

9-12-2013

Experimental Tests for Discrimination by Mortgage Loan Originators

Andrew Hanson

Marquette University, andrew.r.hanson@marquette.edu

Zackary Hawley

Texas Christian University

Hal Martin

Georgia State University

Bo Liu

Georgia State University

Published version. 2013 Policy Summit on Housing, Human Capital, and Inequality, September 19-20, 2013 Cleveland Inter-Continental Hotel & Conference Center. Conference presentation. © 2013 Federal Reserve Bank of Cleveland. Used with permission.

Experimental Tests for Discrimination by Mortgage Loan Originators

Andrew Hanson, Marquette University

Zackary Hawley, Texas Christian University

Hal Martin and Bo Liu, Georgia State University



Mortgage Lending and Race

- Allegations of discriminatory lending practices during 2004-2008 housing boom have resulted in the largest cash settlements ever.
 - \$335 million, Countrywide (Dec. 2011)
 - \$175 million, Wells Fargo (July 2012)
- Only an 8 basis point difference (favoring whites) between whites and minority clients during 2004-2008.
 - Raw, unconditional mean from FFIEC
- Substantial cost of lawsuits and lack of corroboration in aggregate data raises questions.
 - Do mortgage lenders *really* discriminate against minority borrowers?
 - How is this possible in an age of computerized, nearly automatic, underwriting?



Research Goals

- Design and implement a definitive test of lender discrimination
- Compare the effects of borrower race and creditworthiness
- Explore possible channels of discrimination
 - Overt
 - Subtle?

Mr. XXXXX: I usually do not work with anyone without them being referred so if you would like to contact me and speak then please do so, otherwise I feel there is no value in a short e-mail with generic information based on the most minimal of information.

Mr. YYYYY: ...I would love to speak with you on the phone with no obligation so we can see if you would like to have me work on your behalf. ... It is my sincere desire you will give me the opportunity to work with you so I look forward to your call.



Contributions of Our Research

- First field experiment using e-mail correspondence with MLOs
 - Previous work (In-person auditors)
 - Smith and Delair (1999)
 - Ross, Turner, Godfrey, Smith (2008)
 - Heckman critique
 - Housing search discrimination
- Analysis of communication
 - Overt: response vs. non-response
 - Subtle: text of response
- National MLO sample
- Within-subjects design



The Role of Mortgage Loan Originators

- What they do
 - Assist customers with loan applications
 - Offer and negotiate the terms
- Why this is important
 - Initial and primary contact person for borrowers
 - Discretion in responding to customer inquiries
 - Ability to control application process
 - Make suggestions for successful application
 - Improve credit before application
 - Encourage expediency (low interest changes/sales)
 - Present different fees or interest rates
 - Encourage or discourage borrower
 - Offer other financial advice



Field Experiment Design

- Test for differences in lender treatment
 - Between whites and African Americans
 - Across no Credit, poor credit, good credit
 - Interact credit and race
- Inquire with simple questions
 - Semi-automatic design
 - Disguise experiment



Field Experiment Design

- E-mail based
 - G-mail accounts: FirstName.Surname.###@gmail.com
 - Each MLO receives two similar E-mails
- 60 experiment types: 30 combinations * 2 orders

	Questionset #1		Questionset #2	
	Black	White	Black	White
No CS	1	2	7	8
Low CS	3	4	9	10
High CS	5	6	11	12



Field Experiment Design: Signaling Race

- First names
 - New York City Department of Health and Human Hygiene records for babies born in 1990
 - No counts for name/race < 10
 - Exclude Jewish names- national representation?
- Surnames
 - Census 2000
 - Largest probability of white/African American
 - Exclude German last names (Yoder, Mueller, Koch)



Field Experiment Design: Signaling Race

	First Name			Last Name		
	P(Race Name)	Count	Rank	P(Race Name)	Count	Rank
<u>White</u>						
Zachary Miller	1	164	1	0.86	969910	NA
Brendan Nelson	1	55	5	0.8	329788	NA
Jake Krueger	1	43	9	0.97	36694	2
Ethan Schmitt	1	38	10	0.97	35326	6
Maxwell Baker	1	36	15	0.82	343081	NA
Spencer Miller	1	31	17	0.86	969910	NA
Brett Nelson	1	28	20	0.8	329788	NA
Conor Schmitt	1	21	33 (tie)	0.97	35326	6
Luke Krueger	1	22	31	0.97	36694	2
Seth Baker	1	21	33 (tie)	0.82	343081	NA
<u>African American</u>						
Jamal Washington	1	96	1	0.9	163036	1
Jerome Jefferson	1	38	27	0.53	666125	5
DaQuan Booker	1	68	10	0.66	35101	3
Terrell Banks	1	66	12	0.54	99294	4
Darnell Jackson	1	65	13	0.53	666125	5
Tyrone Washington	1	56	14	0.9	163036	1
Kadeem Jefferson	1	84	2	0.75	51361	2
Reginald Jackson	1	51	18	0.75	51361	2
Jermaine Booker	1	49	22	0.66	35101	3
DaShawn Banks	1	39	26	0.54	99294	4



Field Experiment Design: Credit Score

- Credit randomly assigned from bins
- Score distribution from Fair Isaac Company (Federal Reserve)
 - No credit
 - Low credit (600-650)
 - 15-30th percentile of national distribution
 - High credit (700-750)
 - 40-60th percentile of national distribution



Field Experiment Design: Correspondence Construction

[GREETING] [MLO FIRST NAME],

I'm interested in [PRODUCT].

[SOURCE]

[PLEASANTRY]

[If score known, then CREDIT SCORE]

[RANDOMLY ASSIGNED SCORE]

[QUESTION #1a or QUESTION #2a, depending on question set type]

[QUESTION #1b or QUESTION #2b, depending on question set type]

[VALEDICTION]

[RANDOMLY ASSIGNED NAME from Data]

GREETING

Hello

Hi

Hi There

Hey

Dear

PRODUCT

a home loan.

a mortgage.

getting a home loan.

getting a loan.

information on mortgages.

PLEASANTRY

I just have a few questions.

I have a few questions for you.

I'm curious about a few things.

I'd like to ask you a couple of questions.

I'm wondering about a few things.



Field Experiment Implementation: Subject Collection

- Identified through on-line search
 - Hand collected
 - Google, Yellow Pages, Better Business Bureau
 - Name
 - Office location (state, city, address)
 - Contact (e-mail)
 - Company
 - Photo when available → Best guess on gender/race
- Limited by company (50) and branch (8) to avoid exposing
 - Average per company: 2.4
 - Average per branch: 27
- Balance sample by state population → Nationally representative



Field Experiment Implementation: Sample Characteristics

Mortgage Loan Originator Characteristics (Sample: 5,181)

	Audits	Frequency	Overall Response Rate
<u>Gender</u>			
Female	1,916	36.98%	87.37%
Male	2,202	42.50%	84.92%
Not Identified	1,063	20.52%	80.53%
<u>Race</u>			
White	3,619	69.85%	86.57%
Non-White	273	5.27%	85.71%
Arabic	1	0.02%	100.00%
Asian	57	1.10%	80.70%
Black	90	1.74%	91.11%
Hispanic	115	2.22%	84.35%
Indian	7	0.14%	71.43%
Native American	3	0.06%	100.00%
Not Identified	1,289	24.88%	80.14%



Field Experiment Implementation: The Process

- 5 Rounds of E-mailing
 - Round is 2 e-mails
 - 1 week separates each half round
 - 1 pilot round
- Sending on Tuesday, Wednesday, Thursday
 - round repeats day of week & time of day
 - May, 2013
- 10,632 E-mails
- Precautions against exposing experiment
 - Limit e-mails to 2 per branch-day
 - Randomized content
 - Randomized order



Results: Respond or Not by Race

	White	African American	
All audits	68.31% [3540]	65.68% [3402]	2.63% <i>p=0.0022***</i>
White MLOs	70.67% [2554]	67.41% [2443]	3.26% <i>p=0.0014***</i>
Non-White MLOs	68.50% [187]	65.57% [179]	2.93% <i>p=0.2337</i>
Missing Race MLOs	61.70% [799]	60.80% [780]	0.90% <i>p=0.3189</i>
Male MLOs	69.16% [1496]	66.00% [1479]	3.16% <i>p=0.0124**</i>
Female MLOs	70.80% [1382]	67.23% [1264]	3.57% <i>p=0.0085***</i>
Missing Gender MLOs	62.04% [662]	62.23% [659]	-0.19% <i>p=0.5351</i>



Results: Respond or Not by Race

	Respond to neither	Respond to both	White only	African American only	
All audits	16.28% [632]	49.77% [1932]	17.88% [694]	16.07% [624]	1.81% <i>p=0.0573*</i>
White MLOs	14.49% [392]	51.96% [1406]	17.85% [483]	15.71% [425]	2.14% <i>p=0.0585*</i>
Non-White MLOs	13.04% [27]	49.28% [102]	20.77% [43]	16.91% [35]	3.86% <i>p=0.4282</i>
Missing Race MLOs	21.98% [213]	43.76% [424]	17.34% [168]	16.92% [164]	0.42% <i>p=0.8693</i>
Male MLOs	16.66% [277]	50.75% [844]	17.74% [295]	14.85% [247]	2.89% <i>p=0.0434**</i>
Female MLOs	12.98% [184]	51.48% [730]	18.83% [267]	16.71% [237]	2.12% <i>p=0.1964</i>
Missing Gender MLOs	21.35% [171]	44.69% [358]	16.48% [132]	17.48% [140]	-1.00% <i>p=0.6713</i>

Note: P-values from McNemar difference in proportions test distributed Chi-squared



Results: Respond or Not by Credit

Response Rate Differences

	High Credit	Low Credit	No Credit	(High)-(Low)	(High)-(No)	(Low)-(No)
Response Rate (includes all audits)	69.46%	65.76%	65.77%	3.70%	3.69%	-0.01%
	[2397]	[2276]	[2269]	$p=0.0005***$	$p=0.0005***$	$p=0.5024$



Results: Respond or Not by Credit

MLO Level Differences

	Respond to neither	Respond to both	Respond to Higher only	Respond to Low/No only	
High vs. Low Credit	15.21% [132]	49.88% [433]	19.47% [169]	15.44% [134]	4.03% <i>p=0.0506*</i>
High vs. No Credit	15.17% [129]	53.00% [450]	20.14% [171]	11.66% [99]	8.48% <i>p=0.0000***</i>
Low vs. No Credit	17.80% [155]	50.17% [437]	17.22% [150]	14.81% [129]	2.41% <i>p=0.2311</i>



Results: Respond or Not by Race and Credit

Response at MLO level	Respond to neither	Respond to both	White only	African American only	
Equal Credit Within Audit	16.31%	49.36%	17.97%	16.35%	1.62%
	[423]	[1280]	[466]	[424]	<i>p=0.1693</i>
White Higher Credit Within Audit	15.91%	48.22%	23.04%	12.83%	10.21%
	[67]	[203]	[97]	[54]	<i>p=0.0006***</i>
African American Higher Credit Within Audit	15.00%	52.63%	12.63%	19.74%	-7.11%
	[57]	[200]	[48]	[75]	<i>p=0.0187**</i>

- Probit estimation and MFX
 - The effect of being African American is roughly equivalent to having a credit score that is 71 points lower



Testing for Subtle Discrimination

Comparison Form

✕

Hi XXXXX..

Hello XXXXX,

Thanks for emailing me.. What I would need is for you to go to my website and fill out an application . This will give me permission to pull credit.

I could help you with a loan that would fit best for you. We're you thinking to put as little as 3.5% or more down... Once I know this and your credit score we can discuss what would be best for you.

Let me know that you see my website when I send you this email. I'm sending it from my iPhone.

Let me know if you are ready to have your credit pulled and get pre approved for a loan.

Once I pull credit we can talk about different loans. But the score you gave will give you many options. How much did you want to put down? FHA is 3.5 % down .. Let me know.

Thanks!

AAAAA

If my website is not attached I can send it.

Please indicate which email you prefer:

Strongly Prefer Prefer Neutral Prefer Strongly Prefer

Please enter your ID:

ARH

Please indicate the reasons for your preference. Check all that apply:

- | | |
|---|--|
| <input type="checkbox"/> More favorable terms (interest rate, etc.) | <input type="checkbox"/> Unpreferred email was more negative |
| <input checked="" type="checkbox"/> Friendliness | <input type="checkbox"/> Facilitated the transaction |
| <input type="checkbox"/> Included more details | <input type="checkbox"/> Unpreferred email steered into a product or was pushy |
| <input type="checkbox"/> Explained the process | <input type="checkbox"/> Other: <input type="text"/> |

Previous

Next



MARQUETTE
UNIVERSITY

Results: Subtle Discrimination

<u>Author Blind Review</u>	Neutral	Prefer White	Prefer African American	
MLOs Responding to Both Races (1,932 Matched Pairs, Equal Credit)	57.25% [1106]	22.67% [438]	20.03% [387]	2.64% <i>p=0.0817*</i>

Reason for Preference

More Favorable Terms	5.94%	4.13%
Friendliness	33.56%	32.82%
Included More Details	46.58%	40.83%
Explained the Process	5.48%	7.24%
Un-preferred E-mail was Negative	5.25%	8.01%
Facilitated the Transaction	27.85%	30.75%
Un-preferred E-mail Steered or was Pushy	1.37%	0.78%
Other	9.82%	10.85%



Results: Subtle Discrimination

<u>Outside Reviewer Blind Review</u>	Neutral	Prefer White	Prefer African American	
MLOs Responding to Both Races	43.94%	29.19%	26.40%	2.79%
(1,932 Matched Pairs, Equal Credit)	[849]	[564]	[510]	<i>p=0.1058</i>

Reason for Preference

More Favorable Terms		5.67%	5.10%
Friendliness		47.16%	45.29%
Included More Details		54.26%	51.57%
Explained the Process		20.04%	18.82%
Un-preferred E-mail was Negative		7.98%	7.45%
Facilitated the Transaction		26.24%	26.47%
Un-preferred E-mail Steered or was Pushy		2.13%	1.37%
Other		3.90%	5.29%



Conclusions

- Overt discrimination exists, but is not wide-spread
 - About 2% of MLOs, on net
 - Much smaller than unequal treatment by credit score (something that *should* matter)
- Subtle discrimination also exists
 - About 2% of MLOs (of those not overtly discriminating)
 - May effect transaction speed, ease
 - Multiple stages of home purchase
- Comparing race and credit
 - Marginal effect of African American = credit score that is 71 points lower
- Examining lending outcomes in isolation is insufficient for measuring discrimination
 - Composition of sample
 - Compounding (Lending → Search → Purchase)



Still Working On...

- Other measures of subtle discrimination
 - Keyword search
 - Time to respond
 - Likelihood of follow-up communication
 - Non side-by-side Grading
- Heterogeneity across characteristics
 - Demographics
 - Home prices
 - Vacancy rates
 - Foreclosures

