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ANALYZING FORECLOSURES AMONG HIGH-INCOME BLACK/AFRICAN AMERICAN AND HISPANIC/LATINO BORROWERS IN PRINCE GEORGE'S COUNTY, MARYLAND

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Abstract

Although Prince George's County, Maryland, is the wealthiest Black/African American county in the nation, the national foreclosure crisis has had a profound effect on it. Using a merged data set consisting of Home Mortgage Disclosure Act (HMDA), U.S. Census, and Lender Processing Services (LPS) data and utilizing a logistic regression model, we analyzed the likelihood of foreclosure in Prince George's County in the Washington, DC metropolitan area. We found that the borrowers in Black/African American neighborhoods with high-income were 42% more likely and Hispanic/Latino neighborhoods with high-income were 159% more likely than the borrowers in non-Hispanic White neighborhoods to go into foreclosure, controlling for key demographic, socioeconomic, and financial variables.

Introduction

Borrowers and communities of color have been disproportionately affected by the national foreclosure crisis. For mortgages originated between 2004 and 2008, 5.1% of non-Hispanic White borrowers lost their homes to foreclosure, compared to 9.8% of Blacks/African Americans and 11.9% of Hispanics/Latinos (Bocian, Li, Reid, & Quercia, 2011). "The nation is not even halfway through the foreclosure crisis. Among mortgages made between

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2004 and 2008, 6.4% have ended in foreclosure, and an additional 8.3% are at immediate, serious risk.” (Bocian et al., 2011, p. 3).

Since the beginning of the national foreclosure crisis in January 2007, there has been a wave of studies focused on foreclosures at the national (e.g., Immergluck, 2009a, 2009b), regional (e.g., Laderman & Reid, 2008), and select metropolitan levels (e.g., Immergluck & Smith, 2005). The Washington, DC metropolitan area housing market has been understudied so far. While its housing market appeared to be relatively stable in terms of foreclosures in the first two quarters of 2007, it has been characterized by growing foreclosure rates since the third quarter of 2007 (McClain & Fowler, 2008).

While the vast majority of works has differentiated borrowers in terms of race and ethnicity, they have not differentiated among borrowers in terms of income. Although Canner and Bhutta (2008) and Kroszner (2009) have shown that middle- and high-income households have been disproportionately affected by the foreclosure crisis, few studies have investigated whether these findings are true for high-income households of color (see Anacker & Carr, 2011, for an exception). This study fills this gap.

In this study we conduct a logistic regression analysis based on borrowers in Prince George's County, Maryland, a suburban county in the Washington, DC metropolitan area. Prince George's County has been called the “wealthiest majority African American county in the country” (Pettit, Hendey, Kingsley, Cunningham, Comey, Getsinger, & Grosz, 2009, p. 32; see also Lacy, 2007). One might assume that high-income borrowers, regardless of color, would not be affected by foreclosure as much as low-income borrowers. Our results, however, show that high-income Black/African American and Hispanic/Latino borrowers in Prince George's County are disproportionately affected by the foreclosure crisis. This calls into question whether a hypothesized upward mobility into homeownership in the suburbs, in this case in Prince George's County, by high-income Blacks/African Americans is a sustainable one.

Prince George's County is a county where many home owning middle- and high-income Blacks/African Americans cluster. While this clustering phenomenon is currently rather unique at the county as opposed to the neighborhood level, it is something that is also occurring in an entire county of the Atlanta metropolitan statistical area. We expect that this phenomenon

will occur in some other counties in other metropolitan areas in the more distant future.

Table 1 compares and contrasts the racial and ethnic composition of Prince George's County, Maryland with two other areas in the Washington, DC metropolitan area: Washington, DC, and Montgomery County, Maryland. Table 1 illustrates that both Prince George's County and Washington, DC have relatively high proportions of Blacks/African Americans yet relatively low proportions of non-Hispanic Whites. Montgomery County, on the other hand, has relatively high proportions of non-Hispanic Whites and Asians. Table 1 also shows that Blacks/African Americans in Prince George's County have relatively high median household incomes as a group, although they are still slightly lower than household incomes of non-Hispanic Whites and Asians. By contrast, there are very large differences between median household incomes of Blacks/African Americans and non-Hispanic Whites as well as Asians in Washington, DC. Table 1 also shows that the homeownership rate of Blacks/African Americans in Prince George's County is relatively high (61.96%), much higher than the homeownership rate of this racial group in Montgomery County (46.49%) and Washington, DC (39.13%), and almost as high as Prince George's County's overall rate (65.06%). In Prince George's County, owner-occupied homes have a lower value (\$326,700) than in Washington, DC (\$440,500) and in Montgomery County (\$487,500), as illustrated in Table 1.

Very few foreclosure studies have concentrated on high-income Black/African American and Hispanic/Latino borrowers. In this study, we analyzed the factors that explain foreclosures and used Prince George's County as a case study. We used a merged data set consisting of publicly available Home Mortgage Disclosure Act (HMDA) data (2004–2007), publicly available 2000 U.S. Census data, and proprietary Lender Processing Services (LPS) data (January 2004 to December 2008) (more details discussed below). While some states have a nonjudicial foreclosure process (such as the District of Columbia), others have a judicial one. Maryland, however, operates a quasi-judicial foreclosure process in which lenders file the initial notice of foreclosure with the circuit court and the court ratifies the foreclosure sale (Pettit & Comey, 2012). Foreclosures typically take about

90 days in Maryland but only 60 days in the District of Columbia (United States Foreclosure Laws, 2012).

Table 1. Racial and Ethnic Proportions, Median Household Income by Race and Ethnicity, and Home Ownership Rate by Race and Ethnicity in Prince George's County, Maryland and Washington, DC (2005–2009)

Characteristic	Prince George's County, Maryland	Washington, DC	Montgomery County, Maryland
Proportion of:			
Blacks/African Americans	63.84%	55.17%	16.32%
Non-Hispanic Whites	24.80%	36.95%	60.22%
Hispanics/Latinos	12.36%	8.46%	15.06%
Asians	3.89%	2.96%	13.21%
Median household income			
Overall	\$82,847	\$67,006	\$110,865
For Blacks/African Americans ^a	\$70,294	\$34,304	\$62,898
For Non-Hispanic Whites	\$78,023	\$102,343	\$107,511
For Hispanics/Latinos	\$58,455	\$46,998	\$64,712
For Asians	\$76,146	\$71,768	\$99,639
Home ownership rate			
Overall	65.06%	45.10%	70.02%
For Blacks/African Americans	61.96%	39.13%	46.49%
For Non-Hispanic Whites	77.89%	56.57%	77.63%
For Hispanics/Latinos	55.39%	29.21%	60.89%
For Asians	65.76%	39.33%	73.19%
Median year structure built	1971	1949	1976
Median value (owner-occupied housing units)	\$326,700	\$440,500	\$487,500

^aMedian household income in the past twelve months (in 2009 inflation-adjusted dollars). Source: U.S. Bureau of the Census, American Community Survey (2005–2009).

We utilized a logistic regression model in order to analyze the likelihood of foreclosure in Prince George's County, Maryland, focusing on high-income Black/African American borrowers. What makes our study interesting is the fact that we controlled for (a) race/ethnicity, (b) credit risk, and (c) (proxied) debt.¹ As Berkovec, Canner, Gabriel, & Hannan (1996a,

1996b) pointed out, explaining foreclosure rates without accounting for race and ethnicity, credit risk, and debt is problematic. Any omitted variables will cause regression results to be biased and invalid (Hamilton, 1992). While HMDA data provide information on race and ethnicity, they do not provide any information on credit risk and debt (Myers & Chan, 1995). The LPS data set, however, provides information on credit risk through the FICO score variable and on (proxied) debt through the loan-to-value ratio, but not on race and ethnicity. Matching these data sets makes our study unique.

Below we provide a literature review on racial and ethnic wealth inequality and a discussion of the factors that can be attributed to the racial and ethnic wealth gap. A description of the data sets and methods used in this study are then described, followed by a discussion of the results and conclusions.

Literature Review

Housing typically constitutes a large proportion of a household's wealth. While the principal residence constitutes 32.8% of the portfolio of all households, it constitutes 65.1% of the portfolio of households that fall into the middle three quintiles (Wolff, 2010). Thus, "for most Americans homeownership constitutes a wealth-building strategy. For lower-income people, it is the only real wealth-building strategy" (Belsky & Retsinas, 2005, p. 9). While much work has been conducted on the factors that have influenced foreclosures, little work—somewhat surprisingly—has focused on the implications of the foreclosure crisis in terms of racial and ethnic overall wealth inequality, which has been severely impacted by the foreclosure crisis (see Kochhar, Fry, & Taylor, 2011, among others). In the next section we focus on this aspect.

Until about a decade ago, racial and ethnic wealth overall inequality had received little attention in the academic literature (Oliver & Shapiro, 2006; Keister & Moeller, 2000; Wolff, 1995). Research mostly focused on income ("flow"), which provides short-term financial security. However, wealth ("stock") provides for both short- and long-term financial security and household stability, and it better provides for educational, health, housing, and other needs of households and their children. Also, wealth lends social prestige, contributes to political power, and typically generates more wealth over time (Conley, 1999, 2001; Gittleman & Wolff, 2000; Keister & Moeller, 2000; Spilerman, 2000; Wolff, 1998).

The median overall wealth ratio gap has increased over the past few years. Based on the Survey of Income and Program Participation (SIPP), the non-Hispanic White to Black/African American median wealth ratio was 7 to 1 in 1995, 11 to 1 in 2004, and 19 to 1 in 2009. Similarly, the non-Hispanic White to Hispanic/Latino median wealth ratio was 7 to 1 in 1995, 7 to 1 in 2004, and 15 to 1 in 2009 (Kochhar et al., 2011). Most studies have focused on gaps in wealth levels (“stock”), with few concentrated on wealth accumulation (“flow”, i.e., saving, capital gains, and inheritances) (Gittleman & Wolff, 2000, 2004). Homeownership often translates into wealth accumulation, but when the national house price bubble burst in 2006, foreclosure more often translated into a wealth drain.

The racial and ethnic overall wealth gap can be attributed to several factors: first, policy factors; second, socioeconomic factors; third, differences in investment strategies; fourth, factors related to the housing market; and fifth, discrimination; among others (Haurin & Morrow-Jones, 2006). These factors will be discussed in detail below.

Many have claimed that public policies have influenced the overall wealth gap. For example, the Home Owners Loan Corporation (HOLC) and the Federal Housing Administration (FHA) have often favored non-Hispanic White homebuyers over homebuyers of color. HOLC standardized appraisals in the 1930s, factoring in the productive life of housing by including the present or predicted racial composition of each community. Communities that had a present or predicted future of high proportions of residents of color were placed in the lowest evaluation category. FHA adopted HOLC’s appraisal system, which implicitly favored the financing of newly built, single-family detached homes in communities with a high proportion of non-Hispanic Whites over financing existing properties (Conley, 1999, 2001; Crossney & Bartelt, 2005; Jackson, 1985; Oliver & Shapiro, 2006; Shapiro, 2004; Wiese, 2004).

Some have attributed such socioeconomic factors as inequalities in terms of income, education, age, labor market experience, occupation, family status, gender, the number of workers and the number of children in a household, the industrial sector of employment, and work stability to the racial and ethnic wealth gap (Gale & Scholz, 1994; Keister, 2004; Oliver & Shapiro, 2006). Others have suspected that it can be primarily attributed to intergenerational

transfers that are often used to buy homes, build businesses, or create other potentially wealth-generating investments (Blau & Graham, 1990; Choudhury, 2001/2002). Inherited wealth could contribute as little as 20% or as much as 80% to total wealth (Menchik & Jianakoplos, 1998). Others have suggested that parental wealth and income levels have a significant impact on the wealth levels of the current generation, although parental wealth and income levels do not explain the racial and ethnic wealth gap (Choudhury, 2001/2002; Conley, 2001). Yet others have suggested capital gains as an important factor in the increase of household wealth (Greenwood & Wolff, 1992).

In order to account for the racial and ethnic wealth gap, others have pointed out differences in investment strategies and rates of return, although the racial differences in savings rates are not significant once income is controlled (Gittleman & Wolff, 2004; for an alternative opinion see Altonji and Doraszelski, 2001). Some have pointed out that most Blacks/African Americans tend to invest more in consumer durables than do non-Hispanic Whites (Birnbaum & Weston, 1974; Brimmer, 1988; Terrell, 1971). Yet others have pointed out that many Blacks/African Americans have little knowledge of the stock and equity securities markets, which could be attributed to risk-aversion, a low amount of disposable income, and a lack of business and social contacts with stock brokers and others active in the financial sectors (Birnbaum & Weston, 1974). Nevertheless, interest in the stock market typically increases as incomes increase (Brimmer, 1988; Choudhury, 2001/2002; Hurst, Luoh, & Stafford, 1998).

Housing market-related factors might also be responsible for the racial and ethnic wealth gap. The racial and ethnic home ownership gap has been discussed extensively in the literature. Whereas non-Hispanic Whites currently have an ownership rate of 73.56%, Blacks/African Americans have an ownership rate of 45.93% (U.S. Bureau of the Census, 2011, based on the American Community Survey, 2005–2009). Oliver and Shapiro (2006) claim that home ownership is the single most important means of accumulating equity. Whereas portfolios of Blacks/African Americans have a relatively high proportion of home equity, they have a low proportion of other assets (Long & Caudill, 1992; Oliver & Shapiro, 2006). If home equity is a high proportion of a portfolio and if foreclosure rates among borrowers of color are disproportionately high, then wealth building will be very difficult for people of color.

Last but not least, many researchers have pointed out the impact of discrimination on the racial and ethnic wealth gap. The historical legacy thesis suggests that current net wealth differences are largely a result of discrimination in previous generations, whereas the contemporary dynamics thesis holds that current dynamics of institutional racism in the housing and credit markets are responsible for the gap (Conley, 1999, 2001). Also, many have argued that people of color have properties that are of lower or substandard quality (Long & Caudill, 1992; Rose, 1976), and that these properties, which have lower property values, are often located in distressed neighborhoods (Bianchi, Farley, & Spain, 1982; Menchik & Jianakoplos, 1997; Straszheim, 1974, among others). These and other issues have impacted the rate of home ownership, which is an important basis to build wealth, among people of color.

Data and Methods

In this study, we analyzed mortgages originated in the years 2004 through 2007 for Prince George's County, Maryland. As mentioned above, we merged data from three sources: HMDA data, U.S. Census data, and LPS data. The HMDA data set provides information about mortgages at the beginning of their lifecycle but not beyond their origination at the Census tract level. About 80% of originated mortgages in the mortgage market are reported to HMDA (Avery, Brevoort, & Canner, 2007). HMDA data are made publicly available without charge by the Federal Financial Institutions Examinations Council (FFIEC).

LPS data are proprietary mortgage performance data at the borrower level. This data set is compiled by mortgage servicing firms that collect mortgage payments for U.S. lenders and investors. For our particular data set, a total of 16 firms, including nine of the top ten servicers, provided monthly updated data. The national data set provides information on more than 100 million loans to LPS, including over 30 million loans that are currently active. A loan stays in the LPS data set until it is repaid, foreclosed, or completes a real-estate owned (REO) process. As nine of the top ten servicers provided data for this data set, it over-represents prime and near-prime (i.e., Alt-A) loans and under-represents subprime loans, one of the limitations of this data set. However, the LPS data set does not provide information on prime versus

near-prime loans (Immergluck, 2008b). The data subset chosen for this study contained first-lien loans² for owner-occupied residences with one to four units, which represents the vast majority of foreclosures, as 82% of foreclosures have been conducted on owner-occupied residences (Bocian, Li, & Ernst, 2010).

We matched HMDA and LPS data with the help of a geographic crosswalk file³ to account for the different units of observations—HMDA and Census data are provided at the Census tract level and LPS data are provided at the zip code level (Bocian, Ernst, & Li, 2006; Bocian et al., 2010, 2011; Laderman & Reid, 2008; Rodda, Schmidt, & Patrabansh, 2005; see also Coulton, Chan, Schramm, & Mikelbank, 2008 for an alternative matching approach). We employed a unique matching technique that linked loan origination data from HMDA to loan performance data from LPS which allowed us to match loans along loan characteristics, such as the year of origination, the geographic zip code, the loan amount, the loan purpose (purchase versus refinance), and the type of purchaser of the loan, that were common in both data sets.

We designed weights to account for the fact that our data set over-represented prime and near-prime loans and under-represented subprime loans. The weights were also to increase the representativeness of our results for two reasons: first, HMDA only covers about 80% of originated loans on the mortgage market (Avery et al., 2007); and second, LPS under-represents subprime mortgages on the market. Using the HMDA data as the benchmark for weights, we weighted each loan in the matched data set based on zip code, the reported yield rate spread, and race and ethnicity.

Our method is a regression analysis, a statistical technique that is concerned with explaining the value of the dependent variable by using information about the independent variables (Vogt, 2005). The basic form of our logistic regression is as follows:

probability of foreclosure = f (borrower characteristics,
mortgage characteristics, securitization characteristics,
neighborhood characteristics)

Probability of foreclosure was the dependent variable that was explained. In this case, we used logistic regression analysis, as probability of foreclosure had only two value outcomes: “0” (which stood for the absence of

foreclosure) and “1” (which stood for the presence of foreclosure or the REO status in an observation). The independent variables are described in Table 2.

Table 2. Description of Variables from Matched LPS/HMDA Data Set Used in Study

Variables	Description	Source
Dependent variable [household level]		
Foreclosure [dummy variable]	1: a loan that is in foreclosure (presale or post-sale) or is real estate owned (REO) 0: otherwise	LPS (2004–2008)
Independent variables:		
Borrower characteristics [individual level]		
Borrower income	Borrower income	HMDA (2004–2007)
Low FICO score (FICO score <640)	FICO score <640	LPS (2004–2008)
Medium FICO score (640 ≤ FICO score <720)	640 ≤ FICO score <720	LPS (2004–2008)
High FICO score (FICO score ≥720)	FICO score ≥720	LPS (2004–2008)
Non-Hispanic White	Non-Hispanic White	HMDA (2004–2007)
Black/African American	Black/African American	HMDA (2004–2007)
Hispanic/Latino	Hispanic or Latino	HMDA (2004–2007)
Mortgage characteristics [mortgage level]		
Interest-only mortgage [dummy variable]	Mortgage is interest only	LPS (2004–2008)
Balloon mortgage [dummy variable]	Mortgage has balloon term	LPS (2004–2008)
Adjustable rate mortgage [dummy variable]	Mortgage has adjustable rate	LPS (2004–2008)
Refinance mortgage [dummy variable]	Mortgage is used for refinancing	LPS (2004–2008)
Prepayment penalty [dummy variable]	Mortgage has prepayment penalty	LPS (2004–2008)
Payment-to-income ratio	Ratio of mortgage payment to borrower's income (PTI)	LPS (2004–2008)
Loan-to-value ratio	Ratio of mortgage amount to house value (LTV)	LPS (2004–2008)
Securitization characteristics [mortgage level]		
Government-sponsored enterprise (GSE) [dummy variable]	Mortgage purchased by Fannie Mae, Freddie Mae, or Ginnie Mae	LPS (2004–2008)
Private [dummy variable]	Mortgage purchased by private market	LPS (2004–2008)
None/Portfolio [dummy variable]	Mortgage in lender's portfolio	LPS (2004–2008)

Table 2 (continued). Description of Variables from Matched LPS/HMDA Data Set Used in Study

Variables	Description	Source
Neighborhood characteristics [Census tract or zip code level]		
Home Price Index (HPI) [county level]	House price change between previous year and three years prior to the origination of the mortgage	MRIS data set (2000–recent)
Median year structure built [Census tract level]	Median year housing units built	
Proportion owner occupied [Census tract level]	Proportion of housing units occupied by home owner	U.S. Census (2000)
Neighborhood of color [zip code level; dummy variable]	1: a zip code that has a proportion of people of color of 50% or more 0: otherwise	U.S. Census (2000)
Low-income neighborhood [zip code level; dummy variable]	Median family income less than 50% of area median income	U.S. Census (2000)
Moderate-income neighborhood [zip code level; dummy variable]	Median family income more than 50% but less than 80% of area median income	U.S. Census (2000)
Middle-income neighborhood [zip code level; dummy variable]	Median family income more than 80% but less than 120% of area median income	U.S. Census (2000)
High-income neighborhood [zip code level; dummy variable]	Median family income more than 120% of area median income	U.S. Census (2000)
County [dummy variable]	County or independent city	U.S. Census (2000)

The HMDA data set provided information on the race and ethnicity of each borrower. According to the literature, non-Hispanic Whites face lower odds of foreclosure compared with borrowers who are Black/African American and Hispanic/Latino, who face odds of foreclosure that are higher than 1 (Gerardi, Shapiro, & Willen, 2007; Immergluck & Smith, 2005; Laderman & Reid, 2009; Lauria & Baxter, 1999). We expected that our results would corroborate the literature.

The Census data set provided information about several housing and socioeconomic characteristics at the neighborhood level. Examples included whether the neighborhood had a proportion of 50% or more minorities or it had an income that was low (i.e., a median income less than 50% of the area median income), moderate (i.e., a median income more than 50% but less than

80% of the area median income), middle (i.e., a median income more than 80% but less than 120% of the area median income), or high (i.e., a median income more than 120% of the area median income). Other examples were the median year the housing unit was built and the proportion of homes that were owner-occupied. We expected higher odds of foreclosure for the variables Median Year Built, Neighborhood of Color, Low Income Neighborhood, and Middle Income Neighborhood (see Laderman & Reid, 2009). We were unsure about the odds of foreclosure for the variable Proportion Owner Occupied. While many homeowners are assumed to have resources to weather a financial emergency, the foreclosure crisis appears to have disproportionately affected neighborhoods with high ownership rates more than others (Laderman & Reid, 2009).

The LPS data set had information about select (a) borrower characteristics, (b) mortgage characteristics, and (c) securitization characteristics. In terms of borrower characteristics, there was information about borrowers' incomes and Fair Isaac and Company (FICO) scores. We expected that the variable Borrower's Income would have odds lower than 1. We also expected that the variable Low FICO Score (i.e., a FICO score below 640 points) would have higher odds of foreclosure and that the variable High FICO Score (i.e., a FICO score above 720 points) would have lower odds of foreclosure (Laderman & Reid, 2009).

With respect to mortgage characteristics, LPS provided information on select aspects of the mortgage terms, including the following: (1) whether the mortgage was a full documentation mortgage (dummy variable); (2) whether the mortgage was an interest-only mortgage (dummy variable); (3) whether the mortgage was a balloon mortgage (dummy variable); (4) whether the mortgage was an adjustable-rate mortgage (dummy variable); (5) whether the mortgage was a refinance mortgage (dummy variable); (6) whether the mortgage had a prepayment penalty (dummy variable); (7) the payment-to-income ratio; and (8) the loan-to-value ratio. Based on the literature, we expected that these variables would have odds higher than 1 (Ding, Quercia, & Ratcliffe, 2009; Gruenstein & Herbert, 2000; Scheessele, 2002; Schloemer, Li, Ernst, & Keest, 2006).

With regard to securitization characteristics, we had information on the following: (a) whether the mortgage was purchased on the secondary

mortgage market by a government-sponsored enterprise (GSE, Fannie Mae, Freddie Mac, or Ginnie Mae), (b) whether the mortgage was purchased by an actor on the private market, or (c) whether the mortgage remained in the lender's portfolio. We expected that the odds of the GSE variable would be lower, confirming the literature (Immergluck & Smith, 2005). We also expected that the odds of the Private Securitization variable would be higher than 1, corroborated by the literature (Immergluck, 2009a). We were unsure about the odds of variable No Securitization/Portfolio. Odds higher than 1 could indicate a bad credit risk (i.e., that the lender was unable to sell this mortgage on the secondary mortgage market), while odds lower than 1 could indicate a good credit risk (e.g., that the lender preferred to keep a particular mortgage in its portfolio).

In addition to the variables based on the HMDA, the 2000 Census, and the LPS data sets, we created the variable Home Price Index (HPI), based on the Metropolitan Regional Information Statistics (MRIS) data set, to account for the fact that the foreclosure crisis was driven by the house price bubble (Mayer & Pence, 2008). Our HPI measured the annual house price appreciation by county, based on the change in median home sales price in the area. The HPI was calculated as follows: the HPI of 2004 was calculated as the home sales price in 2003 for the county divided by the home sales price in 2001 for the county. We argue that the HPI controls for any systematic variation in the foreclosure rate by year and county of origination and expected that the odds in our regression analysis would be lower than 1, based on the literature (Immergluck, 2008a; Schloemer et al., 2006; see also Laderman & Reid, 2009). We also calculated the capitalization rate (i.e., the ratio of the tract's annualized median rent divided by the median house value) (see Laderman & Reid, 2008).

Results

Descriptive Statistics

The descriptive statistics, which do not control for other factors as a regression typically does, are provided in Tables 3 and 4. Table 3 differentiates between loans not in foreclosure and loans in foreclosure and provides the

number and the proportion for each category. Table 4 provides the mean characteristics for loans not in foreclosure versus loans in foreclosure.

Table 3. Descriptive Statistics for Loans “Not in” versus “In” Foreclosure

Variable	Not in foreclosure		In foreclosure		Total
	Number	Proportion	Number	Proportion	
Borrower characteristics					
Income	[continuous variable]	[continuous variable]	[continuous variable]	[continuous variable]	[continuous variable]
Low FICO score (FICO score <640)	61,471	95.07%	3,186	4.93%	64,657
Medium FICO score (640 ≤ FICO score <720)	52,576	96.44%	1,939	3.56%	54,515
High FICO score (FICO score ≥720)	33,264	98.35%	557	1.65%	33,821
Non-Hispanic White	19,097	98.09%	372	1.91%	19,469
Black/African American	112,320	96.38%	4,219	3.62%	116,539
Hispanic/Latino	15,894	93.58%	1,091	6.42%	16,985
Mortgage characteristics					
Interest-only mortgage	24,848	94.86%	1,346	5.14%	26,194
Balloon mortgage	3,317	83.43%	659	16.57%	3,976
High cost	42,449	91.98%	3,700	8.02%	46,148
Adjustable rate mortgage	90,437	97.93%	1,911	2.07%	92,348
Refinance mortgage	86,893	97.96%	1,807	2.04%	88,700
Full documentation	65,158	96.87%	2,108	3.13%	67,266
Prepayment penalty	14,698	96.23%	576	3.77%	15,274
Payment-to-income ratio	[continuous variable]	[continuous variable]	[continuous variable]	[continuous variable]	[continuous variable]
Loan-to-value ratio	[continuous variable]	[continuous variable]	[continuous variable]	[continuous variable]	[continuous variable]
Origination in 2004	37,319	99.27%	273	0.73%	37,592
Origination in 2005	46,268	97.18%	1,341	2.82%	47,609
Origination in 2006	38,720	92.09%	3,326	7.91%	42,047
Origination in 2007	25,003	97.12%	742	2.88%	25,745
Securitization characteristics					
Government-sponsored enterprise (GSE)	79,334	98.79%	972	1.21%	80,306
Private	43,575	92.05%	3,762	7.95%	47,338
None/Portfolio	22,376	95.99%	936	4.01%	23,311
Neighborhood characteristics					
Home Price Index (HPI)	[continuous variable]	[continuous variable]	[continuous variable]	[continuous variable]	[continuous variable]

Table 3 (continued). Descriptive Statistics for Loans “Not in” versus “In” Foreclosure

Variable	Not in foreclosure		In foreclosure		Total
	Number	Proportion	Number	Proportion	
Median year built	[continuous variable]	[continuous variable]	[continuous variable]	[continuous variable]	[continuous variable]
Proportion owner-occupied	[continuous variable]	[continuous variable]	[continuous variable]	[continuous variable]	[continuous variable]
Neighborhood of color	127,135	96.20%	5,016	3.80%	132,151
Low-income neighborhood	1,393	96.03%	58	3.97%	1,451
Moderate-income neighborhood	39,091	96.39%	1,464	3.61%	40,555
Middle-income neighborhood	81,058	96.40%	3,030	3.60%	84,087
High-income neighborhood	25,768	95.80%	1,131	4.21%	26,899
Total weighted observations	147,310	96.29%	5,682	3.71%	152,993

Table 4. Mean Characteristics of Loans “Not in” Versus “In” Foreclosure

Variable	Not in foreclosure	In foreclosure
Borrower characteristics		
Income	\$84,959	\$99,791
FICO score	672.89	644.85
Mortgage characteristics		
Payment-to-income (PTI) ratio	0.28	0.34
Loan-to-value (LTV) ratio	78.7	98.37
Capitalization rate	0.73	0.72
Neighborhood characteristics		
Home Price Index (HPI)	145.42	153.65
Median year structure built	1974	1973
Proportion owner-occupied	65.66	66.16

With regard to borrower characteristics, results based on our descriptive statistics showed that a higher proportion of borrowers with a low FICO score (4.93%) was affected by foreclosures than borrowers with a medium

(3.56%) or high FICO score (1.65%) (see Table 3). The results also showed that 3.62% of Blacks/African Americans and 6.42% of Hispanics/Latinos were in foreclosure. These proportions are consistent with disproportionately higher rates for borrowers of color as discussed in the literature (Anacker & Carr, 2011; Bocian et al., 2010, 2011; Gerardi et al., 2007; Immergluck & Smith, 2005; Lauria & Baxter, 1999).

Those borrowers who had mortgages that had not foreclosed had mean incomes of \$84,959 and a FICO score of 672, while those who had mortgages that had foreclosed had mean incomes of \$99,791 but a FICO score of 644 (see Table 4). These findings show that there is not necessarily a positive correlation between relatively high incomes and high FICO scores (which do not factor in income) (Anonymous, 2005).

In terms of mortgage characteristics, we found that a disproportionately high proportion of exotic mortgages go into foreclosure (16.57% of balloon mortgages, 8.02% of high cost mortgages, 5.14% of interest-only mortgages, and 3.77% of prepayment penalty mortgages). We also found that a high proportion of foreclosed mortgages were unsustainable i.e., they had a high payment-to-income (PTI) ratio (34% versus 28%) and a very high loan-to-value (LTV) ratio (98.37% versus 78.7%), confirming the literature (Anacker & Carr, 2011; Laderman & Reid, 2008).

With regard to securitization characteristics, our results showed that 7.95% of mortgages sold on the private market went into foreclosure, followed by loans that remained in the lender's portfolio (4.01%) and mortgages sold to government-sponsored enterprises (1.21%). These findings are consistent with findings by others (Agarwal, Chang, & Yavas, 2010).

In terms of neighborhood characteristics, we found that the high-income neighborhoods in Prince George's County that were disproportionately affected by foreclosures (4.21%) are not currently discussed in the literature. This relatively high proportion is followed by low-income (3.97%), moderate-income (3.61%), and middle-income neighborhoods (3.60%). Table 5 also shows that foreclosed mortgages had a larger Home Price Index (153.65) than mortgages that were not foreclosed (145.42), illustrating the buying and lending hype in the mid-2000s discussed extensively in the literature, including Prince George's County.

Logistic Regression Analysis

Logistic regression analyses are used whenever the nature of the dependent variable is dichotomous (i.e., it can either take on a value “1” or “0”). In our case, value “1” stood for a mortgage in foreclosure and value “0” stood for a mortgage not in foreclosure from 2004 to 2008. Results of this particular regression are presented as odds ratios (i.e., the odds of a borrower or a group facing foreclosure divided by the odds of a reference group). Odds ratios include the magnitude in form of the value of the ratio. In general, an odds ratio of 1.0 indicates that there is no disparity between the borrower or a group and the reference group, a value above 1.0 indicates higher odds, and a value below 1.0 indicates lower odds. For example, if the odds ratio between Black/African American borrowers and non-Hispanic White borrowers is 1.3, it means that the odds are 30% greater for Blacks/African Americans than for non-Hispanic White borrowers. If the odds ratio between Asian borrowers and non-Hispanic White borrowers is 0.7, then the odds are 30% lower for Asian borrowers (Bocian et al., 2006). Odds ratios also include significance, which shows whether the observed characteristics have occurred by chance or sampling error.

We built seven regression models, as presented in Table 5. By increasing the number of independent variables from one model to the next, we attempted to address alternative explanations and correct for possible methodological shortcomings. More specifically, we present the following models:

- Model 1: select borrower characteristics (borrower income and race/ethnicity);
- Model 2: all borrower characteristics;
- Model 3: all borrower characteristics and select mortgage characteristics (interest-only mortgage, balloon mortgage, adjustable rate mortgage, refinance mortgage, prepayment penalty, payment-to-income ratio, loan-to-value ratio);
- Model 4: all borrower characteristics, all mortgage characteristics, and county dummies;
- Model 5: all borrower characteristics, all mortgage characteristics, all county dummies, and neighborhood characteristics;
- Model 6: all borrower characteristics, all mortgage characteristics, all county dummies, neighborhood characteristics, and all securitization characteristics;
- Model 7: all borrower and mortgage characteristics, all county dummies, all neighborhood and securitization characteristics, and two interaction terms.

Table 5. Odds Ratios and Coefficient Estimates of Logistic Regression Models

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Independent variable	Odds ratio Coefficient	Odds ratio Coefficient	Odds ratio Coefficient	Odds ratio Coefficient	Odds ratio Coefficient	Odds ratio Coefficient	Odds ratio Coefficient
Borrower characteristics							
Income	1.363*** 0.577***	1.409*** 0.585***	1.404*** 0.584***	1.26*** 0.558***	1.168*** 0.539***	1.115*** 0.527***	1.056*** 0.514***
Low FICO score	---	3.264*** 0.765***	1.846*** 0.649***	1.81*** 0.644***	1.825*** 0.0646***	1.692*** 0.0629***	1.661*** 0.624***
Medium FICO score ^a	---	2.108*** 0.678***	1.287*** 0.563***	1.213*** 0.0548***	1.215*** 0.549***	1.187*** 0.543***	1.174*** 0.540***
Black/African American	1.995*** 0.666***	1.719*** 0.632***	0.939 0.484	0.926 0.481	0.919 0.479	0.89+ 0.471+	0.667+ 0.400+
Hispanic/Latino	3.716*** 0.788***	3.446*** 0.775***	1.465*** 0.594***	1.378*** 0.579***	1.437*** 0.590***	1.356*** 0.576***	0.572*** 0.364***
Mortgage characteristics							
Interest-only mortgage	---	---	1.065 0.516	0.933+ 0.483+	0.926* 0.481*	0.898*** 0.473***	0.902*** 0.474***
Balloon mortgage	---	---	2.154*** 0.683***	1.474*** 0.596***	1.46*** 0.593***	1.344*** 0.573***	1.356*** 0.576***
High-cost mortgage	---	---	2.418*** 0.707***	2.045*** 0.672***	2.102*** 0.678***	1.703*** 0.630***	1.675*** 0.626***
Full documentation	---	---	0.798*** 0.444***	0.817*** 0.450***	0.837*** 0.456***	0.797*** 0.444***	0.805*** 0.446***
Adjustable rate mortgage	---	---	1.568*** 0.611***	1.565*** 0.610***	1.534*** 0.605***	1.265*** 0.558***	1.252*** 0.556***
Refinance mortgage	---	---	0.644*** 0.244***	0.589*** 0.371***	0.573*** 0.364***	0.563*** 0.360***	0.571*** 0.363***
Prepayment penalty	---	---	0.516*** 0.340***	0.574*** 0.365***	0.577*** 0.366***	0.531*** 0.347***	0.533*** 0.348***
Payment-to-income ratio	---	---	1.666*** 0.625***	1.547*** 0.607***	1.526*** 0.604***	1.501*** 0.600***	1.545*** 0.607***
Loan-to-value ratio	---	---	2.518*** 0.716***	2.459*** 0.711***	2.454*** 0.710***	2.388*** 0.705***	2.372*** 0.703***
Origination in 2005 (vs. 2004)	---	---	---	2.531*** 0.717***	2.564*** 0.719***	2.326*** 0.699***	2.232*** 0.691***
Origination in 2006 (vs. 2004)	---	---	---	6.658*** 0.869***	6.875*** 0.873***	6.064*** 0.858***	5.684*** 0.850***
Origination in 2007 (vs. 2004)	---	---	---	3.294*** 0.767***	3.385*** 0.772***	3.289*** 0.767***	3.082*** 0.755***

Table 5 (continued). Odds Ratios and Coefficient Estimates of Logistic Regression Models

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Independent variable	Odds ratio Coefficient	Odds ratio Coefficient	Odds ratio Coefficient	Odds ratio Coefficient	Odds ratio Coefficient	Odds ratio Coefficient	Odds ratio Coefficient
Securitization characteristics							
Private	---	---	---	---	---	2.221*** 0.690***	2.177*** 0.685***
None/ Portfolio ^b	---	---	---	---	---	1.778*** 0.640***	1.768*** 0.639***
Neighborhood characteristics							
Home Price Index (HPI)	---	---	---	---	0.974*** 0.493***	0.964*** 0.491***	0.961* 0.325*
Capitalization rate	---	---	---	---	0.889*** 0.471***	0.897*** 0.473***	0.901*** 0.474***
Median year structure built	---	---	---	---	0.995+ 0.499+	0.996 0.499	0.996 0.499
Proportion owner-occupied	---	---	---	---	1.093*** 0.522***	1.085*** 0.520***	1.077*** 0.519***
Neighborhood of color	---	---	---	---	1.095+ 0.523+	1.095+ 0.523+	1.105* 0.525*
Low-income neighborhood	---	---	---	---	0.713* 0.416*	0.698+ 0.411+	0.764+ 0.433+
Moderate-income neighborhood	---	---	---	---	0.692*** 0.409***	0.73*** 0.422***	0.787*** 0.440***
Middle-income neighborhood ^c	---	---	---	---	0.846*** 0.458***	0.871*** 0.466***	0.884*** 0.469***
Interaction terms							
Black/African American neighborhood * high-income neighborhood	---	---	---	---	---	---	1.42*** 0.587***
Hispanic/Latino neighborhood * high-income neighborhood	---	---	---	---	---	---	2.595*** 0.722***

^aBase case: high FICO score

^bBase case: government-sponsored enterprise (GSE)

^cBase case: higher income neighborhood

+p < .10. *p < .05. **p < .01. ***p < .001

Although Table 5 presents seven models, we will only discuss Model 7 for the sake of simplicity and brevity. The vast majority of the odds ratio estimates were statistically significant at the .1% level. Model 7 had 24 variables that were statistically significant at the .1% level, two variables that were significant at the 5% level, two variables that were significant at the 10% level, and one variable that was not significant. Both interaction terms were significant at the .1% level and had large coefficients, indicating that high-income Black/African American and high-income Hispanic/Latino neighborhoods were disproportionately affected by foreclosures.

Many but not all of our results were consistent with nearly all of the findings from the body of literature devoted to assessing the subprime lending boom and its subsequent collapse. With regard to borrower characteristics, we found that the odds ratio estimate for borrower income was slightly higher than 1, inconsistent with our expectations. We also found that borrowers with a low or medium FICO score and borrowers of color faced higher odds of foreclosure, confirmed by the literature (Gerardi et al., 2007; Immergluck & Smith, 2005; Lauria & Baxter, 1999). Surprisingly, the variables Black/African American Borrower and Hispanic/Latino Borrower had odds of foreclosure lower than 1, inconsistent with the literature, but the interaction terms Black/African American Neighborhood * High-Income Neighborhood and Hispanic/Latino Neighborhood * High-Income Neighborhood were significant at the .1% level and had relatively high odds. Whereas Black/African American borrowers in high income neighborhoods were 42% more likely to be in foreclosure, Hispanic/Latino borrowers in high income neighborhoods were 159% more likely to be in foreclosure. To our knowledge, little of the literature has focused on borrowers of color who live in high income neighborhoods, utilizing interaction terms that encompass borrower race and ethnicity and neighborhood income.

In terms of mortgage characteristics, many exotic mortgage features translated into higher odds of foreclosure. In our case, the variables Balloon Mortgage, High-Cost Mortgage, Adjustable Rate Mortgage, Payment-to-Income Ratio, and Loan-to-Value Ratio were significant at the .1% level and had odds higher than 1. The variable Full Documentation was also significant at the .1% level and had odds lower than 1, consistent with the literature (Laderman & Reid, 2009). Surprisingly, the variables Interest-Only Mortgage,

Refinance Mortgage, and Prepayment Penalty were significant at the .1% level but had, surprisingly, odds lower than 1. This finding raises the question of whether only certain mortgage products were sold in a certain area while others were not. Future research might provide an answer to this question. The odds ratio estimates of the origination variables are worth noting: Borrowers who took out a mortgage in 2006, the peak of the national house price bubble (Shiller, 2008), were 468% more likely to face foreclosure, followed by those who took out mortgages in 2007 (208% more likely), and those who took out mortgages in 2005 (123% more likely). These findings illustrated that mortgage lending during these years was often not sustainable.

With regard to securitization characteristics, our findings showed that privately securitized mortgages and mortgages that remained in lenders' portfolios had higher odds ratios of foreclosure, consistent with the literature (Immergluck, 2009b; Immergluck & Smith, 2005). In terms of neighborhood characteristics, the odds ratio estimates were higher for owner-occupied neighborhoods and neighborhoods of color, consistent with the literature (Anacker & Carr 2011, among others). However, they were surprisingly lower for the variables HPI and Capitalization Rate, somewhat contradicting our findings and interpretations for the origination years. Also, the odds ratio estimates were lower for any neighborhood that had an income below 120% of the Area Median Income (AMI), which has not been discussed much in the literature (see Laderman & Reid, 2009 for an exception).

Conclusion

Our results indicate that high-income Black/African American borrowers and Hispanic/Latino borrowers in Prince George's County, Maryland were more likely to go into foreclosure, controlling for key financial variables. We thus conclude that in the case of Prince George's County, the foreclosure crisis has devastated many previously upwardly mobile Black/African American and Hispanic/Latino borrowers and as a consequence many communities of color, such as Prince George's County.

We conclude that income—not even high income—does not necessarily offer protection from foreclosure (see Institute on Race and Poverty, 2009, for findings on the connection between high-income borrowers

and subprime loans). Based on our findings for Prince George's County, we showed that in this particular county the foreclosure crisis was not driven by poor borrowers with unaffordable loans (as discussed by Lucy, 2010), but by a mix of harmful exotic mortgages to Alt-A and subprime borrowers of color with relatively high incomes who went into foreclosure. Our study focused on a single county in the Washington, DC metropolitan area between the years 2004 to 2008. More analyses for the years beyond 2008 and for counties with similar racial, ethnic, and socioeconomic composition should be undertaken in the near future to see whether our results are generalizable.

The racial and ethnic wealth gap has widened dramatically since the national house price collapse in 2006, the economic recession from December 2007 to June 2009, and the high unemployment and underemployment rates of recent years, especially among people of color (Kochhar et al., 2011). Given the estimated loss of wealth due to the foreclosure crisis among communities of color (Bocian et al., 2010), the racial and ethnic wealth gap probably will not narrow significantly in the near future.

Endnotes

¹ We utilized the loan-to-value (LTV) ratio, wishing for the back-end debt-to-income ratio (DTI) which is unfortunately not populated in the LPS data set.

² The LPS data set also contains information on second and third lien mortgages on a property. Future studies will analyze these mortgages.

³ A geographic crosswalk file provides zip codes that correspond with Census tracts.

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