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Racial Disparities in Foreclosures
and Wealth Building in Southern California

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy
in Social Welfare

by

Jason Sean Harley

2016
ABSTRACT OF THE DISSERTATION

Racial Disparities in Foreclosures
and Wealth Building in Southern California

by

Jason Sean Harley

Doctor of Philosophy in Social Welfare
University of California, Los Angeles, 2016
Professor Todd M. Franke, Chair

The opportunity to own a home in a decent neighborhood is a basic part of the American dream and has been a fundamental goal of housing policy for the last 80 years. Yet there are deep and persisting racial differences in the realization of this dream which have been intensified by the Great Recession. This dissertation attempts to explain the origins of this disparity, its strong connection to the home finance system, and its contemporary function in the alarming increase in the already massive racial wealth accumulation gap found in the United States. This study is guided by the following research questions: How have foreclosures impacted minority borrowers? How have foreclosures impacted mortgage lending for minority borrowers since the housing market crash? And what is the estimated wealth loss for minority families after foreclosure?
An analysis of race on foreclosures and loan application outcomes in six Southern California counties for a period of 8 years between 2006 and 2013 was conducted. A negative binomial regression of proprietary foreclosure data indicates that foreclosures increase with increases in the population of Blacks or Latinos in a census tract. This effect decreases with the addition of demographic variables commonly associated with loan performance—however, those demographic variables are correlated with race. A mixed Poisson model using data from the Home Mortgage Disclosure Act indicates that even as the number of loan applications drops substantially over time, the proportional disadvantage in prime loan denial and subprime loan origination rates faced by Blacks and Latinos remains fairly consistent. A simple mathematical model estimated that in aggregate, both Black and Latino homeowners lost twice as much wealth held in home value as did Whites and Asians. While many reasons for this phenomenon are possible, Critical Race Theory suggests that these disparities are the result of systemic bias deeply rooted in historical advantages enjoyed by White families in this country.
The dissertation of Jason Sean Harley is approved.

Ailee Moon

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2016
Dedicated to my wife Lorena —

“I can’t sleep, tell me about your research.”

And to my children, Ethan and Emily,

who already appreciate having more time with their dad.
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Introduction

The opportunity to own a home in a decent neighborhood is a basic part of the American dream and has been a fundamental goal of housing policy for the last 80 years. Yet there are deep and persisting racial differences in the realization of this dream which has been intensified by the Great Recession. This dissertation attempts to explain the origins of this disparity, its strong connection to the home finance system, and its contemporary function in the alarming increase in the already massive racial wealth accumulation gap found in the United States.

Buying a Home and Increasing Wealth

I was lucky enough to buy a home in Los Angeles back in 2002 before the market began to skyrocket. I was even more fortunate that I was able to provide a sizeable down payment. Mortgage lenders want to make sure the borrower has a stake in the property to reduce the risk of default. Usually they require the borrower to put down 20% of purchase price. At the time I was a public school teacher and California had a program where I could put down 3% and I would borrow 17% on a state secured loan to make a 20% down payment. This was called an 80/17/3 loan. Essentially the primary mortgage I had to qualify for was 80% of the purchase price; the 17% secured by the state would be a second mortgage and I only had to come up with 3% of the purchase price. This was an excellent opportunity to buy a home in the expensive Los Angeles market. However, that opportunity came with unseen price tags in the form of a higher interest rate on the second mortgage and expensive private mortgage insurance (PMI).

Mortgage insurance is required by the lender whenever the loan is greater than 80% of the value of the home. My two loans combined equaled a 97% loan to value ratio (LTV). I would have to pay PMI in addition to my loan payments. Unfortunately, PMI adds no value to the home. It does not go to principal or interest, it cannot be claimed as part of the mortgage
deduction on income taxes and it decreases the loan amount I can qualify for because it adds to my debt payment. If I plan to keep my mortgage current, the PMI payment is essentially money thrown out the window. However, there was another option—intergenerational transfer of wealth.

My father was able and willing to help me with my down payment. He gave me enough money so that my down payment met the threshold required by the bank to avoid PMI. This substantially lowered my costs and helped my own wealth building capabilities in some important ways. I was able to qualify for the house I wanted in a desirable neighborhood which had good growth potential. I was able to qualify for a lower interest loan than was available to me through the public school teacher program. All of my mortgage payment would either go to the principal or interest and the interest could be claimed as an income deduction on my taxes which meant the federal government would subsidize my mortgage. Furthermore, and most importantly, equity built faster in my home. Home values in my neighborhood soared soon after I moved in. Interest rates started to fall and I refinanced my home. The LTV was much lower at that time, enabling me to qualify for excellent rates. Today my home is worth two and a half times what I paid for it. My net wealth has increased tremendously.

This was made possible by financial assistance external to me. After World War II the federal government provided similar assistance with the GI Bill. Government backed, low interest, no down payment loans made purchasing a house less expensive than renting an apartment. Millions of veterans returning from war were hungry for housing, and developments like Levittown sprung up to feed that need. Over time many people from that generation started down a path of equity building, facilitating future intergenerational transfers of wealth.
However, because of underwriting standards, segregated housing markets, and other factors, almost none of these loans went to non-White veterans.

Starting with government backed mortgages after WWII a dual housing market emerged—one for Whites and the other for minorities. Racial restrictive covenants barred non-Whites from purchasing homes in postwar developments like Levittown. The Veterans Administration (VA) and the Federal Housing Administration (FHA), using a neighborhood classification scheme, funneled loans almost exclusively to White communities. Since VA and FHA loans made up most of the mortgage market at the time, this severely limited borrowing options for non-Whites. As time went on, Blacks and other minorities were rejected by mortgage lenders at much higher rates than Whites. The ability for minorities to build wealth was severely hampered while White families saw their net worth grow. The wealth gap widened as regulations changed and new mortgage products entered the market. This allowed greater numbers of Blacks and other minorities to purchase homes but with much higher loan costs. Alan Greenspan (1997) called this the “democratization of credit”. However, when the housing market collapsed, foreclosure wreaked havoc on these populations causing their minimal financial gains to be wiped out. Whites on the other hand fared quite well in this dual housing market. Intergenerational transfer of wealth grew, home purchases rose, and net worth increased.

In a country which promotes justice for all, the result is an economic system that is anything but just. Banks lobbied Congress to relax regulations making it easier for them to target minorities for expensive and unsuitable loans. Many minority first time home buyers were lured into these products by the prospect of finally being able to own a home. The George W. Bush administration made increasing home ownership, particularly among minorities, a
centerpiece of its economic agenda. Home prices continued to rise inordinately, especially as compared to income. When the house of cards finally collapsed, Black and Latino homeowners were left holding the bag. Their losses were disproportionate as compared to their White counterparts. Even in the aftermath, the Obama administration’s attempt to save struggling homeowners did not save as many minority families as it could have.

**Addressing Racial Disparity in Wealth**

This systemic bias and the associated disparate effects create a social injustice that is of the utmost concern to the field of social welfare. However, as will be discussed, there is little attempt to connect disparities in foreclosures to theory. Statistical discrimination has been advanced to explain disparate treatment in the lending process (Ladd, 1998). Stratification theory has been used to look at spatial patterning in residential housing (South & Crowder, 1998). And market led pluralism argues that the free market and individual choice prevents discrimination (Brown & Chung, 2008).

This dissertation adds to the literature by understanding racial disparities in housing finance and wealth distribution through the lens of Critical Race Theory. This is important for two reasons. First, the CRT framework provides for the examination of the systemic forces which bring about this phenomenon. That is, the racial disparities studied here rise above the actions of individuals and can be attributed to the effect of decades of public policy and industry action. CRT uses a structural perspective to examine these systemic forces and creates a starting point for public policy discussion. Second, CRT has not been used to explain racial disparities in housing finance. This connection will extend the reach of CRT and add to its scholarship.

Furthermore, as will be shown, much of the previous research uses descriptive data to show disparities in lending while few have extended the results through the use of inferential
statistics to analyze patterns. Louis (2012) used regression to examine the connection between minority (non-White and non-Asian) residents of a county and the proliferation of subprime loans in that county. That study also analyzed the ratio of subprime loans to foreclosure starts in a county and compared that to its proportion of minority residents (Louis, 2012). Hwang, Hankinson, and Brown (2015) also used regression to look at the incidence of subprime loans in clusters of minority census tracts in major metropolitan areas. They added a hierarchical model starting with minority census tracts and ownership rates and then including a segregation index score and a geographic region locator (Hwang et al., 2015). Both studies relied on subprime loan and foreclosure start data supplied by HUD.

This dissertation adds to the literature an analysis of foreclosures patterns using a negative binomial regression analysis with proprietary foreclosure data as the dependent variable. In using this approach, certain demographic and mortgage variables can be controlled to examine the relationship between race and foreclosure. This analysis will also provide opportunities to predict estimated wealth loss due to foreclosure.

With the Southern California region as a backdrop, publicly available empirical data from the Home Mortgage Disclosure Act (HMDA), the Department of Housing and Urban Development (HUD) and the Census Bureau will be used to examine loan application dispositions, the proliferation of subprime lending, and risk factors associated with mortgage foreclosure. Additionally, proprietary foreclosure data from RealtyTrac will be used to analyze mortgage foreclosure distributions.
This dissertation connects social justice and race to wealth and home ownership through the use of Critical Race Theory to answer the following research questions:

- How have foreclosures impacted minority borrowers?
- How have foreclosures impacted mortgage lending for minority borrowers since the housing market crash?
- What is the estimated wealth loss for minority families after foreclosure?
Literature Review

Wealth

In the fall of 2011 a movement protesting the unequal distribution of resources in this country began peacefully in New York City and quickly spread to other cities in the United States. Occupy Wall Street was fed up with the fact that over the past 40 years the wealthiest one percent of the population had been taking home a bigger piece of the pie (Lindsey, 2009; Mishel & Bivens, 2011). Not only had the top one percent seen dramatic increases in income while growth for the bottom 90 percent was relatively flat, but the accumulation of wealth also grew in similar disproportions (Mishel & Bivens, 2011). Except for small growth during the Great Recession, the wealthiest households in the United States had seen ever increasing positive growth in asset accumulation during the last 30 years. The median household experienced a much smaller growth in assets during this period and at times even lost wealth. In 1983 the ratio of household wealth between the top one percent and the median was 131:1; in 2009 that ratio was 222:1 (Mishel & Bivens, 2011).

Still today, this divide is even more prominent for Black and Latino households when compared to their White counterparts. Black middle class families earn 70% of what White middle class families earn, yet their wealth accumulation is 15% that of Whites, 20% when controlling for education (Oliver & Shapiro, 2006). In other words, wealth found in the median Black family is a small fraction of the median White family wealth, which in itself is a tiny fraction of wealth held by the top one percent of families. In 2005 almost half of Black and Latino families had less than $10,000 in assets, more than twice the percentage of White families. By 2011, Black and Latino families experienced a proportional increase twice that of White families in this lowest asset category. The same phenomenon is seen in reverse at the
upper end of the spectrum. In 2005 25% of Black families and 30% of Latino families had more than $100,000 in assets in comparison to more than half of White families. By 2011 only 21% of Black and Latino families had that much wealth while still more than half of White families did.

Wealth provides families with the ability to participate in society. Purchasing a home, buying a car, sending children to college, and paying for health care, all require some reserve of financial assets that can be used for such purposes. Furthermore, the ability to build wealth often depends on outcomes from previous generations. For example, educational attainment and quality correlate with family wealth. Better education leads to higher occupational prestige which increases income and wealth building opportunities. Parental wealth has also been shown to predict the wealth of their children (Conley, 2010). Intergenerational transfers of wealth are much smaller for Black and Latino families due primarily to higher fertility rates and slower asset growth (Avery & Rendall, 2002; Hodge, Dawkins, & Reeves, 2007; Williams, Nesiba, & McConnell, 2005). In other words, minority families typically have smaller pots to distribute to more children and grandchildren than do White families. Consequently, inhibiting the ability of a family to build wealth in one generation can determine the wealth building power of future generations.

For most families in the United States, a significant portion of wealth is accumulated by building equity in home ownership. However, that opportunity to build equity is not equally available to different racial groups. As of the end of 2014, slightly less than two-thirds of Americans owned a home; almost three-fourths of White households owned their home while much fewer than half of Black and Latino households lived in owner occupied housing (http://www.census.gov/housing/hvs/files/currenthvspress.pdf). Still, housing brings much more than wealth to families.
In a 1995 policy brief, the Department of Housing and Urban Development outlined four benefits of home ownership. The first two—higher education and higher income—are not surprising. Stability helps families become homeowners. Schools in neighborhoods with high homeownership rates tend to be better and the stability resulting from it provides children with that quality education for extended periods of time. This provides more opportunities for higher education. Educational attainment leads to better jobs with higher income (Goux & Maurin, 2007; Haurin, Parcel, & Haurin, 2002).

The third benefit of home-ownership is neighborhood stability. This can be seen in the sense of pride people have in their communities. House maintenance and community involvement improve the quality of life, encourage continued home ownership, and stave off blight (Immergluck & Smith, 2006; Williams et al., 2005). Recent increases in foreclosures have jeopardized that stability. Earl Hutchinson of the Urban Policy Roundtable discusses how the recent increase in foreclosures has negative effects on neighborhoods. He said, “It's easy pickings down there—you had a lot of foreclosures over the last years, people are economically challenged and have lost their homes, and you can get properties on the dime at fire-sale prices. Does that really benefit the area? Essentially, no” (Lazo, 2013). Foreclosures depress neighboring homes, lowering values and increasing instability.

Finally, homeownership leads to greater well-being. Better health, mood, quality of life and contentment can be tied to owning a home (Schloemer, Li, Ernst, & Keest, 2006). Consequently, foreclosed home-owners experienced both financial and emotional pain because of this housing crisis. Foreclosure can lead to feelings of broken trust and personal failure possibly resulting in mental health problems and anti-social behaviors (Barnes, Butt, & Tomaszewski, 2011; Ross & Squires, 2011). One San Diego resident who experienced
foreclosure said, "There's got to be some kind of program to help you reestablish yourself. I'd be the first person in line if there was" (Reckard, 2013). Reestablishing oneself is not just gathering the financial assets to purchase a home. It is a state of well-being that includes financial, emotional, educational, and familial stability.

Leading up to the Great Recession home values were increasing and exotic loan products made home ownership more accessible. After the housing bubble burst, foreclosures reached an all-time high and many Black and Latino families were devastated financially. Poor loan options, predatory lending, and aggressive sales tactics left these families with little to no financial assets. Their wealth building opportunities flew out the window.

This had predictable financial consequences for families, particularly the inability to transfer substantial amounts of wealth to successive generations which compounds the inability to accumulate wealth for multiple generations. Furthermore, when these families did try to get ahead, they were held back by system constraints as well as a lack of assets. Groups of investors with large amounts of cash on hand were, and still are, purchasing foreclosed homes at discounted prices. James Monks, a sales manager at Prudential California Realty, commented on the influx of investors who told him, “Don’t sell to regular people—just sell to us” (Lazo, 2012). No matter where they turned, minority families found themselves playing in a card game with the deck stacked against them. If minority families were able to buy a house, location and loan terms hindered the growth of equity and increased the probability of foreclosure. If they tried to maximize their spending power by purchasing a home in a depressed market, they were competing against investors with much larger reserves of capital. This is still seen today.
Historical Marginalization in Home Mortgages

During the Great Depression, Franklin Delano Roosevelt signed into law two pieces of legislation impacting housing finance, the Home Owners’ Loan Corporation (HOLC, 1933) and the Federal Housing Authority (FHA, 1934). HOLC helped struggling homeowners by buying and refinancing mortgages and establishing appraisal standards (Oliver & Shapiro, 2006). It also ranked neighborhoods into four categories (A, B, C, D) in order of lender risk (Gordon, 2005). While there has been some debate about how these rankings were used by the HOLC, it is clear that neighborhoods with older housing stock and larger Black or immigrant populations were perceived as high risk; loans in these areas had higher interest rates (Crossney & Bartelt, 2005; Hillier, 2003). The FHA then insured private mortgages against default which allowed lenders to make loans with very little risk, if any at all, freeing up money in an effort to alleviate the financial strain of the Great Depression. The FHA, believing that social stability—homogeneity of race and social class—led to better neighborhoods, adapted and codified previous appraisal standards from the HOLC and other experts in a written underwriting manual (Hillier, 2003). It even suggested that restrictive covenants should be used to maintain such a socially stable neighborhood (Oliver & Shapiro, 2006). Maps created from these appraisal standards had a red line drawn around neighborhoods with the highest perceived risk, those that were urban, older, and larger populations of minority residents (Hillier, 2003). As a result, the FHA favored and insured loans for newly constructed homes in White suburban areas. It did not back mortgages in Black, urban, red-lined neighborhoods (Crossney & Bartelt, 2005; Hillier; Oliver & Shapiro, 2006).

After WWII, eager to stimulate economic growth, Congress passed the GI Bill (1944) giving millions of returning soldiers the opportunity to buy homes with extremely low cost
government backed Veterans Administration (VA) loans. Like the FHA, these VA loans were not available in red-lined communities. Combined with restrictive covenants prohibiting their purchase of homes in suburban developments, Blacks were effectively excluded from participating in what became an incredible expansion of wealth for Whites through home equity (Oliver & Shapiro, 2006). While the Supreme Court declared restrictive covenants unconstitutional in *Shelly v. Kraemer* (1948) it was not until 1950 that the FHA removed the suggestion of such covenants from the underwriting manual (Oliver & Shapiro, 2006). And it was another 18 years before Lyndon Johnson signed the Fair Housing Act as Title VIII of the Civil Rights Act of 1968 which prevented discrimination in the housing market and explicitly ended FHA loan approval discrimination (Gordon, 2005).

In order to monitor compliance with the Fair Housing Act, the Home Mortgage Disclosure Act (HMDA) was passed in 1975, requiring banks to make mortgage application data public (Blank, Venkatachalam, McNeil, & Green, 2005). Lenders have been somewhat successful in limiting the scope of HMDA, making it difficult, but not impossible, for researchers to find evidence of racial discrimination (Blank et al., 2005). Then in 1977, Congress passed the Community Reinvestment Act (CRA). This legislation was designed to end the practice of racial and neighborhood discrimination by mortgage lenders. It required banking institutions to provide credit and other banking services in surrounding low and middle income communities (Barr, 2005; Friedman & Squires, 2005). It greatly increased the number of loans to low income and minority borrowers and led to greater racial integration in suburban areas (Friedman & Squires, 2005; Massey, 2005). Except for the HOLC which was disbanded in 1951 (Crossney & Bartelt, 2005), these other pieces of legislation have gone through several revisions and reauthorizations over the years since their initial passage, changes that have usually favored
the borrower. However, clear signs of racial discrimination in the mortgage industry continue to be found.

In recent years, numerous studies have indicated that mortgage denial rates for Black and Latino applicants are much higher than for Whites (Cavell, 2012; Ghent, Hernández-Murillo, & Owyang, 2012; Oliver & Shapiro, 2006). This disparity even persists across income levels. Blacks and Latinos with high incomes still have higher denial rates than Whites at low incomes (Communities in crisis: Race and mortgage lending in the Twin Cities, 2009). The composition of the neighborhood also has a significant impact on denial rates; minority applicants are much more likely to be denied a loan if the home is in a White or transitioning neighborhood (Ezeala-Harrison, Glover, & Shaw-Jackson, 2008). Using methods similar to calculating a racial dissimilarity index, one study found that at least 10% of mortgages in a major metropolitan area would need to be redistributed to minority census tracts to create a more equitable apportionment of such loans (Blank et al., 2005).

This has resulted in two problems. Blacks and other minorities became segregated into neighborhoods with a large minority concentration, which often led to low value homes with slow appreciation and greater levels of poverty (Ross, 2006). Additionally, applicants denied a prime mortgage loan often turned to the subprime loan market (Apgar & Calder, 2005).

**Conditional Acceptance with Subprime Loans**

The recent subprime loan crisis can be traced back to the early 1980’s, which saw a growth in the subprime mortgage loan market because of two acts favorable to the banking industry. The Depository Institutions Deregulation and Monetary Control Act (MCA) of 1980 removed government imposed caps on mortgage interest rates, essentially allowing banks to charge whatever interest rate they chose. In 1982 The Alternative Mortgage Transaction Parity
Act (AMTPA) allowed for loans with variable interest rates, balloon payments, and interest only payments (Chomsisengphet & Pennington-Cross, 2006). Taken together, these acts created a favorable atmosphere for lenders to begin selling subprime loans, adjustable rate mortgages (ARMs), and balloon loans which have a fixed rate for a few years followed by a complete repayment of the remaining principal.

Subprime loans have interest rates that are three percentage points or more above the prime rate (http://www.ffiec.gov/hmdaadwebreport/footnote_HMDA2010.htm, note #16). In the years leading up to the housing crash this represented at least a 50% increase over the prevailing prime rate. Since the bulk of mortgage payments in the early years of the loan is applied toward the interest, these homeowners pay much more to acquire much less home equity than prime loan holders. Subprime loans originally served a small niche of people who may have had temporary credit problems at one time. A subprime loan allowed an applicant to buy a home, fix credit problems, and then refinance into a prime loan (Rivera, Cotto-Escalera, Desai, Huezo, & Muhammad, 2008; Wyly, Moos, Foxcroft, & Kabahizi, 2008). However, it has been estimated that 60% of subprime loans will be refinanced into another subprime loan (Schloemer et al., 2006). This extracts equity from the homeowner through costs and penalties associated with the loan itself (Newman & Wyly, 2004).

Subprime loan rates are correlated with mortgage denial rates; in order to purchase a home, applicants denied a prime loan are left with no other alternative than a subprime lender. (Wyly et al., 2008). Subprime loans are also highly correlated with low income neighborhoods (Calem, Gillen, & Wachter, 2004; Chomsisengphet & Pennington-Cross, 2006; Wyly et al., 2008; Wyly & Ponder, 2011). Therefore, higher denial rates in low income areas, which tend to have a larger concentration of Black and minority residents, will lead to a larger proportion of
subprime loans in those areas (Calem et al., 2004). Consequently, Blacks and Latinos have a much higher probability of purchasing a home with a subprime loan than do Whites (Wyly et al., 2008; Wyly & Ponder, 2011), and there is a high correlation between the percentage of minority and low income residents with subprime loans in many urban cities (Calem et al., 2004).

This is partly explained by the relationship between minority home buyers and mortgage brokers. In an unrestricted market, a buyer works with a realtor who has cultivated relationships with mainstream banks. This creates a connection between the buyer and the lender that provides assistance in securing a prime loan. Due to historical disparities in banking services, minority applicants work in a restricted market. Unlike White buyers who are more likely to have experience in the housing market and a stronger credit record, minorities may not understand the mortgage process, especially if they have no previous involvement with homeownership. This, combined with the high rate of prime mortgage denial among Black and Latino applicants, encourages many to self-select out of the traditional lending process and turn toward a mortgage broker to find a loan (Barr, Mullainathan, & Shafir, 2008; Newman & Wyly, 2004). This results in a disproportionate number of subprime loans going to poorer minority applicants (Ross, 2006; Williams et al., 2005).

Part of the reason for higher subprime loan rates in minority and low income areas is due to predatory lending. Predatory lending is a term used to describe loans that strip equity from the homeowner and increase the chances of foreclosure (Chomsisengphet & Pennington-Cross, 2006). These include subprime loans and other types of loans with prepayment penalties, adjustable rates, and interest only payments as well as broker practices such as misstating income, not including taxes and insurance in monthly costs, and steering low income, minorities, or others who might qualify for a prime loan into a subprime mortgage (Chomsisengphet &
Pennington-Cross, 2006; Rivera et al., 2008; Schloemer et al., 2006). Some studies have shown that Whites applying for a subprime loan are much more likely than Blacks and Latinos to be redirected to a prime mortgage if they qualify (Communities in crisis: Race and mortgage lending in the Twin Cities, 2009; Williams et al., 2005). Furthermore, predatory brokers may churn applications. For example, when the principal comes due on a balloon or interest only loan the broker refines the balance into another high cost loan (Schloemer et al., 2006). The borrower never gets ahead and the principal often grows with the costs associated with refinancing. Low income neighborhoods and minorities are often targeted by predatory lenders. Due to long held perceptions about profit margins, many of these areas are devoid of commercial banks. That void is filled by subprime lenders (Williams et al., 2005)

Predatory lending has four main characteristics which were especially evident before the housing market crash. First, the market was advantaged toward the mortgage broker who, in an example of restricted information flow, had information about lenders and qualification requirements not available to the applicant (Barr et al., 2008; Gupta, 2001). Second, because of a tiered commission structure, the broker had a perverse incentive to sell the applicant the most expensive loan, even if the applicant qualified for one which cost less and was more suitable. While the buyer is looking for an affordable loan, the broker is looking for the most commission (Cavell, 2012; Rivera et al., 2008). Third, the risk was almost entirely carried by the borrower. Prior to the housing crash, mortgages were often packaged and sold to secondary investors after the loan was issued and the broker commission paid. Since broker earnings were not tied to loan performance, if the mortgage went into default, the borrower was left holding the bag—the broker did not own the loan (Rivera et al., 2008). Finally, subprime brokers have not been regulated in the same fashion as the banking industry, allowing them to sell unsuitable loans
while avoiding risk of punishment (Newman & Wyly, 2004; Rivera et al., 2008; Wyly et al., 2008). Furthermore, predatory lending did not help the homeowner build wealth. Default was six times higher for subprime versus prime loans and foreclosure starts were 10–40 times as high (Chomsisengphet & Pennington-Cross, 2006; Immergluck & Smith, 2006). This was all tremendously profitable for lenders who could market these high interest mortgages with little risk while causing many families to experience foreclosure.

**Return to Marginalization and Foreclosure**

The disparate treatment of minorities in the mortgage market continues into foreclosure. In addition to having a larger proportion of subprime loans which have higher rates of default, it has been found that of those who are in default, minorities are 40 times more likely to be foreclosed on than Whites (Quercia & Cowan, 2008). In other words, lenders are more willing to work with White homeowners in default, than minority homeowners in the same situation.

Consequently, there is a cumulative effect of disparities in the mortgage market. High rates of denials lead to high rates of subprime loans which lead to high loan to value ratios, which lead to default and foreclosure (Quercia & Cowan, 2008). Foreclosure negatively affects credit scores and results in a loss of any equity that may have accrued. It is estimated that between 2000 and 2008, Black and Latino homeowners in the United States lost close to $100 billion in (Rivera et al., 2008). This is devastating to the wealth building prospects of Black and Latino families (Carr, 2007).

**Current Theory**

Clearly the post war housing boom was not available to Black and Latino families. FHA and VA redlining or restrictive covenants in new developments like Levittown severely restricted where they could live. Even after the *Kraemer* decision against restrictive covenants and the
Civil Rights Act explicitly ending discrimination by the FHA, years of segregation had laid the foundation for further discrimination resulting in the disparate loan outcomes seen today.

One explanation for mortgage discrimination is stratification theory which argues that society is divided into social categories. A desire to climb the social ladder leads people to live in the best neighborhood that is affordable. However, social and structural barriers prevent full integration and promote residential segregation (Brown & Chung, 2008; South & Crowder, 1998). This creates stratified neighborhoods based on race and social status. Redlining, steering, and restrictive covenants worked to create this type of stratification in the past. Today, neighborhoods perpetuate their own established stratification. An example in Los Angeles is an area known as Ladera Heights, or the Black Beverly Hills, which is populated predominantly by middle and upper class Black families.

Another explanation for these disparities in housing finance is statistical discrimination. This can be defined as using the characteristics of a group to determine the credit worthiness of an individual who happens to belong to the same group (Ladd, 1998). Essentially, loan officers make guesses about an individual’s ability to repay a loan based on past mortgage performance of other loan holders in the individual’s racial or ethnic group (Ladd, 1998; Louis, 2012). Years of segregation left many Black and Latino families with little or no credit making it difficult to acquire loans. This behavior is irrational (Louis, 2012). Any group of individuals defined by a social construct such as race and ethnicity will have members who default on their loans. However, making this the basis for denying a much higher proportion of minority applicants underestimates the credit worthiness of those who do qualify for a loan (Louis, 2012).

Market led pluralism has been used to explain the proliferation of subprime loan products. A relatively new theory, market led pluralism posits that market structures determine
residential racial patterns. Profit motives opened up the housing market and expanded mortgage product offerings allowing more people to purchase homes. Individual choice determined where those homes were purchased. Any resulting segregation was simply a function of the free market (Brown & Chung, 2008).

Claiming that individual choice is the causal mechanism behind residential segregation patterns is short sighted (Charles, 2005) and ignores available evidence on mortgage discrimination (Apgar & Calder, 2005). Depending on the person, individual choice is severely restricted. As discussed above, the market was manipulated for the benefit of Whites and had the effect of extracting wealth from minorities. Different mortgage products marketed to minorities contributed to disparities in wealth accumulation. This means that lending strategies perpetuate the inability of minority families to build wealth and purchase homes in better neighborhoods. Essentially, these families are using expensive loan products to purchase homes in poor quality neighborhoods with lower home values. Therefore, segregation becomes a function of wealth inequality, not the other way around.

As to foreclosures, there has been some discussion that looser standards to meet minority lending requirements established by the government has led to higher rates of foreclosure among minority borrowers. The argument is that the government’s push to increase homeownership allowed unqualified applicants to secure a mortgage (Demyanyk & Van Hemert, 2011). Some have said that the Great Recession may not have been as severe if not for this government push (Laderman & Reid, 2008). However, foreclosures have been more closely tied to subprime loans (Chomsisengphet & Pennington-Cross, 2006) and that high cost subprime loans to minority borrowers are not justified by the actual risk (Kau, Keenan, & Munneke, 2012). In other words, it is not that Blacks and Latinos present a greater risk of default, it is that subprime lending
targeted to those communities increased risk of foreclosure. When home values fell and the recession hit, many minority homeowners had little to no equity in their home—foreclosure was inevitable. This was particularly true in suburban communities that saw a large increase in minority home purchases in the years before the housing crash.
Conceptual Framework

The theories presented above provide very reasonable approaches to different aspects in the problem of housing discrimination. Segregation, mortgage denial rates, subprime loan rates, and foreclosure rates have been discussed within these theories. It paints a picture of how one leads to the next and the impact it has on wealth building opportunities. However, the explanation of this problem is missing a critical link, a theoretical feature that binds these different aspects and creates one systemic cause. Critical Race Theory is one of several ways to explore this link.

Critical Race Theory

Critical Race Theory (CRT) is a paradigm originating in legal scholarship which seeks to understand the dynamic between power and race (Delgado & Stefancic, 2012). This view counters several ideas of legal liberalism. Legal liberalism prioritizes individual rights to equality and liberty, distrusts large institutions and the corruption of power and wealth, and believes that consequences for wrongdoing should be levied on the perpetrator (Simon, 2004). By focusing on individual rights and legal redress, legal liberalism believes that courts are colorblind and will fairly apply the law; CRT challenges the assumption that race is superfluous to legal doctrine (Gotanda, 1995). CRT scholarship argues that the non-recognition of race actually perpetuates systematic racism by allowing the inequality in social structures to continue (Abrams & Moio, 2009). Therefore, the goal is to examine the traditional practices of social institutions to illuminate the systemic underpinnings of the relationship between race and power.

Delgado and Stefancic (2012) thoroughly review the Critical Race Theory paradigm. There are six basic tenets of this scholarship which will be discussed here briefly. The first is endemic racism. Racism is ordinary, commonplace, and ingrained in the fabric of our social
institutions. Color blind policies have only been effective at eliminating the most blatant forms of racism. Second is the social construction of race. Racial groups are created to categorize individuals by superficial characteristics. This categorization has powerful implications on the treatment of different groups. This leads to differential racialization. The acceptance or rejection of racial groups varies depending on the social, political, and economic climate. Fourth is the concept of interest convergence or materialistic determination. In order for social justice policies to prevail, the interests and financial considerations of the dominant group must converge with those seeking redress. Fifth is intersectionality where an individual can be a member of several oppressed groups. Finally, storytelling brings voices and experiences of oppressed groups, often understated in the dominant paradigm, into societal discussions (Abrams & Moio, 2009; Delgado & Stefancic, 2012; Ladson-Billings, 1998).

This paradigm has been applied to other fields, most notably education; however, there has been little application toward housing studies. By viewing this phenomenon through the lens of Critical Race Theory, we can gain a better understanding of the systemic problems associated with it. By understanding the systemic issues, we have a better chance creating change within that system. What follows is a more in depth discussion of two key CRT tenets—endemic racism and interest convergence—and their relationship with housing finance discrimination.

**Critical Race Theory and Housing**

**Endemic Racism.** Racism persists today in somewhat subtle ways which are woven into the fabric of our social institutions. The problem with systemic racism is its virtual invisibility to those who are in power and benefit from it. It is this invisibility which makes such racism endemic. In housing, this presents itself in the mortgage loan approval process.
Mortgage denial rates are higher for Black applicants as well as other minorities as compared to White applicants even when accounting for credit worthiness (Munnell, Browne, McEneaney, & Tootell, 1992; Ross, 2002). This is found at all income levels and in either predominantly minority neighborhoods or predominantly White neighborhoods (Blank et al., 2005; Ezeala-Harrison et al., 2008). A higher rate of subprime loan originations (when the loan is accepted and funded) is also observed among minority applicants; this suggests they turn to subprime loans when prime loans are not available (Williams et al., 2005). Some have suggested that this could be due to increased risk of default (Block, Snow, & Stringham, 2008). However, it has been found that the perceived risks associated with minority neighborhoods are unsubstantiated and therefore do not support the higher cost loans to those residents (Kau et al., 2012).

This type of endemic racism has three profound effects on the Black and Latino population. First, high cost loans dramatically reduce the buying power of the applicant. Higher interest rates and mortgage insurance increase monthly payments and decrease the cost of a home the applicant can qualify for (Barr et al., 2008; Ross, 2006). Second, this relegates minority applicants to predominantly minority neighborhoods which tend to have lesser priced homes. This segregates minorities into poorer neighborhoods (Massey, 2005; Squires, Friedman, & Saidat, 2002) and increases risk of foreclosure (Rugh & Massey, 2010). Finally, homes in poorer neighborhoods appreciate at a slower rate than wealthier areas. This, coupled with higher interest rates, dramatically reduces the amount of equity these homeowners accumulate (Hodge et al., 2007; Oliver & Shapiro, 2006; Quercia & Cowan, 2008; Williams et al., 2005). Consequently, the housing finance system fosters inequality and keeps minorities in a perpetual state of subordinate wealth building prospects (Rusk, 2001).
**Interest Convergence.** Derrick Bell suggested that the Brown v. Board decision of 1954 came at a time when the United States wanted to improve its image in the eyes of the world and Southern leaders saw school segregation as a hurdle to industrialization (Bell, 1980). Blacks had been fighting for school desegregation for many years, but at this time the interests of the dominant group converged with the interests of the oppressed and social justice was served.

In the same vein, minorities and advocacy groups were clamoring for social justice in the housing finance arena. In the mid to late 1970s they were successful in getting some legislation passed, namely the HMDA and the CRA discussed previously. While government agencies were monitoring loan dispositions, lenders were concerned about risk. So at the lending institution’s urging some key finance deregulation in the early 1980s allowed for the development of subprime lending. That is, lenders were willing to appease the public if they got higher rewards for doing so. Once their financial concerns were met, the interest of lenders to sell highly profitable loans converged with the interests of minorities eager to buy houses. This is termed materialistic determination in CRT. Alan Greenspan, revered former chairman of the Federal Reserve Board, called this a “democratization of credit” (Greenspan, 1997).

Actually, it created an economic phenomenon called rent seeking, where business takes advantage of differences between the equilibrium price and a regulated price (Gupta, 2001). Rent seeking is usually used to explain how by setting an artificially high price to subsidize an industry the government encourages an increase in supply (Gupta, 2001). In regard to subprime loans, it is actually the lack of regulation which creates rent seeking. That is, once government imposed caps on interest rates were removed, lenders realized the profitability in selling loans to a market hungry for credit. However, that credit came at a price to minorities in the form of higher interest rates and finance fees (Schloemer et al., 2006).
Furthermore, subprime lending proliferated due in part to a restricted flow of information—when the seller has product knowledge not shared with the buyer in order to maintain control of the market (Gupta, 2001). While relationships between realtors, appraisers, and banks in predominantly White neighborhoods led to prime loans, agents in minority areas leaned toward associations with mortgage brokers. Already distrustful of banks, this helped push many minority applicants toward mortgage brokers to help them find loans. Since these applicants were often unaware of what type of loan could be secured, they relied on the broker to find the most suitable loan. The broker did not tell the buyer which loans were available, only the most expensive one the buyer could afford. Thus the information was restricted. That restriction is challenged in CRT scholarship (Simon, 2004).

Mortgage lenders saw an opportunity to tap into a previously underserved market. Furthermore, they created perverse incentives which encouraged the steering of minority borrowers into subprime loans (Apgar & Calder, 2005; Barr et al., 2008; Barwick, 2010; Ross, 2006). Eventually subprime mortgages grew to over half of loans to Blacks and almost the same for Latinos in 2006, right before the housing crash. This is why interest convergence best explains this problem. Lenders did not open up credit to help previously underserved communities, they did it because their profit margin was higher than for prime loans.

When the housing bubble burst and people were no longer able to afford high priced mortgages, foreclosures ballooned. While initial blame fell on the relaxed requirements designed to increase minority ownership, it has been found that two indicators were associated with foreclosure apart from race and other social characteristics, namely loan to value ratio and interest rate (Kau et al., 2012). Predatory lending practices, aimed at minority communities, resulted in high interest rates, large fees, and a decrease in equity for the homeowner. This is the
driving force behind the foreclosure crisis (Schloemer et al., 2006). The materialistic
determination to increase profits converged with the public desire to increase lending which
devastated wealth building prospects for minority families while lending institutions reaped great
profits and government bailouts.

As previously noted, minority home owners in default were more likely to experience
foreclosure than similar Whites. It appears that banks are more willing to help struggling White
borrowers than Blacks or Latinos (Quercia & Cowan, 2008). Why would this be the case? The
answer lies in materialistic determination. Lenders want their money back. Foreclosure removes
the borrower from the equation and requires the lender to sell the house in order to get its money
back. Foreclosure also has the effect of depressing property values and are higher in areas of
lower priced homes which tend to have larger populations of minorities (Baumer, Arnio, &
Wolff, 2013; Immergluck & Smith, 2006; Lichtenstein & Weber, 2013; Rivera et al., 2008). By
working with struggling homeowners in White neighborhoods, lenders are shoring up their
investment, keeping home values high and decreasing risk of default. Also, it can take the better
part of a year to complete the foreclosure process. During that time income is lost and property
may be damaged by those being forced out of their home. It makes financial sense for lenders to
stave off foreclosure in higher valued homes—those in neighborhoods with larger proportions of
White homeowners. In minority areas, foreclosures create an opportunity for investors to buy
houses at extremely low prices. These homes can be rented out or fixed up and sold when prices
increase. When these homes are sold lenders have another opportunity to provide credit and
recoup losses from the previous foreclosure. In other words, it is in the material interest of the
lender to foreclose more quickly on lower priced homes to start the process of recouping their
money faster.

26
There is certainly a racial gap in wealth accumulation in the United States. Since home ownership accounts for a significant portion of household wealth and the vast majority of homes are purchased with borrowed money, it is important to look at racial disparities found in mortgage lending. The literature shows clear differences among racial groups in the ability to get mortgages at a prime interest rate and the purchasing of subprime loans. While this is the direct result of historical discriminatory practices, there are larger systemic issues at work. Using Critical Race Theory as a lens to study this phenomenon provides additional understanding of how these disparities are embedded in the very fabric of lending institutions allowing White families to expand their advantage over minority households in building wealth. This dissertation will attempt to answer the following questions:

- How have foreclosures impacted minority borrowers?
- How have foreclosures impacted mortgage lending for minority borrowers since the housing market crash?
- What is the estimated wealth loss for minority families after foreclosure?
Methods

The study uses publicly available data from the Home Mortgage Disclosure Act, the U.S. Census Bureau and the Neighborhood Stabilization Program of the Department of Housing and Urban Development. It will also use proprietary foreclosure data from RealtyTrac, a private company that collects mortgage information.

Data Sources

Home Mortgage Disclosure Act. The Home Mortgage Disclosure Act (HMDA) was initially enacted by Congress in 1975. Regulation C requires most lending institutions to submit individual loan data. This data includes applicant demographics and loan disposition information. Rule writing originally rested with the Federal Reserve Board but was transferred to the Consumer Financial Protection Bureau in 2011. The Federal Financial Institutions Examination Council reports aggregated data which is publicly available through its website (http://www.ffcnc.gov/hmdaadwebreport/aggwelcome.aspx).

The study uses HMDA data on conventional, first lien, owner occupied, one to four family home loan applications. Data aggregated at the census tract level includes application numbers and dispositions. For years 2006-2011, census tracts are determined by the 2000 decennial census. For years 2012-2013 the 2010 decennial census is used. Census tract conversions from 2000 to 2010 tabulation areas are computed using the Longitudinal Tract Data Base developed at Brown University (Logan, Xu, & Stults, 2014). Metropolitan Statistical Area (MSA) aggregated data include race and ethnicity, income, location demographics, and loan pricing information.

United States Census Bureau. Census tract demographic data was collected from the 2010 decennial census publicly available from the Census Bureau website
This 100% data includes population, race and ethnicity, and owner occupied households. Additionally, estimated data on income, education level, employment, mortgage and ownership status, and female home ownership was obtained from the American Community Survey (ACS). Census tract level estimates which are available publicly from the ACS for five year aggregates. This study uses the 2012 ACS which includes averages from 2008 to 2012.

Department of Housing and Urban Development. The Department of Housing and Urban Development (HUD) provides public data through its Neighborhood Stabilization Program (NSP). These data include the number of subprime loans, estimated number of mortgages and estimated foreclosure starts in a census tract. The NSP aggregates HMDA data to determine the number of subprime loans made between 2004 and 2006 in a census tract. It also uses HMDA data combined with ACS 2006 data to estimate the number of current homeowner mortgages in the tract. Using those two figures it computes a subprime loan rate for the tract.

RealtyTrac. RealtyTrac is a private company which collects nationwide foreclosure data. The study uses data purchased from RealtyTrac for 2006 to 2013. This data includes the number of notices of default, foreclosure starts, and real estate owned (REO) properties at the end of each calendar year. REO properties are those where title has been transferred to the lending institution—when the property becomes foreclosed. This data is collected at the zip code level. HUD provided crosswalk files were used to convert data from zip code level to census tract level based on the proportion of residential addresses. Residential address information is taken from quarterly zip code reports provided by the U.S. Postal Service. Therefore, foreclosure data collected at the zip code level was distributed to census tracts based on the
proportion of residences the census tract has that fall in a particular zip code. All foreclosure information was converted to census tract level using this method.

**Sample**

This analysis uses census tracts from the six urbanized counties in the Southern California region. Numbers given for population and owner occupied housing units with a mortgage come from the 2010 census. Starting in the northern part of the region, Ventura County is the smallest of the six with a population of about 823,000 and 140,000 owner occupied mortgage holders. Moving south along the coast, Los Angeles County has the highest population in the region with 9.8 million and approximately 1.23 million mortgage holders. This is followed by Orange County and then San Diego County, both with more than 3 million residents and 460,000 owner occupied mortgages. Riverside County with close to 2.2 million residents (360,000 mortgages) sits northeast of San Diego and is directly south of San Bernardino County with a population of just over 2 million people (310,000 mortgages). Starting with 4553 Census tracts in the region and excluding 301 tracts with fewer than 100 owner occupied housing units with a mortgage left 4252 tracts for analysis.

**Variables**

**Dependent variable.** Foreclosure is the primary outcome of interest. In common vernacular, the term foreclosure indicates when the lender takes back the house from the borrower; for analytical purposes this is termed real estate owned (REO). REO is when the title of the home is transferred to the lender through legal process. In the study this variable was calculated by dividing the number of REO homes in a census tract by the number of owner occupied homes with a mortgage in that same tract. It is displayed as a percentage.
Independent variables. The independent variables for the study are divided into three broad categories: race and ethnicity; housing; and individual characteristics.

Race and ethnicity. Derived from the U.S. Census, this category is divided into four main classifications: Asian; Black; Latino; and White. These populations are taken from the Hispanic or Latino and Race portion of the census. Here the population is divided into Latino and Not Latino. The Not Latino category is further broken down into Asian, Black and White. Thus, the population categories will represent Latino, Asian not Latino, Black not Latino, and White not Latino. Each category will be divided by the total population to calculate a percentage of each population in the census tract. To prevent collinearity problems, White will be used as the comparison group.

Housing. Housing data includes owner occupied housing units with a mortgage, mortgage loan applications and dispositions, and subprime loan rates. The number of owner occupied housing units with a mortgage is taken from the U.S. Census and represents housing units in the tract where the owner lives in the unit and has a mortgage or loan secured by the property.

Census tract level application data was taken from HMDA records. The total number of applications represents the number of completed applications where a decision has been made. Applications that were incomplete or withdrawn are not counted in this total. The denial rate is calculated by dividing the number of loans applications denied by the total number of applications. Subprime loan rates are calculated by dividing the number of originated loans with an interest rate three percentage points or more above the prime rate by the total number of originated loans. (Denial rate and subprime loan rate are also used as dependent variables in the application analysis.)
**Individual characteristics.** Census tract level individual characteristics were taken from the ACS. Education will represent the percentage of people in the tract who have at least a college education. Income will be the median income in the tract. Employment will be the percentage of 18-65 year olds in the tract that have full time employment. Female home ownership will be the percentage of owner occupied homes with a female head of household.

**Procedures**

The unit of analysis is 2010 census tracts. Since HMDA data from 2006 – 2011 are aggregated using 2000 census tracts those data were recalculated into 2010 census tracts using the Longitudinal Tract Data Base developed at Brown University (Logan et al., 2014). The 2009 ACS data set is also based on 2000 census tracts and were converted to 2010 census tracts using the same method. This conversion means that data collected from earlier years based on 2000 census tracts are now presented within the boundaries of 2010 census tracts. Foreclosure data is aggregated at the zip code level and was divided into 2010 census tracts using HUD data on the proportion of residential addresses a zip code has in each census tract. The resulting data sets were merged using 2010 census tracts as the unique identifier. All data manipulations were performed with Stata version 12.1.
Analysis

**Research Questions and Hypotheses.** The goal of the study is to determine how housing discrimination amplified disparities in wealth building prospects for minorities, particularly Black and Latino families. To that end there are three research questions:

**RQ 1.** How have foreclosures impacted minority borrowers?

**RQ 2.** How have foreclosures impacted mortgage lending for minority borrowers since the housing market crash?

**RQ 3.** What is the estimated wealth loss for minority families after foreclosure?

For the first question, this study examined foreclosures in conjunction with census tract characteristics as outlined above to explore the following two hypotheses:

**H1 a)** Foreclosures will be more concentrated in census tracts with a higher proportion of subprime loans.

**H1 b)** Foreclosures will be more concentrated in census tracts with a higher percentage of Black and Latino residents.

These hypotheses are closely related as previous research has shown both that minorities tend to have higher rates of subprime loans and that subprime lending decreases the amount of equity which can lead to foreclosures. However, this study looked specifically at the relationship between foreclosures and the proportion of minorities in a given census tract. That is, holding constant conditions of stability that might prevent foreclosure, are foreclosures higher in minority census tracts.

The second question regarding future credit opportunities required an analysis of the change in loan applications, denial rates, and originations since the collapse of the housing market. This leads to the following hypotheses:
H2 a) Prime mortgage originations will be lower proportionally for Black and Latino applicants.

H2 b) Subprime mortgage originations will be higher proportionally for Black and Latino applicants.

Since the housing market collapse prime lending became restricted and subprime lending decreased to a small fraction of what it once was. If minority borrowers are indeed at a disadvantage, then the same lending patterns will repeat even after the crash.

Estimating wealth loss to answer the third question required an analysis of home values as well as estimates of home equity to explore the following hypothesis:

H3) Financial losses will be more severe for Black and Latino households than White households.
Table 1

*Research Questions, Hypotheses, and Variables*

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Hypotheses</th>
<th>Data Set</th>
<th>Variables</th>
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<tbody>
<tr>
<td>1. How have foreclosures impacted minority borrowers?</td>
<td>1a) Foreclosures will be more concentrated in census tracts with a higher proportion of subprime loans.</td>
<td>RealtyTrac</td>
<td>Foreclosures</td>
</tr>
<tr>
<td></td>
<td>1b) Foreclosures will be more concentrated in census tracts with a higher percentage of Black and Latino residents.</td>
<td>Census</td>
<td>Population by Race, Mortgages, College Education, Income, Unemployment, Marital Status, Gender</td>
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<td>HUD</td>
<td>Subprime loans</td>
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<tr>
<td>2. How have foreclosures impacted mortgage lending for minorities since the housing market crash?</td>
<td>2a) Prime mortgage originations will be lower proportionally for Black and Latino applicants.</td>
<td>HMDA</td>
<td>Prime mortgages</td>
</tr>
<tr>
<td></td>
<td>2b) Subprime mortgage originations will be higher proportionally for Black and Latino applicants.</td>
<td></td>
<td>Subprime mortgages</td>
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<tr>
<td>3. What is the estimated wealth loss for minority families after foreclosure?</td>
<td>3) Financial loss will be greater for Black and Latino households than White households.</td>
<td>RealtyTrac</td>
<td>Foreclosures</td>
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<tr>
<td></td>
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<td>Census</td>
<td>Median Home Value, Population by Race</td>
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**Statistical Models.** Using a predictive model will be helpful to answer the first research question. Exploration of the data set revealed non-normal distributions of the dependent variable REO. In order to check for linear regression assumptions, I visually inspected a histogram and a q-q plot of the residuals as well as a scatter plot of the residuals against the outcome variable. This confirmed the suspected non-normal distributions and required the use of a transformative regression model.

The measure of foreclosure is a count model where the number of foreclosures is divided by the number of mortgages in a census tract. I ran simulated Poisson and negative binomial distributions using the measures of central tendency found in my REO variable. The actual distribution of REO most closely matched the negative binomial distribution. Thus, statistical analysis of REO was done using a negative binomial regression.

This is the final model for the foreclosure:

H1) \[ \text{Foreclosure} = \text{Owner Occupied} + \text{Denial Rate} + \text{Subprime Loan Rate} + \]
\[ \text{Race} + \text{Education} + \text{Income} + \text{Unemployment} + \text{Female Owned} + \text{error} \]

The second question requires a historical analysis of loan applications and dispositions. This study examined the interaction of race and time with denial rates and subprime loan rates separately. Again these are count models where the number of denied loans is divided by the number of applications or the number of subprime loans is divided by the number of total loan originations. Therefore, a mixed Poisson model was used. To account for changes in slope structure before and after the housing market crash a piecewise regression model was used.
This is the model for loan denial rates:

H2a) Denied = race + year1 + race(year1) + year1^2 + race(year1^2) + year2 + race(year2)


This is the model for subprime loan rates:

H2b) Subprime = race + year1 + race(year1) + year1^2 + race(year1^2) + year2 + race(year2) + year2^2 + race(year2^2)

Where year1 = 2006-2010 and year2 = 2010-2013

The third question will estimate changes in wealth due to foreclosure using median home values and home equity estimates to determine financial loss. This can be estimated using the following model:

H3) Estimated Financial Loss = Median Home Value x Foreclosures x Race Population Proportion
Results – Region

Descriptive Statistics

The Southern California Region in this study (Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties) is comprised of 4,553 census tracts as measured by the 2010 Census. For model stability, 301 tracts with fewer than 100 mortgage loans were removed from analysis. The resulting sample is 4,252 census tracts. The sample tracts are distributed to the six counties in roughly equal proportions to the total tracts of the region (See Table A1).

In 2010, the region had a population of just over 20 million residents. The selected race groups (non-Latino: Asian, Black, White; and Latino) make up approximately 97% of the total population. Asian and Latino population proportions are roughly twice as large in the region as in the United States a whole, while the Black and White proportions are about half those found in for the same populations in the United States.

The average homeownership rate for the region, calculated as the percentage of households in owner occupied housing, is approximately 54%. This rate for Blacks and Latinos is below the average at 38% and 44% respectively. Asians at 56% and Whites at 63% have a home ownership rate above the region average (see Table 2).
Table 2

Region Population Proportions and Home Ownership Rates by Race

<table>
<thead>
<tr>
<th>Race</th>
<th>Population %</th>
<th>Home Ownership Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>11.8</td>
<td>56.1</td>
</tr>
<tr>
<td>Black</td>
<td>6.2</td>
<td>38.0</td>
</tr>
<tr>
<td>Latino</td>
<td>42.6</td>
<td>44.3</td>
</tr>
<tr>
<td>White</td>
<td>36.4</td>
<td>63.6</td>
</tr>
<tr>
<td>Total</td>
<td>97.0</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>54.4</td>
</tr>
</tbody>
</table>

At the census tract level, female head of households in owner occupied housing averaged to about 21% of all home ownership. In the average tract, 79% of owner occupied homes carry a mortgage and the median home value for a home in 2013 is a little over 408 thousand dollars. The average census tract has a median income close to 66 thousand dollars, almost 29% of the population with at least a college degree, and an unemployment rate of 11.65%.

The foreclosure rate for the region is 2.7%. Foreclosure rate comparisons by the racial composition of a census tract were made by looking at foreclosures in tracts where the group of interest was at its mean population or above. This calculation showed that the foreclosure rate in tracts which had at least the mean population of Blacks or Latinos was above the region average of 2.7% at 4.5% and 3.8% respectively. For tracts with at least the mean population of White and Asian residents, the foreclosure rate was less than the region average at 1.8% and 1.7% respectively.

Census tracts with larger populations of Blacks and Latinos also fare worse than the region average for the remaining variables. The proportion of residents with a college degree as well as home value and income medians are much lower than the average and substantially lower than census tracts with greater numbers of Whites or Asians (see Table 3).
Table 3

Region Selected Variables at or above Population Mean by Race

<table>
<thead>
<tr>
<th>Tracts ≥ Mean Population</th>
<th>Foreclosure %</th>
<th>College Degree %</th>
<th>Median Home Value $</th>
<th>Median Income $</th>
<th>Unemployment %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>1.7</td>
<td>36.3</td>
<td>474,631</td>
<td>73,930</td>
<td>10.0</td>
</tr>
<tr>
<td>Black</td>
<td>4.5</td>
<td>19.7</td>
<td>293,754</td>
<td>51,848</td>
<td>14.0</td>
</tr>
<tr>
<td>Latino</td>
<td>3.8</td>
<td>14.5</td>
<td>291,122</td>
<td>49,661</td>
<td>13.7</td>
</tr>
<tr>
<td>White</td>
<td>1.8</td>
<td>40.8</td>
<td>507,938</td>
<td>80,374</td>
<td>10.0</td>
</tr>
<tr>
<td><strong>Tract Average</strong></td>
<td><strong>2.7</strong></td>
<td><strong>28.7</strong></td>
<td><strong>408,491</strong></td>
<td><strong>65,659</strong></td>
<td><strong>11.7</strong></td>
</tr>
</tbody>
</table>

Foreclosure

The first research question seeks to understand the relationship between race and foreclosure. Using a negative binomial regression analysis, this question was answered using four successive models. Model 1 looked at race proportions as an independent predictor of foreclosure. Model 2 examined race and loan outcomes (denial and subprime loan rates). Model 3 used race with housing and demographic variables. The complete model (Model 4) combines race, loan, housing and demographic variables.

Due to the fact that census tract race proportions co-vary (when one population proportion increases, the others must decrease), the four models were analyzed for each race separately. Therefore, model coefficients indicate the expected effect an increase in one race will have on foreclosure. When added to the set of models for each race, the coefficients for loan, housing, and demographic variables were virtually identical and are only used to examine changes in the effect of race. Complete model sets for each race are presented in Appendix B.

Coefficients are presented as incidence-rate ratios (IRR). IRR’s above one indicate that the outcome increases with an increase in the predictor—in this case, foreclosure by race population proportion. IRR’s below one indicate that foreclosures will decrease with increases
of that particular race. Looking at race alone in Model 1, the IRR for Black is 1.035 indicating that a one percent increase in the proportion of Black residents in a census tract increases the foreclosure rate by approximately 3.5% in that tract. For a one percent increase in the Latino population a 1.7% increase in the foreclosure rate is expected. On the other hand, a one percent increase in the White population of a census tract is expected to decrease the foreclosure rate by 1.4% in that tract. For Asians this corresponds to a 2.6% decrease.

These percentages begin to converge with each successive model. Adding loan outcome variables to race in Model 2 decreases the effect by about 2% for Black and 1% for Latino. The effect increases by about 1% for White and Asian. Adding housing and demographic variables to race in Model 3 decreases the effect over race alone by 1.4% for Black and 1.8% for Latino, however Latino is not significant in this model. For White the effect increases 1.7% and for Asian it increases 1.3%.

In the final model, both Black and White IRR’s have remained above one and show a relative small effect of race on foreclosure. A one percent increase in the Black population on foreclosure is .7% and for Whites it is .5%. An increase of one percent in the Latino population decreases the expected foreclosure rate by .33%. For Asians the decrease is 1.1% (see Table 4).
Table 4

Region Foreclosure Negative Binomial Regression Model Coefficients by Race

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Model 2&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Model 3&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Model 4&lt;sup&gt;d&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IRR</td>
<td>z</td>
<td>IRR</td>
<td>z</td>
</tr>
<tr>
<td>Asian population</td>
<td>0.974</td>
<td>-26.26 **</td>
<td>0.985</td>
<td>-15.15 **</td>
</tr>
<tr>
<td>Black population</td>
<td>1.035</td>
<td>13.26 **</td>
<td>1.014</td>
<td>6.70 **</td>
</tr>
<tr>
<td>Latino population</td>
<td>1.017</td>
<td>32.96 **</td>
<td>1.007</td>
<td>9.03 **</td>
</tr>
<tr>
<td>White population</td>
<td>0.986</td>
<td>-25.97 **</td>
<td>0.995</td>
<td>-5.79 **</td>
</tr>
</tbody>
</table>

Note. IRR = Incidence-rate ratio; Wald $\chi^2$ results for each model/race are significant at p<.01.

<sup>a</sup>Race alone. <sup>b</sup>Race, denial, subprime. <sup>c</sup>Race, owned, female owned, college, value, income, unemployment. <sup>d</sup>All variables.

* p<.05; ** p<.01

Application Outcomes

Loan applications for the study population comprise 86% of all applications in the region. Black and Latino applications are proportionally smaller than their respective populations. Loan denial rates and subprime loan origination rates for Black and Latino applicants are considerably higher than Asian and White applicants as well as region totals. For example, the denial rate for Black applicants is twice that of White applicants; Latino applicants are denied at 1.7 times the rate of their White counterparts. Looking at subprime loans, both Blacks and Latinos purchase subprime loans at more than four times the rate of Whites and more than twice the regional rate (see Table 5).
Table 5

Region Loan Denial and Subprime Loan Rates by Race

<table>
<thead>
<tr>
<th>Race</th>
<th>Loan Denial Rate %</th>
<th>Subprime Loan Rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>17.8</td>
<td>9.1</td>
</tr>
<tr>
<td>Black</td>
<td>34.2</td>
<td>43.1</td>
</tr>
<tr>
<td>Latino</td>
<td>29.0</td>
<td>39.0</td>
</tr>
<tr>
<td>White</td>
<td>17.1</td>
<td>9.3</td>
</tr>
<tr>
<td>Average</td>
<td>22.5</td>
<td>19.4</td>
</tr>
</tbody>
</table>

Applications. In 2006 the total number of loan applications was 514,119 in the region. This dropped to a low of 73,363 in 2011 and up to 101,253 in 2013 (see Table 6). In 2006 the application proportions by race were similar to their population proportions. These proportions changed as the application numbers dropped. In 2013, loan applications by Whites were just under 60 percent while Black applicants were below 2 percent (see Figure 1).

Table 6

Region Applications by Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>514,119</td>
</tr>
<tr>
<td>2007</td>
<td>294,221</td>
</tr>
<tr>
<td>2008</td>
<td>130,507</td>
</tr>
<tr>
<td>2009</td>
<td>87,627</td>
</tr>
<tr>
<td>2010</td>
<td>87,513</td>
</tr>
<tr>
<td>2011</td>
<td>73,363</td>
</tr>
<tr>
<td>2012</td>
<td>83,289</td>
</tr>
<tr>
<td>2013</td>
<td>101,253</td>
</tr>
</tbody>
</table>
Figure 1. Region Application Proportions by Race and Year

Denial Rate. The loan application denial rate reached a high in 2007. In that year 40% of loan applications by Blacks were denied which is twice the rate of White applications. In 2013, Black applications saw a denial rate of over 20%. The denial rate for Whites was a little more than half that at just under 12% (see Figure 2).
The nature of the observed curve indicated a piecewise model. For years 2006-2009 a quadratic formula was used to match the curvilinear observed outcomes in the data. For this set, the difference in the denial rate slope between Black and Latino was not significant; the difference in slopes between Whites and Asians was also not significant. The results indicate that the slope for Black and Latino declines more quickly than for Whites and Asians. For the years 2009-2013, a straight line was fitted to the data. The results show that the denial rate slopes for Blacks and Whites are not significantly different. This indicates that while the denial rate does decline, it declines at the same rate for these two groups. The denial rate for Latinos declines a bit more quickly than Whites. The Asian rate slightly increases. (See Table C1 for complete results.)

**Subprime Loan Rate.** The number of subprime loans in the region decreased dramatically over the time period from a high of 138,272 in 2006 to a low of only 81 in 2010 (see Table 7). Black borrowers consistently purchase a subprime loan in much higher
proportions than White borrowers. In 2006, almost 62 percent of all loans purchased by Black borrowers were subprime. This corresponds to a rate of just under 25% for White borrowers. In 2013, 2.3 percent of all loans purchased by Blacks were subprime. For White borrowers purchased .14 percent of all loans were subprime (see Figure 3).

Table 7

Region Subprime Loans by Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Subprime Loans</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>138,272</td>
</tr>
<tr>
<td>2007</td>
<td>32,579</td>
</tr>
<tr>
<td>2008</td>
<td>3,760</td>
</tr>
<tr>
<td>2009</td>
<td>1,217</td>
</tr>
<tr>
<td>2010</td>
<td>81</td>
</tr>
<tr>
<td>2011</td>
<td>412</td>
</tr>
<tr>
<td>2012</td>
<td>628</td>
</tr>
<tr>
<td>2013</td>
<td>205</td>
</tr>
</tbody>
</table>
Figure 3. Region Subprime Loan Rate by Race and Year

A similar Poisson model was used to predict subprime loans. For years 2006-2010 a quadratic formula was used to account for the curved slopes. As with the denial rate, the subprime loan rate slopes were not significantly different between White and Asian. However, the subprime rate slope for both Black and Latino did differ from White. This indicates that the subprime loan rate dropped much faster for Blacks and Latinos than for Whites between 2006 and 2010.

For the years 2010-2013 a quadratic formula was also used but the curve for this time period is negative. Again, the White and Asian slopes are virtually the same, but the Black and Latino slopes are significantly different from the White slope. This indicates that after 2010 the subprime loan rate for Blacks and Latinos was increasing more quickly than for Whites. And
while it decreases after 2012 it does not meet the White rate as it did in 2010. (See Table C2 for complete results.)

**Wealth Loss**

Wealth loss was computed as the total loss of the asset’s value. This was calculated using the median home value as measured by the 2013 American Community Survey which is a weighted average over the five-year period between 2009 and 2013. This value was then multiplied by the number of foreclosures during the time period of the study. That resulted in an estimated dollar value of the total number of foreclosed homes between 2006 and 2013. That figure was distributed to the four racial groups proportionate to their homeownership in the tract.

For the eight-year period between 2006 and 2013 Black families in the region lost approximately 9 billion dollars and Latino families 39 billion dollars of home value. White families lost more than 70.6 billion dollars and Asian families 14.3 billion dollars in home value. However, differences in home ownership rates make these numbers uncomparable. Looking at the loss of wealth as a percentage of total asset values for each group paints a more accurate picture. Using this calculation, Black families lost over 14% and Latino families close to 13% of their total home value as a group. White and Asian losses are half that at about 7% each. As a comparison, the region as a whole saw an 8.5% loss of total wealth in home value (see Table 8).
Table 8

Region Estimated Foreclosed Values by Race

<table>
<thead>
<tr>
<th>Race</th>
<th>Total Home Value ($ Billions)</th>
<th>Total Foreclosed Value ($ Billions)</th>
<th>% Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>212.5</td>
<td>14.3</td>
<td>6.7</td>
</tr>
<tr>
<td>Black</td>
<td>61.9</td>
<td>8.9</td>
<td>14.4</td>
</tr>
<tr>
<td>Latino</td>
<td>307.6</td>
<td>39.0</td>
<td>12.7</td>
</tr>
<tr>
<td>White</td>
<td>989.2</td>
<td>70.7</td>
<td>7.1</td>
</tr>
<tr>
<td>Total</td>
<td>1,604.4</td>
<td>135.9</td>
<td>8.5</td>
</tr>
</tbody>
</table>
Results – MSA

Descriptive Statistics

Looking at a smaller subset of this sample can serve as a case study of this phenomenon. The Riverside–San Bernardino Metropolitan Statistical Area (MSA) includes Riverside and San Bernardino Counties. It has a total population of just over 4 million residents. This subset has 804 census tracts for analysis. The Black and Latino population proportions are higher than that of the region. The Asian population proportion is half that of the region. These numbers are reflected in proportional differences in application rates (see Table 9).

Table 9

*MSA Population and Application Proportions by Race*

<table>
<thead>
<tr>
<th>Race</th>
<th>Population %</th>
<th>Home Ownership Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>5.9</td>
<td>71.6</td>
</tr>
<tr>
<td>Black</td>
<td>7.0</td>
<td>46.5</td>
</tr>
<tr>
<td>Latino</td>
<td>47.5</td>
<td>57.9</td>
</tr>
<tr>
<td>White</td>
<td>36.6</td>
<td>73.0</td>
</tr>
<tr>
<td>Total</td>
<td>96.9</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>65.2</td>
<td></td>
</tr>
</tbody>
</table>

As seen in the table above, the home ownership rate for the MSA is 65%, more than 10 percent higher than the region as a whole. In fact, home ownership rates are higher for each group in the study. Blacks still have the lowest rate at 46% while Whites and Asians at just above 70% are almost the same.

At the census tract level, MSA owner occupied housing with a female head at close to 22% and with a mortgage at just over 78% is roughly equal to the region. However, the median home value of about 225 thousand dollars is much lower than the region. The median income of
just under 58 thousand dollars and a college degree rate of almost 19% is lower than the region. Unemployment is much higher at 15%.

While there are more foreclosures, the percentage of foreclosures in the MSA does not show the same drastic differences as seen in the region. When compared at the population means or above for each race, foreclosure rates only vary by a few tenths of one percent. Still census tracts with larger proportions of Blacks and Latinos are above the MSA foreclosure average.

As seen in the region, Blacks and Latinos characteristically fare worse than the average of all the variables. Census tracts at or above the population means for Blacks or Latinos have a smaller portion of college degree holders along with lower medians for home values and income than the MSA average. Using the same metric, unemployment rates are higher in tracts with larger portions of Blacks or Latinos than the average for the area (see Table 10).

Table 10

*MSA Selected Variables at or above Population Mean by Race*

<table>
<thead>
<tr>
<th>Tracts ≥ Mean Population</th>
<th>Foreclosure %</th>
<th>College Degree %</th>
<th>Median Home Value $</th>
<th>Median Income $</th>
<th>Unemployment %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>3.5</td>
<td>20.0</td>
<td>234,848</td>
<td>61,519</td>
<td>14.3</td>
</tr>
<tr>
<td>Black</td>
<td>3.7</td>
<td>17.8</td>
<td>216,118</td>
<td>57,048</td>
<td>15.3</td>
</tr>
<tr>
<td>Latino</td>
<td>3.8</td>
<td>15.0</td>
<td>201,325</td>
<td>52,834</td>
<td>15.9</td>
</tr>
<tr>
<td>White</td>
<td>3.5</td>
<td>20.9</td>
<td>238,601</td>
<td>60,199</td>
<td>14.4</td>
</tr>
<tr>
<td>Tract Average</td>
<td>3.6</td>
<td>18.8</td>
<td>224,696</td>
<td>57,691</td>
<td>15.0</td>
</tr>
</tbody>
</table>

Foreclosure

Statistical examination of the Riverside – San Bernardino MSA yields different results than the larger region. For Model 1 with race only the effect of a one percent increase in the proportional Black population results in an expected increase in foreclosures of 3.9% in that
A one percent increase in the Latino population is expected to increase foreclosures by .9%. A one percent increase in the White population is expected to decrease foreclosures by .8%. and a one percent increase in the Asian population is expected to decrease foreclosures by 4.5% in those tracts.

Similar to the region as a whole, these percentages begin to converge with each successive model in the smaller sample, however the change is different. Adding loan outcome variables to race in Model 2 decreases the effect by about .9% for Black and .4% for Latino. The effect increases by about .3% for White and 1% for Asian. Adding housing and demographic variables to race in Model 3 decreases the effect over race alone by 1.9% for Black and 1.5% for Latino. For White the effect increases 1.1% and for Asian it increases 3.5%.

In the final model the expected effect of a one percent increase in the Black population on foreclosure is 2%. For Whites this relationship is also positive resulting in an expected increase in foreclosures of .4%. An increase of one percent in the Latino population decreases the expected foreclosure rate by .6%. For Asians the decrease is 1% (see Table 11; Appendix D has complete results).
Table 11

*MSA Negative Binomial Regression Model Coefficients*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Model 2&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Model 3&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Model 4&lt;sup&gt;d&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IRR</td>
<td>z</td>
<td>IRR</td>
<td>z</td>
</tr>
<tr>
<td>Asian population</td>
<td>0.955 -12.11**</td>
<td>0.965 -9.06**</td>
<td>0.990 -2.38*</td>
<td>0.990 -2.50*</td>
</tr>
<tr>
<td>Black population</td>
<td>1.039 7.79**</td>
<td>1.030 5.79**</td>
<td>1.021 7.12**</td>
<td>1.020 7.02**</td>
</tr>
<tr>
<td>Latino population</td>
<td>1.009 7.47**</td>
<td>1.005 3.65**</td>
<td>0.994 -4.46**</td>
<td>0.994 -4.65**</td>
</tr>
<tr>
<td>White population</td>
<td>0.992 -6.68**</td>
<td>0.995 -3.30**</td>
<td>1.003 2.33*</td>
<td>1.004 2.68**</td>
</tr>
</tbody>
</table>

*Note.* IRR = Incidence-rate ratio; Wald χ² results for each model/race are significant at p<.01.

<sup>a</sup>Race alone.  <sup>b</sup>Race, denial, subprime.  <sup>c</sup>Race, owned, female owned, college, value, income, unemployment.  <sup>d</sup>All variables.

<sup>*</sup>p<.05;  <sup>**</sup>p<.01

**Application Outcomes**

Even though there are more There are similarities in loan statistics between the MSA and the region as a whole even though loan denials and subprime loan originations are both higher in the MSA than found in the region. As seen in the region, loan denial and subprime loan rates are much higher for Blacks and Latinos than Whites and Asians in the MSA. The loan denial rate for Blacks is almost twice that of Whites; For Latinos the denial rate is 1.5 times that of Whites. Compared to Whites, the subprime loan for Blacks is more than three times as high and for Latinos it is 2.5 times larger. These rates are 1.5 times the MSA average subprime loan rate (see Table 12).
Table 12

*MSA Loan Denial and Subprime Loan Rates by Race*

<table>
<thead>
<tr>
<th>Race</th>
<th>Loan Denial Rate %</th>
<th>Subprime Loan Rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>20.2</td>
<td>15.6</td>
</tr>
<tr>
<td>Black</td>
<td>34.2</td>
<td>49.6</td>
</tr>
<tr>
<td>Latino</td>
<td>28.5</td>
<td>43.4</td>
</tr>
<tr>
<td>White</td>
<td>18.6</td>
<td>16.4</td>
</tr>
<tr>
<td>Average</td>
<td>24.5</td>
<td>29.2</td>
</tr>
</tbody>
</table>

**Applications.** In 2006 the total number of loan applications was 168,934 in the MSA. This dropped to a low of 12,735 in 2011 and up to 19,282 in 2013 (see Table 13). In 2006 the application proportions by race were more closely aligned to their population proportions than they were in 2013; these proportions changed as the application numbers dropped. In 2006 about 8 percent of applicants were Black while 30 percent were White. In 2013, Black applicants made up less than 3 percent of the total while White applicants comprised 55 percent (see Figure 4).

Table 13

*MSA Applications by Year*

<table>
<thead>
<tr>
<th>Year</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>168,934</td>
</tr>
<tr>
<td>2007</td>
<td>79,853</td>
</tr>
<tr>
<td>2008</td>
<td>31,055</td>
</tr>
<tr>
<td>2009</td>
<td>17,019</td>
</tr>
<tr>
<td>2010</td>
<td>15,413</td>
</tr>
<tr>
<td>2011</td>
<td>12,735</td>
</tr>
<tr>
<td>2012</td>
<td>13,749</td>
</tr>
<tr>
<td>2013</td>
<td>19,282</td>
</tr>
</tbody>
</table>
Denial Rates. The denial rate observed in the MSA follows a similar pattern to that of the region. For Blacks, denial rates reach a high of almost 40 percent in 2007 and drop to about 19 percent in 2013. The White denial rate also drops from a high of 22 percent in 2007 to 12 percent in 2013. For each year the Black denial rate is about 1.5 times the White denial rate (see Figure 5).
Figure 5. MSA Loan Denial Rate by Race and Year

Using a piecewise Poisson regression to examine the quadratic curve from 2006 – 2009 the denial rate slope is not statistically different between Black, Latino, and Asian. A straight line was fitted to the denial rates for the years 2009 – 2013. Here, the slope is statistically equal between Black, Latino, and White applicants. This indicates that while the denial rate is declining for these groups, it is declining at the same rate for all of them. Asians see a similar increase in their denial rate as observed in the region. (See Table E1 for complete results.)

Subprime Rates. The number of subprime loans in the MSA also decreased dramatically over the time period from a high of 52,266 in 2006 to a low of only 19 in 2010 (see Table 14). Black borrowers consistently purchase a subprime loan in much higher proportions than White borrowers. In 2006, more than 65 percent of all loans purchased by Black borrowers were subprime. This corresponds to a rate of just under 34% for White borrowers. In 2013, 3.6 percent of all loans purchased by Blacks were subprime. For White borrowers .4 percent of all loans purchased were subprime (see Figure 6).
Table 14

**MSA Subprime Loans by Year**

<table>
<thead>
<tr>
<th>Year</th>
<th>Subprime Loans</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>52,266</td>
</tr>
<tr>
<td>2007</td>
<td>11,445</td>
</tr>
<tr>
<td>2008</td>
<td>1,231</td>
</tr>
<tr>
<td>2009</td>
<td>371</td>
</tr>
<tr>
<td>2010</td>
<td>19</td>
</tr>
<tr>
<td>2011</td>
<td>217</td>
</tr>
<tr>
<td>2012</td>
<td>352</td>
</tr>
<tr>
<td>2013</td>
<td>114</td>
</tr>
</tbody>
</table>

*Figure 6. MSA Subprime Loan Rate by Race and Year*

As seen in the region analysis a piecewise Poisson model was used to predict subprime loans in the MSA. For the years 2006-2010 a quadratic formula was used to account for the
curved slopes. During this time period the slopes for Latino, White, and Asian were statistically the same. That is, the subprime loan rate for these three groups changed in similar proportions. The rate of subprime loans for Blacks however showed a much larger negative coefficient (See ). When combined with Figure 6, this indicates that subprime loan rates decreased along a steeper slope than the other groups.

For the years 2010-2013 a quadratic formula was also used to account for the negatively curved slopes. In this case, the Latino and Asian slopes were not statistically different than the White slope. However, the Black rate of subprime loan slope was statistically different than White as well as Asian and Latino. This indicates that after 2010 the subprime loan rate for Blacks increased more quickly than for the other groups. And while it decreases after 2012 it does not meet with the other rates as it did in 2010. (See Table E2 for complete results.)

**Wealth Loss**

Wealth loss was computed as the total loss of the asset’s value. This was computed using the median home value as measured by the 2013 American Community Survey which is a weighted average over the five-year period between 2009 and 2013. This value was then multiplied by the number of foreclosures during the time period of study. That resulted in an estimated dollar value of the total number of foreclosed homes between 2006 and 2013. That figure was distributed to the four racial groups proportionate to their homeownership in the tract.

For the eight-year period between 2006 and 2013 Black families in this MSA lost 2.1 billion dollars and Latino families 11 billion dollars of home value. White families lost approximately 19 billion dollars and Asian families 2.3 billion dollars in home value. This differs from the region in that as a percentage of owner occupied home value, all racial groups in
the MSA lost much more than in the region as a whole. In the MSA, Whites and Asians doubled their losses while Blacks and Latinos saw substantial increases in lost value as compared to the region (See Table 15).

Table 15

*MSA Estimated Foreclosure Values by Race*

<table>
<thead>
<tr>
<th>Race</th>
<th>Total Home Value ($ Billions)</th>
<th>Total Foreclosed Value ($ Billions)</th>
<th>% Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>16.1</td>
<td>2.3</td>
<td>14.4</td>
</tr>
<tr>
<td>Black</td>
<td>10.9</td>
<td>2.1</td>
<td>19.3</td>
</tr>
<tr>
<td>Latino</td>
<td>56.1</td>
<td>11.0</td>
<td>19.7</td>
</tr>
<tr>
<td>White</td>
<td>117.5</td>
<td>19.0</td>
<td>16.1</td>
</tr>
<tr>
<td>Total</td>
<td>205.0</td>
<td>35.2</td>
<td>17.2</td>
</tr>
</tbody>
</table>
Discussion

The data show that racial differences exist in the mortgage lending process. Leading up to the housing crash, Black and Latino applicants faced substantially higher rates of prime loan denials and subprime loan originations than White applicants. In the years after the housing crash, applications decreased dramatically as did denial and subprime loan rates. However, the disparities between Black or Latino borrowers and their White counterparts remained virtually constant. The regression analysis indicates that census tract population increases of Blacks or Latinos have a positive effect on foreclosure rates and that while controlling for variables normally associated with loan performance decreases the effect, those variables themselves are associated with racial bias. Examining these phenomena through the Critical Race Theory lens helps our understanding of how these disparities are perpetuated by systemic discrimination.

Region Foreclosure

A relationship between foreclosure and race can be found in the table of descriptive statistics (see Table 3). As a point of comparison, foreclosure rates compared at race population means show that census tracts with at least the mean population of Blacks or Latinos experience a much higher foreclosure rate than what is average for the region; the opposite is true for Whites and Asians. Foreclosures are more probable for Black and Latino home owners. This provides a catalyst for inferential analysis. Do the raw numbers indicate a systemic bias in the home loan industry or are they confounded by unobserved variables? To answer this a negative binomial regression was used to analyze these figures.

Looking at race alone, the results confirmed what was observed in the descriptive statistics (see Table 4). Increases in Black and Latino population increases foreclosure. The
opposite is true for White and Asian populations. However, this does change with the addition of different variables.

Adding loan variables next was important to account for differences in denial and subprime loan rates. If Blacks and Latinos turn to subprime loans due to higher denial rates and those subprime loans increase the probability of foreclosure, then controlling for these two variables should decrease the effect of race on foreclosure (Coulton, Chan, Schramm, & Mikelbank, 2008; Kaplan & Sommers, 2009; Rugh & Massey). And indeed the effect of race on foreclosure is cut by more than half for Black, Latino and White; a little less than that for Asian. However, the relationship is still positive for Black and Latino and still negative for White and Asian.

Reasons people are denied a loan should include many of the same reasons people experience foreclosure. For example, income, loan to value, and employment can be associated with both loan denial and foreclosure (Block et al., 2008; Cavell, 2012; Ghent et al., 2012; Kaplan & Sommers, 2009; Reid & Laderman, 2009). However, including other demographic variables can help explain differing rates of foreclosure. Particularly, the rates of home ownership and unemployment in a census tract affect foreclosure in a predictable manner (Lee, Rosentraub, & Kobie, 2010; Perkins, 2009).

In the full model, the effect of Black and White on foreclosure converges greatly and both are positive. Does this mean that race no longer has an effect on foreclosure? Absolutely not; a closer examination of the variables that make the effect converge is required.

Home ownership has already been shown to have positive effects for neighborhoods (Immergluck & Smith, 2006; Williams et al., 2005). Therefore, observing that as the percentage of ownership increases in a census tract foreclosure rates go down is to be expected. Yet, as has
been previously discussed, ownership and race are correlated. The average rate of home
ownership in the region is about 54%. That drops to less than 38% for Blacks and 44% for
Latinos. For Whites it climbs to almost 64%. This phenomenon is seen nationwide so it is not
surprising to find it in this region. However, it cannot be ignored in this scenario. If an increase
in the home ownership rate decreases foreclosure, but home ownership rates for Blacks and
Latinos is below the average and much lower than Whites, then the White population is
benefiting more from the ownership effect than is the Black or Latino population.

A similar phenomenon is observed with unemployment rates in reverse. As
unemployment rates increase in a census tract, so does the foreclosure rate. However, census
tracts with at least the mean population of Blacks or Latinos have higher unemployment rates
than those tracts with at least the mean population of Whites or Asians. Again, this is observed
nationwide and is not surprising. However, it highlights the interaction between race and
unemployment on the effect of unemployment on foreclosure. That is, if the unemployment rate
increases when the Black or Latino population increases, then the effect of unemployment on
foreclosure for Blacks or Latinos is greater than it is for Whites.

This is true for denial rates and subprime loan rates as well. Prime mortgage denial leads
to subprime loan origination with is correlated with foreclosure (Immergluck & Smith, 2006;
Louis, 2012; Quercia & Ratcliffe, 2008). Moreover, these rates are substantially higher for
Blacks and Latinos than they are for Whites and Asians, so it is not surprising to see increased
foreclosure rates with increases in Black and Latino populations. Consequently, the effect of
denial rates and subprime loan rates on foreclosure for Blacks and Latinos is compounded by the
factors which lead to the disparity in those rates to begin with.
This suggests that the effect of race persists across a multitude of variables. While racial discrimination may be difficult to parse out from each individual variable, it does not need to be in order to observe its effect on foreclosure. The data show that even when controlling for variables associated with poor loan performance, foreclosures are greater for Blacks than Whites—and those variables themselves are predisposed to racial bias.

**MSA Foreclosure**

Foreclosure rates and home ownership rates appear to be relatively equal when comparing census tracts at or above group population means (see Table 10). This might suggest that bias in foreclosures is lower in the Riverside–San Bernardino MSA than in the region even while taking into consideration the higher rates of subprime loans for Blacks and Latinos in this smaller area. Using this same population mean scale, unemployment is also higher across the board than found in the region, a little bit more so for Blacks and Latinos. Considering what was observed in the region, this indicates that all groups saw similarities in their experience of the economic downturn.

However, the regression analysis of the MSA tells a familiar story (see Table 11). The simple model of race versus foreclosure largely supports the descriptive statistics and is similar to the region. Yet, when the full model is analyzed the same level of convergence in coefficients between Black and White is not observed as it is in the region as a whole. Consequently, even when accounting for differences in the rates for loan denial, home ownership, and unemployment, census tract increases in the Black population are met with increases in foreclosure. So while on the outset the descriptive statistics seem to indicate less bias, the results of the regression show that the MSA actually has more bias than the region.
It is interesting to note that increasing the Asian population of a census tract decreases the expected foreclosure rate. In the MSA this is more drastic than the region as a whole. Over the last several years, Asians—particularly Chinese nationals—have found the Southern California housing market to be a worthwhile investment. In 2013 for example, Chinese nationals comprised 12% of U.S. foreign citizen home purchases. More than half of those purchases were made in California and the vast majority were cash transactions (Reckard & Khouri, 2014, March 24). This type of home investment, primarily in the San Gabriel Valley, Riverside, and San Bernardino areas, is quite resistant to foreclosure and helps to explain the much lower rate of foreclosure in Asian areas.

**Application Outcomes**

By analyzing application outcomes over time the impact of foreclosures can be seen. Looking at the differences between groups over time will show if a bias observed at the height of the market is also observed when credit was much more strictly controlled. In other words, did the foreclosure crisis cause a change in application outcomes?

**Region Applications.** Applications for Blacks and Latinos are disproportionately smaller than their populations while Whites and Asians comprise a larger proportion than their population. In and of itself, this does not indicate a structural bias as it does not account for differences in affordability, family size, need, and availability of housing (Avery & Rendall, 2002; Conley, 2010; Oliver & Shapiro, 2006). However, it could indicate that some Blacks and Latinos do not apply for loans due to fear of denial or a mistrust of banks (Barr et al., 2008; Oliver & Shapiro, 2006).

After 2006 the number of applications in the region dropped dramatically. That is in no doubt due to both the economic recession and the more stringent loan requirements that followed.
after the Dodd-Frank Act of 2010 (Johnston, 2015). The application numbers in 2013 were less than 20 percent of what they were in 2006. Furthermore, the proportional distribution of those applications changed as well. While the application proportions were comparable to population proportions in 2006, by 2013 these proportions were much lower than the population for Blacks and Latinos and much higher for Whites and Asians. This is not surprising as Blacks and Latinos were hardest hit by the economic downturn. It also suggests that more Black and Latino prospective homebuyers were kept out of the market either by advice or by self-selection.

**Region Denial Rate.** When applicants self-select out of the pool, it would seem that the remaining applicants are of higher quality. If this were true, then denial rates for Blacks and Latinos should be on par with other groups if not lower than them. However, as seen in previous studies, denial rates for Blacks are twice that of Whites and Asians (*Communities in crisis: Race and mortgage lending in the Twin Cities*, 2009). Latinos also have a much higher denial rate than Whites and Asians. Certainly, this does not account for other circumstances such as ability to pay or loan worthiness, but it does indicate that a structural disadvantage for Black and Latino applicants exists. The question remains as to the degree of this disadvantage.

Since the application pool is much smaller over the time period and if there is an element of self-selection out of the application process, then it would stand to reason that the denial rates would also drop dramatically. This is partly true. Denial rates did drop and substantially so for Blacks and Latinos. However, this was accompanied by a sizeable application drop. In 2013 Black and Latino applications were about 5 percent of what they were in 2006. By comparison, in 2013 White applications were about 34 percent and Asian applications 44 percent of their 2006 levels. Yet proportionally, the difference in the denial rates between Whites and Blacks remained about the same (See *Figure 2*).
The results of the Poisson regression show that the denial rate decreased more quickly for Blacks than Whites between 2006 and 2009, but from 2009 to 2013 this decrease was statistically the same. After 2007, the lending market became increasingly tight. Applications by Black prospective borrowers dropped off the table. More than 80 percent of the total applications for Blacks during the studied time period were in 2006 and 2007. Accordingly, with fewer people applying for loans their denial rates were expected to drop. However, they never converge with the White denial rate.

Even when the application pool is decreased by 95%, Blacks are almost twice as likely as Whites to be denied a prime loan. Certainly, not all applicants will qualify for a loan, but with a 95 percent drop it would seem that the vast majority of unqualified applicants left the pool. If that is true, then the denial rate for Black applicants should be much closer to that of White applicants. However, the denial rate for these two groups drops along the same slope. In sum, application numbers dropped but much more for Blacks and Latinos and the overall denial rate decreased while the difference in denial rates between Black and White remained the same. This suggests a systemic bias.

**Region Subprime Loans.** The disparity in subprime lending is even more glaring. As seen in other studies, Black and Latino borrowers purchase subprime loans at more than four times the rate of Whites and Asians (Apgar & Calder; Calem et al., 2004; Wyly et al., 2008). Again, while loan qualifications are not included in this figure, it suggests that after being denied a prime loan, Black and Latino applicants are turning to the subprime market. This has severe negative impacts on the ability to build wealth through home equity.

By 2010 lenders had severely restricted the market. Subprime loans had all but disappeared. In that year 81 subprime loans were purchased as opposed to 138,272 in 2006.
Between 2006 and 2013 the slope representing the rate of subprime loans for White and Asian borrowers is statistically the same. Between 2006 and 2010 the rate of subprime loans for Blacks and Latinos fell much more quickly than Whites. Of course, they were starting at a much higher point. After 2010 lenders began to sell subprime loans again, albeit in significantly smaller numbers than seen at the height of the market. However, the subprime loan rate was much higher for Blacks and Latinos than Whites and Asians. Between 2006 and 2008 Blacks were about three times more likely to take out a subprime loan than Whites. Between 2011 and 2013 they were about 15 times more likely to do so (see Figure 3).

Here again a similar phenomenon is observed. Application numbers are at period lows. Denial rates are falling suggesting a more qualified applicant pool. Yet as seen before, Blacks are much more likely to purchase a subprime loan than Whites (Newman & Wyly, 2004; Ross, 2006). Even if the denial rate was completely based on risk and many of those applicants denied a prime loan turned to a subprime loan, the differences in subprime loan rates between Blacks and Whites would be much closer. This suggests a systemic bias where Black applicants are purchasing subprime loans at higher rates than Whites.

**MSA.** Looking at a smaller subset of the data by examining foreclosure results in the Riverside-San Bernardino Metropolitan Statistical Area (MSA) provides an opportunity to see if the region results hold up on a smaller scale. This MSA was selected due to its more extreme volatility in the housing market than the other smaller counties. With more affordable housing prices, many prospective buyers came to this area looking for homes, especially minorities. Over the time period there is a slightly higher percentage of applications coming from Blacks and Latinos than seen in the region which is in line with the MSA differences in population proportions.
However, as compared to the region, application numbers in the MSA took an even bigger hit. Each of these two counties had more applications than Orange and San Diego Counties in 2006 despite a smaller population. Homes were more affordable in this area and people were scurrying to get into the market. By 2013 the situation was reversed; loan applications fell more than the region as a whole. In that year application numbers in the MSA were a little more than 11 percent of their 2006 totals. Black applications were down to less than 4 percent and Latino applications were down to 5 percent of previous highs while White and Asian applications were closer to 21 percent of their 2006 levels. Similar to the region, this indicates that many applicants self-selected out of the loan process. Economic hard times hit Blacks and Latinos hard in this area and undoubtedly buying a home was simply unaffordable.

Compared to the region, overall loan denial rates were about the same for Blacks and Latinos and slightly higher for Whites and Asians. This might suggest that larger proportions of applications bring more unqualified applicants. But as applications decrease dramatically over time, the applicant pool should become much more qualified and denial rates should drop. Indeed, they did (See Figure 5). However, as seen in the region, denial rates by race dropped fairly uniformly. In 2006 and in 2013 Blacks were more than 1.5 times more likely to be denied a loan than Whites, even with a drop of almost 97% in application numbers.

Higher denial rates lead to higher subprime loan rates and the MSA had an overall subprime loan rate about 10 percent higher than the region. White borrowers in the MSA actually saw a greater comparative increase in their subprime loan rate than did Black borrowers as compared to the region; Blacks were more than 4.5 times more likely to purchase a subprime loan than Whites while in the MSA that decreased to three times more likely. Moreover, when
subprime loans began to be sold again after 2010, Blacks and Latinos purchased these loans at substantially higher proportions than Whites and Asians (see Figure 6).

The housing market in this MSA was more volatile than the regions as measured by the application numbers. Proportionally more subprime loans are sold in these two counties than in the region as a whole and, predictably, the rate of these loans is higher for Blacks and Latinos than observed in the region. However, the denial rates by race practically mimic those in the region. This shows that while the tightening of credit affected all groups the disparities remained. It suggests that systemic biases persist and that Blacks and Latinos consistently fare worse than their White and Asian counterparts.

**Wealth Loss**

The wealth gap, whether between the upper echelons and the middle class or between White and minority families, is often the subject of discussion by politicians, journalists, and academics alike. Looking at how the loss of wealth affects this gap paints a stark contrast. According to a 2014 report from the Pew Research Center, in 2007, just before the Great Recession, White households had a median net worth of approximately 192 thousand dollars; the median Black household had a net worth of about 19 thousand dollars amounting to a ratio of 10:1. The median Latino household had a net worth of close to 24 thousand dollars resulting in a White to Latino ratio of 8:1. By 2013 net worth for all three groups fell, but the ratios increased indicating that the recession hit Black and Latino families more severely. Median household net worth for Whites fell to just under 142 thousand dollars, for Blacks to 11 thousand dollars and for Latinos close to 14 thousand dollars. So in 2013 the ratio of White household net worth to that of Black households increased to 13:1 and for Latinos the ratio went up to 10:1 (Kochhar & Fry, 2014).
Home ownership represents the largest portion wealth for the vast majority of households. Therefore, understanding wealth loss through foreclosure is key to understanding the wealth gap. Multiplying median home values by foreclosure rates resulted in an estimated wealth loss of 8.9 billion dollars for Black Families and 39 billion dollars for Latino families during the studied time period. This figure seems rather large and it is. It represents the value of the asset not the equity held by the owner. Equity, the asset value minus the mortgage balance, is difficult to determine. Some researchers have estimated overall equity at about 40 percent of loan value (Carr, 2007; Rivera et al., 2008; Schloemer et al., 2006) to determine equity loss. I think equity is more accurately measured by looking at home value just as banks do when they underwrite a loan. Accounting for the initial outlay and successive mortgage payments a more conservative 20 percent of overall asset value results in an estimated dollar wealth loss of 1.8 billion and 7.8 billion for Black and Latino families in the region. Looking at the smaller population in the MSA, those figures are estimated to be 420 million dollars for Black families and 2.2 billion dollars for Latino families.

In order to understand these numbers better, it helps to look at home value lost through foreclosure as a percentage of each racial group’s total portfolio. As seen in Table 8, Black homeowners as a group experienced more than a 14% loss of the total home value they held collectively; for Latino homeowners this was almost 13% of their group portfolio. This is approximately double White and Asian group losses. In the MSA, the contrast is not as stark, but foreclosures still hurt Black and Latino homeowners as a group more so than White and Asian homeowners (see Table 15). Moreover, these calculations assume a distribution of foreclosures that is equal to each racial group’s home ownership rate. As has been shown in the
regression analysis foreclosures were not evenly dispersed. Consequently, the wealth loss experienced by non-White homeowners, particularly Blacks, is underestimated.

And since these families start with a low net worth, especially when compared to White families, this loss is quite large as a group and financially devastating for an individual. In the region, the median home value is about 356 thousand dollars. Using the calculation above, a Black family is estimated to have lost 71 thousand dollars in equity through foreclosure. In the MSA the median home value is 201 thousand resulting in an estimated loss of 40 thousand dollars. Considering that the Census Bureau estimates the median net worth of Black and Latino families in 2011 to be two thousand and four thousand dollars respectively, the wealth lost due to foreclosure is hard felt. With depleted savings and a black mark on their credit rating, many families continue to feel the effects of disparities in mortgage lending long after foreclosure.

Theory

The difficult question to answer is why these disparities exist. It is certainly absurd to think that all lending institutions act in concert to prevent Blacks and Latinos from building wealth. However, it is quite conclusive that disparate treatment, once built on discriminatory practices, has perpetuated wealth inequality. The theories presented earlier—stratification theory, statistical discrimination theory, and market led pluralism—my shed some light on this phenomenon.

Previous Theory. Stratification theory holds that as minority groups climb the social ladder, structural forces prevent full neighborhood integration. This theory could be used to explain the effects of racial disparities in mortgage denial rates. Higher denial rates seen by Black and Latino applicants hinder their opportunity to purchase homes in better neighborhoods where higher home values promote wealth accumulation. Stratification theorists could argue that
a consequence of denial rate differences is the perpetuation of racially stratified neighborhoods which leads to an increasing wealth gap. However, it is difficult to stretch this theory to explain why the distribution of foreclosures is not equal. While the foreclosure rate has a tendency to decrease with larger populations of White residents, stratification theory really focusses on how neighborhoods become segregated, not necessarily the outcomes of that segregation.

In a similar fashion as stratification theory, statistical discrimination might also explain the differences in mortgage denial rates which lead to the wealth gap. Statistical discrimination might also get closer to explaining the disparity in foreclosures. This theory would suggest that lending institutions are looking at racial groups as a whole when making foreclosure decisions. This seems unlikely.

Market led pluralism might come closest to explaining this phenomenon. This theory puts forth the idea that free market forces and individual choice are the cause of any observed disparities. Scholars holding this belief might suggest that while unfortunate, poor decisions to place trust in mortgage brokers put many minorities in homes with terrible loan terms. This is an outcome of a free market where brokers pushed loans giving them the most commission. They might further argue that higher rates of foreclosure in minority neighborhoods are the effects of lenders disposing of the worst loans first. The resulting expansion of the wealth gap is simply a consequence of ill-fated individual choice in a free market. However, this completely disregards the structural forces that are part of this problem.

**Critical Race Theory.** While no theory serves a perfect explanation and Critical Race Theory (CRT) is not without its faults, I believe it is one theory that can serve as a useful framework for understanding the phenomenon in this study. The data clearly show a relationship between race and loan outcomes in the Southern California Region. Regardless of the financial
climate, loan application indicators unmistakably disadvantage Black and Latino applicants. CRT scholars call this endemic racism.

Years of discrimination relegating Black and Latino families to poorer segregated communities with poor performing schools kept these groups with low educational attainment leading to higher unemployment, lower pay when employed, and lower credit scores than Whites. This propagated the myth that Blacks and Latinos were an inferior credit risk as compared to Whites, making it difficult for them buy homes, build equity, and increase wealth. Effects of discrimination fed into the bias in the loan industry; the system itself favors Whites. CRT scholars call this endemic racism.

This is supported by the data. When loan approvals were easy and streamlined or when they were exceedingly stringent and complicated, Whites had lower denial and subprime loan rates. When application numbers were at record highs or when they were reduced to a small fraction, Whites had lower denial and subprime loan rates. And when mortgage defaults began to rise, lenders had a tendency to work more with White homeowners in an attempt to stave off foreclosure. At every turn, Blacks and Latinos faced a disadvantage.

Moreover, the subprime loan rates point to the CRT principle of interest convergence. At the height of the housing market almost 62 percent of all home loans purchased by Black applicants were subprime; nearly 58 percent of Latino borrowers took out a subprime loan. That means that approximately 60 percent of Black and Latino homeowners were paying 50 percent more for a home than 75 percent of White homeowners. Consequently, they were building equity at a much slower rate which contributed to the substantial wealth gap with White households.
Why is this interest convergence? As previously discussed, the Community Reinvestment Act pushed lenders to provide credit to lower income areas. The banking industry responded by getting Congress to pass legislation allowing for subprime loans. In other words, lending institutions were willing to provide credit to Black and Latino families if they could charge them more for the privilege of doing so. Already rife with endemic racism, they found that it was in their best financial interests to charge Black and Latino applicants higher prices for mortgage loans. These groups were hungry for credit. Interests converged. For many families of color, this was the only opportunity to take part in the American dream so they accepted the terms. However, these high priced loans were not supported by the risk (Kau et al., 2012) which means lending institutions charged Blacks and Latinos higher prices simply because they could. It’s a form of rent seeking based on the materialistic determination of the dominant group looking to make increased profits on loan products by taking advantage of people who had no other alternative if they wanted to buy a home. Unfortunately, this led many down the path to disaster in the form of foreclosure.

The data show that foreclosures were higher in predominantly minority areas even after accounting for a number of economic factors associated with loan performance. Since subprime loans are highly correlated with foreclosure (Baumer et al., 2013; Quercia & Ratcliffe, 2008), higher foreclosure rates are a direct result of the materialistic determination that proliferated the selling of subprime loans in minority areas. Then the interests stopped converging and lending institutions return to what CRT calls differential racialization—treating races differently due to political or economic interests (Abrams & Moio, 2009).

Foreclosures can depress neighboring property values (Baumer et al., 2013; Immergluck & Smith, 2006; Lichtenstein & Weber, 2013) which could lead to more foreclosures.
Foreclosure is expensive for both the borrower and the lender. Lending institutions would prefer not to foreclose. It is in the financial interests of the lender to make sure homes with higher values and larger loans do not foreclose. On the other hand, foreclosed homes in lower priced areas have been a boon to investors who have been able to buy them at below market values then turn around and sell them for a profit. Not only does the lender get its money back but ostensibly another loan sale when the house is resold. Therefore, it becomes less expensive and even profitable to foreclose in higher minority areas. Treating racial groups differently pays off.

On the outset it may appear that concepts like endemic racism, interest convergence, or differential racialization are merely vocabulary terms applied to practices already observed in society. Yes, discriminatory practices in our society are well documented. However, we can use CRT as a lens through which we can understand these practices more accurately. It is not just that Blacks and Latinos have disparate outcomes in mortgage lending. It is that the entire structure is based on those disparate outcomes. It is that racism is endemic to the system itself, so woven within its fabric that it becomes invisible to those who benefit and thus sparks outrage at the mere mention it may exist. The inability of a family to buy a home today is closely linked to the inability of previous generations to buy home. This perpetual disadvantage is endemic racism.

It is not simply that the interests of different groups must converge in order to pass legislation. It is that the dominant group is unwilling to give up anything that may diminish its stronghold in society unless they actually gain standing by making concessions. Lending in low income areas was met with resistance until banking institutions were allowed to charge a premium for providing a service they already provided in other areas. This is the essence of
materialistic determination—allowing the oppressed group to participate in an endemically racist process for the financial gain of the dominant group.

It is not merely a difference in the treatment of the various races which is discussed to this day in the popular media. It is a propensity for lenders to work with White homeowners in default because their homes tend to have more value and be in neighborhoods with similar homes making it in their best interest to prevent foreclosure to keep home values high and to ensure a return on their investment. Of course, the very reason that White homeowners tend to live in wealthier neighborhoods with higher priced homes and were thus treated differently than Black or Latino homeowners during the foreclosure crisis is due to the endemic racism and interest convergence leading up to it.

The purpose of the CRT conceptual framework is not to point a finger at individual banks or mortgage brokers or loan underwriters and levy accusations of racism. Rather it provides a structure to view inequities found in social institutions, in this case the mortgage loan market. The processes which have led to these inequities have been imbedded in the system for decades and further perpetuate the very problems they cause. Specifically, this problem is the inability for minority groups to build wealth. This study demonstrates that the most important avenue to building wealth—home ownership—is at best filled with road blocks and at worst completely closed to minorities. In order to provide more openings for minority home ownership that is both morally and financially sound, we must begin to understand how the very structures of our institutions limit those opportunities.

**Limitations and Further Research**

There are a few limitations in the study worth noting. All data is aggregated at the census tract level. Individual loan application, disposition and performance data is not available to me.
Additionally, zip code to census tract data manipulations increase error. This is also true for the distribution of 2000 census tract data to 2010 census tract areas.

Using racial demographics of census tract residents as a predictor of foreclosure could pose a risk of ecological fallacy. However, as mentioned above, this study does not track individual loan performance. Rather, it attempts to show a relationship between race and foreclosure. While conclusions are limited to the relationship between foreclosures and census tracts it does show patterns that may be attributable to race. Additionally, with well over 4000 census tracts, the sample size is large, making most relationships statistically significant. I have illustrated practical analyses when appropriate.

Also, Critical Race Theory is but one of many theories that may explain this issue. I have chosen this particular theory because it attempts to look at unseen structural forces that may be a cause of this phenomenon. It is also possible that simple business decisions result in disparities without an intent to discriminate. Furthermore, proving intent to discriminate in issues of racism is difficult. The limited scope of this study did not allow for qualitative interviews with bank processors and the results of such interviews would be subject to social desirability bias. However, looking at disparate impact can indirectly show the results of bias in decision making (Henry & Tator, 2011). Furthermore, the purpose of this study is to demonstrate systemic causes of this phenomenon. While there is no variable for interest convergence, statistical analysis interpretations in light of the conceptual framework can indicate its presence.

Continual tracking of loan outcomes is required to see if disparities persist, particularly as the housing market beings to pick up again. The denial rate seems to have leveled off while a slight uptick for Blacks and Latinos is observed in 2013. Also, the subprime rate went up in
2012 and then down again in 2013 for Blacks and Latinos. Monitoring these trends should be of interest to researchers.
Appendix A

Distribution of Census Tracts by County

Table A1

Sample Census Tract Comparison by County

<table>
<thead>
<tr>
<th>County</th>
<th>Region Census Tracts</th>
<th>%</th>
<th>Sample Census Tracts</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles</td>
<td>2,343</td>
<td>51.5</td>
<td>2,105</td>
<td>49.5</td>
</tr>
<tr>
<td>Orange</td>
<td>586</td>
<td>12.9</td>
<td>574</td>
<td>13.5</td>
</tr>
<tr>
<td>Riverside</td>
<td>453</td>
<td>10.0</td>
<td>449</td>
<td>10.6</td>
</tr>
<tr>
<td>San Bernardino</td>
<td>369</td>
<td>8.1</td>
<td>355</td>
<td>8.4</td>
</tr>
<tr>
<td>San Diego</td>
<td>628</td>
<td>13.8</td>
<td>601</td>
<td>14.1</td>
</tr>
<tr>
<td>Ventura</td>
<td>174</td>
<td>3.8</td>
<td>168</td>
<td>4.0</td>
</tr>
<tr>
<td>Total</td>
<td>4,553</td>
<td>100.0</td>
<td>4,252</td>
<td>100.0</td>
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</table>
Appendix B

Region Foreclosures Analyses by Race

Table B1

Region Asian Foreclosure Regression Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1 IRR</th>
<th>Model 1 z</th>
<th>Model 2 IRR</th>
<th>Model 2 z</th>
<th>Model 3 IRR</th>
<th>Model 3 z</th>
<th>Model 4 IRR</th>
<th>Model 4 z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian population</td>
<td>0.974</td>
<td>-26.26 **</td>
<td>0.985</td>
<td>-15.15 **</td>
<td>0.987</td>
<td>-18.08 **</td>
<td>0.989</td>
<td>-16.34 **</td>
</tr>
<tr>
<td>Denial rate</td>
<td>1.017</td>
<td>5.09 **</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.009</td>
<td>4.97 **</td>
</tr>
<tr>
<td>Subprime loan rate</td>
<td>1.021</td>
<td>13.48 **</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.006</td>
<td>6.18 **</td>
</tr>
<tr>
<td>Owner occupied %</td>
<td></td>
<td></td>
<td>0.982</td>
<td>-33.31 **</td>
<td></td>
<td></td>
<td>0.984</td>
<td>-30.69 **</td>
</tr>
<tr>
<td>Female owned %</td>
<td>1.003</td>
<td>3.48 **</td>
<td></td>
<td></td>
<td>1.004</td>
<td>4.57 **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College degree %</td>
<td>0.998</td>
<td>-2.30 *</td>
<td></td>
<td></td>
<td>1.003</td>
<td>3.07 **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median home value</td>
<td>1.000</td>
<td>-25.18 **</td>
<td></td>
<td></td>
<td>1.000</td>
<td>-24.38 **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median income</td>
<td>1.000</td>
<td>7.55 **</td>
<td></td>
<td></td>
<td>1.000</td>
<td>6.96 **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>1.022</td>
<td>10.61 **</td>
<td></td>
<td></td>
<td>1.020</td>
<td>9.37 **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.032</td>
<td>-191.71 **</td>
<td>0.011</td>
<td>-71.88 **</td>
<td>0.095</td>
<td>-43.28 **</td>
<td>0.054</td>
<td>-36.08 **</td>
</tr>
<tr>
<td>alpha</td>
<td>0.50</td>
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<td>0.33</td>
<td></td>
<td>0.14</td>
<td></td>
<td>0.13</td>
<td></td>
</tr>
<tr>
<td>Wald $\chi^2$</td>
<td>689.65 **</td>
<td></td>
<td>2184.96 **</td>
<td></td>
<td>6871.60 **</td>
<td></td>
<td>8364.85 **</td>
<td></td>
</tr>
<tr>
<td>n</td>
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<td>4223</td>
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<td></td>
</tr>
</tbody>
</table>

* p<.05; ** p<.01

Note. IRR = Incidence-rate ratio
Table B2

Region Black Foreclosure Regression Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IRR</td>
<td>z</td>
<td>IRR</td>
<td>z</td>
</tr>
<tr>
<td>Black population</td>
<td>1.035</td>
<td>13.26**</td>
<td>1.014</td>
<td>6.70**</td>
</tr>
<tr>
<td>Denial rate</td>
<td>1.015</td>
<td>4.51**</td>
<td>1.008</td>
<td>4.18**</td>
</tr>
<tr>
<td>Subprime loan rate</td>
<td>1.023</td>
<td>14.27**</td>
<td>1.007</td>
<td>6.91**</td>
</tr>
<tr>
<td>Owner occupied %</td>
<td>1.007</td>
<td>6.29**</td>
<td>1.007</td>
<td>6.69**</td>
</tr>
<tr>
<td>Female owned %</td>
<td>0.996</td>
<td>-4.76**</td>
<td>0.984</td>
<td>-29.54**</td>
</tr>
<tr>
<td>College degree %</td>
<td>0.983</td>
<td>-31.89**</td>
<td>0.984</td>
<td>-29.54**</td>
</tr>
<tr>
<td>Median home value</td>
<td>1.000</td>
<td>-23.85**</td>
<td>1.000</td>
<td>-23.12**</td>
</tr>
<tr>
<td>Median income</td>
<td>1.000</td>
<td>8.69**</td>
<td>1.000</td>
<td>7.77**</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>1.023</td>
<td>10.72**</td>
<td>1.021</td>
<td>9.71**</td>
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<tr>
<td>Constant</td>
<td>0.020</td>
<td>-193.93**</td>
<td>0.009</td>
<td>-80.05**</td>
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<td>alpha</td>
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<td>0.35</td>
<td>0.15</td>
<td>0.14</td>
</tr>
<tr>
<td>Wald $\chi^2$</td>
<td>175.88**</td>
<td></td>
<td>1423.01**</td>
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<tr>
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<td>4223</td>
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</tr>
</tbody>
</table>

Note. IRR = Incidence-rate ratio

* p<.05; ** p<.01
Table B3

Region Latino Foreclosure Regression Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IRR</td>
<td>z</td>
<td>IRR</td>
<td>z</td>
</tr>
<tr>
<td>Latino population</td>
<td>1.017</td>
<td>32.96 **</td>
<td>1.007</td>
<td>9.03 **</td>
</tr>
<tr>
<td>Denial rate</td>
<td>1.012</td>
<td>3.63 **</td>
<td>1.011</td>
<td>5.22 **</td>
</tr>
<tr>
<td>Subprime loan rate</td>
<td>1.020</td>
<td>11.84 **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner occupied %</td>
<td></td>
<td></td>
<td>0.982</td>
<td>-32.51 **</td>
</tr>
<tr>
<td>Female owned %</td>
<td>1.004</td>
<td>3.66 **</td>
<td>1.005</td>
<td>4.51 **</td>
</tr>
<tr>
<td>College degree %</td>
<td>0.995</td>
<td>-4.42 **</td>
<td>0.999</td>
<td>-1.05</td>
</tr>
<tr>
<td>Median home value</td>
<td>1.000</td>
<td>-23.75 **</td>
<td>1.000</td>
<td>-22.83 **</td>
</tr>
<tr>
<td>Median income</td>
<td>1.000</td>
<td>8.10 **</td>
<td>1.000</td>
<td>7.93 **</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>1.026</td>
<td>12.08 **</td>
<td>1.022</td>
<td>10.24 **</td>
</tr>
<tr>
<td>Constant</td>
<td>0.012</td>
<td>-158.95 **</td>
<td>0.008</td>
<td>-92.03 **</td>
</tr>
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<td>alpha</td>
<td>0.44</td>
<td>0.35</td>
<td>0.16</td>
<td>0.14</td>
</tr>
<tr>
<td>Wald $\chi^2$</td>
<td>1086.28 **</td>
<td>2093.18 **</td>
<td>5914.57 **</td>
<td>7768.60 **</td>
</tr>
<tr>
<td>n</td>
<td>4252</td>
<td>4251</td>
<td>4223</td>
<td>4222</td>
</tr>
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</table>

* p<.05; ** p<.01

Note. IRR = Incidence-rate ratio
### Table B4

**Region White Foreclosure Regression Analysis**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>White population</td>
<td>0.986 ** -25.97</td>
<td>0.995 ** -5.79</td>
<td>1.003 ** 4.82</td>
<td>1.005 ** 9.65</td>
</tr>
<tr>
<td>Denial rate</td>
<td>1.013 ** 3.80</td>
<td></td>
<td>1.012 ** 5.92</td>
<td></td>
</tr>
<tr>
<td>Subprime loan rate</td>
<td>1.022 ** 13.04</td>
<td></td>
<td></td>
<td>1.009 ** 8.66</td>
</tr>
<tr>
<td>Owner occupied %</td>
<td></td>
<td>0.981 ** -35.44</td>
<td></td>
<td>0.982 ** -34.48</td>
</tr>
<tr>
<td>Female owned %</td>
<td>1.003 * 2.34</td>
<td>1.003 * 2.47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College degree %</td>
<td>0.993 ** -6.69</td>
<td>0.998 -1.83</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median home value</td>
<td>1.000 ** -23.97</td>
<td>1.000 ** -23.40</td>
<td>1.022 ** 10.30</td>
<td></td>
</tr>
<tr>
<td>Median income</td>
<td>1.000 ** 8.17</td>
<td>1.000 ** 7.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>1.026 ** 12.26</td>
<td>1.022 ** 10.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.041 ** -143.03</td>
<td>0.012 ** -47.72</td>
<td>0.086 ** -41.56</td>
<td>0.042 ** -37.48</td>
</tr>
<tr>
<td>alpha</td>
<td>0.48</td>
<td>0.35</td>
<td>0.16</td>
<td>0.14</td>
</tr>
<tr>
<td>Wald $\chi^2$</td>
<td>674.70 **</td>
<td>1850.65 **</td>
<td>5882.66 **</td>
<td>7967.07 **</td>
</tr>
<tr>
<td>n</td>
<td>4252</td>
<td>4251</td>
<td>4223</td>
<td>4222</td>
</tr>
</tbody>
</table>

*Note.* IRR = Incidence-rate ratio

* p<.05; ** p<.01
Appendix C

Region Mortgage Denial and Subprime Loan Analysis

Table C1

Region Mortgage Denial Rate Poisson Analysis by Race and Year

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>z</th>
</tr>
</thead>
<tbody>
<tr>
<td>race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>0.10</td>
<td>9.2 **</td>
</tr>
<tr>
<td>Black</td>
<td>0.51</td>
<td>47.2 **</td>
</tr>
<tr>
<td>Latino</td>
<td>0.31</td>
<td>44.1 **</td>
</tr>
<tr>
<td>year1</td>
<td>0.15</td>
<td>14.2 **</td>
</tr>
<tr>
<td>race*year1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>-0.06</td>
<td>-2.7 **</td>
</tr>
<tr>
<td>Black</td>
<td>0.16</td>
<td>6.4 **</td>
</tr>
<tr>
<td>Latino</td>
<td>0.23</td>
<td>16.9 **</td>
</tr>
<tr>
<td>year1*year1</td>
<td>-0.07</td>
<td>-20.5 **</td>
</tr>
<tr>
<td>race<em>year1</em>year1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>0.00</td>
<td>0.2</td>
</tr>
<tr>
<td>Black</td>
<td>-0.06</td>
<td>-6.1 **</td>
</tr>
<tr>
<td>Latino</td>
<td>-0.08</td>
<td>-15.1 **</td>
</tr>
<tr>
<td>year2</td>
<td>-0.06</td>
<td>-17.3 **</td>
</tr>
<tr>
<td>race*year2</td>
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<td></td>
</tr>
<tr>
<td>Asian</td>
<td>0.07</td>
<td>11.5 **</td>
</tr>
<tr>
<td>Black</td>
<td>0.01</td>
<td>0.7</td>
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<td>Latino</td>
<td>-0.02</td>
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</tr>
<tr>
<td>Constant</td>
<td>-1.61</td>
<td>-242.6 **</td>
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</tbody>
</table>

Wald $\chi^2$  20623.6 **

Observations  84073
Groups         3946

White is the reference group.
* p<.05; ** p<.01
Table C2

Region Subprime Loan Rate Poisson Analysis by Race and Year

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>z</th>
</tr>
</thead>
<tbody>
<tr>
<td>race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>0.16</td>
<td>13.8 **</td>
</tr>
<tr>
<td>Black</td>
<td>0.71</td>
<td>62.5 **</td>
</tr>
<tr>
<td>Latino</td>
<td>0.60</td>
<td>78.2 **</td>
</tr>
<tr>
<td>year1</td>
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<td>-35.4 **</td>
</tr>
<tr>
<td>race*year1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>-0.09</td>
<td>-2.7 **</td>
</tr>
<tr>
<td>Black</td>
<td>0.39</td>
<td>8.7 **</td>
</tr>
<tr>
<td>Latino</td>
<td>0.27</td>
<td>12.1 **</td>
</tr>
<tr>
<td>year1*year1</td>
<td>-0.14</td>
<td>-18.3 **</td>
</tr>
<tr>
<td>race<em>year1</em>year1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>-0.00</td>
<td>-0.3</td>
</tr>
<tr>
<td>Black</td>
<td>-0.20</td>
<td>-6.9 **</td>
</tr>
<tr>
<td>Latino</td>
<td>-0.08</td>
<td>-6.9 **</td>
</tr>
<tr>
<td>year2</td>
<td>1.29</td>
<td>10.1 **</td>
</tr>
<tr>
<td>race*year2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>-0.11</td>
<td>-0.4</td>
</tr>
<tr>
<td>Black</td>
<td>3.03</td>
<td>8.3 **</td>
</tr>
<tr>
<td>Latino</td>
<td>1.35</td>
<td>7.8 **</td>
</tr>
<tr>
<td>year2*year2</td>
<td>-0.46</td>
<td>-10.3 **</td>
</tr>
<tr>
<td>race<em>year2</em>year2</td>
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<td></td>
</tr>
<tr>
<td>Asian</td>
<td>0.00</td>
<td>0.0</td>
</tr>
<tr>
<td>Black</td>
<td>-0.64</td>
<td>-6.0 **</td>
</tr>
<tr>
<td>Latino</td>
<td>-0.34</td>
<td>-5.7 **</td>
</tr>
<tr>
<td>Constant</td>
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<td>-152.2 **</td>
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</table>

Wald $\chi^2$ 60007.7 **
Observations 78117
Groups 3933

Note. year1 = 2006-2010; year2 = 2010-2013. White is the reference group.
* p<.05; ** p<.01
Appendix D

**MSA Foreclosure Analyses by Race**

Table D1

*MSA Asian Foreclosure Regression Analysis*

<table>
<thead>
<tr>
<th>Variable</th>
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<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
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<tbody>
<tr>
<td></td>
<td>IRR</td>
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<td>IRR</td>
<td>z</td>
</tr>
<tr>
<td>Asian population</td>
<td>0.955</td>
<td>-12.11 **</td>
<td>0.965</td>
<td>-9.06 **</td>
</tr>
<tr>
<td>Denial rate</td>
<td>1.017</td>
<td>2.83 **</td>
<td>1.008</td>
<td>2.47 *</td>
</tr>
<tr>
<td>Subprime loan rate</td>
<td>1.005</td>
<td>2.10 *</td>
<td>0.999</td>
<td>-0.43</td>
</tr>
<tr>
<td>Owner occupied %</td>
<td>0.985</td>
<td>-12.38 **</td>
<td>0.985</td>
<td>-12.00 **</td>
</tr>
<tr>
<td>Female owned %</td>
<td>1.004</td>
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<td>1.003</td>
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*Note.* IRR = Incidence-rate ratio

* p<.05; ** p<.01
### Table D2

**MSA Black Foreclosure Regression Analysis**

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<td>Owner occupied %</td>
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*Note. IRR = Incidence-rate ratio

* p<.05; ** p<.01
### Table D3

**MSA Latino Foreclosure Regression Analysis**

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<td>z</td>
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**Note.** IRR = Incidence-rate ratio

* p<.05; ** p<.01
### Table D4

**MSA White Foreclosure Regression Analysis**

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</table>

*Note.* IRR = Incidence-rate ratio

* p<.05; ** p<.01
Appendix E

MSA Mortgage Denial and Subprime Loan Analysis

Table E1

*MSA Mortgage Denial Rate Poisson Analysis by Race and Year*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
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</thead>
<tbody>
<tr>
<td>race</td>
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<td></td>
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</tbody>
</table>
| Asian     | 0.05        | 2.5 | *
| Black     | 0.50        | 28.3| **|
| Latino    | 0.26        | 21.3| **|
| year1     | 0.18        | 8.7 | **|
| race*year1|             |     |
| Asian     | 0.15        | 3.4 | **|
| Black     | 0.11        | 2.5 | * |
| Latino    | 0.24        | 9.3 | **|
| year1*year1| -0.08      | -11.4| **|
| race*year1*year1|      |     |
| Asian     | -0.06       | -3.8| **|
| Black     | -0.04       | -2.4| * |
| Latino    | -0.07       | -7.4| **|
| year2     | -0.07       | -8.2| **|
| race*year2|             |     |
| Asian     | 0.12        | 7.3 | **|
| Black     | 0.00        | 0.0 |
| Latino    | -0.01       | -1.0|
| Constant  | -1.55       | -123.0| **|

Wald $\chi^2$ 5274.1  **

Observations 12849

Groups 580


White is the reference group.

* p<.05; ** p<.01
Table E2

**MSA Subprime Loan Rate Poisson Analysis by Race and Year**

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*Note. year1 = 2006-2010; year2 = 2010-2013. White is the reference group. * p<.05; ** p<.01
References


Kochhar, R., & Fry, R. (2014). *Wealth inequality has widened along racial, ethnic lines since the end of Great Recession*. Retrieved from: http://pewrsr.ch/1yImF75


Reckard, E. S. (2013, January 29). New type of subprime loan pushed; the proposed dignity mortgage would cut rates after five years of on-time payments. *Los Angeles Times.* Retrieved from [www.latimes.com](http://www.latimes.com)


