Racial Bias in the Housing Market: Mortgage Lending

By: Aishah Newson & Autumn Rains

MIDS W231: Final Project Report, December 12, 2021

Introduction

Owning a home in the United States is a cornerstone of the American Dream. Owning a home as well as time spent within it were particularly highlighted for much of the world during the Covid-19 pandemic beginning in 2020. As many may recall, voluntary lock-downs and 'stay at home' orders forced major shifts in daily life and placed a greater degree of emphasis on the importance of having a safe and solitary place of residence. All scales of business in wide ranges of industries globally suddenly were concerned about impacts to revenues and profits.

Despite the economic downturn from the Covid-19 pandemic, the U.S. housing market saw double-digit growth rates in home pricing and equity appreciation in 2021. According to the Federal Housing Finance Agency, U.S. house prices grew 17.4 percent in the second quarter of 2021 versus 2020 and increased 4.9 percent from the first quarter of 2021 (U.S. House Price Index Report, 2021). Given these figures, obtaining a mortgage financing has further become vital to the home buying process for potential homeowners. Advancements in Machine Learning in the financial industry have expanded loan products as mortgage lenders embrace digital technologies to speed up the mortgage lending process. This allows mortgage lenders the ability to serve a broader, growing customer base. Currently, it is estimated that "45% of the country's largest mortgage lenders now offer online or app-based loan origination, as FinTech looks to play a major role in reducing bias in the home lending market, CultureBanx reported." (Hale, 2021)

Unfortunately, the ability to obtain a mortgage from lenders is not equal for all potential homeowners due to bias within the algorithms of these digital products. According to the Consumer Financial Protection Bureau (Mortgage refinance loans, 2021):

> "Initial observations about the nation's mortgage market in 2020 are welcome news, with improvements in the overall volume of home-purchase and refinance loans compared to 2019," said CFPB Acting Director Dave Uejio. "Unfortunately, Black and Hispanic borrowers continued to have fewer loans, be more likely to be denied than non-Hispanic White and Asian borrowers, and pay higher median interest rates and total loan costs. It is clear from that data that our economic recovery from the COVID-19 pandemic won't be robust if it remains uneven for mortgage borrowers of color."

Given these figures above, has bias in mortgage lending been observed only recently? Sadly, no this is not a new issue. Exploring the history of mortgage lending in the United States, discrimination based on race has been an undertone in our history.

A History of Bias

In 1933, the United States saw the makings of a housing shortage. In an effort to address this, housing programs created under 'The New Deal' in 1933 aimed to increase housing inventory. The process of creating and assigning this inventory were blatant forms of segregation. In fact, the policies from this program as found in the ‘Underwriting Manual’ mandated segregation through regulation such as "incompatible racial groups should not be permitted to live in the same communities." Another example from this government document recommended “that highways be a good way to separate African-American from white neighborhoods.” Therefore, people of color were not included in new plans for suburban communities and instead placed into urban housing projects. In an article about history of American housing policies in a book titled ‘The Color of Law’, Author Richard Rothstein states:

> “The Federal Housing Administration's justification was that if African-Americans bought homes in these suburbs, or even if they bought homes near these suburbs, the property values of the homes they were insuring, the white homes they were insuring, would decline. And therefore their loans would be at risk.There was no basis for this claim on the part of the Federal Housing Administration. In fact, when African-Americans tried to buy homes in all-white neighborhoods or in mostly white neighborhoods, property values rose because African-Americans were more willing to pay more for properties than whites were, simply because their housing supply was so restricted and they had so many fewer choices. So the rationale that the Federal Housing Administration used was never based on any kind of study.” (Gross, 2017)

The following year, the Federal Housing Administration (FHA) was established and created a policy known as 'redlining.' This policy furthered segregation for people of color by refusing to issue mortgages for properties in or near African-American neighborhoods. Maps were created to color-code specific areas with dense populations of groups by race. Red was used to indicate an area of majority African Americans. Through the adoption of these maps by the FHA, banks began to rely on these color-codings to determine initial loan risks. (Gross, 2017)

While the ‘redlining’ policy was in effect, the FHA also offered subsidies for large-scale builders who prioritized suburban development project builds. The subsidies required that builders sold none of these homes to African-Americans. Vacancies in white-only developments, known as suburban developments (‘suburbs’) were ample while developments intended for people of color were much more limited. Over time major industries moved out of major city centers leaving those who remained with fewer options for employment. Even as city centers opened up vacancies for people of color, the effects of the FHA housing development program had created stratifications in wealth and housing affordability gaps that we still see in effect today. (Gross, 2017).

Bias in the Algorithms

From the brief historical overview above, it is clear that racial bias has been a core aspect of the housing and lending markets and continues into the digital product offerings of today. Researchers at UC Berkeley Haas School of Business discovered that black and Latino

borrowers were charged higher interest rates of 7.9 bps both online and in-person in 2019 (Public Affairs & Affairs, 2018). Similarly, 'The Markup' also explored this bias in mortgage lending and found the following about national loan rates:

> Holding 17 different factors steady in a complex statistical analysis of more than two million conventional mortgage applications for home purchases, we found that lenders were 40 percent more likely to turn down Latino applicants for loans, 50 percent more likely to deny Asian/Pacific Islander applicants, and 70 percent more likely to deny Native American applicants than similar White applicants. Lenders were 80 percent more likely to reject Black applicants than similar White applicants. […] In every case, the prospective borrowers of color looked almost exactly the same on paper as the White applicants, except for their race.

Mortgage lenders approach the digital lending process similarly to traditional banks regarding risk evaluation criteria. These criteria include financial details about individuals such as:

- Pay stubs for the last 30 days
  W-2 forms, last two years
- Signed federal tax return, last two years
- Documentation of any other sources of income
- Bank statements, two most recent
- Documentation of the source of your down payment: investment or savings account statements showing at least two months' history of ownership. If some of the funds were a gift, get a signed statement from the giver stating that the funds were a gift.
- Documentation of name change, if recent
- Proof of your identity (typically a drivers' license or non-driver ID)
- Social security number

Lenders aim to review an individual's overall assets and liabilities to determine the type of lending products to offer as well as identify which individuals may present too much risk. These criteria and factors are in line with federal guidelines with the Consumer Finance Protection Bureau (CFPB). (Consumerfinance.gov 2021)

The CFPB issued guidelines after the 2008 recession to reduce the risk of predatory lending to consumers. If a potential home buyer does not meet these criteria, they are classified as a risk. Mortgage lenders could consider using additional criteria such as utility or rental payment history. However, most lenders typically do not. Explaining further within the New York Times article:

> "To fund their loans, they rely on the secondary mortgage market, which includes the government-backed entities Freddie Mac and Fannie Mae, and which became more conservative after the 2008 crash. With some exceptions, if you don't meet the standard C.F.P.B. criteria, you are likely to be considered a risk." (Miller, 2020)

These criteria do tend to put people of color at a disadvantage. For example, credit scores are typically calculated based on individual spending and payment habits. Rental payments are typically the most significant payment individuals pay routinely, but these generally are not reported to credit bureaus by landlords.

According to an article in the New York Times, more than half of Black Americans pay rent. Alanna McCargo, Vice President of housing finance policy at the Urban Institute, further elaborates within the article (Miller, 2020):

> "We know the wealth gap is incredibly large between white households and households of color," said Alanna McCargo, the vice president of housing finance policy at the Urban Institute. "If you are looking at income, assets and credit — your three drivers — you are excluding millions of potential Black, Latino and, in some cases, Asian minorities and immigrants from getting access to credit through your system. You are perpetuating the wealth gap." […] As of 2017, the median household income among Black Americans was just over $38,000, and only 20.6 percent of Black households had a credit score above 700."

Mortgage lending relies heavily on credit scores using models. The primary model used today was created by the Fair Isaac Corporation (FICO). Potential solutions to reduce hidden bias in the mortgage lending algorithms therefore could include widening the data criteria used for risk evaluation decisions. Disappointingly, the Federal Housing Administration does not require these additional criteria nor does the secondary mortgage market even in the loan products created for low and moderate-income borrowers. However, newer FICO models have begun to incorporate additional criteria. (Miller, 2020)

Alternative Lending Models: The Belmont Report

If mortgage lenders are now considering additional criteria to incorporate into loan decisions, what can be considered and how feasible is it to collect this information? It is important to clearly state that some demographic factors about an individual cannot be considered according to the law. The Fair Housing Act of 1968 states that within mortgage underwriting, lenders cannot consider sex, religion, race, or marital status as part of the evaluation. However, these may be factors by proxy through variables like timeliness of bill payments, a part of the credit score evaluation previously discussed. If Data Scientists have additional data points beyond the scope of the recommended guidelines of the Consumer Finance Protection Bureau, should these be considered? If so, do any of these extra data points include bias directly or by proxy? These considerations pose quite a dilemma for Data Scientists, digital mortgage lenders, and companies involved in credit modeling.

Viewing these questions through the lens of the Belmont Report, a critical document that defines the core of research ethics, would be a first step in exploring the feasibility of these criteria. The table below explores the addition of rental history payments into mortgage lending credit score models (*The Belmont Report* 1979):

Belmont Report Principle	Additional Criteria-Mortgage Lending: Rental Payment History
Respect for Persons: Defined as treating people as agents with their own autonomy while also giving protections to those with diminished autonomy.	In the instance of incorporating Rental Payment History, individuals should be given the opportunity to submit this information when applying for loan products as supplemental. This would ensure consent of submission for this information. Mortgage lending algorithms should be designed to incorporate this information where possible but not weigh it such that individuals who cannot or will not submit this information are impacted negatively for a lack of submission. Also, standardizing on the minimum amount of rental payment history that could impact a mortgage lending decision should be completed by FICO or FHA guidelines. For example, is three months of history adequate or would 2 years be sufficient? Where does the risk vs. lack of risk 'line' lie? In the instance of diminished authority (e.g. individuals who are incapable of governing their own autonomy due to handicaps or lack of understanding), there should be the option for co-applications and/or a loan officer who is willing to explain each step in a more slow and controlled approach to the lending process. Perhaps this could be created through the FHA as well.
Beneficence: Defined as minimizing potential harms while maximizing benefits of participation for all involved.	In mortgage lending products with rental payment history, there should be provisions for prohibited contact to existing or previous landlords to reduce the possibility of retaliation. [e.g.: Default answer to contacting landlords should be NO/not allowed, unless consent given by loan applicant] Additionally, the location of rental units should not be a factor in the criteria. Location bias (or perception of locations that are 'better' or 'worse' to live in would therefore be minimized in algorithms. This aspect of rental history should simply be: did you submit rental payments on time for the length of time you lived at the property. Perhaps the property name is the only piece of data needed to submit as part of the history submission along with bank account statements showing payment. Further, can an individual show they paid the lease in full vs. showing dates/payments on a monthly basis. Ultimately the goal for correctly maximizing the benefit while minimizing harm is to allow an individual to showcase their ability to pay a significant, routine payment on a recurring basis successfully. Location bias (based on perception of lenders) should be closely monitored to reduce any additional harms (bias) this could introduce to machine learning models.
Justice: Defined as equal, fair distribution of risks and benefits.	Fundamentally, the incorporation of additional criteria is a means to further redistribute justice in mortgage lending. The statistics as described previously clearly indicate that people of color do not have equal access to mortgage lending products. It is important to also state that mortgage lenders are constantly evaluating risk as a part of

	this process at all stages. Expanding the model criteria would seem to enhance their abilities to evaluate an individual while also introducing ways to eliminate bias based on the history of prior models. Clearly asking about race as a part of the evaluation is illegal, however, can metrics be created such that individuals can opt-in to sharing their demographics to allow mortgage lenders to study their customer base and increase the diversity? It is possible, but perhaps too late in the process. Therefore, it does go back to the initial aspects of the model as created and studying the bias within it. Perhaps the FHA or FCPB can require banks report in detail on efforts in this area to ensure equal access for all.

Alternative Lending Model: Credit Scores with VantageScore

To further explore alternative lending models, our project team identified an alternative credit scoring model by VantageScore. VantageScore, founded in 2006, is the largest competitor to FICO and is created by the big three U.S. credit bureaus, Experian, Equifax and TransUnion. Together, FICO and VantageScore are the two man providers of credit scoring for mortgage lenders as they follow the same scoring system between 300 and 850 with higher scores being better. According to an article on CNBC (Adamcyzk, 2021):

> "Both scores have different models, and lenders use different versions. But they primarily take a person's payment history, credit utilization rate, length of credit history, types of credit accounts and recent credit account openings into consideration. Payments and balances for credit cards, mortgages, student loans, auto loans, etc., are all reported to the credit bureaus."

VantageScore was created to target additional, non-traditional consumers like college students or immigrants and give them the ability to obtain a credit score. What makes VantageScore unique is that they evaluate the same factors for credit history as FICO, but weighs them differently. There are four key factors (Gravier, 2021):

1. Extremely influential: Total credit usage, balance and available credit
2. Highly influential: Credit mix and experience
3. **Moderately influential: Payment history**
4. Less influential: Age of credit history and new accounts opened

Further exploration of VantageScore products from their website, they state (*The Model for Credit Scoring Innovation* 2020):

> "VantageScore models are developed by using anonymized data from each credit reporting company (CRC); providing greater consistency, predictability, stability as well as new customer opportunities with each model release."

Additionally, VantageScore has opted to share results of studying bias in their 3.0 product as found in a report on their website. The report findings form the conclusion section 'Ethnicity Study' state (*Testing methodologies for credit score ... - vantagescore* 2014):

> "In both instances, secured and unsecured credit products, there is no evidence of bias toward protected classes when using VantageScore 3.0. By comparing one million randomly selected consumers in each case, there were no discernible differences in the probability to default within each score band when these consumers were overlaid with demographic data. VantageScore 3.0 produces no favorable biases in assessing risk outcomes for either product for any impacted ethnic group."

This is a step in the right direction for credit score companies like VantageScore, but it is not surprising that a self-funded study found no bias. In the future, companies should be audited by a third party for not only bias, but privacy and security concerns.Given that companies like VantageScore fundamentally rely on Personally Identifiable Information (PII) as submitted by individuals, it does bring into question their policies on how they collect, store and distribute this information for PII but also additional, 'alternative' criteria like rental or payment histories.

Alternative Lending Model - VantageScore: Privacy Policy Framework Analysis

Based on the above findings, our project team evaluated VantageScore privacy policy to attempt to understand how they collect, store and distribute the PII collected by individuals. We utilized three policy frameworks to do this analysis. The results are detailed below.

Solove Taxonomy

Solove's Taxonomy consists of four main pieces that we will consider when assessing VantageScore's privacy policy. Information collection takes into consideration the way companies or organizations are gathering various data points about a user. For example, VantageScore makes note that they try to avoid collecting any personally identifiable information aside from name and emails, which they do note that the users voluntarily share. However, if a user must submit those pieces of information to utilize their credit scoring system, does that make it truly voluntary.

The next piece of Solove's Taxonomy looks at information processing. Is a user's data being aggregated with other information? A positive from VantageScore's privacy policy is that they note they try to work with only aggregated data to avoid being able to identify a single individual's information. However, as we have learned through the course of this class, aggregating data is not a guaranteed way to avoid being able to identify people in a dataset.

Aggregating data feeds into the next point of Solove's Taxonomy which is information dissemination. While VantageScore does believe they are minimizing risk by aggregating data, they do not have a lot of discussion around who that information is being shared with, how that information is being shared and for what purpose is that information being shared. There is no

mention of what information is being discussed with outside partners. This same idea can also be applied when looking at their internal teams at the company. They do not say if they have some process in place to ensure that the right and necessary information is only being shared or accessed by the people that actually need it to do their work.

The last component to consider of Solove's Taxonomy is invasions. As discussed earlier, VantageScore does collect your email address when you utilize their platform. They also note that by doing this, a user isn't only agreeing to their services, but a user is also automatically enrolled in their newsletters and various educational resources that they share with their database. As we know, sometimes default settings can be troublesome and VantageScore also falls short because they don't discuss ways in which the user is consenting to this process. They also do not discuss how a user can opt out of these default settings should they want to do so at any point in time.

Nissenbaum's Contextual Integrity

When considering VantageScore's privacy policy through the lens of Nissenbaum's Contextual Integrity, there are a few main factors that should be considered. First, is the idea that focuses on the flow of information. As we have discussed in great lengths throughout this semester, true privacy is not defined as secrecy, but rather it is appropriate flows. VantageScore does not share information around the flow of the data they are collecting. After they collect the necessary information from users, to where and with whom is that information being shared with.

In addition to not discussing their information flow, VantageScore also doesn't share much around their transmission principles. Meaning is the information that they are gathering being shared with everyone or is the information being shared on a need-to-know basis by each team. As one can imagine, the marketing, finance, and data science team all probably need and should be looking at different categories of data. Also, VantageScore does not mention what steps they take to ensure that any third-party vendors they work with are up to a certain standard when it comes to their privacy. If a company such as VantageScore is going to share user's data with outside companies, then it is on them to ensure that those companies have high privacy standards as well. As of now, their privacy statement says that they do make sure all outside companies meet their standards of privacy protection, but what are those standards? When companies make such blanket and vague statements around important information, it becomes harder for those statements to have any true meaning or value to the users.

Mulligan Analytic

The Mulligan/Koopman Analytic is a tool that allows multiple interested parties to view privacy from varying perspectives using multiple dimensions. The table below uses this analytic from the perspective of the individuals to explore privacy given their information is submitted and saved internally to any mortgage lender to obtain consideration for a loan. Given the ability

for businesses to obtain a FICO report of individuals at any point now or in the future, it is crucial to consider these dimensions when reevaluating privacy risks. (Mulligan, et. al, 2016)

Dimension	Description
Theory: Object	The object of privacy seeks to answer “what is privacy for?” For this dataset, privacy would afford the user(s) who intend to apply for a mortgage the ability to control their personal information.
Theory: Contract Concept	Contract concept is a way to determine within a specific scenario what is not private. Based on the terms of the Vantagescore privacy policy, it is not explicitly clear that personally identifiable information is kept private. The policy states that user information such as demographics or IP addresses are aggregated for the use of marketing communications or research purposes. The policy also mentions that a third party may be used for storage or analysis. This ‘third party’ is not identified nor is information on their terms included for review by users.
Protection: Subject	Subject, or whose privacy is at stake, is the privacy of the individual users creating and/or logging in to the digital product site. However, because identifiable information like IP addresses, full legal names, physical addresses, and demographics are actively collected for analysis, the privacy of those connected to the individual logging in may also be at stake. Certainly, immediate family and friends may encounter greater harm to their privacy based upon their connection to the individual who has an active account.
Harm: Action	Action is a dimension that details how privacy has been violated. Referencing Solove’s Taxonomy, the dissemination of personal information after collection online is the action that violates the privacy of the individuals and possibly their immediate professional and/or personal connections.
Provision: Mechanism	Mechanism details how privacy is provided. From the perspective of the individuals and those connected to them personally or professionally, there is a degree of privacy provided in the form of security log-ins. User(s) create accounts with passwords. As long as those accounts are not compromised, there is privacy afforded to them at the onset of the mortgage lending process.

Scope: Temporal Scale	Temporal scale is the amount of time in which privacy should be installed. In the instance of this privacy policy and the subsequent data collection of individuals, privacy should be applied indefinitely. This is especially important if user data is continuously applied to research studies at the time of collection and beyond. Users are not notified of additional future research studies utilizing their information.

Recommendations

Our team has come up with three main recommendations to help with improvement in this space. The first recommendation is bias reduction. This seems like such a large goal to try to tackle, but if no one is trying then there will never be any progress made. Our team believes that one way this can be improved is by widening the data criteria that is currently being used for risk evaluation decisions. As we previously discussed, there are some limits on what information can be used according to the Housing Act of 1968, but there could undoubtedly be value in using variables such as timeliness of bill payment or rental payments to name a few.

Our second recommendation focuses on policy improvements. While it seems like we are quite a ways away from having models and algorithms that can reduce hidden biases, we believe having increased diversity in the lending process can be a simple step in the right direction. In particular, having more diverse teams of loan officers who are focused on the risk evaluation process at mortgage lending companies can provide a more well rounded picture of potential homeworns' total spending and payment history.

Lastly, increased transparency at every step in the lending process is important. At the end of the day, individuals attempting to attain mortgage financing want to understand what is happening within the process and why, especially when decision outcomes are unfavorable. If people are able to truly receive answers to decisions or questions related to the process then that gives them a clearer picture of what they might need to work on in order to improve their chances of purchasing a home.

Conclusion

At the end of the day, there is much more work to be done in the space of racial bias in the housing market including but not limited to the mortgage lending process. While there are examples of improvement, it is obvious how many years of these harmful practices can have negative, long lasting impacts for generations. Companies such as VantageScore are doing the work to try to improve upon certain aspects in this space, but even they more work to do. We all have a lot more work to do. Our report truly scratches the surface of what has happened, what's currently happening and what can be done to improve upon it in the future. After all, the American dream of owning a home remains a constant in our society for everyone. Equal access to this dream remains an issue.

References

Adamcyzk, A. (2021, July 28). Credit scores are increasingly including things like rent and utilities-here's what that means for you. CNBC. Retrieved December 1, 2021, from https://www.cnbc.com/2021/07/28/how-lenders-incorporate-alternative-data-in-your-credit-score.html.

Consumerfinance.gov. (2021). *Create a loan application packet*. Consumer Financial Protection Bureau. Retrieved December 1, 2021, from https://www.consumerfinance.gov/owning-a-home/process/prepare/create-a-loan-application-packet/.

Gravier, E. (2021, August 6). Here's everything you need to know about your VantageScore credit score, plus how to check it. CNBC. Retrieved December 1, 2021, from https://www.cnbc.com/select/what-is-vantagescore/.

Gross, T. (2017, May 3). A 'forgotten history' of how the U.S. government segregated America. NPR. Retrieved September 17, 2021, from https://www.npr.org/2017/05/03/526655831/a-forgotten-history-of-how-the-u-s-government-segregated-america.

Hale, K. (2021, September 3). A.I. bias caused 80% of black mortgage applicants to be denied. Forbes. Retrieved December 1, 2021, from https://www.forbes.com/sites/korihale/2021/09/02/ai-bias-caused-80-of-black-mortgage-applicants-to-be-denied/?sh=668aabe436fe.

Hhs.gov. (1979, April 18). The Belmont Report. U.S. Department of Health & Human Services. Retrieved December 1, 2021, from https://www.hhs.gov/ohrp/sites/default/files/the-belmont-report-508c_FINAL.pdf.

Miller, J. (2020, September 18). Is an algorithm less racist than a loan officer? The New York Times. Retrieved September 17, 2021, from https://www.nytimes.com/2020/09/18/business/digital-mortgages.html.

Mortgage refinance loans drove an increase in closed-end originations in 2020, new CFPB report finds. Consumer Financial Protection Bureau. (2021, August 19). Retrieved September 17, 2021, from https://www.consumerfinance.gov/about-us/newsroom/mortgage-refinance-loans-drove-an-increase-in-closed-end-originations-in-2020-new-cfpb-report-finds/.

Public Affairs, U. C. B. N. 13, & Affairs, P. (2018, November 13). Mortgage algorithms perpetuate racial bias in lending, study finds. Berkeley News. Retrieved September 17, 2021, from

https://news.berkeley.edu/story_jump/mortgage-algorithms-perpetuate-racial-bias-in-lending-study-finds/.

The Model for Credit Scoring Innovation. VantageScore. (2020). Retrieved December 12, 2021, from https://vantagescore.com/lenders/our-models.

Testing methodologies for credit score ... - vantagescore. Testing Methodologies for Credit Score Models to Identify Statistical Bias toward Protected Classes. (2014, May). Retrieved December 12, 2021, from https://vantagescore.com/pdfs/VantageScore_Statistical_Bias_whitepaper-05-2015.pdf.

U.S. House Price Index Report 2021 Q2. U.S. House Price Index Report 2021 Q2 | Federal Housing Finance Agency. (2021, August 31). Retrieved September 17, 2021, from https://www.fhfa.gov/AboutUs/Reports/Pages/US-House-Price-Index-Report-2021-Q2.aspx