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Neighborhood Patterns of High-Cost Lending: The Case of Atlanta

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Abstract

Concentration of subprime lending in certain neighborhoods can cause adverse consequences for borrowers and communities. This paper presents an empirical analysis of how race and ethnicity, income levels, and other neighborhood characteristics explain the distribution of higher-priced mortgages in Atlanta. Higher concentrations of higher-priced mortgages are found in low-income neighborhoods and predominantly African American

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neighborhoods. Additionally, individual African American and Hispanic borrowers are more likely to receive higher-priced loans regardless of the profile of the neighborhoods in which they live. We examine the role of the Federal Housing Administration (FHA) in those markets; results suggest that FHA and higher-priced lending are complementary products that serve many of the same neighborhoods where the prime conventional share is relatively low.

Keywords: *high-price, neighborhood, subprime*, Home Mortgage Disclosure Act, *HMDA, Atlanta*

I. Background and Literature Review

Subprime lending[1] practices, characterized by high rates and fee structures geared toward less creditworthy customers, increased dramatically between the mid-1990s and 2007. This rise stemmed largely from changes in the structure of the mortgage banking industry and the adoption of automated underwriting, risk-based pricing, and securitization by mortgage practitioners (Chomsisengphet & Pennington-Cross, 2006). The subprime surge was rapid and wide: between 1994 and 2006, the subprime share of all mortgage originations more than quadrupled, from 4.5 percent to 20.1 percent; and subprime loan originations increased more than seventeen fold, from $35 billion to about $600 billion. The surge was largely fueled by securitization: over the same period, the volume of securitized subprime mortgage loans increased over forty-four-fold, from $11 billion to more than $483 billion in 2006, accounting for more than 80 percent of all subprime lending (Inside Mortgage Finance, 2007).

Beginning in late 2006, the chickens came home to roost. A rapid rise in subprime mortgage delinquency and foreclosure caused a so-called meltdown of the subprime market. In the third quarter of 2007, the subprime delinquency rate jumped to 16.3 percent from 12.6 percent a year earlier. Although subprime mortgages represent only 13 percent of the outstanding loans, they represent 55 percent of the foreclosures started during the third quarter (Mortgage Bankers Association, 2007). The total delinquency rate, the rate of foreclosure starts, and the percentage of loans in the process of foreclosure are all at the highest recorded levels. The Center for Responsible Lending projects that 19.4 percent of subprime loans issued during 2005 and 2006 will end in foreclosure, and 2.2 million households in the subprime market either have lost or will lose their homes over the next several years (Schloemer, Li, Ernst, & Keest, 2006).

Subprime lenders emphasize that they generate homeownership opportunities for individuals who do not qualify for conventional mortgages or who lack access to traditional lending institutions because of redlining practices. Ending redlining practices by prime lenders was, in fact, an original motivation for the 1977 Community Reinvestment Act (CRA): "Congress intended the CRA to end the banking practice known as redlining, by which banks would refuse to lend in certain neighborhoods, especially older and inner-city neighborhoods and neighborhoods whose residents were predominantly minority or low-income" (Marsico, 2004, p. 718).

However, the concentration of subprime lending in certain neighborhoods and among certain racial/ethnic groups has led to concerns among policy makers and researchers about the soundness of subprime lending procedures (Apgar & Herbert, 2005; Chomsisengphet & Pennington-Cross, 2006). Concentrations of subprime lending may cause adverse consequences for borrowers and communities because of the high default rates, reduced access to prime lending, and higher costs that accompany subprime mortgages. Moreover, subprime lending appears targeted to much the same neighborhoods at risk of redlining by prime lenders. This reverse redlining involves "subprime lenders purposefully marketing to African-American communities . . . at a higher cost and with less favorable conditions."[2]

These concerns are now playing out as subprime foreclosures mount and threaten the wealth of homeowners and their neighbors.[3] As of the end of 2007, the national homeownership rate had fallen more than a percentage point to 67.8 percent from its 2004 peak of 69.2 percent.

One proposed response to the foreclosure crisis is to expand the role of FHA-insured mortgages. With its small down payment requirement and flexible underwriting standards, FHA was once an important financing tool for increasing and sustaining U.S. homeownership. But as subprime lending exploded after 1994, especially after the early 2000s, FHA market share shrank from a high of 11.8 percent of total originations in 1994 to just 1.5 percent in 2006 (Inside Mortgage Finance, 2007). In August 2007, FHA launched a new FHASecure product to make it easier for some borrowers to refinance out of certain subprime and adjustable rate mortgages (U.S. Department of Housing and Urban Development [HUD], 2007). A recently approved economic stimulus package will increase the agency's loan limits. Even more far-reaching proposals have been put forth in the name of "FHA Modernization," including elimination of the standard 3 percent down payment requirement, an increase in loan terms to forty years, and introduction of a risk-based pricing scheme (Federal Housing Administration, 2007).

This article uses the case of Atlanta to better understand the extent to which high-cost lenders target particular neighborhoods and borrowers, as well as the role of FHA in those same markets.

A. Neighborhood Patterns of Subprime Lending

Prior research on subprime lending patterns confirms that subprime lending occurs disproportionately among minority borrowers or within neighborhoods where minority and low-income households predominate. For example, HUD and the U.S. Department of the Treasury (2000) present evidence that, nationally, subprime loans are on average three times more frequent in low-income neighborhoods than in upper-income neighborhoods and five times more frequent in predominantly black neighborhoods than in predominantly white neighborhoods. Several empirical studies in certain Metropolitan Statistical Areas (MSAs) provide further evidence of the geographic concentration of subprime mortgages in census tracts[4] with high concentrations of low-income and minority households: Scheessele

(2002) examined twenty-seven different MSAs; the National Community Reinvestment Coalition (2003) used ten major MSAs; Calem, Hershaff, and Wachter (2004) looked at Philadelphia and Chicago; Calem, Gillen, and Wachter (2004) examined refinance lending in seven MSAs; and Apgar and Herbert (2005) studied lending patterns in Dallas.

Our specific area of study, the Atlanta market, has itself been the subject of previous research into mortgage lending patterns. A series of Pulitzer-prize winning articles in the *Atlanta Journal-Constitution* in 1988 drew national attention to disparate lending by the city's depository institutions. Those depositories made six times more loans per owner-occupied housing unit in predominantly white census tracts than in African American tracts (Dedman, 1988). A decade later, these lending patterns were found to be little improved despite far-reaching changes in the CRA and fair housing regulations and the creation of more expansive secondary-market guidelines for affordable mortgages. In the intervening years, independent mortgage companies began reporting Home Mortgage Disclosure Act (HMDA) data, which revealed that mortgage bankers demonstrated less race-based disparities than city depositories in providing mortgage finance to predominantly minority census tracts (Wyly & Holloway, 1999). A HUD study used 1998 HMDA data to reveal the other edge of this two-edged sword: the concentration of subprime loans in low-income and minority neighborhoods. Indeed, subprime refinance loans held seven times the market share in very low-income neighborhoods as compared to upper-income neighborhoods and nearly five times the market share in black neighborhoods as compared to white neighborhoods in Atlanta (HUD, 2000).

B. HMDA and New Data on High-Cost Lending

The HMDA data[5] discussed above are used in most neighborhood studies of subprime lending because they identify the lending institution; the type, purpose, and amount of the loan; the action taken toward the application; the property census tract; and the applicant or borrower's income, gender, and race or ethnicity. However, prior to 2004, HMDA data did not include pricing information. To analyze trends in subprime lending using pre-2004 HMDA data, therefore, HUD identified predominantly subprime lenders (those for which over half of their originations were subprime). Still, this approach proved insufficient because it treated all loans originated by the predominantly subprime lenders as subprime loans and failed to include any subprime loans originated by lenders not on the HUD list.

In 2004, for the first time, HMDA data began to differentiate those loans that were higher-priced. The 2004 data thus allowed us to overcome some data deficiencies in previous empirical studies and more precisely investigate patterns of high-cost lending. New HMDA requirements[6] direct lenders to report the spread between a loan's annual percentage rate (APR) and the yield on Treasury securities of comparable maturity (APR spread) for first-lien originations in which the APR spread is at least 3 percentage points.[7] In this paper, we refer to those rate-reported first-lien loans as *higher-priced*

loans. Freddie Mac estimates that, in 2004, a typical APR spread for "A" quality, conforming, conventional mortgages (which we will refer to in this paper as *prime*) was between 1 and 1.25 percentage points.[8] This implies that a first-lien mortgage designated as higher-priced would have an APR 1.75 to 2 percentage points above that of a prime mortgage.[9]

Our focus on higher-priced loans adds significantly to previous studies because these loans constitute one of the most negative aspects of subprime lending. This study focuses on the proportion of subprime loans that carry the tangible higher-priced burden. We specifically analyzed a single metropolitan area, Atlanta, because of its sizable population of minorities, especially African Americans.[10] Furthermore, higher-priced loans account for a greater share of the conventional mortgage market in Atlanta than in the nation on average (12.9 percent versus a national average of 11.5 percent for purchase money mortgages, and 18.9 percent versus 15.5 percent for refinances). Metropolitan-level analysis allowed us to identify factors connected to within-city concentrations of higher-priced loans without a need to control for fixed effects in lending patterns across cities. We used the census tract as our spatial unit for this analysis because this is the smallest level of spatial aggregation built into the HMDA data files.

C. FHA's Role in the Market

This paper also explores the provision of FHA loans in a neighborhood as correlated with the level of higher-priced loans. The FHA single-family program offers low down payment mortgages with flexibility in such underwriting criteria as credit history and debt-to-income ratios. As a result, FHA loans are, in the aggregate, riskier than prime conventional loans but not as risky as subprime loans, as clearly revealed by the loan performance indicators.[11] Nationally, the market share of FHA declined precipitously as the subprime share grew. HUD has proposed "modernizing" FHA "to reach families who are capable of becoming homeowners and to offer them a safe and fairly-priced loan option" (Montgomery, 2006), presumably as an alternative to higher-priced loans. The concentration of FHA loans among minority and low-income borrowers and in underserved communities seems to reflect the program's purposes of promoting homeownership and combating discrimination in mortgage lending (Pennington-Cross & Yezer, 2000). Yet some studies highlight the role of "loan steering" and abusive push marketing in the concentration of FHA lending in minority communities and among minority populations (e.g., Bradford, 1998; National Training and Information Center, 2002). They pointed out that minorities are more likely to be steered into minority communities and toward FHA products than white home seekers. Similar claims have been made about subprime lending practices (e.g., Carr & Kolluri, 2001; Renuart, 2004).

Several recent studies have investigated the interplay of prime, subprime, and FHA loans. Ambrose, Pennington-Cross, and Yezer (2002) provided evidence that the lack of conventional lending in certain markets leaves FHA with the role of maintaining the mortgage credit supply in

these communities. This parallels research by Immergluck and Wiles (1999) establishing that the failure of prime lenders to seek out creditworthy borrowers in lower-income and minority communities leaves those communities vulnerable to subprime lenders, resulting in a "dual mortgage market." Pennington-Cross (2002) examined conventional prime, subprime, and FHA lending among 306 MSAs to demonstrate that prime lenders concentrate in markets with less risk while FHA and subprime lenders are more active in riskier markets. In contrast, two recent studies (An & Bostic, 2006a, 2006b) suggest that increases in government-sponsored enterprise (GSE) purchase activity (prime loans) are associated with declines in FHA and subprime mortgage activities and that the effects tend to be stronger in minority neighborhoods. The interplay of FHA and subprime lending, the subject of our research, was not investigated in these studies.

At the borrower level, recent empirical studies have started to analyze the factors associated with whether a particular borrower obtains a subprime, prime, or FHA mortgage. Pennington-Cross and Nichols (2000) employed a conditional discrete choice model to study households' choices between FHA and conventional loans. Rodda, Schmidt, and Patrabansh (2005) used the same framework to investigate the market overlap among different mortgage products. Generally, these studies suggest that FHA and subprime loans serve different borrower segments with little overlap because of product features. FHA was found to serve borrowers with relatively better credit, higher loan-to-value (LTV) ratios, and smaller loan amounts (due to the FHA loan limit).[12] Borrowers with more impaired credit and higher equity or down payment resources were more likely to choose subprime mortgages. Taken collectively, these studies led us to hypothesize that FHA and subprime lending are complementary at the neighborhood level. This study investigated the relationship between FHA and subprime lending by considering the impact of FHA lending in our models, in addition to a set of variables reflecting neighborhood and borrower characteristics.

II. Methodology

A. Data

Our data came from two primary sources: 2004 HMDA data including loan origination information, borrower characteristics, and geographic information; and Census 2000 data on neighborhood characteristics at the census tract level. Table 1 shows the share of higher-priced lending nationally and in Atlanta in several loan categories. Our analysis focused on conventional, first-lien loans originated for purchase or refinance of owner-occupied homes in 2004.[13] The loans included in the analysis cover 75 percent of all HMDA reported, first-lien originations, including both purchase and refinance loans. In this paper, for simplification we use the terms *purchase loans* or *refinance loans* as shorthand for conventional, first-lien home purchase or refinance loans, respectively, originated for the purpose of owner occupancy only.

Table 1

HMDA-Reported Originations by Type, Purpose, and Lien Position (Owner-Occupancy Only), 2004

			Higher-Priced Loans			
					APR spread[1]	
Type of Loan		Total Loans Originated	Number	Percent	Mean	Median
Home Purchase						
Conventional						
First-Lien	U.S.	3,745,490	270,688	11.5	4.1	3.8
	Atlanta	88,880	11,475	12.9	4.1	3.9
Junior-Lien	U.S.	70,1078	270,688	38.6	6.4	6.2
	Atlanta	21,192	8,404	39.7	6.7	6.6
Government-Backed[2]						
First-Lien	U.S.	479,498	6,298	1.3	4.2	3.9
	Atlanta	16,506	80	0.5	4.5	3.9
Junior-Lien	U.S.	1,036	29	2.8	7.1	6
	Atlanta	4	0	0	0	0
Refinance						
Conventional						
First-Lien	U.S.	5,708,965	884,108	15.5	4.2	3.9
	Atlanta	93,168	17,636	18.9	4.3	4.0
Junior-Lien	U.S.	439,495	120,500	27.4	7.3	6.7
	Atlanta	7,427	2,657	35.8	7.8	6.9
Government-Backed[2]						
First-Lien	U.S.	269,349	4,084	1.5	3.9	3.6
	Atlanta	9,873	85	0.9	3.9	3.5
Junior-Lien	U.S.	268	12	4.5	7.3	6.7
	Atlanta	5	0	0	0	0

Note: Based on 2004 HMDA data. Transition-period applications (those submitted before 2004) were excluded. Loans originated for business purpose, manufactured housing, loans for houses that will not be occupied by the borrower as a year-round residence, multifamily housing, and loans with incomplete geography information were also excluded.

[1] APR spread is the difference between the APR on the loan and the yield on a comparable-maturity Treasury security. The threshold for first-lien loans is a spread of three percentage points.

[2] Government-backed loans include FHA-insured, VA-guaranteed, and FSA/RHS loans; a majority are FHA loans (89 percent for home purchase loans and 79 percent for refinance loans).

B. Descriptive Analysis

In 2004, borrowers in Atlanta took out a higher-than-average share of higher-priced loans. In total, 88,880 purchase loans were originated, of which 12.9 percent were higher-priced (11,475 loans totaling $1.7 billion; see table 1). This percentage was somewhat higher than the national

average of 11.5 percent; the average APR spread of these higher-priced loans is the same as the national average (4.1 percent versus 4.1 percent). Higher-priced loans in Atlanta accounted for 18.9 percent of the 93,168 refinance loans originated in 2004, significantly higher than the national average of 15.5 percent. Again, the average APR spread of these higher-priced refinance loans was similar to the national average (4.3 percent versus 4.2 percent). About 97 percent of Atlanta MSA census tracts had at least one HMDA loan (both purchase and refinance). Our study focuses on the distribution of higher-priced loans in these 685 tracts.[14]

At the borrower level, the incidence of higher-priced lending varied substantially across racial and ethnic groups (table 2). About 30 percent of purchase loans taken out by African Americans were higher-priced loans, compared to only 7 percent for whites. African American borrowers were four times more likely to buy a home using a higher-priced loan than white borrowers (without controlling for income, credit history, and other factors). Furthermore, although African American borrowers accounted for 22 percent of home purchasers in 2004, they took out nearly half of all higher-priced purchase loans (49.1 percent). In addition, over 34 percent of HMDA refinance loans received by African Americans were higher-priced, much higher than the Atlanta MSA average of 18.9 percent. The percentage of higher-priced loans among Hispanics was almost equal to the MSA average.

When we looked at race and income together in analyzing the prevalence of higher-priced loans among borrowers, we found that African American households were far more likely to receive higher-priced loans than white households in the same income bracket. For example, low-income African American households (less than 80 percent average median income (AMI)) were three times more likely to receive higher-priced purchase loans than low-income white families. High-income African American households (more than 120 percent AMI) were an astonishing five times more likely to get a higher-priced purchase loan than high-income white families. Similar patterns can also be found for refinance lending in Atlanta (table 2).

At the neighborhood level, not surprisingly, the share of higher-priced loans was much higher in minority and low-income neighborhoods. The share of higher-priced purchase loans was over 25 percent in high-minority neighborhoods (more than 50 percent minority) in Atlanta, almost double the MSA average of 12.9 percent (table 4). Higher-priced purchase loans were 2.8 times more likely to occur in high-minority neighborhoods (more than 50 percent minority) than in low-minority neighborhoods (less than 15 percent minority); higher-priced refinance loans, 2.3 times more likely. As to the neighborhood income level, higher-priced purchase loans were 4.3 times more likely in very low-income neighborhoods (less than or equal to 50 percent AMI) than in high-income neighborhoods (more than 120 percent AMI); the figure was 3.6 times greater for higher-priced refinance loans.

Table 2

Borrower Characteristics for Higher-Priced Loans and FHA Loans in Atlanta, 2004

			Conventional Market Only	Conventional and Government-Backed Loans Combined	
Loan Purpose	**Borrower Characteristic**		**Higher-priced Loans share (%)[a]**	**Higher-priced Loans share (%)**	**FHA-Insured Loans share (%)[b]**
Purchase	Race/ Ethnicity	Hispanic	14.3	11.7	18.0
		Asian	4.7	4.5	3.6
		African American	29.9	22.0	24.0
		White	7.1	6.3	10.4
		American Indian/ Native Hawaiian	14.3	12.7	11.1
		Missing	12.5	11.0	10.7
	Household Income	≤50% AMI	17.8	13.2	25.7
		51–80% AMI	17.6	13.4	22.4
		81–120% AMI	13.7	11.7	12.8
		>120% AMI	7.2	6.9	3.4
		Missing	10.9	10.7	1.8
	Race & Income	Black and ≤80% AMI	33.5	22.0	32.6
		Black and >120% AMI	22.4	20.1	7.9
		White and ≤80% AMI	10.5	8.4	19.2
		White and >120% AMI	4.3	4.2	2.3
	MSA		12.9	11.0	14.0
Refinance	Race/ Ethnicity	Hispanic	20.3	17.2	15.1
		Asian	6.4	6.3	2.0
		African American	34.2	27.6	15.6
		White	13.5	12.8	4.6
		American Indian/Native Hawaiian	20.6	19.0	8.0
		Missing	22.4	20.8	6.2
	Household Income	≤50% AMI	31.3	30.0	3.9
		51–80% AMI	26.2	25.2	3.7
		>120% AMI	10.7	10.6	0.8
		Missing	6.5	2.6	50.0

(Continued)

Table 2
Continued

Loan Purpose	Borrower Characteristic		Conventional Market Only: Higher-priced Loans share (%)[a]	Conventional and Government-Backed Loans Combined: Higher-priced Loans share (%)	Conventional and Government-Backed Loans Combined: FHA-Insured Loans share (%)[b]
	Race & Income	Black and ≤80% AMI	39.4	37.0	6.0
		Black and >120% AMI	24.5	23.9	2.3
		White and ≤80% AMI	21.3	20.4	2.8
		White and >120% AMI	8.1	8.1	0.6
	MSA		18.9	17.2	7.6

Note: based on 2004 HMDA data on first lien loans. Number of conventional purchase loans: 88,880; number of conventional refinance loans: 93,168; number of FHA purchase loans: 14,738; number of FHA refinance loans: 7,802. Manufactured housing and multifamily housing and loans with incomplete geography information were also excluded.

[a] Loans originated with an APR >+thread 3% (purchase or refinance) divided by all conventional first-lien loans for the same purpose for particular group of borrowers.

[b] Number of FHA-insured loans divided by the total number of first-lien loans for the same purpose (conventional and government-backed loans) particular group of borrowers.

For context on the overlay of neighborhood and borrower characteristics, table 3 cross-tabulates borrower race and income with neighborhood race and income. As expected, about two-thirds of African American borrowers were in minority neighborhoods (more than 30 percent minority), and almost half of Hispanic borrowers were also in minority neighborhoods. There was a particularly high concentration of black borrowers (45 percent for purchase and 53 percent for refinance) in high-minority neighborhoods (more than 50 percent minority). Most white borrowers were located in low-minority neighborhoods or neighborhoods with a median income greater than 80 percent AMI. Interestingly, those borrowers with missing reported race information occurred in neighborhoods with above-average concentrations in low-income and minority.[15]

Regarding the second component of our research, we found the profile of FHA loans in Atlanta to be consistent with FHA's market role and somewhat similar to that of higher-priced loans: both had a greater market share among minority and low-income borrowers and in minority

Table 3

Neighborhood Characteristics for HMDA Loan Borrowers in Atlanta, 2004 (Column percentage)

Loan Purpose		Census Tract Characteristic (# of Tracts)	Hispanic	Asian	Black	White	Others	Race Missing
Purchase	Minority (%)	≤15% (190)	26.6	25.7	17.7	49.5	30.7	38.0
		15.1–30% (139)	28.1	37.0	20.8	29.9	32.3	28.3
		30.1–50% (108)	23.1	22.3	16.1	12.7	19.1	13.4
		>50% (248)	22.2	15.1	45.4	8.0	17.9	20.3
	Tract Median Income	>120% AMI (182)	30.1	51.8	20.4	47.7	35.1	43.6
		81–120% AMI (249)	51.3	37.1	53.1	40.5	50.2	40.7
		51–80% AMI (185)	16.9	9.8	20.2	10.1	11.7	12.1
		≤50% AMI (69)	1.7	1.4	6.3	1.8	3.0	3.6
	MSA (# of loans)		5,335	4,737	19,216	50,044	498	9,050
Refinance	Minority (%)	≤15% (190)	23.3	21.2	15.3	47.3	31.0	27.0
		15.1–30% (139)	24.3	31.1	18.2	27.1	28.2	22.6
		30.1–50% (108)	24.6	24.3	14.0	12.4	15.5	15.2
		>50% (248)	27.8	23.4	52.6	13.2	25.4	35.2
	Tract Median Income	>120% AMI (182)	20.5	36.5	15.1	27.6	21.1	23.3
		81–120% AMI (249)	56.2	44.1	52.4	50.2	54.9	52.6
		51–80% AMI (185)	20.1	15.3	23.4	19.2	16.9	17.8
		≤50% AMI (69)	3.1	4.1	9.1	3.0	7.0	6.4
	MSA (# of loans)		2,752	2,397	18,828	56,391	427	12,373

Note: based on 2004 HMDA data on first lien conventional loans. Number of conventional purchase loans: 88,880; number of conventional refinance loans: 93,168. Manufactured housing and multifamily housing and loans with incomplete geography information were also excluded.

and lower-income neighborhoods than among and in other segments (see tables 2 and 4). In fact, in the purchase market, both FHA and higher-priced loans made up a comparable share of all loans (11 percent and 14 percent,

Table 4

Distribution of Higher-priced and FHA Loans in Atlanta by Census Tract Characteristics

			Conventional Market Only	Conventional and Government-Backed Loans Combined	
Purpose	**Census Tract Characteristic (# of Tracts)**		**Higher-Priced Loans Share (%)[a]**	**Higher-Priced Loans Share (%)**	**FHA Loans Share (%)[b]**
Purchase	Minority (%)	≤15% (190)	9.0	7.9	12.1
		15.1–30% (139)	10.2	8.7	13.0
		30.1–50% (108)	12.8	10.8	14.2
		>50% (248)	25.2	20.1	18.9
	Tract Median Income	>120% AMI (182)	6.6	6.1	6.6
		81–120% AMI (249)	15.3	12.3	18.0
		51–80% AMI (185)	21.2	16.3	21.6
		≤50% AMI (69)	28.1	26.5	5.5
	MSA		12.9	11.0	14.0
Refinance	Minority (%)	≤15% (190)	14.0	13.1	4.9
		15.1–30% (139)	14.6	13.5	6.3
		30.1–50% (108)	20.0	17.6	8.6
		>50% (248)	32.8	27.9	12.8
	Tract Median Income	>120% AMI (182)	10.0	9.6	3.3
		81–120% AMI (249)	21.6	18.9	10.1
		51–80% AMI (185)	31.3	27.6	10.0
		≤50% AMI (69)	35.9	33.4	6.8
	MSA		18.9	17.2	7.6

Note: based on 2004 HMDA data on first lien loans. Number of conventional purchase loans: 88,880; number of conventional refinance loans: 93,168; number of FHA purchase loans: 14,738; number of FHA refinance loans: 7,802. Manufactured housing and multifamily housing and loans with incomplete geography information were also excluded.

[a] Loans originated with an APR >+thread 3% (purchase or refinance) divided by all conventional first-lien loans for the same purpose in particular group of tracts.

[b] Number of FHA-insured loans divided by the total number of first-lien loans for the same purpose (conventional and government-backed loans) census tracts.

respectively) and of loans to African Americans in particular (24 percent and 22 percent, respectively). However, although FHA maintained a much greater share of purchase loans to very low-income borrowers (26 percent versus 13 percent for purchases; see table 2), the market share of FHA loans in very low-income tracts was small (6 percent versus 26 percent for purchases; see table 4). In other words, subprime lenders appear more likely to target low-income borrowers in very low-income communities while FHA lenders are more likely to focus on low-income borrowers in neighborhoods outside the very low-income bracket.

Overall, the preliminary descriptive analyses reveal that the higher-priced loan share in a census tract was highly correlated with the tract's share of minority residents, especially African Americans. Likewise, there was a negative correlation with the median tract income.

C. Multivariate Analysis

We used a multivariate regression analysis to test for the association between lending patterns of higher-priced loans and measures of neighborhood characteristics, taking into account a number of neighborhood and borrower characteristics. We analyzed the relative frequency of higher-priced lending across neighborhoods, where the dependent variable is the percentage of loans that are higher-priced (home purchase or refinance). This approach is based on the theory that a financial institution's mortgage lending and pricing decisions are a function of perceived risk and return factors. Such risk and return factors relate to both the borrower and the property, whose price trajectory may be affected by neighborhood attributes. Based on this hypothesis, we analyzed geographic patterns of higher-priced lending through taking into account the following variables: racial/ethnic composition (including the percentages of residents that identify as African American, Hispanic, and Asian), median income level of neighborhoods, credit risk and neighborhood property risk, and housing condition and share of nonowner-occupied households in census tracts.

In addition, we obtained a number of tract-level economic and demographic variables from the Census 2000 data and 2004 HMDA data for use in the analysis. The first of these variables is tract median household income or economic status of census tracts.[16] Second, we measured price risk in real estate investment. A tract's capitalization rate is defined as the ratio of the tract's annualized median rent divided by the median house value. Early studies suggest that owner-occupied units usually appreciate faster in neighborhoods with a smaller value of capitalization rate (the median rent is lower relative to the median housing value) (Taylor, Silver, and Berenbaum, 2004). Therefore, a larger value for this measure is consistent with lower expected price appreciation or more uncertain future house prices and indicates increased risk.

Third, we measured housing turnover in a census tract, a measure of property risk. This variable is constructed by dividing the number of

purchase loans (by our definition, owner-occupied only) by the number of owner-occupied housing units in census tracts. A higher amount of housing turnover may suggest a more vibrant market and faster home value appreciation. Neighborhoods with little turnover might have less certain housing values and, as a result, represent greater collateral risk. Conversely, a high turnover rate can also be a proxy for white flight and unstable neighborhoods, or low turnover might suggest residents with longer tenure (perhaps elderly) and with greater accumulated equity—a group that consumer advocates commonly cite as a target of push marketing for subprime home equity loans. In this latter case, we might expect a strong correlation with higher-priced refinance lending. In sum, we expected the price risk variable to be positively associated with higher-priced lending and remained unsure as to whether the turnover variable would be positively or negatively associated with higher-priced lending at the neighborhood level.

Our fourth measurement was a proxy for credit risk: the denial rate for conventional HMDA loan applications for home purchase can roughly represent the average credit risk in the census tracts because the higher the credit risk that the borrowers in a neighborhood have, the higher the denial rate for conventional mortgage applications. We expected this variable to be positively associated with the extent of higher-priced lending in the neighborhood.

Finally, we measured the share of renters in census tracts, and we looked at the median house age as of 2004, a variable reflecting the property condition of neighborhoods.

To determine whether FHA competes with or complements subprime lending at the neighborhood level, we added a new FHA variable—the share of FHA first-lien purchase loans. We limited our analysis to loans at or below the FHA loan limit ($176,605 for one-unit homes in 2004) and to purchase loans because a majority (65 percent) of FHA loans in Atlanta are purchase loans.

In summary, we conducted our analysis for both home purchase and refinance lending and estimated several specifications: (a) neighborhood demographic and economic variables only, (b) neighborhood demographic and economic variables plus measures of property risks and neighborhood characteristics, and (c) neighborhood variables plus borrower characteristics in a logit regression model.[17] We also extended our models to consider the impact of FHA lending by incorporating the FHA variable and focusing on FHA-eligible loans. The number of tracts with HMDA home purchase and refinance loans is 685, which accounts for 97 percent of all census tracts in Atlanta. The number of purchase loans is 88,880 and the number of refinance loans is 93,168. When we focus on FHA-eligible purchase loans, the number of tracts does not change but the number of purchase loans drops to 53,436. Descriptive statistics for Atlanta tract-level variables are presented in table 5.

Table 5
Variable Definition and Descriptive Statistics

Sample	Variable	Variable Definition	Median	Mean	Std Dev
No loan amount limit	PCT_HIGH_P	Higher-priced Purchase Loans Originated in the Tract (%)	13.6	17.1	13.5
	PCT_HIGH_R	Higher-priced Refinance Loans Originated in the Tract (%)	20	22.3	14.7
	PCT_BLACK	Pct of Tract Residents Black (%)	17.1	32.5	32.7
	PCT_HISP	Pct of Tract Residents Hispanic (%)	2.9	5.9	8.6
	PCT_ASIAN	Pct of Homeowners Residents Asians (%)	3.2	4.6	4.3
	MEDINC	Tract Median Income ($k)	47.3	51.5	22.2
	PCT_RENTER	Pct of Tract House Units Renters (%)	28.6	34.5	25
	HOUSE_AGE	Median House Age as of 2004	24	28.6	14.8
	PCT_DENIAL	Denial Rate of First-Lien Loans for Purchase (%)	14.1	16	8.8
	CAP_RATE	Median Rent / Median House Value (%)	7.4	7.3	2.3
	PCT_TNOVER	Turnover Rate of Tract Housing Stock (%)	9.9	13.1	11.7
FHA eligible loans	PCT_HIGH_P	Higher-priced Purchase Loans Originated in the Tract (%)	14.4	17.8	13.5
	PCT_FHA_P	FHA Purchase Loans Originated in the Tract (% of the total FHA-eligible loans)	13.3	15.0	11.6

Note: The number of tracts in this sample is 685.

III. Regression Model Results and Empirical Evidence

A. Neighborhood Features Associated with More High-Cost Lending

Our tract-level models (table 6) show that neighborhoods with a higher-percentage of African American households have a much greater share of higher-priced loans (both home purchase and refinance) than other neighborhoods, even after controlling for a variety of neighborhood characteristics. The results from Model 2 suggest that in tracts where all residents

Table 6
Tract-level Regression Results for Purchase and Refinance Loans

	Home Purchase			Refinancing	
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Variable	**Estimated Coefficient**	**Estimated Coefficient**	**Estimated Coefficient**	**Estimated Coefficient**	**Estimated Coefficient**
PCT_BLACK	0.22**	0.12**	0.12**	0.21**	0.14**
PCT_HISP	–0.17**	–0.06	–0.06	–0.13**	–0.04
PCT_ASIAN	–0.27**	–0.14	–0.19*	–0.31**	–0.17*
MEDINC	–0.14**	–0.16**	–0.11**	–0.23**	–0.25**
PCT_RENTER		–0.12**	–0.09**		–0.12**
HOUSE_AGE		–0.08**	–0.03		–0.05*
PCT_DENIAL		0.69**	0.56**		0.46**
CAP_RATE		0.66**	0.57**		1.07**
PCT_TNOVER		–0.11**	–0.15**		–0.14**
FHA Lending					
PCT_FHA_P			0.16**		
Chi-square	209.4**	218.3**	157.3**	238.9**	207.9**
Adj. R2	0.55	0.74	0.69	0.59	0.73

Note: *significant at 0.05 level; **significant at 0.01 level. Dependent variable is the share of higher-priced loans in census tracts (home purchase or refinance, respectively). Model 1, 2, 4, and 5 use all conventional loans (purchase or refinance) and Model 3 focuses on FHA eligible purchase loans. The sample sizes are 685. The estimation method is weighted least square regression weighted by tract total house units.

are African American, higher-priced loans encompass a 12 percent greater share of purchase loans and a 14 percent greater share of refinance loans than in tracts where all residents are white, all else being equal. The results are somewhat mixed concerning other race variables.

For both purchase and refinance loans, the lower the income level for households in the neighborhood, the higher the share of higher-priced loans.

Further, our findings indicate that several factors affect the prevalence of higher-priced loans in a given neighborhood. The increased credit risk of a neighborhood is associated with a larger higher-priced share for both home purchase and refinance loans. Also, a lower expected price appreciation or greater uncertainty regarding future house prices is correlated with a larger share for higher-priced loans in census tracts. Perhaps prime lenders find neighborhoods less attractive if the capitalization rate is high, resulting in a greater portion of higher-priced loans in these neighborhoods. In addition, for every one percent decrease in the housing turnover rate, which varies significantly from tract to tract, there is a 0.11 percent increase in the share of higher-priced purchase loans and a 0.14 percent increase in the share of higher-priced refinance loans. The significant and negative sign of this variable for both purchase and refinance loans suggests that it is a good

indicator of the market's vibrancy and attractiveness (or lack thereof) to prime lenders. Somewhat surprisingly, results suggest that there are more higher-price loan originations in tracts with newer houses.

Other things being equal, the share of FHA loans is found to be statistically significant and positively correlated with the share of higher-priced loans in a census tract for purchase lending.[18] These results show that high rates of FHA activity are often found in neighborhoods with high rates of higher-priced lending in Atlanta.

B. Borrower Characteristics Associated with More High-Cost Lending

At the loan level (table 7), we found that African American borrowers have a much greater likelihood of obtaining a higher-priced loan than the

Table 7

Loan-level Logistic Regression Results

	Home Purchase		Refinancing
	Model 6	Model 7	Model 8
Variable	Estimated Coefficient	Estimated Coefficient	Estimated Coefficient
Neighborhood Variables			
PCT_BLACK	–0.0024**	–0.0017*	0.0010*
PCT_HISP	–0.0076**	–0.0038	–0.0012
PCT_ASIAN	–0.0002	–0.0066	–0.0059
MEDINC	–0.0225**	–0.0208**	–0.0219**
PCT_RENTER	–0.0104**	–0.0098**	–0.0081**
HOUSEAGE	–0.0094**	–0.0058**	–0.0082**
PCT_DENIAL	0.0465**	0.0344**	0.0205**
CAP_RATE	0.0457**	0.0426**	0.0528**
PCT_TNOVER	–0.0089**	–0.0123**	–0.0090**
FHA Lending			
PCT_FHA_P		0.0080**	
Borrower Variables			
BLACK	1.1998**	1.1378**	0.6977**
HISPANIC	0.4951**	0.4244**	0.3251**
ASIAN	–0.4708**	–0.4544**	–0.7812**
RACEMISSING	0.3763**	0.4307**	0.5411**
HHINC	–0.0031**	–0.0009**	–0.0046**
Walt χ^2	7326.10**	4146.20**	6600.9**

Note: *significant at 0.05 level; **significant at 0.01 level. Dependent variable is the odds of getting higher-priced conventional loans for a borrower (purchase or refinance, respectively). Model 6 and Model 8 used all conventional first-lien loans while Model 7 focused on FHA-eligible purchase loans. The number of purchased loans used in Model 6 and Model 7 is 85,362 and 51,315, respectively; and the number of refinance loans used in Model 8 is 89,417.

comparison group, non-Hispanic whites (the odds ratio is 3.3 for purchase and 2 for refinance; see table 7). Hispanic borrowers have a relatively higher likelihood of obtaining a higher-priced mortgage (the odds ratio is 1.6 for purchase and 1.4 for refinance), while Asian borrowers have a relatively lower likelihood of receiving higher-priced loans. Not surprisingly, household income is inversely correlated with the likelihood of getting a higher-priced loan.

The results pertaining to borrowers with missing race information are particularly interesting because they suggest that those borrowers have a relatively higher likelihood of obtaining a higher-priced loan. One possible interpretation of the correlation between higher-priced loans and borrowers with missing race information for refinances is that subprime lenders or brokers are more active in minority neighborhoods and thus are less likely to report race information. The results support earlier findings concerning missing race information in the HMDA data (Wyly & Holloway, 2002; Calem, Hershaff, et al., 2004).

C. Interaction of Borrower and Neighborhood Characteristics

In the case of refinance loans, even after controlling for the race of the borrower, the share of African Americans in a tract continues to have a positive impact on the likelihood of an individual borrower getting a higher-priced loan, though the share of Hispanics and Asians becomes insignificant. It seems that overall neighborhood racial composition still matters for refinance lending and that borrowers in predominantly African American neighborhoods are more likely to receive higher-priced refinance loans even after controlling for the race of borrowers.

In contrast, for purchase loans, once borrower race is factored in, the percentage of African American or Hispanic homeowners in the tract is statistically significant and inversely associated with the odds of that borrower obtaining a higher-priced purchase money mortgage. In other words, even after controlling for the race of the borrower, the likelihood of an individual borrower obtaining a higher-priced loan goes down as the minority share of the neighborhood goes up. One possible explanation is that home buyers in high-minority neighborhoods are more predisposed to use FHA or CRA loans, making them less likely to obtain a higher-priced loan to purchase their homes.

To test whether FHA loans might play this role, we factored in the share of FHA purchase loans as an independent variable, with the result that the share of African American residents became less significant while the Hispanic share variable simply became insignificant (see model 7 in table 7). This result supports to some extent the hypothesis that borrowers in high-minority neighborhoods are predisposed to use FHA loans to purchase homes.

Notwithstanding the FHA effect, the overall finding from the purchase analysis, taking into account both neighborhood and borrower racial data, indicates that the concentration of higher-priced purchase loans in

Atlanta's minority neighborhoods is fully explained by the presence of individual minority borrowers (especially African Americans and Hispanics) who, even when controlling for income, are more likely to receive higher-priced loans.

Finally, as model 7 shows, the likelihood of an individual home buyer getting a subprime loan increases as the rate of FHA activity in a neighborhood increases, which is consistent with what we learned from the tract-level regression model.

Taken together, our results verify that FHA and higher-priced loans are complementary home purchase financing mechanisms at the neighborhood level. We suggest several hypotheses, not necessarily mutually exclusive, to explain our findings. One possibility is that high rates of FHA lending in certain neighborhoods crowd out prime lenders, which in turn creates an opportunity for subprime lending. Of course, the reverse might also be true: high levels of subprime lending might chase out prime lenders and thus create opportunities for FHA lending. Another related hypothesis is that minority borrowers are steered, by lenders and real estate brokers, into the FHA and subprime markets. Thirdly, it is possible that the higher market share of both FHA loans and higher-priced loans is due to subtle forms of redlining by prime lenders; in this hypothesis, FHA and subprime lenders together maintain credit supply in neighborhoods that lack access to conventional prime lending but serve largely different groups of customers. Building on Ambrose et al. (2002), a variation on this hypothesis is that credit rationing by prime lenders in higher-risk markets drives more borrowers to FHA lenders, which keeps their underwriting guidelines constant, and to subprime lenders, who by definition adjust price according to perceived risks.

The question of whether the complementary market position of FHA and higher-priced loans is due to push marketing by subprime and FHA originators or to avoidance by prime lenders cannot be answered by using cross-sectional HMDA data alone. Additional analysis will be required to further tease out the causes from the effects. Using 1996 and 2000 HMDA data, An and Bostic (2006a, 2006b) found that more aggressive purchases by GSEs induce those potential FHA and subprime borrowers with the best credit quality to finance through the prime market.

Whatever the causes, in light of our findings about the complementary nature of FHA and subprime lending, it is not surprising that FHA has put forth modernization proposals that will allow it to compete better with conventional lenders farther along the credit spectrum.

IV. Conclusions

This paper presents an empirical analysis of how neighborhood attributes explain the distribution of higher-priced mortgage lending across census tracts in Atlanta. It also provides a preliminary analysis of the relationship between FHA and higher-priced lending at the neighborhood level. Generally, the results of our analysis of 2004 HMDA data are consistent with

findings from previous research indicating that subprime loans are concentrated among lower-income and minority neighborhoods and borrower groups. Our analysis goes one step further in confirming that these lending patterns disproportionately place the tangible cost burden of higher-priced mortgage debt on communities with the least resources.

In Atlanta, we found a strong geographic concentration of higher-priced lending in African American tracts and low-income tracts, even after including other tract-level explanatory variables.[19] Moreover, as expected, the tract median income consistently exhibited an inverse association with the higher-priced loan share in census tracts: the lower the tract income, the higher the likelihood that borrowers would pay more for their mortgage debt. In our study, household income also inversely correlated with the likelihood of getting a higher-priced loan: the lower the income of the household, the greater the likelihood of that household carrying a mortgage with a higher price tag. These relationships held true for both home purchase and refinance loans. We also can conclude that African American and Hispanic borrowers have a higher likelihood of obtaining a higher-priced loan, no matter which neighborhoods they live in and no matter what their income levels are.

We also found some important differences regarding refinance versus purchase loans. For refinance loans, even after controlling for the race of the individual borrower, borrowers in high-minority tracts are still more likely to obtain a high-cost refinance loan than in other neighborhoods. But for purchase loans, once the effect of borrower race is factored in, the odds of a home buyer obtaining a higher-priced purchase loan actually decrease as the share of African American or Hispanic homeowners increases. It seems that home buyers in high-minority neighborhoods may have a greater predisposition to use FHA loans and, as a result, are less likely to obtain a higher-priced purchase loan.

With respect to the overall relationship between FHA and higher-cost subprime mortgages, we can generally conclude that FHA loans are given to minorities and low- to middle-income borrowers and, with some notable exceptions, in those neighborhoods where there is also a concentration of higher-priced loans. In the preliminary analysis of the relationship between higher-priced loans and the incidence of FHA mortgages at the census tract level, we find some evidence to suggest that FHA and higher-priced purchase loans complement one another. Our tentative interpretation is that the lack of conventional loans in certain neighborhoods creates a market for both FHA and higher-priced loans. Because FHA and subprime lenders serve somewhat different groups of customers, the share of FHA loans and the share of subprime loans are positively correlated for the cross-sectional data at the tract level. Our finding, that FHA loans complement high-cost loans, suggests that FHA is naturally positioned to play an important role in the most affected communities. Whether FHA will step up to fill this market role, and whether it can manage to do so without causing some of the same problems, remains to be seen.

In sum, the Atlanta analysis shows high-cost subprime lending to be most concentrated among minorities and in the very neighborhoods that could least afford it. Given this suggested imbalance, it is not surprising that many subprime loans are proving unsustainable. Sadly, the high default rate among subprime loans exacerbates the burden on those same communities, which must also bear the cost of foreclosures, vacancies, and, often, opportunistic speculation.

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1. Subprime mortgages are often called *A- through D credits*.
2. *See* www.hud.gov/offices/fheo/lending/subprime.cfm.
3. *See* Center for Responsible Lending (2008) for analysis of the spillover effect of foreclosures on neighbors' property values.
4. Census tracts are small, relatively permanent statistical subdivisions of a county delineated by local participants as part of the U.S. Census Bureau's Participant Statistical Areas Program. Census tracts generally have between 1,500 and 8,000 people, with an optimum size of 4,000 people. *See* www.census.gov/geo/www/tiger/glossry2.html#censustract.
5. HMDA data on the individual characteristics of mortgage loans and borrowers are collected by the Federal Financial Institutions Examination Council (FFIEC) in accordance with the HMDA. Under the HMDA, lending institutions with more than $33 million (in 2004) in assets and that have branches in MSAs are required to provide information about their mortgage loan applications.

The 8,853 lenders covered by the law as of the end of 2004 are estimated to have accounted for about 80 percent of all home loan originations that year (Avery & Canner, 2005).

6. Home Mortgage Disclosure Act, Regulation C (effective Jan. 1, 2004).

7. For 2004, the rate on Treasury securities used to calculate the spread for home loans with thirty-year terms varied from 4.67 percent to 5.54 percent. The variation implies that the threshold for reporting a first-lien loan as higher-priced ranged from 7.67 percent to 8.54 percent over the year. For second-lien loans, the APR spread-reporting threshold is five percentage points.

8. *See* details in Avery and Canner (2005, p. 370); www.freddiemac.com/.

9. An unknown proportion of subprime loans (those whose APR spreads were below the reporting threshold) were not rate-reported. Because no rate-reported loan was prime, all HMDA rate-reported loans are subprime, but not all subprime loans are rate-reported.

10. According to census data, the population of the Atlanta metropolitan area in 2000 was 4.11 million: 2.46 million (59.9 percent) were white; 1.18 million (28.6 percent) were black; 0.27 million (6.5 percent) were Hispanic; and the rest, 0.21 million (5.1 percent), were other races, including Asian or Native American.

11. Historically, for example, ninety-plus-days' delinquency rates for FHA loans have run from two times to five times higher than conventional prime rates (Pennington-Cross & Yezer, 2000, p. 361). As of September 2005, the seasonally adjusted, thirty-plus-days' delinquency rates for prime, FHA, and subprime loans stood at 2.2 percent, 6.9 percent, and 10.3 percent, respectively (Mortgage Bankers Association, 2005).

12. FHA mortgage lending limits vary based on a variety of housing types and the state and county in which the property is located. FHA guidelines specified that the maximum FHA loan limit was $176,605 for one-unit homes in Atlanta in 2004. *See* www.hudclips.org/sub_nonhud/html/pdfforms/03-23aii.xls.

13. Government-backed loans (FHA, Veterans Administration, and Rural Housing Authority) show such a low incidence of higher-priced mortgages that they were not included in the base models but were examined in supplemental analysis. Nor did the analysis include junior-lien loans (junior-lien loans have a substantially higher incidence of higher-priced lending than do first-lien loans for the same purpose; Atlanta also has a higher-than-national-average share of higher-priced junior-lien loans), loans originated for business purposes (a few loans not subject to the Truth in Lending Act do not get reported rates because they are made for a commercial purpose; most loans not subject to the act are identifiable (see Avery and Canner (2005, notes 37 & 39) for a detailed discussion), manufactured housing, loans originated for home improvement or multifamily dwellings, or loans for houses that will not be occupied by the borrower as a year-round residence (such as investment property or second homes).

14. A census tract may be completely or partly inside an MSA. This number is determined by overlaying the layers of Atlanta's MSA and tracts and then deciding the number of tracts inside or intersecting Atlanta's MSA boundaries.

15. According to Dietrich (2001), there are six main reasons why race data are not reported: (1) customer does not provide race information during direct applications, (2) customer does not provide information during indirect applications (mail, telephone, or Internet), (3) loan was purchased, (4) loan was

brokered, (5) data errors, and (6) fraud. In our data, 12 percent of purchases and 22 percent of refinances had missing data. Refinances are more likely to be taken by phone or Internet, thus explaining the higher share of missing race data for refinances.

16. A set of economic and demographic variables is highly correlated with this variable, including tract unemployment rate, poverty rate, and average educational attainment; as a result, these variables are not included in the model because of multi-collinearity problems.

17. For the borrower-level analysis, we followed Ambrose et al. (2002) and Calem, Gillen, et al. (2004), who hypothesize that individual households maximize their welfare by choosing the lowest-cost mortgage. We model the bivariate choice between higher-priced and normal-priced, where households finance their home purchase or refinance their mortgage loans through less costly prime lenders, unless their risk profile makes them ineligible for such loans.

18. A model using data for all conventional loans without considering the FHA loan limit gets similar results. Results were not included in table 6 but are available from the authors upon request.

19. However, the results do not necessarily indicate the occurrence of unequal treatment because of some shortcomings for new HMDA data during the transition period and because of the indirect and quite imperfect control of credit risk in the models.