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The Unequal Costs of Native American Homeownership*  

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Abstract  

Using the confidential Home Mortgage Disclosure Act (HMDA) data from 2018 to 2021, we document disparities in interest rates and rate spreads on home loans between American Indian and Alaska Natives (AIAN) borrowers living either on or off federally recognized reservations and White borrowers. Consistent with past research, we find large raw interest rate and rate spread disparities, especially for on-reservation AIAN borrowers. These rate disparities are largely driven by the disproportionate use of home-only loans, which are not tied to real property. While on-reservation AIAN borrowers are more likely to have leasehold interest in the underlying property, property interests alone cannot explain the greater reliance on home-only loans by on-reservation AIAN borrowers. We find that living closer to a manufactured home dealership is highly correlated with a greater likelihood of securing a home-only loan, but this factor, along with distance to a city and stated preferences about trust in the banking system, cannot account for the differential rate of home-only loan usage between AIAN and White applicants.  

Keywords: Indigenous peoples, inequality, mortgage pricing  
JEL classification: G50, J15, G21, G28, R21  

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1 Introduction

Disparities in accessing mortgage lending among minorities have long been documented (Holmes and Horvitz, 1994; Munnell et al., 1996; Quillian et al., 2020). Even when credit is available, existing studies have shown that minorities pay higher interest rates on home loans (Agarwal et al., 2016; Ambrose et al., 2021; Bayer et al., 2018; Gerardi et al., 2023; Guiso et al., 2022). Despite this large literature, little is known about the cost of homeownership among American Indian and Alaska Native (AIAN) borrowers.¹ We do know that Native communities are often underrepresented in traditional financial services and access to capital (Cattaneo and Feir, 2021; Community Development Financial Institutions [CDFI] Fund, 2001; Dimitrova-Grajzl et al., 2015; Dymski, 1999; Fund, 2001; Jorgensen and Akee, 2017; Laderman and Reid, 2010; Schumacher et al., 2006; United States Congress Senate Committee on Indian Affairs, 2015). We also know that individual characteristics such as liquidity constraints vary by population groups and affect the cost of homeownership (Bhutta et al., 2022; Gupta et al., 2022). The relative importance of these factors will inform the causes of these differences and the effectiveness of policies intended to create more parity in housing finance markets.

Our paper aims to better understand pricing gaps on home loans between on and off-reservation AIAN borrowers relative to White borrowers. In particular, our paper is motivated by a set of stylized facts contained in Figure 1, which plots the rate spread and interest rate on home loans at each decile for on-reservation AIAN, off-reservation AIAN and White borrowers located in the Home Mortgage Disclosure Act (HMDA) dataset between 2018 and 2021.² Relative to White borrowers,²

¹Throughout the paper we use the term AIAN as shorthand for borrowers identified in the HMDA dataset as American Indian or Alaska Native. We also use the terms Native American, Indigenous, Native, and AIAN interchangeably, though Native American commonly includes American Indians, Alaska Natives and Native Hawaiians. In HMDA, AIAN status is either self- or socially identified (by the lender in this context). Since race is both a political and social construct, all racial classifications contain a degree of arbitrariness. Additionally, we do not know if the self- or socially-identified AIAN borrowers in HMDA have formal tribal affiliations with Native Nations. While the type of racial identification in HMDA (self vs. social) does not affect the estimated White-AIAN disparities in rate spreads, AIAN status may be endogenous to mortgage outcomes.

²This figure is different than Cattaneo and Feir (2021)’s accounting of the relative spread of “higher-cost” mortgages, which means the annual percentage rate was 1.5 percentage points or more than the average prime offer rate, between AIAN and White borrowers. They show that between 2010 and 2017, 27% of mortgages in tribal areas for Native applicants were classified as a “higher cost” loan compared to only 9% of mortgages for non-Native applicants living in...
the average rate spread (or interest rate) paid by off-reservation AIAN borrowers is approximately 26 (9) basis points (bps) more but this inequality is relatively constant across the entire interest rate distribution. Inequalities in rate spreads and interest rates between on-reservation AIAN and White borrowers, on the other hand, increase markedly at the high end of each distribution. For example, at the 90th percentile, the rate spread paid by on-reservation AIAN is more than three times larger than that of White borrowers. On-reservation AIAN borrowers in the highest decile are on average being charged nine percent compared to roughly five percent for White borrowers in the highest decile. To illustrate the significance of these loan prices, consider the following: for a $150,000 home loan over a 20-year period (the modal term length on a home-only loan, for which refinances are rare, is 23 years), AIAN borrowers facing this interest rate would end up paying more in interest than the principal borrowed when the loan matures. Since we observe a non-linear gap in rate spreads and interest rates between AIAN borrowers living on reservations and White borrowers, there is something specific about the on-reservation context that generates gaps in borrowing costs.

Using the confidential HMDA data from 2018 to 2021, we find that off-reservation rate spread and interest rate disparities are largely due to individual borrower characteristics such as credit score. On the other hand, we find that the significant presence of home-only loans, rather than differences in individual borrower characteristics, among on-reservation AIAN borrowers explains the higher rate spreads and interest rates they experience relative to White borrowers. Approximately 34% of all loans in HMDA and 85% of all manufactured home loans to AIAN borrowers on reservations are home-only loans. While home-only loans are often associated with higher interest rates and fewer consumer protections, borrowers sometimes access these loans to avoid putting the underlying land at risk if the loan gets foreclosed or if a borrower does not have direct land ownership (Schneider et al., 2021). While most on-reservation AIAN borrowers do not directly own land, we find that property rights, i.e., whether the land is directly owned or leased, alone cannot explain the disproportionately large number of home-only loans used on reservations. This is important because commentators

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3Home-only loans are loans not tied to real property.
4For more information on the mortgage process on tribal trust lands, see Appendix Section A.
have suggested that trust land status directly limits wealth creation (Anderson and Parker, 2009). Other factors such as proximity to a manufactured home dealership predict the likelihood of picking a home-only loan but do not explain the heavy reliance on home-only loans by AIAN borrowers, especially among those living on reservations.

Another potential reason borrowers pick home-only loans over mortgages is how home-only loans are processed. Lenders process home-only loan applications much faster than applications for manufactured home mortgages; however, we find no evidence that AIAN borrowers benefit from faster processing times on home-only loan applications relative to White home-only loan applications. Other aspects of processing a mortgage application, such as time to close, may proceed more slowly for on-reservation AIAN borrowers, but, unfortunately, we do not have duration data for the entire mortgage process.

Last, we study whether there are any AIAN-White disparities in mortgage approval rates, and, if so, whether these disparities are smaller for applications for home-only loans. Similar to the work by Ky and Lim (2022), we find racial disparities in approval rates for mortgages for manufactured homes after controlling for available underwriting characteristics. The estimated racial disparities in the likelihood of approval decrease for both on- and off-reservation AIAN applicants, when the application is for a home-only loan. Thus, relatively favorable approval rates may drive AIAN borrowers away from manufactured home mortgages and towards home-only loans. However, more data is needed to understand better the decision process that leads a borrowers to obtain a home-only loan.

Taken together, our results suggest that higher use of home-only loans explains much of the premium in home loan prices paid by AIAN borrowers. The disproportionate use of home-only loans is not fully explained by factors like lenders’ processing time or proximity to manufactured home dealerships. Since most borrowers do not start the loan process with a preference for receiving a home-only loan, our results suggest that home-only loans may be used to fill the void in AIAN communities in cases when banks are unwilling to issue mortgages. Regardless, policies that could
lower the price of these loans through secondary market purchases (whose rights would have to be approved by the tribe) would have outsized effects on AIAN borrowers. Alternatively, efforts to build credit in AIAN borrowers could shrink (but not eliminate) disparities in rate spreads since differences in pricing hold after controlling for borrower credit quality. Alternative policies to increase funding to Native Community Development Financial Institutions (NCDFIs), speed up harder-to-measure processing times to perfect mortgages on trust land, and educate more banks on how to provide affordable mortgages in Native communities would also likely have outsized benefits to AIAN homeowners.

This paper fits into a growing literature on racial disparities in mortgage rates. Focusing on loan purchases on the secondary market, Bartlett et al. (2022) finds small differences in racial disparities in interest rates and attribute these differences to discriminatory lending practices. Heimer et al. (2021) also find evidence of individualized racial discrimination in mortgage applications by leveraging how monthly volume quotas reduce how much subjectivity loan officers apply to loans they process at the end of the month. Bhutta and Hizmo (2021) focus on FHA loans and find that racial differences in utilizing discount points explain why minorities face higher interest rates (which is not the case in our context). Similar to other work for other populations (Cheng et al., 2015; Ghent et al., 2014; Haughwout et al., 2009), we do not observe significant racial disparities in rate spreads on AIAN loans after accounting for sorting into loan markets.

This paper also fits into the relatively small academic literature on manufactured home lending. Capozza and Thomson (2005) study the recovery rates of repossessed homes with home-only loans and find that less common home models have a lower recovery rate. Canner and Laderman (1999) analyzes the rise of manufactured home specialty lenders and the associated increased denial rates in HMDA. Schmitz (2020) discusses home-only loans, the manufactured housing market structure, and the recent push to create a secondary market for manufactured home loans. Jensen (2023) studies how the structure of floor financing at dealerships can distort competition at the retailer level.

5Unlike other minorities, AIAN is also a political classification. For this paper, we investigate AIAN outcomes relative to a comparison group, White borrowers. In doing so, we do not claim that the AIAN population is only a racial group.
Our results also complement the growing literature on the importance of property rights in economic development on reservations in Canada and the United States. Land tenure systems on reservations have important economic consequences (Leonard and Dominic, Leonard and Dominic; Leonard et al., 2020) but institutions can be developed so trust land can be effectively used for economic development. For example, Akee (2009) and Akee and Jorgensen (2014) suggest that long-term leasing arrangements on reservation trust land tenures can result in similar housing stock and business outcomes as land that is held as fee simple. However, not all property rights institutions that make trust land closer to fee-simple land deliver improved outcomes for Indigenous communities. In Canada, Aragon and Kessler (2020) show the introduction of transferable land tenures in small shares on reserves is only associated with improvements in housing stock for non-Indigenous people living on reserves. Our results suggest that differences in property rights between White and AIAN borrowers are not the sole determining factor that explains the AIAN-White gaps in rate spreads secured on home loans.

2 Data

Our analysis relies primarily on the confidential Home Mortgage Disclosure Act (HMDA) data from 2018 to 2021. As a requirement of HMDA, all financial institutions that surpass a specific threshold of mortgage loans or open lines of credit are required to disclose detailed information on each loan application. As a result, HMDA covers approximately 88% of all home loan originations in the United States (Jo et al., 2020). Important for our purposes, HMDA also includes self and socially-identified racial classification and the broadly-defined location of where the home sits.

Historically, HMDA data lacked information on loan contracting structure, loan type, prop-

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6Year-to-year fluctuations in HMDA can be substantial. For example, in 2020 a change in HMDA reporting requirements raised the threshold for the amount of lending activity for a lender to report to HMDA. The reduction in coverage in 2020 disproportionately affected loans made in rural areas (Liu and Rodrigue, 2021). To the extent that institutions making fewer than 25 loans per year are more likely to make loans in rural areas, that may also worsen coverage in rural areas. All regressions model will contain year fixed effects to account for year-to-year reporting, collection and reporting statutes changes.
roperty characteristics, and the applicant’s creditworthiness, all of which lenders use to evaluate loan applications. In addition, HMDA data did not contain the full distribution of interest rates and rate spreads (Bartlett et al., 2022). However, in 2018, additional information was added to HMDA due to the Consumer Financial Protection Bureau’s (CFPB) implementation of Section 1094 of the Dodd-Frank Act. These new data fields include the applicant’s credit score, the rate spread on the loan (for all prices), along with key underwriting variables such as loan-to-value (LTV) ratios. The new HMDA fields most germane to the AIAN borrower experience, especially among those living on American Indian reservations and off-reservation trust lands, are whether a manufactured home loan is only secured to a home or if the loan is tied to the home and land along with whether the borrower has direct ownership or leasehold property interest where the home sits.  

We restrict our sample to residential loans for single-unit properties whose primary borrower is American Indian/Alaska Native or White. Racial identity is reported in HMDA in two ways: (1.) the borrower can report the race on the loan application or (2.) the loan officer can report the race based on visual inspection or surname. Our analysis identifies someone as AIAN if AIAN was listed as one of the five-race fields; thus, our classification of “AIAN” borrowers in our sample is similar to the “AIAN alone or in combination with other races” classification used in federal data sources. For comparison purposes, we limit our sample of White borrowers to those who listed White as their primary race along with no other races. Many applications contain co-borrowers and, in our main specification, we control for the presence of a co-borrower.

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7A limitation of the revised HMDA reporting standards is that Section 104(a) of the Economic Growth, Regulatory Relief, and Consumer Protection Act (EGRRCPA) added partial exemptions to HMDA reporting requirements for some fields for institutions making fewer than 500 loans annually. More information on the HMDA Rule can be found here. Information on the implementation of Section 104(a) of EGRRCPA can be found here. If AIAN borrowers disproportionately receive mortgage loans from these lenders, these fields will be disproportionately missing for them in the HMDA data.

8In HMDA, 99.6% of the overall self- or lender-identified AIAN population are single informants, i.e., the applicant is identified as only AIAN. Self-identified AIAN population is endogenous to local economic conditions (Antman and Duncan, 2023) and fluid over time (Liebler et al., 2017). In this analysis, the endogeneity of racial classification would bias the estimated disparities but the direction of the bias is unclear. Ky and Lim (2022) find that HMDA applicants with missing race data have high loan amounts, high credit scores, and very low loan-to-value ratios. These characteristics do not match well with the characteristics of AIAN borrowers as a whole in our sample, particular on-reservation AIAN borrowers. If unreported AIAN borrowers with high credit scores and lower mortgage costs are more likely to have no race listed on their loan application relative to similar, creditworthy White loan applicants, then our rate spread disparities are biased upward.
Since AIAN loans represent a small share of the universe of HMDA loans, we do not restrict our attention to a specific loan product. As a result, our sample includes mortgages (conventional or federal loan products – FHA, VA and USDA loans) for both site-built homes and loans for manufactured homes.\textsuperscript{9} Manufactured home loans can be classified into two types. First, manufactured home mortgages occur when the loan is secured by both the home and land, which makes those loan arrangements eligible for federal loan products such as FHA, VA and USDA loan products as well as specific loan products designed to spur tribal citizen homeownership such as the HUD Section 184 loan.\textsuperscript{10} Second, a manufactured home loan can be secured only by the home, in which case the loan is a personal property loan, otherwise known as a home-only loan. Except for a very small number of home-only loans insured by the FHA’s Title I program, these loans are often not eligible to be federally insured or guaranteed, are rarely purchased on the secondary market by private investors or government-sponsored enterprises, and are often issued by nonbanks.

While the HMDA data contains a rich set of important covariates, it only includes information on the name of the U.S. Census tract where the home sits. Since Census tract boundaries do not perfectly align with reservation (or off-reservation trust land) boundaries, studies within the broader Indigenous economics literature use the percentage of a Census unit’s area that overlaps with American Indian reservation (or offReservation trust land) for the on/off-reservation assignment rule. For example, when measuring differences in internet access and connectivity between reservation and non-reservation areas, Bauer et al. (2022) defines all Census block groups as being located “on reservations” when at least 50% of a Census block group’s area overlaps with federal Indian reservation or off-reservation trust land.

In our paper, we use calculations from a subset of 2021 loans with longitude and latitude to supplement our main dataset. Using information on these loans and the shapefiles for both reservations and census tracts, we choose what percentage of a Census tract should overlap with a reservation

\textsuperscript{9}Given the wide range of loan products in our sample, our sample best mirrors that of the analysis in Bhutta et al. (2022) of the effects of automated underwriting systems whose main sample contains several loan types, new loan originations, and refinancing loans. Our results are robust to excluding FHA, VA, and USDA loans.

\textsuperscript{10}Native Hawaiians can access a similar loan product, the HUD Section 184A loan. Unfortunately, HMDA does not classify either Section 184 or 184A loans.
to define an on-reservation loan. Figure 2 plots in 10 percentage point increments the Type I and Type II errors of each assignment rule. If we assign a loan to a reservation when only 10% of the tract overlaps with a reservation, most loans designated as “on reservation” are falsely assigned when we compare to the loan’s latitude and longitude. The rate of false positives (Type I errors) goes to zero as we increase the percentage of a tract that must overlap with a reservation for the loan to be designated as on-reservation. On the other hand, a tract assignment rule may also result in false negatives (Type II errors), where the latitude and longitude of the loan are on a reservation. This error decreases as we decrease the percentage of a tract that must overlap with reservation (or off-reservation trust) land for the loan to be considered an “on-reservation” loan.

We choose the point at which these types of errors are set equal which will approximately minimize the sum of both types of errors. Figure 2 reveals that this occurs when the overlapping area of a Census tract is approximately equal to 60%. As a result, when at least 60% of a Census tract’s area overlaps with reservation land (and off-reservation trust land), we assume all borrowers within these tracts regardless of race are located on American Indian reservations (or off-reservation trust lands).

Our final sample contains 4,462,087 new originations within 21 states with at least one “on-reservation” loan (i.e, located on a Census tract with at least 60% of its area overlapping with federally recognized Indian reservation and off-reservation trust land) in the HMDA data. Since credit scores are not reported for roughly 10% of this sample, we dummy out these values to retain as many observations as possible. We use a similar method when we control for missing observations in other variables.

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11 We do not have access to the overall geocoded 2018–2021 HMDA data. An advantage of using the Census-tract-based measure for the on-/off-reservation indicator is that not all loans have longitude and latitude populated in the available subset, which may introduce a source of bias not present in the Census tract measure if the missing longitudes and latitudes are nonrandom.

12 Those states are Alaska, Arizona, California, Colorado, Idaho, Michigan, Minnesota, Montana, Nebraska, Nevada, New York, New Mexico, North Carolina, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, Wisconsin and Wyoming. The distribution of accepted “on-reservation” AIAN loans by state is shown in Appendix Figure A1.

13 As mentioned earlier, some of the new HMDA data fields can be exempt from reporting if the lender is an insured bank or credit union, originated fewer than 500 mortgages or fewer than 500 lines of credit during the preceding two years, and received at least a “satisfactory” Community Reinvestment Act (CRA) rating for two previous years. These reporting exemptions, however, do not disproportionately impact data availability by race, ethnicity or income ([GAO], 2021).
Our main outcomes of interest are the rate spread and interest rate on a loan. Rate spread is the difference between the average prime offer rate (APOR) and the annual percentage rate (APR). The APOR is a survey-based estimate of APRs for comparable loans and is published weekly by the Federal Financial Institutions Examination Council (FFIEC). The APR measures the total cost of the loan which incorporates discount points, fees, mortgage insurance premiums, and other costs (Bhutta and Hizmo, 2021). Since lenders are not required to include lender credits in their APR, if White borrowers are more likely to receive lender credits, then omitting lender credits may bias the estimates against finding racial disparities in rate spread. However, Figure 3 shows that the main results are unchanged when we account for the role of lender credits on the rate spread of a loan.

Summary statistics on this sample are shown in Table 1. The first column shows the mean values for each variable for on-reservation AIAN loans. The second column shows the mean values for off-reservation loans to AIAN borrowers. The third column shows the mean values for loans to White borrowers. The last three columns summarize the difference in means between on-reservation AIAN and White loans (column 4), off-reservation AIAN and White loans (column 5), and on-reservation and off-reservation AIAN loans (column 6).

The mean rate spread paid for on-reservation AIAN borrowers is 257 bps over prime compared to the mean rate spreads paid by off-reservation AIAN and White borrowers of 79 and 53 bps, respectively. The mean interest rate paid by on-reservation AIAN borrowers is 5.38% compared to a mean interest rate of 3.91% and 3.82% paid by off-reservation AIAN and White borrowers, respectively.

The bottom half of Table 1 compares average borrower and basic loan characteristics in the sample across groups. On-reservation AIAN borrowers have, on average, lower credit scores, lower incomes, lower property values, and higher debt-to-income ratios relative to both groups. Off-reservation AIAN borrower averages tend to sit between those of on-reservation AIAN and White borrower averages. The mean differences between on-reservation AIAN borrowers and Whites, off-reservation AIAN borrowers and Whites, and on-reservation AIAN and off-reservation AIAN borrowers are statistically significant except for the difference in the presence of a co-borrower and in-

14These APORs can be found here.
come between on- and off-reservation AIAN borrowers and the age difference between on-reservation AIAN and White borrowers.

Table 2 shows the mean differences in the usage of major loan products across these three groups. The type of loan products used varies substantially across groups. Both on-reservation and off-reservation AIAN borrowers secure FHA-insured and USDA loans at roughly one-and-a-half to twice the rate of White borrowers. VA loans are most utilized by off-reservation AIAN borrowers and represent 13.5% of all new off-reservation AIAN loans. Approximately 39% of on-reservation AIAN loans were for manufactured homes, compared to only 3% for all new loan originations for White borrowers. Roughly eight out of 10 on-reservation AIAN manufactured home loans were home-only. Compared to White borrowers, on-reservation AIAN borrowers are 34 times more likely to use a home-only loan and, compared to off-reservation AIAN borrowers, 10 times more likely to use a home-only loan.

Taken together, we see a large share of manufactured home loans among AIAN borrowers relative to White borrowers and an especially large share of home-only loans secured by on-reservation AIAN borrowers. Our analysis will subsequently focus on whether this relatively high reliance on home-only loans can explain the large rate spread gaps we observed in Figure 1.

3 Empirical Method

We use the following linear regression model to estimate racial disparities in rate spreads:

$$y_{ist} = \beta_1 \text{on-AIAN}_{ist} + \beta_2 \text{off-AIAN}_{ist} + x_{ist}\psi + \alpha_s + \tau_t + \epsilon_{ist}$$ (1)

where $y_{ist}$ is the rate spread or interest rate for borrower $i$ in state $t$ in year $t$. The parameter $\beta_1 = E[y_1 - y_0|x]$ where $E[y_1|x]$ is the mean rate spread for on-reservation AIAN borrowers and $E[y_0|x]$ is the mean rate spread for White borrowers after controlling for $x$. Likewise, the parameter $\beta_2$ documents the mean difference in rate spreads between off-reservation AIAN and White borrowers,
conditional on $x$.

The baseline controls in vector $x$ include age (and its square), a female indicator, a co-borrower indicator, income (and its square), loan amount (and its square), property value (and its square), indicators for each federal loan product (FHA, VA and USDA), credit score bins which follow Fannie Mae’s pricing matrix found here, and indicators whether credit score and property values are missing.\(^{15}\) Given the heavy reliance on home-only loans for reservation-located borrowers, we also add a home-only loan indicator as an additional control and, in some specifications, interact the baseline controls with the home-only loan indicator to allow the relationship between rate spread and the underwriting variables to vary by home-only loan status.\(^{16}\) In some specifications, we include a property interest indicator, one if the underlying land is directly owned, zero if land where the home sits is leased, which is correlated (but not perfectly) with the home-only loan status.

To measure price, we use rate spread and interest rate as the outcome variables. While these variables both measure the price of a loan, they do so in different ways. Rate spread is based on APR and meant to represent the entire price of the loan that is known up front. These fees in addition to interest can be substantial and vary by loan type—for example, FHA loans have an up-front mortgage insurance premium of 1.75% that can be financed as part of the loan. The downside of an APR-based measures is that APR assumes that these upfront fees are spread over the life of a loan. Relatively few borrowers hold a mortgage for its entire term, with many refinancing or moving to another home before the loan’s term is complete. Thus, if a borrower refinances or moves before the term is up, APR understates the effective annual cost of the loan because it spreads the upfront fees which the borrower pays regardless of how long they hold the loan, over the complete term of the loan. If the likelihood of a borrower repaying early is not distributed equally, then APR comparisons could be misleading, since borrowers more likely to repay earlier would be effectively paying a higher price annually than those holding the loan for longer. Neither measure includes any fees charged after the

\(^{15}\)We show in Figure 3 that our imputations for missing values do not greatly affect the coefficients on the on-reservation AIAN and off-reservation AIAN indicators.

\(^{16}\)A borrower’s debt-to-income (DTI) ratios are not included in our main specifications because if pricing discrimination occurs, then DTI ratios for AIAN borrowers would be considered an outcome of pricing decisions. Nonetheless, we add DTI bins as a control in our robustness checks and do not find substantive changes to our estimated disparities.
loans is originated, such as late fees. The interest rate clearly includes the interest the borrower pays on the loan, but does not include other fees paid by the borrower and thus as a measure of price is not affected by how long the borrower holds the loan. Thus, in addition to using the APR-based rate spread as an outcome, we also consider models using interest rate as an outcome alone. While we could control for observed upfront fees in the interest rate models, this would present a similar problem in measuring annual cost as the APR-based measures because we do not observe variation in the probability that a borrower will repay their loan early.

Each specification includes state fixed effects, $\alpha_s$, and year fixed effects, $\tau_t$. The error term, $\epsilon_{ist}$, is for loan $i$ in state $s$ in year $t$. We cluster the standard errors at the county level to account for spatial autocorrelation in local mortgage markets.

4 Main Results

Table 3 presents our main results. In particular, each column shows the results of OLS regressions of the rate spread on the on- and off-reservation AIAN borrower indicators (where the omitted reference group is White borrowers). Column 1 contains state and year fixed effects but the estimated rate spread gaps are similar to those in Table 1. Column 2 adds controls for age, gender, co-applicant, federal mortgage indicators, binned credit score categories, borrower income (and its square), loan amount (and its square) and property value (and its square). The estimated disparities for off-reservation AIAN borrowers are much smaller under this specification (7.8 basis points) which means that borrower and basic loan characteristics explain roughly two-thirds of the estimated disparities between off-reservation AIAN and White loan prices. Interestingly, those same characteristics explain only 16% of the raw disparities in loan prices between on-reservation AIAN and White borrowers.

The regression in column 3 includes a home-only loan indicator to account for the rate spread variation between home-only loans and mortgage loans (i.e., both manufactured home mortgages and site-built mortgages are included in this sample). When we account for the effect of home-only
loans on rate spread, the estimated rate spread disparities on on-reservation AIAN loans decreases by 88.9% (comparing coefficients from columns 2 and 3). Thus, our model with borrower characteristics, loan amounts and loan types explains 91% of the raw disparities on on-reservation AIAN loans (197 bps). Column 3 also shows that the smaller unexplained gap in rate spreads that is correlated with off-reservation AIAN loans is eliminated when we account for whether the loan is only for the home or for the land and home.

If lenders treat the underwriting variables differently for home-only loan applications than for mortgage loan applications, then our model in column 3 may be misspecified. To determine if our model specification drives our results in column 3, the regression in column 4 interacts the home-only loan indicator with each baseline control. When we allow for the effect of each underwriting variable to vary by loan type, we see no substantial changes to the estimated racial disparities in rate spread: we still estimated a small but positive rate spread disparities on on-reservation AIAN loans while we see no racial disparities for off-reservation AIAN loans after accounting for the home-only loan status.

Since on-reservation AIAN borrowers are less likely to own the land where the home sits compared to White borrowers, and home-only loans are more commonly used when the borrower does not have direct ownership of the land, the home-only loan effect might be capturing differences in property interests between on- (and off-reservation) AIAN borrowers and White borrowers. To determine if home-only loan status is simply capturing differences in property interests, we add a property interest indicator in column 5 which equals one if the borrower indirectly or directly owns the land where the home sits and zero if the borrower has an unpaid or paid leasehold property interest in the land where the home sits. Interestingly, controlling for property interest does not explain as

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17 For example, if conventional loan lenders add more bps to the cost of a loan compared to home-only lenders when the borrower has a low credit score, all else constant, and since the mean credit score for AIAN borrowers, whether living on- or off-reservations, is lower relative to Whites (see Table 1), then \( \beta_1 \) and \( \beta_2 \) in Table 3, column 3 would be biased towards finding no evidence of rate spread disparities.

18 According to HMDA, an applicant securing a manufactured home can either have direct or indirect ownership or have access to the land where the home sits through a paid or unpaid leasehold. Within many American Indian reservations, property regimes range from land held in trust (either by the tribe or on behalf of individuals) and fee simple land. While private landholders within reservations are often non-tribal citizens (an estimated 10% of all fee simple within reservations are held by tribal members (Chang, 2011; Parman, 1994)), tribal citizens can own land outright or have direct
much of the estimated disparities on on-reservation AIAN loans as controlling for home-only loan status did. For example, the null hypothesis that $\beta_1$ in column 3 is equal to the $\beta_1$ in column 5 was rejected at the 1% level ($\chi^2 = 15.68$ with p-value=0.000). In other words, the estimated disparities on on-reservation AIAN loans after accounting for property interest are significantly higher than the estimated disparities after controlling for home-only loan status. This implies that differences in property interests between on-reservation AIAN and White borrowers only partially explains the rate spread disparities. On the other hand, netting out the effect of property interest on rate spread explains away the estimated disparities in rate spread on off-reservation AIAN loans. Thus, unlike the on-reservation AIAN disparities, we do not have enough information to isolate the role of home-only loan status in explaining the off-reservation AIAN rate spread disparities.

While home-only lending explains a substantial amount of the racial disparity in rate spread, those loans can only be used for manufactured homes. To discern whether home-only lending drives our estimated disparities or whether features unique to manufactured home financing drives our results, we add a manufactured home control in column 6. By doing so, we are controlling for the general effect of manufactured homes, many of which may be used for home-only loans, on rate spread. Column 6 shows that accounting for property interest and manufactured home purchases do not explain the rate spread disparities in on-reservation AIAN loans to the same extent as home-only loan status does.\footnote{The null hypothesis that $\beta_1$ in column 5 is the same as $\beta_1$ in column 3 is rejected at the 1% level ($\chi^2 = 9.46$ with p-value=0.002).} Alternatively, our estimated racial disparities in rate spread on off-reservation AIAN loans are again eliminated when we control for manufactured home loans. While we cannot isolate the factors driving the off-reservation AIAN disparities in rate spread, we can say definitively that neither property interests nor the choice of a manufactured home can completely account for the rate spread disparities paid by on-reservation AIAN borrowers in our model.

Table 4 presents our estimated disparities in home loan interest rates using the same regression models as Table 3. In particular, each column shows the results of OLS regressions of the rate spread...
on the on- and off-reservation AIAN borrower indicators (where the omitted reference group is White borrowers). The influence of borrower characteristics and loan types on the on and off-reservation AIAN disparities reveal the same pattern as Table 3. In particular, observed differences in borrower characteristics (see $\hat{\beta}_1$ in column 2) explain very little of the on-reservation AIAN interest rate disparities (approx. 14% of raw interest rate gap). Rather, controlling for home-only loan status and borrower characteristics (column 3) explain about 93% of the raw interest rate disparities on on-reservation AIAN loans. With respect to off-reservation AIAN disparities, borrower characteristics (column 2) explain about one-third of the interest rate disparities while adding the home-only loan indicator (column 3) explains the remaining off-reservation AIAN disparity. Our alternative hypotheses tests in columns 5 and 6 also reveal that accounting for property interests or whether the home is a manufactured home do not have the same explanatory power as home-only loan status in explaining the interest rate disparities on on-reservation and off-reservation AIAN loans.\footnote{The null hypothesis that $\beta_1$ in column 4 is equal to $\beta_1$ in column 3 is rejected at the 1% level ($\chi^2 = 16.21$, p-value =0.0001). The same test comparing $\beta_1$ in column 5 to $\beta_1$ in column 3 is also rejected at the 1% level ($\chi^2 = 10.05$, p-value =0.002). The off-reservation AIAN coefficient $\beta_2$ in column 4 is also statistically different to $\beta_2$ in column 3 ($\chi^2 = 7.02$, p-value =0.008). Same is true for comparisons between $\beta_2$ in column 5 and $\beta_2$ in column 3 ($\chi^2 = 8.02$, p-value = 0.005).}

To determine the sensitivity to the main findings in Tables 3 and 4, we run several robustness checks to determine if alternative model specifications omitting the home-only loan indicator explain away the estimated on-reservation AIAN disparities in a similar fashion as netting out the rate spread (and interest rate) variation between home-only loans and mortgage loans did. We also report the coefficient on the off-reservation AIAN indicator even though we find evidence of no racial disparities in rate spread after controlling for property interests in the underlying land. To this end, Figures 3 and 4 compare the on-/off-reservation AIAN coefficients from column 3 in Tables 3 and 4, respectively, to different model specifications that omit the home-only loan indicator. In particular, Figures 3 and 4 adjusts our model with baseline controls (but omits the home-only loan indicator) in column 3 in Tables 3 and 4 in the following ways: (1.) county fixed effects are added; (2.) state-by-year fixed effects; (3.) lender credits are added as a control; (4.) binned DTI categories are included; (5.) binned credit score/LTV categories are included; (6.) all observations with imputed credit score
values are dropped; (7.) on-reservation AIAN borrowers are defined when 10% or more of the home Census tract overlaps with reservation land (or off-reservation trust land); (8.) on-reservation AIAN borrowers are defined when 90% or more of the home Census tract overlaps with reservation land (or off-reservation trust land); (9.) all census tracts that overlap with Navajo Nation, by far the largest American Indian reservation in size, are dropped; (10.) we consider the boundaries of Oklahoma Tribal Statistical Areas (OTSAs), Hawaiian Home Lands (HHL), and Alaska Native Village Statistical Areas (ANVSAs) when computing the “on-reservation” AIAN indicator.

As shown in Figure 1, the mean difference in rate spreads and interest rates do not fully capture where the unconditional rate spread gaps are the largest. For example, for on-reservation AIAN borrowers, the gap in rate spread and interest rate is substantially larger at the upper end of their distributions. Thus, while Table 3’s analysis sheds light on the forces that generate mean differences in rate spreads and interest rates, it may fail to explain why on-reservation AIAN borrowers pay much more at the top end of the distribution.

To understand the rate spread and interest rate disparities at each decile of the rate spread distribution, we estimate unconditional quantile regressions following Firpo et al. (2009) by leveraging recentered-influence functions for each decile of the rate spread distribution.\textsuperscript{22} We consider the

\textsuperscript{21}The land that comprises the Muskogee (Creek) OTSA was re-recognized by the Supreme Court in McGirt vs. Oklahoma. Oklahoma state courts have re-recognized the other of the Five Tribes (Choctaw, Cherokee, Chickasaw, and Creek) and the Quapaw reservation. Other tribal lands have been re-recognized but those decisions are being appealed. Within these OTSAs, some parcels that are held in trust or as restricted fee. Census Bureau shapefiles, however, identify the boundaries of each OTSA and not which parcels within each OTSA are trust status lands. As a result, when we include OTSAs in the sample, we expect to increase the Type I error (false positive) and would attenuate the estimated on-reservation disparities. Alaska Native Village Statistical Areas (ANVSAs) are geographic areas where Alaska Natives, and especially members of an Alaska Native village, represents a large proportion of the area’s population.

\textsuperscript{22}It is important to distinguish the difference between a standard quantile regression and an unconditional quantile regression done here. Consider for a moment how to interpret the coefficient on a covariate in a standard OLS regression where $Y$ is the outcome vector of interest, $X$ the covariate of interest, and $\beta$ the estimated relationship between $Y$ and $X$. In this circumstance $E(Y|X)=X\beta$ and by the law of iterated expectations, it is also the case that $E(Y) = E_X [E(Y | X)] = E(X)\beta$. Thus we can interpret $\beta$ as the effect of increasing the mean value of $X$ on the unconditional mean value of $Y$. However, if we use a standard quantile regression that fits a regression model for the $\tau$th quantile, we obtain $Q_\tau(X) = X\beta$. Since the law of iterated expectations does not apply in the case of quantiles, we must interpret $\beta$.
three specifications in Table 3, columns 1, 2 and 3, the unconditional relationship, one controlling for baseline covariates, and one that adds an indicator for whether the loan was a home-only loan or a mortgage loan.\footnote{The quantile regressions only differ in that we add Census region fixed effects instead of state fixed effects because some of our decile bins contain very few on-reservation AIAN loans. If we completely drop geographic fixed effects from the quantile regressions, the results do not change in a meaningful way.} We consider the same three specifications in Table 4 when estimating the interest rate disparities at each decile of the interest rate distribution.

Figure 5 graphs the 95% confidence interval on the rate spread gaps for on-reservation AIAN borrowers in panel A and the same gaps for off-reservation AIAN borrowers in panel B at each decile under three different model specifications. Figure 6 uses the same three specifications to estimate the interest rate gaps. In both figures, the red lines are simply the unadjusted rate spread gaps. The blue lines are the rate spread gap after controlling for the borrower and basic loan characteristics. The black lines are the rate spread gaps after adding the home-only loan indicator.

Both panels in Figure 5 reveal that differences in borrower and basic loan characteristics explain rate spread gaps between the 10\textsuperscript{th} and 50\textsuperscript{th} percentile. However, at the top end of the rate spread distribution, controlling for the borrower and basic loan characteristics does not completely eliminate racial disparities. When we add the home-only loan indicator, the racial disparities for off-reservation AIAN borrowers are eliminated at each decile while we still see a small but positive disparities for on-reservation AIAN loans at top end of the distribution. Consistent with Table 3, Columns 3-4, we find home-only loans account for the significant racial disparities in White-AIAN loan prices.

Panel A in Figure 6 shows that the interest rate disparities between on-reservation AIAN and White loans at each decile is also largely explained by when we incorporate the loan type used into the model. Borrower characteristics also again cannot explain the disparities in interest rates by on-reservation AIAN borrowers at the top end of the distribution. The interest rate disparities in Panel B in Figure 6 reveal that interest rate disparities on off-reservation AIAN loans are explained by a combination of borrower characteristics for all but the most expensive loans. When we add the...
home-only loan indicator, the racial disparities for off-reservation AIAN borrowers are eliminated even within the top end of the interest rate distribution.

So far, two main results about the large raw disparities in rate spreads (and interest rates) on on-reservation AIAN loans are worth noting. First, accounting for the variation in rate spreads between home-only and mortgage loans explains a large portion of the rate spread and interest rate disparities on on-reservation AIAN loans. This result is complemented when we implement the Shapley decomposition (Israeli, 2007) to the model in Table 3. This decomposition reveals that the loan type used explains roughly two-thirds of the total variation in rate spread, compared to the baseline controls which explains roughly 20% of the rate spread variation, while the race variables explains less than 1%. Second, relative to White borrowers, property interests alone cannot explain the rate spread and interest rate disparities for on-reservation AIAN loans in the same manner that home-only loan status does. For off-reservation AIAN borrowers, uptake of home-only loans and property interests are so highly correlated that one cannot isolate each effect.

These results beg the question: why are expensive home-only loans used in greater frequencies among on-reservation AIAN borrowers and, to a lesser extent, off-reservation AIAN borrowers? The home-only loan borrower experience can be gleaned from a 2018 survey of manufactured home borrowers in Texas (FreddieMac and UNC, 2020). Their survey found that borrowers were unlikely to enter the home-buying process preferring a home-only home loan: in particular, among the borrowers who ended up with a home-only loan, 46% originally intended to take out a mortgage and only 17% preferred a home-only loan from the outset. The survey evidence suggests that manufactured home buyers are not likely to enter the home-buying process preferring a home-only loan.

We know of no survey data on the AIAN manufactured home borrower experience. Thus, we

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There may be some unobserved costs to securing a manufactured home mortgage which may be avoided by using a home-only loan. For example, private mortgage insurance is required to obtain a mortgage, especially those with less than 20% down and those purchased by a GSE. The insurance company will likely require the manufactured home is comply with local building codes. These homes must sit on a permanent foundation and have proper hookups for electricity, water and sewer. Since most home-only loans are held by the lender on portfolio, those requirements are more likely to be up to the lender’s discretion. Some home-only loans may require much lower up-front investments (e.g., the costs of sitting the home on piers is likely a low-cost alternative to sitting on a permanent foundation), home-only loan financing could be a viable alternative to mortgage financing. Our model does not allow us to make statements about the welfare effects of different types of financing.
devote the remainder of the paper to understanding why AIAN borrowers are more likely to pur-
chase home-only loans, many of which are made by nonbanks, than White borrowers.

5 Racial Disparities in Home-Only Loan Usage

Underwriting variables alone, such as creditworthiness, cannot fully explain the pricing disparities
between White and on-/off-reservation AIAN loans (See Tables 3 and 4, col. 2). If the loan type
used (i.e., either a home-only loan or a mortgage) explains the observed disparities in loan prices and
borrowers sorted into loan markets based on their characteristics alone, then we would expect that
controlling for those would explain away the disparities. However, observable borrower character-
istics do not predict entry into the home-only loan market. We document this in Figure 7. In panel
A, we plot the home-only loan shares by credit score bins for all loan applications and only approved
loans in panel B. The figure illustrates how a borrower’s creditworthiness affects the probability they
take out a home-only loan. We do this for on-reservation AIAN, off-reservation AIAN and White
borrowers.

As expected, there is a negative relationship between credit scores and home-only loan shares in
both panels: borrowers with higher credit scores are less likely to take out home-only loans than bor-
rowers with lower credit scores. This relationship holds for all groups; however, this relationship is
most pronounced for on-reservation AIAN borrowers. For example, in panel A, as we move from the
20th to the 80th percentile of the credit score distribution, the on-reservation AIAN-White disparities
in home-only loan take-up fall from 45 to roughly 20 percentage points. Despite this convergence,
credit building alone does not eliminate the gaps in home-only loan usage, especially among on-
reservation AIAN borrowers. Even the most creditworthy on-reservation AIAN borrowers receive
home-only loans at much higher rates than other groups.
5.1 Predicting home-only loan usage

To determine the factors that predict home-only loan usage, we limit our sample to manufactured home loan applications, which helps isolate areas where local zoning laws and land use restrictions permit the option of buying a manufactured home. Thus, if the borrower uses a home-only loan or a manufactured home mortgage when buying a manufactured home they are included in our sample. We merge the HMDA data with external data sources to test whether potential determinants from the mortgage literature explain the racial disparities in home-only loan use. Specifically, those sources help estimate disparities in home-only loan use while accounting for (1) the distance to the nearest city using Census Bureau definitions for an urbanized area\textsuperscript{25}, (2) the distance to the closest manufactured home dealer\textsuperscript{26}, and (3.) differences in banking trust preferences between adult American Indians/Alaska Natives and Whites.\textsuperscript{27}

Table 5 contains the results from OLS regression of home-only loan use on our two variables of interest (where the omitted category is White borrowers). Column 1 contains the estimated disparities in home-only loan usage after controlling for state and year fixed effects. On-reservation AIAN borrowers are, on average, 51 percentage points more likely to apply for a home-only loan as opposed to a manufactured home mortgage relative to White borrowers. The difference in home-only loan application rates between off-reservation AIAN and White borrowers is around 15 percentage points. Since AIAN applicants have lower credit scores which may deter access to mortgages, Column 2 adds the full set of baseline controls and both estimated disparities decrease but borrower characteristics

\begin{itemize}
  \item The Census Bureau defines urbanized areas as cities and surrounding areas consisting of at least 50,000 people.
  \item To our knowledge, there is no database on the universe of manufactured home dealers so to capture the location of as many manufactured home dealers as possible, we use a large place-based dataset published by SafeGraph on the exact location of roughly 10 million venues. We filtered those venues by the six-digit NAICS code for residential property managers (531311) which in the SafeGraph data contain the majority of manufactured home dealers. This decreases the number of venues to roughly 74,000. We then filter that list by including only establishments with the term “home” in their company name. Our final sample contains 13,000 establishments. We then determine the distance from each Census tract’s centroid to the nearest dealership.
  \item We used data on self-reported AIAN and White survey respondents in the Collaborative Multiracial Post-Election Survey of 2020 which contains an oversample of Native Americans. We use one question from the survey: “How much do you trust banks on a scale from 0 (no trust) to 10 (total trust)?” There are 1,916 AIAN and 3,626 Whites in this data. We can only isolate a respondent to a specific state so we cannot determine any within-state racial variation in this measure of bank trustfulness. However, survey weights are used to construct by-group, state-level averages in a “trust in banks” measure.
\end{itemize}
explain *more* of the off-reservation AIAN home-only loan application rate (compared to Whites) than the on-reservation AIAN home-only loan application rate. Given the larger reduction in the coefficient on off-reservation AIAN applicants (compared to the coefficient on on-reservation AIAN applicants) from column 1 to column 2, we find additional evidence that sorting into home-only loan applications by observables is more common among off-reservation AIAN applicants.

In column 3, we add four additional predictors of home-only loan usage: distance to the closest urbanized area, proximity to the closest manufactured home dealer, a property interest indicator, and a measure of trust in banks by race. There are multiple reasons why being near a dealership may be related to a borrower’s decision to finance their manufactured home with a home-only loan. First, dealerships may provide information that influences borrowers’ loan choices. Survey results from a sample of manufactured home borrowers in Texas find that 50% of borrowers cited the lender being on a list provided by their retailer as an important factor and these lists may help borrowers find home-only lenders (FreddieMac and UNC, 2020). This survey also found that only 12.7% of borrowers chose whether to get a mortgage or home-only loan before choosing a lender, suggesting that they may learn more about the process from the lender that leads them to choose a home-only loan. As discussed earlier, few borrowers enter the borrowing process planning to get a home-only loan, but many end up choosing one. Second, on average, new homes are much more likely to be financed with home-only loans. For example, a national survey of newly shipped homes found that 76% of new homes were financed with home-only loans, whereas HMDA that year reported that 42% of manufactured homes were financed with home-only loans when combining new and used

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[28] Regulations may affect whether a retailer recommends a lender(s) to the borrower. The CFPB’s 2014 report on manufactured housing explains that under the CFPB’s 2013 Loan Originator (LO) Compensation rule, “many manufactured-housing retailers do not want to incur the cost of becoming a licensed LO. Retailers report that, instead of referring a consumer to a particular creditor or two, they do not advise consumers about which creditors are most likely to accept their applications.” However, in May 2018, Section 107 of the Economic Growth, Regulatory Relief and Consumer Protection Act (EGRRCPA) set out new provisions regarding manufactured home retailers. The provisions of Section 107 include, for example, that an employee of a manufactured home retailer is not a loan originator if they do not receive greater compensation for a transaction financed by a loan than a cash transaction if they disclose an affiliation with any creditor, provide at least one unaffiliated creditor and do not directly negotiate loan terms. Since the survey discussed above covered home purchases from 2015 until 2018, it is likely that a majority of the purchases were made before this change. We are not aware of evidence on whether consumers’ shopping experiences for manufactured home loans have changed as a result of EGRRCPA.
homes (Schneider et al., 2021). Due to the high transportation costs of moving manufactured homes across long distances, people may be more likely to buy a new home if they live near a dealership.

Column 3 shows that these additional controls have the expected signs and, together, help explain around 25% of the overall variation in the home-only loan indicator. Individuals living in rural areas of a state have a higher likelihood of applying for a home-only loan than individuals living in more urban areas. The negative and highly significant coefficient on the distance to the nearest manufactured home dealer implies that homes closer to manufactured home dealerships were more likely to use home-only loans, potentially for the abovementioned reasons. The negative coefficient on the property interest indicator means individuals with direct ownership are much less likely to apply for a home-only loan. Last, individuals living in areas where trust in banks exceed that of the median level are less likely to apply for a home-only loan. None of these factors, however, eliminate the racial disparities in home-only loan usage by both on- and off-reservation AIAN borrowers. In fact, controlling for these additional controls slightly increases the estimated on-reservation AIAN disparities in home-only loan applications.

In column 4, we include county fixed effects, and the estimated racial disparities only decrease by a small amount. Interestingly, this large set of controls only accounts for less than half of the unconditional disparities in home-only loan application rates between on-reservation AIAN and White applicants but explains close to 85% of the raw difference in the likelihood of a home-only loan application between off-reservation AIAN and White applicants. Thus, similar to our estimated rate spread disparities, property interest alone and, other potential observed factors, cannot explain at to a large degree why on-reservation AIAN borrowers rely more on home-only loans than Whites. As a robustness checks, we test whether we find disparities in the likelihood of applying for a home-only loan by limiting the sample to only loans no greater than $150,000 in column 5 and find the same disparities estimated using the full sample.

If a tribal member does not hold legal title to land, a manufactured home can still be tied to the land through a leasehold mortgage or a trust land mortgage. Under a leasehold mortgage, the underlying property, even if the land is held in trust, is tied to the home with a lease certified by either the Bureau of Indian Affairs or, under agreements with the BIA, the tribe. Because of historical events, we expect to see a variation in property interest even within small geographic entities such as a county.
What else might be driving AIAN borrowers, especially those living in tribal areas, towards using home-only loans? We consider four potential, hard-to-measure factors that may create differential usage of home-only loans. First, one possibility could be financial literacy: i.e., the average AIAN borrower, due to the historical underdevelopment of banking services in Native communities, may have limited knowledge about all the available loan products compared to the average White borrower. Second, structural barriers specific to Native communities, such as disproportionately higher construction costs and a limited number of contractors willing to travel far distances to work in often rural Native communities, may raise the relative cost of building a permanent foundation to tie a home to land. If so, then cost considerations may push more on-reservation AIAN borrowers towards expensive, home-only loans compared to White borrowers. Third, if AIAN borrowers are less interest rate sensitive than White borrowers, all else constant, then the advantages of one-stop shopping, where the home is purchased at the dealership and the loan is taken out from a list of lenders potentially provided by the dealership specializing in manufactured homes, may outweigh the cost advantages of tying land and home together in a mortgage application. Fourth, advertising by manufactured home dealers might lead to borrowers choosing to take out loans home-only lenders, which may be more pronounced in Native communities where alternative banking options can be limited.

Two other possibilities are that home-only loan applications are processed faster than conventional loan applications, or people, in particular, potential AIAN homeowners, believe they are more likely to be approved for a home-only loan than a conventional loan. We consider both these possibilities here.

5.2 Fast Loan Processing Times

Tying a home to land on trust land is a notoriously long and cumbersome process for both the lender and borrower (Kunesh, 2018). The progress involves the lender, the borrower, the Bureau of Indian Affairs, the Indian Health Service, the tribe, and other federal agencies, such as HUD. Less is known about the efficiency of processing home-only loans. In this section, we investigate two different ways
in which loan processing times may affect the decision for AIAN borrowers to take out a home-only loan. First, we investigate whether the loan processing times for manufactured home loan applications are shorter for home-only loans than for mortgages and whether this difference varies between (on and off-reservation) AIAN applicants and White applicants. Second, when an applicant applies for a home-only loan, we determine whether those loan applications are processed faster for AIAN applicants compared to White applicants. If applicants trade off between loan processing times and loan costs, then the accessibility of home-only loans relative to manufactured home mortgages may drive AIAN borrowers towards these higher-cost loan products.

To this end, we investigate racial disparities in one component of securing a loan: the number of days the lender takes to either accept or reject a manufactured home loan application. Similar to Wei and Zhao (2022), we run OLS regressions where the number of days it took a lender to decide on a manufactured home loan application is the dependent variable, and racial indicators are key independent variables of interest (White loan applicants are omitted). We include a home-only loan indicator to determine whether teasing out the variation in loan processing speed between home-only and mortgage loan applications explains away racial differences in loan processing times. If so, then differences in loan processing times between AIAN and White applicants are driven by differences in the likelihood of applying for specific loan types (in this case, home-only loans versus manufactured home mortgages). If we find evidence of AIAN loans are processed slower than Whites after controlling for home-only loan status, then AIAN applicants face a loan processing penalty within loan markets. In some models, we interact the home-only loan indicator with both on- and off-reservation AIAN indicators to determine if home-only loan application processing times vary by race.

Table 6 presents the results. In column 1, we estimate racial disparities in processing times after accounting for the baseline controls. We find that, all else constant, manufactured home loan applications by off-reservation AIAN borrowers are processed at the same rate as White manufactured home loan applications. In contrast, on-reservation AIAN manufactured home loan applications are
processed roughly 10 days slower than White applications for all manufactured home loans. However, since borrower characteristics do not fully capture the differential uptake of home-only loan applications, we expect these estimates to be biased downward if home-only loan processing times are faster than mortgages.

In column 2, we control for whether the loan application is for a home-only loan (the control group is White mortgage applicants). The coefficient on the home-only indicator implies that home-only loan applicants by White borrowers are processed 20 days faster than mortgage applications by White borrowers. The positive coefficient on the on-reservation AIAN indicator means that home-only loan applications by on-reservation AIAN borrowers are processed faster than White mortgage loan applications by only \((20.91 - 17.79)\) three days. The positive coefficient on the on-reservation AIAN indicator also implies that on-reservation AIAN mortgage applications take roughly 18 days longer to process than White mortgage applications. The small but positive coefficient on the off-reservation AIAN indicator suggests that Whites and off-reservation AIAN borrowers face similar loan processing times. Taken together, home-only loan applications are, on average, processed faster than manufactured home mortgage applications but not in a way that would encourage on-reservation AIAN borrowers to utilize these loans to a greater degree relative to White borrowers.

Column 3 more formally tests whether loan processing times for home-only loans vary by race by interacting the home-only loan indicator with both AIAN indicators.\(^{30}\) Since the interaction terms on both race variables are positive (and significant for the off-reservation AIAN interaction term), both on and off-reservation AIAN home-only loans are processed on average slower than White home-only loan applications. In sum, the findings presented in Table 6 reveal that while we see evidence that home-loan loans are processed much faster than manufactured home mortgages, when compared to White applicants, there are no time-savings when AIAN applicants try to take out a home-only loan.

\(^{30}\)We also interact each baseline control with the home-only loan indicator to allow for the effects of borrower characteristics on loan processing time to vary by loan type.
6 Disparities in Approval Rates

Finally, we investigate racial disparities in mortgage approval rates and, if so, whether those disparities are lower if an applicant applies for a home-only loan. We speculate that the disproportionate use of home-only loans, especially by on-reservation AIAN borrowers, may be partly driven by smaller disparities in approvals for home-only relative to racial disparities in approvals for mortgages.

Table 7 contains suggestive evidence that the relative gaps in loan approvals are smaller for home-only loans than for mortgage applications. In particular, relative to White loan applicants, on-reservation AIAN applicants, on average, face an approval rate that is 12 percentage points lower than White mortgage loan applicants. However, the unconditional racial disparity in home-only loan approvals is 9.1 percentage points. Relative to white loan applicants, the raw gap in mortgage loan approval rates for off-reservation AIAN is much smaller, 5.4 percentage points, but slightly larger, 6.3 percentage points, if applying for a home-only loan. Of course, these differences may be driven by borrower underwriting characteristics.

More formally, to determine whether the disparities in loan approvals differ between home-only loans and manufactured home mortgages, we regress the likelihood of approval on the two AIAN indicators, the home-only loan indicator and the interaction between both AIAN indicators and the home-only status indicator while controlling for borrower and basic loan characteristics. For these regressions, the sample is comprised of completed applications for manufactured homes. A positive (and significant) coefficient on the interaction term between the home-only loan status and one of the AIAN indicators means that the AIAN disparities in home-only approvals is smaller than the on-reservation AIAN disparities in manufactured home mortgage approvals. Alternatively, a negative coefficient on an interaction term implies that estimated disparities in home-only loan approvals are greater (in absolute value) than the estimated disparities in manufactured home mortgage approvals.

The results are shown in Table 8. After adjusting for borrower and basic loan characteristics, the positive and significant coefficients on both the on- and off-reservation AIAN interaction terms implies that the racial disparities in home-loan approvals is much smaller than the estimated racial
disparities in manufactured home mortgages. In the case of on-reservation AIAN applicants, the likelihood of a home-only loan is greater than a White applicant with similar borrower and loan characteristics. Column 2 allows the interactions to vary by each baseline control and the main results do not change. When we control for property interest in column 3, we find no change in our estimated racial disparities in home-only loans compared to manufactured home mortgages.

Taken together, while we estimate disparities in mortgage loan approvals for both on- and off-reservation AIAN applicants, we find much smaller racial disparities when AIAN applicants apply for home-only loans. Further investigation is needed to determine if the relative accessibility (compared to White applicants) of home-only loans drives the disproportionate share of home-only loans by both on- and off-reservation AIAN borrowers.

7 Conclusion

We find significant rate spread and interest rate disparities between AIAN borrowers and White borrowers, especially for AIAN borrowers located on reservations. The heavy reliance on home-only loans as a source of housing capital alone can largely explain the higher rate spreads and interest rates charged on on-reservation and off-reservation AIAN loans. While one may speculate that this result is a direct consequence of building homeownership on trust land, we find that differences in property interest cannot explain the greater reliance on home-only loans by on-reservation AIAN borrowers. In particular, on-reservation AIAN borrowers are 29 percentage points more likely to apply for a home-only loan compared to Whites living in the same county, controlling for property interests. Thus, structural differences above and beyond property interests are likely forces that result in home-only loans being a more common home loan arrangement for AIAN borrowers living on reservations. We find that AIAN borrowers face smaller racial disparities in the likelihood of getting a loan application approved when they apply for home-only loans rather than a manufactured home mortgage; however, we cannot claim that AIAN borrowers are turning to home-only loans when alternative loans are relatively scarce.
It is important to state that American Indians and Alaska Natives, especially tribal citizens living on reservations, have alternative venues to build homeownership than just home-only loans commonly issued by nonbanks or conventional mortgage products from large financial entities. Tribes and tribal designated housing entities (TDHEs) can use the Native American Housing Assistance and Self Determination Act (NAHASDA) funds to provide down payment assistance and/or sell tribal housing units on a lease-to-own basis (Ingram, 1998; Pierson, 2010; Pindus et al., 2017). Tribal housing authorities can also convert low-income housing tax credit (LIHTC) developments into housing units for homeownership after the compliance period, under which the developments must be rented, has expired (Bandy et al., 2014). Last, tribally owned banks and non-profit Native Community Development Financial Institutions (CDFIs) also provide financial services such as mortgages to underserved, AIAN populations. Due to their loan volume, these loans are often not required to report to HMDA.\textsuperscript{31}

Government-sponsored entities (GSEs) have been considering starting a pilot program to invest in home-only loans for some time. Under the Federal Housing Finance Administration’s Duty to Serve Underserved Markets Rule, Freddie Mac and Fannie Mae are directed to facilitate a secondary mortgage market for lower and moderate-income borrowers. Facilitating a secondary market for home-only loans is one of the measures that the GSEs have discussed to fulfill their Duty to Serve requirements.

GSEs currently purchase manufactured home mortgages.\textsuperscript{32} Historically, the GSEs did purchase home-only loans before a market crisis in the early 2000s that in many ways foreshadowed the sub-prime mortgage crisis later that decade. The crisis was characterized by a high default rate on loans

\textsuperscript{31}In the appendix, we randomly sample home-only loans and mortgage from the White HMDA loan distribution to determine how many additional loans are needed to close the on-reservation AIAN disparities at each part of the rate spread/interest rate distribution. The results are shown in Appendix Figures A2 and A3. When we randomly sample 1000 White loans and add them to the on-reservation AIAN HMDA loans, the on-reservation AIAN disparities in loan pricing are mostly eliminated at the lower end of the pricing distribution but remain large at the top end of the distribution. As a result, it takes roughly 10,000 additional loans with characteristics similar to White loans to eliminate the on-reservation AIAN pricing disparities at each decile of the rate spread (or interest rate) distribution.

\textsuperscript{32}In its 2022-2024 Duty to Serve plan, Freddie Mac discussed purchasing 1500-2500 home-only loans in 2024. Fannie Mae said in their 2022-2014 plan that “We continue to work with our regulator to understand safety and soundness considerations and the viability of a home-only loan pilot program.” https://www.fhfa.gov/PolicyProgramsResearch/Programs/Documents/FannieMae2022–24DTSPlan–April2022.pdf
made to consumers with subprime credit scores, built-in incentives that encouraged loan officers
to make loans that consumers could not afford, and fraud. Fannie Mae wrote down at least $206
million in losses on home-only loans.33

Since that market crisis, home-only loans have largely been held on portfolio by lenders. It is
possible that expanding the secondary market for home-only loans while ensuring that consumers
can afford to repay their loans would benefit consumers through more lenders participating in the
home-only loan market. Another possible change to the the home-only loan market comes from the
Federal Housing Administration (FHA), which recently proposed changes to its Title 1 program that
can be used for home-only loans.34 The FHA insures about half of all manufactured home mort-
gages recorded in HMDA, suggesting that FHA insurance also has the potential to be important in
the home-only manufactured home loan market. Since many nonbank lenders have an originate-
to-distribute business model and hold little capital in proportion to their loan volume, the lack of a
secondary market for home-only loans likely makes this product unattractive for these lenders who
now originate a majority of mortgages for site-built homes. Our estimates suggest that if new policies
lowered the prices of home-only loans, this would benefit AIAN borrowers more than White bor-
rowers due to their disproportionate use of home-only financing and the role it plays in explaining
the higher prices AIAN borrowers pay to buy a home.

33https://www.wsj.com/articles/SB108060795897068570
References


Ky, K.-E. and K. Lim (2022). The role of race in mortgage application denials. Available at SSRN 433119.


Figure 1: **Disparities in Home Loan Borrowing Costs**

Notes: The y-axis in panel A is the rate spread, defined as the difference between the average prime offer rate and the annual percentage rate. The y-axis in panel B is the interest rate. The x-axis in both panels shows the 10th through 90th percentile of the rate spread across our three population groups. The red (blue) line plots the rate paid by on-reservation (off-reservation) AIAN borrowers at each decile. The gray line plots the rate paid by White borrowers at each decile. We discuss how on-/off-reservation AIAN and White borrowers are classified in HMDA in Section 2. Data are from the confidential HMDA data, 2018–2021.
Figure 2: **Comparing address-based and tract-based AIR measures**

*Notes:* This figure was generated using observations from 2021 HMDA only.
Figure 3: Robustness Checks, rate spread disparities

Notes: The 95% confidence intervals for the coefficients on on- and off-reservation AIAN borrowers in various model specifications are displayed above. The “baseline” specification is identical to Table 3, Column 3. “County Fixed Effects” uses county fixed effects instead of state fixed effects, “Add lender credits” includes a dummy if lender credits were given to the borrower, “Add DTI controls” adds DTI bins as controls, “Add CS-LTV bins” contain credit score-LTV bins, “Drop imputed values” drops all observations with imputed credit scores, “Alt. Reservation Rule 1” assign AIAN borrowers to reservations if at least 10% of the home’s Census tract area overlaps with reservation land, “Alt. Reservation Rule 2” assigns AIAN borrowers to reservation if at least 90% of the home’s Census tract overlaps with reservation land, “Exclude Navajo Nation” drops all census tracts that overlap with the Navajo Nation, “Include OTSAs/HHL/ANVSAs” assigns AIAN borrowers to reservations if at least 60% of a Census Tract’s area overlaps with any AIANNH Area (reservations and off-reservation trust lands, OTSAs, HHLs, ANVSAs, state reservations).
Figure 4: Robustness Checks, interest rate disparities

Notes: The 95% confidence intervals for the coefficients on on- and off-reservation AIAN borrowers in various model specifications are displayed above. The “baseline” specification is identical to Table 4, Column 3. “County Fixed Effects” uses county fixed effects instead of state fixed effects, “Add lender credits” includes a dummy if lender credits were given to the borrower, “Add DTI controls” adds DTI bins as controls, “Add CS-LTV bins” contain credit score-LTV bins, “Drop imputed values” drops all observations with imputed credit scores, “Alt. Reservation Rule 1” assign AIAN borrowers to reservations if at least 10% of the home’s Census tract area overlaps with reservation land, “Alt. Reservation Rule 2” assigns AIAN borrowers to reservation if at least 90% of the home’s Census tract overlaps with reservation land, “Exclude Navajo Nation” drops all census tracts that overlap with the Navajo Nation, “Include OTSAs/HHL/ANVSAs” assigns AIAN borrowers to reservations if at least 60% of a Census Tract’s area overlaps with any AIANNH Area (reservations and off-reservation trust lands, OTSAs, HHLs, ANVSAs, state reservations).
Notes: The outcomes in all regressions is the rate spread. Panels A and B show the 95% confidence interval for each coefficient on the on-reservation and off-reservation AIAN indicator from three separate quantile regressions: the red points are from a model without any individual controls, the blue points are from a model that includes demographic and basic loan characteristics, and the black points are from a model that includes the home-only loan indicator. Since we cut the data into deciles, we control for Census region fixed effects instead of state fixed effects.
Notes: The outcome in all regressions is the interest rate. Panels A and B show the 95% confidence interval for each coefficient on the on-reservation and off-reservation AIAN indicator from three separate quantile regressions: the red points are from a model without any individual controls, the blue points are from a model that includes demographic and basic loan characteristics, and the black points are from a model that includes the home-only loan indicator. Since we cut the data into deciles, we control for Census region fixed effects instead of state fixed effects.
Figure 7: **Home-only Loan Shares, by Credit Score bins**

*Notes:* Both panels plot the share of home-only loans by credit score deciles for each group of interest: on-reservation AIAN, off-reservation AIAN and White borrowers. The sample in the top panel is all HMDA loan applications, and the sample in the bottom panel is only approved loans.
Table 1: Summary Statistics, group averages

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<th></th>
<th>on-Reservation AIAN (1)</th>
<th>off-Reservation AIAN (2)</th>
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<th>(1)-(3)</th>
<th>(2)-(3)</th>
<th>(1)-(2)</th>
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Notes: Means are reported with standard deviations in parentheses and the number of observations in brackets. The sample contains all accepted (i.e., approved and originated) loans in states with at least one loan on a Census tract that can be considered an “on reservation” loan. Some variables, such as rate spread and credit score, are exempt from reporting for small lenders. Thus, the number of loans in each population group refers to the number of loans with reported data. Even though negative debt-to-income (DTI) ratios can be considered valid, we restrict the sample to only DTI ratio between 0 and 100%. Significance stars: * 0.10 ** 0.05 *** 0.01.
### Table 2: Summary Statistics for Loan Types

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<th>Indigenous in Res.</th>
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<td>(1)</td>
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<td>(3)</td>
<td>(1)-(3)</td>
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<td>FHA</td>
<td>0.281 (0.450)</td>
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<td>VA</td>
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<td>0.135 (0.342)</td>
<td>0.095 (0.293)</td>
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<td>USDA</td>
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<td>manufactured home</td>
<td>0.389 (0.488)</td>
<td>0.069 (0.254)</td>
<td>0.033 (0.180)</td>
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<td>home-only loan</td>
<td>0.337 (0.473)</td>
<td>0.032 (0.177)</td>
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**Notes:** Means are reported with standard deviations in parentheses and the number of observations in brackets. Significance stars: * 0.10 ** 0.05 *** 0.01.
Table 3: The Role of Home-Only Loans on Rate Spread Disparities

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<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
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<td>1.967***</td>
<td>1.651***</td>
<td>0.183***</td>
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<td></td>
<td>(0.434)</td>
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Notes: Column 1 contains only state and year fixed effects. Column 2 includes demographic and basic loan controls: female indicator, co-applicant indicator, age and its square, income and its square, property value and its square, loan amount and its square, credit score bins that follow Fannie Mae’s pricing model and FHA, VA and USDA indicators. Column 3 adds a home-only loan indicator. Column 4 interacts the home-only loan indicator with each baseline control. Column 5 includes a direct ownership indicator. Column 6 includes a manufactured home loan and direct ownership indicator. ***, **, *: significant at the 1%, 5%, 10% levels. Standard errors are clustered at the county level.
Table 4: The Role of Home-Only Loans on Interest Rate Disparities

<table>
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<tr>
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<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
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Baseline controls: ✓ ✓ ✓ ✓ ✓ ✓  
State fixed effects: ✓ ✓ ✓ ✓ ✓ ✓  
Year fixed effects: ✓ ✓ ✓ ✓ ✓ ✓  
Home-only interactions: ✓ ✓ ✓ ✓ ✓ ✓  
Observations: 4453860 4453860 4453860 4453860 4453860 4453860
Adjusted $R^2$: 0.480 0.536 0.699 0.706 0.679 0.688

Notes: Interest rates were winsorized in order to drop interest rates in the 99.9 percentile. Column 1 contains only state and year fixed effects. Column 2 includes demographic and basic loan controls: female indicator, co-applicant indicator, age and its square, income and its square, property value and its square, loan amount and its square, credit score bins that follow Fannie Mae’s pricing model and indicators for FHA, VA and USDA loans. Column 3 adds a home-only loan indicator. Column 4 interacts the home-only loan indicator with each baseline control. Column 5 includes a direct ownership indicator. Column 6 includes a home-only loan and direct ownership indicator. ***, **, *: significant at the 1%, 5%, 10% levels. Standard errors are clustered at the county level.
Table 5: OLS Estimates predicting Likelihood of applying for a Home-Only Loan

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>on-reservation AIAN</td>
<td>0.508***</td>
<td>0.309***</td>
<td>0.345***</td>
<td>0.285***</td>
<td>0.327***</td>
</tr>
<tr>
<td></td>
<td>(0.073)</td>
<td>(0.039)</td>
<td>(0.065)</td>
<td>(0.051)</td>
<td>(0.064)</td>
</tr>
<tr>
<td>off-reservation AIAN</td>
<td>0.151***</td>
<td>0.0687***</td>
<td>0.0367***</td>
<td>0.0286***</td>
<td>0.0357***</td>
</tr>
<tr>
<td></td>
<td>(0.033)</td>
<td>(0.019)</td>
<td>(0.009)</td>
<td>(0.008)</td>
<td>(0.010)</td>
</tr>
<tr>
<td>property interest (1=owned, 0=leased)</td>
<td>-0.687***</td>
<td>-0.649***</td>
<td>-0.660***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.012)</td>
<td>(0.012)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>trust in banks</td>
<td>-0.138**</td>
<td>-0.0393</td>
<td>-0.136*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.068)</td>
<td>(0.032)</td>
<td>(0.072)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>log(distance to nearest MH dealer)</td>
<td>-0.00865***</td>
<td>-0.00255</td>
<td>-0.00810***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>log(distance to urban area)</td>
<td>0.00426**</td>
<td>0.00174</td>
<td>0.00375*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Baseline controls ✓ ✓ ✓ ✓ ✓  
Year fixed effects ✓ ✓ ✓ ✓ ✓  
State fixed effects ✓ ✓ ✓ ✓ ✓  
County fixed effects ✓ ✓ ✓ ✓ ✓  
Observations 266938 266938 266938 266938 217214  
Adjusted $R^2$ 0.174 0.527 0.766 0.779 0.745  

Notes: The sample in Columns 1–5 is only for manufactured home loans and the each regression predicts the probability of getting a home-only loan given that the borrower picked a manufactured home. Column 1 shows the estimated differences after controlling for state and year fixed effects. Column 2 adds the baseline controls. Column 3 includes a property interest indicator, log distance to nearest manufactured home dealership, log distance to nearest urban area, and a trust in bank indicator. Column 4 includes county fixed effects. Column 5 uses the model specification in col. 3 but limits the sample to loan amounts no greater than $150,000. Standard errors are clustered at the county level. ***, **, *: significant at the 1%, 5%, 10% levels.
Table 6: Model Predicting Loan Processing Time

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>on-reservation AIAN</td>
<td>9.680***</td>
<td>17.79***</td>
<td>9.010</td>
</tr>
<tr>
<td></td>
<td>(3.263)</td>
<td>(3.616)</td>
<td>(7.116)</td>
</tr>
<tr>
<td>off-reservation AIAN</td>
<td>0.0423</td>
<td>1.857**</td>
<td>-1.127</td>
</tr>
<tr>
<td></td>
<td>(0.810)</td>
<td>(0.745)</td>
<td>(1.175)</td>
</tr>
<tr>
<td>home-only loan</td>
<td>-20.99***</td>
<td>-34.88***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.704)</td>
<td>(2.409)</td>
<td></td>
</tr>
<tr>
<td>home-only loan × on-reservation AIAN</td>
<td></td>
<td></td>
<td>11.24</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(7.895)</td>
</tr>
<tr>
<td>home-only loan × off-reservation AIAN</td>
<td></td>
<td></td>
<td>5.632***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1.337)</td>
</tr>
<tr>
<td>state fixed effects</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>year fixed effects</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>baseline controls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Observations</td>
<td>268680</td>
<td>268680</td>
<td>268680</td>
</tr>
<tr>
<td>Adjusted R^2</td>
<td>0.083</td>
<td>0.102</td>
<td>0.108</td>
</tr>
</tbody>
</table>

Notes: The sample contains only manufactured home loans. Column 1 contains the full set of baseline controls along with state and year fixed effects. Column 2 adds the home-only loan indicator. Column 3 includes interaction terms between the home-only loan indicator and the race variables along with a full set of interactions with the baseline controls. ***, **, *: significant at the 1%, 5%, 10% levels.
<table>
<thead>
<tr>
<th></th>
<th>on-Reservation AIAN (1)</th>
<th>off-Reservation AIAN (2)</th>
<th>White (3)</th>
<th>Statistical Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>approval rates, home-only loans</td>
<td>0.273 (0.446) [1855]</td>
<td>0.301 (0.459) [7359]</td>
<td>0.364 (0.481) [120649]</td>
<td>*** *** *</td>
</tr>
<tr>
<td>approval rates, mortgage loans</td>
<td>0.802 (0.399) [1243]</td>
<td>0.872 (0.334) [75750]</td>
<td>0.926 (0.262) [4771361]</td>
<td>*** *** ***</td>
</tr>
</tbody>
</table>

Notes: “Approval rates, mortgage loans” is the share of mortgage loan applications that were approved and originated rather than denied. Loans that were approved but not accepted by the borrower were not considered. “Approval rates, home-only loans” is the share of home-only loans that were approved and originated rather than denied. The standard deviation is reported in parenthesis below the mean and the number of observations is listed in brackets. ***, **, *: significant at the 1%, 5%, 10% levels.
Table 8: AIAN-White Disparities in Loan Approvals

<table>
<thead>
<tr>
<th></th>
<th>All Loans</th>
<th>Manufactured Homes Only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>on-reservation AIAN</td>
<td>-0.108***</td>
<td>-0.0915***</td>
</tr>
<tr>
<td></td>
<td>(0.039)</td>
<td>(0.037)</td>
</tr>
<tr>
<td>off-reservation AIAN</td>
<td>-0.108***</td>
<td>-0.0943***</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.007)</td>
</tr>
<tr>
<td>home-only loan</td>
<td>-0.257***</td>
<td>-0.527***</td>
</tr>
<tr>
<td></td>
<td>(0.009)</td>
<td>(0.027)</td>
</tr>
<tr>
<td>home-only loan × on-reservation AIAN</td>
<td>0.103***</td>
<td>0.0840***</td>
</tr>
<tr>
<td></td>
<td>(0.038)</td>
<td>(0.036)</td>
</tr>
<tr>
<td>home-only loan × off-reservation AIAN</td>
<td>0.131***</td>
<td>0.109***</td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.017)</td>
</tr>
<tr>
<td>property interest (1=owned, 0=leased)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>baseline controls</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>baseline interactions</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>state fixed effects</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>year fixed effects</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Observations</td>
<td>275137</td>
<td>275137</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.274</td>
<td>0.293</td>
</tr>
</tbody>
</table>

Notes: The sample contains only manufactured home loans. Column 1 includes demographic and basic loan controls: female indicator, co-applicant indicator, age and its square, income and its square, property value and its square, loan amount and its square, indicators for each federal loan product, and credit score bins that follow Fannie Mae’s pricing model. Column 2 adds a full set of interaction terms between home-only loan status and each baseline control. Column 3 adds an indicator for property interest. ***, **, *: significant at the 1%, 5%, 10% levels. Standard errors are clustered at the county level.
A Background

Since mortgaging lending on reservations, specifically on tribal trust land, differs significantly from mortgage lending in the rest of the U.S., we discuss some of the key decisions facing Native families living on reservations when buying a home.\(^{35}\)

In general, there are three different types of property on American Indian reservations and two types of owners. The two main landowners on reservations are individuals and Tribes (some reservations contain Federal land, e.g., national parks, which is owned by the federal government but homeownership is prohibited on those lands). Similar to most borrowers who live outside of Indian reservations, individuals (of any race) and tribes can own fee simple land within reservation borders. Fee simple property means the owner has sole claim to the land subject to a limited set of encumbrances such as liens. The owner can encumber the real property as collateral for loans, sell or rent the property and transfer the property to beneficiaries in a will. In addition, like all fee-simple property, the owners of fee-simple property on reservations also pay local property taxes. From a tribal governance standpoint, fee-simple property limits tribal jurisdiction for two reasons: (1) the vast majority of fee-simple property is owned by non-tribal members, and (2) Supreme Court rulings (such as U.S. v Montana) maintain that tribes do not have civil and criminal jurisdiction over non-tribal members living on fee land.

Both tribes and individual tribal citizens can also own restricted-fee and trust land on reservations (both of which are referred to as trust status lands). Both types of property are eligible for either a trust land mortgage or a leasehold mortgage.\(^{36}\)

A trust land mortgage uses the underlying trust status land as collateral for the loan. For these loans, federal approval is required during the mortgage application process in order to detail how the land will be transferred in case of foreclosure. Trust land mortgages also contain a number of additional requirements: environmental assessments, a title status report that is certified by the Bureau of Indian Affairs (BIA), a mortgage application (along with a pre-approval for the mortgage), and an appraisal by the lender. Under this type of mortgage, the borrower is given sole ownership of land but, unlike fee simple land, this land cannot be alienated without federal authority. Since trust status land cannot be easily alienated, the value of the underlying land is estimated to equal the fair market value for the land.\(^{37}\) Trust land mortgages are more common when the home sits on trust status land with a relatively small number of undivided interests.

Another loan product available for a home-site mortgage is a leasehold mortgage. The lessee needs the lease to trust land approved by either the Bureau of Indian Affairs (BIA) or a Tribe, if the tribe has authority under the HEARTH Act, and recorded in the BIA’s Trust Asset Accounting Management System (TAAMS) prior to starting the mortgage process. Once the mortgage application starts, the lender can request a certified Title Status Report (TSR) to verify the existence of the lease and the BIA will subsequently process that request.

The mortgage application and verified lease that authorizes a mortgage/deed of trust is send to

\(^{35}\) For an overview of the credit market conditions in Indian country, see Community Development Financial Institutions [CDFI] Fund (2001) and Jorgensen (2016).

\(^{36}\) The following discussion of mortgage lending in Indian country leans heavily on the BIA Mortgage Handbook (2017), and Kunesh (2018).

\(^{37}\) The details of the regulations of alienation of trust lands can be traced back to the Indian Non-Intercourse Act of 1790 (25 USC 177).
the local BIA agency office, the BIA will enter the package into its Realty Tracking System (RTS) and into its Mortgage Tracker. Within 1 days after receipt of the mortgage package, a local BIA office will determine if the package is complete (i.e., the package contains a BIA lease number, certified leasehold mortgage/deed of trust document, a certified promissory note; consent of landowners, a Program Rider, a survey map with legal descriptions). In addition, the local office or Tribe needs to request a National Environmental Policy Act (NEPA) review since the underlying land is held in trust by the federal government. The terms of the lease need to be aligned with the Master Lease. The initial TSR needs to be approved by the BIA. If incomplete, the package is returned but if completed, the information is updated in the RTS and Mortgage Tracker.

Within 20 days of the receipt of the complete package, the following happens: the agency will approve or deny the leasehold mortgage. If the leasehold mortgage is approved, the following steps must be completed by the BIA: the legal document to the leasehold mortgage/deed of trust is assign; a contract I ID for the lender is created in TAAMS; the leasehold mortgage is recorded by the LTRO and cross-referenced to the original lease in TAAMS. A final, certified TSR needs to be recorded as well with the leasehold mortgage documents.

When a borrower is delinquent on mortgage payments on a home that sits on tribal trust land, the lender must send a Right of First Refusal notice to the tribe. The tribe has three options: (1.) pay the loan current and take over the monthly payments; (2.) pay off the loan in full, or (3.) do nothing and have the borrower go into foreclosure which causes Housing and Urban Development (HUD) to proceed with the foreclosure process.

The federal government has created several lending products specific to Native Americans to encourage lending. First, the Section 184 Indian Home Loan Guarantee Program, which was established in 1992, provides fully-insured loans with a low down payment to Native homeowners located both inside and outside of tribal lands. Second, the US Department of Agriculture (USDA) provides 100% direct financing to purchase a single-family home in rural areas for low-income applicants, which can be may apply to Native families living on tribal lands. Third, the Native American Direct Loan (NADL) program administered by Veterans Affairs also supports Native American veterans (or their spouses) by providing easy terms (e.g., no down payment and limited closing costs) associated with their loan product to build a home on federal lands, such as trust land. However, while most research is not current, all research suggests that each of these three government-insured loan products have not penetrated Indian county (Cyree et al., 2004; Laderman and Reid, 2010).

If a borrower wants to bypass this process and still secure a loan for a home, then one can apply for a home-only loan on a manufactured home. home-only loans, much like car loans, are personal property loans. They face fewer consumer protections, have higher interest rates, and are rarely refinanced. The benefit of a home-only loan is that, as mentioned above, the cumbersome process of securing a manufactured home mortgage is avoided.

There are several benefits and costs of securing a site-built mortgage on trust or restricted-fee land. First, the value of the property secured by the loan is more likely to appreciate over time, regardless of whether it is a manufactured or stick-built home. This makes the loan less risky for the lender, which is reflected in lower interest rates, even for a similarly risky borrower. On the other hand, a trust land mortgage, whose mortgage is titled as real property, would face a greater likelihood of removing the land from the tribal land base if the loan goes into default. Additionally, lenders may be less willing to engage in a mortgage process where the home is titled as real property
on trust status land if the administrative process lowers the profitability of issuing the loan. Thus, higher transaction costs for issuing mortgages to homes titled as real property might cause borrowers to enter into high-cost mortgage markets. The scarcity of conventional banks on or near tribal lands may also curb the uptake of conventional loans. The goal of this paper is to determine whether these factors affect the mortgage costs of Native borrowers, especially those located in Indian Country.

For example, a lender may need to repurchase a loan, most likely at a loss, that was sold on the secondary market if a mortgage takes years to close. In addition, during this long application process, if a borrower’s credit history or debt to income is negatively altered, the lender may be forced to reject the mortgage application despite allocating resources during the mortgage process.
Figure A1: Concentration of Approved Loans in Indian Country

Notes: This figure maps the number of on-reservation AIAN approved loans by state. Data from the 2018–2021 confidential HMDA.
(a) Adding 100 loans sampled from White distribution

(b) Adding 1,000 loans sampled from White distribution

(c) Adding 10,000 loans sampled from White distribution

Figure A2: Rate Spread Disparities under 3 scenarios

Notes: Panel A adds 100 loans randomly sampled with replacement from the White distribution to the “on-reservation AIAN” group. Panel B adds 1,000 loans randomly sampled with replacement from the White distribution to the “on-reservation AIAN” group. Panel C adds 10,000 loans randomly sampled with replacement from the White distribution to the “on-reservation AIAN” group. The sample of loans is restricted to first-lien loans for home purchases located in states with at least one Census tract that is defined as being located “on a reservation” using our methodology discussed in Section 2.
(a) Adding 100 loans sampled from White distribution

(b) Adding 1,000 loans sampled from White distribution

(c) Adding 10,000 loans sampled from White distribution

Figure A3: Interest Rate Disparities under 3 scenarios

Notes: Panel A adds 100 loans randomly sampled with replacement from the White distribution to the “on-reservation AIAN” group. Panel B adds 1,000 loans randomly sampled with replacement from the White distribution to the “on-reservation AIAN” group. Panel C adds 10,000 loans randomly sampled with replacement from the White distribution to the “on-reservation AIAN” group. The sample of loans is restricted to first-lien loans for home purchases located in states with at least one Census tract that is defined as being located “on a reservation” using our methodology discussed in Section 2.