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# Racial Segregation and the American Foreclosure Crisis

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## Abstract

The rise in subprime lending and the ensuing wave of foreclosures was partly a result of market forces that have been well-identified in the literature, but it was also a highly racialized process. We argue that residential segregation created a unique niche of minority clients who were differentially marketed risky subprime loans that were in great demand for use in mortgage-backed securities that could be sold on secondary markets. We test this argument by regressing foreclosure actions in the top 100 U.S. metropolitan areas on measures of black, Hispanic, and Asian segregation while controlling for a variety of housing market conditions, including average creditworthiness, the extent of coverage under the Community Reinvestment Act, the degree of zoning regulation, and the overall rate of subprime lending. We find that black residential dissimilarity and spatial isolation are powerful predictors of foreclosures across U.S. metropolitan areas. To isolate subprime lending as the causal mechanism through which segregation influences foreclosures, we estimate a two-stage least squares model that confirms the causal effect of black segregation on the number and rate of foreclosures across metropolitan areas. We thus conclude that segregation was an important contributing cause of the foreclosure crisis, along with overbuilding, risky lending practices, lax regulation, and the bursting of the housing price bubble.

## Keywords

segregation, foreclosures, race, discrimination

Four decades after passage of the Fair Housing Act, residential segregation remains a key feature of America's urban landscape. Levels of black segregation have moderated since the civil rights era, but declines are concentrated in metropolitan areas with small black populations (Charles 2003). In areas with large African American communities—places such as New York, Chicago, Detroit, Atlanta, Houston, and Washington—declines have been minimal or nonexistent (Iceland, Weinberg, and Steinmetz 2002). As a result, in 2000 a majority of black urban dwellers continued to live under conditions of hypersegregation (Massey 2004). At the same time, levels of Hispanic segregation have

been rising; during the 1990s, Latinos in New York and Los Angeles joined African Americans among the ranks of the hypersegregated (Wilkes and Iceland 2004). Although much of the increase in Hispanic segregation stems from rapid population growth during a period of mass immigration, levels of anti-Latino prejudice and

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discrimination have also risen in recent years (Charles 2003; Massey 2009; Ross and Turner 2005). In addition, much research shows that dark-skinned Latinos experience higher levels of segregation than do their light-skinned counterparts (Denton and Massey 1989; Massey and Bitterman 1985; Massey and Denton 1992).

During the 1990s, rates of subprime mortgage lending, home equity borrowing, and home ownership increased among minorities; in the context of high segregation, many new borrowers were necessarily located in minority neighborhoods (Been, Ellen, and Madar 2009; Squires, Hyra, and Renner 2009). Williams and colleagues (2005) estimate, for example, that subprime lending accounted for 43 percent of the increase in black home ownership during the 1990s and 33 percent of the growth in ownership within minority neighborhoods. As a result, when the housing bubble burst in 2007 and deflated in 2008 and 2009, the economic fallout was unevenly spread over the urban landscape (Immergluck 2008). Given that segregation concentrates the effects of any economic downturn spatially (Massey and Denton 1993), the rise in foreclosures hit black and Hispanic neighborhoods with particular force (Bromley et al. 2008; Hernández 2009; Immergluck 2008; Schuetz, Been, and Ellen 2008).

Economic studies generally conclude that leveraged refinancing, overbuilding, the collapse of home prices, and a poorly regulated mortgage market were primarily responsible for the rise in foreclosures across metropolitan areas (Doms, Furlong, and Krainer 2007; Gerardi, Shapiro, and Willen 2009; Glaeser, Gyourko, and Saiz 2008; Haughwout, Peach, and Tracy 2008; Khandani, Lo, and Merton 2009). We argue that the foreclosure crisis also had significant racial dimensions. Although prior research has considered race as a factor, it was mainly to attribute intergroup disparities in defaults and foreclosures to minority group members' weaker economic position. A careful reading of recent

scholarship on segregation and mortgage lending reveals, however, that racial discrimination occurred at each step in the complex chain of events leading from loan origination to foreclosure (Bond and Williams 2007; Immergluck 2009; Stuart 2003; Williams, Nesiba, and McConnell 2005; Wyly et al. 2006). Specifically, ongoing residential segregation and a historical dearth of access to mortgage credit in U.S. urban areas combined to create ideal conditions for predatory lending to poor minority group members in poor minority neighborhoods (Been et al. 2009; Squires et al. 2009). This racialized the ensuing foreclosure crisis and focused its negative consequences disproportionately on black borrowers and home owners (Hernández 2009; Oliver and Shapiro 2006; Shapiro, Meschede, and Sullivan 2010; Wyly et al. 2006, 2009).

## SEGREGATION AND THE FORECLOSURE CRISIS

High levels of segregation create a natural market for subprime lending and cause riskier mortgages, and thus foreclosures, to accumulate disproportionately in racially segregated cities' minority neighborhoods. By definition, segregation creates minority-dominant neighborhoods, which, given the legacy of redlining and institutional discrimination, continue to be underserved by mainstream financial institutions (Renuart 2004; Ross and Yinger 2002). Moreover, the financial institutions that do exist in minority areas are likely to be predatory—for example, pawn shops, payday lenders, and check cashing services that charge high fees and usurious rates of interest—so that minority group members are accustomed to exploitation and frequently unaware that better services are available elsewhere (Immergluck and Wiles 1999). Segregation also spatially concentrates the disadvantages associated with minority status, such as poverty and joblessness (Massey and Fischer 2000). When the economy stagnated, families in minority

neighborhoods were more likely than others to turn to home equity loans as a means of maintaining consumption, thereby creating a ready demand for unscrupulous brokers to exploit (Sullivan, Warren, and Westbrook 2000).

Under conditions of high residential segregation, individual disadvantages associated with minority status are compounded in space and amplified in markets that are necessarily organized geographically (Dymski and Veitch 1992; Immergluck 2008). By concentrating underserved, financially unsophisticated, and needy minority group members who are accustomed to exploitation in certain well-defined neighborhoods, segregation made it easy for brokers to target them when marketing subprime loans (Stuart 2003). Avery, Brevoort, and Canner (2008) found that among mortgage lenders who went bankrupt in 2007, black borrowers who received loans in 2006 were three times more likely to receive a subprime than a prime loan (74 versus 26 percent) and Hispanics were twice as likely to receive a subprime than a prime loan (63 versus 37 percent). By contrast, whites were slightly more likely to get a prime than a subprime loan from the same lenders (46 versus 54 percent). Among institutions that did not go bankrupt in 2007, blacks who borrowed in 2006 were just as likely to receive prime as subprime loans (51 versus 49 percent), underscoring the discriminatory nature of predatory lending practices in the United States.

### *Securitization and Rewards to Risky Lending*

Residential segregation has always created dense concentrations of potentially exploitable clients in need of capital, but in the 1990s, these borrowers' attractiveness to mortgage lenders changed. Before the 1980s, lenders avoided inner-city minority neighborhoods through a combination of fear, prejudice, and institutional discrimination (Squires 1994). The invention of securitized mortgages,

however, changed the calculus of mortgage lending and made minority households very desirable as clients. Indeed, the spread of mortgage-backed securities during the 1980s transformed home lending throughout the United States by splitting apart the origination, servicing, and selling of mortgages into discrete transactions that made it possible for banks to earn more money quickly by originating and selling loans than by lending money and collecting interest payments over time (Raynes and Rutledge 2003; Sowell 2009).

The advent of securitized mortgages transformed what had been a bank-based intermediary credit system into a securities-based market system (Dymski 2002). In so doing, the new financial instruments vastly expanded the pool of money available for lending. Under traditional systems of lending, the number of mortgages was limited by the amount of deposits a bank had on hand to lend. Under the new system, the volume of mortgages was no longer limited by deposits, but by the number of potential borrowers and investors' willingness to purchase mortgage-backed securities. The new arrangements thus created a demand on the part of banks to expand the pool of borrowers.

Securitized mortgages are not sold whole but are pooled together and divided into different shares, or tranches, on the basis of risk (Raynes and Rutledge 2003). High interest mortgages pay more to investors, of course, but they also carry more risk; to manage the risk, financial engineers combined different risk tranches into diversified bonds that could be sold on secondary markets. By mixing different tranches together, financiers could create a salable security with almost any risk rating and interest rate they wished. In theory, the risk of default by borrowers in high-risk tranches was offset by the surety of payments within low-risk tranches, thereby yielding a relatively safe investment that rating services beholden to the financiers were happy to affirm for a generous fee (Raynes and Rutledge 2003).

Because virtually any mortgage, however shaky, could be sold and repackaged as part of a collateralized debt obligation, risky borrowers who were formerly shunned by lenders suddenly became quite attractive. The resultant wave of predatory lending was spearheaded by independent mortgage brokers who did not bear the risk of their reckless lending practices. They simply generated mortgages and immediately sold them to banks and other financial institutions, which in turn capitalized the shaky subprime instruments as securities and sold them to third-party investors who ended up assuming the risk, typically in ways they neither appreciated nor understood (Engel and McCoy 2007; Lewis 2010; Peterson 2007). These lucrative subprime lending and securitization practices did not suddenly appear “at the fringes of finance,” but were produced and legitimated by the financial industry using new, high-tech tools such as credit scoring, risk-based pricing, securitization, credit default swaps, and variable rate mortgages that were billed as rational, scientific, and safe (Langley 2008, 2009; Stuart 2003).

### *How Segregation Shaped Unequal Lending*

With the move to securitized lending, discrimination in real estate lending shifted from the outright denial of home loans to the systematic marketing of predatory loans to poor black and Hispanic households, which were easily found within segregated neighborhoods (Engel and McCoy 2008; Massey 2005a). Before the subprime boom, black borrowers were more likely to be denied loans overall, especially in white areas, whereas whites were often denied loans in minority neighborhoods (Holloway 1998). During the boom, minority borrowers' underserved status made them prime targets for subprime lenders who systematically targeted their communities for aggressive marketing campaigns (Dymski and Veitch

1992; Holloway 1998; Stuart 2003). Discriminatory real estate practices (e.g., steering) prevented black and Latino homebuyers from accessing better housing and sounder loan products in affluent suburbs (Friedman and Squires 2005; Hanlon 2010) and channeled them into depressed inner-ring suburbs that were undergoing sustained disinvestment (Hackworth 2007).

In a very real way, as Williams and colleagues (2005) show, the old inequality in home lending made the new inequality possible by creating geographic concentrations of underserved, unsophisticated consumers that unscrupulous mortgage brokers could easily target and efficiently exploit (see also Hernández 2009; Lee 1999). A study of subprime borrowers in Los Angeles, Oakland, Sacramento, and San Diego found that African Americans were significantly more likely than whites (40 versus 24 percent) to report lender marketing efforts as the impetus for taking out a home equity loan (California Reinvestment Committee 2001). In the end, subprime lending not only saddled borrowers with onerous terms and unforeseen risks, but it also reinforced existing patterns of racial segregation and deepened the black-white wealth gap (Bond and Williams 2007; Friedman and Squires 2005; Williams et al. 2005).

In the new regime of racial inequality, African American and Latino homeowners bore a disproportionate share of costs stemming from the bursting of the housing bubble. Compared with whites with similar credit profiles, down payment ratios, personal characteristics, and residential locations, African Americans were much more likely to receive subprime loans (Avery, Brevoort, and Canner 2007; Avery, Canner, and Cook 2005; Bocian, Ernst, and Li 2006; Pennington-Cross, Yezer, and Nichols 2000). Moreover, after controlling for background factors, black and Hispanic homeowners were significantly more likely than whites to receive loans with unfavorable terms such as prepayment penalties (Bocian et al. 2006; Farris and Richardson 2004; Quercia, Stegman, and Davis 2007;

Squires 2004), higher cost ratios (Elliehausen, Staten, and Steinbuks 2008; LaCour-Little and Holmes 2008), and higher rate spreads (Bocian et al. 2006). The racial gap in subprime lending holds across all income levels (Bromley et al. 2008; Immergluck and Wiles 1999; Williams et al. 2005), with perhaps an increase at higher income levels (Institute on Race and Poverty 2009; Williams et al. 2005).

During the 1990s, the United States was increasingly characterized by a dual, racially segmented mortgage market, one that was structured by the race of borrowers and the racial composition of neighborhoods (Apgar and Calder 2005; Stuart 2003; U.S. Department of Housing and Urban Development 2000). Controlling for neighborhood characteristics, the incidence of subprime lending was significantly greater among black and Hispanic borrowers (Calem, Hershaff, and Wachter 2004) and among people who had not gone to college (Manti, Raca, and Zorn 2004). As a result, from 1993 to 2000, the share of subprime mortgages going to households in minority neighborhoods rose from 2 to 18 percent (Williams et al. 2005).

The rise of racially targeted subprime lending destabilized minority neighborhoods by increasing turnover (Gerardi and Willen 2008), and the destabilizing effects on homeownership did not remain confined to minority neighborhoods, but spilled over into adjacent white and mixed neighborhoods (Schuetz et al. 2008). National evidence from a longitudinal study of homeowners from 1999 to 2005 shows that the racial gap in homeownership exit rates widened in a way that cannot be explained by social, economic, or financial factors that historically accounted for black-white differentials (Turner and Smith 2009). The coincidence of the peak in subprime lending with the inexplicable decline in the stability of black homeownership and exit rates offers compelling evidence that segregation and the new face of unequal lending combined to undermine black residential stability and erode any accumulated wealth (Shapiro et al. 2010).

### *Race and the Housing Bust*

From a lender's perspective, the new system worked well as long as real estate and lending markets remained liquid and housing prices continued to rise. For a while, minority ownership rates rose and everyone involved in securitized lending made good money—the broker who originated the loan, the lender who put up the money, the firm that packaged and underwrote the mortgage-backed security, the rating agency that affirmed its creditworthiness, and the company that insured the investments through novel instruments known as credit default swaps. To keep the system in operation and profits rolling in, however, more borrowers had to be constantly found and housing prices had to continue rising. As the number of buyers increased and housing prices inflated, a speculative fever took hold (Andrews 2009; Shiller 2008). People began to finance home purchases on the assumption that home prices would rise indefinitely (Khandani et al. 2009), buying properties with interest-only loans, waiting for real estate prices to rise, and then “flipping” the properties to realize the capital gain. Research shows that minority-owned properties were more likely than others to be involved in loan flipping and equity stripping schemes (Immergluck and Wiles 1999).

After 2004, as the market peaked, speculators, dubious lenders, negligent securities dealers, and compromised ratings firms increasingly focused on a select few booming regional markets, such as Las Vegas, Phoenix, and South Florida. These markets appear to have played a large role in the final run-up in risky lending. At the height of the bubble, fraud may have been the rule rather than the exception. When Pendley, Costello, and Kelsch (2007:4) analyzed a sample of delinquent subprime loans made in 2006, for example, they found widespread “appearance of fraud or misrepresentation”; two-thirds of stated owner-occupied dwellings were never actually occupied, and nearly half of all

claims to first-time ownerships did not appear to be valid. These findings suggest that the inflated housing bubble motivated sophisticated lenders, brokers, and buyers to engage in an unparalleled level of deceit.

As the market became fully saturated in 2006, housing prices ultimately stalled, foreclosures rose, and faith in mortgage-backed securities evaporated, bringing down the entire system of collateralized debt obligations and taking much of the U.S. economy with it (Khandani et al. 2009; Shiller 2008). Ultimately, brokers, lenders, securitizers, and most of all, ratings agencies, failed to foresee the perils of “default correlation,” or the interrelated risks bound up in interconnected portfolios of troubled loans (Langley 2009). The utter collapse of subprime lending exposed the extremes of a pricing regime that assessed risks individually but not collectively, not accounting for the aggregate risk of ever-increasing subprime lending and securitization. Less than 1 percent of mortgage loans were in foreclosure at the end of 2005; this rate more than quadrupled to over 4.6 percent by the end of 2009. At the same time, the foreclosure rate on riskier subprime loans went from 3.3 percent in 2005 to 15.6 percent in 2009 (Mortgage Bankers Association 2006, 2010).

The resulting tidal wave of foreclosures was concentrated in areas that only a few years earlier had been primary targets for the marketing of subprime loans (Bond and Williams 2007; Edmiston 2009), and minority neighborhoods often bore the brunt of the foreclosures (Bromley et al. 2008; Edmiston 2009; Hernández 2009; Immergluck 2008; Institute on Race and Poverty 2009; Mallach 2009; Márquez 2008). In the end, the housing boom and the immense profits it generated frequently came at the expense of poor minorities living in central cities and inner suburbs who were targeted by specialized mortgage brokers and affiliates of national banks and subjected to discriminatory lending practices (Been et al. 2009; Engel and McCoy 2008;

Peterson 2007; Powell 2010; Squires et al. 2009).

Two additional lines of research also suggest that predatory lending and subsequent asset stripping were structured on the basis of race as well as class. First, contrary to conventional wisdom, the housing crisis was not caused primarily by a decline in underwriting standards (Haughwout 2009; see also Khandani et al. 2009). Bhardwaj and Sengupta (2009) show, for example, that average credit scores within the subprime loan sector actually increased in years prior to the housing bust and that most of the loans fell into the near-prime, low- or no-documentation “Alt-A” category, rather than in more speculative B and C categories. Second, the crisis cannot be attributed to riskier lending engendered by the Community Reinvestment Act (CRA). Using a regression discontinuity design, Bhutta (2008) examined lending rates just below and above the CRA neighborhood income cutoff and found that while CRA oversight did increase lending in targeted areas, unregulated lending activity also increased substantially in the same places. Only 6 percent of subprime loans were made to low-income borrowers or individuals in neighborhoods subject to CRA oversight, and less than 2 percent of loans that originated with unregulated independent mortgage brokers were CRA credit-eligible (Bhutta and Canner 2009).

Although lending standards often left much to be desired, it appears that ongoing racial segregation, discriminatory lending, and an overheated housing market combined to leave minority group members uniquely vulnerable to the housing bust. As Immergluck (2009) wryly notes, financial literacy and creditworthiness did not suddenly plummet on the eve of the crisis—home prices did. At the same time, although CRA regulations stimulated lending to minority households in low-income neighborhoods, the increase was not nearly enough to bring about the housing crisis (Bhutta and Canner 2009; Park 2008).

## DATA SOURCES

From the above research, we conclude that residential segregation was significant in structuring how the rise of predatory lending and the consequent wave of foreclosures played out in U.S. housing markets (Bond and Williams 2007; Engel and McCoy 2008; Hernández 2009; Stuart 2003; Williams et al. 2005; Wyly et al. 2006, 2009). We hypothesize, first, that segregation facilitated racially targeted subprime mortgage lending during the boom and, second, that it magnified the consequences of the housing crisis for blacks and Latinos by concentrating foreclosures in poor minority neighborhoods during the bust. To test these assertions, we draw on two principal sources of data. We define our dependent variables based on data obtained from RealtyTrac, the nation's largest provider of foreclosure listings. We compute the number of properties with at least one foreclosure action in 2006, 2007, and 2008 in the nation's 100 largest metropolitan statistical areas and divisions (MSAs), as defined in 2003. We then divide this figure by the number of housing units in 2006 to derive a foreclosure rate.<sup>1</sup> Over 77 percent of all foreclosure properties during the period under consideration were located in this set of MSAs. This sample is especially useful for making inferences about minorities in the United States because these 100 MSAs were home to over 75 percent of African Americans, nearly 80 percent of Hispanics, and 90 percent of Asians in the country in 2000.

Our principal explanatory variables are measures of residential unevenness and spatial isolation for Hispanics, African Americans, and Asians computed across census tracts in the top 100 metropolitan areas (see Iceland et al. 2002). We measured unevenness with the well-known index of dissimilarity and isolation using the  $P^*$  within-group isolation index. The former gives the relative proportion of minority group members who would have to exchange tracts with majority group

members to achieve an even residential distribution; the latter gives the proportion of own-group members in a tract inhabited by the average minority group member. Of the five dimensions of segregation identified by Massey and Denton (1988), evenness and isolation are the most important and empirically account for most of the common variation (Massey, White, and Phua 1996).

Our analytic strategy is to regress the number and rate of foreclosures in MSAs on these two measures of segregation while holding constant the effect of metropolitan-level factors shown to influence the odds of foreclosure. Our controls include standard census-based variables, such as 2008 MSA population and racial and ethnic composition from 2000, as well as socioeconomic characteristics obtained from the 2005 to 2007 American Community Surveys, such as percent of persons holding a college degree, median household income, and percent of homeowners with a second mortgage (all defined as of 2006). We also include the median age of MSA housing stock from the 2000 housing census. The 2006 unemployment rate and the 2000 to 2006 change in rate of annual unemployment come from the Bureau of Labor Statistics; the share of the workforce that was unionized comes from Hirsch and MacPherson (2007). In initial specifications of the model we also tested for effects of the poverty rate, share of female-headed households, and per capita income, but these variables add nothing to the explanatory power of the models and were dropped from further consideration. The final models also include dummy variables to control for region, coastal location, and location along the Texas border with Mexico (the Rio Grande River).

In addition to these standard indicators, we include three specialized measures of conditions in metropolitan real estate markets that prior research finds to be important in explaining the foreclosure crisis. First, we construct a measure of overbuilding by computing the ratio of 2000 to 2006 MSA housing starts to housing units in 2000, a procedure closely

following that of Glaeser and colleagues (2008). Second, we include the Wharton Residential Land Use Regulation Index as a measure of local land use planning regulation. Gyourko, Summers, and Saiz (2008) developed this index for different municipalities; following Rothwell and Massey (2009), we take the weighted average of the index for municipalities within each MSA that responds to Gyourko's survey. We then center the distribution on the mean for the top 100 areas to yield a measure that controls for housing price premiums stemming from regulatory constraints on housing supply (Fischel 1990; Glaeser 2009; Glaeser and Gyourko 2003, 2008; Glaeser et al. 2008). Finally, we include a measure of the housing price boom in each MSA by using the Federal Housing Finance Agency's quarterly metropolitan area House Price Index (HPI), which is a weighted, repeat-sales index based on transactions involving single-family homes. We benchmark the housing price boom for each MSA by dividing annualized change in HPI from 2000 to 2006 by the annualized change in the two decades prior to 2000.

We also include MSA-level controls for the degree of subprime lending, the extent of CRA regulatory oversight, and borrowers' average creditworthiness. To assess the prevalence of subprime lending, we compute the aggregate share of all loans originated in 2004, 2005, and 2006 that were subprime, drawing on data from the Federal Financial Institutions Examination Council (<http://www.ffiec.gov/hmda>). The FFIEC tabulates information that lending institutions must provide to the federal government under the Home Mortgage Disclosure Act (HMDA). These data cover more than 28 million loans originated during the peak years of the housing boom. More than 6.9 million loans, or nearly one in four, were subprime, meaning that the interest rate at origination exceeded that for a comparable U.S. Treasury security (e.g., a 30-year bond) by 3 percent or more. This is the cutoff for reporting a loan in the data files (rates of lower priced loans are

intentionally left blank in fields) and is the definition of subprime lending used in other research (e.g., Been et al. 2009; Bocian et al. 2006; Squires et al. 2009).<sup>2</sup>

To measure the degree of regulatory oversight, we draw on 2004 to 2006 HMDA data and compute the weighted share (by dollar amount) of all 2004 to 2006 loans in each MSA that were originated by CRA-covered lending banking institutions (following Friedman and Squires 2005). In doing so, we use HMDA data on conventional loans (i.e., those not guaranteed by government) for the purchase of single-family properties (1 to 4 units) and take a 20 percent extract of the nearly 28 million mortgage loans originated in the top 100 metropolitan areas and compute the share of subprime loans going to borrowers. On average, less than two-thirds of total lending per MSA fell under the ambit of federal CRA regulation, but this share is noticeably lower, about half or less, in MSAs with elevated foreclosures (e.g., Detroit, Michigan; Las Vegas, Nevada; and Bakersfield, California). This suggests that greater CRA lending oversight reduces foreclosures even as it makes more loans available to minority group members (Bond and Williams 2007; Friedman and Squires 2005).

Finally, to control for borrowers' creditworthiness, we compute the average consumer credit score at the MSA level using information obtained from the Experian National Score Index. The index ranges from 672 to 720 for the top 100 MSAs and constitutes the mean FICO (Fair Isaac Corporation) credit score for all consumers living in all counties of each MSA whose credit behavior is reported to Experian, one of the nation's three major credit reporting bureaus. We expect that higher overall MSA credit scores will be associated with lower foreclosure rates because of the higher aggregate creditworthiness of borrowers, and by extension, mortgage holders. To mitigate omitted variables bias, we include this variable as a proxy for differences in credit history and access that co-vary with racial composition and segregation.

Table 1 presents means and standard deviations of the foregoing variables. In terms of our leading explanatory variable, levels of segregation are highest for African Americans, lowest for Asians, and Hispanics are in-between. The index of dissimilarity, for example, averages .59 for blacks with a range of plus or minus two standard deviations that goes from .34 to .83. By convention, dissimilarities below .3 are considered low, those from .3 to .6 are considered moderate, and those above .6 are regarded as high, with anything above .75 considered extremely high. Under these criteria, black segregation runs from moderate to extremely high. By contrast, the comparable range for Asians is .25 to .52 with a mean of .39, and Hispanics have a range of .24 to .67 with a mean of .46. Asians range from low to moderate, and Hispanics range from low to high.

Similar patterns prevail with respect to the isolation index. The black isolation index averages .45 and ranges from .07 to .84, going from minus to plus two standard deviations; the Hispanic index averages .32 and ranges from zero to .75; and the Asian mean stands at a very low .14 and ranges from zero to .40. If segregation creates a natural niche for subprime lending, then the more extreme maxima and greater variability of black segregation measures hold by far the greatest potential to predict foreclosures, followed by Hispanic segregation measures. The generally low averages and restricted variation of isolation and dissimilarity among Asians suggest a more limited potential to influence inter-metropolitan variation in foreclosures.

Segregation's effect in creating fertile terrain for subprime lending also depends on a group's socioeconomic status. This generalization holds because segregation not only concentrates minority group members spatially within particular neighborhoods, but it also concentrates any characteristic associated with minority group status (Massey and Denton 1993; Massey and Fischer 1999). For underprivileged minorities, segregation spatially concentrates poverty and its correlates

to create areas of concentrated disadvantage that constitute prime targets for subprime lending. For privileged minorities, segregation has the opposite effect—it concentrates advantage and its correlates to produce areas that are unlikely targets for subprime lending. As of 2008, the poverty rate for Asians stood at 12 percent, compared with 25 percent among African Americans and 23 percent among Hispanics (DeNavas-Walt, Proctor, and Smith 2009). Likewise, the median per capita income for Asians was \$30,000 in 2008, compared with just \$18,000 for African Americans and \$16,000 for Hispanics. The Asian median income even exceeded that for non-Hispanic whites (\$28,500). To the extent that segregation has an effect on the economic geography of Asians, it would be to concentrate advantage and thus diminish the frequency of subprime lending and foreclosures.<sup>3</sup>

## SEGREGATION'S EFFECT ON FORECLOSURES

Despite the persistence of residential segregation and its prevalence in areas with large minority populations, racial segregation is no longer as universal across U.S. urban areas as it once was. As indicated by the wide variance just described, there is now considerable variation across metropolitan areas in the degree of black and Hispanic segregation (Charles 2003; Iceland et al. 2002; Massey, Rothwell, and Domina 2009). In addition to a small minority population, other characteristics that predict lower levels of residential segregation are a small urban population, newer housing stock, presence of a college or a university, proximity to a military base, higher socioeconomic status, and location in the West or the Southwest (Farley and Frey 1994). Inter-urban differentials in Hispanic and black segregation thus carry the potential to contribute significantly to variation in foreclosure rates across U.S. metropolitan areas.

**Table 1.** Summary Statistics for Data Used in Analysis of Foreclosures in Top 100 MSAs

Variables	Mean	SD
Outcome Measures		
Foreclosures 2006 to 2008	33,633	38,710
Foreclosure Rate (per 100)	4.100	3.031
Index of Dissimilarity		
African Americans	.587	.121
Hispanics	.455	.108
Asians	.385	.068
P* Isolation Index		
African Americans	.453	.193
Hispanics	.317	.215
Asians	.137	.133
Control Variables		
Ratio of 2000 to 2006 Housing Starts to 2000 Units	.121	.073
Wharton Land Use Regulation Index	.000	.757
Relative Change in Housing Price Index (HPI) after 2000	4.068	2.534
Percent Subprime Loans, HMDA (2004 to 2006)	24.230	5.826
Percent Loans Made by CRA-Covered Lenders (2004 to 2006)	64.729	6.799
Experian MSA Credit Score Index	691.560	14.259
Population (2008)	1,891,540	1,787,775
Percent Persons 25+ with College Degree (2006)	29.473	6.783
Percent African American (2000)	13.592	9.618
Percent Hispanic (2000)	13.292	15.861
Percent Asian (2000)	4.834	7.297
Median Household Income (2006)	54,697	10,821
Percent Homeowners with Second Mortgage (2006)	7.346	2.153
Percent Workforce Unionized (2006)	12.075	6.593
Unemployment Rate (2006)	4.598	1.022
Change in Unemployment Rate 2000 to 2006	.755	1.026
Median Age of Housing Stock, Years (2000)	31.310	9.370
Region		
Northeast	.230	.423
Midwest	.180	.386
South	.370	.485
West	.220	.416
Costal MSA	.380	.488
Borders Rio Grande	.020	.141

Note:  $N = 100$ . See text for data sources.

To assess the effect of segregation on foreclosures, we estimate a simple OLS multiple regression model defined by the equation:

$$F = \alpha + \beta_1 S + \beta_2 Z + \varepsilon \quad (1)$$

where  $F$  represents either the log of the total number of foreclosure filings or the log of foreclosures per housing unit,  $\alpha$  is the intercept,  $S$  is a vector of segregation measures with associated coefficients  $\beta_1$ ,  $Z$  is a vector

of control variables with associated coefficients  $\beta_2$ , and  $\varepsilon$  is the error term.<sup>4</sup> Table 2 presents estimates of equations that use dissimilarity and isolation indices to predict the log of total foreclosures by MSA; Table 3 shows estimates that predict the log of foreclosure rates by MSA.

In both tables the models fit the data extremely well, with the predictor variables explaining, on average, 77 percent of the variance in the log of the foreclosure rate and 90

**Table 2.** OLS Estimates of Effect of Selected Measures of Residential Segregation on Log of Total Foreclosures

Variables	Dissimilarity Index		Isolation Index	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Index of Segregation				
African Americans	3.718**	.725	2.122**	.619
Hispanics	-.773	.596	.080	.656
Asians	-2.080*	.920	-2.161	1.636
Control Variables				
Housing Starts Ratio	2.980**	.960	3.067**	1.077
Wharton Land Use Index	.250**	.082	.272**	.096
Change in Housing Price Index	.082**	.024	.092**	.029
CRA-Covered Lending Share	-1.295	.912	-.810	1.061
Subprime Loan Share	3.022*	1.353	4.310**	1.581
MSA Credit Score Index	-.015*	.007	-.016*	.007
Log of Population	1.008**	.089	1.013**	.093
Percent with College Degree	-1.341	1.315	-.997	1.459
Log Median Household Income	.253	.509	.340	.515
Percent with Second Mortgage	.751	3.687	.225	4.350
Percent Workforce Unionized	-.025**	.011	-.022*	.011
Unemployment Rate	-.010	.064	.012	.071
Change in Unemployment Rate	.245**	.052	.213**	.063
Age of Housing Stock	.004	.012	.014	.013
Region				
Midwest	.434*	.200	.631**	.200
South	.042	.257	.081	.296
West	.463	.384	.679	.436
Coastal MSA	-.053	.123	.070	.133
Borders Rio Grande	-1.030**	.370	-1.054**	.380
Constant	1.960	7.557	.979	8.150
<i>R</i> <sup>2</sup>	.91		.90	
Joint <i>F</i> -Test for Region	3.35*		7.97**	
Joint <i>F</i> -Test for Segregation	10.48**		6.28**	

Note: *N* = 99. Robust standard errors. Model also includes percent black, percent Hispanic, and percent Asian.

\**p* < .05; \*\**p* < .01 (two-tailed tests).

percent of the variance in the logged absolute number of foreclosures. Moreover, coefficients for the segregation indices closely follow theoretical expectations. Whether measured in terms of residential dissimilarity or spatial isolation, segregation of African Americans is a powerful and highly significant predictor of the number and rate of foreclosures across U.S. metropolitan areas. For instance, a .1 unit increase in black dissimilarity is associated with 37 percent more foreclosure actions and a 34 percent increase in the foreclosure rate. Inter-metropolitan variation

in the segregation of Hispanics, however, does not consistently affect the rate and absolute number of foreclosures. As we discuss in the next section, the effect of Hispanic segregation may be overwhelmed by the effect of black segregation. These statistical estimates are consistent with the findings of Been and colleagues (2009) and Squires and colleagues (2009).

By contrast, Asian-white residential dissimilarity significantly reduces the number and rate of foreclosures across metropolitan areas, and spatial isolation also has a negative,

**Table 3.** OLS Estimates of Effect of Selected Measures of Residential Segregation on the Log of the Foreclosure Rate

Variables	Dissimilarity Index		Isolation Index	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Index of Segregation				
African Americans	3.412**	.725	1.990**	.604
Hispanics	-.686	.580	.074	.642
Asians	-1.761 <sup>+</sup>	.906	-1.572	1.562
Control Variables				
Housing Starts Ratio	2.868**	.946	2.973**	1.032
Wharton Land Use Index	.236**	.081	.259**	.092
Change in Housing Price Index	.072**	.023	.080**	.027
CRA-Covered Lending Share	-1.331	.901	-.847	1.026
Subprime Loan Share	3.269*	1.358	4.560**	1.547
MSA Credit Score Index	-.014 <sup>+</sup>	.007	-.015*	.007
Log of Population	.012	.087	.010	.089
Percent with College Degree	-1.746	1.291	-1.420	1.410
Log Median Household Income	.750	.489	.858 <sup>+</sup>	.500
Percent with Second Mortgage	1.468	3.643	.703	4.190
Percent Workforce Unionized	-.027*	.010	-.024*	.011
Unemployment Rate	.016	.063	.031	.068
Change in Unemployment Rate	.224**	.051	.200**	.060
Age of Housing Stock	.003	.012	.012	.013
Region				
Midwest	.409*	.194	.583**	.192
South	.032	.251	.072	.286
West	.448	.372	.663	.422
Coastal MSA	-.077	.124	.030	.129
Borders Rio Grande	-1.040*	.392	-1.042*	.395
Constant	1.121	7.443	.098	8.005
<i>R</i> <sup>2</sup>	.78		.76	
Joint <i>F</i> -Test for Region	3.17*		7.44**	
Joint <i>F</i> -Test for Segregation	8.71**		5.62**	

Note: *N* = 99. Robust standard errors. Model also includes percent black, percent Hispanic, and percent Asian.

<sup>+</sup>*p* < .10; \**p* < .05; \*\**p* < .01 (two-tailed tests).

although insignificant, effect. Residential segregation concentrates group characteristics, whatever they are, in space. In the case of blacks, the prevailing characteristics are poverty and socioeconomic deprivation; given that Asian incomes exceed those of whites, on average, their prevailing characteristics are affluence and socioeconomic privilege. By concentrating affluence, the segregation of Asians creates communities that are inherently resistant to the entreaties of subprime lenders—hence the negative relationship between Asian segregation and foreclosures.

The various control variables generally function as hypothesized, lending face validity to the equation estimates. As expected, foreclosures are positively predicted by greater housing start shares, higher rates of subprime lending, increasing unemployment, rising home prices, lower credit scores, more second mortgages, higher median incomes, greater levels of land use regulation, and location in the Midwest or the West.<sup>5</sup> If we assume that the housing start ratio measures overbuilding and that rising relative home prices capture the housing bubble, then our results are

consistent with prior work on the economic causes of the U.S. foreclosure crisis (e.g., Glaeser et al. 2008; Hauhout et al. 2008; Immergluck 2009; Kochhar, Gonzalez-Barraera, and Dockterman 2009; Mayer, Pence, and Sherlund 2009; National Association of Realtors 2004).

In the attempt to understand the foreclosure crisis, our study adds the important and independent role played by racial segregation in structuring the housing bust. Table 4 shows segregation's relative predictive power compared with other significant factors by reporting the standardized effect sizes evaluated at the sample mean of the foreclosure total and rate (in terms of number of foreclosures and percentage points, respectively). In the model using dissimilarity indexes, a standard deviation increase in the segregation of African Americans increases the number of foreclosures by 15,028 actions and the rate of foreclosures by 1.68 percentage points. This effect exceeds the effect of MSA home building, house price booms, and all other important explanatory variables. Changes in the proxy measures of economic conditions, land use restrictions, and overbuilding exert a considerably smaller impact on foreclosures, with absolute standard effect sizes just 40 to 56 percent of that for black segregation.

In the isolation model, one standard deviation in black segregation leads to a large change in foreclosures (13,842) and the foreclosure rate (1.58 percentage points). Standardized changes in the subprime lending share lead to an increase of nearly 8,500 foreclosures and an even greater effect on foreclosure rates, at 1.1 percentage points. Relative changes in house prices and housing starts, average credit scores, and changes in unemployment rates show an increase of 7,000 to 8,000 foreclosures and .8 to .9 percentage points in the foreclosure rate. While the effect size of Hispanic segregation in the dissimilarity model is not statistically distinguishable from zero, Hispanic isolation has a standardized effect of more than 3,800 foreclosures

and a .66 percentage point increase in the foreclosure rate.

## FORECLOSURES AND THE SEGREGATION-SUBPRIME LINK

Taking into account the distribution of effect sizes estimated in Table 4, we conclude that the influence of black residential segregation clearly exceeds that of other factors linked by earlier studies to inter-metropolitan variation in foreclosures. Furthermore, racial segregation is an important and hitherto unappreciated contributing cause of the current foreclosure crisis. This conclusion rests, of course, on a cross-sectional ecological regression and thus may be subject to certain methodological criticisms. Because we are not seeking to infer individual behavior from aggregate data, ecological bias itself is not an issue—our argument is structural and specified at the metropolitan, not the individual, level.

As with any cross-sectional analysis, however, endogeneity or reverse causality is a potential problem. In this case, it does not seem likely that foreclosures could reasonably cause segregation. Patterns of racial segregation are the cumulative product of decades of actions in the public and private spheres, and high levels of black segregation were well institutionalized in U.S. urban areas by the mid-twentieth century (Massey and Denton 1993). In addition, we measure segregation in 2000 and foreclosures in 2006 to 2008, so the independent variable is temporally prior to the dependent variable.

A more serious threat to causal inference is endogeneity. Perhaps there is a third, unmeasured variable that influences both segregation and foreclosures to bring about the observed association between them. Although we endeavored to apply a rather exhaustive set of controls, it is simply not possible to control for all potential confounding variables. One possible confounding variable is the degree

**Table 4.** Effect of a One Standard Deviation Increase in Selected Variables on the Number and Rate of Foreclosures

Effect of One <i>SD</i> Increase in:	Number of Foreclosures (Mean: 33,947)	Foreclosure Rate (Mean: 4.135%)
<b>Dissimilarity Model</b>		
Black Dissimilarity Index	15,028	1.680
Hispanic Dissimilarity Index	n.s.	n.s.
Asian Dissimilarity Index	-4,830	-.499
Housing Starts Ratio	7,392	.867
Wharton Land Use Index	6,208	.713
Ratio of post- to pre-2000 HPI	7,094	.762
Subprime Loan Share	5,944	.871
MSA Credit Score Index	-7,301	-.817
Change in Unemployment Rate	8,383	.933
<b>Isolation Model</b>		
Black Isolation Index	13,842	1.581
Hispanic Isolation Index	n.s.	n.s.
Asian Isolation Index	n.s.	n.s.
Housing Starts Ratio	7,615	.899
Wharton Land Use Index	6,767	.784
Ratio of post- to pre-2000 HPI	7,939	.840
Subprime Loan Share	8,477	1.092
MSA Credit Score Index	-7,817	-.878
Change in Unemployment Rate	7,276	.830

Note: *N* = 99. Effect on foreclosure rate shown in percentage points.

of anti-black prejudice and discrimination, which could well vary across metropolitan areas and simultaneously increase segregation and the extent of racially targeted subprime lending, thus increasing the number and rate of foreclosures. Indeed, Galster (1986) and Galster and Keeney (1988) show that discrimination in lending had a strong effect on racial segregation across 40 MSAs in the 1970s and 1980s.

The relationship between segregation and foreclosures can be purged of endogeneity using two-stage least squares, but only if a suitable instrument is available. Because we argue that segregation facilitates subprime lending to African Americans, we should be able to use inter-metropolitan variation in the size of racial differentials in subprime lending to isolate segregation's causal effect. Specifically, if our argument is correct, then intergroup differentials in subprime lending offer a suitable instrument to predict segregation in a two-stage least squares model of

foreclosures. Although simple logic predicts a strong relationship between the overall prevalence of subprime lending and foreclosures, there is no a priori reason to believe that the black-white or Hispanic-white gap in the extent of subprime lending will affect these outcomes; according to our argument, however, the size of the racial gap in subprime lending should clearly be causally related to the degree of black segregation.

In a preliminary examination of the data we indeed found that inter-metropolitan variation in the size of the racial gap in subprime lending is strongly correlated with segregation but uncorrelated with either the rate or the number of foreclosures. This confirms its suitability as an instrument. According to Angrit and Krueger (2001:73), "a good instrument is correlated with the endogenous regressor for reasons the researcher can verify and explain, but uncorrelated with the outcome variable for reasons beyond its effect on the endogenous regressor." We compute intergroup differentials

in subprime lending by metropolitan area using the combined HMDA data from 2004, 2005, and 2006 (described in the Data Sources section). If lending discrimination is greater in more segregated MSAs, then racial-ethnic differentials in subprime lending permit us to identify the causal effect of residential segregation on MSA foreclosure rates, enabling us to specify the following two-stage model:

$$S = \eta + \delta RACEDIFF + W\lambda + \nu \quad (2)$$

$$F = \alpha + (\eta + RACEDIFF\delta + W\lambda + \nu)\beta_1 + Z\beta_2 + \varepsilon. \quad (3)$$

In this system, Equation 2 expresses the first-stage relationship between segregation,  $S$ , and  $RACEDIFF$ , the black-white or Hispanic-white gap in the likelihood of obtaining a subprime loan in 2006. In this equation,  $\delta$  is the coefficient associated with this variable;  $W$  is a vector of controls including percent black, percent Hispanic, and percent Asian;  $\lambda$  is a vector of coefficients associated with these variables; and  $\nu$  is the error term. Equation 3 simply substitutes the value of segregation predicted from this first-stage equation into Equation 1 to yield a second-stage equation that expresses foreclosures as a function of the segregation instrument plus the variables in  $Z$ .  $\beta_1$  and  $\beta_2$  are then re-estimated in the second-stage equation, along with  $\varepsilon$ .

To generate a more refined measure of lending discrimination to use as our instrument, we estimate black-white and Hispanic-white differentials in the likelihood of receiving a subprime loan after adjusting for borrower and neighborhood characteristics reported in the HMDA data. That is, using an extract of 5,360,007 HMDA loan-level records with non-missing data, we predict  $RACEDIFF$  for each MSA using a probit model where the dependent variable is a dichotomous indicator equal to one if the loan is flagged as subprime in the data by a non-missing interest rate greater than or

equal to 3 percent. The probit model expresses the likelihood of receiving a subprime loan as a function of the type (i.e., home purchase, refinance, or improvement) and amount of the loan, borrower income, first or second lien status, occupancy (i.e., investor or owner), type of loan purchaser (i.e., government agency, private, bank, finance company, lender affiliate, or other independent entity), median tract income and tract-to-MSA ratio, ratio of total tract single-family units to population, and tract minority percentage.

We also merge the following extended control variables to the foregoing data computed from the HMDA data: tract population density in persons per square mile, median age of tract housing stock, and the MSA-level average credit score index, described earlier. The probit estimation clusters errors at the MSA level. Avery and colleagues (2005) show that HMDA data file variables explain nearly half (48 percent) of the black-white gap in subprime lending, whereas credit factors such as FICO scores, loan-to-value ratios, and interest rate type account for only an additional one-sixth (17 percent) of the observed gap. Although we recognize the limitations of ecological data at the tract- and MSA-levels, we believe our proxies for credit factors in the probit equation adequately reduce potential bias in our estimates.

For each MSA, we average the group likelihood of receiving a subprime loan in 2004 to 2006 by summing the predicted probability by race and ethnicity across all loans and then dividing by the total number of loans to each borrower race/ethnic group (i.e., non-Hispanic white, non-Hispanic black, and Hispanic). We then calculate the black-minus-white and Hispanic-minus-white differences in regression-adjusted predicted subprime lending probabilities for each of the 100 MSAs. The black-white differential has a mean of 11.8 percent (*sd* 4.3 percent) and ranges from 2.3 to 24.0 percent; the Hispanic-white differential is also always positive, with a mean of 8.1 percent (*sd* 3.8 percent) and a range of 1.4 to 17.5 percent. We

merge these two differential variables to the main data file.

We use the regression-adjusted black-white and Hispanic-white differentials in subprime lending by MSA to predict the segregation instrument inserted into the second-stage equation. Table 5 reports OLS and 2SLS estimates of the effect of black and Hispanic segregation on the rate of foreclosures for the top 100 MSAs, excluding Honolulu, Hawaii, as in our main analysis. The model includes the same covariates as in Table 1 except log of population, level of unemployment, the Rio Grande border dummy, and age of housing stock.<sup>6</sup>

The estimated OLS coefficient for black segregation (see the first column in Table 5) is highly significant, and at 3.84 it is comparable to that in our initial model (see Table 2). This suggests that a .10-point rise in black segregation is associated with a 38 percent increase in the foreclosure rate. By contrast, the instrumental variable estimate of the coefficient is 4.64. This coefficient is estimated quite precisely and attains significance at the .001 level. Its higher point estimate implies that a .10-point increase in black segregation is associated with a 46 percent increase in the foreclosure rate. While this effect is not statistically different from the OLS effect due to overlapping confidence intervals, its higher value offers more evidence that segregation indeed has a causal effect on the MSA foreclosure rate by producing racial differentials in subprime lending.

Test statistics for endogeneity indicate that the racial differential instrument is indeed exogenous, a conclusion corroborated by the fact that it is uncorrelated with the residuals of the reduced form model in Equation 3. The percent of the MSA population that is black has no impact whatsoever on our segregation estimates and a much smaller offsetting impact on the rate of foreclosures. This auxiliary finding underscores our hypothesis that racial concentration in space, and not race alone, is a significant structural cause of the current foreclosure crisis.

Likewise, the coefficient for Hispanic segregation is initially insignificant with a coefficient of .81 when estimated using OLS, but using the instrumental variable estimator the value rises to 1.12, which is nearly statistically significant ( $p = .15$  using a two-tailed test and  $p = .08$  under a one-tailed test). A .10-point increase in Hispanic dissimilarity is estimated to result in an 11 percent increase under IV estimation, indicating that unexplained Hispanic-white differences in subprime loan usage augment our understanding of the effect of Latino segregation on metropolitan-level foreclosures.<sup>7</sup> Note that the OLS and IV models yield similar coefficient estimates for the effect of economic trends, housing market conditions, land use regulation, region, and other controls. This suggests that segregation contributes to explaining variation in the foreclosure rate above and beyond the standard indicators heretofore employed in analytic models.

## CONCLUSIONS

The analyses provide strong empirical support for the hypothesis that residential segregation constitutes an important contributing cause of the current foreclosure crisis, that segregation's effect is independent of other economic causes of the crisis, and that segregation's explanatory power exceeds that of other factors hitherto identified as key causes (e.g., overbuilding, excessive subprime lending, housing price inflation, and lenders' failure to adequately evaluate borrowers' creditworthiness). Simply put, the greater the degree of Hispanic and especially black segregation a metropolitan area exhibits, the higher the number and rate of foreclosures it experiences. Neither the number nor the rate of foreclosures is in any way related to expanded lending to minority home owners as a result of the Community Reinvestment Act.

The confluence of low interest rates, unparalleled levels of equity extraction via

**Table 5.** Estimates of the Effect of Residential Segregation on Log of 2006 to 2008 Foreclosure Rate via Black-White and Hispanic-White Adjusted Differentials in the Likelihood of Obtaining a Subprime Loan in 2004 to 2006

	Black Segregation				Hispanic Segregation			
	OLS		IV		OLS		IV	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Dissimilarity Index								
African Americans	3.842**	.630	4.638**	.888				
Hispanics					.811	.662	1.124	.788
Selected Control Variables								
Housing Starts Ratio	2.581**	.773	2.728**	.714	1.874*	.939	1.901*	.832
Ratio of pre- to post-2000 HPI	.086**	.022	.083**	.020	.101**	.032	.101**	.029
Wharton Land Use Index	.221*	.083	.229**	.078	.182*	.091	.178*	.078
Subprime Loan Share, 2004 to 2006	2.568 <sup>+</sup>	1.404	2.085	1.292	4.893*	1.887	4.965**	1.654
MSA Credit Score Index	-.015*	.007	-.015*	.006	-.014 <sup>+</sup>	.008	-.0144*	.007
Change in Unemployment Rate	.239**	.041	.247**	.039	.203**	.057	.199**	.048
Percent Black, 2000	-1.649*	.685	-1.826**	.595	-.797	.907	-.881	.805
Percent Hispanic, 2000	-.752	.538	-.635	.486	-1.315	.737	-1.441*	.698
Percent College Degree, 2006	-1.957 <sup>+</sup>	1.161	-2.265*	1.147	-.475	1.700	-.445	1.517
Region								
Midwest	.386*	.188	.297*	.152	.813**	.213	.840**	.199
South	-.007	.216	-.010	.189	.009	.288	.060	.280
West	.501	.326	.525*	.289	.382	.395	.419	.366
Constant	1.396	6.839	.608	6.363	5.195	8.035	5.751	7.239
<i>R</i> <sup>2</sup>	.77		.76		.65		.65	
<i>F</i>	27.4				10.65			
Wald $\chi^2$			534.72				257.27	
[ <i>F</i> , 2SLS 1 <sup>st</sup> stage]			[38.89]				[27.08]	
Tests of Endogeneity (Null: Instrument is Exogenous)								
Robust $\chi^2$ ( <i>p</i> value)			1.18 (.27)				.45 (.50)	
Robust <i>F</i> ( <i>p</i> value)			.99 (.32)				.35 (.56)	
Covariance (Instrument, $\varepsilon_{IV}$ )			-.00001				-.0041	

*Note:* *N* = 99. Ordinary Least Squares (OLS) and Indirect Least Squares or Instrumental Variables (IV) estimates with robust standard errors. Additional covariates included in model but not shown here are listed in Table 2 excluding log of 2008 population, 2006 unemployment rate, borders Rio Grande, and age of housing stock. See text for detailed description of adjusted racial and ethnic differences in subprime lending instrument.  $\varepsilon_{IV}$  is the residual error term value from the corresponding IV regression model. <sup>+</sup>*p* < .10; \**p* < .05; \*\**p* < .01 (two-tailed tests).

refinancing, and the bust of the housing bubble may have combined with overbuilding and lax regulation to make the foreclosure crisis possible (Glaeser 2009; Khandani et al. 2009). However, we add a crucial addition to the understanding of the causes and consequences of the foreclosure crisis by demonstrating the key role of residential segregation in shaping how the crisis played out. By concentrating foreclosures in metropolitan areas with large racial differentials in subprime lending, segregation structured the

causes of the crisis, as well as the geographic and social distribution of its costs, on the basis of race. Segregation therefore racialized and intensified the consequences of the American housing bubble. Hispanic and black home owners, not to mention entire Hispanic and black neighborhoods, bore the brunt of the foreclosure crisis. This outcome was not simply a result of neutral market forces but was structured on the basis of race and ethnicity through the social fact of residential segregation.

Ultimately, the racialization of America's foreclosure crisis occurred because of a systematic failure to enforce basic civil rights laws in the United States. Discriminatory subprime lending is simply the latest in a long line of illegal practices that have been foisted on minorities in the United States (Satter 2009). It is all the more shocking because these practices were well-known and documented long before the housing bubble burst (e.g., Squires 2004; Stuart 2003; U.S. Department of Housing and Urban Development 2000; Williams et al. 2005). In addition to tighter regulation of lending, rating, and securitization practices, greater civil rights enforcement has an important role to play in cleaning up U.S. markets.

It is in the nation's interest for federal authorities to take stronger and more energetic steps to rid U.S. real estate and lending markets of discrimination, not simply to promote a more integrated and just society but to avoid future catastrophic financial losses. Racial discrimination is easily detected through a methodology known as the audit study, in which trained testers identifiable as black or white are sent into markets to seek out proffered goods and services. Black and white testers' experiences over a number of trials are compiled and compared to discern systematic differences in treatment (Fix and Struyk 1993; Yinger 1986). Numerous audit studies document the persistence of anti-black discrimination not only in markets for real estate (Yinger 1995; Zhao, Ondrich, and Yinger 2006) and credit (Ross and Yinger 2002; Squires 1994), but also in markets for jobs (Bertrand and Mullainathan 2004; Pager 2007; Turner, Fix, and Struyk 1991), goods (Ayres and Siegelman 1995), and services (Feagin and Sikes 1994; Ridley, Bayton, and Outtz 1989). Nonetheless, the discrimination continues.

An important goal in expanding civil rights enforcement should be the creation of federal programs to monitor levels of discrimination in key U.S. markets and to take remedial action on a routine basis. If a society uses markets to allocate production, distribute

goods and services, generate wealth, and produce income, then it is incumbent upon government to ensure that all citizens have the right to compete freely in all markets (Massey 2005b). In a market society, lack of access to markets translates directly into a lack of equal access to material well-being and ultimately into socioeconomic inequality (Massey 2007).

Unfortunately, to secure passage of the Civil Rights Acts of 1964, 1968, 1974, and 1977 and to avoid a southern filibuster, most of the enforcement mechanisms included in the original legislation were stripped away and the federal government is largely prohibited from playing an active role in uncovering discrimination or instigating actions to sanction those who discriminate. The existing body of civil rights law must be updated to establish within the U.S. Departments of Treasury, Labor, Commerce, and Housing and Urban Development permanent offices authorized to conduct regular audits in markets for jobs, goods, services, credit, and housing based on representative samples of market providers, both for purposes of enforcement and to measure progress in the elimination of discrimination from U.S. markets.

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### Notes

1. The RealtyTrac database does not include tabulations for foreclosures in the Grand Rapids–Wyoming, Michigan MSA; it substitutes the Charleston–North Charleston, South Carolina MSA.
2. Subprime loan pricing data were first made available in the 2004 HMDA data. Comparing extremes in our data, about 40 percent of all 2004 to 2006 loans were subprime in the Detroit–Livonia–Dearborn, MI Metro Division and the Miami–Miami Beach–Kendall, FL Metro Division, but less than 10 percent of loans were subprime in the San Francisco–San Mateo–Redwood City, CA Metro Division.
3. Asian Americans are also clustered in MSAs with either very high (e.g., coastal California, New York, and Hawaii) or remarkably affordable (e.g.,

- Texas) home prices, which somewhat forestalled the rise of subprime lending.
4. The error term is specified to be robust to heteroscedasticity using the “robust” option in Stata statistical software version 10.
  5. The share of lending made by CRA-covered banks is negative, as predicted, and is insignificant only in the presence of the subprime lending share (the two variables are significantly negatively correlated,  $r = -.31, p < .01$ ).
  6. Additionally, in the Hispanic segregation models, black segregation is omitted.
  7. To estimate the potential effects of Hispanic segregation, we undertook a separate analysis of the nation’s largest state, California, where Hispanics are numerous and there are far fewer blacks. In the analysis of California foreclosures at the city- and county-levels that control for a much more extensive array of loan underwriting factors, such as weighted loan-to-value ratios, average credit scores, and interest rates and matched city-level home price trends, we estimated a significant, robust effect of Hispanic segregation. Notwithstanding the incredible boom and bust in places like the Central Valley and Inland Empire, the residential segregation of Latinos matters a great deal to local differences in foreclosure trends. These results support our proposition about the primacy of segregation in structuring the foreclosure crisis and do not bode well for the housing market fortunes of Hispanics, who became the largest minority group during the housing boom.
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