

Cross-Lender Variation in Home Mortgage Lending

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Introduction

Federal fair housing and credit legislation addresses two major requirements. First, depository institutions must help meet the credit needs of their communities in a manner consistent with safe and sound lending practices (Community Reinvestment Act of 1977 [CRA]). Second, lenders must not discriminate against individual applicants on the basis of race, ethnic origin, gender, or religion (Equal Credit Opportunity Act of 1974 [ECOA]) and Fair Housing Act of 1968 (as amended in 1988). Government agencies charged with regulating depository institutions are responsible for monitoring individual lenders' compliance with these statutes.

Historically, enforcement of the CRA and fair lending statutes has relied on qualitative, non-statistical methods. CRA examinations, for example, have focused primarily on procedural issues. With rare exception, regulators have considered the actions of individual complainants to enforce the other fair lending statutes. In the past year, both community activists and lenders have called for strategies to move toward more quantitative, outcome-based enforcement procedures. These calls stem, in part, from a belief that CRA and fair lending policy

guidelines are unclear and often counterproductive, and perhaps more likely to generate paperwork than loans and services.

A recent change in the reporting requirements of the Home Mortgage Disclosure Act (HMDA) makes the move toward outcome-based enforcement procedures seem much more feasible. Since 1990, lenders in urban mortgage markets have been required to report to regulators the neighborhood (census tract) and a limited number of other characteristics (such as loan size, applicant race and income, and government guarantee) of all applications for mortgage credit during each calendar year. These data permit the quantitative comparison of a number of lending activities across lenders. Indeed, recent proposals by the bank regulatory agencies call for the use of HMDA data in evaluating CRA and fair lending compliance for lenders.¹

The objective of this study is to evaluate the feasibility of using HMDA data to form quantitative measures of lender activity for use in enforcement. We consider three potential measures of firm-level mortgage lending activity:

■ 1 See "Community Reinvestment Act Regulations," *Federal Register*, October 7, 1994 (59 FR 51232).

loan application rates, loan approval rates, and loan origination rates. We examine the extent to which the three measures can differentiate among banks with respect to how they serve four subpopulations cited in the fair lending laws: minority loan applicants, applicants for loans in minority neighborhoods, low-income loan applicants, and applicants for loans in low-income neighborhoods. Using national filings for the first year of the new HMDA regulations, 1990, we compare the performance of measures adjusted and unadjusted for local conditions and borrower characteristics.

Several conclusions emerge. We find that variation across lenders in loan originations to each of the four subpopulations is driven primarily by variation in application rates, not by variation in lender approval rates. This finding holds when both unadjusted and adjusted measures are examined and for a wide variety of lender groups sorted by size and type of institution. Furthermore, we find virtually no correlation between application rates and approval rates, so using indices based only on approval rates can be potentially misleading when evaluating individual lenders' compliance with the CRA. Indeed, variation in application rates appears to play a much more significant role in explaining variation in credit flows. Furthermore, focusing on approval rates may lead to outcomes that are counter to the intent of the legislation: To improve their minority-to-white approval rates, some lenders may discourage applications from all but the most creditworthy minority applicants, thereby reducing credit originations to minority and low-income communities.

One objection that has been raised to the use of application rates in evaluating lender compliance is that these rates are determined primarily by the neighborhoods that lenders serve. Our evidence suggests that this is not the case. Most of the variation in application rates stems from differences in the applicants that lenders attract *within* neighborhoods and not from the general racial characteristics of the neighborhoods as a whole. Finally, we also find that controlling for the economic characteristics and neighborhoods of the loan applicants provides relatively little power in explaining cross-lender differences. This suggests that gross application and approval-rate measures may give relatively good rankings of bank performance.

I. Background of Fair Housing Legislation

In response to community concerns about the flow of housing credit to minority and low-income communities and about the extent to which individual lenders were meeting the credit needs of their communities, Congress passed a series of laws during the 1970s. The ECOA of 1974 and the Fair Housing Act of 1968 (as amended in 1988) mandate that lenders do not discriminate against individual applicants on the basis of race, ethnic origin, gender, or religion. Two other laws were enacted primarily to fight geographic discrimination. HMDA, enacted in 1975, requires certain lenders to report annually the number and dollar value of mortgage loans they make in their communities according to census tract. Under the terms of the CRA, enacted in 1977, depository institutions must help meet the credit needs of their communities, including low- and moderate-income neighborhoods, in a manner consistent with safe and sound lending practices.

Monitoring individual lenders for compliance with these fair lending statutes is problematic. The standard for compliance with the ECOA is relatively well defined—other things equal, lenders cannot discriminate on the basis of race or property location. This implies that lenders must treat “comparable” applications from members of different racial groups and neighborhoods equally. Problems arise, however, in determining what types of behavior are considered discriminatory and in measuring whether two applications are the same except for the applicant's race and the property location.² Moreover, focus on the treatment of formal applications sidesteps the issue of indirect screening, whereby applicants are screened out before they formally apply. These concerns have shifted much of the focus in current enforcement of ECOA from procedures to outcomes. If the outcome of the process differs across racial groups or neighborhoods, then the burden of proof is on the lender to demonstrate that its procedures are not biased. For example, the lender can show that the differences arise from variables other than race and that the use of these variables in loan screening can be justified by their relationship to costs or loan performance. If differential outcomes in origination rates create the *prima facie* case for

■ 2 See Wienk (1992) for a discussion of conceptual and measurement problems related to assessing the degree of discrimination in credit markets.

bias, the lender could face an examination of its application and approval rates, as both affect originations.

CRA is concerned with the extent to which individual lenders extend credit to various groups within their market areas. While Congress did not articulate the standards for compliance beyond "meeting the credit needs of the community," the bank regulatory agencies responsible for enforcement issued joint policy statements in 1980 and 1989 reflecting their procedures. Apart from periodic examinations for compliance, regulators are required to take account of an institution's CRA record in assessing applications for regulatory actions such as mergers. Since 1990, lenders have also been required to give the public access to their examination assessments. Enforcement of CRA has generally focused on procedures rather than outcomes. Regulators have given significant weight to evidence of affirmative action—for instance, the location of loan offices, number of minority loan officers, methods of advertising, participation in community development banks, and availability of special low- to moderate-income housing programs.

On the surface, ECOA and CRA appear to address different aspects of the lending process. ECOA is concerned primarily with individuals, equal treatment, and race; CRA involves neighborhoods, credit flows, and income. More recently, though, enforcement of both acts has begun to evolve along quite similar lines. Regulators consider fair lending practices a critical factor in assigning CRA ratings. Moreover, as a practical matter, CRA enforcement has begun to place more weight on racial issues rather than focusing exclusively on income.

HMDA was instituted to provide regulators and the public with information on how lenders were serving low-income areas. Data reported under HMDA are now integral to enforcement efforts for both ECOA and CRA. Initially, depository institutions were required to report mortgage lending totals by census tract with no disaggregation by race, but concerns arose about the dearth of data available to analyze the reasons for differential mortgage credit flows and individual discrimination in mortgage lending. Amendments to HMDA in 1989 now require most mortgage lenders to collect and report information on all individual loan applications taken, whether approved or not. In addition, some applicant information is now recorded, most notably income, loan amount requested, property location, gender, and race.

Many informative HMDA-based studies addressing issues concerning both ECOA and CRA

have appeared during the past 15 years. Because the pre-1990 HMDA data contain no information about the individual applicants or about applications that were not approved, most of the early studies focus on the flow of credit to various neighborhoods (CRA), as opposed to a consideration of discrimination against particular loan applicants (ECOA). These studies ask whether mortgage lenders in an area, *taken collectively*, provided mortgage credit in predominantly minority or low-income neighborhoods at diminished rates relative to predominantly white or higher-income neighborhoods. Although researchers generally find disparate lending patterns between white and minority (or low-income) neighborhoods, they do not consider differences in lending patterns across individual lenders: Are these neighborhoods receiving less credit because each lender originates only a few loans in these areas, or because there are only a few lenders operating in these areas?³ In addition, the data do not allow a clean investigation of the roles of credit supply and credit demand: Are these neighborhoods receiving less credit because of lender bias, or because lenders are not receiving comparable numbers of qualified applications from the various neighborhoods examined?

The expanded HMDA data set has spawned a number of new analyses of individual and neighborhood discrimination. Using information from a special survey that supplemented HMDA data for Boston, Munnell et al. (1992) examine the role of individual characteristics, particularly race, in loan approval. Avery, Beeson, and Sniderman (1993) discuss similar issues using 1990 and 1991 HMDA data drawn from the whole country. The role of neighborhood racial composition in generating applications and approving loans is explored in Avery, Beeson, and Sniderman (1994).

Many questions remain as to the appropriate methods of CRA and ECOA enforcement and the nature of the data collected to support this effort. Critics of the CRA, in particular, have argued that enforcement efforts need to focus

■ 3 Using pre-1990 HMDA data, Canner (1981), Avery and Buynak (1981), Avery and Canner (1983), and Bradbury, Case, and Dunham (1989) contrast the differences in mortgage credit originations between predominantly white and predominantly minority neighborhoods in various metropolitan statistical areas (MSAs). One of the few studies to look at lenders is Calem (1993). He contrasts the experiences of individual lenders participating in a Philadelphia area mortgage-lending plan with those who did not participate. However, his paper does not document the existence of lender differences in the penetration of minority communities; his primary focus is on the characteristics of the voluntary mortgage plan operated by a group of lenders. Avery (1989) notes the differences between studies based on lending in a neighborhood and the procedures adopted by individual lenders.

BOX 1

HMDA Data and Methodology

Overall, HMDA reported information on 6,595,089 loan applications and purchases in 1990. Of these, 1,137,741 were purchased from other institutions and 1,523,429 were applications received for properties outside an MSA. Excluding these left 3,933,919 applications (59.6 percent) to reporting institutions for properties within an MSA in which the lender had an office. Of these applications, 787,952 were for home improvement loans, 716,595 were for refinancing of one- to four-family home loans, and 32,176 were for multifamily home loans. An additional 241,295 applications were never acted on because they were either withdrawn by the applicant or closed due to incompleteness. Eliminating these from our sample left a total of 1,984,688 loan applications that met the study criteria.

Not surprisingly, the initial HMDA filings contained many errors and inconsistencies that required extensive editing by the receiving federal agencies. Unfortunately, these procedures do not appear to have been uniformly applied, requiring additional cleaning and editing for this study. In addition, smaller institutions were not required to report race, income, and gender for loan applicants. We decided to deal with missing data using a "hot deck" imputation procedure similar to that used by the U.S. Census Bureau. Applications with missing data were statistically matched to applications in the same census tract that came closest to them in reported characteristics (race, loan action, income, and loan amount). Missing values were filled in using the variable value of the matched observation. Applications with implausible reported values were treated as missing and imputed in the same way. Overall, income was imputed for 4.9 percent, loan amount for 1.5 percent, gender for 4.0 percent, and race for 5.6 percent of the study sample applications.

more on performance and less on process. In this spirit, the bank regulatory agencies have recently called for comments on a comprehensive reform of CRA regulations and enforcement procedures. The proposed reforms would institute a new system of evaluation based primarily on performance. The data reported under HMDA are critical to the success of such an effort, both for quantifying an institution's own performance and for providing a benchmark of what other institutions are doing.

Because the new regulations encompass an expanded role for HMDA data, it is natural to ask how capable the data are for meeting this task. The new regulations call for only a mild expansion of HMDA, so the current data are representative of what would be available in the future. In this paper, we use the existing data to examine their effectiveness in provid-

ing the quantitative measures of institutional performance called for by the proposed new regulations. We examine three potential outcome measures: loan origination rates, loan application rates, and application approval rates. These are used to compare institutions' performance in serving four subpopulations cited by CRA: minority individuals, minority neighborhoods, low-income individuals, and low-income neighborhoods. In each case, we compare the rankings implied by gross outcome measures with those adjusted for neighborhood and applicant characteristics.

II. Data Description

Amendments to HMDA in 1989 now require most depository institutions (and certain other mortgage lenders) to collect and report information on all individual loan applications taken for home purchase, mortgage refinance, and home improvements, whether approved or not. This study makes use of the HMDA data for 1990—the first release of the new data—which represent the most comprehensive survey of mortgage lending in the United States.⁴ All commercial banks, savings and loan associations, credit unions, and other mortgage lending institutions (primarily mortgage bankers) that have assets of more than \$10 million, make one or more one- to four-family home purchase loans, and have an office in a metropolitan statistical area (MSA) are required to meet HMDA reporting requirements.

For each mortgage application received or mortgage loan purchased from another institution during the calendar year, the lender must report the loan amount; the location of the property (state, county, and 1980 census tract number); whether the property is owner-occupied; the loan purpose (home purchase, home improvement, or refinancing for one- to four-family or multifamily unit); the type of loan (conventional, FHA, VA, guaranteed by Farmers Home Administration [FmHA]); the action taken by the lender (loan approved and originated, application approved but withdrawn, application denied, application withdrawn before lender action, file closed for incompleteness, loan purchased from another institution); the race and gender of the loan applicant (and co-applicant, if

■ 4 At the time this paper was published, 1991 and 1992 HMDA data were also available. Although not reported here, analysis of data from these later years suggests similar conclusions to those presented here.

TABLE 1

Characteristics of Home Mortgage Applications, 1990 HMDA

	Percent of Sample	Percent of Loan Dollars	Approval Rate
Race of Applicant			
Native American	0.6	0.6	80.7
Asian (or Pacific Islander)	4.6	6.8	85.6
Black	6.2	4.8	70.6
Hispanic	6.6	6.4	77.9
White	81.4	80.5	86.9
Other	0.7	1.0	80.2
Race of Co-applicant			
No co-applicant	28.4	24.1	82.7
Same race as applicant	69.4	73.4	86.2
Different race than applicant	2.2	2.5	84.4
Loan Type			
Conventional	75.1	82.9	85.1
FHA	20.4	13.7	85.5
VA	4.5	3.5	84.2
FmHA	0.0	0.0	98.0
Lender Action			
Loan denied	14.8	13.1	
Loan accepted and withdrawn	2.9	3.5	
Loan originated	82.3	83.4	
Loan kept by originator ^a	44.9	47.7	
Loan sold to FNMA ²	14.5	14.4	
Loan sold to GNMA ³	10.5	7.6	
Loan sold to FHLMC ⁴	9.0	9.1	
Loan sold elsewhere ⁴	21.1	21.2	
Memo Items			
Median income		\$48,000	
Median loan request		\$77,000	
Number of loans		1,984,688	

a. Percent of originations.

SOURCE: Authors' calculations.

any); and the income relied on by the lending institution in making the loan decision.⁵

In total, 9,333 financial institutions filed HMDA reports in 1990 on more than 6 million loan applications and loan purchases. Our analysis focuses on a subset of these filings: applications for one- to four-family home purchase loans that were acted upon (approved or denied) by the lender. This sample includes 1,984,688 loan applications made to 8,745 separate lenders operating in 40,008 census tracts in all 340 of the U.S. MSAs defined as of 1990 (see box 1 for details).

The study sample has a substantial degree of representation from applicants of different races and income levels (table 1). Overall, however, applicants for home purchase mortgages are a select sample of American house-

holds. Applicants' median income (\$48,000) is substantially higher than the median income of families in MSAs (\$37,918) as reported in the 1990 decennial census.⁶ The racial composition of the study sample also appears to differ somewhat from that of all U.S. families. Blacks filed 6.2 percent of the HMDA housing loan applications, yet were 7.7 percent of the homeowners and headed 11.4 percent of the MSA households. Asian loan applicants (4.6 percent), however, were overrepresented compared with their numbers in the census (2.5 percent of MSA household heads and 2.2 percent of homeowners). The share of white (81.4 percent) or Hispanic (6.6 percent) applicants is approximately representative of their numbers (78.1 percent of household heads and 84.8 percent of homeowners for whites and 7.5 percent of household heads and 5.0 percent of homeowners for Hispanics).⁷

Also worth noting is the substantial presence of the federal government in mortgage lending. One-quarter of the mortgages issued were directly guaranteed by the federal government (FHA, VA, or FmHA), with an additional quarter purchased in the secondary market by one of the federal housing credit agencies (FNMA and FHLMC).⁸ Indeed, 55 percent of all mortgages issued were sold in the secondary market, suggesting that the study of mortgage lending patterns is more an analysis of a brokered industry than one where participants buy for their own portfolios.

Sample characteristics are broken down by type of lender and applicant in table 2. Lender here is defined at the MSA level. Thus, a lender reporting loans for two different MSAs is treated as two different lenders.⁹ Lenders, shown in the rows, are grouped by size and

■ **5** See Canner and Smith (1991, 1992) for a full description of the HMDA data. Information on income, race, and sex of the applicant does not have to be supplied by reporting institutions with assets less than \$30 million or for purchased loans.

■ **6** In the HMDA data, household income may be slightly understated because it reflects only the portion of an applicant's income needed for mortgage qualification.

■ **7** The percent Hispanic in the HMDA sample is slightly higher than the share for the overall U.S. population, due in part to the inclusion of Puerto Rico.

■ **8** These acronyms represent, respectively, the Federal Housing Administration, Veterans Administration, Farmers Home Administration, Federal National Mortgage Association, and Federal Home Loan Mortgage Corporation.

■ **9** The 8,745 financial institutions with loans in the study sample operated in an average of 2.4 MSAs. This translated into 20,695 study lenders when lenders were defined at the MSA level.

TABLE 2

**Minority and Low-Income Individuals
and Tracts Relative to Total Mortgage
Lending, 1990 HMDA**

	Minority ^a					Low-Income ^b			
	Overall Approval Rate	Percent Applica- tions ^c	Percent Origi- nations ^c	Approval Rate	Relative Approval Rate	Percent Applica- tions ^c	Percent Origi- nations ^c	Approval Rate	Relative Approval Rate
Type of Institution									
Commercial banks	0.82	11.2	9.1	0.67	0.81	20.5	17.4	0.69	0.85
Thrift institutions	0.87	13.9	12.5	0.78	0.90	11.0	9.6	0.76	0.87
Credit unions	0.89	9.0	7.7	0.77	0.86	15.6	13.4	0.77	0.86
Bank subsidiaries	0.84	12.7	11.1	0.73	0.87	17.9	14.5	0.68	0.81
Thrift subsidiaries	0.86	14.2	12.0	0.72	0.84	14.5	12.6	0.74	0.87
Other mortgage banks	0.87	15.9	14.3	0.79	0.90	12.0	11.1	0.81	0.92
Size of Institution									
> 500 applications	0.86	17.1	15.3	0.77	0.90	12.1	10.4	0.74	0.86
100 – 500 applications	0.85	10.9	9.2	0.72	0.85	17.0	14.5	0.73	0.85
< 100 applications	0.84	9.5	8.1	0.71	0.85	17.6	14.7	0.70	0.83
Market Share of Institution									
> 5 percent	0.86	14.2	12.3	0.74	0.87	16.9	14.5	0.73	0.86
1–5 percent	0.85	13.2	11.7	0.76	0.89	14.2	12.0	0.72	0.85
< 1 percent	0.84	11.6	10.1	0.73	0.87	12.4	10.4	0.70	0.84
Size of MSA									
> 25,000 applications	0.86	18.1	16.5	0.78	0.91	8.6	7.4	0.74	0.86
< 25,000 applications	0.85	10.9	9.2	0.72	0.85	18.2	15.4	0.72	0.85
Percent Minority Applications									
> 22 percent	0.80	31.8	29.5	0.75	0.93	12.8	9.6	0.66	0.82
< 22 percent	0.86	10.3	8.9	0.75	0.87	15.5	13.2	0.73	0.85
Total	0.85	13.3	11.7	0.75	0.88	15.0	12.7	0.72	0.85
Minority Census Tracts^d									
Low-Income Census Tracts^e									
	Overall Approval Rate	Percent Applica- tions ^c	Percent Origi- nations ^c	Approval Rate	Relative Approval Rate	Percent Applica- tions ^c	Percent Origi- nations ^c	Approval Rate	Relative Approval Rate
Type of Institution									
Commercial banks	0.82	11.0	9.3	0.69	0.85	22.5	20.1	0.76	0.93
Thrift institutions	0.87	13.2	12.1	0.80	0.92	10.4	9.4	0.79	0.90
Credit unions	0.89	8.5	7.7	0.80	0.90	18.0	16.5	0.82	0.92
Bank subsidiaries	0.84	11.7	10.2	0.73	0.87	17.7	15.3	0.72	0.86
Thrift subsidiaries	0.86	13.3	11.3	0.73	0.85	17.0	14.9	0.75	0.88
Other mortgage banks	0.87	14.9	13.6	0.80	0.91	12.7	11.9	0.82	0.94
Size of Institution									
> 500 applications	0.86	16.7	15.2	0.78	0.91	10.8	9.4	0.75	0.88
100 – 500 applications	0.85	9.8	8.4	0.73	0.86	18.8	17.1	0.77	0.91
< 100 applications	0.84	8.9	7.8	0.74	0.88	19.8	18.0	0.76	0.90
Market Share of Institution									
> 5 percent	0.86	13.1	11.5	0.76	0.88	18.7	16.7	0.77	0.90
1–5 percent	0.85	12.5	11.3	0.77	0.90	14.4	12.9	0.76	0.90
< 1 percent	0.84	11.8	10.5	0.75	0.89	11.0	9.9	0.75	0.89
Size of MSA									
> 25,000 applications	0.86	18.8	17.3	0.79	0.92	5.7	5.1	0.77	0.90
< 25,000 applications	0.85	9.5	8.2	0.73	0.86	20.4	18.4	0.76	0.90
Percent Minority Applications									
> 22 percent	0.80	40.2	38.2	0.77	0.88	12.5	10.7	0.69	0.86
< 22 percent	0.86	8.0	7.1	0.75	0.95	16.0	14.4	0.77	0.90
Total	0.85	12.6	11.2	0.76	0.89	15.5	13.9	0.76	0.90

a. Native Americans, blacks, and Hispanics.

b. Applicant income below \$25,000.

c. Percent of applications received (loans originated) by each class of lender from minority applicants or low-income tracts.

d. Census tracts with more than 30 percent of loan applications from minority applicants.

e. Census tracts with more than 30 percent of loan applications from low-income applicants.

SOURCE: Authors' calculations.

type of institution and by the size and minority population of their MSA as shown in the rows of the table. Applicants are grouped into five categories shown in the columns: 1) overall; 2) minority (native American, black, and Hispanic, about 13 percent of applicants); 3) low-income (family income of \$25,000 or less, roughly the bottom 15 percent of applicants); 4) residents of minority census tracts (those with more than 30 percent of loan applications from minority applicants, roughly 13 percent of applicants); and 5) residents of low-income census tracts (those with more than 30 percent of loan applications from low-income applicants, again roughly 15 percent of applicants).¹⁰ For each applicant category, we show the percent of the lender-type's loan applications or originations made to members of the category.¹¹ We also present the category approval rate (the portion of all loan applications from members of the category that are approved) and the relative approval rate (the ratio of the category approval rate to the overall approval rate for all applicants), shown in column 1.

There is little evidence that specific types of lenders, such as commercial banks or thrifts, specialize in minority lending. On the other hand, at least superficially, it would appear that there is specialization by *size* of lender. About 17 percent of the applicants to lenders receiving more than 500 home purchase loan applications were minorities, with a similar percentage from minority tracts. Smaller lenders (those with less than 100 applicants) took in only 9 percent of their applications from these categories. However, much of this difference may simply reflect the concentration of large lenders in large MSAs, where there is also a high concentration of minority applicants and minority tracts. Within MSAs, the difference in minority share between the larger institutions (those with market shares exceeding 5 percent) and small institutions is much less.

The picture looks somewhat different for low-income applicants. Commercial banks and

their subsidiaries receive a disproportionately large share of low-income applications; on the other hand, a disproportionately small percentage of thrift business comes from low-income borrowers or tracts. Larger lenders also receive disproportionately fewer low-income loan applications. Again, though, this appears to be a result of the between-MSA distribution of applicants. Within MSAs, the largest lenders tend to receive *more* low-income applications.

Finally, we note that the specific measure used to compare minority and nonminority lending or low-income and high-income lending has little impact on the distribution across lenders. The same patterns are found when minority lending is measured by the number of minority applications, the number of applications from minority census tracts, the dollar value of minority applications (not shown), or the dollar value of applications from minority tracts (not shown). Similarly, for low-income lending, the cross-lender distribution is the same whether lending is measured by the number or dollar value of loans or whether income is measured by the applicant or tract.

III. Variance in Lending Patterns

The sample statistics reported in the previous section reflect the *average* percentage of loan applications from minority and low-income individuals (or tracts) and the *average* approval rate on those applications by various types of lending institutions. These statistics could be thought of as describing the prototypical lender in the mortgage market, not the actions of any individual lender operating in that market, and as ignoring the variation across these individual lenders. In this section, we compare three measures of individual lender performance: 1) minority and low-income origination rates (the share of loans originated going to minorities or low-income individuals or tracts), 2) application rates (the share of applications received from minorities or low-income individuals or tracts), and 3) relative approval rates (differences in the actions taken on applications).

We first address the relationship among these three measures. Because origination rates are equal to the product of application rates and relative approval rates, we would like to know the extent to which credit origination differences among lenders stem from the former factor versus the latter. That is, if we are concerned about credit flows to minority and

■ **10** The decision to treat Asians and "other race" applicants as non-minorities was somewhat arbitrary. As shown in table 1, the overall acceptance rate for Asian home purchase loan applicants is much closer to the white acceptance rate than to acceptance rates for blacks, Hispanics, or native Americans. We note, though, that the acceptance rates for Asian refinancing and home improvement loan applicants are closer to those of Hispanic applicants than to those of whites.

■ **11** We count all applications approved by the lender as "originations." In fact, some applications (2.9 percent) are approved by the lender but are subsequently withdrawn by the borrower. In these cases, the loan will not actually be made.

TABLE 3

Analysis of Variance in Origination Rates across Lenders, 1990 HMDA

	Number of Lenders	Number of Applications	Origination Rate		Regression R-Squared ^a	Percent Attributable to Variance in: ^b	
			Mean	Standard Deviation ^a		Minority/Low-Income Application Rate	Relative Approval Rate
Minority							
Number	11,598	1,867,211	0.16	0.18	0.92	86.7–90.7	9.3–13.3
Dollar value	11,598	1,867,211	0.14	0.18	0.91	87.4–91.1	8.9–12.6
Center city	8,548	745,161	0.23	0.22	0.93	82.5–88.5	11.5–17.5
Minority Tracts							
Number	8,846	1,624,207	0.20	0.19	0.91	88.7–91.9	8.1–11.3
Dollar value	8,846	1,624,207	0.17	0.19	0.91	89.7–92.2	7.8–10.3
Low-Income Applicants							
Number	13,651	1,918,018	0.21	0.19	0.91	85.4–87.8	12.2–14.6
Dollar value	13,651	1,918,018	0.16	0.19	0.92	88.4–90.7	9.3–11.6
Center city	9,668	764,423	0.26	0.23	0.93	81.7–85.8	14.2–18.3
Low-Income Tracts							
Number	11,024	1,566,699	0.32	0.24	0.94	90.2–92.6	7.4–9.8
Dollar value	11,024	1,566,699	0.27	0.23	0.94	93.3–95.3	4.7–6.7

a. Expressed as deviation around MSA means.

b. Minimum and maximum contributions to variance based on deviations around MSA means.

SOURCE: Authors' calculations.

low-income applicants and neighborhoods, does variation across lenders arise primarily from differences in treatment or in application rates?

An approximate answer to this question can be obtained by estimating the following equation:

$$(1) \quad \text{Origination rate}_L = \beta_1 \text{MSA}_L + \beta_2 \text{application rate}_L + \beta_3 \text{relative approval rate}_L + e_L$$

where the origination rate for lender L equals minority (or low-income) originations as a portion of total originations, MSA_L is a vector of dummy variables indicating the metropolitan area in which lender L operates, application rate is minority (or low-income) applications as a share of total applications, and relative approval rate is the minority (or low-income) approval rate divided by the overall approval rate. The MSA fixed effects control for differences in the mortgage lending market that are common to all lenders in that market but may vary across markets, such as the size of the minority population or lending practices.

Fitting equation (1) provides an estimate of the relative importance of application rates and approval rates in explaining variation in origi-

nation rates. Unfortunately, as with any regression, because application rates and relative approval rates are likely to be correlated, we cannot compute a precise estimate of the contribution of each component to the variation in origination rates. However, several approximate estimates are possible. We determine a lower bound on the contribution of each component by estimating its marginal contribution: that is, the additional variation in origination rates explained by adding the component to a model containing the other component. We compute an upper bound on the contribution of each component from its univariate fit — the proportion of the variation in origination rates that it explains by itself. The difference in the lower and upper bound estimates derives from how the impact of the covariance between the two components is assigned. The lower bound estimate assigns the covariance to the other component, and the upper bound assigns the full effect of the covariance to the variable in question.

Table 3 reports the allocation of variance for estimates of equation (1) for several different origination rates. The variance associated with MSAs is removed from the total before we measure the contributions of the application

and relative approval rates. Thus, we are decomposing the variance in the deviations about MSA means. Row 1 shows the variance in decomposition across lenders for the origination rate of minority individuals. Row 4 shows the decomposition for originations in minority tracts. Rows 6 and 9 show the decomposition for low-income individuals and tracts, respectively. Rows 2, 5, 7, and 10 report decompositions for origination rates weighted by dollars. Finally, decompositions for minority and low-income individuals applying in central cities are shown in rows 3 and 8.

For each decomposition estimated, the sample includes all lenders for which the origination rate, application rate, and relative approval rate are defined. We note that this reduces the sample of lenders substantially from the full sample reported in tables 1 and 2. For example, the sample used for minority individuals includes only 11,598 of the 20,695 HMDA-reporting lenders (40 percent were dropped because they had no minority applicants and 3 percent because they had no originations of any type). However, these lenders received 1,867,211 of the 1,984,688 full sample applications (94 percent). Moreover, the percentage of applications made by minorities in the decomposition sample (14.1 percent) is only slightly higher than in the full sample (13.3 percent).

For each decomposition, we present several statistics. In columns 3 and 4, we show the mean and standard deviation of the origination rate across lenders. Note that the mean origination rate across lenders is generally higher than the sample average, indicating that smaller lenders make more of their loans to minorities or low-income individuals. In column 5, we show the R-squared of the estimated equation (1). Both the R-squared and standard deviations are adjusted for deviations about MSA means. Finally, in columns 6 and 7, we show the percentage of the total variation of the origination rate that can be attributed to the application rate or relative approval rate, adjusted for MSA fixed effects.

We find that the overwhelming majority of the cross-lender variance in minority originations is attributable to differences in minority application rates. Differential approval rates by race account for a relatively small portion of the variance. For example, after controlling for MSA differences, 87 to 90 percent of the variance in originations to minority individuals is captured by lender-specific differences in minority application rates; only 10 to 13 percent stems from different approval rates for these

applications. This narrow range suggests that the contribution of the covariance is quite small, which greatly enhances our ability to identify the importance of the application rates.

Our results concerning low-income lending are much the same as those for minority lending. The only difference is that the ranges for low-income lending are somewhat larger than those for minority lending, indicating that the covariance between application rates and relative approval rates contributes more to the cross-lender variance in low-income originations than it does to the cross-lender variance in minority origination rates. The results are virtually identical when dollar values are used or when census tracts rather than individual applicant characteristics are examined. Restriction of the sample to central cities does little to alter the results, other than showing a slight increase in the variance that may be attributable to relative approval rates.

To examine the robustness of these results further, table 4 reports the allocation of the variance across lenders in minority originations for lenders grouped by type, size, and market share of institution, and by MSA size and percent minority. The dominance of differences in application rates as the source of lender differences in minority origination rates holds across all types of lenders, all sizes of lenders (measured in terms of both the volume of applications received by the lender and the lender's market share), and types of MSAs. Even for mortgage banks (subsidiaries of depository institutions as well as independents), where the contribution is smallest, cross-lender differences in application rates account for at least three-quarters, and may account for as much as 90 percent, of the variance in minority originations.

The contribution of minority application rates to the variance in originations is smallest among small lenders, regardless of the type of lender. For the largest lenders (those with 500 or more applications), differences in application rates account for 93 to 99 percent; for lenders with less than 100 applications, they account for 85 to 89 percent. This is also true when size is measured by market share. Differences in lender minority application rates account for 96 to 97 percent of the variance across those with 5 percent or more of the market, and for 84 to 89 percent across lenders with less than 1 percent of the market. Although not presented here, similar conclusions hold for the decomposition of minority tracts and low-income individuals and tracts by lender types and size.

TABLE 4

Allocation of Variance in Minority Origination Rates by Type and Size of Lender, 1990 HMDA

	Origination Rate			Percent Attributable to Variance in: ^b	
	Mean	Standard Deviation ^a	Regression R-Squared ^d	Minority/Low-Income Application Rate	Relative Approval Rate
Type of Institution					
Commercial banks	0.13	0.19	0.91	86.5-91.1	8.9-13.5
Thrift institutions	0.11	0.14	0.93	92.0-93.9	6.1-8.0
Credit unions	0.18	0.29	0.97	85.2-93.1	6.9-14.8
Bank subsidiaries	0.13	0.15	0.88	80.4-83.4	16.6-19.6
Thrift subsidiaries	0.13	0.18	0.90	74.2-81.7	18.3-25.8
Other mortgage banks	0.16	0.18	0.94	86.5-90.2	9.8-13.5
Size of Institution					
More than 500 applications	0.13	0.09	0.99	92.8-98.8	1.2-7.2
100 to 500 applications	0.09	0.08	0.96	96.5-98.0	2.0-3.5
Less than 100 applications	0.15	0.21	0.92	85.0-89.3	10.7-15.0
Market Share of Institution					
More than 5 percent	0.10	0.07	0.95	95.7-97.3	2.7-4.3
1 to 5 percent	0.11	0.09	0.93	92.8-94.1	5.9-7.2
Less than 1 percent	0.20	0.22	0.92	84.0-88.7	11.3-16.0
Size of MSA					
More than 25,000 applications	0.15	0.20	0.94	86.4-91.0	9.0-13.6
Less than 25,000 applications	0.18	0.17	0.91	86.6-90.4	9.6-13.4
Percent Minority Applications					
More than 22 percent	0.36	0.24	0.94	76.6-86.8	13.2-23.4
Less than 22 percent	0.13	0.17	0.92	87.7-91.0	9.0-12.2
Total	0.16	0.18	0.92	86.7-90.7	9.3-13.3

a. Expressed as deviation around MSA means.

b. Minimum and maximum contributions to variance based on deviations around MSA means.

SOURCE: Authors' calculations.

We conclude that differences in the relative approval rates of minority and low-income loans account for only a small portion of the variance across institutions in the portion of originations going to minority and low-income applicants. In the following section, we examine various factors that may be contributing to the cross-lender variance in application and approval rates.

IV. Sources of Cross-Lender Variance in Lending Patterns

The outcome measures presented in the previous section are gross measures of lender performance. As such, they do not control for exogenous market factors that affect lender performance but that are beyond the lender's control. The effects

of any such exogenous factors should be removed before constructing measures of lender performance to be used in CRA and fair lending evaluation. Although it by no means contains an exhaustive list, HMDA includes information on a number of applicant characteristics that arguably should be controlled for: loan size, applicant income, loan type (FHA/VA or conventional), and property location. To the extent that these factors are correlated with race, this specialization will contribute to the observed cross-lender variance in minority application rates. Similarly, to the extent that they are correlated with creditworthiness, these applicant characteristics may also be contributing to the observed differences in relative approval rates. In this section, we examine the effect of removing these factors on our assessment of various measures of lender performance. We focus on individual minority application rates and relative

approval rates, although our results hold for low-income and neighborhood taxonomies as well.

We compute adjusted indices as the lender average for each variable after the effects of property location and applicant characteristics are removed. For the application and overall approval rate, this is estimated directly from a fixed-effects linear probability model, where the fixed effects are, by construction, the average of the dependent variable after the effects of other variables are removed. The fixed-effects linear probability models used to compute the adjusted indices were estimated with the full 1,984,688 loan sample, and have the following form:

$$(2) \quad APPLICATION_{iMl} = \beta_A AC_i + \beta_M MSA_M + \beta_T TRACT_T + \beta_L LENDER_L + u_{iMl},$$

$$(3) \quad APPROVAL_{iMl} = \Gamma_A AC_i + \Gamma_R RACE_i + \Gamma_M MSA_M + \Gamma_T TRACT_T + \Gamma_L LENDER_L + v_{iMl},$$

where *APPLICATION* is coded one if the *i*th applicant using the *L*th lender in the *M*th MSA and *T*th census tract is a minority (native American, black, or Hispanic) and zero otherwise; and *APPROVAL* is coded one if the *i*th applicant loan using the *L*th lender in the *M*th MSA and *T*th census tract is approved and zero otherwise. *AC* is a vector of application characteristics reported in the HMDA data, including gender, marital status, occupancy, income, loan amount, income-to-loan ratio, loan type, and interactions among these variables. *RACE* includes dummy variables for six applicant and two co-applicant racial categories. The racial dummies are also interacted with FHA and VA loan dummies. *MSA*, *TRACT*, and *LENDER* are dummy variables indicating which of the 340 MSAs, 40,008 census tracts, and 20,695 lenders the application relates to, and *u* and *v* are residuals. By construction, the MSA effects are normalized to have an overall mean of zero, and within each MSA, the lender and tract effects are normalized to have means of zero.¹²

Adjusted indices for the minority and relative approval rates are more complicated to estimate because they involve the ratio of predictions for two groups. For these calculations, we used variants of the fixed effects, computed by averaging lender residuals from the overall approval rate model separately for minorities and

nonminorities. Thus, the adjusted lender indices were taken either as the direct LENDER fixed effects estimated in equations (2) and (3) or computed as lender residuals averaged over the minority and nonminority subgroups. Finally, we were also interested in computing the average lender "quality" of applicants as measured by their average *AC* and *TRACT* effects. The exact construction of each of the variables used in this portion of the analysis is

1) the average economic characteristic effects of the *L*th lender's applicants,

$$AC_{app} = \sum_{i \in L} \beta_A AC_i / N,$$

$$AC_{apr, minority} = \sum_{j \in L} \Gamma_A AC_j / N_j, \text{ for all minority applicants } j,$$

$$AC_{apr, nonminority} = \sum_{k \in L} \Gamma_A AC_k / N_k, \text{ for all nonminority applicants } k;$$

2) the average census tract effects of the lender's applicants,

$$TRACT_{app} = \sum_{i \in L} \beta_T TRACT_i / N,$$

$$TRACT_{apr, minority} = \sum_{j \in L} \Gamma_T TRACT_j / N_j, \text{ for all minority applicants } j,$$

$$TRACT_{apr, nonminority} = \sum_{k \in L} \Gamma_T TRACT_k / N_k, \text{ for all nonminority applicants } k;$$

3) and the adjusted lender indices, estimated directly as fixed effects or averaged separately for minorities and nonminorities,

$$LENDER_{app} = \beta_L,$$

$$LENDER_{apr} = \Gamma_L,$$

$$LENDER_{apr, minority} =$$

MINORITY APPROVAL RATE

$$- AC_{apr, minority} - TRACT_{apr, minority}$$

$$- \sum_{j \in L} \Gamma_R RACE_j / N_j - \Gamma_M, \text{ for all minority applicants } j,$$

$$LENDER_{apr, nonminority} =$$

NONMINORITY APPROVAL RATE

$$- AC_{apr, nonminority} - TRACT_{apr, nonminority}$$

$$- \sum_{k \in L} \Gamma_R RACE_k / N_k - \Gamma_M, \text{ for all non-minority applicants } k,$$

where *N*, *N_j*, and *N_k* are, respectively, the total, minority, and nonminority number of applicants to the lender and *M* is the MSA of the lender.

Four different measures of lender loan activity were regressed against these constructs, and a variance decomposition similar to that

TABLE 5

**Allocation of Institutional Differences,
Percent Deviations around MSA
Means, 1990 HMDA**

	Minority Application Rate	Relative Approval Rate	Minority Approval Rate	Overall Approval Rate
Applicant economic characteristics	0.8–2.6	2.4–4.6	2.5–5.7	3.5–10.9
Census tract	21.9–28.9	4.0–5.9	3.6–4.2	2.0–3.2
Overall lender effect	—	—	26.4–38.3	—
Unexplained lender effect	70.7–74.8	91.0–92.7	53.8–65.9	88.7–91.1

SOURCE: Authors' calculations.

performed in the previous section was undertaken. The four measures were

1) the minority application rate, which was regressed against AC_{app} and $TRACT_{app}$;

2) the relative approval rate, which was regressed against $AC_{apr, minority}$, $AC_{apr, nonminority}$, $TRACT_{apr, minority}$, $TRACT_{apr, nonminority}$, $LENDER_{apr, minority}$, and $LENDER_{apr, nonminority}$;

3) the minority approval rate, which was regressed against $AC_{apr, minority}$, $AC_{apr, nonminority}$, $TRACT_{apr, minority}$, $TRACT_{apr, nonminority}$, and $LENDER_{apr, nonminority}$;

4) the overall approval rate, which was regressed against $AC_{apr, minority}$, $AC_{apr, nonminority}$, $TRACT_{apr, minority}$, and $TRACT_{apr, nonminority}$.

Each regression was run with MSA dummies; thus, we analyze within-MSA variation. The contribution of each component to the overall variance in minority application rates is identified using the same variance decomposition procedure as in the previous section. Again, because we are looking at a decomposition of variance, the amount attributable to each source can only be approximated. As in the previous section, lenders used in these regressions were limited to the 11,598 lenders for whom all dependent variables were defined (at least one minority applicant and one approved loan).

The AC and $TRACT$ components can be thought of as exogenous factors, potentially beyond the lender's control. The adjusted lender effects in minority application and approval rates constructed above ($LENDER_{app}$, $LENDER_{apr}$, $LENDER_{apr, minority}$, and $LENDER_{apr, nonminority}$)

can be interpreted as lender-specific differences in application and approval rates controlling for applicant characteristics and property location. The variance decomposition allows us to compare the unadjusted measures of lender performance, as represented by the gross minority application and relative approval rates, with the adjusted indices, as measured by the $LENDER$ variables. If the $LENDER$ variables account for most of the variation in the gross measures, then regulators may be able to use gross performance measures without serious cost. If, on the other hand, AC and $TRACT$ account for a substantial portion of the variation in the gross measures, this may be an inappropriate decision.

Table 5, column 1 shows the decomposition of the cross-lender variance in minority application rates. Differences in application characteristics account for 1 to 3 percent of the within-MSA variance across lenders. Much more surprisingly, differences in the census tracts from which lenders receive applications account for only 22 to 29 percent of the variation, with 71 to 75 percent of the variation across lenders attributable to the unexplained pure $LENDER$ effect. This means that most of the variation across lenders in the number of minority applications they receive does not stem from the fact that they serve different neighborhoods, but from how they draw applicants within neighborhoods. This result is robust to a number of variations, such as ignoring MSA effects or weighting the regression by the number of applications received by the lender, and runs counter to the conventional wisdom that variation in the racial composition of the neighborhoods served by lenders is the major source of

cross-lender variation in the proportion of minority applications received.¹³

Column 2 of table 5 shows the decomposition of the within-MSA variance in relative approval rates. Between 2 and 5 percent of the difference across lenders can be attributed to variation in the application characteristics, and between 4 and 6 percent can be attributed to census tract location. The overwhelming majority of variation (91 to 93 percent) cannot be explained by these factors and is attributable to the pure lender effect.

Similar conclusions are reached when we use the same methodology to examine sources of cross-lender variation in minority approval rates (table 5, column 3). Applicant economic and census tract effects are small. The overall standard of the institution, measured by the non-minority lender effect, explains about one-third of the within-MSA variation (that is, minorities who apply to institutions with low approval rates for all applicants tend to be approved at lower rates, *ceteris paribus*). However, more than half of the variation in minority approval rates cannot be explained by any of these factors. These remaining differences may reflect differential treatment of minority applications or differences in the unobserved characteristics of the loan application; without additional information, it is impossible to make a determination.

It appears that this large component of unexplained variation is consistent with evidence of significant idiosyncratic lender behavior. Column 4 of table 5 reports the decomposition of the cross-lender variance in overall approval rates (minority and nonminority) based on the same methodology used above. About 90 percent of the within-MSA variation in overall lender approval rates cannot be explained either by applicant characteristics (as we measure them) or by census tract.

These results suggest that the adjusted measures of lender performance account for the vast majority of variation in the gross measures. This finding is further examined in table 6, which reports the differences in gross and adjusted performance measures across various lender groups arranged by type, size, and mar-

ket share, and by size and percent minority in the MSA. The difference between the gross and adjusted standard deviations for each group reflects the importance of the control factors, *AC* and *TRACT*.

The first column of table 6 is the cross-lender variance in minority application rates; the second column is the variance in the pure lender effect on the application rate. For the full sample of lenders, cross-lender variance before controlling for the applicant characteristics and property location is 0.20; after controlling for these factors, the variance is 0.14. Thus, about 30 percent of the cross-lender variance in minority application rates is explained by control factors. These factors account for a larger portion of the variance across commercial banks than for other types of lenders. They also account for more of the variance across lenders with large market shares, and those in MSAs with large numbers of minority applicants.

The control factors explain relatively little of the cross-lender variance in overall approval rates (columns 5 and 6) or in minority approval rates (columns 7 and 8). However, they do explain a sizable portion of the cross-lender variance in relative approval rates (minority approval rate/overall approval rate). Before controlling for the factors in our model, the cross-lender variance in relative approval rates is 0.37; after controlling for them, the variance is 0.26—almost 30 percent lower. As was the case with application rates, control factors account for relatively more of the variation in approval rates for commercial banks and their mortgage subsidiaries, for lenders with large market shares, and for lenders in MSAs with larger numbers of minority applicants than other institutions.

It is also interesting to examine the relationship between the pure lender effect on minority application rates and the pure lender effects on absolute and relative minority approval rates. Overall, those lenders with higher-than-expected minority application rates (positive lender effects) are associated with slightly higher-than-expected minority approval rates, both absolute and relative. However, the correlations are surprisingly small (0.001 and 0.024, respectively), suggesting that minority applicants do not seem to be applying to lenders where their probability of approval is higher.

■ 13 The potential contribution of census tracts is larger when the regression is weighted by the number of applications each lender received. Since this decomposition focuses on within-MSA variation and gives most weight to the largest lenders within the MSA, it is difficult to separate the lender effect from the census tract effect. As a result of the covariance between the two, the range of the contribution of each is quite large (27 to 69 percent for census tracts and 30 to 63 percent for lender effects). We note that even in this decomposition—the most favorable case for census tract effects—at least 30 percent of the variance across lenders cannot be explained by loan application characteristics or by the racial composition of the neighborhood from which the lender draws applications.

TABLE 6

**Standard Deviation of Minority Lending
across Lenders Controlling for Applicant
Characteristics and Property Location**

	Minority Application Rate		Minority Origination Rate		Overall Approval Rate		Minority Approval Rate		Relative Approval Rate	
	Gross ^a	Adj. ^b	Gross ^a	Adj. ^b	Gross ^a	Adj. ^b	Gross ^a	Adj. ^b	Gross ^a	Adj. ^b
Type of Institution										
Commercial banks	0.23	0.14	0.18	0.15	0.17	0.16	0.34	0.32	0.41	0.28
Thrift institutions	0.18	0.11	0.15	0.11	0.12	0.11	0.27	0.25	0.29	0.23
Credit unions	0.28	0.26	0.19	0.26	0.16	0.16	0.32	0.31	0.38	0.27
Bank subsidiaries	0.16	0.12	0.14	0.12	0.20	0.18	0.32	0.30	0.40	0.27
Thrift subsidiaries	0.19	0.15	0.14	0.15	0.19	0.18	0.30	0.28	0.38	0.27
Other mortgage banks	0.19	0.15	0.17	0.15	0.17	0.16	0.28	0.27	0.33	0.23
Size of Institution										
More than 500 applications	0.13	0.05	0.13	0.05	0.11	0.09	0.16	0.13	0.12	0.07
100 to 500 applications	0.12	0.05	0.11	0.05	0.13	0.11	0.21	0.20	0.21	0.16
Less than 100 applications	0.23	0.17	0.19	0.17	0.19	0.18	0.35	0.34	0.43	0.31
Market Share of Institution										
More than 5 percent	0.16	0.05	0.16	0.05	0.12	0.10	0.23	0.10	0.24	0.18
1 to 5 percent	0.14	0.06	0.14	0.06	0.15	0.13	0.27	0.13	0.30	0.22
Less than 1 percent	0.23	0.18	0.25	0.19	0.19	0.18	0.35	0.18	0.43	0.30
Size of MSA										
More than 25,000 applications	0.20	0.14	0.21	0.14	0.17	0.16	0.31	0.27	0.38	0.24
Less than 25,000 applications	0.20	0.14	0.21	0.15	0.17	0.16	0.29	0.29	0.32	0.27
Percent Minority Applications										
More than 22 percent	0.28	0.18	0.30	0.18	0.19	0.19	0.28	0.27	0.32	0.21
Less than 22 percent	0.17	0.14	0.18	0.14	0.16	0.15	0.31	0.30	0.37	0.27
Total	0.20	0.14	0.21	0.15	0.17	0.16	0.31	0.29	0.37	0.26

a. Gross cross-lender variation not controlling for applicant characteristics or property location.

b. Adjusted cross-lender variation controlling for applicant characteristics and property location.

SOURCE: Authors' calculations.

V. Conclusion

This paper uses recently released HMDA data to examine differences in minority and low-income lending patterns across lending institutions. The new data allow us to identify both the application and the action taken on that application by the lender, thus enabling us to sort out lender behavior from applicant behavior to a greater extent than allowed by previous data. We therefore can determine the extent to which the differences across lenders in minority (low-income) originations found in earlier studies reflect differences in minority (low-income) application rates across lenders as opposed to differences across institutions in their minority (low-income) approval rates relative to their overall approval rates.

Our examination of the HMDA data reveals the following patterns related to lender differences in minority lending. First, lender differences in mi-

nority approval rates account for only about 10 percent of lender differences in minority loan originations: Differences across lenders in minority application rates account for the remaining 90 percent. Second, we find that very little of the lender variation in either minority application rates or approval rates can be attributed to applicant characteristics. Third, somewhat surprisingly, we determine that while property location explains a nontrivial portion of the cross-lender variance in application rates, most variation stems from differences in the applicants that lenders attract *within* the neighborhoods they serve. Finally, the correlation across lenders between minority application rates and minority approval rates is quite small. Minorities do tend to apply to lenders with low overall approval rates, but within this class of lenders, minority application rates are highest at those lenders with relatively large minority approval rates.

These results suggest that gross measures of lender performance may work fairly well in implementing a more quantitative regulatory evaluation system. They also suggest that application rate measures should play a particularly important role if increased credit flows to selected groups are the desired objective. Interestingly, even here, gross application rate measures may work fairly well in differentiating among lenders. We caution, however, that even though our research indicates that lenders vary enormously in terms of their relationships with minority and low-income applicants, we can say little about the reasons for this variation. Differences may result from illegal practices, or simply from economic factors on both sides of the market. Furthermore, because a number of financial institutions have initiated new lending practices during the last few years, the observed variation among lenders may be narrowing. Regulators and the public should attain a better understanding of the variation in lenders' practices before reaching definitive conclusions about how to use measures of such variation in enforcement of the CRA or fair lending laws.

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