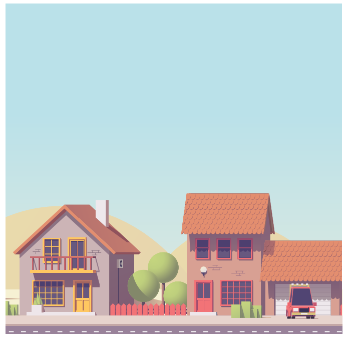
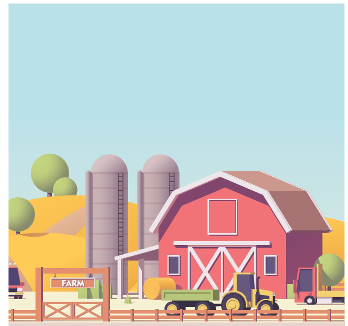
NCUA Office of the Chief Economist: Research Note[1]

Observations on Credit Unions' Mortgage Lending to Minority Borrowers



Part 1: Recent Research on Mortgage Lending

Summary

Using loan-level data from the 2020 Home Mortgage Disclosure Act (HMDA) database, a recently published Working Paper by Stephen Popick at the FDIC found higher mortgage denial rates and worse pricing outcomes for minority borrowers.[2] The research, which attempted to control for credit risk characteristics and other factors, analyzed relative denial rates and differences in various pricing measures, including interest rates, loan costs, discount points, and lender credits. The paper did not show results for different loan originator types; all reported estimates were for the overall market (i.e., all HMDA filers).

In this paper, the NCUA's Office of the Chief Economist (OCE) has used the same model to produce estimates specifically for the credit union industry. To assist, Stephen Popick and the FDIC provided the NCUA with the underlying statistical code relied upon to produce the working paper and answered questions regarding the data, model construction, and results.

Looking at HMDA data for 2020 and 2021, the OCE's statistical analysis produces broadly similar results for credit unions.[3] That is—the model results suggest that, all else equal, minority borrowers were more likely to be rejected in their loan applications and, when they did obtain loans, average pricing for many was less favorable. As recognized in Popick's working paper, care must be taken in interpreting the results. For instance, important credit-risk indicators are not available in HMDA and thus are not accounted for in the analysis. That said, the

1 The views and opinions expressed here do not necessarily reflect the views, opinions, or policies of the National Credit Union Administration or its Board.

2 Popick, Stephen, Did Minority Applicants Experience Worse Lending Outcomes in the Mortgage Market? A Study Using 2020 Expanded HMDA Data (June 2022). FDIC Center for Financial Research Paper No. 2022-05, available at SSRN: https://ssrn.com/abstract=4131603

3 For this analysis, CUSO mortgages and applications in HMDA have been pooled together with credit union records.

results are evidence that, in the HMDA-filing part of the credit union industry, material outcome differences between minority- and non-minority mortgage borrowers are present.

Discussion of Model and Results

The Popick paper used two types of econometric models—a logit model for estimating relative denial likelihoods and a simultaneous equation model to analyze pricing components.[4] The suite of models was estimated separately across select loan types (conventional/FHA) and loan purpose (purchase-money, rate-term refinance, cash-out refinance). OCE focused exclusively on estimating relative credit union outcomes for the three types of conventional mortgages.[5] Popick employed the 2020 HMDA data for the analysis of the overall market. OCE has produced credit union estimates using HMDA data for both 2020 and 2021.

Denial Rates

Table 1 in the Appendix reports the relative likelihood that, after controlling for various measures of credit risk, mortgage applications were denied for different minority applicant groups.[6] Econometric odds ratios are shown, which are interpreted as the relative likelihood of denial for minority applicants versus non-minority applicants. For instance, a value of 1.5 indicates that, all else equal, the odds that a minority applicant was rejected was about 1.5 times the odds of rejection for non-minority applicants.[7] So, for example, if the average denial rate for White applicants was 4 percent, otherwise-similar non-White applicants were estimated to have a rejection likelihood of about 6 percent.[8] The table compares the overall market estimates found in Popick with the estimates produced using only the credit union mortgages in HMDA.[9]

In general, the results in Table 1 reveal that, for both the mortgage market as a whole and for credit union mortgages specifically, the estimated denial likelihood was higher for minority applicants than for non-minority applicants. For credit union mortgages of all three types--purchase-money, rate-term refinances, and cash-out refinances--the relative denial likelihood for minority borrowers ranged from about 1.2 to 1.9 times the rate of White borrowers in 2020. By comparison, Popick's estimates ranged from about 1.3 to 1.7 times. While Popick's market-wide estimates are only available for 2020, OCE's estimates for 2021 for credit unions indicated odds ratios of between 1.3 and 1.8. All estimated odds ratios were found to be statistically significant.[10]

4 A detailed discussion of the models and the data filters can be found in the working paper.

5 For many of the various loan-type combinations, sample sizes for credit union applications and originations are exceedingly limited. For instance, the number of FHA, rate-term refinances originated by HMDA-filing credit unions in 2020 that met the analysis criteria was about 650.

6 OCE followed Popick's methodology in defining minority groups. Borrowers were denoted as Black if either the borrower or co-borrower was Black (race=3 in HMDA) and not of Hispanic ethnicity (ethnicity=2), as Asian if either the borrower or co-borrower was Asian (race=2) and not of Hispanic ethnicity, and as Hispanic if either the borrower or co-borrower had a Hispanic ethnicity (ethnicity=1).

7 A value of 1 would indicate the same odds of being rejected.

8 As noted in the caveats section below, "otherwise similar" means that the available data are identical. However, important unobserved differences may have existed.

9 For both the Popick work and this analysis, the data sample has been constrained to first-lien, 1–4 unit, owner-occupied, site-built, fully amortizing, closed-end, conforming loan applications. Credit union mortgages are identified as those where regulator is reported as NCUA, or in case of credit unions >$10B, CFPB.

10 That is, at the 95 percent confidence level (or more), the ratios were found to be different from 1.0.

Pricing / Interest Rate Differences

Mortgage "prices" include multiple elements--contract interest rates, discount points, origination fees, and lender credits. When looking at the association between minority status and one element of pricing, it is thus necessary to control for the other elements of pricing. For instance, when analyzing differences in contract interest rates, the model needs to account for how much borrowers paid in discount points and origination fees and how much they received in lender credits. The Popick model does this with a "simultaneous equation" model, an established tool in econometrics. The mechanics of such models, as well as Popick's implementation, are beyond the scope of this research note, but the upshot is that minority - non-minority loan pricing differences in the simultaneous equation models can be interpreted as differences that control for other pricing elements.

Table 2 in the Appendix reports estimated differences in interest rates for different minority groups. In analyzing the overall market, Popick found that, after controlling for various credit-risk-related and other relevant factors, Black and Hispanic borrowers paid up to 6 basis points higher rates in 2020 than White borrowers,[11] whereas Asian borrowers paid slightly lower rates (4 to 5 basis points).

For Black borrowers that obtained mortgages from HMDA-filing credit unions in 2020 and 2021, the estimates indicate higher interest rates--consistent with what Popick found. Black borrowers paid between 2 and 10 basis points more than Whites on average and such differences were consistently statistically significant across years and loan types. For Hispanic borrowers obtaining purchase-money mortgages, rate premiums were statistically significant and ranged between 10 and 13 basis points. For other loan types, results for Hispanic borrowers generally were not large or statistically significant.

In line with the Popick results, Table 2 indicates that Asian borrowers tended to pay lower rates on average. The rate "discounts" were between 2 and 4 basis points and were statistically significant.

The real-world impact of the interest rates "premiums" paid by Black and Hispanic borrowers in 2020 and 2021 is quite significant in dollar terms. For a $200,000, 30-year fixed rate loan, for instance, each basis point amounts to about $390 in additional payments over 30 years. So, for instance, given the 13 basis point premium in purchase-money mortgage rates for Hispanic borrowers in 2021, total mortgage payments over 30 years would be about $5,000 higher than for Whites.[12]

This research note focuses on estimated differences in contract interest rates, although other differences, such as lender credits and loan costs, were also estimated through the simultaneous equation framework. The core finding evident for interest rates—that specific minority groups paid slightly higher rates--generally does not differ when accounting for these other pricing elements. Table 3 in the Appendix provides results for the additional cost elements estimated by the model.

11 For one loan type—conventional rate-term refinances—the difference in rates paid by Hispanic borrowers was not statistically different from zero.

12 The difference has been calculated with a 3 percent mortgage rate—a representative rate for 2020 and 2021. The total payment difference is calculated as the simple sum of higher payments; it is not calculated in present value terms and no inflation adjustments have been made. To the extent that the loan life is less than 30 years, the total estimated premium would be lower.

Caveats

As noted in Popick, caution must be exercised in interpreting minority – non-minority differences:

> [D]ifferences in loan underwriting or loan pricing decisions between population groups… should not be interpreted as evidence of discrimination under fair lending (or other relevant) law, as such results may reflect unobserved factors…. or unobserved lender-specific differences in permissible use of such factors…. that are correlated with race and ethnicity (p.2).

The basic caveats included in the working paper are:

1) *The HMDA data do not include important credit-risk-related factors.*
   While the HMDA database was enhanced in 2018 to include a number of credit-risk-related factors—including credit scores, debt-to-income ratio, and loan-to-value ratio—the database still does not include several important metrics. [13] For instance, the applicants' work history and bankruptcy history are not reflected. Data on borrower assets (e.g., months of reserves) are also not collected.[14] To the extent that systematic differences in such measures exist across minority groups, those differences may explain the estimated gap in loan rejection rates and pricing.

2) *Minorities may be selecting systemically different types of institutions when applying for loans.*
   In estimating denial likelihoods and loan pricing, Popick introduces some controls for lender volume[15] and other lender-specific attributes, such as whether the lender employed an automated underwriting system. To the extent that the controls do not fully account for underwriting- or pricing-relevant characteristics, the minority outcomes may reflect/absorb the impact of such factors. Relatedly, if minority borrowers did less "price shopping" for favorable interest rates than Whites, the impact of differences would be reflected in the observed estimates.[16]

3) *The HMDA database does not capture all mortgages and mortgage applications.*
   Exemptions from HMDA filing requirements mean that many loan originators—including many credit unions—are not required to submit HMDA data. In some cases, loan originators are required to submit HMDA data, but are not required to submit certain variables (including specific credit-risk-related fields).

As a result of the broad and the variable-specific exemptions, many lenders--especially smaller ones--are not included in the HMDA-based statistical analysis. Indeed, while the nation's largest credit unions are included in the analysis, more than 3,500 are not in the 2020 and 2021 HMDA database.[17] Accordingly, the association between mortgage outcomes and minority status for such institutions is not reflected in the statistical findings.

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13 See Popick for details.

14 Popick did not specifically identify this factor.

15 The models include dummy variables that "bucket" lender volume into various categories (e.g., lender originated 1-500 loans during the year, 501-2000 loans, etc.)

16 See Popick (page 7) for a discussion of mortgage shopping. For further discussion, see Bhutta, Neil and Fuster, Andreas and Hizmo, Aurel, Paying Too Much? Price Dispersion in the U.S. Mortgage Market (August 2020). FEDS Working Paper No. 2020-62, available at SSRN: https://ssrn.com/abstract=3679204

17 Of course, a nontrivial number—roughly 1,600—of these credit unions were not engaged in mortgage lending in 2020 and 2021.

Appendix for Part 1

Table 1: Relative Odds Ratios for Mortgage Denial (>1 means higher likelihood of mortgage application denial for minority group)

Product Type / Minority Group	**Overall Mortgage Market 2020** (as Reported in Popick)	**Credit Unions in 2020** (OCE estimate based on Popick Model)	**Credit Unions in 2021** (OCE estimate based on Popick Model)
Conventional, Purchase-Money Mortgages			
Black	1.61*	1.62*	1.60*
Hispanic	1.41*	1.18*	1.55*
Asian	1.65*	1.28*	1.60*
Conventional, Rate-Term Refinances			
Black	1.66*	1.94*	1.54*
Hispanic	1.35*	1.38*	1.32*
Asian	1.37*	1.53*	1.57*
Conventional, Cash-Out Refinances			
Black	1.58*	1.89*	1.81*
Hispanic	1.28*	1.40*	1.45*
Asian	1.46*	1.84*	1.50*

* - Significantly different from 1.0 at least at the 95% confidence level

Notes:

1. The data sample, which is limited to data from HMDA-filing institutions, has been constrained to first-lien, 1–4 unit, owner-occupied, site-built, fully amortizing, closed-end, conventional, conforming loan applications. Credit union mortgages are identified as those where regulator is reported as NCUA, or in case of credit unions >$10B, CFPB.
2. For details about the precise specification of the logit model (including a discussion of the independent variables), see Popick, page 9. In general, the model includes controls for various credit risk indicators such as credit scores and loan-to-value ratios, as well as some information on loan originator characteristics (e.g., loan origination volumes).
3. The coefficients reported in this table are not marginal effects but are odds ratios. The odds ratios here describe the relative odds of mortgage denial of Black, Hispanic, and Asian applicants versus Whites. Based on the above odds ratios, the average marginal effects, which reflect the increase in the absolute likelihood of being rejected, range from 2 to 4 percentage points, 1 to 3 percentage points, and 2 to 4 percentage points, respectively, for Blacks, Hispanics, and Asians across the three mortgage categories.
4. As discussed in the paper, caution should be exercised in interpretating these loan coefficients. There are factors which are not part of the estimated model, including other credit-risk-related variables, that may explain away the differences. Put simply, gaps may reflect factors unrelated to discrimination in the underwriting process.
5. Sources: Column 1: Popick, Stephen, Did Minority Applicants Experience Worse Lending Outcomes in the Mortgage Market? A Study Using 2020 Expanded HMDA Data (June 2022); Column 2: 2020 HMDA, March 31, 2021 Agency datasets; Column 3: 2021 HMDA, August 27, 2022 Agency datasets.

Table 2: Estimated Difference in Contract Interest Rates (reported in basis points; values >0 mean higher rate for minority group)

Product Type / Minority Group	**Overall Mortgage Market 2020** (as Reported in Popick)	**Credit Unions in 2020** (OCE estimate based on Popick Model)	**Credit Unions in 2021** (OCE estimate based on Popick Model)
Conventional, Purchase-Money Mortgages			
Black	6.1*	10.3*	7.5*
Hispanic	6.4*	10.4*	12.9*
Asian	-5.4*	-4.2*	-2.8*
Conventional, Rate-Term Refinances			
Black	1.9*	3.1*	1.7*
Hispanic	-0.1	-0.0	-0.7*
Asian	-5.3*	-3.1*	-3.6*
Conventional, Cash-Out Refinances			
Black	4.4*	6.4*	1.9*
Hispanic	1.0*	1.0	-0.3
Asian	-3.7*	-2.1	-2.4*

* - Significantly different from 0 at least at the 95% confidence level

Notes:

1. The data sample, which is limited to data from HMDA-filing institutions, has been constrained to first-lien, 1–4 unit, owner-occupied, site-built, fully amortizing, closed-end, conventional, conforming mortgages. Credit union mortgages are identified as those where regulator is reported as NCUA, or in case of credit unions >$10B, CFPB.
2. The above estimates are obtained from a simultaneous equation model. As described in detail by Popick (see, in particular, pages 10-11), the model controls for other elements of pricing (including credit score, LTV ratio, and origination amount), as well as various credit factors, in estimating the association between minority status and contract interest rates. To estimate the overall association between minority status and overall pricing (including such things as discount points, fees, etc.), one would need to add together all the minority coefficients. The general finding shown above suggests higher pricing for minorities overall if one looks at all elements of pricing simultaneously.
3. As discussed in the paper, caution should be exercised in interpretating these loan coefficients. There are factors which are not part of the estimated model, including other credit-risk-related variables, that may explain away the differences. Put simply, gaps may reflect factors unrelated to discrimination in the underwriting process.
4. Sources: Column 1: Popick, Stephen, Did Minority Applicants Experience Worse Lending Outcomes in the Mortgage Market? A Study Using 2020 Expanded HMDA Data (June 2022); Column 2: 2020 HMDA, March 31, 2021 Agency datasets; Column 3: 2021 HMDA, August 27, 2022 Agency datasets.

Table 3: Differences in Pricing Using Popick's Model: Discount Points, Lender Credits, Loan Costs

Product Type / Minority Group	Discount Points (% of Loan Amount)			Lender Credits (% of Loan Amount)			Loan Costs (% of Loan Amount)		
	Overall Mortgage Market in 2020	Credit Unions in 2020	Credit Unions in 2021	Overall Mortgage Market in 2020	Credit Unions in 2020	Credit Unions in 2021	Overall Mortgage Market in 2020	Credit Unions in 2020	Credit Unions in 2021
Conventional, Purchase-Money Mortgages									
Black	0.054*	0.006	0.009	0.065*	0.014*	0.014*	0.126*	0.190*	0.128*
Hispanic	0.053*	0.017	0.032*	0.019*	-0.002	0.007*	0.110*	0.020	-0.023
Asian	0.030*	0.039*	0.031*	0.030*	0.014*	0.010*	-0.140*	-0.040	-0.107*
Conventional, Rate-Term Refinances									
Black	0.143*	0.012	-0.009	-0.022*	0.004	0.001	0.226*	0.189*	0.043
Hispanic	0.048*	0.017	0.035*	-0.009*	-0.003	0.010*	0.140*	0.112*	0.108*
Asian	-0.060*	0.014	0.021*	0.120*	0.015*	0.013*	-0.230*	-0.100	-0.107*
Conventional, Cash-Out Refinances									
Black	0.179*	0.053*	0.031*	-0.010*	-0.002	0.007	0.274*	0.104	0.118*
Hispanic	0.038*	0.031*	0.045*	-0.002	-0.003	0.022*	0.121*	0.053	0.084*
Asian	-0.030*	0.073*	0.058*	0.060*	0.000	0.015*	-0.022*	-0.035	-0.070*

Notes:

1. The data sample, which is limited to data from HMDA-filing institutions, has been constrained to first-lien, 1–4 unit, owner-occupied, site-built, fully amortizing, closed-end, conventional, conforming mortgages. Credit union mortgages are identified as those where regulator is reported as NCUA or in case of credit unions >$10B, CFPB.
2. The above estimates are obtained from a simultaneous equation model. As described in detail by Popick (see, in particular, pages 10-11), the model controls for other elements of pricing (including credit score, LTV ratio, and origination amount), as well as various credit factors, in estimating the association between minority status and contract interest rates. To estimate the overall association between minority status and overall pricing (including such things as discount points, fees, etc.), one would need to add together all the minority coefficients. The general finding shown above suggests higher pricing for minorities overall if one looks at all elements of pricing simultaneously.
3. As discussed in the paper, caution should be exercised in interpretating these loan coefficients. There are factors which are not part of the estimated model, including other credit-risk-related variables, that may explain away the differences. Put simply, gaps may reflect factors unrelated to discrimination in the underwriting process.
4. Sources: Columns 1, 4, 7: Popick, Stephen, Did Minority Applicants Experience Worse Lending Outcomes in the Mortgage Market? A Study Using 2020 Expanded HMDA Data (June 2022); Columns 2, 5, 8: 2020 HMDA, March 31, 2021 Agency datasets; Columns 3, 6, 9: 2021 HMDA, August 27, 2022 Agency datasets.

Part 2: Relative Frequency of Mortgage Lending to Minorities by Credit Unions

Part 2 of this research note provides additional information on mortgage lending to minorities. Using HMDA data and the same loan criteria and minority definitions employed by Popick, OCE compiled statistics for the share of mortgage loans made to minorities by credit unions and the overall market. Table 4 below provides minority shares for the eight quarters in 2020 and 2021. Separate estimates are provided for the three different categories analyzed in Part 1: conventional, purchase-money mortgages; conventional, rate-term refinances; and conventional, cash-out refinances.

In general, the HMDA data indicate that about 20-30 percent of credit union mortgage loans were extended to minorities during 2020 and 2021. For other originators (i.e., not credit unions), the proportions were generally a few percentage points higher each quarter. The largest "gaps" tended to be for purchase-money mortgages, where credit union shares were 2-6 basis points below those of the rest of the market.

In reviewing the estimates and "gaps," it is important to recognize that credit unions necessarily serve specific fields of membership (FOMs). For individual credit unions and the credit union system as a whole, the share of minority borrowers in these FOMs may be systematically different than for the overall market. In other words, the share of minorities in credit unions' "pool" of prospective mortgage borrowers may not be the same as for other lenders.

As the table computes percentages using HMDA data, the fundamental limitations of the HMDA database should also be recognized. Because many mid- and small-sized institutions are not required to (and generally do not) report loan-level data through HMDA, the proportions shown in the table are not necessarily reflective of the overall lending patterns of the institutions.

Table 4: Percentage of HMDA Loan Originations to Minority Borrowers

	2020Q1	2020Q2	2020Q3	2020Q4	2021Q1	2021Q2	2021Q3	2021Q4
All Conventional First-Lien Mortgages (Purchase-Money, Rate-Term Refinance, Cash-Out Refinance)*								
Credit Union Originators	26%	23%	24%	25%	25%	27%	28%	29%
Other Originators	26%	24%	26%	28%	28%	29%	30%	31%
Purchase-Money Mortgages**								
Credit Union Originators	26%	24%	24%	26%	28%	26%	28%	28%
Other Originators	28%	26%	27%	30%	31%	31%	33%	34%
Rate-Term Refinance***								
Credit Union Originators	26%	23%	25%	25%	25%	29%	30%	31%
Other Originators	26%	24%	27%	27%	27%	30%	30%	31%
Cash-Out Refinance****								
Credit Union Originators	26%	21%	22%	22%	22%	25%	26%	27%
Other Originators	24%	21%	21%	23%	23%	26%	27%	28%

Notes:

The percentages have been calculated using loan counts (i.e., not loan dollar amounts). The data sample, which is limited to data from HMDA-filing institutions, has been constrained to first-lien, 1–4 unit, owner-occupied, site-built, fully amortizing, closed-end, conventional, conforming mortgages. Credit union mortgages are identified as those where regulator is reported as NCUA, or in case of credit unions >$10B, CFPB.

* In HMDA, this includes Loan Purposes of 1, 31, and 32.

** In HMDA, these loans are flagged as Loan Purpose=1.

*** In HMDA, these loans are flagged as Loan Purpose=31.

**** In HMDA, these loans are flagged as Loan Purpose=32.