, then the variable displayed greater influence on the outcome of the dependent variable. If the value was close to zero, then the variable was said to have less influence on the dependent variable.

In using the hedonic approach, the factors that influence property values were structured in five groups: housing structural characteristics, neighborhood level attributes temporal dimensions, distance measures, and foreclosure characteristics.

The model was expressed as:

$$Ln^{3} (P) = ß_1 + ß_S X_S + ß_N X_N + ß_T X_T + ß_D X_D + ß_F X_F + \mu$$

where P = the housing price of the specific housing unit; $ß_1$ = intercept; $ß_S X_S$ = structural variables; $ß_N X_N$ = neighborhood level variables; $ß_T X_T$ = temporal variables; $ß_D X_D$ = distance variables; $ß_F X_F$ = foreclosure variables; μ represents the degree of error in the model.

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[3] When the price of housing was plotted with housing size, the relationship was not linear. Therefore, the price of housing was logged in order to produce a more linear relationship in the model (Makridakis, 1998).

Figure 11 presents a graphical representation of the hedonic price model. Detailed descriptions of the five independent variable groupings are also contained in this diagram.

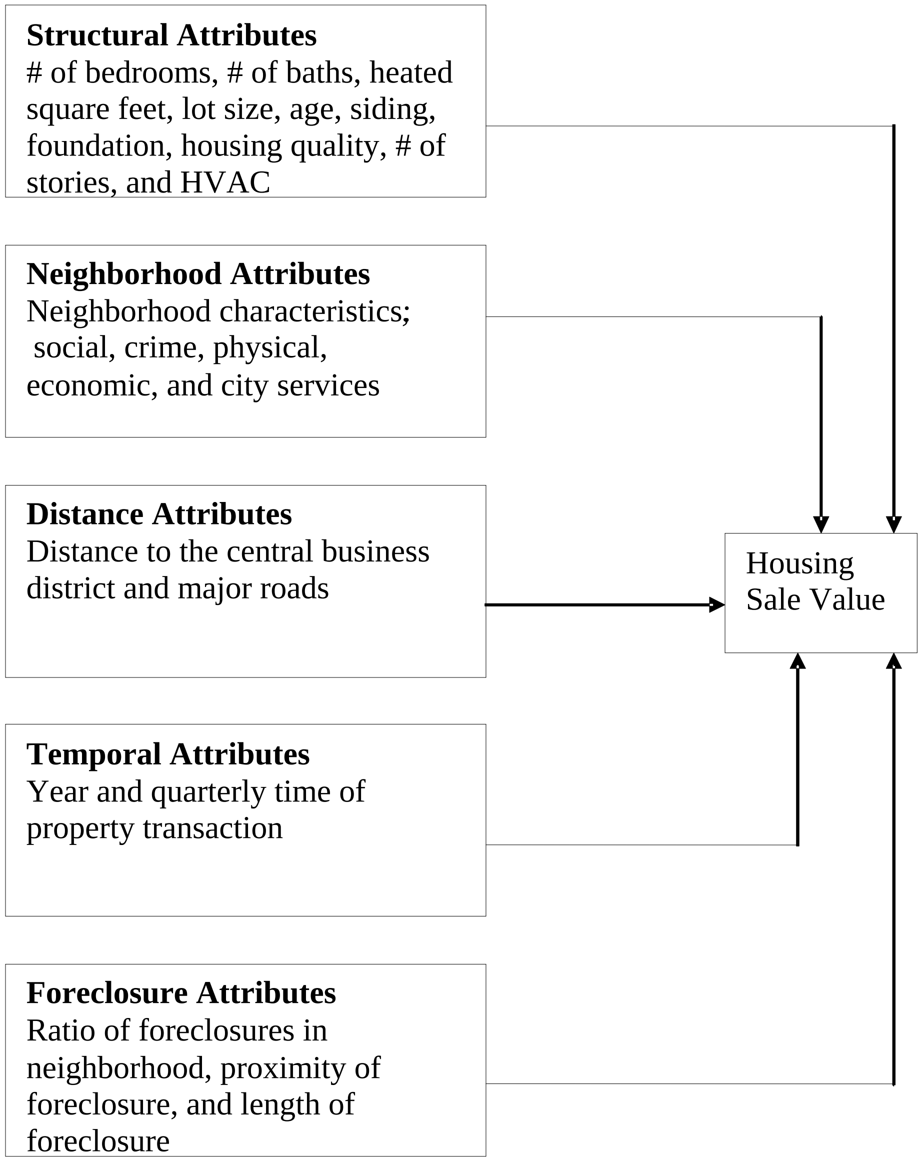

Figure 11. Graphical Representation of the Hedonic Housing Sale Value Model

Mortgage Foreclosure and Home Ownership Methods

Logistic regression was used to test the strength of association between homeownership status and foreclosures in a residential community. Logistic regression is used to predict the outcome of a binary variable which has only two values. Therefore, a logistic regression model consisted of several independent variables to predict the probability of a homeownership status. Thus, the dependent variable was either owner-occupied or renter occupied. The model was used to test Hypotheses #5 through #8. The independent variables of the model were expressed using an odds ratio. If a particular independent variable exhibited a large positive or negative value, then the variable was more likely to influence the outcome of the dependent variable. If the value was close to zero, then the variable was said to have less influence on the dependent variable. Using this model, the factors that influence homeownership were structured in five groups. As in the previous model, these groups were housing structural characteristics, neighborhood level attributes temporal dimensions, distance measures, and foreclosure characteristics.

The model was expressed as:

$$H = ß_1 + ß_S X_S + ß_N X_N + ß_T X_T + ß_D X_D + ß_F X_F + \mu$$

where H = owner-occupancy of a specific unit; $ß_1$ = intercept; $ß_S X_S$ = structural variables; $ß_N X_N$ = neighborhood level variables; $ß_T X_T$ = temporal variables; $ß_D X_D$ = distance attributes; $ß_F X_F$ = foreclosure attributes; μ represents the degree of error in the model. Figure 12 presents a graphical representation of the logistic regression model and describes the information within the five independent variable groups.

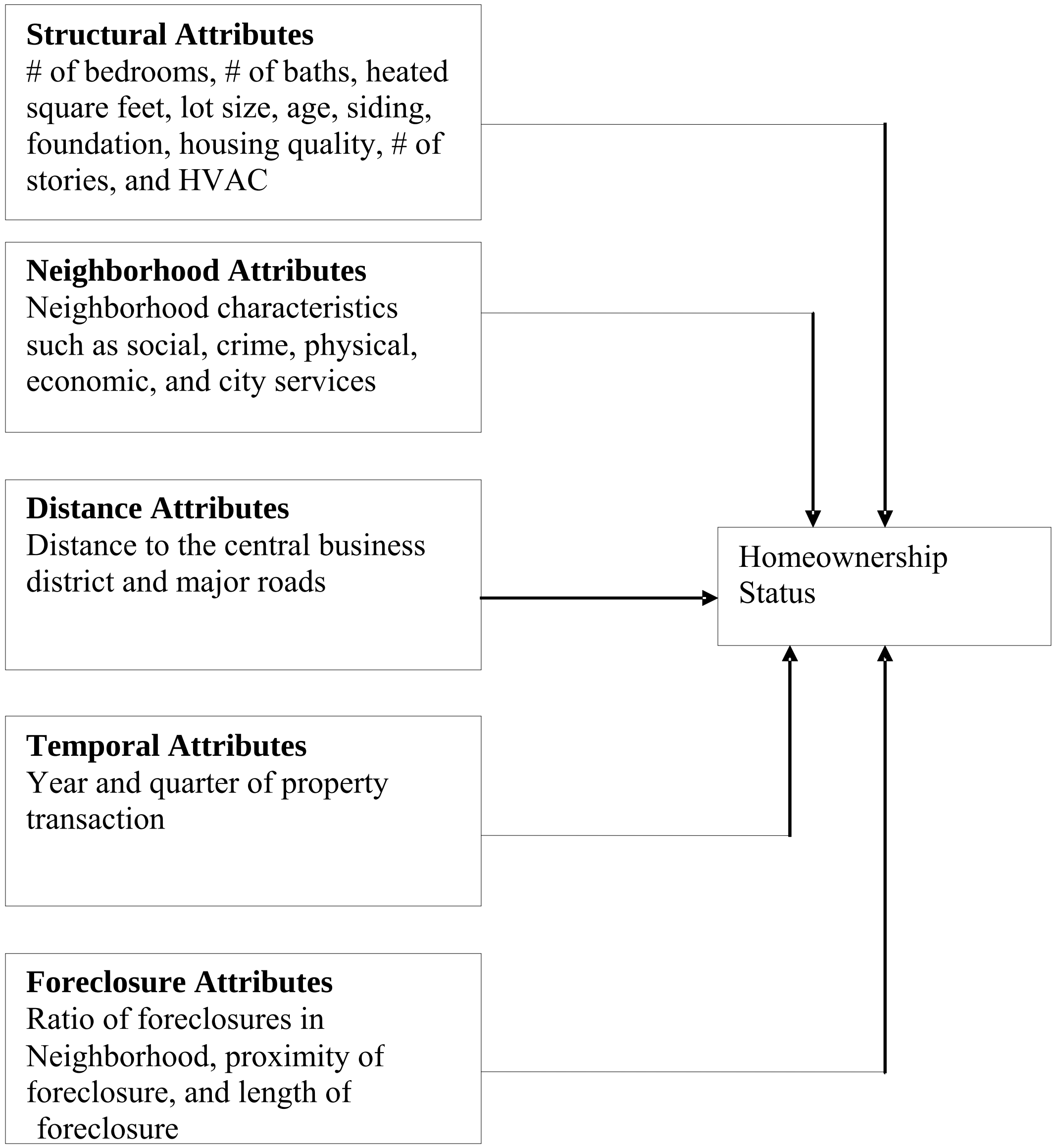

Figure 12. Graphical Representation of the Logistic Regression Model

Study Area

The study area for the research was the City of Charlotte, North Carolina and its Extra-Territorial Jurisdiction (ETJ), that is, those areas that will be annexed to the city following sufficient population gains. The political geography is depicted in Figure 13.

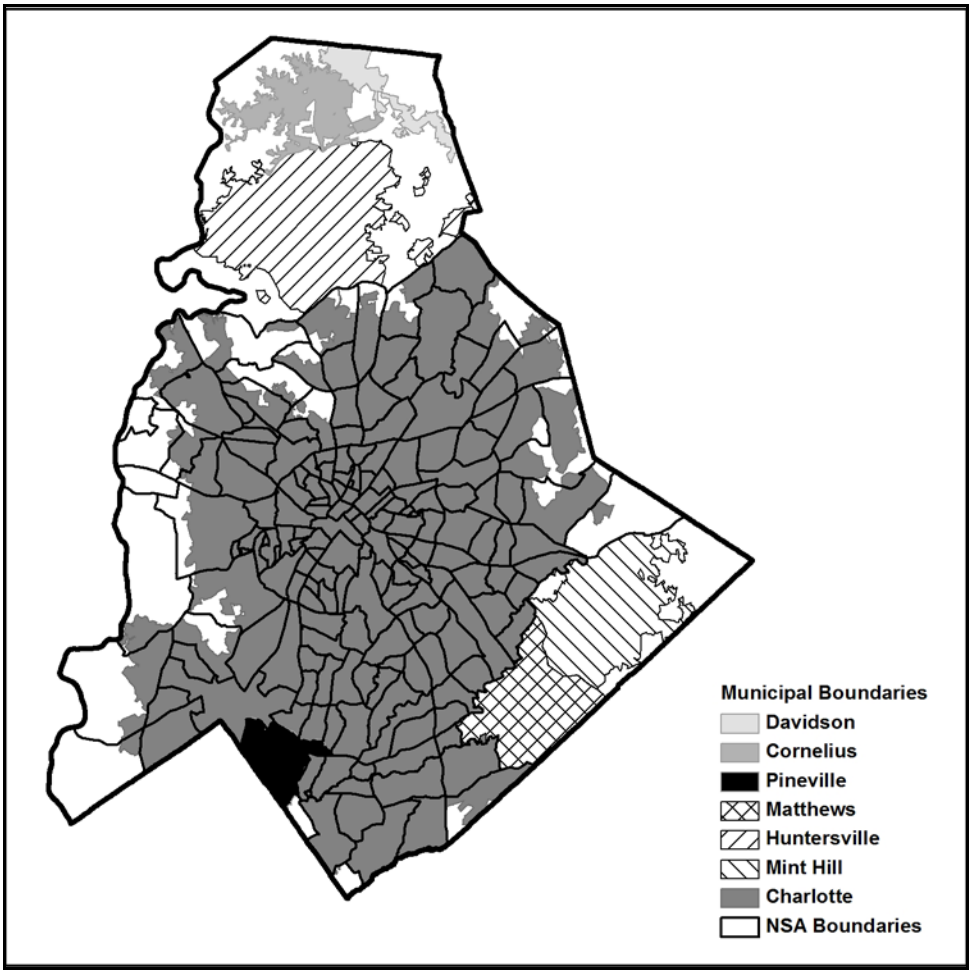

Figure 13, Municipal Boundaries in Mecklenburg County
Source: Charlotte Mecklenburg Planning Commission, 2009

The municipal boundaries of Charlotte encompassed a majority of Mecklenburg County. Because the State of North Carolina annexation rules were flexible and tend to advantage local governments, Charlotte was able to regularly annex new residential areas. Within the governmental framework, land subdivision and zoning regulations are business friendly and produce uniformly similar residential development patterns. My study area was chosen for three reasons. First, the Charlotte study area provided an opportunity to analyze the real estate market under relatively normal real estate conditions. The study area had increasing prices during the proposed study period of 2003-2007. However, Charlotte was less impacted by the national housing "boom and bust," characterized by external factors that artificially inflated housing prices and then experienced the sharp decline in housing prices. Second, the study area was experiencing an increased number of foreclosures during a period that housing prices were increasing. Indeed, foreclosures jumped from 1,500 annually in 2002 to over 2,000 in 2004. This trend suggested that certain neighborhoods were experiencing higher levels of foreclosures that might be expected to have impacted the effected neighborhoods differently from non-impacted neighborhoods. Finally, considering the expected spatial differentiation of foreclosure impacts across neighborhoods, the Charlotte data presented the opportunity to assess changes over time as neighborhood evolved and therefore, established a better model for analysis.

Within the Charlotte study area, 173 neighborhood scale subareas were identified. These neighborhood statistical areas (NSAs) have been used on the city's neighborhood quality of life study since 2000[4]. The neighborhood boundaries are represented in Figure 13. While NSAs do not match existing census geographies, they reflect community derived neighborhood boundaries. Thus, they were socially constructed rather than based upon externally generated boundaries. Operationally, NSA boundaries provided a

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[4] The Neighborhood Quality of Life Study was a biennial report completed by UNC Charlotte Metropolitan Studies and Extended Academic Programs for the City of Charlotte's Neighborhood Development.

template to assess neighborhood longitudinal change as they have been maintained for the entire study period. Since the existing boundaries were consistent, city, county, and non-profit organizations have used the NSA framework to measure and guide neighborhood change studies across the community. In turn, other cities such as Chesapeake, VA have replicated this approach and many others, as part of the Urban Institutes National Neighborhood Indicators Project[5] created a framework for similar neighborhood quality of life studies.

Research Data

A research database contained 72,061 records. This encompassed all single family residential market sales and single family homeownership in Charlotte between 2003-2007. One caveat, the dataset excluded single family detached housing 0.5 mile from the Charlotte study area boundary. The exclusion was to make all points comparable when a proximity analysis was conducted since adjacent property records outside the boundary were not available. Townhomes and condominiums data were also excluded because of the anticipated differences in the variables affecting purchasing behavior. Further, in order to eliminate outliers and removed non-market sale transactions, housing units transaction priced below $20,000 and above $1,000,000 were excluded. Transaction prices below $20,000 were not considered a market sale since they were not arms-length transaction[6]. The few transactions above $1,000,000 were removed in order to normalize the analysis. Since there were very few foreclosures above this price range, the impact on the overall analysis was minimal. Other outlier categories included houses that were

[5] http://www2.urban.org/nnip/

[6] An arm's length transaction occurs when the buyer and seller do not know each other prior to the sale.

larger than 5,000 square feet and residential properties larger than 134,680 square feet for 3 acres, were removed. The latter properties were often sold for development and not for living in the existing housing.

The market sale database was also stratified by assessed value to analyze the differences across the different value groups. Assessed values were used instead of market price to maintain uniformity of the analyses with the foreclosure variables. Since foreclosures are not "market sales", it is not possible to group them unless a standard measure of value based on the assessment is used.

Following the sorting process, the dataset was structured in three assessed value groups: less than $150,000, $150,000 to $250,000, and greater than $250,000. The assessed value ranges were chosen based upon the median household income for Charlotte. Houses valued under $150,000 were considered affordable to very low to low-income households. Houses valued between $150,000 and $250,000 were assumed affordable for middle-income working family households. And, it was expected that upper-income households would be able to buy homes valued above $250,000.

The data used to test the proposed hypotheses were drawn primarily from local government data sources. As detailed below, two independent variables, 32 continuous variables and 68 dummy variables were utilized in the research. A listing of the dependent and independent variables were presented in Table 2, along with a description of the variables.

The dependent variables, housing price (LPRICE) and homeownership (H_OWNER) data were extracted from the Register of Deeds in Mecklenburg County, North Carolina. When a property was sold in Mecklenburg County, the contract sales

Table 2: Variable List

Variable Name	Variable Description
LPRICE	LN Sale Price
H_OWNER	Homeownership Status two years post transaction
Structural Attributes	
AGE	Age of House at Sale
AGE^2	Age of House at Sale Squared (Transformed Data)
AGE^3	Age of House at Sale Cubed (Transformed Data)
BEDS	Number of Bedrooms
FBATHS	Number of Full Baths
HBATHS	Number of Half Baths
SQFT	Heated Square Feet
$SQFT^2$	SQFT Squared
FIRE	Number of Fireplaces
LOTSIZE	Lot Area
Sty_15	1 Story
STY_15	1.5 Story
STY_2	2.0 Story
STY_25	>= 2.5 STORY
A_FRAME	A-Frame
BILEVEL	Bi-Level
CAPECOD	Cape Cod
RRANCH	Ranch with Basement
SPLIT LEVEL	Split Level
AD	Air-Ducted Heat
BASEBOARD	Baseboard Heat
HP	Heat Pump
HW	Hot Water
CELL_RD	Radiant Ceiling
STEAM	Steam
ELECTRIC	Electric Heat
GAS	Gas Heat
NONE	No Heat Source
OWC	Oil/Wood/Coal Heat
SOLAR	Solar Heat - Passive
CS	Crawl Space
ALUMVINYL	Aluminum or Vinyl
ASBSDGSHG	Asbestos Siding or Shingles
BOARDBATTE	Board and Batten
CEDARRDWD	Redwood Cedar
CEM_BRSPL	Cement Brick/Special Blend
COMPWALL	Composite or Wallboard
CONCBLOCK	Concrete Block

Table 2, Continued

LGT_CORR	Corrugated Light Metal
PLYWOOD	Exterior Plywood
FACEBRICK	Brick
HARDIPLK	Hardiplank
JUMBBRICK	Jumbo/Composite Brick
MASONITE	Masonite
SDGNONE	Siding None/Minimal
SIDINGNS	Siding with no sheathing
STONE	Stone
HRDSTUCC	Hardcoat Stucco
SYNSTUCC	Synthetic Stucco
STGWD	Wood on Sheathing
SHINGWD	Wood Shingle
AVERAGE	Average Quality
BELOW	Below Average Quality
CUSTOM	Custom Built
EXCELLENT	Excellent Quality
GOOD	Good Quality
VG	Very Good Quality
AC	Air Conditioning
Foreclosure Attributes	
LFORECLOSE	Length of Time Foreclosed Property is Bank Owned
PERFORE	Percent of Singe Family Housing Units Foreclosed
D330HU	Percent of Foreclosed Housing Units within 330 Feet
D660HU	Percent of Foreclosed Housing Units between 331 and 660 Feet
D990HU	Percent of Foreclosed Housing Units between 661 and 990 Feet
Neighborhood Attributes	
CITY	Inside City of Charlotte Limits
VIOLENT	Violent Crime
PROPERTY	Property Crime
JUVENILE	Juvenile Arrest
APPEARANCE	Appearance Index
SUBSTANDARD	Substandard Housing
N_OWNER	Homeownership
SIDEWALK	Sidewalk Index
INCOMECHG	Income Change

Table 2, Continued

FOODSTAMP	Percent Food Stamp Recipients
TRANSIT	Access to Transit
RETAIL	Access to Retail
NWHITE	Percent of Non-White Students
NSCHOOLS	Percent Attending Neighborhood Schools
Distance Attributes	
DMAJOR	Distance to Major Thoroughfare
DCBD	Distance to CBD
$DCBD^2$	Distance to CBD Squared (Transformed Data)
Temporal Variables	
Y2003_Q1	Sale Year 2003, Quarter 1
Y2004_Q2	Sale Year 2003, Quarter 2
Y2003_Q3	Sale Year 2003, Quarter 3
Y2003_Q4	Sale Year 2003, Quarter 4
Y2004_Q1	Sale Year 2004, Quarter 1
Y2004_Q2	Sale Year 2004, Quarter 2
Y2004_Q3	Sale Year 2004, Quarter 3
Y2004_Q4	Sale Year 2004, Quarter 4
Y2005_Q1	Sale Year 2005, Quarter 1
Y2005_Q2	Sale Year 2005, Quarter 2
Y2005_Q3	Sale Year 2005, Quarter 3
Y2005_Q4	Sale Year 2005, Quarter 4
Y2006_Q1	Sale Year 2006, Quarter 1
Y2006_Q2	Sale Year 2006, Quarter 2
Y2006_Q3	Sale Year 2006, Quarter 3
Y2006_Q4	Sale Year 2006, Quarter 4
Y2007_Q1	Sale Year 2007, Quarter 1
Y2007_Q2	Sale Year 2007, Quarter 2
Y2007_Q3	Sale Year 2007, Quarter 3
Y2007_Q4	Sale Year 2007, Quarter 4

price and ownership information were recorded by the Register of Deeds. The sales price recorded was based on the contract sales price negotiated between the seller and the buyer.

At the time of the sales transaction, the owner's mailing address was collected. In addition, if the occupying owner had moved out of the housing unit and rented the property, the address was changed with the Mecklenburg County tax collector to reflect the current residence address. For this research, the property owner's mailing address was compared to the physical address of the property to determine homeownership status. If the property address did not match, the record was coded as a rental. The analysis was conducted two or more years after the sales transaction to account for any change in the potential for investors buying property for investment purposes.

The independent variables used to test the eight hypotheses were organized into five categories: structural, neighborhood, temporal, distance, and foreclosure groups. The structural variables were collected from the Mecklenburg County Property Ownership and Land Records Information System which merged the Mecklenburg County Tax Assessor with sale data from the Register of Deeds. The structural variables included the age of the residential building at the date of sale (AGE). AGE was also transformed by squaring and cubing the value to correct for the non-linearity of the variable. Additional structural variables included the number of bedrooms (BEDS), number of full bathrooms (FBATHS), half baths (HBATHS), the number of fireplaces (FIRE), and the area of the building lot (LOTSIZE). Heated square feet (SQFT) was also included and was squared to improve the linearity of the variable in the equations. These structural variables were expected to be positively correlated with both dependent variables except for AGE. An additional 48 structural variables were included as dummies to control for important housing attributes, including siding, foundation, heating, air conditioning, and number of stories.

The neighborhood attributes category relied on neighborhood conditions data contained in the Charlotte Neighborhood Quality of Life Study from 2002-2008. The individual housing sales data were linked to the closest study year moving forward. So that, home sales in 2003 were linked with the 2004 Quality of Life report, 2004 and 2005 home sales were linked with the 2006 report and the 2006 and 2007 home sales were linked with the 2008 report. NSA scale economic, crime, physical, and social attributes were selected for the analyses.

All crime data were provided by the Charlotte-Mecklenburg Police Department. Three crime variables were selected. The violent crime rate (VIOLENT) encompassed homicides, rapes, robberies, and aggravated assaults defined according to Uniform Crime Report (UCR) standards. The property crime rates (PROPERTY) included burglaries, larcenies, vehicle thefts, arson and vandalism incidences as defined according to UCR standards. VIOLENT and PROPERTY were calculated by dividing the number of crimes by the NSA population. The juvenile arrest rate (JUVENILE) was represented as the number of individuals arrested in an NSA under the age of 16.

The physical variables captured the appearance, housing quality, ownership, walkability and access to amenities for a NSA. Neighborhood appearance (APPEARANCE) was based on the number of code violations normalized by the number of parcels in an NSA. Housing code violations (SUBSTANDARD) were summarized by each NSA and divided by the number of residential units. Both APPEARANCE and

SUBSTANDARD were maintained by the City of Charlotte Neighborhood and Business Services. The overall homeownership of the NSA (N_OWNER) was summarized for all housing units including single family homes, condominiums, townhomes, and apartments.

The Sidewalk index (SIDEWALK) measured the length of sidewalk compared to the total length of the streets in the NSA. The Charlotte Department of Transportation (CDOT) maintained this information and it was further updated using digital aerial photography for the portions of the study area in Mecklenburg County. The availability of transit (TRANSIT) was measured by the number of residential units situated within a ¼ mile of a Charlotte Area Transit System bus stop. The availability of retail (RETAIL) was represented by the number of residential units within ¼ mile of a grocery store or pharmacy.

The socio-economic characteristics of a neighborhood were represented by four variables. These included income change, food stamp recipients, school attendance preference, and ethnicity. Income change (INCOMECHG) measured the shift in median household income with data purchased from Claritas, a vendor that sells projected census data. The number of individuals receiving food stamps (FOODSTAMP) was provided by the Mecklenburg County Department of Social Services and was divided by the population of the NSA. More detailed definitions and sources for thee eleven variables just discussed and used in the Quality of Life Report are provided in the Appendix A.

Two additional socio-economic variables used in the study analyses were not derived from the Quality of Life Study. They were variables collected from Charlotte-Mecklenburg Schools (CMS). The percentage of non-white students was coded by CMS where races codes other than Caucasian were considered non-white (NWHITE). In addition, the percentage of students who attended neighborhood schools was calculated by CMS. Students were assigned a home school. If the home school matched the school attended, the student was classified as attending a neighborhood school (NSCHOOL).

An additional physical variable (CITY) was collected to control for the annexation date of the property to the city of Charlotte. The variable was coded as 1 as being inside the city limits on the date of sale and 0 if not in the city limits.

The distance attributes were calculated with ARCGIS 9.3 using the latitude and longitude coordinates of the market sale. The distance from the market sale to the center City of Charlotte (DCBD) was measured in straight line with the intersection of Trade and Tryon streets considered to be center city. The distance to a major thoroughfare (DMAJOR) was measured in feet between a market sale and the closest non-residential street as classified by CDOT.

The temporal attributes included dummy variables for each quarter of market sales. Since there were four quarters in each of the five years, 20 dummy variables representing the quarter a market sale was included.

Finally, the foreclosure data category was processed to create five variables. The foreclosed housing units were identified by trustee deed filed with the register of deeds. When a housing unit was foreclosed, a trustee deed instrument indicated the mortgage holder has taken ownership of the property.

First, the percentage of single family detached units foreclosed (PERFORE) was calculated by dividing the number of foreclosed properties in a calendar year by the number of single family units in each NSA. The PERFORE value was then assigned to all market sales in the NSA for the corresponding year.

Second, the length of time a foreclosed property was bank owned was calculated based on the difference of two dates in the property transaction history. The first date was calculated based on the date the property was transferred from individual ownership to a financial institution as recorded by the Mecklenburg County Register of Deeds. This transaction record was usually coded as “TRUSTEE DEED”. However, errors in this coding were detected and further analysis was conducted to identify the ownership by financial institution to specifically determine the exact transaction date. If the housing unit did not transfer to a financial institution and was sold to another individual owner, the number of days calculated was 0. The second date was calculated when the property transferred from the financial institution to an individual owner or investor. The difference between the two dates was calculated for each foreclosed property to determine the number of days the foreclosure property was bank owned. The average number of days for all foreclosed properties in a NSA for each calendar year was summarized (LFORECLOSURE). The variable LFORECLOSURE was assigned to all market sales in the NSA.

A third, fourth, and fifth variables were the proximity to foreclosure. These variables were calculated by measuring a ‘shadow distance’ around each market sale for every sales quarter, 2003-2007. The number of foreclosures at each level and sales quarter was summarized and normalized by the number of housing units. The distance rings were 0-330 feet (D330HU), 331-660 feet (D660HU), and 661-990 feet (D990HU). These choices of three distances were made because of widespread data variability for areal units less than 1/8 mile (1320 feet). Appendix B describes other distances used to test the sensitivity of other distances.

Figure 14 illustrates an example of how the variable was calculated. For analytical purposes, the author selected his house in the College Downs neighborhood (NSA 138) This single family home was purchased in 2007.

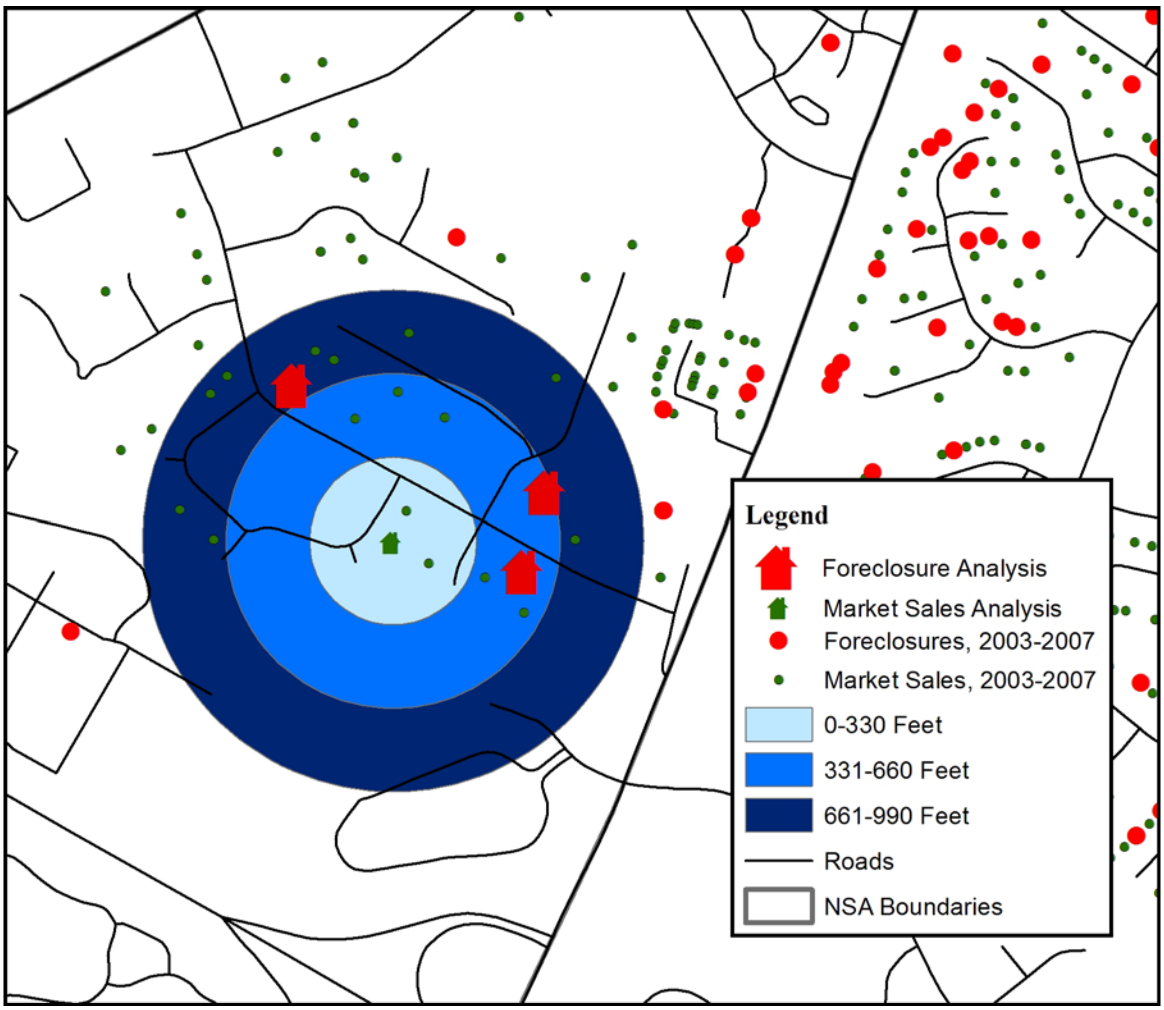

Figure 14, Foreclosure Analysis
Source: Author compiled from Mecklenburg County Register of Deeds

In this illustration, the house symbols indicate the actual market sale and the relevant foreclosures. The relevant foreclosures were divided by all the housing units (not shown) to obtain the proportion of foreclosed units for each housing ring. The data were processed using ArcGIS 9.3 and SPSS.

CHAPTER 5: RESULTS

During the study period, 2003-2007, over 84,000 single family residential properties changed ownership in Charlotte, North Carolina. Of these, 72,061 were willing market transfers between buyers and sellers. These market sales were the basis for the number of records analyzed in the eight hypotheses. There were 10,279 “foreclosures” used to calculate the foreclosure attributes in the hypotheses. The percent of foreclosures and length of foreclosures were calculated using the NSA geography combined with each of the 72,061 market sales. The foreclosure shadow zone variables were calculated based upon each individual market sale location and the concentration of foreclosures at three distance rings.

As one might expect, the geographical pattern of foreclosures activity was not uniformly distributed across the community. As seen in Figure 15, the percentage of single family housing units foreclosed in 2007, showed a highest concentrations in the Northwest, North, and East portions of Charlotte. These geographical bands encompassed older, middle, ring neighborhoods as well as the newly developed suburban ‘vinyl village’ communities discussed earlier.

The sharp geographical contrast, the “wedge of wealth” in southeast Charlotte displayed the lowest portions of foreclosure. In addition, gentrifying neighborhoods around the center city of Charlotte had lower foreclosure rates.

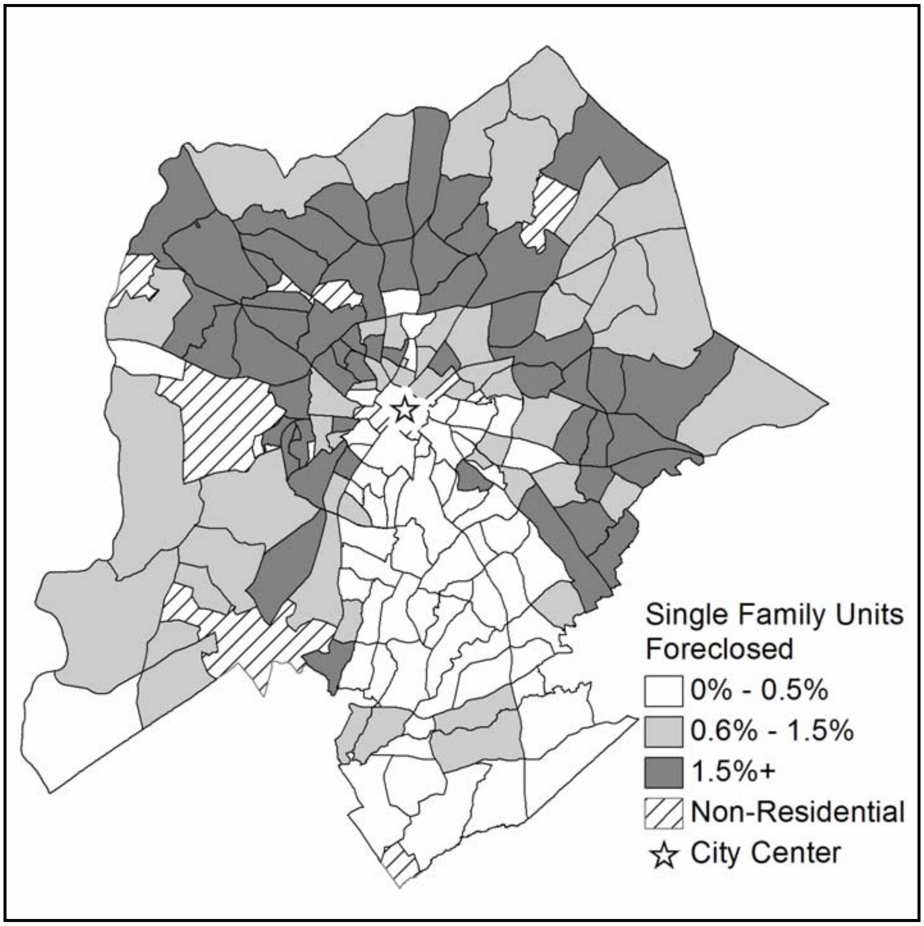

Figure 15, Percentage of Single Family Housing Units Foreclosed, 2007
Source: Author compiled from Mecklenburg County Register of Deeds

The geographical pattern of foreclosures mirrored the fundamental social geography of Charlotte. The intersection of traditional median household income, housing prices, and race/ethnicity was illustrated. In particular, neighborhoods in the Southeast have had higher median household income, higher housing prices, and mostly white. Whereas, the areas in the Northwest, North and the East have had lower median household incomes, lower housing values, and higher proportions of non-white populations. These patterns, while representing broad socio-economic zones of Charlotte, should not be interpreted as a cause and effect relationship suggesting that only lower income households living in lower priced housing experienced foreclosure. Simply, the data showed that foreclosure was not evenly distributed across all classes and geographies in Charlotte.

Figure 16 offers a time series perspective on foreclosure activity for the period from 2003-2007. It displays the percentage change within each neighborhood during the four year period. The citywide differences are stark. Some neighborhoods had drops in foreclosure or no foreclosure activity, while in other cases the rate of increase was over 100 percent.

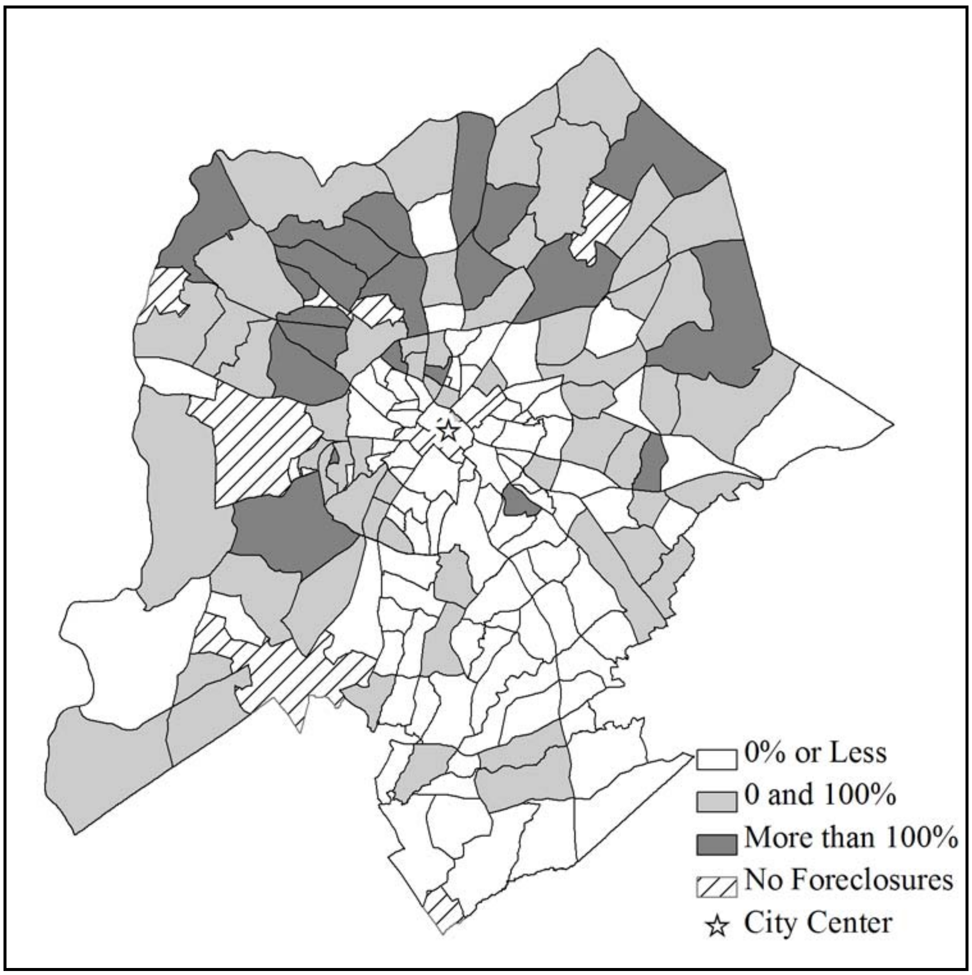

Figure 16, Percentage Change in Single Family Housing Units Foreclosed, 2003-2007
Source: Author compiled from Mecklenburg County Register of Deeds

The overall geographical pattern of foreclosure activity did not shift significantly. Foreclosure rates increased, but selected inner city neighborhoods and Southeast Charlotte were largely unaffected. The distribution of foreclosed units continued to be most heavily concentrated in the areas north of the city center and middle ring suburbs in East Charlotte.

These geographical distributions of foreclosure change follow the traditional socio-economic geographies outlined previously. Indeed, The Charlotte Neighborhood Quality of Life data showed that during the study period, many neighborhoods in the Southeast enjoyed increases in income and housing prices. Whereas, the areas in the North and the East had shrinking median household incomes and flat or declining housing values. The modeling results presented later in this chapter offer insights on these descriptive data.

Beyond the magnitude of the foreclosure in single family housing markets, the length of time that a property was bank owned after foreclosure was hypothesized to be a critical concern. Figure 17 shows the average length of time that a single family home was bank owned between 2003 to 2007. Again, these data were framed by NSA geography. In order to avoid potential interpretation error, NSAs with less than five foreclosures during the study period were excluded from the analysis.

The spatial patterns of the time in foreclosure show that the longest periods of time, i.e. greater than 160 days, were highly clustered in suburban areas Northwest and Northeast of the center city in NSAs with large starter subdivision activity. Smaller pockets in East and Southeast quadrants of the city had longer periods of foreclosure.

These neighborhoods were 'middle ring' neighborhoods often undergoing redevelopment as large immigrant settlement destinations.

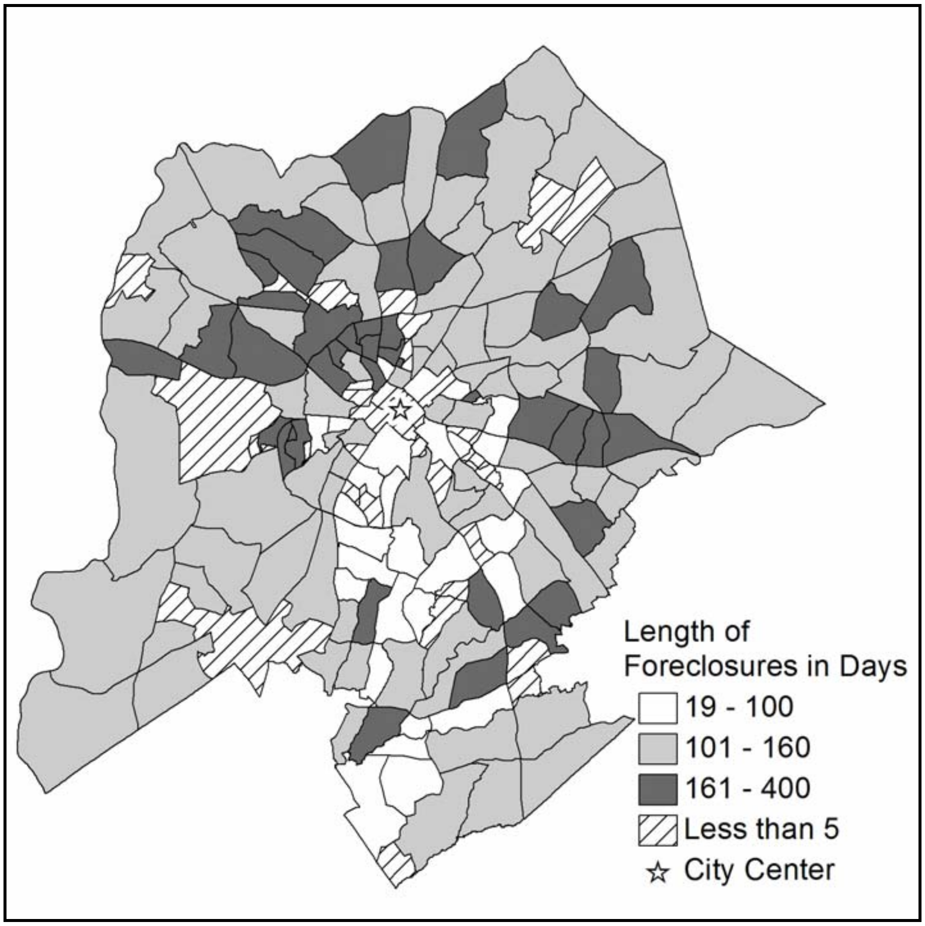

Figure 17, Average Length of Foreclosure, 2003-2007
Source: Author compiled from Mecklenburg County Register of Deeds

The descriptive statistics for the dependent and independent variables used in the analysis are presented in Table 3. In order to further analyze these data, they are broken out by single family housing submarkets – low valued, middle valued and upper valued in Table 4.

A review of housing submarket data showed widespread evidence that housing price differential translates into significant differences beyond the size and features of the residential housing stock. Deep socio-economic gaps were displayed as average housing

Table 3: Overall Descriptive Statistics

Dependent Variables		
	Mean	Std. Deviation
SALE_PRICE	211,074	146,858
H_OWNER	0.83	0.38
Structural Attributes		
AGE	17.12	21.04
AGE^2	735.56	1,424.64
AGE^3	40,648.95	108,537.84
BEDS	3.28	0.72
FBATHS	2.04	0.59
HBATHS	0.59	0.51
SQFT	2,093.38	827.10
$SQFT^2$	5,066,310.53	4,155,464.42
FIRE	0.85	0.38
LOTSIZE	12,777.90	9,214.87
Sty_15	0.3352	0.4721
STY_15	0.0564	0.2307
STY_2	0.5629	0.4960
STY_25	0.0159	0.1252
A_FRAME	0.0000	0.0065
BILEVEL	0.0037	0.0605
CAPECOD	0.0007	0.0255
RRANCH	0.0043	0.0658
SPLIT LEVEL	0.0208	0.1428
AD	0.9288	0.2572
BASEBOARD	0.0061	0.0779
HP	0.0444	0.2060
HW	0.0005	0.0214
CELL_RD	0.0001	0.0083
STEAM	0.0001	0.0037
ELECTRIC	0.0843	0.2778
GAS	0.9067	0.2908
NONE	0.0032	0.0567
OWC	0.0057	0.0752
SOLAR	0.0001	0.0083
CS	0.4628	0.4986
ALUMVINYL	0.5242	0.4994
ASBSDGSHG	0.0074	0.0859
BOARDBATTE	0.0003	0.0162
CEDARRDWD	0.0061	0.0781

Table 3, Continued

CEM_BRSPL	0.0001	0.0099
COMPWALL	0.0003	0.0167
CONCBLOCK	0.0006	0.0250
LGT_CORR	0.0001	0.0118
PLYWOOD	0.0059	0.0767
FACEBRICK	0.2260	0.4182
HARDIPLK	0.0199	0.1397
JUMBBRICK	0.0001	0.0099
MASONITE	0.1321	0.3386
SDGNONE	0.0000	0.0053
SIDINGNS	0.0006	0.0241
STONE	0.0002	0.0154
HRDSTUCC	0.0098	0.0984
SYNSTUCC	0.0012	0.0347
STGWD	0.0613	0.2399
SHINGWD	0.0037	0.0603
Average	0.7966	0.4026
Below	0.0055	0.0740
Custom	0.0049	0.0699
Excellent	0.0101	0.1001
Good	0.1403	0.3473
Vg	0.0426	0.2020
Ac	0.9394	0.2385
Foreclosure Attributes		
Lforeclose	124.48	64.72
PerFore	0.0109	0.0089
D330HU	0.0054	0.0248
D660HU	0.0046	0.0143
D990HU	0.0046	0.0121
Neighborhood Attributes		
CITY	0.94	0.24
VIOLENT	0.61	0.80
PROPERTY	0.75	0.69
JUVENILE	0.71	1.07
APPEARANCE	0.07	0.10
SUBSTANDARD	0.01	0.02
N_OWNER	0.67	0.18

Table 3, Continued

SIDEWALK	0.43	0.27
INCOMECHG	0.02	0.01
FOODSTAMP	0.06	0.07
TRANSIT	0.32	0.37
RETAIL	0.12	0.14
NWHITE	0.58	0.27
NSCHOOLS	0.66	0.14
Distance Attributes		
DMAJOR	846.56	671.04
DCBD (miles)	8.13	3.30
$DCBD^2$	76.94	53.47
Temporal Attributes		
Y2003_Q1	0.03	0.18
Y2004_Q2	0.04	0.20
Y2003_Q3	0.04	0.20
Y2003_Q4	0.04	0.19
Y2004_Q1	0.03	0.18
Y2004_Q2	0.05	0.22
Y2004_Q3	0.05	0.23
Y2004_Q4	0.05	0.22
Y2005_Q1	0.04	0.19
Y2005_Q2	0.06	0.23
Y2005_Q3	0.06	0.24
Y2005_Q4	0.06	0.23
Y2006_Q1	0.05	0.22
Y2006_Q2	0.07	0.26
Y2006_Q3	0.06	0.24
Y2006_Q4	0.06	0.23
Y2007_Q1	0.05	0.21
Y2007_Q2	0.06	0.24
Y2007_Q3	0.05	0.23
Y2007_Q4	0.04	0.19

Table 4: Descriptive Statistics by Value Group

	Less than $150,000		$150,000-$250,000		Greater than $250,000	
	Mean	SD	Mean	SD	Mean	SD
Dependent Variables						
SALE_PRICE	$124,846	$34,605	$210,332	$52,200	$461,557	$193,410
H_OWNER	0.76	0.43	0.87	0.33	0.90	0.30
Independent Variables						
Structural Attributes						
AGE	21	22	11	17	18	23
AGE^2	939	1,513	411	1,041	858	1,728
AGE^3	51,195	116,390	20,941	74,652	53,342	137,636
BEDS	2.97	0.51	3.40	0.67	3.93	0.83
FBATHS	1.78	0.44	2.08	0.37	2.74	0.75
HBATHS	0.44	0.50	0.73	0.46	0.73	0.51
SQFT	1,478	346	2,346	487	3,317	750
$SQFT^2$ (000)	2,306	1,057	5,741	2,383	11,568	4,902
FIRE	0.71	0.46	0.97	0.20	1.01	0.24
LOTSIZE	11,485	7,642	12,000	8,736	18,219	12,026
STY_1	0.5507	0.4974	0.1605	0.3671	0.0952	0.2935
STY_15	0.0304	0.1716	0.0679	0.2515	0.1066	0.3086
STY_2	0.3787	0.4851	0.7425	0.4373	0.7018	0.4575
STY_25	0.0004	0.0187	0.0063	0.0792	0.0820	0.2744
A_FRAME	0.0001	0.0076	0.0000	0.0062	0.0000	0.0000
BILEVEL	0.0062	0.0788	0.0018	0.0421	0.0004	0.0205
CAPECOD	0.0013	0.0366	0.0000	0.0062	0.0000	0.0000
RRANCH	0.0039	0.0627	0.0035	0.0588	0.0074	0.0859
SPLIT LEVEL	0.0283	0.1658	0.0175	0.1311	0.0065	0.0804
AD	0.8916	0.3109	0.9637	0.1871	0.9597	0.1966
BASEBOARD	0.0118	0.1078	0.0011	0.0329	0.0008	0.0276
HP	0.0565	0.2309	0.0322	0.1764	0.0362	0.1869
HW	0.0003	0.0162	0.0003	0.0176	0.0014	0.0367
CELL_RD	0.0001	0.0108	0.0000	0.0062	0.0000	0.0000
STEAM	0.0000	0.0000	0.0000	0.0000	0.0001	0.0092
ELECTRIC	0.1146	0.3185	0.0553	0.2287	0.0602	0.2379
GAS	0.8684	0.3380	0.9427	0.2324	0.9386	0.2401
NONE	0.0066	0.0810	0.0002	0.0124	0.0002	0.0130
OWC	0.0104	0.1012	0.0017	0.0412	0.0009	0.0305
SOLAR	0.0001	0.0076	0.0001	0.0088	0.0001	0.0092
CS	0.3936	0.4885	0.3533	0.4780	0.9028	0.2962

Table 4, Continued

	Less than $150,000		$150,000 - $250,000		Greater than $250,000	
	Mean	SD	Mean	SD	Mean	SD
ALUMVINYL	0.4549	0.4980	0.6219	0.4849	0.5107	0.4999
ASBSDGSHG	0.0061	0.0781	0.0083	0.0907	0.0094	0.0963
BOARDBATTE	0.0003	0.0179	0.0002	0.0124	0.0003	0.0184
CEDARRDWD	0.0075	0.0861	0.0047	0.0687	0.0053	0.0727
CEM_BRSPL	0.0001	0.0076	0.0002	0.0124	0.0001	0.0092
COMPWALL	0.0003	0.0171	0.0003	0.0176	0.0002	0.0130
CONCBLOCK	0.0007	0.0259	0.0006	0.0248	0.0005	0.0225
LGT_CORR	0.0002	0.0132	0.0002	0.0124	0.0000	0.0000
PLYWOOD	0.0056	0.0745	0.0057	0.0753	0.0073	0.0854
FACEBRICK	0.2745	0.4463	0.1671	0.3730	0.2146	0.4105
HARDIPLK	0.0185	0.1349	0.0229	0.1496	0.0173	0.1304
JUMBBRICK	0.0001	0.0076	0.0001	0.0108	0.0002	0.0130
MASONITE	0.1410	0.3480	0.1067	0.3088	0.1621	0.3685
SDGNONE	0.0000	0.0054	0.0000	0.0000	0.0001	0.0092
SIDINGNS	0.0006	0.0248	0.0006	0.0248	0.0004	0.0205
STONE	0.0002	0.0143	0.0002	0.0139	0.0004	0.0205
HRDSTUCC	0.0139	0.1170	0.0062	0.0785	0.0058	0.0761
SYNSTUCC	0.0017	0.0411	0.0007	0.0263	0.0009	0.0305
STGWD	0.0701	0.2553	0.0499	0.2177	0.0610	0.2394
SHINGWD	0.0038	0.0615	0.0036	0.0598	0.0034	0.0580
AVERAGE	0.9851	0.1211	0.8691	0.3373	0.0927	0.2901
BELOW	0.0112	0.1053	0.0003	0.0186	0.0003	0.0184
CUSTOM	0.0000	0.0000	0.0000	0.0000	0.0299	0.1703
EXCELLENT	0.0000	0.0000	0.0000	0.0000	0.0616	0.2405
GOOD	0.0036	0.0598	0.1269	0.3329	0.5645	0.4959
VG	0.0001	0.0094	0.0036	0.0597	0.2510	0.4336
AC	0.8843	0.3199	0.9893	0.1031	0.9887	0.1058
Foreclosure Variables						
LFORECLOSURE	140.37	54.63	120.94	64.47	86.35	74.36
PERFORE	0.0153	0.0090	0.0086	0.0071	0.0034	0.0037
D330HU	0.0086	0.0287	0.0030	0.0198	0.0018	0.0211
D660HU	0.0072	0.0170	0.0028	0.0104	0.0012	0.0117
D990HU	0.0072	0.0145	0.0029	0.0096	0.0011	0.0069

Table 4, Continued

	Less than $150,000		$150,000 - $250,000		Greater than $250,000	
	Mean	SD	Mean	SD	Mean	SD
Neighborhood Attributes						
CITY	0.94	0.24	0.92	0.27	0.95	0.21
VIOLENT	0.97	0.96	0.31	0.42	0.24	0.34
PROPERTY	1.00	0.80	0.53	0.46	0.52	0.48
JUVENILE	1.02	1.22	0.45	0.84	0.35	0.78
APPEARANCE	0.11	0.12	0.04	0.05	0.03	0.03
SUBSTANDARD	0.01	0.02	0.00	0.01	0.00	0.00
N_OWNER	0.62	0.20	0.73	0.15	0.70	0.15
SIDEWALK	0.39	0.23	0.43	0.26	0.53	0.35
INCOMECHG	0.02	0.01	0.02	0.01	0.03	0.02
FOODSTAMP	0.10	0.08	0.03	0.04	0.02	0.02
TRANSIT	0.43	0.38	0.18	0.29	0.35	0.38
RETAIL	0.12	0.15	0.09	0.12	0.16	0.16
NWHITE	0.73	0.20	0.50	0.23	0.28	0.19
NSCHOOLS	0.60	0.11	0.70	0.13	0.76	0.14
Distance Attributes						
DMAJOR (feet)	810.11	615.26	870.09	686.27	900.39	777.49
DCBD (miles)	6.86	2.81	9.36	2.90	9.10	4.00
$DCBD^2$ (miles)	54.91	40.40	96.02	50.15	98.78	66.78
Temporal Attributes						
Y2003_Q1	0.04	0.19	0.03	0.16	0.03	0.17
Y2004_Q2	0.04	0.19	0.04	0.19	0.05	0.21
Y2003_Q3	0.04	0.20	0.04	0.19	0.04	0.21
Y2003_Q4	0.04	0.20	0.03	0.18	0.03	0.18
Y2004_Q1	0.04	0.19	0.03	0.18	0.03	0.18
Y2004_Q2	0.05	0.22	0.05	0.22	0.06	0.25
Y2004_Q3	0.05	0.23	0.05	0.22	0.06	0.24
Y2004_Q4	0.05	0.22	0.05	0.22	0.05	0.21
Y2005_Q1	0.04	0.19	0.04	0.19	0.03	0.18
Y2005_Q2	0.06	0.23	0.06	0.23	0.06	0.24
Y2005_Q3	0.06	0.24	0.06	0.24	0.06	0.24
Y2005_Q4	0.06	0.24	0.06	0.23	0.05	0.22
Y2006_Q1	0.05	0.22	0.05	0.22	0.04	0.20
Y2006_Q2	0.07	0.26	0.08	0.26	0.07	0.26
Y2006_Q3	0.06	0.24	0.07	0.25	0.06	0.24
Y2006_Q4	0.06	0.23	0.06	0.24	0.06	0.23
Y2007_Q1	0.05	0.21	0.05	0.22	0.05	0.21
Y2007_Q2	0.06	0.23	0.06	0.24	0.06	0.24
Y2007_Q3	0.05	0.22	0.06	0.23	0.06	0.23
Y2007_Q4	0.03	0.18	0.04	0.20	0.04	0.19

prices increase. The most critical differentiation was that submarket characteristics were linked to residential foreclosure. Simply stated, foreclosure was far more characteristic among lower income home owners and least prevalent among upper-income householders. Figure 18 shows a tabular distribution of foreclosure across time and the three housing submarkets. Temporally, after an approximately 20 percent increase in foreclosure in the lowest priced housing market between 2003 and 2004, the rate of foreclosure remained stable through 2007. Because the other two categories, $150,000-$250,000 and greater than $250,000 were much smaller, their foreclosure numbers fluctuated up and down in the 10 percent range.

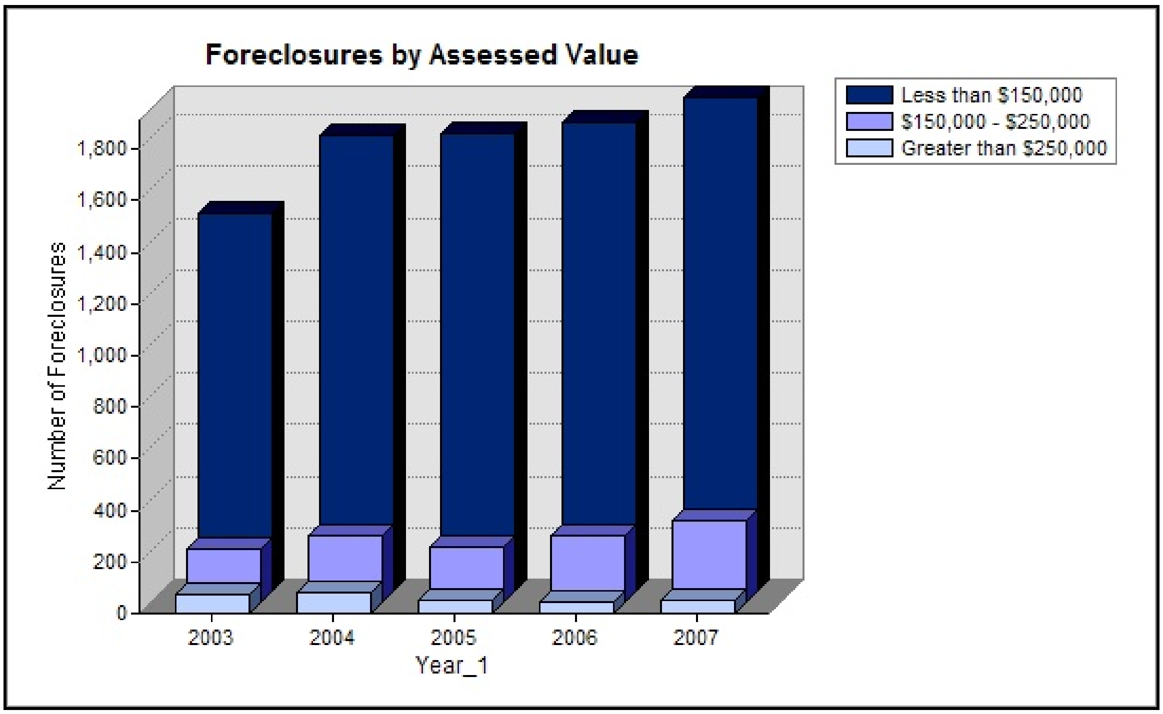

Figure 18, Foreclosures by Assessed Value
Source: Author compiled from Mecklenburg County Register of Deeds

When the descriptive data were combined, a highly segmented picture of foreclosure activity was revealed. Single family homes, with assessed values less than

$150,000 targeted at low-income household owners, displayed the highest rates of mortgage foreclosure, 1.5 percent. They experienced the longest average length of time in foreclosure, at slightly more than 140 days, the time between the bank takes possession of the house to when it sells the property to a non-financial institution. And, they were the most concentrated, as reflected by the shadow zones, around market sales in the same assessment category. Within the 330 feet shadow zone, the concentration of foreclosures was 0.9 percent, while within 331-660 feet, and 661-990 feet of a market sale, the concentration was 0.7 percent.

Single family homes with assessed values between $150,000 and $250,000 were marketed to middle-income household owners. This housing segment displayed an average rate of mortgage foreclosure, 0.86 percent. They experienced an average length of time in foreclosure, at slightly more than 121 days. And, they were geographically more evenly distributed, as reflected by the shadow zone around market sales in the same assessment range. Within all three distance rings, the concentration of foreclosures was 0.3 percent.

Finally, single family homes with assessed values greater than $250,000, were expected to be occupied by upper-income households owners. This grouping displayed the lowest average rates of mortgage foreclosure, 0.34 percent. They experienced an average length of time in foreclosure, at slight less than 86 days. They were unevenly distributed, within the shadow zones around market sales in the same assessed value range. Within 330 feet of a market sale, the concentration of foreclosures was 0.2 percent, while within 331-600 and 661-990 distance rings, the concentration was 0.1 percent.

The primary focuses of this research was to statistically measure and examine the strength of the relationship between foreclosure activity and surrounding market sale residential properties. Broadly stated, within this framework, the study posited that the scale and intensity of single-family housing foreclosure would adversely affect surrounding market sale properties. Based upon a review of the existing research literature and my own empirical work in community development and planning, four hypotheses were developed and testes, in order to examine these housing related issues.

Hypothesis 1

As stated, hypothesis 1 was that as the proportion of foreclosed homes in a residential community increased, the market sale prices of other homes in the community would be negatively impacted. As seen Table 5, the hypothesis was supported by the multiple regression analysis. The adjusted R^2 was 0.855 and the standardized beta coefficient was -0.066. These results can be interpreted to report that the model was able to account for over 85 percent of the variation in housing sale prices. The direction of the relationship was negative. In other words, as the proportion of foreclosures increased, housing sales prices were lower.

In order to better understand the structural impact of foreclosure across the Charlotte housing market, the full model was deconstructed to examine the relationship across the three real estate submarkets. Thus, the multiple regression analysis was carried out in low valued, middle valued, and upper valued housing submarkets.

The results, presented in Table 5, show that the three sub-models were statistically significant. However, there were notable differences across the sub-models. First, the explanatory power of the model varied as housing values changed, with the strongest

Table 5: Multiple Regression Results for Hypothesis #1

	All Single Family		Assessed Value Less than $150,000		Assessed Value $150,000-$250,000		Assessed Value Greater than $250,000	
	B (Std. Error)	Z-Beta	B (Std. Error)	Z-Beta	B (Std. Error)	Z-Beta	B (Std. Error)	Z-Beta
Constant	11.608** (0.18)		11.265** (0.028)		11.927** (0.036)		12.937** (0.085)	
Percent of Foreclosed Housing Units	-4.157** (0.143)	-0.066	-3.176** (0.163)	-0.088	-7.876** (0.269)	-0.226	2.512* (0.978)	0.023
Structural Attributes	Yes		Yes		Yes		Yes	
Neighborhood Attributes	Yes		Yes		Yes		Yes	
Year and Quarter of Sale Dummy	Yes		Yes		Yes		Yes	
Observations	72,061		34,251		25,960		11,850	
Adjusted R^2	0.855**		0.615**		0.537**		0.590**	

* P < 0.05, **P< 0.01.

Source: Author

predictive power among the lowest valued homes. The R^2 was 0.615. The highest values home explained slightly less variation with an R^2 at 0.590 and those in the middle price range at 0.537.

More critically, the direction of the relationship was different for the upper valued housing submarkets. Among the lowest and middle valued homes, the beta coefficients were negative and mirrored the operation of the full model. Again, these findings were that increased foreclosures translated into lower home values. But, in the most expensive home markets, increased foreclosures were linked to increases in home sales prices. One potential explanation for the counterintuitive findings may relate to the scale of NSA geography and the location of "high end" foreclosures. Spatially, the upper income housing market is concentrated in Southeast Charlotte and in suburban districts. These real estate markets were experiencing the highest rate of real estate appreciation. When combined with the relatively low number of foreclosures in homes valued at over $250,000, i.e. less than 200 homes each year during the study period, the negative impact was submerged by the larger number of market sales in the high wealth neighborhoods.

While these research findings were case study specific, they offered scientific evidence confirming the differential impact of foreclosures on housing prices linked to the increased mortgage defaults in low income communities. In turn, the differing foreclosure experiences between low wealth and high wealth communities during this time created another challenge for struggling neighborhoods both inner city and suburban.

Hypothesis 2A

As stated, hypothesis 2 was that the market sale price of a residential property was adversely impacted by the close proximity to existing foreclosed housing units. The findings of the multiple regression analysis support the hypothesis. See Table 6. The adjusted R^2 was 0.854. As with Hypothesis 1, the model was able to account for over 85 percent of the variation in housing sales prices. As expected, the concentration of foreclosures in the closest distance ring, 0-330 feet, showed the strongest negative relationship. The standardized beta coefficient was -0.021. In the next zone, 331-660 feet distance ring, the relationship was weaker, with a standardized beta coefficient of -0.010. But, unexpectedly, in the 661-990 feet distance ring, the relationship strengthened with the concentration of foreclosures with a standardized beta coefficient of -0.017.

The direction of all the shadow zone relationships with the concentration of foreclosures in each distance ring was negative. In other words, as the concentration of foreclosures increased in each distance ring, the housing sale price was lower.

Considering the differentiated proportion of foreclosures at the neighborhood level, the strengthening of the standardized beta coefficient suggested a potential relationship between foreclosure proximity and housing price in Charlotte's housing submarkets. In order to examine this relationship, separate multiple regression analyses were conducted for the three market segments, low valued, middle valued, and upper valued housing submarkets.

These results are presented in Table 6. A review of these findings show that the correlation between the proximity of foreclosure to low valued, middle valued and upper valued submarkets had a similar relationship to the overall dataset. However, the adjusted

Table 6: Multiple Regression Results for Hypothesis #2

	All Single Family		Assessed Value Less than $150,000		Assessed Value $150,000-$250,000		Assessed Value Greater than $250,000	
	B (Std. Error)	Z-Beta	B (Std. Error)	Z-Beta	B (Std. Error)	Z-Beta	B (Std. Error)	Z-Beta
Constant	11.665** (0.018)		11.320** (0.028)		12.029** (0.036)		12.905** (0.084)	
% Foreclosed Units 0-330ft	-0.480** (0.033)	-0.021	-0.513** (0.039)	-0.046	-0.379** (0.054)	-0.031	-0.254* (0.120)	-0.014
% Foreclosed Units 331-660ft	-0.386** (0.059)	-0.010	-0.367** (0.067)	-0.019	-0.685** (0.104)	-0.029	0.185 (0.215)	0.006
% Foreclosed Units 661-990ft	-0.767** (0.069)	-0.017	-0.561** (0.079)	-0.025	-1.104** (0.114)	-0.043	-0.448 (0.338)	-0.008
Structural Attributes	Yes		Yes		Yes		Yes	
Neighborhood Attributes	Yes		Yes		Yes		Yes	
Year and Quarter of Sale Dummy	Yes		Yes		Yes		Yes	
Observations	72,061		34,251		25,960		11,850	
Adjusted R^2	0.854**		0.614**		0.525**		0.590**	

* $P < 0.05$, **$P < 0.01$.

Source: Author

R^2 was lower for all three value groups. These findings were statistically significant at the 99% confidence level. Low valued housing properties showed the strongest relationship. The adjusted R square was 0.614. Upper valued housing ranked second with an adjusted R square of 0.59. Finally, the middle valued housing properties presented an adjusted R square of 0.525.

The relationship at the three distance rings was varied across the submarkets. But, the standardized beta coefficients were all negative and generally mirrored the operation of the full model. Reflecting theoretic and empirical literature, closest proximity to foreclosure translated into lower market sales. Moreover, the negative relationship with foreclosures weakened as the distance increased to between 331-660 feet. The negative relationship with the concentration of foreclosures then strengthened as the distanced increased from 661-900 feet.

The strongest relationship was found for the lowest valued housing (< $150,000) and concentrations of foreclosures within 330 feet. The standardized beta coefficient was -0.046. The analysis results for housing valued between $150,000 and $250,000 was less clear-cut. Indeed, the most separated distance ring 661-990 feet had the strongest standardized beta coefficient -0.043. The results suggest that the proximity of foreclosure concentration to market sales in this group have a different pattern than the low valued housing properties. Perhaps, the middle income housing market is more robust and impacted by factors or neighborhood conditions that override the stigma or effect of concentrated foreclosures.

For housing greater than $250,000, the strongest negative relationship occurred at closest distance ring, 0-330 feet. The relationship of foreclosure concentration was positive at the second distance ring, 331-660 feet, and shifted to negative in the third distance ring, 661-990 feet. The second and third distance rings were not statistically significant. These findings suggest the impact of the proximity of foreclosure concentration in this highest valued housing submarket was much localized. In addition, the location of “high end” foreclosures in portions of Charlotte that were experiencing the highest rate of real estate appreciation may also have mitigated the impact of foreclosure concentration considering that less than 200 Charlotte homes valued over $250,000 were foreclosed. Consequently, the adverse impact was submerged by the larger number of market sales in high wealth neighborhoods.

While limited to a single case study, these analyses offered evidence of magnified foreclosure nuisance effects on lower valued housing. The data also suggested that in all housing value groups distance mattered in affecting market sale pricing.

Hypothesis 2B

Research hypothesis 2 was that the market sale price of a residential property was adversely impacted by the close proximity to existing foreclosed housing units. Hypothesis 2B was an additional analysis conducted to compare different foreclosure rates within the housing valued less than $150,000. The housing submarket was targeted for further analysis owing to the large number and proportion of foreclosures. Indeed, it was far higher than the other housing submarkets. For this analysis, neighborhoods with less than 1.5 percent of housing units foreclosed were compared to neighborhoods with more than 1.5 percent of housing units foreclosed. The choice of 1.5 percent equals to 0.5 standard deviation above the average percent of foreclosed housing units at the neighborhood level. Both groups were approximately the same size, roughly between 16,500 and 17,400 housing units.

As seen in Table 7, the hypothesis for both categories of low-income neighborhoods was supported by the multiple regression analysis. The adjusted R^2 was 0.744 for neighborhood with less than 1.5 percent of foreclosed single family homes and 0.844 for neighborhood greater than 1.5 percent. It is noteworthy that neighborhoods with higher rates of foreclosure displayed a significantly stronger relationship between proximity and affected sales price.

In both groups, the shadow affect of concentrated foreclosure followed research expectations and were statistically significant. In every case, the direction of the standardized beta coefficient was negative. In other words, as the concentration of foreclosed property increased in each distance ring, the housing sale prices were lower. In neighborhoods with less than 1.5 percent of foreclosures, the strongest standardized beta coefficients was -0.057 for foreclosure concentrations in the closest distance ring, 0-330 feet. The standardized beta coefficients weakened to -0.034 in the middle distance ring and dropped to -0.029 in the outer most distance ring. Unlike the analysis for all housing under $150,000, the standardized beta coefficient in the furthest ring was the weakest.

In neighborhoods with greater than 1.5 percent foreclosed housing units, the strongest standardized beta coefficients was -0.043 for foreclosure concentrations in the closest distance ring. The second distance ring displayed a weaker standardized beta coefficient of -0.015, but the value strengthened slightly to -0.021 for the outer most distance ring.

Table 7: Multiple Regression Results for Hypothesis #2, Assessed Value Less than $150,000

	Neighborhood Foreclosures Less than 1.5%		Neighborhood Foreclosures Greater than 1.5%	
	B (Std. Error)	Z-Beta	B (Std. Error)	Z-Beta
Constant	11.832** (0.037)		10.656** (0.043)	
% Foreclosed Units 0-330ft	-0.919** (0.083)	-0.057	-0.382** (0.041)	-0.043
% Foreclosed Units 331-660ft	-0.851** (-0.131)	-0.034	-0.229** (0.073)	-0.015
% Foreclosed Units 661-990ft	-0.808** (0.144)	-0.029	-0.393** (0.088)	-0.021
Structural Attributes	Yes		Yes	
Neighborhood Attributes	Yes		Yes	
Distance Attributes	Yes		Yes	
Year and Quarter Dummies	Yes		Yes	
Observations	17,357		16,458	
Adjusted R^2	0.744**		0.822**	

* P < 0.05, **P< 0.01.

Taken together, these results suggested that market sales in neighborhood with less than 1.5 percent of foreclosed housing units were more sensitive to the proximity of foreclosed housing units than those in neighborhoods with the proportion of foreclosed homes greater than 1.5 percent. The data suggested that a higher concentration of foreclosed housing units at the neighborhood level makes it more difficult to measure the impact of the proximity of foreclosures on housing prices.

Since the group with higher foreclosure rates had a larger adjusted R square, the data suggested markets sale characteristics in high foreclosure neighborhoods varied less than market sales in low foreclosure neighborhoods. A further review of the descriptive statistics showed that higher foreclosure neighborhoods were newer leaving less time for the neighborhoods to make significant changes to the housing stock and repeat more uniform development patterns.

Hypothesis 3

Hypothesis 3 focused upon the temporal impact of mortgage foreclosed residential properties in a neighborhood. It posited that the longer the average foreclosed home was for sale, the more severe the negative price impact upon neighborhood residential units. As seen in Table 8, the hypothesis was supported by the multiple regression analysis. The adjusted R^2 for all properties was 0.854. The standardized beta coefficient was -0.042, indicating the direction of the relationship was negative. In other words, as the length of foreclosure increased, housing sale prices were lower.

In order to better understand the impact of the length of foreclosure or how long a banking institution owned a residential property, the full model was deconstructed to examine the relationship across the three real estate assessment submarkets. Thus, the

Table 8: Multiple Regression Results for Hypothesis #3

	All Single Family		Assessed Value Less than $150,000		Assessed Value $150,000-$250,000		Assessed Value Greater than $250,000	
	B (Std. Error)	Z-Beta	B (Std. Error)	Z-Beta	B (Std. Error)	Z-Beta	B (Std. Error)	Z-Beta
Constant	11.657** (0.018)		11.361** (0.028)		12.018** (0.036)		12.922** (0.085)	
Length of Foreclosure (000)	-0.154** (0.007)	-0.042	-0.179** (0.010)	-0.071	-0.149** (0.009)	-0.091	0.034 (0.018)	0.015
Structural Attributes	Yes		Yes		Yes		Yes	
Neighborhood Attributes	Yes		Yes		Yes		Yes	
Year and Quarter of Sale Dummy	Yes		Yes		Yes		Yes	
Observations	72,061		34,251		25,960		11,850	
Adjusted R^2	0.854**		0.614**		0.526**		0.590**	

* $P < 0.05$, ** $P < 0.01$.

Source: Author

multiple regression analysis was carried out in for the low valued, middle valued, and upper valued housing submarkets.

The results for the three sub-models were all statistically significant. But, there were significant differences between the housing submarkets. First, the explanatory power of the model varied as housing values increased, with the strongest predictive power among the lowest valued homes. The adjusted R^2 was 0.615 in this submarket. The next most powerful model, the adjusted R^2 equals 0.593 occurred at the highest valued homes. The adjusted R^2 was 0.528.

Secondly, the direction of the relationship differed between groups. Among the lowest and middle valued homes, the beta coefficients were negative and mirrored the operation of the full model. The data suggested that increased length of foreclosure translated into lower home values. But, in the most expensive home markets, increased length of foreclosure was linked to higher home sales prices.

As in the earlier research results surrounding high income housing markets, these counterintuitive findings may relate to the NSA scale geography and the concentration of “high end” foreclosures in parts of the city that were experiencing the highest rate of real estate appreciation. So that, given the relatively low number of foreclosures in homes valued at over $250,000, i.e. less than 200 homes each year during the study period, the negative impact was submerged by the larger number of market sales in the high wealth neighborhoods.

While these findings were limited to this single case study, they indicated that along with the percent of foreclosed homes, the length of foreclosed homes has a differential impact across the housing submarkets. Specifically, these results found low valued housing owners were more impacted by increased length of time that a foreclosed property was owned by banking institution.

Hypothesis 4

Research hypothesis 4 posited that market sales prices for residential properties were influenced by the structural attributes of the unit, neighborhood quality of life characteristics as well as, temporal and locational elements. Table 9, presents the findings of the regression analysis. The hypotheses surrounding all four categories were supported. Following the earlier research framework, the regression analysis was carried using residential foreclosures and also applied to the three housing markets. The full model had an adjusted R square of 0.854, accounting for 85 percent of the variation in housing sale prices in the neighborhood. The submarket modeling was statistically significant but less reliable models. The strongest explanation was observed in the lowest price housing market, adjusted R square equals 0.614, and high income housing market, adjusted R square equals 0.590. The middle income housing market slipped to an adjusted R square equals 0.525.

Among the independent variables categories, the structural attributes performed in the expected direction in the full model. The AGE variable operated in a negative direction with sales price. The beta coefficient was -0.012. This finding suggested that as the housing unit increased in age there was a lower housing sales price. The result makes sense since older housing diminished in value due to increased maintenance, replacement costs, and overall obsolescence of older housing.

Conversely, the variables BEDS, FBATHS, HBATHS, SQFT, FIRE, and LOTSIZE displayed positive beta coefficients with housing price. In other words as the

Table 9: Multiple Regression Results for Hypothesis #4

	All Single Family	Assessed Value Less than $150,000	Assessed Value $150,000-$250,000	Assessed Value Greater than $250,000
	B	B	B	B
	(Std. Error)	(Std. Error)	(Std. Error)	(Std. Error)
Constant	11.665** (0.018)	11.320** (0.028)	12.029** (0.036)	12.905** (0.084)
Structural Attributes				
AGE	-0.012** (0.000)	-0.012** (0.000)	-0.007** (0.000)	-0.005** (0.001)
AGE^2	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)
AGE^3	-0.000** (0.000)	-0.000** (0.000)	-0.000** (0.000)	-0.000** (0.000)
BEDS	0.005** (0.001)	0.016** (0.002)	0.011** (0.001)	-0.008* (0.003)
FBATHS	0.044** (0.002)	0.059** (0.004)	0.018** (0.003)	0.031** (0.004)
HBATHS	0.017** (0.002)	0.021** (0.003)	-0.011** (0.003)	0.026** (0.006)
SQFT (000s)	0.456** (0.001)	0.894** (0.023)	0.214** (0.000)	0.028** (0.023)
$SQFT^2$	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)
FIRE	0.059* (0.003)	0.049** (0.003)	0.078** (0.005)	-0.044** (0.010)
LOTSIZE (000s)	0.004** (0.000)	0.002** (0.000)	0.002** (0.017)	0.004** (0.002)
STY_1	0.024** (0.003)	Reference	0.023** (0.005)	-0.018 (0.010)
STY_15	0.056** (0.004)	-0.007 (0.007)	0.050** (0.005)	0.033** (0.008)
STY_2	Reference	-0.038** (0.004)	Reference	Reference
STY_25	0.004 (0.007)	-0.043 (0.057)	0.075** (0.014)	-0.015 (0.009)
A_FRAME	-0.142 (0.122)	-0.137 (0.140)	-0.167 (0.169)	N/A
BILEVEL	-0.092** (0.013)	-0.069** (0.014)	-0.135** (0.025)	-0.081 (0.114)
CAPECOD	-0.005 (0.031)	-0.024 (0.029)	-0.551** (0.171)	N/A

Table 9, Continued

RRANCH	-0.017 (0.012)	0.046** (0.017)	-0.017 (0.018)	-0.0890** (0.028)
SPLIT LEVEL	-0.033** (0.006)	-0.017* (0.007)	-0.077** (0.009)	-0.093** (0.030)
AD	0.037* (0.019)	0.109** (0.024)	-0.046 (0.030)	-0.131 (0.082)
BASEBOARD	0.117** (0.013)	0.096** (0.013)	0.090** (0.040)	-0.148 (0.105)
HP	0.121** (0.009)	0.104** (0.010)	0.055** (0.024)	-0.081 (0.064)
HW	0.180** (0.037)	0.145* (0.066)	-0.081 (0.065)	-0.096 (0.088)
CELL_RD	0.103 (0.094)	0.117 (0.099)	-0.037 (0.170)	N/A
STEAM	0.437 (0.236)	N/A	N/A	N/A
ELECTRIC	-0.023** (0.004)	-0.010* (0.005)	-0.062** (0.007)	-0.049** (0.016)
GAS	Reference	Reference	Reference	Reference
NONE	-0.102** (0.023)	-0.033 (0.027)	0.668 (0.098)	0.0621** (0.198)
OWC	-0.070** (0.011)	-0.046** (0.011)	-0.087** (0.027)	0.026 (0.078)
SOLAR	0.072 (0.106)	0.204 (0.142)	0.076 (0.199)	0.178 (0.261)
CS	0.053** (0.003)	0.007 (0.004)	0.084** (0.003)	0.083** (0.010)
ALUMVINYL	Reference	Reference	Reference	-0.146** (0.009)
ASBSDGSHG	-0.046** (0.010)	-0.036** (0.010)	0.051 (0.030)	-0.070 (0.069)
BOARDBATTE	0.087 (0.049)	-0.325* (0.140)	0.120 (0.076)	0.001 (0.074)
CEDARRDWD	0.157** (0.011)	0.074 (0.046)	0.119** (0.016)	0.042** (0.015)
CEM_BRSPL	0.055 (0.080)	N/A	0.081 (0.169)	-0.400 (0.254)
COMPWALL	-0.287** (0.047)	-0.272** (0.046)	-0.144 (0.169)	N/A
CONCBLOCK	0.007 (0.032)	-0.133** (0.034)	0.061 (0.076)	0.148 (0.131)
LGT_CORR	0.043 (0.070)	0.026 (0.075)	0.097 (0.120)	N/A

Table 9, Continued

PLYWOOD	-0.018 (0.011)	-0.018 (0.011)	0.050 (0.029)	-0.016 (0.127)
FACEBRICK	0.093** (0.003)	0.052** (0.005)	0.103** (0.005)	Reference
HARDIPLK	0.025** (0.006)	-0.002 (0.018)	0.087** (0.009)	-0.099** (0.011)
JUMBBRICK	0.050 (0.080)	0.063 (0.075)	N/A	N/A
MASONITE	0.030** (0.003)	0.010** (0.004)	0.045** (0.004)	-0.051** (0.009)
SDGNONE	-0.041 (0.149)	0.122 (0.197)	N/A	-0.194 (0.253)
SIDINGNS	-0.023 (0.033)	-0.013 (0.033)	0.056 (0.098)	-0.211 (0.253)
STONE	0.030 (0.051)	0.253** (0.066)	0.179 (0.085)	-0.636** (0.127)
HRDSTUCC	0.179** (0.009)	-0.048 (0.034)	0.150** (0.027)	0.057** (0.011)
SYNSTUCC	0.083** (0.023)	0.067 (0.114)	N/A	-0.0562 (0.028)
STGWD	0.022** (0.004)	0.001 (0.005)	0.057** (0.007)	-0.050** (0.013)
SHINGWD	0.144** (0.014)	0.042 (0.042)	0.079** (0.024)	0.038 (0.020)
AVERAGE	Reference	Reference	Reference	-0.047** (0.009)
BELOW	-0.154** (0.011)	-0.158** (0.011)	0.771** (0.061)	0.185 (0.136)
CUSTOM	0.644** (0.012)	N/A	N/A	0.507** (0.015)
EXCELLENT	0.443** (0.009)	N/A	N/A	0.306** (0.011)
GOOD	0.158** (0.003)	0.174** (0.019)	0.096** (0.004)	Reference
VG	0.317** (0.005)	-0.054 (0.141)	0.064** (0.020)	0.164** (0.006)
AC	0.078** (0.005)	0.055** (0.005)	-0.001 (0.012)	0.017 (0.024)

Table 9, Continued

Neighborhood Attributes				
CITY	0.018** (0.003)	-0.000 (0.005)	0.055** (0.004)	0.073** (0.014)
VIOLENT	-0.040** (0.003)	-0.027** (0.002)	-0.011 (0.006)	-0.042** (0.018)
PROPERTY	0.034** (0.002)	0.030** (0.002)	0.036** (0.005)	-0.084** (0.013)
JUVENILE	-0.009** (0.001)	-0.008** (0.001)	-0.002 (0.005)	-0.013** (0.004)
APPEARANCE	-0.544** (0.015)	-0.318** (0.0156)	-0.732** (0.032)	-1.086** (0.1137)
SUBSTANDARD	-1.114** (0.070)	-1.148** (0.070)	-3.565** (0.261)	-3.913** (1.039)
N_OWNER	-0.087** (0.008)	-0.091** (0.010)	-0.069** (0.011)	-0.124** (0.027)
SIDEWALK	0.093** (0.004)	0.116** (0.007)	0.011 (0.006)	0.081** (0.012)
INCOMECHG	1.261** (0.095)	1.814** (0.143)	0.391** (0.138)	1.158** (0.246)
FOODSTAMP	-0.905** (0.029)	-0.897** (0.031)	-0.542** (0.064)	-0.714** (0.243)
TRANSIT	0.084** (0.005)	0.046** (0.006)	0.111** (0.008)	0.118** (0.012)
RETAIL	0.121** (0.008)	0.118** (0.010)	0.052** (0.012)	0.038 (0.023)
NWHITE	-0.444** (0.006)	-0.394** (0.009)	-0.276** (0.009)	-0.104** (0.025)
NSCHOOLS	-0.031** (0.010)	-0.186** (0.015)	-0.016 (0.0138)	0.352** (0.030)
Distance Attributes				
DMAJOR (00s)	0.001** (0.001)	0.009** (0.002)	0.009** (0.002)	0.039** (0.004)
DCBD (miles)	-0.014** (0.000)	-0.012** (0.000)	-0.015** (0.000)	-0.019** (0.001)
$DCBD^2$ (miles)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)
Temporal Attributes				
Y2003_Q1	-0.205** (0.006)	-0.171** (0.007)	-0.215** (0.008)	-0.240** (0.017)
Y2003_Q2	-0.202** (0.005)	-0.170** (0.007)	-0.211** (0.007)	-0.203** (0.015)
Y2003_Q3	-0.193** (0.005)	-0.177** (0.007)	-0.197** (0.007)	-0.186** (0.015)

Table 9, Continued

Y2003_Q4	-0.200** (0.005)	-0.168** (0.007)	-0.195** (0.007)	-0.236** (0.016)
Y2004_Q1	-0.154** (0.005)	-0.133** (0.007)	-0.162** (0.007)	-0.185** (0.016)
Y2004_Q2	-0.132** (0.005)	-0.119** (0.007)	-0.137** (0.006)	-0.155** (0.013)
Y2004_Q3	-0.118** (0.004)	-0.101** (0.006)	-0.136** (0.006)	-0.140** (0.013)
Y2004_Q4	-0.118** (0.005)	-0.101** (0.006)	-0.125** (0.006)	-0.142** (0.014)
Y2005_Q1	-0.098** (0.005)	-0.086** (0.007)	-0.111** (0.007)	-0.111** (0.016)
Y2005_Q2	-0.075** (0.004)	-0.067** (0.006)	-0.084** (0.006)	-0.074** (0.013)
Y2005_Q3	-0.065** (0.004)	-0.059** (0.006)	-0.076** (0.006)	-0.052** (0.013)
Y2005_Q4	-0.060** (0.004)	-0.062** (0.006)	-0.059** (0.006)	-0.041** (0.014)
Y2006_Q1	-0.034** (0.005)	-0.025** (0.006)	-0.028** (0.006)	-0.068** (0.014)
Y2006_Q2	Reference			
Y2006_Q3	0.017** (0.005)	0.005** (0.006)	0.028** (0.006)	0.019 (0.014)
Y2006_Q4	0.027** (0.005)	0.011** (0.006)	0.038** (0.006)	0.040** (0.014)
Y2007_Q1	0.091** (0.005)	0.095** (0.007)	0.082** (0.007)	0.063** (0.015)
Y2007_Q2	0.124** (0.005)	0.125** (0.006)	0.106** (0.006)	0.106** (0.014)
Y2007_Q3	0.124** (0.005)	0.127** (0.007)	0.104** (0.006)	0.104** (0.014)
Y2007_Q4	0.112** (0.005)	0.124** (0.007)	0.088** (0.007)	0.084** (0.016)
Foreclosure Attributes				
D330HU	-0.480** (0.033)	-0.513** (0.039)	-0.379** (0.054)	-0.254* (0.120)
D660HU	-0.386** (0.059)	-0.367** (0.067)	-0.685** (0.104)	0.185 (0.215)
D990HU	-0.767** (0.069)	-0.561** (0.079)	-1.104** (0.114)	-0.448 (0.338)
Observations	72,061	34,251	25,960	11,850
Adjusted R^2	0.854**	0.614**	0.525**	0.590**

* P < 0.05, **P< 0.01.

Source: Author

variables increased, the price of housing was higher. All were statistically significant. These results made economic sense as most consumers are willing to pay more for housing as the number of beds, bathrooms, square footage and lot size grow.

The model also included an additional 48 structural variables to control for the variability in the model. These variables included siding, foundation type, structure quality, number of stories, heating type, air conditioning type.

The analytical findings with the neighborhood variables did not always match the expected relationship. In the case of VIOLENT, JUVENILE, APPEARANCE, SUBSTANDARD, FOODSTAMP, NWHITE the beta coefficients were negatively related with sales price. The relationship suggested that as these variables increased at the neighborhood level, the price of individual housing units was lower. These results affirmed the literature showing that housing in neighborhoods with higher rates of crime and increased appearance and housing code violations were priced lower than comparable housing in other neighborhoods.

Similarly, the variable SIDEWALK, INCOMECHG, and RETAIL, presented a positive relationship with sales price. Thus, as these variables increased, the price of housing was higher. In the case of these results, the analysis may represent the trend toward more compact neighborhood development and a willingness of homeowners to pay more for housing in neighborhoods with increased sidewalk access and walkable access to retail shopping.

The remaining variables did not, however, perform as expected. The Variables CITY, PROPERTY, and TRANSIT, were expected to have a negative relationship with sales price. However, they showed a positive relationship. Since housing units outside the city of Charlotte limits have lower taxes, their housing prices were expected to be higher outside the city limits. While property crime is expected to have a negative relationship with housing price, property crime could be higher with increasing opportunities in higher valued housing areas. Access to transit was expected to be negative since the data only incorporated bus stop information which is usually associated with lower valued housing. Restating the relationship, as property crime and transit access increased, the price of housing was higher. For the entire dataset, housing prices in the city increased faster than housing units outside the city limits.

The N_OWNER and NSCHOOLS variables were expected to show a positive relationship with housing sales price. Neighborhoods with higher proportions of owner occupied housing and students attending neighborhood schools, exhibited a negative relationship. On potential explanation for this outcome was that the model was affected by gentrification processes. Specifically, given strong gentrification trends during the study period, neighborhoods experiencing the highest increase in housing values were inner city neighborhoods with lower home ownership and with fewer students attending neighborhood schools. Indirectly, the model has identified areas that are experiencing elements of gentrification.

The two distance variables offered differing outcomes relative to locational characteristics. DMAJOR revealed a positive relationship with sales price. In other words, as the distance to major roads increased, the price of residential property declined. The DCBD variable displayed a negative relationship with housing price. Consequently, as housing separation from the central business district increased, the sale price was lower.

For the temporal attributes, the beta coefficients increased in value as expected for each successive quarter which mirrored the increase in housing prices experienced in the Charlotte region during the study period of 2003-2007.

In order to better understand the impact of structural attributes, the full model was deconstructed to examine model performance across the three real estate submarkets.

As noted earlier, the explanatory power of the model varied across the three submarkets. More critically, the direction of the relationship was also different for some of the variables between the groups. The AGE variable had a negative relationship with sales price for all three sub-models, while FBATHS, SQFT, and LOTSIZE maintained a positive relationship in all three sub-models. However, the middle valued submarkets displayed a negative relationship with HBATHS. Therefore, houses in this value group with more half baths presented lower housing prices. This relationship may be explained by the demand for two full baths in houses in this price category group. For upper valued housing submarkets, BEDS and FIRE showed a negative relationship with housing price. Thus, the analyses suggest that housing with more bedrooms and fireplaces have lower housing prices. The explanation for this relationship was not easily offered.

In a similar outcome, the neighborhood variables did not always match the expected relationship across the three submarkets. VIOLENT, JUVENILE, APPEARANCE, SUBSTANDARD, FOODSTAMP, NWHITE all showed negative beta coefficients with sales price. All the variables were statistically significant.

In turn, the SIDEWALK, INCOMECHG, and RETAIL variables showed a positive relationship with sales price across all three sub-models. All the variables were statistically significant except for SIDEWALK for the middle valued housing group.

The remaining variables did not display the posited relationship. The Variables CITY, PROPERTY, and TRANSIT were expected to have a negative linkage with sales price. But, they showed a positive association. The only exception was PROPERTY which had a negative relationship with upper valued housing submarkets. All the variables were statistically significant except for CITY in the low valued housing submarket.

The N_OWNER and NSCHOOLS variables were presumed to show a positive relationship with sales price. For the upper valued housing submarket, NSCHOOLS featured a positive relationship, but the other two subgroups exhibited a negative relationship. All housing subgroups had a negative connection with N_OWNER.

For the distance attributes, DMAJOR showed a positive correlation with sales price in all three housing groups, while DCBD displayed a negative relationship all the submarkets. Both variables were statistically significant in cases.

For the temporal attributes, the sales quarters for all three subgroups generally displayed increasing beta coefficient values for each successive quarter indicating the housing prices increased during the study period for all submarkets.

Taken together, the analyses of the structural, neighborhood, temporal and location characteristics confirmed the major findings in the literature that these elements did matter in terms of housing, neighborhood, and locational preferences of homebuyers. Importantly, however, the neighborhood characteristics used in this analysis did provide a research enhancement that had not been included in previous research in this area.

The second focus of this research was to examine the impact of foreclosure activity on homeownership in surrounding residential properties. Within this framework, in general, the study posited that the scale and intensity of single-family housing foreclosures would reduce the probability that surrounding residential properties would be owner-occupied. Four hypotheses were constructed and tested, in order to broadly examine this issue.

Hypothesis 5A

Research hypothesis 5 proposed that as the proportion of foreclosures in a residential community increased, the homeownership was adversely influenced. As seen in Table 10, the hypothesis was supported by the logistic regression analysis. The full model X^2 test was statistically significant. In other words, the independent variables added to the model showed a relationship to homeownership two years post the market sale date.

For our variable of interest, the percent of foreclosed homes in the neighborhood, the standardized beta coefficient was -0.105 with an odds ratio of 0.901. With the odds ratio less than the reference value of 1 and a negative standardized beta coefficient, the relationship was negative. In other words, the housing unit is less likely to be owner occupied 2 years after a market sale in neighborhoods as the rates of foreclosure increased.

In order to better understand foreclosure trends across Charlotte’s housing submarkets, the citywide analysis was disaggregated to examine the impact of foreclosure across the three real estate submarkets. Thus, the logistic regression analysis was carried out in low valued, middle valued, and upper valued housing submarkets.

These results, presented on Table 10, show that foreclosure rates and the negative impact on homeownership were exhibited in the lower-income and middle valued submarkets two years post market sale. But, foreclosure activity had a positive impact on homeownership in the upper valued submarket. All three sub models had significant X^2 tests. In general, the odds ratios moved with housing value changes, with the lower-income valued housing presenting an odd ratio of 0.893 and middle valued housing with an odds ratio 0.865. For the upper valued housing group, the odds ratio of 1.577 indicates the probability of homeownership increases two years post transaction as the percentage of foreclosed housing increases, however, the relationship was not significant in the model.

Little research around the effects of foreclosure had not examined data at the housing unit level. These new research results showed low valued housing was less likely to be owner-occupied as foreclosures increased at the neighborhood level. Put into context on recent programs to foster low income homeownership, the results indicated a setback in the progress they have made in the past (Wyly, 2001).

Hypothesis 5B

Expanding the scope of hypothesis 5, an additional analysis was conducted to see if the likelihood of individual housing level ownership was different across neighborhoods with different homeownership rates. The purpose of this examination was to determine if individual housing ownership in low homeownership neighborhoods were impacted by foreclosures differently than individual housing ownership in high homeownership neighborhoods. Operationally, neighborhoods with less than 65 percent owner-occupied housing were compared to neighborhoods with more than 65 percent

Table 10: Logistic Regression Results for Hypothesis #5

	All Single Family		Assessed Value Less than $150,000		Assessed Value $150,000-$250,000		Assessed Value Greater than $250,000	
	Z-Beta (Std. Error)	Exp(B)	Z-Beta (Std. Error)	Exp(B)	B (Std. Error)	Exp(B)	B (Std. Error)	Exp(B)
Percent of Foreclosed Housing Units	-0.105** (0.015)	0.901	-0.113** (0.017)	0.893	-0.145** (0.041)	0.865	0.455** (0.118)	1.577
Structural Attributes	Yes		Yes		Yes		Yes	
Neighborhood Attributes	Yes		Yes		Yes		Yes	
Year and Quarter of Sale Dummy	Yes		Yes		Yes		Yes	
Observations	72,061		34,251		25,960		11,850	
Model X^2 Significance	Yes**		Yes**		Yes**		Yes**	

* P < 0.05, **P< 0.01.

Source: Author

owner-occupied housing. The choice of 65 percent matches the average owner-occupied housing rate at the NSA scale in Charlotte.

As seen in Table 11, the analysis verified the research hypothesis. Foreclosures rates adversely impacted housing level ownership in both low and high homeownership neighborhoods. Both models had significant model X^2 values. The odds ratio for the percent of foreclosed housing unit variable was -0.897 for neighborhoods with less than 65 percent of owner-occupied households. The odds ratio was -0.880 for neighborhoods with greater than 65 percent of owner-occupied households. With the odds ratios less than the reference value of 1 and a negative standardized beta coefficient, the housing unit regardless of the neighborhood homeownership rate is less likely to be owner occupied two years after a market sale in neighborhoods as the rates of foreclosure increased.

Hypothesis 6

Hypothesis 6 postulated that homeownership was adversely impacted by the close proximity to existing or recently foreclosed housing units. The results of the logistic regression shown in Table 12 confirmed the thesis. For the concentration of foreclosures in the closest distance ring, 0-330 feet, the standardized beta coefficient was -0.053 with an odds ratio of 0.948. With the a negative standardized beta coefficient and an odds ratio of less than 1, the probability of homeownership decreases as the percent of foreclosure in this distance ring increases.

The standardized beta coefficient for the concentration of foreclosures at the 331-660 feet distance ring was -0.022 with the odds ratio increasing to 0.978. The odds ratios were significant in the two closest distance rings of foreclosure concentrations.

Table 11: Logistic Regression Results for Hypothesis #5 by Neighborhood Homeownership

	Neighborhood Homeownership Less than 65%		Neighborhood Homeownership Greater than 65%	
	Z-Beta (Std. Error)	Exp(B)	Z-Beta (Std. Error)	Exp(B)
Percent of Foreclosed Housing Units	-0.108** (0.018)	0.897	-0.118** (0.027)	0.889
Structural Attributes	Yes		Yes	
Neighborhood Attributes	Yes		Yes	
Distance Attributes	Yes		Yes	
Year and Quarter Dummies	Yes		Yes	
Observations	27,198		44,247	
Model X^2 Significance	Yes**		Yes**	

* P < 0.05, **P< 0.01.
Source: Author

Table 12: Logistic Regression Results for Hypothesis #6

	All Single Family		Assessed Value Less than $150,000		Assessed Value $150,000-$250,000		Assessed Value Greater than $250,000	
	Z-Beta (Std. Error)	Exp(B)	Z-Beta (Std. Error)	Exp(B)	B (Std. Error)	Exp(B)	B (Std. Error)	Exp(B)
% Foreclosed Units 0-330ft	-0.053** (0.009)	0.948	-0.061** (0.011)	0.941	-0.055** (0.019)	0.947	-0.020 (0.034)	0.980
% Foreclosed Units 331-660ft	-0.022* (0.010)	0.978	-0.032** (0.011)	0.969	-0.026 (0.024)	0.975	0.130 (0.080)	1.139
% Foreclosed Units 661-990ft	-0.015 (0.010)	0.985	-0.025** (0.011)	0.975	0.025 (0.024)	1.025	0.088 (0.070)	1.091
Structural Attributes	Yes		Yes		Yes		Yes	
Neighborhood Attributes	Yes		Yes		Yes		Yes	
Quarter Sale Dummy	Yes		Yes		Yes		Yes	
Observations	72,061		34,251		25,960		11,850	
Model X^2 Significance	Yes**		Yes**		Yes**		Yes**	

* P < 0.05, **P< 0.01.

Source: Author

In the 661-990 feet ring, the most distant from the foreclosure the standardized beta coefficient dropped to -0.015 with an odds ratio of 0.985. It was not statistically significant. Taken together, the analysis suggests that the impact proximity to foreclosed homes is diminished as it is stretched.

In order to better understand the proximity impacts of foreclosures on home ownership across the Charlotte housing market, the analysis was deconstructed across the three real estate submarkets. Thus, the logistic regression was carried out in low valued, middle valued and upper valued housing submarkets.

The logistic regression results, presented on Table 12, show that the proximity of foreclosure is accompanied by negative impact on homeownership in all low-valued housing, and had limited impact on middle valued properties. The odds ratios at the three distance rings varied across each submarket. The odds ratio in all distance rings was significant for housing valued less than $150,000. Houses in this value range were less likely to be owner-occupied 2 year post market sale transaction with the increasing concentration of foreclosures at all three distance rings. For the closest distance ring of foreclosure concentration, 0-331 feet, the odds ratio was 0.941. The odd ratios increased to 0.969 in the 331-660 foot distance ring and increased further to 0.975. The values suggest that as the concentration of foreclosure increased at each distance ring, the housing units for a market sale property two years post transaction was less likely to be owner-occupied.

A similar trend occurred for the odds ratios in the housing valued between $150,000 and $250,000. The closest distance ring of foreclosure concentration displayed a statistically significant odds ratio of 0.947. However, the next distance ring of foreclosure concentration had an odds ratio of 0.975. It was not statistically significant. The full model of the middle value range housing submarkets produced a X^2 that was statistically significant.

The outer most distance ring of foreclosure concentration had an odds ratio of 1.025. With an odds ratio greater than 1, the increase in concentration of foreclosure results in a higher probability of homeownership. However, the odds ratio was not statistically significant.

For housing valued greater than $250,000, the results indicate that the proximity of foreclosure is not significant for any of the distance rings. Indeed, only the closest distance ring has the only odds ratio less than 1 at 0.980. The values suggest that the concentration of foreclosure has a negative impact on foreclosure only on the closest distance ring and is less relevant as the housing values increase. The full model of the upper value range housing submarkets produced a X^2 that was statistically significant.

These findings, focused primarily on the proximity effects of foreclosures upon housing unit homeownership, offered new empirical evidence that advanced the literature in externality theory. While proximity to foreclosure had been shown to negatively impact housing prices, these data found the same relationship to homeownership. Additionally, the low valued housing market was significantly impacted.

Hypothesis 7

Hypothesis 7 focused upon the impact of the average time period of mortgage foreclosure in the neighborhood, proposing that the longer the average foreclosure, the more severe the negative impact upon residential homeownership. The hypothesis was supported by logistic regression analysis. See Table 13. The odds ratio for the length of

Table 13: Logistic Regression Results for Hypothesis #7

	All Single Family		Assessed Value Less than $150,000		Assessed Value $150,000-$250,000		Assessed Value Greater than $250,000	
	Z-Beta (Std. Error)	Exp(B)	Z-Beta (Std. Error)	Exp(B)	Z-Beta (Std. Error)	Exp(B)	Z-Beta (Std. Error)	Exp(B)
Length of Foreclosure	0.036** (0.013)	0.965	-0.066** (0.018)	0.937	0.027 (0.026)	1.028	0.010 (0.037)	1.010
Structural Attributes	Yes		Yes		Yes		Yes	
Neighborhood Attributes	Yes		Yes		Yes		Yes	
Year and Quarter of Sale Dummy	Yes		Yes		Yes		Yes	
Observations	72,061		34,251		25,960		11,850	
Model X^2 Significance	Yes**		Yes**		Yes**		Yes**	

* P < 0.05, **P< 0.01.

Source: Author

foreclosure variable was 0.965. With the odds ratio less than the reference value of 1, the housing units were less likely to be owner-occupied 2 years after the market sale in neighborhoods with longer average time periods of mortgage foreclosures. The calculated X^2 was statistically significant.

In order to better understand the length of time of mortgage foreclosures across the Charlotte housing market, the logistic regression analysis was deconstructed to examine the length of foreclosure across the three real estate submarkets. These research findings, presented in Table 13, show that the length of foreclosure and the associated negative impact on homeownership is confirmed for the lowest valued housing. With an odds ratio of 0.937, the probability of homeownership for these low valued housing units two years post market sale transaction was diminished. For the middle valued and upper valued housing, the odds ratios were positive, but the results were not statistically significant.

Since research related to the length of foreclosure and homeownership was absent from the literature, these findings provided new insights. In particular, the negative neighborhood effects of bank owned foreclosed properties in low income neighborhoods was noteworthy.

Hypothesis 8

As stated, hypothesis 8 was that homeownership was influenced by the structural attributes of the individual property, neighborhood quality of life characteristics and locational elements. As seen in Table 14, the hypothesis was supported by the logistic regression analysis. The values used to explain the results in this section reference standardized beta coefficients. If the coefficients are negative, then the relationship is

Table 14: Logistic Regression Results for Hypothesis #8

	All Single Family	Assessed Value Less than $150,000	Assessed Value $150,000-$250,000	Assessed Value Greater than $250,000
	Z-Beta	Z-Beta	Z-Beta	Z-Beta
	(Std. Error)	(Std. Error)	(Std. Error)	(Std. Error)
Structural Attributes				
AGE	0.455** (0.085)	0.416** (0.112)	0.822** (0.176)	0.365 (0.241)
BEDS	0.119** (0.014)	0.105** (0.021)	0.122** (0.022)	0.092* (0.034)
FBATHS	0.042* (0.019)	0.069* (0.032)	-0.069 (0.029)	0.044 (0.038)
HBATHS	0.042** (0.014)	0.094** (0.020)	-0.087** (0.028)	0.032 (0.038)
SQFT	0.808** (0.068)	1.846** (0.228)	0.688* (0.241)	0.567** (0.230)
FIRE	0.106** (0.011)	0.109** (0.012)	0.024 (0.034)	0.112* (0.055)
LOTSIZE	-0.054** (0.012)	-0.028 (0.019)	-0.078** (0.023)	-0.040 (0.027)
STY_1	0.015 (0.039)	0.042 (0.046)	-0.075 (0.090)	0.025 (0.197)
STY_15	-0.030 (0.022)	-.036 (0.028)	-0.037 (0.046)	0.080 (0.097)
STY_2	-0.113 (0.042)	-0.166 (0.049)	-0.032 (0.095)	0.076 (0.205)
STY_25	-0.032 (0.017)	-0.085 (0.086)	-0.066 (0.036)	0.030 (0.054)
RRANCH	0.010 (0.012)	-0.031 (0.016)	-0.025 (0.024)	0.028 (0.039)
AD	0.064 (0.058)	0.059 (0.071)	0.022 (0.132)	-0.072 (0.299)
HP	0.099 (0.021)	0.087 (0.023)	0.024 (0.087)	0.092 (0.139)
HW	0.005 (0.010)	-0.011 (0.015)	0.004 (0.025)	0.015 (0.021)
CS	0.007 (0.018)	-0.017 (0.025)	0.036 (0.031)	-.014 (0.067)
ALUMVINYL	0.051 (0.092)	0.121 (0.224)	0.017 (0.205)	0.100 (0.133)
ASBSDGSHG	-0.007 (0.018)	0.010 (0.039)	-0.031 (0.051)	-0.086 (0.056)

Table 14, Continued

CEDARRDWD	0.010 (0.019)	0.126 (0.088)	-0.019 (0.039)	0.017 (0.024)
CONCBLOCK	-0.013 (-0.013)	-0.006 (0.015)	-0.017 (0.031)	-0.022 (0.032)
PLYWOOD	-0.005 (0.016)	0.012 (0.035)	-0.056 (0.045)	-0.221 (0.092)
FACEBRICK	0.038 (0.076)	0.074 (0.188)	0.046 (0.171)	0.039 (0.102)
HARDIPLK	0.005 (0.027)	0.006 (0.068)	0.019 (0.060)	-0.009 (0.037)
MASONITE	0.050 (0.063)	0.095 (0.153)	0.025 (0.140)	0.059 (0.091)
HRDSTUCC	0.003 (0.021)	-0.028 (0.057)	0.065 (0.073)	0.002 (0.027)
SYNSTUCC	-0.008 (0.013)	0.028 (0.046)	N/A	-0.014 (0.014)
STGWD	0.014 (0.044)	0.045 (0.108)	0.011 (0.099)	0.003 (0.065)
AC	0.089 (0.012)	0.078 (0.013)	0.059 (0.044)	0.217 (0.059)
Neighborhood Attributes				
CITY	0.096* (0.044)	0.012 (0.015)	0.031 (0.018)	0.087* (0.042)
VIOLENT	0.047 (0.025)	0.036 (0.027)	0.156 (0.090)	0.239 (0.176)
PROPERTY	0.052** (0.017)	0.049** (0.019)	0.040 (0.059)	0.037 (0.115)
JUVENILE	0.003 (0.012)	-0.001 (0.014)	-0.005 (0.028)	-0.011 (0.050)
APPEARANCE	-0.081** (0.016)	-0.071** (0.018)	-0.209 (0.049)	-0.182 (0.124)
SUBSTANDARD	-0.055** (0.011)	-0.053** (0.012)	0.024 (0.066)	0.289 (0.196)
N_OWNER	-0.029 (0.018)	-0.041 (0.024)	-0.041 (0.038)	-0.002 (0.068)
SIDEWALK	-0.004 (0.016)	0.013 (0.023)	-0.035 (0.030)	-0.058 (0.012)
INCOMECHG	0.033 (0.017)	0.049* (0.024)	0.047 (0.034)	-0.026 (0.246)

Table 14, Continued

FOODSTAMP	-0.182** (0.022)	-0.161** (0.024)	-0.277** (0.068)	-0.416* (0.197)
TRANSIT	-0.036 (0.023)	-0.092** (0.029)	0.187** (0.057)	-0.066 (0.096)
RETAIL	0.005 (0.013)	0.015 (0.017)	-0.050 (0.033)	-0.019 (0.044)
NWHITE	-0.104** (0.022)	-0.060 (0.009)	0.006 (0.046)	-0.178* (0.087)
NSCHOOLS	-0.048* (0.019)	-0.186* (0.033)	-0.076* (0.035)	0.052 (0.051)
Distance Attributes				
DMAJOR (00s)	0.053** (0.011)	0.062** (0.016)	0.058** (0.020)	0.057 (0.032)
DCBD (miles)	-0.094 (0.084)	0.020 (0.121)	-0.259 (0.192)	-0.261 (0.280)
$DCBD^2$ (miles)				
Temporal Attributes				
Y2003_Q1	0.016 (0.016)	-0.031 (0.020)	0.094 (0.031)	0.057 (0.051)
Y2004_Q2	0.030 (0.017)	0.003 (0.023)	0.065 (0.031)	0.049 (0.050)
Y2003_Q3	0.037 (0.017)	0.002 (0.023)	0.094 (0.032)	0.043 (0.052)
Y2003_Q4	0.024 (0.016)	-0.024 (0.023)	0.078 (0.032)	0.039 (0.051)
Y2004_Q1	-0.005 (0.015)	-0.038 (0.021)	0.017 (0.028)	0.046 (0.049)
Y2004_Q2	0.026 (0.018)	-0.018 (0.024)	0.090 (0.032)	0.038 (0.052)
Y2004_Q3	0.020 (0.017)	-0.031 (0.023)	0.082 (0.030)	0.051 (0.051)
Y2004_Q4	0.024 (0.016)	-0.018 (0.022)	0.078 (0.032)	0.054 (0.051)
Y2005_Q1	-0.003 (0.015)	-0.046 (0.020)	0.059 (0.027)	0.005 (0.046)
Y2005_Q2	0.023 (0.017)	-0.030 (0.023)	0.102 (0.031)	0.026 (0.051)
Y2005_Q3	-0.008 (0.017)	-0.047 (0.023)	0.004 (0.030)	0.103 (0.056)
Y2005_Q4	-0.002 (0.017)	-0.043 (0.023)	0.057 (0.030)	-0.002 (0.051)
Y2006_Q1	-0.056 (0.016)	-0.055 (0.021)	0.034 (0.028)	-0.010 (0.049)

Table 14, Continued

Y2006_Q2	-0.035 (0.018)	-0.064 (0.024)	-0.016 (0.030)	-0.003 (0.054)
Y2006_Q3	-0.045 (0.016)	-0.076 (0.022)	-0.002 (0.026)	-0.026 (0.049)
Y2006_Q4	-0.037 (0.015)	-0.081 (0.021)	0.028 (0.026)	-0.005 (0.047)
Y2007_Q1	-0.027 (0.015)	-0.055 (0.020)	0.010 (0.024)	-0.010 (0.044)
Y2007_Q2	0.005 (0.016)	-0.029 (0.022)	0.055 (0.026)	0.008 (0.047)
Y2007_Q3	-0.004 (0.015)	-0.044 (0.021)	0.048 (0.026)	0.025 (0.046)
Y2007_Q4		()	()	()
Foreclosure Attributes				
D330HU	-0.053** (0.009)	-0.061** (0.011)	-0.055** (0.019)	-0.020 (0.034)
D660HU	-0.022* (0.010)	-0.032** (0.011)	-0.026 (0.024)	0.130 (0.080)
D990HU	-0.015 (0.010)	-0.025* (0.011)	0.025 (0.024)	0.088 (0.070)
Observations	72,061	34,251	25,960	11,850
Model X^2 Significance	Yes**	Yes**	Yes**	Yes**

* P < 0.05, **P< 0.01.

Source: Author

negative and the odds ratios would be less than 1. In other words, as the value decreases the likelihood of homeownership increases. If the coefficient is positive, then the relationship is positive and the odds ratios would be greater than 1. In other words, as the value increases, the likelihood of homeownership increases. While the percent of foreclosed properties, proximity of foreclosed properties, and length of foreclosure were all tested using the full model of structural, neighborhood, distance and temporal attributes, the results for the proximity of foreclosures were used to describe the relationships with the variables in the full model.

For the structural variables, a housing unit was more likely to be owner-occupied two years post transaction for older units, rather than newer units. This positive relationship could be explained by the fact that many newer homes were located in neighborhoods that were more likely to be converted to rentals than older sold in the same time period. For the variables BEDS, FBATHS, FBATHS, SQFT, FIRE, the housing units were more likely to be owner-occupied as the variable values increased. Conversely, the LOTSIZE variable presented a negative probability of homeownership that was not expected. So that, homeownership was more likely as lot sizes became smaller. This trend might be explained by the increase in smaller lot development in newer housing being sold during the study. The model also included an additional 21 structural variables where sufficient data available. These variables included siding material, foundation type, structure quality, number of stories, heating type, air conditioning type. These variables did not have significance in the overall model.

The neighborhood attributes did not always perform in the expected direction or offer statistical significance. Among the variables that did operate as expected were

APPEARANCE, SUBSTANDARD, FOODSTAMP, and NWHITE. All of these variables produced negative relationships indicating that housing units were more likely to be owner-occupied as these variables decreased at the neighborhood level. In contrast, PROPERTY showed a positive relationship to homeownership, which was not expected. Another unexpected finding, variable NSCHOOLS showed a negative relationship with homeownership. The remaining neighborhood attributes did not gain significance.

Among the distance attributes, DMAJOR presented a positive relationship with homeownership. Therefore, a housing units is more likely to be owner-occupied the greater the distance from a non-residential street. For the temporal attributes, not of the sales quarters were significant which indicated that there was no detectable pattern of homeownership two years post transaction between 2003 and 2007.

In order to better understand the impact of structural attributes of the individual property, neighborhood quality of life characteristics, temporal, and locational elements, the full model was deconstructed to examine the relationship across the three real estate assessment submarkets using the logistic regression analysis. All three sub models had X^2 results that were significant.

These findings are presented on Table 14. For the low valued housing submarket, the positive relationships evidenced in the full model were reproduced. For variables BEDS, HBATHS, FBATHS, SQFT, FIRE, the housing units were more likely to be owner-occupied as these values increased. LOTSIZE did not have significance.

The analysis of middle valued housing resulted in similar statistically significant positive relationships for the variables AGE, BEDS and SQFT. But, HBATHS exhibited a negative relationship. This relationship might be explained by housing in this value range with 1 ½ baths have lower market demand then housing with 2 baths. LOTSIZE also exhibited a negative relationship with homeownership. As previously stated, housing in this price range were built on smaller lots were more likely to be owner-occupied than larger lots. FIRE and FBATHS were not statistically significant.

For upper valued housing submarkets, the variables BEDS, SQFT, and FIRE all had positive relationships with homeownership as expected. FBATHS, HBATHS, and LOTSIZE were not statistically significant. The remaining structural characteristics in the model were not significant.

The neighborhood variables did not always offer the expected relationship nor significance, but presented differences across the three sub-models. For the low valued real estate submarket, APPEARANCE, SUBSTANDARD, and FOODSTAMP had the expected negative relationship with homeownership. In other words, as these variables increased, a housing unit was less likely to be owner-occupied. NSCHOOLS and TRANSIT also had a negative relationship with homeownership which was not expected. INCOMECHG had a positive relationship with homeownership which was expected. These findings showed that as income increases, the likelihood of homeownership grew. PROPERTY also had a positive relationship, which was not expected. CITY, VIOLENT, JUVENILE, N_OWNER, SIDEWALK, RETAIL, and NWHITE did not have a significant relationship with homeownership in this submarket.

For middle valued housing, FOODSTAMP exhibited a negative relationship with homeownership as expected. TRANSIT had a positive relationship with homeownership in this value range as expected. NSCHOOLS also had a negative relationship with homeownership. The result mirrored the low valued housing submarket findings. As was previously presented, one explanation for this relationship may be attributed to the impact of gentrification in housing markets that was widely evidenced in neighborhoods with lower rates of neighborhood school attendance. The remaining neighborhood variables in the middle valued housing submarkets were not statistically significant with the homeownership rates.

Analysis for the upper valued housing submarkets found a positive relationship between CITY and homeownership. In other words, housing in this category was more likely to be owner-occupied two year post market sales transaction within the city limits than outside the city limits. FOODSTAMP and NWHITE had a negative relationship with homeownership as expected. Therefore, upper valued homes were more likely to be owner-occupied in neighborhoods with fewer food stamp recipients and non-white public school students. The remaining neighborhood level variables were not statistically significant.

For the distance variable category, DMAJOR or distance to major roads had a positive relationship with lower and middle valued housing. The farther away these homes were from major roads, the more likely the homes were owner-occupied. While distance to the center city, DCBD, did not have significance with homeownership. Within the upper valued housing submarkets, not of the distance attributes were statistically significant. Similarly, none of the temporal attributes had any statistically significance with homeownership in any of the submarkets examined.

Since previous research has not carried out homeownership level analysis[7], the results from my analysis furthered the literature. In particular, these findings could be utilized to help develop strategies to attract potential owners in this market.

Validity Tests

The residuals from house price analysis were analyzed using Moran's I and displayed significant spatial autocorrelation at 0.5. An auto regressive analysis was conducted to reduce spatial autocorrelation. While the analysis reduced the spatial autocorrelation detected using Moran's I to 0.22, spatial autocorrelation still exists and the results should be interpreted with caution.

A test for heteroskedasticity was also conducted to determine if the residuals showed any additional patterns bias. The test did not indicate problems with heteroskedasticity with the data set.

Prior to the analysis of the variables, a bivariate correlation was conducted on the all the variables. Correlations between two variables above 0.7 indicated problems with multi-colinearity. Violent Crime and Violent Crime Hot Spots were correlated above 0.7. Violent Crime Hot Spots was removed and replaced with Juvenile Arrest Data. After the analysis was conducted, VIF scores were reviewed to further assess for multi-colinearity and none were above 7 for the variables discussed. Variable diagnostics are presented in Appendix C.

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[7] Clauretie (2006) analyzed Multiple Listing Service data showing that owner-occupied housing returned a higher selling price than renter-occupied or vacant housing. However, these data did not include For Sale By Owner transactions.

CHAPTER 6: CONCLUSION, FUTURE RESEARCH OPPORTUNITIES AND POLICY IMPLICATIONS

Between 2003 and 2007, over 10,000 single family housing units foreclosures occurred in Charlotte. More than 90 percent of these foreclosures were housing assessed less than $150,000. Additionally, over 8 percent of these foreclosures were housing assessed between $150,000 and $250,000, while less than 2 percent were over $250,000. These data anchor the contention that lower-income and middle-income households were primarily impacted by these foreclosures. At the neighborhood level, homogenous communities comprised of single family detached housing with assessed values of less than $150,000 suffered the greatest decline in housing prices. Following in severity were the single family residential subdivisions with middle valued housing between $150,000 and $250,000. These differential foreclosure impacts provided empirical evidence for supporting the incipient literature that low and middle income neighborhoods have been more afflicted by mortgage defaults (Belsky, 2008).

While the decline in market value in these neighborhoods negatively impacted a foreclosed owner's net worth, the foreclosure effect impacted adjacent properties and the surrounding neighborhood. The concentration of foreclosed homes in Charlotte's low and middle income neighborhoods presented new challenges to already at-risk communities. Despite the national efforts to increase homeownership and improve the amenities of in lower income neighborhoods, these residents now must deal with the new blighted landscape created by foreclosure, which represented another obstacle for creating vibrant healthy neighborhoods. This summary set the stage for assessing the impact of foreclosures on the Charlotte market sale housing and homeownership during the early part of the 21^{st} century.

The findings of the research modeling showed that proximity to foreclosures had a statistically significant negative impact on housing prices in the two lowest value housing market, with the most definitive impact on housing prices in the lowest value group in neighborhoods with higher rates of foreclosure. The length of foreclosure was also shown to have a negative impact on housing prices in the lowest valued group. While the nuisance externality of foreclosure had already been identified in the literature, this study found that housing prices in lower priced neighborhoods were more seriously affected. Furthermore, in low wealth neighborhoods, if foreclosures were located in proximity to market sales, homes were less likely to be owner-occupied two years after the transaction. This relationship was especially pernicious since these findings described a “domino effect”. That is to say, in communities with large numbers of foreclosures, the presence of empty homes leads to further declines in the neighborhood.

Other modeling results pointed out that structural, neighborhood and distance attributes also influenced the likelihood that homes were owner occupied. Specifically, owner occupancy was linked to larger homes in neighborhoods with higher rates of income change, fewer appearance and housing code violations. These neighborhoods were less diverse both racially and economically. Distance from non-residential streets was also a significant predictor of owner-occupied homes.

A related analytical theme was the impact of these variables on housing values. These modeling results identified a number of statistically significant relationships. In general, as most variables increased in value as the housing prices were higher. Specifically, home size, lot size, number of bedrooms, and bathrooms all increased as the home price were higher. The only exception was the age, which was inversely linked to home value.

What is the significance of these research findings? Although my research was limited to a single community and a narrow 5 year band of time, it did offer scholastic insights that were unique. To the best of my knowledge, this study was the first to incorporate the average length of time a house was foreclosed in the relationship to housing prices. While the differential impact of foreclosure had been examined, this was the first study where the proximity of foreclosure for different housing submarkets was analyzed in relationship to sales price. This is also the first study to analyze housing unit ownership grouped into different market and identify if the percent of foreclosed homes, proximity to foreclosed homes and length of foreclosure had any impact on the likelihood of homeownership. Also, the relationship of structural, neighborhood and location elements to housing unit homeownership had not been thoroughly examined.

Because of the unique local data resources, the findings of this study offered extensions of current theoretic constructs surrounding the urban housing market and urban social geography in the U.S. As discussed previously, the dominant trends in American urban growth in the post-World War II milieu was suburbanization. The expansive growth in lower density housing on the edge of existing urban areas was fueled by white, middle class families. The suburban housing vision was framed by enhanced quality of life for families, escape from social ills in the city, and economic advancements. Single family housing in the suburbs increased in value. Home equity translated into social stability and personal wealth. Housing programs that encouraged low income home ownership, and the exotic mortgage market in the late twentieth century, spurred the growth in a new wave of suburban single family subdivisions for first-time, low income householders.

However, these households were at greater risk of defaulting on their mortgages for two main reasons. Because they were low- to middle income to start with, they have fewer resources to rely on if they suffered financial hard times. Second, they were also more likely to have a subprime mortgage which sometimes created increased mortgage costs after a short time period that maybe unaffordable even for households with steady incomes. The patterns of foreclosures in Figure 15 revealed that fragile states of the vinyl villages or starter subdivisions that predominated residential growth in Northwest and North Charlotte. The collapse of the starter home market raised challenges for the widely held assumptions of suburbanization. In a variety of ways, large scale foreclosure followed by housing abandonment, visible decline in neighborhood character and incessant crime mirrored the traditional markers on inner city neighborhood deterioration. We may be observing a new 21st century suburban slum (Wehrwein, 1942). These areas face the same challenges and issues that challenged their twentieth century urban peers. Only now, the geographical settings were reversed.

While the suburban slum term proposed by Wehrewein refered to unplanned subdivisions or shanty towns between the rural and urban fringe creating increased costs for local governments, the 21st century suburban slums created by the foreclosure effect are in reality the same. Pockets of escalating decay in what were formerly greenfield sites with newly built homes were either abandoned or bought by investers to rent. Instead of slow neighborhood change that can take many years in a urban working class neighborhoods during the 1990's, community change was now occuring in a matter of three to five years.

My research findings presented in Figure 19 offer a different perspective on the housing market of inner city neighborhoods.

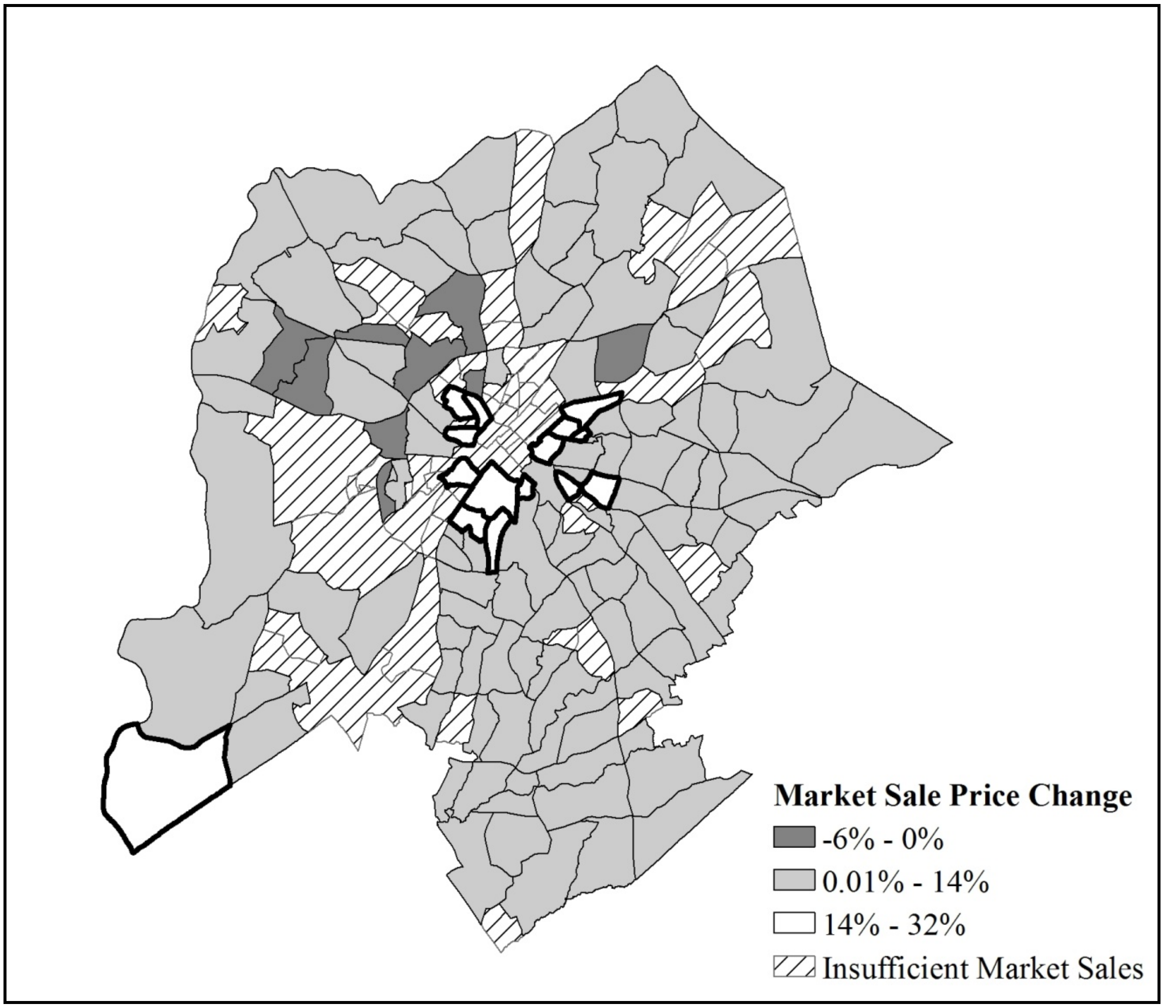

Figure 19, Average Change in Housing Market Sale, 2003-2007
Source: Author compiled from Mecklenburg County Register of Deeds

A review of the map shows neighborhoods experiencing largest sales price gains during the study periods were located closest to the center city. These communities also experienced less foreclosure pressure. The robust real estate market in these neighborhoods was linked to gentrification. Cartographically, the gentrifying areas were pockets of stability in a sea of housing distress. In turn, these sharp difference between inner city neighborhood supported the arguments made by Wyly (2001) suggesting the dissimilarity between urban gentrifiers and existing low income residents. This differential had the potential of creating increased tension between current residents and gentrifiers who were able to withstand fluctuations in the real estate market, pay the escalating property taxes, and begin to socially reshape neighborhood life. In this way, this research extends our understanding of the persistence and economic impact of gentrification in urban neighborhoods during a period of high foreclosure activity

Future Research

As with any research project, there were improvements or enhancements to the efforts that were discovered after the project had been started. This dissertation was no exception. The concluding section of this report offers my suggestions and ideas for future work.

As part of this research, all market sales recorded by the register of deeds were included in the study. But, information related to length of time a home was on the market was not captured. Since most market sales were contained in the Multiple Listing Service (MLS), this information could be included in future research. The caveat associated with MLS is that these data are proprietary, and it does not include For Sale By Owner (FSBO) activity. While the FSBO may be a small proportion of the total real estate transactions, it does lead to missing data and may affect the variability neighborhoods' housing market. This would be true especially if the owner tried to sell the property before listing with a MLS.

Another component to be considered by future research pertains to mortgage default filings. When the homeowner defaults on a mortgage, the mortgage company will file a foreclosure notice. In many instances, there will be multiple filings before the property is auctioned or the loan is modified. In some cases the same housing unit is also still listed as for sale. As a consequence, these can lead to misinformation and data accuracy problems. What is the real status of the home? Clarity or at least an objective way to classify real estate status is needed. In a related fashion, better data surrounding short sales would also provide an opportunity for future research. Short sales were considered distressed, but are not a real foreclosure in terms of the impact on the homeowner's credit report. Future research models would be enhanced if short sale information could be included. This is especially important for measuring community impact as short sales may affect property values and neighborhood conditions.

During this research, foreclosure transactions were identified from the register of deeds. However, the transaction price for the foreclosure was not consistently recorded. Future research would be strengthened if a systematic approach could be established to capture these actual foreclosure price transactions. Although foreclosures are not market sale transactions, they may represent a viable housing transaction cost. Furthermore, evidence suggests that these transactions were being used in the comprehensive revaluation of the real estate property in Mecklenburg County properties and appraisals for mortgages lending (Bethea 2010). With these concerns in mind, future research may want to design a process to determine the price impact of foreclosures and include in the analytics.

While this research did not examine the causes for foreclosure, the author suspects that many neighborhoods in Charlotte were impacted by more than one study component during the study period. There was much anecdotal evidence that the concentration in foreclosures in starter home communities was linked to unscrupulous or illegal business practices marketed toward lower income households, centered around sub-prime loans. Along with that, some developers may have been using fraudulent practices to sell homes as higher prices than the homes were actually worth. The combination of all these factors plus the overall economy led to an implosion of the housing market in selected portions of Charlotte and the surrounding region. While these practices were regularly reported in the Charlotte Observer (Crouch 2005), scientific research requires additional analysis to systematically determine the impact of foreclosure. Since loan information is only provided aggregately at the census tract level, the unit of analysis for the database would need to be modified to fit census geography. With the release of the newly enhanced 2010 American Community Survey, a real opportunity exists for future researchers to measure the changing neighborhood conditions at the census tract level with data provided by the federal home loan system to assess the reasons for foreclosure and the impact on neighborhoods.

Future research, focused on Charlotte, could also benefit from use of this study as a starting point or baseline. This research project offers insights into the Charlotte housing market before the national economic recession and collapse of the national real estate market. During the study period of 2003-2007, the overall Charlotte economy was improving, housing prices were increasing on average, and the unemployment rate was steady.

By 2010, Charlotte real estate market was mired in the lowest number of market sales since the 1990s. The average price of market sale housing increased. But, these transactions encompassed only 50 percent of the transactions in the Charlotte housing market. Since nearly half of the transactions consisted of foreclosures, it was increasingly difficult to value the real price of real estate when most or all of the transitions were foreclosures in some neighborhoods.

The foreclosure trends during 2009 and 2010 were further clouded by various moratoriums that were enacted by lenders or mortgage holders. For example, in Center City Charlotte a number of condominium real estate properties were pressured to convert to rental or partial rental properties. While all housing developments have different lifecycles with newer housing development having higher rates of homeownership, the rate of conversion from owner-occupied to rentals can be different between single family detached and rentals. These differences represent another opportunity for future scholarship examining the relationship of homeownership and foreclosures.

To better understand the different buying behavior across housing types, a buyer survey or focus group would be a valuable tool to better understand the motivations of buying housing in certain neighborhoods. For example, the survey or focus group might be able to distinguish between preferences between single family and multi-family housing and determine why consumers ultimately select between housing types. Qualitative surveys could also probe the subject of foreclosures. These data collected might examine the perceptions of foreclosures in the neighborhood or help differentiate between market sales of existing homes versus buying real estate from a bank.

One impact of foreclosures on homeownership not examined in this research was the dimensions of future ownership of foreclosed properties. While the summary statistics suggest that distinct long term differences exist between foreclosures and market sales, the reasons behind this discrepancy were not fully explored. Antidotal evidence suggests that the difficulty of purchasing a foreclosed property deters most potential homeowners even though the savings could be quite dramatic. Conversely, investors who have different motivations may have more time and patience to deal with banks. Survey and focus group strategies may be able to capture the difference. Indeed, broadly speaking qualitative research into buying behaviors, characteristics, foreclosure perceptions, and bank owned properties would fill in the missing information that the current housing research has not currently assessed.

In the 1990's, the federal government developed programs designed to increase minority and lower income household homeownership. In turn, disadvantaged groups showed enormous gains in homeownership through 2006. Since many of the programs made it easy to buy housing through sweat equity, down payment grants, and subsidized interest rates, these groups benefited greatly with achieving American dream of homeownership. More recently, these groups were at the greatest risk of losing their homes to foreclosure. Federal programs developed to make it easy to buy housing did not prepare the homeowners with the financial reality of maintaining property. Targeting by lenders marketing sub-prime mortgage products, many low-income or minority homeowners refinanced their homes into riskier loans that tapped into home equity.

During the economic recession and housing bubble, many of these sub-prime loans made it extremely difficult to maintain mortgage payments especially for households with limited financial means. The American dream often turned into the foreclosure nightmare as homeowners have systematically lost their homes and all financials benefits invested.

The collapse of homeownership rates among lower income and minority households indicates the current housing policies need review and adjustment. Homeownership programs for lower income households need to take a long terms approach. Because a substantial portion of their savings is in the equity of their homes, more flexible options are needed to help withstand the fluctuations in income that occur as the result of periods of unemployment and underemployment. If the goal is to increase homeownership across in these more economically challenged households, the infrastructure for dealing with their situations needs to be reworked. While banks and mortgage companies require private mortgage insurance for down payments for less than 20 percent, homeowners should be able to purchase mortgage insurance to cover payments when all other financial resources have been exhausted. This will maintain the security of providing housing to a household during a truly difficult economic hardship.

Another policy option for homeownership is to allow partial ownership programs. The government can provide opportunities for homeowners to but partial shares in the housing they live in. By providing this option, the homeowner can maintain a lower housing payment that will less likely exceed their recommended portion of income. Since these households live with less stable working histories, they can better manage their overall households responsibilities without worrying about losing their homes and any built up equity (Clarke 2007).

The trends in homeownership occurring over the past several years as the result of the changing economic situation provide a unique opportunity to assess neighborhood evolution. Since the economy has not experienced such a severe downturn since the Great Depression, a once in a lifetime opportunity to research foreclosure impacts on neighborhoods long term viability has presented itself. The data suggests that neighborhood conditions can change quite rapidly. For example, drawing on existing literature and urban geography theory, one might hypothesize those newer suburban neighborhoods less than 10 years old would move down the neighborhood lifecycle faster than older neighborhoods, 10 to 20 years old. The change could be attributed to increasing numbers of foreclosures leading to an increased turnover in households that resulted in lower levels of homeownership. The research completed thus far provides the critical foundation for this proposed work and indicates a striking difference in the expected development and evolution of our urban neighborhoods.

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APPENDIX A: NEIGHBORHOOD VARIABLE DEFINITIONS

Violent - Violent crime rate in each NSA as compared with the violent crime rate in the City of Charlotte. The locations of violent crime offenses were summarized for each NSA and the City of Charlotte. For the purpose of this study, violent crimes include homicides, rapes, robberies, and aggravated assaults defined according to UCR (Uniform Crime Report) standards. The number of violent crime incidents for each NSA and the City of Charlotte were divided by their respective populations to get the violent crime rate for each NSA and the City of Charlotte.

The Location Quotient method was used to compare the NSA and city wide rate. The method gives a measure of the share of all violent crime in the City of Charlotte captured by the individual NSA. Thus, a score of 2.00 indicates that the particular NSA has a violent crime rate that is twice the rate in the city; while a score of 0.5 shows that the NSA violent crime rate is one-half the rate of the entire city.

Source: Charlotte-Mecklenburg Police Department, Research and Planning Department

Juvenile - Juvenile arrest rate in each NSA as compared with the juvenile arrest rate in the City of Charlotte. The locations of juvenile arrests were summarized for each NSA and the City of Charlotte. For the purpose of this study, juvenile arrests are based on individuals arrested under the age of 16. This definition is based on North Carolina state statutes which generally define a juvenile offender according to this age definition.

The number of juvenile arrest incidents for each NSA and the City of Charlotte were divided by their respective juvenile populations to get the juvenile arrest rate.

The Location Quotient method was used to compare the NSA and city wide rate. The method gives a measure of the share of all juvenile arrests in the City of Charlotte captured by the individual NSA. Thus, a score of 2.00 indicates that the particular NSA has a juvenile arrest rate that is twice the rate in the city; while a score of 0.5 shows that the NSA juvenile arrest rate is one-half the rate of the entire city.

Source: Charlotte-Mecklenburg Police Department, Research and Planning Department

Property - Property crime rate in each NSA as compared with the property crime rate in the City of Charlotte. The locations of property crime offenses were summarized for each NSA and the City of Charlotte. For the purpose of this study, property crimes include burglaries, larcenies, vehicle thefts, arsons, and vandalisms defined according to UCR (Uniform Crime Report) standards. The number of property crime incidents for each NSA and the City of Charlotte were divided by their respective populations to get the property crime rate.

The Location Quotient method was used to compare the NSA and city wide rate. The method gives a measure of the share of all property crime in the City of Charlotte captured by the individual NSA. Thus, a score of 2.00 indicates that the particular NSA has a property crime rate that is twice the rate in the city; while a score of 0.5 shows that the NSA property crime rate is one-half the rate of the entire city.

Source: Charlotte-Mecklenburg Police Department, Research and Planning Department

APPEARANCE - Index of code violations for each NSA. The violations recorded were summarized for each NSA. The number of documented violations was divided by the total number of parcels in the NSA.

Source: Neighborhood and Business Services

SUBSTANDARD - Percentage of housing units in a NSA with housing code violations. The violations recorded were summarized for each NSA. The number of documented violations was divided by the total number of housing units in the NSA.

Source: Neighborhood and Business Services

N_OWNER - Percentage of owner-occupied residential units.

Source: Mecklenburg County Property Records and Land Management

Transit - Percentage of NSA residents, who live within walking distance of public transportation, using the Charlotte Area Transit System bus stops. By utilizing the tax parcel database, the total number housing units and the total number of housing units within ¼ mile of a bus-stop were compiled for each NSA. The transit accessible housing units were divided by the total number of housing units.

Source: Charlotte Area Transit System

RETAIL – Percentage of NSA residents that are within walking distance to a grocery store and/or a pharmacy. By utilizing the tax parcel database, the total number housing units and the total number of housing units within one-quarter mile of a grocery store and/or pharmacy were compiled for each NSA. The retail accessible housing units were divided by the total number of housing units.

Sources: Mecklenburg County Property Records and Land Management; Yellow Pages, Charlotte

SIDEWALK - Pedestrian friendliness based on the total length of sidewalks in each NSA as compared to the total length of the streets. Index values could rank from 0-2.0. The index score were scaled using the following qualitative ranking.

0.0 - 1.0 Low Pedestrian Friendliness; 1.1 - 1.3 Medium Pedestrian Friendliness;

1.4+ High Pedestrian Friendliness

Source: Charlotte Department of Transportation

FOODSTAMP - The percentage of people in a NSA receiving Food Stamps.

Sources: Mecklenburg County Department of Social Service Office of Planning and Evaluation

INCOMECHG - Percentage change in median household income per year. The following equation was used:

$$\frac{\text{Specific Year Income} - \text{1999 income}}{\text{1999 income}} * 100 = \text{\% Change in Income}$$

Source: Claritas; Census 2000.

APPENDIX B: DISTANCE RING SENSITIVITY ANALYSIS

Prior to developing the finalizing the model used to test Hypothesis #2, I analyzed the foreclosures at distance rings of 0 to 670 feet, 671 to 1,340 feet, and 1,341 to 2640 feet. The results displayed in the Appendix, Table 15, show housing prices adversely impacted by the proximity of foreclosure for each distance ring. However, most of the foreclosures were occurring in the lowest value housing group. Moreover, the descriptive statistics suggested that neighborhoods composed of lower valued housing units presented with higher proportions of foreclosure activity, 1.5 percent versus the overall average of 1.0 percent. With this context, my research design was realigned to measure the impact of foreclosures at an intra-neighborhood scale, therefore the distance measurement was reduced to a narrower impact zone. By making the zones smaller, the analysis was better able to pick up the immediate proximity of vacant housing and other nuisance behavior that would not be as relevant at larger distance rings.

Using Figure 14 as an example, the analysis utilized only incorporated locations with the housing unit's neighborhood. If the distance rings were made larger, they would have included units outside the neighborhood and sub-neighborhood differences would not be detected. Since Hypothesis #1 captured the neighborhood level foreclosure impact on housing prices, Hypothesis #2 was able to differentiate any negative impacts of foreclosure within a neighborhood.

Table 15: Multiple Regression Results for Hypothesis #2

	All Single Family		Assessed Value Less than $150,000		Assessed Value $150,000-$250,000		Assessed Value Greater than $250,000	
	B (Std. Error)	Z-Beta	B (Std. Error)	Z-Beta	B (Std. Error)	Z-Beta	B (Std. Error)	Z-Beta
Constant	11.661** (0.018)		10.907** (0.027)		12.000** (0.018)		12.732** (0.043)	
Foreclosure per Sq Mile 0-670 ft (00)	-0.082** (0.005)	-0.023	-0.054** (0.006)	-0.038	-0.077** (0.054)	-0.057	-0.101** (0.120)	-0.016
Foreclosure per Sq Mile 671-1340 ft (00)	-0.119** (0.011)	-0.018	-0.080** (0.013)	-0.027	-0.106** (0.104)	-0.052	-0.065 (0.215)	-0.006
Foreclosure per Sq Mile 1341-2640 ft (00)	-0.474** (0.021)	-0.039	-0.198** (0.025)	-0.034	-0.302** (0.114)	-0.079	-0.560** (0.338)	-0.030
Neighborhood	Yes		Yes		Yes		Yes	
Structural	Yes		Yes		Yes		Yes	
Sale Dummy	Yes		Yes		Yes		Yes	
Observations	72,061		34,251		25,960		11,850	
Adjusted R^2	0.855**		0.569**		0.513**		0.765**	

* P < 0.05, **P< 0.01.

Source: Author

APPENDIX C: VARIABLE DIAGNOSTICS

Table 16: Variable Diagnostics

	t	Sig.	Tolerance	VIF
(Constant)	768.616	0.000		
AGE	-20.148	0.000	0.225	4.437
BEDS	1.687	0.092	0.593	1.687
FBATHS	16.885	0.000	0.331	3.019
HBATHS	3.837	0.000	0.494	2.023
SQFT	136.562	0.000	0.244	4.092
FIRE	26.21	0.000	0.725	1.380
LOTSIZE	25.104	0.000	0.650	1.538
STY_1	-6.822	0.000	0.345	2.896
STY_15	14.061	0.000	0.876	1.142
STY_25	-5.342	0.000	0.891	1.123
A_FRAME	-1.239	0.215	0.998	1.002
BILEVEL	-10.509	0.000	0.960	1.041
CAPECOD	-2.073	0.038	0.990	1.010
RRANCH	-4.572	0.000	0.962	1.040
SPLITLEVEL	-14.603	0.000	0.824	1.214
BASEBOARD	3.359	0.001	0.795	1.257
HP	3.193	0.001	0.542	1.844
HW	4.589	0.000	0.988	1.012
CELL_RD	0.28	0.779	0.999	1.001
STEAM	1.473	0.141	0.799	1.251
ELECTRIC	-11.653	0.000	0.462	2.167
NONE	-5.27	0.000	0.876	1.141
OWC	-6.635	0.000	0.929	1.076
SOLAR	0.838	0.402	0.800	1.250
CS	13.833	0.000	0.394	2.535
ASBSDGSHG	-6.86	0.000	0.877	1.140
BOARDBATTE	0.346	0.729	0.991	1.009
CEDARRDWD	10.213	0.000	0.905	1.105
CEM_BRSPL	0.715	0.475	0.998	1.002
COMPWALL	-5.377	0.000	0.990	1.010
CONCBLOCK	-1.035	0.301	0.955	1.047
LGT_CORR	0.403	0.687	0.999	1.001
PLYWOOD	-6.205	0.000	0.942	1.061
FACEBRICK	12.578	0.000	0.372	2.687

Table 16, Continued

HARDIPLK	11.383	0.000	0.848	1.179
JUMBBRICK	-0.549	0.583	0.997	1.003
MASONITE	-12.346	0.000	0.760	1.316
SDGNONE	-0.785	0.433	0.999	1.001
SIDINGNS	-1.501	0.133	0.976	1.024
STONE	-0.025	0.980	0.996	1.004
HRDSTUCC	12.927	0.000	0.844	1.185
SYNSTUCC	0.388	0.698	0.968	1.033
STGWD	-4.913	0.000	0.660	1.516
SHINGWD	12.289	0.000	0.931	1.074
BELOW	-16.078	0.000	0.906	1.104
CUSTOM	48.751	0.000	0.852	1.173
EXCELLENT	43.047	0.000	0.765	1.306
GOOD	54.823	0.000	0.553	1.808
VG	56.929	0.000	0.554	1.805
AC	23.754	0.000	0.602	1.661
CITY	-5.416	0.000	0.897	1.114
VIOLENT	-6.281	0.000	0.141	6.758
PROPERTY	15.07	0.000	0.304	3.286
JUVENILE	-12.366	0.000	0.689	1.450
APPEARANCE	-34.254	0.000	0.313	3.190
SUBSTANDARD	-12.39	0.000	0.576	1.736
N_OWNER	-17.086	0.000	0.312	3.203
SIDEWALK	45.722	0.000	0.547	1.829
INCOMECHG	11.755	0.000	0.401	2.497
FOODSTAMP	-32.222	0.000	0.166	6.028
TRANSIT	9.526	0.000	0.195	5.116
RETAIL	11.037	0.000	0.554	1.806
NWHITE	-79.075	0.000	0.229	4.375
NSCHOOLS	-9.914	0.000	0.328	3.048
DMAJOR	10.681	0.000	0.909	1.100
DCBD	-37.827	0.000	0.205	4.880
Y2003_Q1	-35.956	0.000	0.669	1.494
Y2003_Q2	-38.598	0.000	0.622	1.609
Y2003_Q3	-37.203	0.000	0.604	1.656

Table 16, Continued

Y2003_Q4	-36.612	0.000	0.638	1.567
Y2004_Q1	-27.435	0.000	0.668	1.496
Y2004_Q2	-27.223	0.000	0.573	1.744
Y2004_Q3	-25.258	0.000	0.599	1.671
Y2004_Q4	-23.228	0.000	0.624	1.604
Y2005_Q1	-19.101	0.000	0.687	1.457
Y2005_Q2	-17.202	0.000	0.589	1.697
Y2005_Q3	-15.245	0.000	0.568	1.760
Y2005_Q4	-13.502	0.000	0.590	1.695
Y2006_Q1	-6.876	0.000	0.619	1.616
Y2006_Q3	0.407	0.684	0.504	1.984
Y2006_Q4	2.959	0.003	0.528	1.895
Y2007_Q1	15.331	0.000	0.556	1.798
Y2007_Q2	22.981	0.000	0.506	1.975
Y2007_Q3	22.267	0.000	0.527	1.897
Y2007_Q4	18.74	0.000	0.615	1.625
D_330_HU	-15.369	0.000	0.943	1.060
D_660_HU	-7.707	0.000	0.894	1.119
D_990_HU	-12.044	0.000	0.892	1.121