RESPONSIBLE BANKING IN THE TWIN CITIES

Analysis of Banking Practices Based on 2008 - 2013 HMDA & CRA data

Minneapolis & St.Paul Metropolitan Area

Samuel Myers. Jr.
University of Minnesota
myers006@umn.edu

Won Fy Lee
University of Minnesota
leex5089@umn.edu

Jermaine Toney
The New School
jermaine.toney@gmail.com

Roy Wilkins Center for Human Relations & Social Justice

University of Minnesota

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1 Introduction

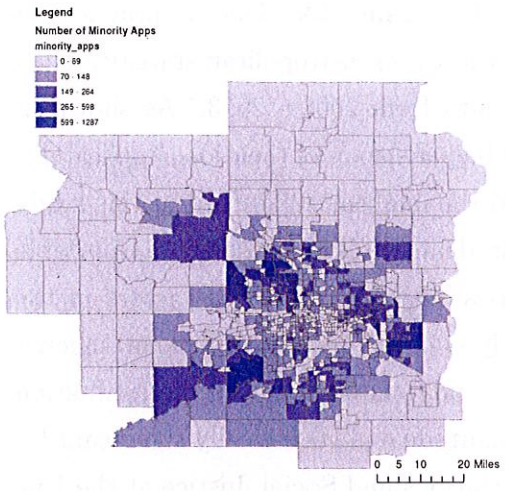
This report investigates the current state of discriminatory lending practices of financial institutions that operates in the Twin-Cities metropolitan statistical area using publicly available loan application data from 2008 - 2013. As shown in Figure 1, minorities have disproportionately higher chance of their loan applications being rejected in the Twin Cities area and the analysis conducted in this study supports the claim that the gap in the loan denial rate is not solely attributable to applicants' socio-economic characteristics that are important factors in the financial institutions' lending decision such as credit risk or applicants' income. The statistical methods employed in this study shows that the discrimination against minority group is non-trivial in magnitude and statistically significant.[1]

The Roy Wilkins Center for Human Relations and Social Justice at the University of Minnesota in coordination with the Minneapolis Foundation and Jewish Community Action undertook this study to examine how the Twin Cities 50 largest banks apply their practices in the Twin Cities with a specific focus on minority access to the credit market.[2] First part of this report ranks the 50 lenders on six unique and independent indicators of lending practices, including loan denial rates by loan type, race, ethnicity, and at various geographical levels and summarizes the data in Tables 1-6 in Table 7. Second part of this report demonstrates that there is a disparity between the lending rates of the largest 20 lenders and details what portion of the disparity is explained and unexplained due to discrimination in Tables 9 and present summary of grades in Table 12. In the third part, survey conducted to the largest 50 institutions are discussed and the final grade that aggregates measure of discrimination indicators is assigned to each of the largest 50 institutions.

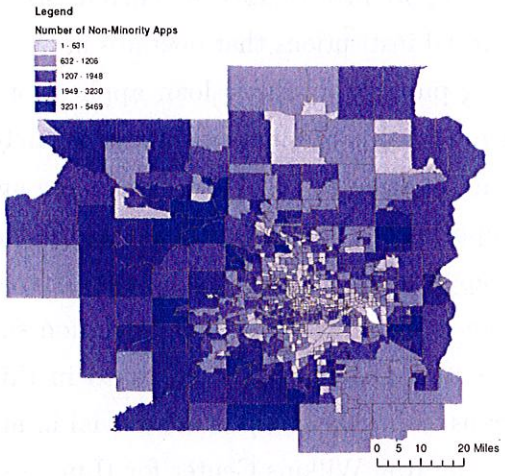
[1] see Appendix Table A0-1 and A0-2 for the detail regression results that support prevalence of discrimination in lending practices in the Twin-Cities area.

[2] The opinions expressed in this report do not necessarily represent those of the University of Minnesota, the Minneapolis Foundation, Jewish Community Action or any of the persons or organizations providing support for this study. This report summarizes the outcome of the data analysis and make no recommendation for action but rather is to be used as a tool for measuring fair access to credit markets.

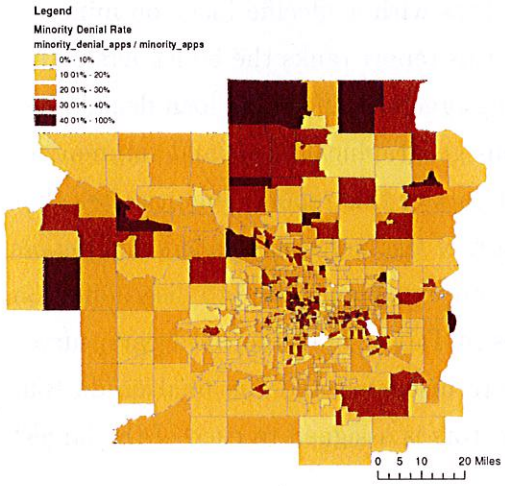
Figure 1: Loan Applications and Denial Rates in Twin Cities



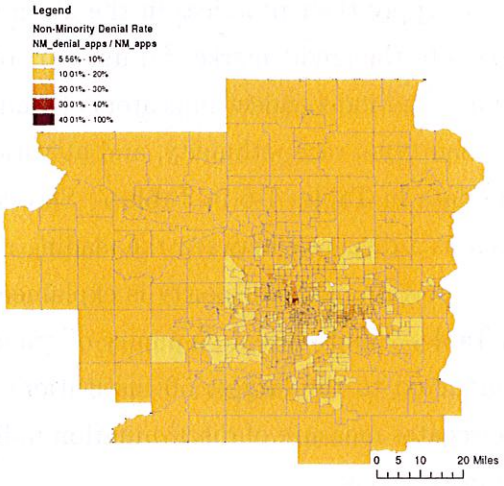
(a) Minority Number of Applications



(b) Non-minority Number of Applications



(c) Minority Loan Denial Rate



(d) Non-minority Loan Denial Rate

2 HMDA and CRA Datasets

Two data sets were utilized in this study. Under the Home Mortgage Disclosure Act (HMDA) of 1975, lenders are required to keep a Loan Application Register (LAR) that includes the date of the application, the loan amount, the type of action taken, the location of the property, the ethnicity and race of the borrower, among other information, in order to monitor and encourage minority access to the credit market. HMDA information was used for years 2008-2013 for loan applications with properties inside the metropolitan statistical area (MSA). One unit of observation is equal to one loan application; there were 1,192,995 complete applications received by the institutions in Twin-cities for the six-year period. The HMDA data also contains loan denial rates by race and ethnicity at various geographic levels. HMDA data is publicly available.[3] Second, the Community Reinvestment Act (CRA) of 1977 ensures that banks reduce discriminatory credit practices towards low-income neighborhoods by requiring banks to collect information on small business borrowers at the time of application. CRA information was used for years 2008-2013 for loan applications with businesses inside the MSA.[4] For the purposes of this analysis, 50 of the largest lenders were selected by totaling the amount of loan applications for years 2008-2013 and selecting the 50 banks with the most loan applications in the Twin Cities area. The 50 largest lenders are then compared against each other in a variety of tables based on the indicators. However, all lenders were utilized when making quintile comparisons and thus the quintile comparisons should be construed as a landscape across all 413-557 lenders depending on the indicator.[5] This study divides the distribution of an indicator into quintiles; five intervals from lowest to highest so that 20% of the population is in each group. The rank in each quintile is coded following a typical grading scale:

[3] http://www.ffiec.gov/hmda/hmdaproducts.htm

[4] http://www.ffiec.gov/cra/craproducts.htm

[5] Institutions that received less 30 applications were not considered in the calculation of distribution of indicators.

Quintiles	Ranking Scale
Top Quintile	A^+, A, A^-
2nd Quintile	B^+, B, B^-
3rd Quintile	C^+, C, C^-
4th Quintile	D^+, D, D^-
Bottom Quintile	F^+, F, F^-

2.1 Definitions

- **Minority**: Minority is defined as the union of four mutually exclusive race/ethnicity categories:

  1. American-Indian or Alaska Native
  2. Asian
  3. Hispanic
  4. Non-Hispanic Black or African American

  There is the "Not applicable" category in the Loan/Application Register(LAR) HMDA data that could be included in our definition of minority, however, this category is excluded from the definition due to the difficulty in delineating minority/non-minority for those who fall into this category. The non-Hispanic White which consists as the majority of the population in the study area is defined as non-minority group.

- **Loan Types**: The study includes five mutually exclusive Loan Types that are defined as combination of three variables available in the HMDA LAR data:

Loan Types	HMDA Codes
Home Purchase(28%)	1.Property Type=One to four-family 2.Loan Purpose=Home purchase 3.Owner-Occupancy=Owner-occupied as a principal dwelling
Manufacturing Home Purchase(0.3%)	1.Property Type=Manufactured housing 2.Loan Purpose=Home Purchase 3.Owner-Occupancy=Owner-occupied as a principal dwelling
Home Improvement(4%)	1.Property Type=One to four-family and Manufactured housing 2.Loan Purpose=Home improvement 3.Owner-Occupancy=Owner-occupied as a principal dwelling
Refinancing(62%)	1.Property Type=One to four-family and Manufactured housing 2.Loan Purpose=Refinancing 3.Owner-Occupancy=Owner-occupied as a principal dwelling
Not Owner-occupied(5.7%)	3.Owner-Occupancy=Not owner-occupied as a principal dwelling

- **Loan applications**: Applications received by institution excluding applications withdrawn by applicants or files closed for incompleteness
- **Loan Denial**: Application denied by financial institution

3 Performance Indicators &Methods

3.1 Descriptive Indicators

3.1.1 Ranking based on Descriptive Statistics from 2008-2013 HMDA data

The largest 50 lenders are ranked in the tables below based on the following four indicators derived from HMDA data.[6] The loan applications that are used for the calculation of the indicators include all the loan types defined in the section 2.1.:

- **Indicator 1 (Table 1).** Within-Institution Relative Loan Denial Rate

$$\text{Indicator } 1_j | j \in \{1, 2, 3, ..., 50\} = \frac{\text{Minority Loan Denial Rate}_j}{\text{Non-Minority Loan Denial Rate}_j}$$

- **Indicator 2 (Table 2).** Within-Institution Share of Minority Loans Originated by Dollar Amount.

$$\text{Indicator } 2_j | j \in \{1, 2, 3, ..., 50\} = \frac{\text{Dollar Amount of Originated Minority Loan}_j}{\text{Total Dollar Amount of Originated Loan}_j}$$

[6]Metropolitan Statistical Area: Four levels of geography were utilized in this study: 1) Minneapolis-St. Paul, 2) Hennepin County, 3) the City of Minneapolis and 4) the City of St. Paul. HMDA and CRA data were used for loan applications with properties inside the confines of those four geographic areas. The Minneapolis-St. Paul Metropolitan Statistical area consists of 11 counties: Anoka, Carver, Chisago, Dakota, Hennepin, Isanti, Ramsey, Scott, Sherburne, Washington and Wright counties.

- **Indicator 3 (Table 3).** Within-Institution Share of Minority Loans Originated by Number of Loans.

$$\text{Indicator } 3_j | j \in \{1, 2, 3, ..., 50\} = \frac{\text{Number of Originated Minority Loan}_j}{\text{Total Number of Originated Loan}_j}$$

- **Indicator 4 (Table 4).** Relative Market Share of Loans Originated in MSP-MSA by Dollar Amount.

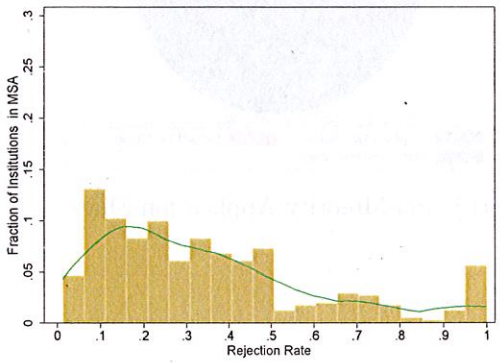
$$\text{Indicator } 4_j | j \in \{1, 2, 3, ..., 50\} = \frac{\text{Market Share of Originated Minority Loan}_j}{\text{Market Share of Originated Loan}_j}$$

What Does This Mean? Indicators in Tables 1-4 demonstrate that the majority of the largest 50 institutions are in the middle or lower distribution in terms of the specified indicators within the market. The rankings of the institutions within the MSA can be better understood looking at the distributions shown in Figure 2, the distributions show minority denial rate, non-minority denial rate and relative ratio (that is, Minority/Non-minority denial rate) of institutions operated in the Twin-cities between the study periods. One can see in panel (c) that the high fraction of the institutions have relative ratio between 1 - 2, large portion of the largest 50 institutions falls into this range, receiving ranks C or Ds.

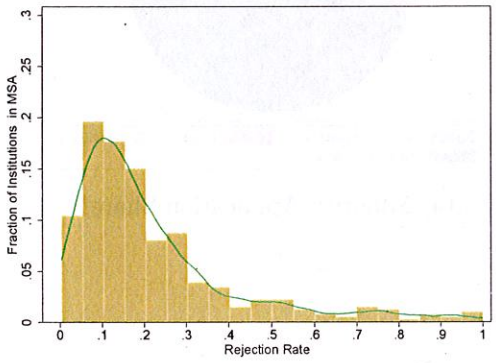
Important Caveat Indicator 1 gives Wells Fargo a quintile rank C^-, although as shown in the appendix Table A3-7, loan denial rate for minority of Wells Fargo is lower than average market loan denial rate of 0.239. This results comes from the fact that Wells Fargo also have relatively low loan denial rate for non-minorities as well. Since Indicator 1 is a measure that concerns with relative measure that is calculated by the ratio of loan denial rate for minority and non-minority within institution, the actual level of loan denial rate is not accounted by the measure. As another example, althoguh the Affinity Plus has incredibly low loan denial rate for minorities that is half the rate that of Wells fargo, the indicator 1 gives

Affinity Plus a quintile rank D since the Affinity plus has even lower loan denial rate for non-minorities, the relative loan denial ratio is large and ranked in the lower quintile in the indicator 1. Similar caution is required when interpreting indicator 4 which is a relative ratio for the market. Another thing to note from Table A3-7 is that, with few exceptions, the difference in the loan denial rate between minority and non-minority is not trivial. The loan denial rate for minority exceeds 20% for half of the institutions in the list, which indicates that relative loan denial rate is not an artifact of trivial differences.

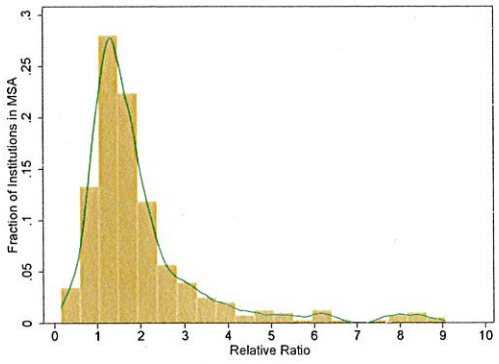
Figure 2: Loan Denial Ratio Distribution in the Twin Cities



(a) Minority Denial Rate



(b) Non-Minority Denial Rate

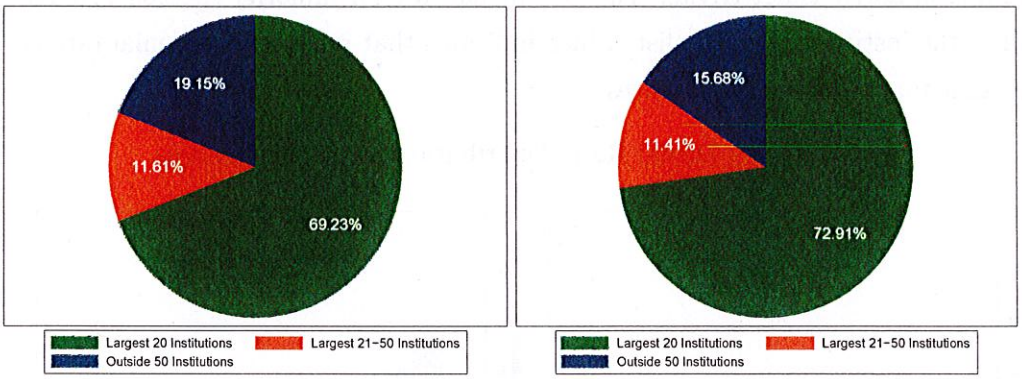


(c) Relative Ratio

It should be noted that the largest 20 institutions (50 institutions) account for nearly 70% (80%) of all loans generated in the study period in the Twin Cities

area, both for minority and non-minority groups. Although this report focus on the largest 50 institutions (20 institutions for the analysis part), we are concerned with majority of market loans in terms of practical significance.

Figure 3: Minority/Non-minority Application Share (Number of Apps): by Institution Size



(a) Minority Application Share (b) Non-Minority Application Share

Table 1: Within-Institution Relative Loan Denial Rate: Minority/Non-minority

Institution	Relative Ratio	Rank	Rank (Q)	Institution	Relative Ratio	Rank	Rank (Q)
1.Wells Fargo	1.688	236	C^-	26.BMO Harris Bank	1.666	230	C^-
2.US Bank	1.798	253	D^+	27.Franklin Amer Mort	2.042	289	D
3.JPM Chase	1.604	219	C	28.Klein Bank	2.074	292	D
4.CITI Bank	1.555	202	C	29.Trustone FCU	2.059	291	D
5.Bank of America	1.657	228	C	30.Tradition Mort	1.526	194	C
6.Bell ST Bank	1.982	280	D	31.Hiway FCU	3.999	375	F
7.PHH Mort Corp	1.756	249	D^+	32.US FCU	2.120	300	D
8.Ally Bank	1.475	180	C^+	33.Spire FCU	2.091	297	D
9.TCF Bank	1.321	146	B^-	34.Freedom Mort	2.045	290	D
10.Affinity Plus FCU	2.172	306	D	35.Homeservices Lending	1.613	221	C
11.Quicken Loans	1.232	126	B	36.USAA Savings Bank	1.184	106	B
12.Alerus Financial	1.893	265	D^+	37.Wing FCU	2.220	312	D^-
13.Summit Mort	1.710	237	C^-	38.Mort Unlimited	1.900	267	D^+
14.Flagstar Bank	1.723	241	C^-	39.Guaranteed Rate INC	2.110	298	D
15.Barrington Bank	1.411	166	B^-	40.Lake Area Bank	1.078	77	A^-
16.Marketplace H Mort	2.114	299	D	41.Ideal Credit Union	2.032	286	D
17.Associated Bank	1.918	270	D	42.Liberty Savings Bank	1.969	278	D
18.Provident Funding	1.014	63	A^-	43.Advanced Financial	1.082	78	A^-
19.CU Mort Serv	1.729	243	C^-	44.Endura Financial	2.212	311	D^-
20.Midcountry Bank	1.303	143	B	45.Primelending	1.597	215	C
21.Suntrust Mort	0.923	40	A	46.Ever Bank	1.421	168	C^+
22.Waterstone Mort	1.313	145	B	47.Topline FCU	2.019	285	D
23.Fifth Third Mort	1.452	175	C^+	48.Universal American	1.082	79	A^-
24.Bremer Bank	1.810	255	D^+	49.Merchant Bank	0.732	23	A
25.Nationstar Mort	1.394	160	B^-	50.Baxter CU	1.250	133	B

Note: Rank by Quintile (Rank (Q)) is based on Minority/Non-minority ratio distribution of 413 institutions.

See table A3-1 in the Appendix for details of relative loan denial rates for individual institutions by race/ethnicity and loan types.

See table A3-6 in the Appendix for list of top 10 institutions ranked in terms of relative loan denial rate.

Table 2: Within-Institution Share of Minority Loans: by amount($)

Institution	Share	Rank	Rank (Q)	Institution	Share	Rank	Rank (Q)
1.Wells Fargo	0.066	224	C	26.BMO Harris Bank	0.055	274	C^-
2.US Bank	0.054	282	C^-	27.Franklin Amer Mort	0.084	165	B
3.JPM Chase	0.048	309	D^+	28.Klein Bank	0.027	379	D^-
4.CITI Bank	0.064	236	C	29.Trustone FCU	0.042	324	D
5.Bank of America	0.077	186	B^-	30.Tradition Mort	0.015	427	F
6.Bell ST Bank	0.053	289	C^-	31.Hiway FCU	0.067	220	C^+
7.PHH Mort Corp	0.069	214	C^+	32.US FCU	0.055	272	C
8.Ally Bank	0.054	277	C^-	33.Spire FCU	0.032	360	D
9.TCF Bank	0.038	339	D	34.Freedom Mort	0.070	212	C^+
10.Affinity Plus FCU	0.099	128	B	35.Homeservices Lending	0.039	334	D
11.Quicken Loans	0.058	260	C	36.USAA Savings Bank	0.059	258	C
12.Alerus Financial	0.048	310	D^+	37.Wing FCU	0.025	384	D^-
13.Summit Mort	0.070	209	C^+	38.Mort Unlimited	0.099	129	B
14.Flagstar Bank	0.073	195	B^-	39.Guaranteed Rate INC	0.102	119	B^+
15.Barrington Bank	0.112	98	A^-	40.Lake Area Bank	0.128	68	A
16.Marketplace H Mort	0.065	235	C	41.Ideal Credit Union	0.047	314	D^+
17.Associated Bank	0.047	313	D^+	42.Liberty Savings Bank	0.025	387	D^-
18.Provident Funding	0.134	62	A	43.Advanced Financial	0.039	335	D
19.CU Mort Serv	0.072	197	B^-	44.Endura Financial	0.071	206	C^+
20.Midcountry Bank	0.130	65	A	45.Primelending	0.057	263	C
21.Suntrust Mort	0.176	24	A^+	46.Ever Bank	0.077	185	B^-
22.Waterstone Mort	0.070	208	C^+	47.Topline FCU	0.056	267	C
23.Fifth Third Mort	0.057	262	C	48.Universal American	0.219	17	A^+
24.Bremer Bank	0.063	240	C	49.Merchant Bank	0.011	454	F
25.Nationstar Mort	0.078	184	B^-	50.Baxter CU	0.141	49	A

Note: Rank by Quintile (Rank (Q)) is based on the *Minority share* distribution of 493 institutions.
See table A.3-2 in the Appendix for details of share of minority loans.

Table 3: Within-Institution Share of Minority Loans: by number

Institution	Share	Rank	Rank (Q)	Institution	Share	Rank	Rank (Q)
1.Wells Fargo	0.073	227	C	26.BMO Harris Bank	0.077	212	C^+
2.US Bank	0.057	283	C^-	27.Franklin Amer Mort	0.092	161	B
3.JPM Chase	0.055	293	C^-	28.Klein Bank	0.028	392	D^-
4.CITI Bank	0.061	268	C	29.Trustone FCU	0.047	330	D
5.Bank of America	0.090	170	B	30.Tradition Mort	0.016	449	F
6.Bell ST Bank	0.059	274	C^-	31.Hiway FCU	0.087	180	B^-
7.PHH Mort Corp	0.078	211	C^+	32.US FCU	0.055	292	C^-
8.Ally Bank	0.058	277	C^-	33.Spire FCU	0.037	358	D
9.TCF Bank	0.056	287	C^-	34.Freedom Mort	0.070	235	C
10.Affinity Plus FCU	0.093	156	B	35.Homeservices Lending	0.043	343	D
11.Quicken Loans	0.059	273	C^-	36.USAA Savings Bank	0.060	271	C
12.Alerus Financial	0.051	314	D^+	37.Wing FCU	0.026	407	F^+
13.Summit Mort	0.082	195	B^-	38.Mort Unlimited	0.112	106	B^+
14.Flagstar Bank	0.080	203	C^+	39.Guaranteed Rate INC	0.123	88	A^-
15.Barrington Bank	0.131	77	A^-	40.Lake Area Bank	0.182	28	A
16.Marketplace H Mort	0.078	210	C^+	41.Ideal Credit Union	0.051	313	D^+
17.Associated Bank	0.057	285	C^-	42.Liberty Savings Bank	0.024	412	F^+
18.Provident Funding	0.121	93	A^-	43.Advanced Financial	0.043	341	D
19.CU Mort Serv	0.067	247	C	44.Endura Financial	0.071	231	C
20.Midcountry Bank	0.176	31	A	45.Primelending	0.069	242	C
21.Suntrust Mort	0.158	41	A	46.Ever Bank	0.082	197	B^-
22.Waterstone Mort	0.080	204	C^+	47.Topline FCU	0.049	317	D^+
23.Fifth Third Mort	0.063	264	C	48.Universal American	0.218	19	A^+
24.Bremer Bank	0.069	237	C	49.Merchant Bank	0.013	462	F
25.Nationstar Mort	0.086	184	B^-	50.Baxter CU	0.138	68	A

Note: Rank by Quintile (Rank (Q)) is based on the *Minority share* distribution of 493 institutions.
See table A.3-2 in the Appendix for details of share of minority loans.

Table 4: Relative market share ratio (Minority share/Total loan share)

Institution	Share	Rank	Rank (Q)	Institution	Share	Rank	Rank (Q)
1.Wells Fargo	0.984	224	C	26.BMO Harris Bank	0.819	274	C^-
2.US Bank	0.801	282	C^-	27.Franklin Amer Mort	1.255	165	B
3.JPM Chase	0.716	309	D^+	28.Klein Bank	0.405	379	D^-
4.CITI Bank	0.958	236	C	29.Trustone FCU	0.631	324	D
5.Bank of America	1.156	186	B^-	30.Tradition Mort	0.226	427	F
6.Bell ST Bank	0.787	289	C^-	31.Hiway FCU	0.997	220	C^+
7.PHH Mort Corp	1.036	214	C^+	32.US FCU	0.825	272	C
8.Ally Bank	0.808	277	C^-	33.Spire FCU	0.477	360	D
9.TCF Bank	0.574	339	D	34.Freedom Mort	1.040	212	C^+
10.Affinity Plus FCU	1.483	128	B	35.Homeservices Lending	0.586	334	D
11.Quicken Loans	0.861	260	C	36.USAA Savings Bank	0.875	258	C
12.Alerus Financial	0.716	310	D^+	37.Wing FCU	0.375	384	D^-
13.Summit Mort	1.041	209	C^+	38.Mort Unlimited	1.477	129	B
14.Flagstar Bank	1.098	195	B^-	39.Guaranteed Rate INC	1.525	119	B^+
15.Barrington Bank	1.675	98	A^-	40.Lake Area Bank	1.907	68	A
16.Marketplace H Mort	0.964	235	C	41.Ideal Credit Union	0.706	314	D^+
17.Associated Bank	0.708	313	D^+	42.Liberty Savings Bank	0.366	387	D^-
18.Provident Funding	2.006	62	A	43.Advanced Financial	0.585	335	D
19.CU Mort Serv	1.081	197	B^-	44.Endura Finanacial	1.053	206	C^+
20.Midcountry Bank	1.935	65	A	45.Primelending	0.845	263	C
21.Suntrust Mort	2.631	24	A^+	46.Ever Bank	1.156	185	B^-
22.Waterstone Mort	1.048	208	C^+	47.Topline FCU	0.834	267	C
23.Fifth Third Mort	0.849	262	C	48.Universal American	3.266	17	A^+
24.Bremer Bank	0.941	240	C	49.Merchant Bank	0.161	454	F
25.Nationstar Mort	1.161	184	B^-	50.Baxter CU	2.111	49	A

Note: Rank by Quintile (Rank (Q)) is based on the *Minority share* distribution of 493 institutions.
See table A.3-3 in the Appendix for details of share of minority Loans to the market.

3.1.2 Ranking based on Descriptive Statistics from 2008-2013 CRA data

The CRA data provides small business loan lending activity information of CRA-regulated institutions at the county-level. Lenders that meet or exceed the designated asset size thresholds ($1.202 billion as of December 31 of each of the prior two calendar years) are subject to the data collection and reporting requirements under CRA. There are total of 245 institutions that had data entry in the CRA reporting during 2008 - 2013 Among the largest 50 institutions defined in this report, 17 out of 50 have entries in the CRA data.

- **Indicators 5 (Table 6).** Within-Institution Share of Small Business Loans to Low-Income Tracts

$$\text{Indicator } 5_j | j \in \{1, 2, 3, ..., 17\} = \frac{\text{Dollar Amount of Originated Business Loan to LI CT}_j}{\text{Total Dollar Amount of Business Loan}_j}$$

- **Indicators 6 (Table 6).** Within-Institution Share of Small Business Loans to Low&Middle-Income Tracts

$$\text{Indicator } 6_j | j \in \{1, 2, 3, ..., 17\} = \frac{\text{Dollar Amount of Originated Business Loan to LMI CT}_j}{\text{Total Dollar Amount of Business Loan}_j}$$

What Does This Mean? A similar pattern is found in the small business lending to the low income, and often minority concentrated, census tracts as in the home mortgage loan loans to minority. Most of the rankings of the institutions falls in the middle or lower rank.

Table 6: Ranking based on 2008-2013 CRA data

		Amount(Dollar in thousands)			share ($)		share (#)	
	Institutions	$	#	Avg Loan $	Share	Rank	Share	Rank
LI CT	1.Wells Fargo	277495	7654	36.255	0.079	C	0.065	D^+
	2.US Bank	204956	4901	41.819	0.080	C	0.081	C
	3.JPM Chase	6036	163	37.031	0.057	D^+	0.068	D^+
	4.CITI Bank	4356	914	4.766	0.070	C^-	0.092	C
	5.Bank of America	11198	34	329.353	0.058	D^+	0.063	D^+
	6.Bell ST Bank	24694	193	127.948	0.125	B^-	0.128	B
	8.Ally Bank	2295	5	459	0.263	A^-	0.294	A^-
	9.TCF Bank	18368	51	360.157	0.137	B	0.076	C
	12.Alerus Financial	16393	74	221.527	0.051	D^+	0.058	D^+
	15.Barrington Bank	0	0		0	F	0	F
	17.Associated Bank	108865	562	193.710	0.092	C	0.104	C^+
	21.Suntrust Mort	2857	32	89.281	0.119	B^-	0.098	C^+
	23.Fifth Third Mort	770	1	770	0.084	C	0.020	D^-
	24.Bremer Bank	145636	613	237.579	0.093	C^+	0.094	C^+
	26.BMO Harris Bank	40406	186	217.237	0.097	C^+	0.072	C^-
	28.Klein Bank	65777	379	173.554	0.061	D^+	0.049	D
	46.Ever Bank	52	2	26	0.056	D^+	0.087	C
LMI CT	1.Wells Fargo	689668	20430	30.119	0.195	C	0.174	C
	2.US Bank	560198	11270	42.163	0.219	C^+	0.185	C
	3.JPM Chase	15460	378	44.005	0.146	D^+	0.157	C^-
	4.CITI Bank	9657	1876	6.261	0.155	C^-	0.188	C^+
	5.Bank of America	28685	81	357.621	0.150	D^+	0.151	D^+
	6.Bell ST Bank	39345	240	131.344	0.199	C	0.159	C
	8.Ally Bank	2295	5	513.353	0.263	B	0.294	B
	9.TCF Bank	31976	123	200.722	0.238	B^-	0.184	C
	12.Alerus Financial	68363	254	252.265	0.212	C^+	0.198	C^+
	15.Barrington Bank	50	2	227	0.044	D^-	0.400	B^+
	17.Associated Bank	335639	1520	219.610	0.284	B	0.282	B
	21.Suntrust Mort	3428	51	73.440	0.143	D^+	0.156	D^+
	23.Fifth Third Mort	2891	12	183.300	0.315	B	0.240	B
	24.Bremer Bank	371891	1565	240.508	0.237	B^-	0.240	B
	26.BMO Harris Bank	106542	539	163.157	0.254	B	0.210	B^-
	28.Klein Bank	133337	709	139.371	0.123	D	0.091	D^-
	46.Ever Bank	52	2	40.435	0.056	D^-	0.087	D^-

Note: Rank is based on the distribution of 245 institutions.

LI: Low Income loan is defined as the loan to small business with 50% or less of Median Family Income of MSP Metropolitan Statistical Area.

LMI: Low and Middle Income loan is defined as the loan to small business with 80% or less of Median Family Income of MSP Metropolitan Statistical Area.

3.1.3 Summary Quintile Ranking based on HMDA & CRA indicators

The quintile rankings based on the 6 indicators from HMDA and CRA data are summarized in Table 7. The quintiles are color coded to help the reader evaluate the results:

Quintiles	Color Code
Top Quintile	
2nd Quintile	
3rd Quintile	
4th Quintile	
Bottom Quintile	

What Does This Mean? Clearly, the 50 largest institutions are not the highest ranking in terms of minority/non-minority disparity ratio, the share of minority loans (Indicators 1 - 4) and the share of small business loans to L&MI census tracts (Indicators 5 and 6). Only a select few of the 50 largest institutions have green cells that represent a higher ranking among the institutions operating in the market. It is important to note that these indicators are "within-institution" measures that are not affected by the institution size.

Table 7: Summary Quintile Rankings based on HMDA & CRA indicators

	HMDA				CRA	
Institution	Indicator 1	Indicator 2	Indicator 3	Indicator 4	Indicator 5	Indicator 6
1.Wells Fargo	C$^-$	C	C	C	C	C
2.US Bank	D$^+$	C$^-$	C$^-$	C$^-$	C	C$^+$
3.JPM Chase	C	D$^+$	C$^-$	D$^+$	D$^+$	D$^+$
4.CITI Bank	C	C	C	C	C$^-$	C$^-$
5.Bank of America	C	B$^-$	B	B$^-$	D$^+$	D$^+$
6.Bell ST Bank	D	C$^-$	C$^-$	C$^-$	B$^-$	C
7.PHH Mort Corp	D$^+$	C$^+$	C$^+$	C$^+$	-	-
8.Ally Bank	C$^+$	C$^-$	C$^-$	C$^-$	A$^-$	B
9.TCF Bank	B$^-$	D	C$^-$	D	B	B$^-$
10.Affinity Plus FCU	D	B	B	B	-	-
11.Quicken Loans	B	C	C$^-$	C	-	-
12.Alerus Financial	D$^+$	D$^+$	D$^+$	D$^+$	D$^+$	C$^+$
13.Summit Mort	C$^-$	C$^+$	B$^-$	C$^+$	-	-
14.Flagstar Bank	C$^-$	B$^-$	C$^+$	B$^-$	-	-
15.Barrington Bank	B$^-$	A$^-$	A$^-$	A$^-$	F	F
16.Marketplace H Mort	D	C	C$^+$	C	-	-
17.Associated Bank	D	D$^+$	C$^-$	D$^+$	C	B
18.Provident Funding	A$^-$	A	A$^-$	A	-	-
19.CU Mort Serv	C$^-$	B$^-$	C	B$^-$	-	-
20.Midcountry Bank	B	A	A	A	-	-
21.Suntrust Mort	A	A$^+$	A	A$^+$	B$^-$	D$^+$
22.Waterstone Mort	B	C$^+$	C$^+$	C$^+$	-	-
23.Fifth Third Mort	C$^+$	C	C	C	C	B
24.Bremer Bank	D$^+$	C	C	C	C$^+$	B$^-$
25.Nationstar Mort	B$^-$	B$^-$	B$^-$	B$^-$	-	-

Note: Top Quintile 2nd Quintile 3rd Quintile 4th Quintile Bottom Quintile

Indicator 1: Within-Institution Disparity Ratio

Indicator 2: Within-Institution Share of Minority Loans, Dollar Amount

Indicator 3: Within-Institution Share of Minority Loans, Number of Loans

Indicator 4: Market Disparity Ratio

Indicator 5: Within-Institution Share of Small Business Loans to Low-Income Tracts

Indicator 6: Within-Institution Share of Small Business Loans to Low and Middle-Income Tracts

Table 7: Summary Quintile Rankings based on HMDA & CRA indicators - continued

	HMDA				CRA	
Institution	Indicator 1	Indicator 2	Indicator 3	Indicator 4	Indicator 5	Indicator 6
26.BMO Harris Bank	C$^-$	C$^-$	C$^+$	C$^-$	C$^+$	B
27.Franklin Amer Mort	D	B	B	B	-	-
28.Klein Bank	D	D$^-$	D$^-$	D$^-$	D$^+$	D
29.Trustone FCU	D	D	D	D	-	-
30.Tradition Mort	C	F	F	F	-	-
31.Hiway FCU	F	C$^+$	B$^-$	C$^+$	-	-
32.US FCU	D	C	C$^-$	C	-	-
33.Spire FCU	D	D	D	D	-	-
34.Freedom Mort	D	C$^+$	C	C$^+$	-	-
35.Homeservices Lending	C	D	D	D	-	-
36.USAA Savings Bank	B	C	C	C	-	-
37.Wing FCU	D$^-$	D$^-$	F$^+$	D$^-$	-	-
38.Mort Unlimited	D$^+$	B	B$^+$	B	-	-
39.Guaranteed Rate INC	D	B$^+$	A$^-$	B$^+$	-	-
40.Lake Area Bank	A$^-$	A	A	A	-	-
41.Ideal Credit Union	D	D$^+$	D$^+$	D$^+$	-	-
42.Liberty Savings Bank	D	D$^-$	F$^+$	D$^-$	-	-
43.Advanced Financial	A$^-$	D	D	D	-	-
44.Endura Financial	D$^-$	C$^+$	C	C$^+$	-	-
45.Primelending	C	C	C	C	-	-
46.Ever Bank	C$^+$	B$^-$	B$^-$	B$^-$	D$^+$	D$^-$
47.Topline FCU	D	C	D$^+$	C	-	-
48.Universal American	A$^-$	A$^+$	A$^+$	A$^+$	-	-
49.Merchant Bank	A	F	F	F	-	-
50.Baxter CU	B	A	A	A	-	-

Note: Top Quintile 2nd Quintile 3rd Quintile 4th Quintile Bottom Quintile

Indicator 1: Within-Institution Disparity Ratio

Indicator 2: Within-Institution Share of Minority Loans, Dollar Amount

Indicator 3: Within-Institution Share of Minority Loans, Number of Loans

Indicator 4: Market Disparity Ratio

Indicator 5: Within-Institution Share of Small Business Loans to Low-Income Tracts

Indicator 6: Within-Institution Share of Small Business Loans to Low and Middle-Income Tracts

3.2 Indicators from Discrimination Analysis

Four different statistical methods are employed to measure degree of discrimination. We focus on the largest 20 institutions in three of the four methods due to the limited number of minority loan applications received in the smaller institutions that hampers statistical analysis. However, as shown in Table 10, largest 20 institutions are of particular importance in that it account for 67% of all minority loans given out in the MSP-MSA for the study periods. The methods employed in this section allows one to examine whether the loan approval/denial decision of the financial institutions can be explained by the observed differences between the minority and non-minority such as applicants' annual income, debt-to-income ratio and census tract characteristics. The parts of the loan denial disparity that are left unexplained after we account for these readily observable characteristics, we attribute it to the discrimination. For each of the four methods, we conduct both ordinary least squares (OLS), an estimation methods that minimizes the sum of squared residuals, and maximum-likelihood estimation (MLE), an estimation methods that maximizes sample log-likelihood under some distributional assumption for the purpose of comparison in rank changes depending on the estimation methods.

3.2.1 Estimation of Credit Risk

One of the limitations of HMDA data in the study of credit market discrimination is the availability of the key variable in the loan denial decision function of lenders, the credit risk of applicants. In order to overcome this limitation, the credit risk is estimated by exploiting the fact that HMDA data records reasons for loan denial for each of the denied applications. A binary dependent variable is created that equals 1 if the reason for denial is either due to credit history or incomplete credit application and 0 otherwise for the loans that are denied. Then, credit risk is estimated for each applications conditional on observed characteristics that includes geographic, race, sex, income, year, debt-to-income ratio, loan types from HMDA data and census tract characteristics that includes minority share, income level, unemployment rate, housing value from 5-year American Community Survey (ACS) data for the corresponding years. The estimated credit risk correctly predicted the

actual incidence of loan rejection at the reasonable level (71.8% at the threshold of 50%).

3.2.2 Blinder-Oaxaca Decomposition

The Blinder-Oaxaca (BO) decomposition is used to determine a measure of discrimination. The BO decomposition is an oft-used method in disciplines of economics literature, which analyze gap in mean outcomes between two groups by one due to the qualification or endowment difference (that is, explained portion) and the other due to the discrimination (that is, unexplained portion). The BO decomposition is estimated in two steps. First, loan denial equation is estimated for minority and non-minority group separately, then, the mean estimated difference in loan denial rate between the two groups are decomposed using coefficients estimated in the first step.

Missing key variable in the loan approval/denial decision: Credit Risk One of the limitations of HMDA data in the study of credit market discrimination is the availability of the key variable in the loan denial decision function of lenders, the credit risk of applicants. In order to overcome this limitation, the credit risk is estimated using logit model. The estimated credit risk correctly predicted the actual incidence of loan rejection at the reasonable level (71.8% at the threshold of 50%).

LPM-Based. The linear probability model (LPM) estimates the binary dependent variable (that is, loan approval/denial decision) using OLS method, which assumes the probability of loan denial is a linear function of the controlled variables. The LPM-based BO decomposition can be written as:

$$\Delta_{Linear} = \underbrace{E(\mathbf{X}_{ij}^{NM} - \mathbf{X}_{ij}^{M})\beta^{NM}}_{\text{Explained portion}} + \underbrace{E(\mathbf{X}_{ij}^{M})(\beta^{NM} - \beta^{M})}_{\text{Unexplained portion}}$$

where Δ_{Linear} denote mean differences in loan denial rates between non-minority and minority group estimates using LPM. $E(\mathbf{X}_{ij}^{NM} - \mathbf{X}_{ij}^{M})\beta^{NM}$ is the explained portion in the mean difference that stems from qualification difference between minority and non-minority. This portion of the gap is often referred to as the endowment effect and β^{NM} is the counter-factual non-discriminatory coefficient vector from the LPM model, which is, by assumption, coefficients on the non-minority group. $E(\mathbf{X}_{ij}^{M})(\beta^{NM} - \beta^{M})$ is the unexplained portion in the mean difference that is due to the coefficient difference which proxies for the discrimination. If there exist no discrimination against minority, β^{NM} would be identical to β^{M}.

$\mathbf{X}$ is a control vector that includes socio-economic characteristics of individual applicants as well as the loan characteristics that affects the possible loan approval decision of the institutions. Specifically, the $\mathbf{X}$ includes annual income, gender, co-applicant race/ethnicity, loan amount, debt-to-income ratio, loan types, estimated credit risk, census tract characteristics, indicator for property located in the city of Minneapolis and city of St.Paul and year of application.

In the decomposition analysis, only the largest 20 institutions in terms of the number of loan applications received are used due to small sample size.

Logit Model-Based. Although LPM is widely used for its simplicity, the assumption of LPM that the marginal effect of explanatory variables on the loan denial rate are linear is unrealistic. Non-linear models are often employed in order to overcome this problem of LPM. The assumption of the logit-based model that marginal effects on loan denial rate are smaller at the extreme values of $\mathbf{X}$ than the middle values is more intuitive than the linear assumption of LPM. The non-linear logit-based BO can be described in its simple equation:

$$\Delta_{NL} = \underbrace{[E_{\beta^{NM}}(Y_{ij}^{NM}|\mathbf{X}_{ij}^{NM}) - E_{\beta^{NM}}(Y_{ij}^{M}|\mathbf{X}_{ij}^{M})]}_{\text{Explained portion}} + \underbrace{[E_{\beta^{NM}}(Y_{ij}^{M}|\mathbf{X}_{ij}^{M}) - E_{\beta^{M}}(Y_{ij}^{M}|\mathbf{X}_{ij}^{M})]}_{\text{Unexplained portion}}$$

where Δ_{NL} denote mean difference in loan denial rate between non-minority and minority group. $E_{\beta^{NM}}(Y_{ij}^{NM}|\mathbf{X}_{ij}^{NM})$ is the conditional expectation of Y_{ij}^{NM} evaluated at the parameter vector β^{NM}, similar to the LPM-based model, β^{NM} is the counterfactual non-discriminatory coefficient vector, which is, by assumption, coefficients on non-minority group. If there exist no discrimination against the minority group, $\hat{\beta}^{NM}$ would be identical to $\hat{\beta}^{M}$.

3.2.3 Within-Institution Multiple Regression with Minority Dummy

Multiple Regression with minority dummy is a simpler method that we use for the measure of discrimination. The coefficient on minority dummy can be interpreted as an alternative measure of discrimination. The model can be written as:

$$LD_{ij} = \alpha_j + \mathbf{X}_{ij}'\beta + \gamma Minority_{ij} + \epsilon_{ij}$$

where LD_{ij} is the loan denial indicator for applicant i for institution j, $\mathbf{X}_i$ is the control vector same as in the BO-decomposition that includes socio-economic characteristics of individual applicants that affects the possible loan approval decision of the institutions. The ϵ_{ij} is a random error. The variable of interest, *Minority* is a dummy variable that equals 1 if applicant belongs to a minority group and 0 if otherwise. The γ is the measure of discrimination estimated for each institution. By controlling for $\mathbf{X}_i$, we test the hypothesis of existence of discrimination against minorities among a group of people who have same qualifications in $\mathbf{X}_i$.

3.2.4 Pooled Multiple Regression with Institution Dummy and Interaction Terms

$$LD_i = \alpha_0 + \mathbf{X}_i'\beta + \gamma_1 \sum_{j=1}^{20} Inst_{ij} + \gamma_2 Minority_i + \delta \sum_{j=1}^{20} Inst_{ij} \times Minority_i + \epsilon_i$$

By introducing the interaction term, $\gamma_2 + \delta$ presents measure of discrimination for each of the largest 20 institutions included in the analysis. $Inst_j$ is an indicator for the largest 20 institutions where $Inst_j = 0$ is the all the institutions that are not. Note that when $Inst_j = 0$, γ_2 captures the average discrimination made by the all the non-largest 20 institutions in the market. δ captures incremental discrimination made by each largest 20 institutions in reference to the average discrimination made by the non-largest 20 institutions in the market. The largest 20 institutions are ranked based on the size of $\gamma_2 + \delta$.

3.2.5 Results

The estimation results and ordered ranking based on estimation methods are shown in Table 9. The ranks based various methods are presented to show robustness of the estimation. Overall, the rank is consistent across the models, although not perfectly. First thing to note is that majority of the coefficients are positive and statistically significant, which implies the presence of gap that is unexplained after controlling for the important factors in the institutions' loan approval/denial decision. The coefficients presented in the Table 9 can be interpreted as follows:

Pooled LPM. The $Gamma_{LPM}$ is the marginal change in the loan denial rate for minority of jth institution in the largest 20 institutions, compared to the loan denial rate for non-minority outside of the largest 20 institutions[7], holding everything else constant.

Pooled Logit. The $Gamma_{Logit}$ represents the odds of getting the loan denied as minority of jth institution in the largest 20 insitutions, compared to the odds of getting the loan denied as non-minority outside of the largest 20 institutions, holding everything else constant.

Individual LPM. The coefficient on minority is the marginal change in the loan denial rate for minority for jth, compared to the loan denial rate for non-minority

[7]Descriptive statistics of largest 20 lenders and the non-largest 20 lenders are presented in Table 10.

of the same jth institution, holding everything else constant.

Individual Logit. The coefficient on minority is the odds of getting the loan denied as minority of jth institution, compared to the odds of getting the loan denied as non-minority of the same jth institution, holding everything else constant.

BO Decomp-LPM&Logit. Pct Unexplained is the unexplained portion in the mean difference that is due to the coefficient difference which proxies for the discrimination.

One can infer from the analysis conducted in this section that discrimination against minority group exists in the market[8] and the size is not trivial.

■ Various measures, for example, of US Bank can be interpreted as follows for each methods:

Pooled LPM. Being a minority increases the probability of loan denial by 8.1% compared to the non-minority group outside of the largest 20 institutions, given that other qualifications controlled in the model remain the same for minority and non-minority.

Pooled Logit. Odds of getting the loan denial increases by 24% compared to the non-minority group outside of the largest 20 institutions, given that other qualifications controlled in the model remain the same for minority and non-minority.

Individual LPM. Being a minority increases the probability of loan denial by 6.8% compared to the non-minority group in US Bank, given that other qualifications controlled in the model remain the same for minority and non-minority.

[8]The results from BO-decomposition conducted for the entire MSA including all institutions shows that unexplained portion of the gap is 40% and 20% for LPM- and Logit-based decomposition, respectively.

Individual Logit. Odds of getting the loan denial increases by 54% compared to the non-minority group in US Bank, given that other qualifications controlled in the model remain the same for minority and non-minority.

BO Decomp-LPM&Logit. The results show that 31% and 20% of minority and non-minority gap in loan denial rate is left unexplained given the controlled qualifications are same for minority and non-minority group, for LPM and Logit model respectively.

- **Table 9.** Result of Discrimination Analysis
- **Table 10.** Descriptive Statistics Comparison of Largest 20 Institutions Vs. the Rest

Table 9: Discrimination Analysis

	Pooled LPM		Pooled Logit		Individual LPM		Individual Logit		Oaxaca LPM		Oaxaca Logit	
Institutions	$Gamma_{LPM}$	Rank	$Gamma_{Logit}$	Rank	Coefficient	Rank	Coefficient	Rank	Pct Unexplained	Rank	Pct Unexplained	Rank
1.Wells Fargo	0.042	15	1.392***	11	0.031***	15	1.214***	10	0.450***	10	0.246***	9
2.US Bank	0.101***	18	1.661***	17	0.094***	19	1.732***	19	0.686***	15	0.595***	14
3.JPM Chase	0.024***	12	1.351	9	0.062***	17	2.298***	20	1.348***	20	1.974***	19
4.CITI Bank	0.033	13	1.159	4	0	7	0.989	6	-0.383*	6	-0.565***	6
5.Bank of America	0.050	16	1.461***	13	0.065***	18	1.712***	17	0.819***	17	0.882***	17
6.Bell ST Bank	0.010***	8	1.778***	18	0.019***	10	1.514***	16	0.664***	14	0.608***	15
7.PHH Mort Corp	0.011***	10	1.436	12	0.026***	14	1.487***	15	0.655***	13	0.388***	10
8.Ally Bank	0.040	14	1.102	3	0.025	13	1.146	8	0.377	9	0.149	8
9.TCF Bank	0.107***	19	1.327	8	-0.020	3	1.038	7	-0.719***	4	-0.363***	7
10.Affinity Plus FCU	0.009***	7	1.626**	16	0.020***	11	1.433**	14	0.986***	19	0.401	11
11.Quicken Loans	-0***	3	0.903***	1	-0.059***	1	0.645***	1	-2.249***	1	-3.021***	3
12.Alerus Financial	-0.002***	2	1.605	15	0.008	8	1.377	13	0.817	16	1.574	18
13.Summit Mort	0.002***	4	1.381	10	-0.003	6	0.886	4	-0.141	7	22.557	20
14.Flagstar Bank	0.051	17	1.466	14	0.035**	16	1.286**	12	0.494**	11	0.457*	12
15.Barrington Bank	-0.003***	1	1.175	5	-0.007	5	0.887	5	-1.188*	3	-0.798*	5
16.Marketplace H Mort	0.004***	5	1.870**	19	0.010	9	1.216	11	0.206	8	-6.302	2
17.Associate Bank	0.138***	20	1.888***	20	0.101***	20	1.729***	18	0.592***	12	0.482***	13
18.Provident Funding	0.007***	6	1.046**	2	-0.024	2	0.879	3	-1.912	2	-94.294	1
19.CU Mort Serv	0.011***	9	1.237	7	-0.014	4	0.673	2	-0.549	5	-1.502***	4
20.Midcountry Bank	0.014**	11	1.202	6	0.021	12	1.203	9	0.853	18	0.800	16

* p<0.1, ** p<0.05, *** p<0.01

The coefficient on *Minority* in the LMP-based pooled regression for the market is 0.048.

Table 10: Descriptive Statistics Comparison of Largest 20 lenders Vs. the Rest

	2008-2013 Data	
	The 20 Largest Lenders	All other Lenders
Minority Denial Rate	0.215	0.298
Non-minority Denial Rate	0.128	0.189
Minority/Non-minority Ratio	1.675	1.570
Share of Loans to $Minority_{Insl}$(#)	0.069	0.076
Share of Loans to $Minority_{Insl}$($)	0.063	0.074
Share of Loans to $Minority_{MSA}$(#)	0.674	0.325
Share of Loans to $Minority_{MSA}$($)	0.670	0.329
Share of Loans to $Minority_{LMICT}$(#)	0.666	0.333
Share of Loans to $Minority_{LMICT}$($)	0.671	0.328

Note: Number of institutions used in the sample are 537.

Institutions that receive less than 30 apps were dropped from the sample.

3.2.6 Quintile Rankings based on Pooled Multiple Regression with individual Institution Dummy and Interaction Terms

$$LD_i = \alpha_0 + \mathbf{X}_i'\beta + \kappa_1 Inst_i + \kappa_2 Minority_i + \rho Inst_i \times Minority_i + \epsilon_i$$

The only difference in the model compared to the model in the section 3.2.4 is that it includes single institution dummy as opposed to the 20 institution dummies and repeated 50 times. The coefficients from this model compares the individual ith lender to everybody else. The coefficient $\kappa_1 + \rho$ indicates difference in discrimination of ith lender relative to everybody else. The largest 50 institutions are ranked based on the ratio of $(\kappa_1 + \rho)/\kappa_2$, which represents the discrimination contributed by the ith institution and the discrimination made by all the other institutions in the market. It should be noted that the ranking is determined based on relative to the largest 50 lenders, instead of all the available lenders in the market as in the ranking based on descriptive indicator in table 7.

Table 11: Quintile Rankings based on analysis

	Rank Based on Individual Pooled Interaction			
Institution	Relative Share-OLS	Rank	Relative Share-Logit	Rank
1.Wells Fargo	-0.278	C^-	-0.219	C^-
2.US Bank	2.230	F^+	1.717	F
3.JPM Chase	-1.200	B	-1.253	B
4.CITI Bank	-0.064	D^+	-0.190	D^+
5.Bank of America	-0.273	D^+	-0.280	C
6.Bell ST Bank	-2.113	A	-3.030	A
7.PHH Mort Corp	-1.465	B^+	-1.619	B^+
8.Ally Bank	0.719	D^-	0.267	D
9.TCF Bank	5.613	F^-	3.182	F^-
10.Affinity Plus FCU	-2.804	A^+	-3.819	A
11.Quicken Loans	-0.245	D^+	-0.405	C
12.Alerus Financial	-2.180	A	-4.361	A^+
13.Summit Mort	-2.195	A	-3.105	A
14.Flagstar Bank	0.314	D	0.432	D^-
15.Barrington Bank	-1.531	B^+	-1.572	B^+
16.Marketplace H Mort	-2.550	A	-3.820	A^+
17.Associated Bank	2.713	F	1.859	F
18.Provident Funding	0.065	D	0.172	D
19.CU Mort Serv	-1.848	A^-	-2.165	A^-
20.Midcountry Bank	-0.413	C^-	-0.007	D^+
21.Suntrust Mort	-1.092	B	-1.178	B
22.Waterstone Mort	-0.539	C	-0.134	D^+
23.Fifth Third Mort	0.333	D	0.385	D
24.Bremer Bank	-2.617	A^+	-3.807	A
25.Nationstar Mort	0.174	D	0.020	D

Note: Top Quintile 2nd Quintile 3rd Quintile 4th Quintile Bottom Quintile

Relative Share is calculated by the ratio of $(\kappa_1 + \rho)/\kappa_2$

Table 11: Quintile Rankings based on analysis-continued

	Rank Based on Individual Pooled Interaction			
Institution	Relative Share-OLS	Rank	Relative Share-Logit	Rank
26.BMO Harris Bank	3.713	F	2.724	F
27.Franklin Amer Mort	-0.490	C	-0.383	C
28.Klein Bank	0.824	D^-	0.682	D^-
29.Trustone FCU	-0.964	B^-	-1.158	B^-
30.Tradition Mort	1.307	F^+	1.535	F^+
31.Hiway FCU	-1.071	B	-1.149	B^-
32.US FCU	-0.761	C^+	-0.874	C^+
33.Spire FCU	0.312	D	0.049	D
34.Freedom Mort	1.158	F^+	0.815	F^+
35.Homeservices Lending	-0.946	B^-	-1.362	B
36.USAA Savings Bank	3.405	F	2.890	F^-
37.Wing FCU	-0.664	C^+	-0.778	C^+
38.Mort Unlimited	-2.872	A^+	-5.953	A^+
39.Guaranteed Rate INC	-2.033	A	-2.770	A^-
40.Lake Area Bank	-0.619	C^+	-0.250	C
41.Ideal Credit Union	2.393	F	1.556	F^+
42.Liberty Savings Bank	-1.214	B	-1.370	B
43.Advanced Financial	5.419	F^-	2.616	F
44.Endura Financial	-0.562	C	-0.682	C^+
45.Primelending	-1.280	B	-1.359	B
46.Ever Bank	3.352	F	2.289	F
47.Topline FCU	-0.446	C	-0.593	C
48.Universal American	-0.466	C	-0.200	C^-
49.Merchant Bank	-1.962	A^-	-2.796	A
50.Baxter CU	-1.405	B^+	-1.793	B^+

Note: Top Quintile 2nd Quintile 3rd Quintile 4th Quintile Bottom Quintile

Relative Share is calculated by the ratio of $(\kappa_1 + \rho)/\kappa_2$

3.2.7 Summary ranking based on discrimination analysis

The letter grade was assigned to the estimated coefficients from each of the methods that was conducted only for top 20 institutions. The range for the grading for each of the methods comes from coefficients and standard errors estimated using non-top 20 institution pooled sample. The following scale was used for the grading:

Grade	Rule
F	$\hat{\beta} + 2 \cdot \sigma < \hat{\gamma}$
D	$\hat{\beta} + \sigma < \hat{\gamma} \leq \hat{\beta} + 2 \cdot \sigma$
C	$\hat{\beta} - \sigma \leq \hat{\gamma} \leq \hat{\beta} + \sigma$
B	$\hat{\beta} - 2 \cdot \sigma \leq \hat{\gamma} < \hat{\beta} - \sigma$
A	$\hat{\beta} - 2 \cdot \sigma < \hat{\gamma}$

where $\hat{\beta}$ is the coefficient estimated from the non-top 20 sample, σ is the standard error and $\hat{\gamma}$ is the coefficients in the discrimination analysis. The summary ranking based on the discrimination analysis is shown in Table 12.

Table 12: Summary Rankings based on Discrimination Analysis

Institution	Indicator 1	Indicator 2	Indicator 3	Indicator 4	Indicator 5	Indicator 6	Indicator 7	Indicator 8
1.Wells Fargo	A	A	A	A	C	A	C^-	C^-
2.US Bank	F	F	F	F	F	F	F	F
3.JPM Chase	A	A	F	F	F	F	B	B
4.CITI Bank	A	A	A	A	A	A	D^+	D^+
5.Bank of America	A	A	F	F	F	F	D^+	C
6.Bell ST Bank	A	F	A	F	F	F	A	A
7.PHH Mort Corp	A	A	A	F	F	C	B^+	B^+
8.Ally Bank	A	A	A	A	A	A	D^-	D
9.TCF Bank	F	A	A	A	A	A	F^-	F^-
10.Affinity Plus FCU	A	F	A	F	F	C	A^+	A
11.Quicken Loans	A	A	A	A	A	A	D^+	C
12.Alerus Financial	A	F	A	F	F	F	A	A^+
13.Summit Mort	A	A	A	A	A	F	A	A
14.Flagstar Bank	A	A	B	C	C	D	D	D^-
15.Barrington Bank	A	A	A	A	A	A	B^+	B^+
16.Marketplace H Mort	A	F	A	A	A	A	A	A^+
17.Associated Bank	F	F	F	F	F	D	F	F
18.Provident Funding	A	A	A	A	A	A	D	D
19.CU Mort Serv	A	A	A	A	A	A	A^+	A
20.Midcountry Bank	A	A	A	A	F	F	C^-	D^+
21.Suntrust Mort	-	-	-	-	-	-	B	B
22.Waterstone Mort	-	-	-	-	-	-	C	D^+
23.Fifth Third Mort	-	-	-	-	-	-	D	D
24.Bremer Bank	-	-	-	-	-	-	A	A^+
25.Nationstar Mort	-	-	-	-	-	-	D	D

Note: For Indicators 1 - 6 - A B C D F

Note: For Indicators 7&8 - Top Quintile 2nd Quintile 3rd Quintile 4th Quintile Bottom Quintile

Indicator 1: Pooled LPM with Institution dummies and interaction terms

Indicator 2: Pooled Logit with Institution dummies and interaction terms

Indicator 3: Within-Institution LPM with Minority dummy

Indicator 4: Within-Institution Logit with Minority dummy

Indicator 5: Blinder-Oaxaca Decomposition - LPM

Indicator 6: Blinder-Oaxaca Decomposition - Logit

Indicator 7: Pooled LPM with individual institution dummy and interaction terms

Indicator 8: Pooled Logit with individual institution dummy and interaction terms

Table 12: Summary Rankings based on Discrimination Analysis - continued

Institution	Indicator 1	Indicator 2	Indicator 3	Indicator 4	Indicator 5	Indicator 6	Indicator 7	Indicator 8
26.BMO Harris Bank	-	-	-	-	-	-	F	F
27.Franklin Amer Mort	-	-	-	-	-	-	C	C
28.Klein Bank	-	-	-	-	-	-	D^-	D^-
29.Trustone FCU	-	-	-	-	-	-	B^-	B^-
30.Tradition Mort	-	-	-	-	-	-	F^+	F^+
31.Hiway FCU	-	-	-	-	-	-	B	B^-
32.US FCU	-	-	-	-	-	-	C^+	C^+
33.Spire FCU	-	-	-	-	-	-	D	D
34.Freedom Mort	-	-	-	-	-	-	F^+	F^+
35.Homeservices Lending	-	-	-	-	-	-	B^-	B
36.USAA Savings Bank	-	-	-	-	-	-	F	F^-
37.Wing FCU	-	-	-	-	-	-	C^+	C^+
38.Mort Unlimited	-	-	-	-	-	-	A^+	A^+
39.Guaranteed Rate INC	-	-	-	-	-	-	A	A^-
40.Lake Area Bank	-	-	-	-	-	-	C^+	C
41.Ideal Credit Union	-	-	-	-	-	-	F	F^+
42.Liberty Savings Bank	-	-	-	-	-	-	B	B
43.Advanced Financial	-	-	-	-	-	-	F^-	F
44.Endura Financial	-	-	-	-	-	-	C	C^+
45.Primelending	-	-	-	-	-	-	B	B
46.Ever Bank	-	-	-	-	-	-	F	F
47.Topline FCU	-	-	-	-	-	-	C	C
48.Universal American	-	-	-	-	-	-	C	C^-
49.Merchant Bank	-	-	-	-	-	-	A^-	A
50.Baxter CU	-	-	-	-	-	-	B^+	B^+

Note: For Indicators 1 - 6 - A B C D F

Note: For Indicators 7&8 - Top Quintile 2nd Quintile 3rd Quintile 4th Quintile Bottom Quintile

Indicator 1: Pooled LPM with Institution dummies and interaction terms

Indicator 2: Pooled Logit with Institution dummies and interaction terms

Indicator 3: Within-Institution LPM with Minority dummy

Indicator 4: Within-Institution Logit with Minority dummy

Indicator 5: Blinder-Oaxaca Decomposition - LPM

Indicator 6: Blinder-Oaxaca Decomposition - Logit

Indicator 7: Pooled LPM with individual institution dummy and interaction terms

Indicator 8: Pooled Logit with individual institution dummy and interaction terms

3.3 Indicators from Survey

The survey was sent out to the top 50 institutions in the Twin cities with questions on lending practices that is not answered through the public data. The survey consists of 48 questions that pertain to home purchase/small business lending, foreclosure, credit building and trial loan modifications. Due to low survey and item responses, only subset of the questions were included in calculating the final score.

The survey was conducted over 4 weeks period where e-mail invitation was sent to each of top 50 institutions where research team identified the contact information from various sources including, website search, phone calls and Dunn & Bradstreet database. Two follow-up reminder e-mail was sent to all the financial institutions weekly after the first invitation was sent out. Starting from third week, reminder phone calls were made to non-responders until the data collection ends in the fourth week.

Among 50 institutions, 12 institutions responded the survey, 4 refused to respond, 15 never-responded and 19 were failed to contact. 19 institutions that refused to respond or never-responded to the survey were assigned F. The ranking based on the survey response is shown in Table 13.

The ranking is based on the equally-weighted sum of responses where each responses were given 1 if the answer is positive and 0 if the answer is negative or missing. For questions that contain continuous values, mean value of the available response were used as a reference.

Table 13: Rankings based on Survey

Institution	% Scores	Rank
1.Wells Fargo	N/A	N/A
2.US Bank	7.69	F
3.JPM Chase		F
4.CITI Bank		F
5.Bank of America		F
6.Bell ST Bank		F
7.PHH Mort Corp	0	F
8.Ally Bank		F
9.TCF Bank	38.46	D
10.Affinity Plus FCU	38.46	D
11.Quicken Loans	N/A	N/A
12.Alerus Financial	26.92	D
13.Summit Mort	3.84	F
14.Flagstar Bank		F
15.Barrington Bank	N/A	N/A
16.Marketplace H Mort		F
17.Associated Bank	N/A	N/A
18.Provident Funding	N/A	N/A
19.CU Mort Serv	N/A	N/A
20.Midcountry Bank	N/A	N/A
21.Suntrust Mort		F
22.Waterstone Mort		F
23.Fifth Third Mort	N/A	N/A
24.Bremer Bank	53.84	C
25.Nationstar Mort		F

12 responded. 4 refused (F)

15 never-responded (F). 19 contact-Failed (N/A)

Table 13: Quintile Rankings based on Survey - continued

Institution	% Scores	Rank
26.BMO Harris Bank	N/A	N/A
27.Franklin Amer Mort	3.84	F
28.Klein Bank		F
29.Trustone FCU		F
30.Tradition Mort	N/A	N/A
31.Hiway FCU	N/A	N/A
32.US FCU		F
33.Spire FCU	30.76	D
34.Freedom Mort	N/A	N/A
35.Homeservices Lending	100	A
36.USAA Savings Bank	N/A	N/A
37.Wing FCU	N/A	N/A
38.Mort Unlimited	0	F
39.Guaranteed Rate INC	N/A	N/A
40.Lake Area Bank		F
41.Ideal Credit Union		F
42.Liberty Savings Bank	N/A	N/A
43.Advanced Financial		F
44.Endura Financial		F
45.Primelending		F
46.Ever Bank	N/A	N/A
47.Topline FCU	N/A	N/A
48.Universal American	N/A	N/A
49.Merchant Bank	69.23	B
50.Baxter CU		F

12 responded. 4 refused (F)

15 never-responded (F). 19 contact-Failed (N/A)

3.4 Final Scores & Grades

The letter grades that were assigned to each of the indicators were transformed to grade points for averaging grades across the different methods and back-transformed to an unique letter-grades according the range defined as follows:

Grade	Grade Points	Range
A^+	4.333	4.333
A	4.000	$4.000 \leq x < 4.333$
A^-	3.667	$3.667 \leq x < 4.000$
B^+	3.333	$3.333 \leq x < 3.667$
B	3.000	$3.000 \leq x < 3.333$
B^-	2.667	$2.667 \leq x < 3.000$
C^+	2.333	$2.333 \leq x < 2.667$
C	2.000	$2.000 \leq x < 2.333$
C^-	1.667	$1.667 \leq x < 2.000$
D^+	1.333	$1.333 \leq x < 1.667$
D	1.000	$1.000 \leq x < 1.333$
D^-	0.667	$0.667 \leq x < 1.000$
F^+	0.333	$0.333 \leq x < 0.667$
F	0.000	$x < 0.333$

The final score and grade are presented in two different form with/without the imputation of missing individual scores in Table 14. Missing scores were imputed by the mean value of each methods. In calculating final score and grade, less weight was given to the survey in order to account for possible under-estimation of the final score due to the low survey item response (i.e., (0.3*(1) + 0.3*(2) + 0.3*(3) + 0.1*(4); refer to footnotes in Table 14).

The grades for the imputed averaged scores in Table 14 is shown in Table 15 and Final grades for each of the institutions are presented in Table 16.

Table 14: Final Scores

	Without Imputation					With Imputation				
Institution	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
1.Wells Fargo	1.917	2	3.167	N/A	2.361	1.917	2.000	3.167	0.419	2.167
2.US Bank	1.583	2.3335	0.000	0	0.979	1.583	2.333	0.000	0.000	1.175
3.JPM Chase	1.583	1.333	1.750	0	1.167	1.583	1.333	1.750	0.000	1.400
4.CITI Bank	2.000	1.667	3.333	0	1.750	2.000	1.667	3.333	0.000	2.100
5.Bank of America	2.583	1.333	1.417	0	1.333	2.583	1.333	1.417	0.000	1.600
6.Bell ST Bank	1.500	2.3335	2.000	0	1.458	1.500	2.333	2.000	0.000	1.750
7.PHH Mort Corp	2.083	N/A	2.583	0	1.555	2.083	1.961	2.583	0.000	1.988
8.Ally Bank	1.833	3.3335	3.208	0	2.094	1.833	3.333	3.208	0.000	2.513
9.TCF Bank	1.583	2.8335	2.500	1	1.979	1.583	2.833	2.500	1.000	2.175
10.Affinity Plus FCU	2.500	N/A	2.292	1	1.931	2.500	1.961	2.292	1.000	2.126
11.Quicken Loans	2.167	N/A	3.417	N/A	2.792	2.167	1.961	3.417	0.419	2.305
12.Alerus Financial	1.333	1.833	2.042	1	1.552	1.333	1.833	2.042	1.000	1.662
13.Summit Mort	2.250	N/A	3.500	0	1.917	2.250	1.961	3.500	0.000	2.313
14.Flagstar Bank	2.333	N/A	2.208	0	1.514	2.333	1.961	2.208	0.000	1.951
15.Barrington Bank	3.417	0	3.833	N/A	2.417	3.417	0.000	3.833	0.419	2.217
16.Marketplace H Mort	1.833	N/A	3.542	0	1.792	1.833	1.961	3.542	0.000	2.201
17.Associated Bank	1.333	2.5	0.125	N/A	1.319	1.333	2.500	0.125	0.419	1.229
18.Provident Funding	3.833	N/A	3.250	N/A	3.542	3.833	1.961	3.250	0.419	2.755
19.CU Mort Serv	2.250	N/A	4.042	N/A	3.146	2.250	1.961	4.042	0.419	2.518
20.Midcountry Bank	3.750	N/A	2.375	N/A	3.063	3.750	1.961	2.375	0.419	2.468
21.Suntrust Mort	4.167	2	3.000	0	2.292	4.167	2.000	3.000	0.000	2.750
22.Waterstone Mort	2.500	N/A	1.667	0	1.389	2.500	1.961	1.667	0.000	1.838
23.Fifth Third Mort	2.083	2.5	1.000	N/A	1.861	2.083	2.500	1.000	0.419	1.717
24.Bremer Bank	1.833	2.5	4.167	2	2.625	1.833	2.500	4.167	2.000	2.750
25.Nationstar Mort	2.667	N/A	1.000	0	1.222	2.667	1.961	1.000	0.000	1.688

Note: Missing values are imputed by the mean value of each sub-group methods.

(1) Home Lending Disparities

(2) Small Business Lending

(3) Discrimination in Loan Denials

(4) Customer Service

(5) Final Score

Table 14: Final Scores - continued

	Without Imputation					With Imputation				
Institution	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
26.BMO Harris Bank	1.833	2.666	0.000	N/A	1.500	1.833	2.667	0.000	0.419	1.392
27.Franklin Amer Mort	2.500	N/A	2.000	0	1.500	2.500	1.961	2.000	0.000	1.938
28.Klein Bank	0.750	1.1665	0.667	0	0.646	0.750	1.167	0.667	0.000	0.775
29.Trustone FCU	1.000	N/A	2.667	0	1.222	1.000	1.961	2.667	0.000	1.688
30.Tradition Mort	0.500	N/A	0.333	N/A	0.416	0.500	1.961	0.333	0.419	0.880
31.Hiway FCU	1.833	N/A	2.833	N/A	2.333	1.833	1.961	2.833	0.419	2.030
32.US FCU	1.667	N/A	2.333	0	1.333	1.667	1.961	2.333	0.000	1.788
33.Spire FCU	1.000	N/A	1.000	1	1.000	1.000	1.961	1.000	1.000	1.288
34.Freedom Mort	1.917	N/A	0.333	N/A	1.125	1.917	1.961	0.333	0.419	1.305
35.Homeservices Lending	1.250	N/A	2.833	4	2.695	1.250	1.961	2.833	4.000	2.213
36.USAA Savings Bank	2.250	N/A	0.000	N/A	1.125	2.250	1.961	0.000	0.419	1.305
37.Wing FCU	0.584	N/A	2.333	N/A	1.458	0.584	1.961	2.333	0.419	1.505
38.Mort Unlimited	2.667	N/A	4.333	0	2.333	2.667	1.961	4.333	0.000	2.688
39.Guaranteed Rate INC	2.833	N/A	3.833	N/A	3.333	2.833	1.961	3.833	0.419	2.630
40.Lake Area Bank	3.917	N/A	3.167	0	2.361	3.917	1.961	3.167	0.000	2.713
41.Ideal Credit Union	1.250	N/A	0.167	0	0.472	1.250	1.961	0.167	0.000	1.013
42.Liberty Savings Bank	0.667	N/A	3.000	N/A	1.833	0.667	1.961	3.000	0.419	1.730
43.Advanced Financial	1.667	N/A	0.000	0	0.556	1.667	1.961	0.000	0.000	1.088
44.Endura Finanacial	1.833	N/A	2.167	0	1.333	1.833	1.961	2.167	0.000	1.788
45.Primelending	2.000	N/A	3.000	0	1.667	2.000	1.961	3.000	0.000	2.088
46.Ever Bank	2.583	1	0.000	N/A	1.194	2.583	1.000	0.000	0.419	1.117
47.Topline FCU	1.583	N/A	2.000	N/A	1.792	1.583	1.961	2.000	0.419	1.705
48.Universal American	4.167	N/A	1.833	N/A	3.000	4.167	1.961	1.833	0.419	2.430
49.Merchant Bank	1.000	N/A	3.833	3	2.611	1.000	1.961	3.833	3.000	2.338
50.Baxter CU	3.750	N/A	3.333	0	2.361	3.750	1.961	3.333	0.000	2.713

Note: Missing values are imputed by the mean value of each sub-group methods.

(1) Home Lending Disparities

(2) Small Business Lending

(3) Discrimination in Loan Denials

(4) Customer Service

(5) Final Score

Table 15: Grades by individual methods

Institution	Home Lending Disparities	Small Business Lending	Discrimination in Loan Denials	Customer Service
1.Wells Fargo	C^{-}	C	B	F^{+}
2.US Bank	D^{+}	C^{+}	F	F
3.JPM Chase	D^{+}	D^{+}	C^{-}	F
4.CITI Bank	C	C^{-}	B^{+}	F
5.Bank of America	C^{+}	D^{+}	D^{+}	F
6.Bell ST Bank	D^{+}	C^{+}	C	F
7.PHH Mort Corp	C	C^{-}	C^{+}	F
8.Ally Bank	C^{-}	B^{+}	B	F
9.TCF Bank	D^{+}	B^{-}	C^{+}	D
10.Affinity Plus FCU	C^{+}	C^{-}	C	D
11.Quicken Loans	C	C^{-}	B^{+}	F^{+}
12.Alerus Financial	D^{+}	C^{-}	C	D
13.Summit Mort	C	C^{-}	B^{+}	F
14.Flagstar Bank	C^{+}	C^{-}	C	F
15.Barrington Bank	B^{+}	F	A^{-}	F^{+}
16.Marketplace H Mort	C^{-}	C^{-}	B^{+}	F
17.Associated Bank	D^{+}	C^{+}	F	F^{+}
18.Provident Funding	A^{-}	C^{-}	B	F^{+}
19.CU Mort Serv	C	C^{-}	A	F^{+}
20.Midcountry Bank	A^{-}	C^{-}	C^{+}	F^{+}
21.Suntrust Mort	A	C	B	F
22.Waterstone Mort	C^{+}	C^{-}	D^{+}	F
23.Fifth Third Mort	C	C^{+}	D	F^{+}
24.Bremer Bank	C^{-}	C^{+}	A	C
25.Nationstar Mort	B^{-}	C^{-}	D	F

Note: A B C D F

Table 15: Grades by individual methods - continued

Institution	Home Lending Disparities	Small Business Lending	Discrimination in Loan Denials	Customer Service
26.BMO Harris Bank	C$^-$	C$^+$	F	F$^+$
27.Franklin Amer Mort	C$^+$	C$^-$	C	F
28.Klein Bank	D$^-$	D	D$^-$	F
29.Trustone FCU	D	C$^-$	B$^-$	F
30.Tradition Mort	F$^+$	C$^-$	F$^+$	F$^+$
31.Hiway FCU	C$^-$	C$^-$	B$^-$	F$^+$
32.US FCU	D$^+$	C$^-$	C$^+$	F
33.Spire FCU	D	C$^-$	D	D
34.Freedom Mort	C$^-$	C$^-$	F$^+$	F$^+$
35.Homeservices Lending	D	C$^-$	B$^-$	A
36.USAA Savings Bank	C	C$^-$	F	F$^+$
37.Wing FCU	F$^+$	C$^-$	C$^+$	F$^+$
38.Mort Unlimited	C$^+$	C$^-$	A$^+$	F
39.Guaranteed Rate INC	B$^-$	C$^-$	A$^-$	F$^+$
40.Lake Area Bank	A$^-$	C$^-$	B	F
41.Ideal Credit Union	D	C$^-$	F	F
42.Liberty Savings Bank	F$^+$	C$^-$	B	F$^+$
43.Advanced Financial	D$^+$	C$^-$	F	F
44.Endura Finanacial	C$^-$	C$^-$	C	F
45.Primelending	C	C$^-$	B	F
46.Ever Bank	C$^+$	D	F	F$^+$
47.Topline FCU	D$^+$	C$^-$	C	F$^+$
48.Universal American	A	C$^-$	C$^-$	F$^+$
49.Merchant Bank	D	C$^-$	A$^-$	B
50.Baxter CU	A$^-$	C$^-$	B$^+$	F

Note: A B C D F

Missing values are imputed by the mean value of each sub-group methods.

Table 16: Final Grades

	Without Imputation	With Imputation
1.Wells Fargo	C^+	C
2.US Bank	D^-	D
3.JPM Chase	D	D^+
4.CITI Bank	C^-	C
5.Bank of America	D^+	D^+
6.Bell ST Bank	D^+	C^-
7.PHH Mort Corp	D^+	C^-
8.Ally Bank	C	C^+
9.TCF Bank	C^-	C
10.Affinity Plus FCU	C^-	C
11.Quicken Loans	B^-	C
12.Alerus Financial	D^+	D^+
13.Summit Mort	C^-	C
14.Flagstar Bank	D^+	C^-
15.Barrington Bank	C^+	C
16.Marketplace H Mort	C^-	C
17.Associated Bank	D	D
18.Provident Funding	B^+	B^-
19.CU Mort Serv	B	C^+
20.Midcountry Bank	B	C^+
21.Suntrust Mort	C	B^-
22.Waterstone Mort	D^+	C^-
23.Fifth Third Mort	C^-	C^-
24.Bremer Bank	C^+	B^-
25.Nationstar Mort	D	C^-

Note: A B C D F

Missing values are imputed by the mean value of each sub-group methods.

Table 16: Final Grades - continued

	Without Imputation	With Imputation
26.BMO Harris Bank	D^+	D^+
27.Franklin Amer Mort	D^+	C^-
28.Klein Bank	F^+	D^-
29.Trustone FCU	D	C^-
30.Tradition Mort	F^+	D^-
31.Hiway FCU	C^+	C
32.US FCU	D^+	C^-
33.Spire FCU	D	D
34.Freedom Mort	D	D
35.Homeservices Lending	B^-	C
36.USAA Savings Bank	D	D
37.Wing FCU	D^+	D^+
38.Mort Unlimited	C^+	B^-
39.Guaranteed Rate INC	B^+	C^+
40.Lake Area Bank	C^+	B^-
41.Ideal Credit Union	F^+	D
42.Liberty Savings Bank	C^-	C^-
43.Advanced Financial	F^+	D
44.Endura Finanacial	D^+	C^-
45.Primelending	D^+	C
46.Ever Bank	D	D
47.Topline FCU	C^-	C^-
48.Universal American	B	C^+
49.Merchant Bank	C^+	C^+
50.Baxter CU	C^+	B^-

Note: A B C D F

Missing values are imputed by the mean value of each sub-group methods.

4 Conclusion

Descriptive statistics presented in this report shows that there exist sizable disparity in availability of financial loans between minority and non-minority groups in Minneapolis-St.Paul metropolitan area within the study period. The result from quintile rankings of largest 50 institutions suggest that the largest institutions are not the producers of financial loans to the minorities in most favorable terms.

The existence of discrimination against minority groups is examined using the various statistical analytical techniques. The result indicates that these observations showing large disparity between minority and non-minority applicants are not simple functional outcomes of observed characteristics of individuals, but rather, suggest unobserved factors (that is, discrimination) are contributing to the disparity.

4.1 Limitation

Our analysis is limited because the measure of discrimination derived from different methods can only be held true under the assumption of absence of omitted variables in the model; we can only operate on the assumptions that we have made in this study and if there are other assumptions that would explain the disparity, they are not accounted for in this study. Although we include a proxy of credit risk in the model, this is only a partial measure of the credit risk of the applicants, which may lead to wrong estimates of the parameter of interest, especially for the estimates based on the multiple regression models. However, as previously noted, our endeavor to measure credit risk using employed statistical method yield high percent of correct prediction, which suggests that our estimates, although not perfect, are the product of credible estimation methods.

5 Appendix

5.1 Appendix: Supplemental Tables[9]

The HMDA data provides information regarding home mortgage lending activity at the individual loan-level and number of observations that are confined to the MSP metropolitan statistical area (MSA) for the 6 year period is 1,192,995. The descriptive statistics presented in this part of report are derived from 2008 - 2013 HMDA data contains loan denial rates by race/ethnicity at various geographic administrative levels:

- **Table A0-1.** Regression result using dummy variable method for overall market.
- **Table A0-2.** Regression result using Oaxaca Decomposition method for overall market.
- **Table A1-1.** Loan denial rate by loan type, race/ethnicity and year for MSP-MSA and Hennepin County.
- **Table A1-2.** Loan denial rate by loan type, race/ethnicity and year for City of Minneapolis and City of St. Paul.
- **Table A2-1.** The 6-year period loan denial rate by loan type, race/ethnicity at various geographic administrative levels.
- **Table A2-2.** The 6-year period loan denial rate for "Not owner-occupied" properties by loan type, race/ethnicity at various geographic administrative levels.
- **Table A3-1.** Relative loan denial rate at institutional level by loan type, race/ethnicity; Ordered Ranking based on relative loan denial rate of all loan types for MSP-MSA.

[9]The detail regression tables along with data files and codes used to produce them will be available in Roy Wilkins Center website.

- **Table A3-2.** Share of minority loans originated by institution relative to total loans made by institution.
- **Table A3-3.** Share of minority loans originated by institution relative to total loans made in the market.
- **Table A3-4.** Share of minority loans originated by institution relative to total loans to low income census tract in the market.
- **Table A3-5.** Share of minority loans originated by institution relative to total loans to low and middle income census tract in the market.
- **Table A3-6.** List of top 10 institutions in the market by relative loan denial rate.

5.2 Key Observations on Loan Denial Rates (A1-1, A1-2, A2-1 & A2-2)

5.2 Key Observations on Loan Denial Rates (A1-1, A1-2, A2-1 & A2-2)

- The loan denial rates are exceptionally high in year 2008 regardless of loan types and race/ethnicity compared to loan denial rates in year 2009 - 2013. There are approximately 36 percent difference between year 2008 and year 2009, probably stemming from the bad credit market condition due to the subprime mortgage crisis in 2007.
- The loan denial rate of the minority group is consistently higher than that of the non-minority group. For example, the loan denial rate of Blacks is greater than that of the non-minority by a factor of two.
- Home improvement loans are the type of loans that has the highest loan denial rate. As shown in Table A.2-2, the loan denial rate is the highest when the property is not owner-occupied.

Table A0-1: Dummy Variable Method for Overall Market

	(1) LPM	(2) Logit
Minority_dummy	1.050***	1.471***
	(0.00170)	(0.0190)
stpaul_dummy	0.990***	0.899***
	(0.00166)	(0.0134)
minneapolis_dummy	0.993***	0.912***
	(0.00127)	(0.0115)
v29_app_income	1.000***	0.999***
	(0.00000899)	(0.000110)
Applicant Sex (base.Male)		
Female	1.006***	1.051***
	(0.000812)	(0.00791)
No.Info	1.030***	1.238***
	(0.00720)	(0.0673)
N/A	0.853***	1
	(0.0182)	(.)
v29_app_income_sq	1.000***	1.000***
	(1.61e-09)	(1.26e-08)
co-applicant Race (base.single)		
White	0.976***	0.788***
	(0.000799)	(0.00623)
Black	1.034***	1.106***
	(0.00555)	(0.0379)
Hispanic	1.010**	1.049
	(0.00427)	(0.0343)
Asian	0.976***	0.824***
	(0.00272)	(0.0197)
Amer.Indian	1.007	0.956
	(0.0108)	(0.0740)
Info.Missing	0.989***	0.897***
	(0.00397)	(0.0331)
Credit Risk Proxy	1.182***	6.472***
	(0.0145)	(0.774)
v8_loan_amnt	1.000***	1.002***
	(0.00000912)	(0.0000923)
v8_loan_amnt_sq	1.000***	1.000***
	(3.28e-09)	(3.49e-08)
debt_to_income_ratio	0.940***	0.657***
	(0.00157)	(0.00915)
debt_to_income_ratio_sq	1.014***	1.100***
	(0.000276)	(0.00220)
Census Tract Characteristics		
75% Minority Population	1.024***	1.040
	(0.00548)	(0.0355)
Avg.Income	0.998***	0.984***
	(0.0000839)	(0.000825)
Avg.Income^2	1.000***	1.000***
	(0.000000388)	(0.00000418)
Gini Index	0.998	0.972
	(0.00765)	(0.0726)
Unemployment rate	1.002***	1.011***
	(0.000158)	(0.00133)
House Median value	1.000***	1.000***
	(8.10e-09)	(8.73e-08)
% with mortgage	1.000***	1.002***
	(0.0000498)	(0.000468)
Loan Type (base. Home Purchase)		
2. Manufac.Home.Purch	1.445***	7.011***
	(0.0149)	(0.460)
3.Home Improve	1.175***	3.976***
	(0.00387)	(0.108)
4.Refinancing	1.114***	3.381***
	(0.000921)	(0.0356)
Year Trend.base(2008)		
Year2009	0.957***	0.754***
	(0.00161)	(0.0109)
Year2010	0.941***	0.634***
	(0.00139)	(0.00768)
Year2011	0.947***	0.664***
	(0.00143)	(0.00818)
Year2012	0.924***	0.517***
	(0.00138)	(0.00643)
Year2013	0.918***	0.473***
	(0.00147)	(0.00675)
N	870414	870406
R^2	0.055	0.0685

Spec (2)in Odds Ratio: Robust Standard errors in parentheses

* p<0.1. ** p<0.05. *** p<0.01

Table A0-2: Oaxaca Decomposition for Overall Market

	(1) LPM-based	(2) Logit-based
Differential		
Prediction_1	0.119***	-2.166***
	(0.000364)	(0.00407)
Prediction_2	0.189***	-1.636***
	(0.00140)	(0.0109)
Difference	-0.0702***	-0.530***
	(0.00144)	(0.0116)
Decomposition		
Explained	-0.0221***	-0.175***
	(0.00131)	(0.0129)
Unexplained	-0.0481***	-0.356***
	(0.00189)	(0.0168)
% Unexplained	68.52	67.17
N	870414	870406
R^2		

Standard errors in parentheses

* p<0.1, ** p<0.05, *** p<0.01

Table A1-1: MSP-MSA&Hennepin County Loan Denial Rate: by year, race/ethnicity and loan type

		Loan Denial Rates															
		MSP-MSA								Hennepin							
Year	Loan Type	White	Black	Hispanic	Asian	A.Indian	N/A	Minority	All	White	Black	Hispanic	Asian	A.Indian	N/A	Minority	All
2013	All Loans	0.115	0.231	0.186	0.151	0.263	0.212	0.181	0.116	0.112	0.258	0.199	0.143	0.358	0.210	0.191	0.115
	Home Purchase	0.055	0.143	0.108	0.083	0.171	0.092	0.105	0.055	0.052	0.140	0.134	0.078	0.233	0.082	0.107	0.054
	Home Improve	0.247	0.579	0.485	0.475	0.638	0.360	0.525	0.280	0.235	0.573	0.439	0.494	0.636	0.373	0.534	0.278
	Refinancing	0.138	0.262	0.224	0.198	0.229	0.230	0.221	0.138	0.135	0.310	0.243	0.193	0.360	0.240	0.244	0.139
	N	147,384	3,815	2,927	8,207	552	17,934	15,501	204,933	51,083	1,799	1,132	3,397	204	6,674	6,532	73,192
2012	All Loans	0.121	0.235	0.186	0.149	0.263	0.231	0.180	0.123	0.114	0.256	0.193	0.138	0.236	0.234	0.183	0.119
	Home Purchase	0.058	0.148	0.104	0.082	0.125	0.104	0.104	0.057	0.051	0.167	0.113	0.077	0.148	0.100	0.111	0.054
	Home Improve	0.238	0.637	0.514	0.503	0.484	0.526	0.548	0.309	0.233	0.692	0.543	0.519	0.500	0.526	0.594	0.312
	Refinancing	0.134	0.250	0.205	0.170	0.282	0.230	0.200	0.136	0.128	0.266	0.219	0.153	0.241	0.237	0.198	0.133
	N	176,698	3,736	3,024	8,544	562	21,631	15,866	239,180	61,787	1,873	1,099	3,567	199	8,201	6,738	86,112
2011	All Loans	0.141	0.252	0.230	0.181	0.285	0.268	0.212	0.141	0.135	0.271	0.212	0.176	0.300	0.261	0.213	0.137
	Home Purchase	0.061	0.131	0.103	0.094	0.168	0.119	0.108	0.059	0.052	0.134	0.087	0.092	0.140	0.103	0.106	0.053
	Home Improve	0.297	0.607	0.505	0.548	0.591	0.437	0.565	0.330	0.306	0.648	0.536	0.500	0.636	0.431	0.581	0.338
	Refinancing	0.163	0.332	0.288	0.219	0.284	0.286	0.260	0.167	0.157	0.358	0.292	0.204	0.343	0.283	0.264	0.163
	N	120,785	2,943	2,143	6,275	445	15,353	11,806	168,685	41,864	1,435	808	2,591	150	5,967	4,984	60,553
2010	All Loans	0.137	0.268	0.211	0.174	0.293	0.229	0.210	0.140	0.129	0.301	0.204	0.169	0.228	0.226	0.217	0.135
	Home Purchase	0.060	0.139	0.120	0.104	0.186	0.110	0.120	0.062	0.055	0.157	0.107	0.092	0.045	0.100	0.114	0.060
	Home Improve	0.282	0.681	0.547	0.500	0.583	0.470	0.584	0.323	0.275	0.701	0.429	0.558	0.625	0.500	0.605	0.329
	Refinancing	0.152	0.329	0.233	0.191	0.307	0.239	0.235	0.155	0.142	0.376	0.251	0.185	0.300	0.237	0.251	0.150
	N	149,901	3,614	2,584	7,248	532	17,521	13,978	198,242	51,861	1,798	1,018	3,003	184	6,729	6,003	70,878
2009	All Loans	0.142	0.282	0.240	0.196	0.233	0.233	0.229	0.137	0.134	0.307	0.258	0.190	0.267	0.226	0.241	0.133
	Home Purchase	0.060	0.144	0.130	0.113	0.100	0.097	0.125	0.060	0.055	0.175	0.152	0.116	0.091	0.100	0.141	0.061
	Home Improve	0.272	0.655	0.462	0.522	0.605	0.415	0.560	0.285	0.273	0.643	0.500	0.506	0.688	0.457	0.578	0.291
	Refinancing	0.165	0.359	0.293	0.229	0.262	0.253	0.277	0.159	0.156	0.378	0.324	0.222	0.290	0.243	0.289	0.153
	N	163,745	4,270	2,833	7,830	648	17,007	15,581	225,579	57,231	2,197	1,103	3,304	225	6,433	6,829	81,319
2008	All Loans	0.210	0.465	0.384	0.306	0.376	0.315	0.377	0.215	0.190	0.470	0.402	0.282	0.366	0.294	0.383	0.202
	Home Purchase	0.079	0.258	0.229	0.165	0.125	0.147	0.204	0.088	0.071	0.278	0.270	0.155	0.107	0.135	0.219	0.087
	Home Improve	0.296	0.616	0.477	0.508	0.517	0.367	0.546	0.307	0.313	0.621	0.440	0.550	0.444	0.364	0.565	0.315
	Refinancing	0.285	0.582	0.489	0.418	0.512	0.373	0.497	0.290	0.260	0.578	0.511	0.395	0.449	0.348	0.502	0.274
	N	110,224	4,877	3,071	6,283	612	14,825	14,843	156,376	36,928	2,598	1,288	2,476	205	5,528	6,567	55,533

Minority includes Non-Hispanic Black, Hispanic, Asian, American Indian.

Table A1-2: Minneapolis&St.Paul Loan Denial Rate: by year, race/ethnicity and loan type

		Loan Denial Rates															
		Minneapolis								St. Paul							
Year	Loan Type	White	Black	Hispanic	Asian	A.Indian	N/A	Minority	All	White	Black	Hispanic	Asian	A.Indian	N/A	Minority	All
2013	All Loans	0.119	0.322	0.239	0.175	0.460	0.228	0.261	0.127	0.122	0.252	0.215	0.199	0.270	0.248	0.215	0.131
	Home Purchase	0.056	0.179	0.184	0.091	0.222	0.084	0.149	0.060	0.057	0.123	0.094	0.107	0.286	0.121	0.109	0.062
	Home Improve	0.250	0.532	0.444	0.471	0.600	0.406	0.518	0.306	0.240	0.548	0.462	0.464	.	0.366	0.480	0.299
	Refinancing	0.146	0.390	0.278	0.262	0.500	0.258	0.337	0.160	0.148	0.253	0.342	0.302	0.227	0.278	0.293	0.166
	N	13,672	695	418	583	87	1,822	1,783	19,919	7,038	365	284	969	37	1,044	1,655	11,386
2012	All Loans	0.124	0.310	0.243	0.162	0.342	0.292	0.245	0.136	0.133	0.286	0.206	0.178	0.392	0.294	0.212	0.143
	Home Purchase	0.055	0.188	0.152	0.086	0.286	0.135	0.146	0.060	0.057	0.104	0.109	0.086	0.167	0.122	0.095	0.059
	Home Improve	0.256	0.697	0.571	0.667	.	0.538	0.662	0.350	0.293	0.621	0.615	0.520	0.500	0.648	0.577	0.402
	Refinancing	0.142	0.317	0.269	0.169	0.319	0.298	0.261	0.156	0.146	0.338	0.238	0.281	0.481	0.292	0.293	0.164
	N	15,863	680	358	605	76	2,140	1,719	22,421	8,128	308	287	888	51	1,207	1,534	12,422
2011	All Loans	0.151	0.373	0.221	0.253	0.338	0.327	0.296	0.162	0.155	0.283	0.258	0.212	0.293	0.329	0.238	0.162
	Home Purchase	0.055	0.201	0.103	0.168	0.182	0.110	0.164	0.061	0.085	0.151	0.077	0.101	0.235	0.141	0.111	0.077
	Home Improve	0.327	0.634	0.625	0.545	0.500	0.485	0.597	0.378	0.324	0.550	0.545	0.632	0.200	0.452	0.575	0.382
	Refinancing	0.175	0.435	0.302	0.269	0.387	0.361	0.351	0.194	0.163	0.336	0.375	0.341	0.462	0.363	0.353	0.187
	N	10,750	496	276	470	68	1,592	1,310	15,789	6,624	325	240	825	41	926	1,431	10,435
2010	All Loans	0.135	0.374	0.239	0.229	0.221	0.253	0.291	0.148	0.149	0.332	0.224	0.220	0.417	0.281	0.253	0.159
	Home Purchase	0.056	0.211	0.115	0.148	0.094	0.096	0.164	0.065	0.064	0.162	0.124	0.143	0.263	0.107	0.147	0.074
	Home Improve	0.316	0.667	0.400	0.619	0.667	0.506	0.611	0.372	0.279	0.610	0.474	0.444	.	0.488	0.509	0.346
	Refinancing	0.149	0.440	0.299	0.242	0.270	0.275	0.341	0.166	0.165	0.359	0.282	0.332	0.455	0.294	0.334	0.182
	N	13,300	688	351	541	77	1,712	1,657	18,493	8,268	370	263	908	48	1,073	1,589	12,282
2009	All Loans	0.150	0.360	0.319	0.211	0.350	0.257	0.307	0.153	0.157	0.346	0.295	0.236	0.327	0.295	0.280	0.164
	Home Purchase	0.063	0.202	0.183	0.144	0.138	0.111	0.177	0.070	0.063	0.167	0.169	0.132	0.150	0.113	0.146	0.073
	Home Improve	0.280	0.642	0.500	0.647	0.571	0.462	0.615	0.315	0.276	0.806	0.500	0.535	1	0.453	0.636	0.356
	Refinancing	0.186	0.419	0.432	0.235	0.444	0.277	0.377	0.186	0.189	0.406	0.370	0.305	0.407	0.351	0.361	0.196
	N	14,736	815	426	544	80	1,736	1,865	21,358	9,226	485	325	907	52	1,110	1,769	14,091
2008	All Loans	0.196	0.494	0.442	0.358	0.413	0.335	0.445	0.221	0.208	0.495	0.445	0.373	0.446	0.372	0.425	0.243
	Home Purchase	0.084	0.299	0.339	0.184	0.150	0.143	0.276	0.104	0.090	0.210	0.316	0.251	0.250	0.203	0.254	0.118
	Home Improve	0.289	0.590	0.560	0.625	0.333	0.438	0.579	0.324	0.245	0.560	0.529	0.517	0.600	0.449	0.542	0.325
	Refinancing	0.278	0.587	0.538	0.542	0.475	0.408	0.564	0.313	0.293	0.610	0.507	0.477	0.438	0.422	0.530	0.331
	N	10,570	1,135	575	595	75	1,729	2,380	16,922	6,648	620	411	1,013	65	1,183	2,109	11,263

Minority includes Non-Hispanic Black, Hispanic, Asian, American Indian.

Table A2-1 : Loan Denial Rate (2008-2013): by geographic boundaries, race/ethnicity and loan type

		Loan Denial Rates							
Year	Loan Type	White	Black	Hispanic	Asian	A.Indian	N/A	Minority	All
MSA	All Loans	0.141	0.298	0.242	0.189	0.286	0.245	0.231	0.142
	Home Purchase	0.062	0.162	0.134	0.105	0.143	0.111	0.127	0.063
	Home Improve	0.274	0.627	0.495	0.508	0.571	0.424	0.553	0.304
	Refinancing	0.164	0.366	0.289	0.226	0.312	0.261	0.279	0.165
	N	868,737	23,255	16,582	44,387	3,351	104,271	87,575	1,192,995
Hennepin	All Loans	0.132	0.322	0.251	0.178	0.293	0.240	0.239	0.137
	Home Purchase	0.056	0.179	0.151	0.101	0.129	0.104	0.135	0.061
	Home Improve	0.275	0.639	0.471	0.525	0.597	0.431	0.573	0.309
	Refinancing	0.154	0.391	0.309	0.211	0.327	0.258	0.288	0.160
	N	300,754	11,700	6,448	18,338	1,167	39,532	37,653	427,587
Minneapolis	All Loans	0.143	0.384	0.300	0.231	0.356	0.281	0.316	0.156
	Home Purchase	0.062	0.220	0.202	0.137	0.172	0.113	0.186	0.070
	Home Improve	0.286	0.613	0.511	0.598	0.525	0.469	0.589	0.336
	Refinancing	0.171	0.444	0.364	0.273	0.397	0.309	0.378	0.187
	N	78,891	4,509	2,404	3,338	463	10,731	10,714	114,902
St. Paul	All Loans	0.153	0.352	0.287	0.239	0.367	0.304	0.279	0.167
	Home Purchase	0.069	0.157	0.156	0.134	0.216	0.136	0.143	0.077
	Home Improve	0.273	0.607	0.519	0.521	0.458	0.479	0.551	0.348
	Refinancing	0.179	0.416	0.365	0.346	0.413	0.331	0.375	0.199
	N	45,932	2,473	1,810	5,510	294	6,543	10,087	71,879

Minority includes Non-Hispanic Black, Hispanic, Asian, American Indian.

Table A2-2 : Loan Denial Rate(2008-2013): by administrative boundaries, race/ethnicity and loan type (Not Owner-Occupied Properties Only)

		Loan Denial Rates							
Year	Loan Type	White	Black	Hispanic	Asian	A.Indian	N/A	Minority	All
MSA	All Loans	0.177	0.426	0.295	0.249	0.345	0.290	0.292	0.167
	Home Purchase	0.107	0.333	0.201	0.009	0.260	0.178	0.219	0.098
	Home Improve	0.374	0.836	0.652	0.643	0.714	0.604	0.724	0.384
	Refinancing	0.216	0.402	0.317	0.277	0.309	0.313	0.310	0.207
	N	42,467	1,189	755	3,982	203	5,778	6,129	67,404
Hennepin	All Loans	0.181	0.435	0.318	0.248	0.475	0.295	0.307	0.170
	Home Purchase	0.107	0.333	0.201	0.009	0.260	0.178	0.219	0.098
	Home Improve	0.374	0.836	0.652	0.643	0.714	0.604	0.724	0.384
	Refinancing	0.221	0.419	0.316	0.273	0.346	0.313	0.320	0.210
	N	16,825	711	358	1,776	59	2,444	2,904	28,104
Minneapolis	All Loans	0.193	0.467	0.347	0.283	0.590	0.329	0.367	0.184
	Home Purchase	0.119	0.371	0.319	0.022	0.467	0.243	0.300	0.117
	Home Improve	0.351	0.773	0.700	0.606	0.846	0.645	0.718	0.367
	Refinancing	0.228	0.474	0.307	0.284	0.455	0.336	0.365	0.218
	N	7,301	452	225	593	39	1,092	1,309	12,567
St. Paul	All Loans	0.185	0.503	0.267	0.311	0.519	0.309	0.342	0.179
	Home Purchase	0.104	0.397	0.088	0.019	0.500	0.153	0.268	0.105
	Home Improve	0.331	0.741	0.625	0.712	0.750	0.618	0.714	0.389
	Refinancing	0.227	0.500	0.310	0.313	0.462	0.343	0.348	0.218
	N	4,032	173	101	819	27	612	1,120	7,700

Minority includes Non-Hispanic Black, Hispanic, Asian, American Indian.

Table A3-1: Relative Loan Denial Rate: by race/ethnicity, loan institution and loan type

2008 - 2013 HMDA Data

		Black/White					Hispanic/White					Asian/White					A.Indian/White					Minority/White				
Institutions	S	All	HPL	HIL	REF	R	All	HPL	HIL	REF	R	All	HPL	HIL	REF	R	All	HPL	HIL	REF	R	All	HPL	HIL	REF	R
1.Wells Fargo	0.224	2.188	2.655	2.316	1.968	C^-	1.590	4.860	1.732	1.516	C^+	1.403	3.594	1.780	1.330	C	2.205	7.233	2.068	1.713	C	1.688	3.976	1.987	1.539	C^-
2.US Bank	0.094	1.938	2.078	1.816	2.283	C	2.007	2.749	1.626	2.065	C^-	1.604	2.033	1.811	1.695	C^-	2.283	4.090	1.774	2.042	C	1.798	2.251	1.774	1.933	D^+
3.JPM Chase	0.059	2.020	2.696	1.713	2.212	C	1.579	15.649	0.734	1.560	C^+	1.349	11.576	1.495	1.476	C	2.375	23.290	2.855	1.895	C^-	1.604	12.812	1.625	1.679	C
4.CITI Bank	0.045	1.802	1.811	1.849	1.843	C^+	1.353	1.318	1.849	1.161	B	1.519	0.976	1.849	1.297	C	1.430	1.961	1.387	1.496	B	1.555	1.081	1.817	1.427	C
5.Bank of America	0.037	1.916	2.597	1.169	1.916	C	1.767	4.001		1.766	C	1.492	2.959	2.125	1.588	C	1.407	5.956		1.525	B	1.657	3.273	0.995	1.718	C
6.Bell ST Bank	0.037	2.648	3.825		1.933	D	2.283	11.854		1.789	D^+	1.522	8.768		1.515	C	2.533	17.644		3.313	D^+	1.982	9.700		1.724	D
7.PHH Mort Corp	0.026	2.105	2.646		2.418	C	1.633	7.813		2.076	C^+	1.623	5.779		1.170	C^-	1.722	11.630		0.672	C^+	1.756	6.393		1.741	D^+
8.Ally Bank	0.022	1.976	1.923	1.281	2.067	C	1.255	1.062		1.362	B	1.159	0.786		1.350	B	1.631	1.580		1.530	B^-	1.475	0.871	0.549	1.621	C^+
9.TCF Bank	0.015	1.452	1.848	1.642	1.437	B	1.263	1.225	1.500	1.261	B	1.254	0.906	1.621	1.265	B^-	1.263	1.822	2.464	1.186	A^-	1.321	1.004	1.632	1.314	B^-
10.Affinity Plus FCU	0.012	2.474	2.083	3.260	2.589	D^+	3.149	6.546	4.582	3.080	D	1.616	4.841	1.009	1.425	C^-	3.097	9.740		4.268	D	2.172	5.359	2.355	2.107	D
11.Quicken Loans	0.010	1.225	1.258		1.237	B^+	1.334	1.509		1.384	B	1.152	1.117		1.146	B	1.473	2.246		1.216	B	1.232	1.237		1.227	B
12.Alerus Financial	0.009	1.992	4.468	11.000		C	0.496	33.274			A^+	2.144	24.607		1.900	D^-	4.846	49.508		4.846	F	1.893	27.237	5.500	1.354	D^+
13.Summit Mort	0.009	2.018	2.241		2.356	C	2.026	7.866		2.326	C^-	1.312	5.815		1.093	C^+	3.740	11.707		3.904	F^+	1.710	6.432		1.727	C^-
14.Flagstar Bank	0.008	2.024	2.310	2.250	1.647	C	1.187	2.288		1.095	B^+	1.685	1.695		0.988	D^+	1.698	3.405		2.034	C^+	1.723	1.876	1.800	1.239	C^-
15.Barrington Bank	0.008	2.044	1.950		2.595	C	1.545	4.349		1.341	B^-	1.105	3.216		1.146	B	0.936	6.480			A	1.411	3.552		1.517	B^-
16.Marketplace H Mort	0.006	2.490	2.570		2.832	D^+	2.736	9.568		2.683	D	1.918	7.076		2.427	D		14.243				2.114	7.828		2.427	D
17.Associate Bank	0.006	2.590	1.274	2.789	2.826	D	1.435	2.305	1.211	1.494	B	1.642	1.705	2.055	1.683	C^-	2.463	3.430	1.974	2.323	D^+	1.918	1.887	2.068	1.989	D
18.Provident Funding	0.006	1.799	1.828		1.618	C^+	1.464	1.180		1.361	B	0.883	0.872		0.807	A	1.923	1.755		1.685	C	1.014	0.966		0.909	A^-
19.CU Mort Serv	0.006	2.313	2.676		2.498	C^-	1.731	9.796		1.890	C	1.119	7.247		1.736	B	1.298	14.576		1.768	B^+	1.729	8.021		2.102	C^-
20.Midcountry Bank	0.004	1.510	1.770		2.420	B	1.236	2.579		1.347	B^+	0.963	1.906	1.571	1.651	A^-	2.690	3.841		6.396	D	1.303	2.104	0.786	1.853	B
21.Suntrust Mort	0.005	1.554	1.132		1.646	B	1.766	1.593		1.157	C	0.707	1.177		0.519	A	0.773	2.369			A^+	0.923	1.304		0.679	A
22.Waterstone Mort	0.005	1.606	2.382		1.309	B^-	1.517	4.129		2.538	B^-	0.900	3.053		1.100	A	3.001	6.148		0.916	D	1.313	3.374		1.414	B
23.Fifth Third Mort	0.005	2.535	3.391		2.182	D	1.458	1.657		0.784	B	1.159	1.225		0.958	B		2.463				1.452	1.359		1.217	C^+
24.Bremer Bank	0.005	1.892	4.246	2.800	4.017	C^+	2.890	21.791	2.800	1.887	D	1.372	16.122	2.800	2.147	C	0.826	32.433		2.965	A^+	1.810	17.830	2.800	2.798	D^+
25.Nationstar Mort	0.004	1.791	1.938		2.012	C^+	1.508	1.848		1.536	B^-	0.893	1.367		0.898	A	3.306	2.754		2.942	D^-	1.394	1.514		1.473	B^-
26.BMO Harris Bank	0.004	2.014	2.376	1.217	2.243	C	1.669	1.324	1.577	1.546	C^+	1.344	0.972	0.946	1.414	C^+	1.391	1.954	2.839	1.266	B	1.666	1.093	1.419	1.733	C^-
27.Franklin Amer Mort	0.004	1.963	2.427		0.909	C	2.097	2.178		2.566	C^-	1.889	1.615		0.919	D	3.096	3.243		1.091	D	2.042	1.789		1.225	D
28.Klein Bank	0.004	2.023	3.815	1.927	0.800	C	2.529	2.504	3.211	2.965	D	1.821	1.853	1.606	2.058	D	1.897	3.726			C^+	2.074	2.051	2.550	1.879	D
29.Trustone FCU	0.004	2.332	1.327	2.895	2.230	C^-	1.529	3.014	1.389	1.810	B^-	2.033	2.230	3.474	1.911	D	0.710	4.486		1.734	A^+	2.059	2.469	2.416	2.039	D
30.Tradition Mort	0.004	2.081	1.970		1.410	C	0.880	0.995		1.007	A	1.635	0.738		1.592	C^-		1.480				1.526	0.817		1.476	C
31.Hiway FCU	0.004	5.456	4.100	5.593	4.745	F	1.964	10.351	4.288	0.719	C^-	3.883	7.655	4.093	3.124	F	2.985	15.402	3.216	3.019	D	3.999	8.475	4.387	3.148	F
32.US FCU	0.003	2.950	4.244		2.819	D	1.255	3.215	12.850	1.280	B	1.493	2.378	8.567	1.387	C	2.377	4.784		2.184	C^-	2.120	2.633	5.841	1.970	D
33.Spire FCU	0.003	2.473	3.923	2.027	2.578	D^+	1.750	0.991	1.802	1.468	C	2.307	0.736	1.621	2.336	D^-	0.482	1.474		0.909	A^+	2.091	0.816	1.689	2.138	D
34.Freedom Mort	0.003	2.495	2.294	11.000	1.899	D^+	1.727	1.205		0.823	C	1.855	0.891		1.720	D	1.189	1.790			A^-	2.045	0.994	5.500	1.568	D
35.Homeservices Lending	0.003	2.654	5.201			D	0.715	11.160			A^+	1.512	8.250		1.213	C	27.866	16.615			F^-	1.613	9.130		0.679	C
36.USAA Savings Bank	0.003	1.285	1.311	1.794	1.579	B^+	1.210	1.291	1.196	1.369	B^+	0.978	0.955	0.897	0.912	B^+	1.504	1.920	1.436	1.369	B	1.184	1.059	1.346	1.288	B
37.Wing FCU	0.003	3.327			3.397	D^-		7.050				2.098	5.215		2.042	D^-		10.490				2.220	5.774		2.376	D^-
38.Mort Unlimited	0.003	2.600	3.349			D	2.756	20.001			D	1.288	14.794			C^+		29.777				1.900	16.362			D^+
39.Guaranteed Rate INC	0.003	2.353	3.865			C^-	1.854	10.343		1.440	C	2.091	7.631		2.984	D^-		15.392				2.110	8.441		2.152	D
40.Lake Area Bank	0.003	0.854	1.004	0.948	3.684	A	1.068	2.691		1.403	A	1.159	1.990	1.896	1.516	B	2.382	4.007		2.807	C^-	1.078	2.194	1.580	1.965	A^-
41.Ideal Credit Union	0.003	2.237	5.690		2.706	C^-	1.550	2.587	0.584	1.721	B^-	2.427	1.914	1.558	2.933	F^+	2.175	3.849		2.277	C	2.032	2.125	0.668	2.288	D
42.Liberty Savings Bank	0.002	2.020			3.350	C	3.928	8.268		4.123	F^+	1.309	6.117		1.914	C^+		12.303				1.969	6.772		2.680	D
43.Advanced Financial	0.002	1.083	1.000		1.084	A	1.099	0.252		1.101	A^-	1.072	0.187		1.072	B	1.145	0.376		1.147	A	1.082	0.207		1.086	A^-
44.Endura Financial	0.002	1.748	6.190		1.454	C^+	3.501	3.439	3.840	3.249	D^-	1.776	2.543		1.918	D^+	2.823	5.116		2.363	D	2.212	2.816	1.581	2.055	D^-
45.Primelending	0.002	2.106	3.060		2.127	C	1.540	5.985		2.506	B^-	1.451	4.427		1.017	C		8.909				1.597	4.896		1.575	C
46.Ever Bank	0.002	1.676	2.634		1.662	B^-	1.583	1.224		1.203	C^+	1.307	0.907		1.109	C^+		1.814				1.421	1.010		1.257	C^+
47.Topline FCU	0.002	2.496	2.626	9.250	2.728	D	0.664	2.486			A^+	1.548	1.839	3.083	1.474	C	2.322	3.698		3.410	C	2.019	2.036	5.550	2.031	D
48.Universal American	0.002	3.481	3.767			F^+	1.094	3.138		4.295	A^-	0.957	2.306		0.934	A^-		4.671				1.082	2.549		1.052	A^-
49.Merchant Bank	0.002							4.414				1.513	3.265		1.292	C		6.567				0.732	3.616		0.646	A
50.Baxter CU	0.002	3.273	8.166	1.563	2.666	D^-	1.851	8.934	2.083	2.874	C	0.811	6.602	0.694	0.940	A	3.124	13.293	1.042	3.832	D	1.250	7.307	1.122	1.339	B

1. The relative loan denial rate ratio for each loan type is calculated by: Loan denial rate for minority group j for institution i/ Loan denial rate for White group for institution i.
2. Share(**S**) is calculated by: Number of apps received by institution i / Total number of apps.
3. Ranking(**R**) is based on the "All Loans".
4. For A.Indian group, ratios calculated with observations greater than 30 is marked with dagger signs.
5. Minority includes Non-hispanic Black, Hispanic, Asian, American Indian.

Table A3-2: Share of Minority Loans

	2008 - 2013 HMDA Data							
	by Number				by Amount(in thousands)			
Institutions	Minority	Total	Share	Rank	Minority	Total	Share	Rank
1.Wells Fargo	12,767	174,786	0.073	C	2,313,025	35,109,060	0.066	C
2.US Bank	4,068	70,927	0.057	C$^-$	760,220	14,180,440	0.054	C$^-$
3.JPM Chase	1,138	20,603	0.055	C$^-$	223,743	4,667,472	0.048	D$^+$
4.CITI Bank	1,048	17,041	0.061	C	191,464	2,987,258	0.064	C
5.Bank of America	1,907	21,095	0.090	B	322,382	4,167,320	0.077	B$^-$
6.Bell ST Bank	2,801	47,290	0.059	C$^-$	521,120	9,893,884	0.053	C$^-$
7.PHH Mort Corp	1,623	20,859	0.078	C$^+$	283,248	4,083,923	0.069	C$^+$
8.Ally Bank	314	5,373	0.058	C$^-$	63,099	1,166,053	0.054	C$^-$
9.TCF Bank	424	7,527	0.056	C$^-$	59,366	1,545,355	0.038	D
10.Affinity Plus FCU	1,258	13,582	0.093	B	175,107	1,763,599	0.099	B
11.Quicken Loans	610	10,286	0.059	C$^-$	117,888	2,046,243	0.058	C
12.Alerus Financial	617	12,193	0.051	D$^+$	134,505	2,808,032	0.048	D$^+$
13.Summit Mort	873	10,607	0.082	B$^-$	157,615	2,261,751	0.070	C$^+$
14.Flagstar Bank	514	6,449	0.080	C$^+$	99,353	1,352,168	0.073	B$^-$
15.Barrington Bank	1,169	8,934	0.131	A$^-$	194,763	1,736,942	0.112	A$^-$
16.Marketplace H Mort	623	7,977	0.078	C$^+$	110,525	1,713,104	0.065	C
17.Associated Bank	337	5,912	0.057	C$^-$	69,412	1,463,776	0.047	D$^+$
18.Provident Funding	760	6,298	0.121	A$^-$	183,713	1,368,581	0.134	A
19.CU Mort Serv	393	5,833	0.067	C	66,992	925,893	0.072	B$^-$
20.Midcountry Bank	711	4,044	0.176	A	94,160	726,907	0.130	A
21.Suntrust Mort	617	3,897	0.158	A	160,005	908,569	0.176	A$^+$
22.Waterstone Mort	444	5,576	0.080	C$^+$	71,868	1,024,653	0.070	C$^+$
23.Fifth Third Mort	279	4,449	0.063	C	57,565	1,013,477	0.057	C
24.Bremer Bank	395	5,695	0.069	C	56,126	890,835	0.063	C
25.Nationstar Mort	295	3,431	0.086	B$^-$	51,803	666,469	0.078	B$^-$
26.BMO Harris Bank	274	3,560	0.077	C$^+$	47,699	869,881	0.055	C$^-$
27.Franklin Amer Mort	334	3,630	0.092	B	59,258	705,597	0.084	B
28.Klein Bank	121	4,276	0.028	D$^-$	18,196	670,968	0.027	D$^-$
29.Trustone FCU	195	4,163	0.047	D	25,067	593,440	0.042	D
30.Tradition Mort	66	4,227	0.016	F	17,512	1,159,243	0.015	F
31.Hiway FCU	375	4,304	0.087	B$^-$	32,309	484,341	0.067	C$^+$
32.US FCU	188	3,390	0.055	C$^-$	18,431	333,708	0.055	C
33.Spire FCU	111	3,004	0.037	D	7,057	221,212	0.032	D
34.Freedom Mort	225	3,224	0.070	C	43,758	628,552	0.070	C$^+$
35.Homeservices Lending	166	3,903	0.043	D	33,699	859,881	0.039	D
36.USAA Savings Bank	159	2,649	0.060	C	31,503	537,642	0.059	C
37.Wing FCU	80	3,102	0.026	F$^+$	13,547	540,169	0.025	D$^-$
38.Mort Unlimited	423	3,780	0.112	B$^+$	72,032	728,568	0.099	B
39.Guaranteed Rate INC	441	3,582	0.123	A$^-$	72,812	713,197	0.102	B$^+$
40.Lake Area Bank	513	2,823	0.182	A	47,300	370,548	0.128	A
41.Ideal Credit Union	126	2,489	0.051	D$^+$	15,409	325,989	0.047	D$^+$
42.Liberty Savings Bank	68	2,820	0.024	F$^+$	12,435	507,080	0.025	D$^-$
43.Advanced Financial	15	347	0.043	D	2,487	63,548	0.039	D
44.Endura Financial	169	2,391	0.071	C	17,746	251,706	0.071	C$^+$
45.Primelending	178	2,593	0.069	C	29,127	515,204	0.057	C
46.Ever Bank	107	1,309	0.082	B$^-$	21,559	278,599	0.077	B$^-$
47.Topline FCU	79	1,599	0.049	D$^+$	11,720	210,017	0.056	C
48.Universal American	515	2,363	0.218	A$^+$	155,890	713,203	0.219	A$^+$
49.Merchant Bank	27	2,040	0.013	F	4,498	416,819	0.011	F
50.Baxter CU	255	1,850	0.138	A	56,118	397,104	0.141	A

Note: Rank by Quintile is based on Minority/Non-minority ratio distribution of 493 institutions.

Table A3-3: Relative market share ratio (Minority Share/Non-minority Share)

	2008 - 2013 HMDA Data							
	by Number				by Dollar Amount			
Institutions	NM share	M share	Ratio	Rank	NM share	M share	Ratio	Rank
1.Wells Fargo	0.249	0.248	0.998	C	0.250	0.246	0.984	C
2.US Bank	0.101	0.079	0.783	C^+	0.101	0.081	0.801	C^-
3.JPM Chase	0.029	0.022	0.754	C^+	0.033	0.024	0.716	D^+
4.CITI Bank	0.024	0.020	0.840	C	0.021	0.020	0.958	C
5.Bank of America	0.030	0.037	1.235	D	0.030	0.034	1.156	B^-
6.Bell ST Bank	0.067	0.055	0.809	C^+	0.071	0.056	0.787	C^-
7.PHH Mort Corp	0.030	0.032	1.063	C^-	0.029	0.030	1.036	C^+
8.Ally Bank	0.008	0.006	0.798	C^+	0.008	0.007	0.808	C^-
9.TCF Bank	0.011	0.008	0.769	C^+	0.011	0.006	0.574	D
10.Affinity Plus FCU	0.019	0.024	1.265	D	0.013	0.019	1.483	B
11.Quicken Loans	0.015	0.012	0.810	C^+	0.015	0.013	0.861	C
12.Alerus Financial	0.017	0.012	0.691	B^-	0.020	0.014	0.716	D^+
13.Summit Mort	0.015	0.017	1.124	D^+	0.016	0.017	1.041	C^+
14.Flagstar Bank	0.009	0.010	1.089	C^-	0.010	0.011	1.098	B^-
15.Barrington Bank	0.013	0.023	1.787	F^+	0.012	0.021	1.675	A^-
16.Marketplace H Mort	0.011	0.012	1.067	C^-	0.012	0.012	0.964	C
17.Associated Bank	0.008	0.007	0.779	C^+	0.010	0.007	0.708	D^+
18.Provident Funding	0.009	0.015	1.648	F^+	0.010	0.020	2.006	A
19.CU Mort Serv	0.008	0.008	0.920	C	0.007	0.007	1.081	B^-
20.Midcountry Bank	0.006	0.014	2.402	F	0.005	0.010	1.935	A
21.Suntrust Mort	0.006	0.012	2.163	F	0.006	0.017	2.631	A^+
22.Waterstone Mort	0.008	0.009	1.088	C^-	0.007	0.008	1.048	C^+
23.Fifth Third Mort	0.006	0.005	0.857	C	0.007	0.006	0.849	C
24.Bremer Bank	0.008	0.008	0.947	C	0.006	0.006	0.941	C
25.Nationstar Mort	0.005	0.006	1.174	D^+	0.005	0.006	1.161	B^-
26.BMO Harris Bank	0.005	0.005	1.051	C^-	0.006	0.005	0.819	C^-
27.Franklin Amer Mort	0.005	0.006	1.257	D	0.005	0.006	1.255	B
28.Klein Bank	0.006	0.002	0.387	B^+	0.005	0.002	0.405	D^-
29.Trustone FCU	0.006	0.004	0.640	B	0.004	0.003	0.631	D
30.Tradition Mort	0.006	0.001	0.213	A	0.008	0.002	0.226	F
31.Hiway FCU	0.006	0.007	1.190	D^+	0.003	0.003	0.997	C^+
32.US FCU	0.005	0.004	0.758	C^+	0.002	0.002	0.825	C
33.Spire FCU	0.004	0.002	0.505	B	0.002	0.001	0.477	D
34.Freedom Mort	0.005	0.004	0.953	C	0.004	0.005	1.040	C^+
35.Homeservices Lending	0.006	0.003	0.581	B	0.006	0.004	0.586	D
36.USAA Savings Bank	0.004	0.003	0.820	C	0.004	0.003	0.875	C
37.Wing FCU	0.004	0.002	0.352	A^-	0.004	0.001	0.375	D^-
38.Mort Unlimited	0.005	0.008	1.529	D^-	0.005	0.008	1.477	B
39.Guaranteed Rate INC	0.005	0.009	1.682	F^+	0.005	0.008	1.525	B^+
40.Lake Area Bank	0.004	0.010	2.482	F	0.003	0.005	1.907	A
41.Ideal Credit Union	0.004	0.002	0.691	B^-	0.002	0.002	0.706	D^+
42.Liberty Savings Bank	0.004	0.001	0.329	A^-	0.004	0.001	0.366	D^-
43.Advanced Financial	0.000	0.000	0.590	B	0.000	0.000	0.585	D
44.Endura Finanacial	0.003	0.003	0.965	C	0.002	0.002	1.053	C^+
45.Primelending	0.004	0.003	0.938	C	0.004	0.003	0.845	C
46.Ever Bank	0.002	0.002	1.117	D^+	0.002	0.002	1.156	B^-
47.Topline FCU	0.002	0.002	0.675	B^-	0.001	0.001	0.834	C
48.Universal American	0.003	0.010	2.977	F^-	0.005	0.017	3.266	A^+
49.Merchant Bank	0.003	0.001	0.181	A	0.003	0.000	0.161	F
50.Baxter CU	0.003	0.005	1.883	F	0.003	0.006	2.111	A

Note: Rank by Quintile is based on Minority/Non-minority ratio distribution of 493 institutions.

Table A3-6: List of Top 10 Institutions by Relative Loan Denial Rate

Institution	Relative Ratio
1.Devon Bank	0.150
2.RoundPoint Mortgage Company	0.267
3.Prior Lake State Bank	0.389
4.Carrington Mortgage Services	0.402
5.Peoples Bank of Commerce	0.413
6.Charles Schwab Bank	0.442
7.Vermillion State Bank	0.499
8.Guidance residential LLC	0.502
9.Wyndham Capital Mortgage	0.517
10.Rescue Mortgage INC	0.545

Table A3-7: Loan Denial Rate by Institutions

Institutions	Non-Minority LDR	Minority LDR	Relative Rate LDR	Rank
1.Wells Fargo	0.120	0.203	1.688	C$^-$
2.US Bank	0.180	0.323	1.798	D$^+$
3.JPM Chase	0.084	0.134	1.604	C
4.CITI Bank	0.199	0.309	1.555	C
5.Bank of America	0.128	0.212	1.657	C
6.Bell ST Bank	0.034	0.067	1.982	D
7.PHH Mort Corp	0.055	0.097	1.756	D$^+$
8.Ally Bank	0.274	0.404	1.475	C$^+$
9.TCF Bank	0.533	0.705	1.321	B$^-$
10.Affinity Plus FCU	0.042	0.091	2.172	D
11.Quicken Loans	0.185	0.228	1.232	B
12.Alerus Financial	0.017	0.031	1.893	D$^+$
13.Summit Mort	0.037	0.063	1.710	C$^-$
14.Flagstar Bank	0.114	0.196	1.723	C$^-$
15.Barrington Bank	0.071	0.101	1.411	B$^-$
16.Marketplace H Mort	0.030	0.063	2.114	D
17.Associate Bank	0.203	0.389	1.918	D
18.Provident Funding	0.219	0.222	1.014	A$^-$
19.CU Mort Serv	0.089	0.154	1.729	C$^-$
20.Midcountry Bank	0.131	0.171	1.303	B
21.Suntrust Mort	0.144	0.133	0.923	A
22.Waterstone Mort	0.111	0.146	1.313	B
23.Fifth Third Mort	0.139	0.203	1.452	C$^+$
24.Bremer Bank	0.043	0.078	1.810	D$^+$
25.Nationstar Mort	0.209	0.292	1.394	B$^-$
26.BMO Harris Bank	0.287	0.479	1.666	C$^-$
27.Franklin Amer Mort	0.103	0.210	2.042	D
28.Klein Bank	0.132	0.273	2.074	D
29.Trustone FCU	0.101	0.207	2.059	D
30.Tradition Mort	0.175	0.267	1.526	C
31.Hiway FCU	0.067	0.268	3.999	F
32.US FCU	0.089	0.188	2.120	D
33.Spire FCU	0.159	0.333	2.091	D
34.Freedom Mort	0.153	0.313	2.045	D
35.Homeservices Lending	0.036	0.058	1.613	C
36.USAA Savings Bank	0.318	0.376	1.184	B
37.Wing FCU	0.083	0.183	2.220	D$^-$
38.Mort Unlimited	0.011	0.021	1.900	D$^+$
39.Guaranteed Rate INC	0.032	0.067	2.110	D
40.Lake Area Bank	0.153	0.165	1.078	A$^-$
41.Ideal Credit Union	0.179	0.363	2.032	D
42.Liberty Savings Bank	0.071	0.139	1.969	D
43.Advanced Financial	0.874	0.945	1.082	A$^-$
44.Endura Financial	0.106	0.235	2.212	D$^-$
45.Primelending	0.066	0.106	1.597	C
46.Ever Bank	0.316	0.448	1.421	C$^+$
47.Topline FCU	0.108	0.217	2.019	D
48.Universal American	0.087	0.094	1.082	A$^-$
49.Merchant Bank	0.088	0.065	0.732	A
50.Baxter CU	0.080	0.100	1.250	B