The Higher Price of Mortgage Financing for Native Americans

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Abstract

Affordable access to capital and quality housing is a challenge facing Native Americans. In this paper, we demonstrate that mortgage loans with Native Americans as the primary borrower are systematically more likely to be higher-priced. These loans have an average interest rate nearly 2 percentage points above the average loan for non-Native Americans. We also demonstrate that these higher-priced home loans are predominately found on reservation lands and that manufactured homes account for nearly 25 percent to 35 percent of the difference in the cost of financing. These results potentially suggest that without other institutional market reforms, promoting homeownership as a method of increasing Native American equity and assets may be less effective than for other populations.

The views expressed here do not reflect those of the Federal Reserve Bank of Minneapolis.

1 Introduction

Access to quality housing is a challenge facing many Native communities in the United States (Pettit et al., 2014), and one recent solution proposed to expand the stock of quality housing is to support homeownership (Kunesh, 2017, 2018a, 1993; Garcia, 2018). However, affordable access to capital has been a persistent concern for Native peoples[1] and is one of the potential challenges of homeownership as a method of increasing quality housing. A lack of access to affordable capital also may limit the opportunity that homeownership provides to build the asset base of Native Americans and address concerns over wealth equality. In this paper we examine the extent to which Native Americans (including American Indians, Native Hawaiians, and Alaska Natives) face a higher cost of mortgage financing than other populations in order to better understand the challenges facing homeownership as a strategy to equitably build long-run equity and the housing stock in Native communities.

We use data from the Home Mortgage Disclosure Act (HMDA) from 2010 to 2017 to examine whether Native Americans are more likely to have "higher-priced" home loans[2] than other populations and, if so, by how much. We also describe how this changes over time, and whether it varies by geography, including on reservation lands, nearby reservation lands, and in Hawaii and Alaska. We also use the available data to determine to what extent any observed difference can be accounted for by observable factors including gender, income, loan amount, loan-to-income ratio, bank branch presence, loan type,[3] whether a home is a manufactured home, and observable and fixed unobservable characteristics.

We find that first-lien home purchase loans are far more likely to be higher-priced loans if the primary borrower is identified as Native American and the loans are for a property

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[1]See Community Development Financial Institutions Fund (2001); United States Congress House. Senate Committee on Indian Affairs (2015); Jorgensen (2016); Jorgensen and Akee (2017).

[2]We use the standard definition of "higher-priced mortgage loans," where higher cost loans are loans that have a annual percentage rate (APR) that is 1.5 percentage points higher than the average prime offer rate (APOR) if it is a first-lien home purchase loan (Consumer Financial Protection Bureau, 2017).

[3]Specifically whether it is VA-guaranteed (Veteran Administration), FSA/RHS-guaranteed (Farm Service Agency/Rural Housing Service), or FHA-insured (Federal Housing Administration) mortgage.

in a census tract associated with a reservation. In fact, these loans are more likely to be higher-priced than for any other population. For example, in 2016, about 17 percent of loans made to African American borrowers generally were higher priced, while almost 30 percent of loans made to American Indian and Alaska Natives (AIAN) for properties associated with a reservation (AIAN-reservation loans) were higher priced. Only 10 percent of loans in the same time period made to non-Native borrowers for properties in nearby geographies to reservations were higher-priced. In addition, conditional on the loan being a higher-priced loan, AIAN-reservation loans had a significantly higher rate spread[4] than for all other populations considered. For example in 2016, the mean rate spread for AIAN-reservation loans was over 5 percent, while for non-AIAN-reservation loans, the mean rate spread was 2.5 percent, conditional on the loan being higher-priced. Assuming a mortgage term of 30 years, an average prime offer rate (APOR) of 4.5 percent, and considering the average loan size for AIAN people on reservation lands, this interest rate difference translates into AIAN people on reservation lands paying over $107,000 more in interest over the life of the mortgage.

We demonstrate using regression and decomposition methods that a large part of the difference in the cost of mortgage finance is explainable by the disproportionate number of Native-reservation associated loans that are made for manufactured homes. Previous work has demonstrated that mortgage lending for manufactured homes in tribal areas is highly concentrated (Todd and Johnson, 2017). This raises concerns around manufactured housing financing practices generally (Todd and Johnson, 2017; Baker and Wagner, 2015). Our findings suggest that possible reforms are required in the manufactured housing markets to support equitable access to finance for Native peoples.

However, a significant difference in the cost of financing remains unexplained even conditional on the loan amount and type, primary borrower income and gender, census tract population, percentage of the population that is identified as a minority, bank branch pres-

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[4]The rate spread is effectively the difference between the annual percentage rate on the loan and the average prime offer rate in the market at the time the loan was originated.

ence, and fixed unobservable census tract characteristics.

We find a large variation in the extent to which different Native American populations face a higher cost of mortgage loans. For example, we find that conditional on observable factors, Native Americans living on census tracts that border reservation lands actually face a lower probability of having a higher-priced loan than non-Native people living in the same geographies. We also show that Alaskan Natives may actually have a lower probability of having a higher-priced loan than others living in Alaska and that Native Hawaiians have the same probability of having a higher-priced loan as other populations living in Hawaii.

We contribute broadly to the literature on Native American access to capital. The most comprehensive studies of Native American access to capital are those by the Community Development Financial Institutions Fund (2001) and the more recent studies by Jorgensen and Akee (2017) and Jorgensen (2016). These studies identify numerous challenges in accessing finance on reservation lands and for Native Americans more generally, including a lack of financial experience, lender understanding of tribal government or legal systems, and a lack of capital, collateral, or credit histories. These studies also identify a historical absence of trust between tribes and banks, discrimination, limited use of trust land as collateral, uncertain commercial laws and regulations, and a poor lender understanding of tribal sovereignty and sovereign immunity as challenges facing native people in accessing finance.[5] They do not, however, engage in-depth statistical analysis of any particular measure of access to capital. Dimitrova-Grajzl et al. (2015) does offer a more in-depth analysis of restricted access to finance as measured by lower credit limits faced by Native Americans even conditional on many observable factors.

We also contribute explicitly to the literature on mortgage lending to Native peoples. In the 2001 Financial Survey from the Native American Lending Study from the CDFI Fund at the U.S. Department of the Treasury, 65 percent of Native American and Native Hawaiian

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[5]While the Community Development Financial Institutions Fund (2001) identified a lack of financial institutions on Native American lands as a significant challenge in accessing finance, data from Jorgensen and Akee (2017) suggest that access to banking services may be less of a constraining factor, at least in recent years.

respondents reported that conventional mortgages are "difficult" or "impossible" to obtain (Community Development Financial Institutions Fund, 2001, p.2). While homeownership rates have increased in recent years (Pettit et al., 2014, p.54) perhaps partially due to recent initiatives, such as the Housing and Urban Development (HUD) Office of Native American Programs Section 184 Indian Home Loan Guarantee Program, existing evidence suggests that the Section 184 Guarantee Program and other loan guarantee programs have been largely ineffective on tribal lands (Laderman and Reid, 2010; Cyree et al., 2004), with a few clear exceptions (Kunesh, 2018b). Both Cyree et al. (2004) and Laderman and Reid (2010) suggest that this loan guarantee program has virtually no statistically observable impact on the mortgage loan denial rates for Native Americans living on reservation lands.[6] This literature points to the difficulties of lending on reservation lands as one possible cause for the program's lack of success. This is complemented by the work of Parker (2012), which suggests that institutional arrangements on reservation lands that lower lender transaction costs and increase lender-perceived security are associated with greater access to mortgage finance.

We add to this literature by demonstrating that there are additional challenges facing borrowers beyond denial: Even conditional on being approved for a mortgage, Native American people, particularly those living on census tracts associated with a reservation, face a much higher cost of financing than other populations living nearby. This higher financing cost may partially explain the lower rates of home ownership among Native Americans (Todd and Burlon, 2009; Pettit et al., 2014; Pindus et al., 2017). Our work also complements the work on the lower mortgage approval rates on tribal lands (Schumacher et al., 2006; Todd and Johnson, 2018).

Finally, we contribute to the literature on racial wealth disparities and the role of homeownership. While the existing statistical literature on the Native-white wealth gap is sparse, existing evidence related to Native wealth suggests a substantial divide exists. For example,

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[6]The Section 184 program is studied bundled with the Federal Housing Administration Section 248 Mortgage Insurance Program in the work of Cyree et al. (2004).

while 45 percent of white Americans said they were certain they could come up with $2,000 if an unexpected need arose within the next month, only 25 percent of American Indian and Alaska Natives said they were certain they could (Dewees and Mottola, 2017, p. 4). Given the possible wealth gap between Native Americans and White Americans, differences in homeownership and equity accumulation may be a substantial driving factor in creating the gap. Existing literature suggests that differences in homeownership rates between black and white Americans accounts for the largest share in the black-white wealth gap. This implies that increasing homeownership rates among black Americans may provide promise for the closure of the racial wealth gap. However, there is also evidence that black Americans accumulate equity more slowly and their home values are generally less than the home values of white Americans and this poses a challenge to the strategy of increasing homeownership to close the racial wealth gap (Shapiro, 2006; Shapiro et al., 2013; Sullivan et al., 2015; Long and Caudill, 1992). Our results suggest that this may also be the narrative for Native peoples in the 48 contiguous states.

2 Data and Sample Description

We use the public Home Mortgage Disclosure Act (HMDA) data extracted from the Federal Reserve Bank cluster in order to determine the prevalence of higher-priced loans among Native Americans and the factors that are associated with these higher-priced loans. Data under HMDA initially started being collected in 1975 in order to determine whether financial institutions were servicing the housing credit needs of the communities in which they are located and to aid public investments decisions (Federal Deposit Insurance Corporation, 2018). In 1989, the legislation was amended to require information on borrower race, gender, and income to be reported in order to address possible discriminatory lending practices and to enforce anti-discrimination statutes (Federal Deposit Insurance Corporation, 2018). The HMDA data are currently the most comprehensive source of publicly available information on the U.S. mortgage market (Bhutta et al., 2017) and one of the few data sources that

allows for large-scale quantitative analysis of the potential higher cost of financing faced by Native American borrowers more generally.

In order to have a consistent definition of higher cost mortgage loans, we restrict the analysis to first-lien home purchase loans that originated between 2010 and 2017. Focusing on first-lien, originated home purchase loans allows for a single definition of "higher cost" (i.e., the APR is 1.5 percentage points or more higher than the APOR (Consumer Financial Protection Bureau, 2017)).[7] Restricting the time period to after 2009 is necessary since the guidance for classifying higher-priced loans and calculating their cost changed beginning on January 1, 2010 (RADAR, 2018).

We focus on two different measures of "higher-priced mortgage financing." The first is simply an indicator of whether a loan is classified as "higher-priced" by standard definitions. The second measure is, conditional on having a higher priced loan, the "rate spread" on the loan. Specifically, the rate spread is the difference between the APR on a loan and the APOR in effect. This rate is only reported if the spread is equal to or greater than 1.5 percentage points above the APOR. The APOR schedule, provided on the FFIEC website by the Board of Governors, is based on a survey of lenders during the time period the loan is originated (RADAR, 2018).

While HMDA data is the best available for our purposes, it is not completely comprehensive. Not all institutions are required to report loan data under HMDA; some small, rural lenders may be exempt from reporting (Federal Deposit Insurance Corporation, 2018). This is of particular concern when thinking about mortgage lending to Native Americans, especially for those living in reservations or rural areas. However, while there are significant coverage gaps in some areas, HMDA is still a generally useful and important source of information on rural and reservation mortgage lending with coverage on average above 80 percent in these areas (Johnson and Todd, 2019).

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[7]If it is a jumbo loan, it is 2.5 percentage points or more higher, and if it is a subordinate-lien mortgage, it is higher price if the APR is 3.5 percentage points or more higher than the APOR (Consumer Financial Protection Bureau, 2017).

We conduct the analysis by considering the main object of interest to be the racial category of the primary borrower and ignore the race of any co-borrowers. The primary borrower can report up to five races, so if Native American was ever reported, we identify the primary borrower as Native American. While not all studies using HMDA data that focus on Native American populations are specific in how they construct their indicator of "Native American loans," from what we can observe, our approach is consistent with the prior literature that have used HMDA data after 2004 when multiple races could be reported (Laderman and Reid, 2010; Parker, 2012). One draw back of the racial identification indicator (which is a problem with most American data sets) is that American Indian and Alaska Native indistinguishable in the data, as are Native Hawaiians and other Pacific Islanders.

To identify reservation and nearby geographies, we use the information in the HMDA data on the 2010 Census Tract location of the loan. We then overlay this information with the Census Bureau 2010 shapefiles for American Indian areas and restrict focus to federally recognized Indian Reservations and off-reservation trust lands. We designate a census tract as a "reservation associated tract" if it contains housing units that are within the reservation boundaries. We label a tract a "nearby tract" if a tract borders a reservation tract. Future research would benefit from using more detailed geographic information on the precise locations of loans since census tracts do not perfectly overlap reservation tracts.[8]

The main body of the analysis will focus on loans with AIAN primary borrowers relative to loans with other-race primary borrowers living generally in the 48 contiguous United States. We then specifically focus on loans with AIAN and other-race borrowers where the loans are for a property on reservation-associated Census Tracts (AIAN-reservation loans) or loans with AIAN or other-race borrowers with properties on census tracts that border reservation census tracts. We will refer to loans with AIAN primary borrowers for properties on reservation-associated tracts as AIAN-reservation loans. We will refer to loans with AIAN primary borrowers for properties for census tracts that border reservation-associated census

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[8]Less than 1 percent of census tracts are classified as both a "nearby tract" and a "reservation associated tract" since a smaller number of reservations boarder each other within the same state.

tracts as AIAN-nearby loans. We will refer to loans with other-race primary borrowers simply as other-reservation loans and other-nearby loans. We also perform separate analysis for Native Hawaiians versus other populations living in Hawaii and Alaska Natives versus other populations living in Alaska.

Finally, in order to gain some understanding of the extent to which access to traditional finance impacts the cost of obtaining a home loan for Native Americans, data on the number of bank branches by county were extracted from the Federal Deposit Insurance Corporation's (FDIC) web page.[9] The data in the third quarter, on the number of bank branches as of June 30 in a county for the years 2010 to 2016 were extracted and merged into the HMDA data. While multiple measures of bank presence were considered, we simply use an indicator variable at the county level as to whether a county contains at least one bank branch. We do not use bank presence as an explanatory factor in our main analysis because it is not yet available for the full period the HMDA data are available.

3 Empirical Approach

We first approach the question of whether Native peoples face a higher-priced of mortgage finance than other groups by summarizing some of the trends over time in the prevalence of higher-priced mortgage loans, their location, and by the racial category of the primary borrower.

We assume the rate spread on any particular loan can be modeled as

$$R_{itc}^* = \pi_0 N_{itc} + \pi_1 L_c + \pi_2 N_{itc} \times L_c + X_{itc}\pi_3 + Z_{tc}\pi_4 + \gamma_t + \alpha_c + \epsilon_{itc}, \tag{1}$$

where R_{itc}^* is the latent rate spread which is only observed in the HMDA data if it is greater than 1.5, and i indexes the loan, t the year, and c indicates the census tract location of the loan. N_{itc} is an indicator of Native American status and L_c an indicator of a census tract overlaps reservation lands. We also interact Native American status and reservation

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[9]See https://www5.fdic.gov/sod/dynaDownload.asp?barItem=6.

land to determine if Native Americans who live on reservation census tracts experience a higher cost of mortgage loans than non-Native Americans who live in a census tract that overlaps a reservation.[10]

We then see whether any association between these indicators can be accounted for from individual characteristics of the borrower/loan denoted by X_{itc} or the census tract characteristics denoted by Z_{tc}. The vector of borrower characteristics includes an indicator for gender and the natural log of nominal income in thousands of dollars. The loan characteristics include whether the loan was for a manufactured home, the natural log of nominal loan amount in thousands of dollars, and whether the loan was FHA-insured, VA-guaranteed, or FSA/RHS-guaranteed. An interaction of the log of income and the loan amount is also included. The time-varying community characteristics include the natural log of population in thousands of people, the percent minority, and the natural log of median family income in thousands of dollars.

In all specifications, we allow for a flexible time trend by vector of time fixed effects γ_t. In our main estimates we also control for county fixed effects denoted by α_c. All specifications cluster the standard errors at the level of the census tract. Our main estimates for the probability of a loan being higher cost is estimated using a probit model, while our main estimates for the rate spread, conditional on the log being higher cost, is estimated using a tobit model censored at 1.5.

Since we are unable to view individual credit scores or loan terms in our data, we use the methodology of Oster (2018) to bound the selection on unobservables (credit score being of primary concern), assuming the same degree of selection as on observables, as well as a threshold for the maximum allowable R-squared.[11]

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[10]Since we cannot perfectly proxy for whether a loan is in reservation land a significant coefficient on this could imply that Native peoples in census tracts are far more likely to live on tribal land and thus it is a better proxy for the relative cost of a loan on reservation lands. However, to the extent non-Native individuals live in the same locations *within* a given census tract, it is suggestive about the importance of race even conditional on being on reservation lands.

[11]We follow the recommendations in Oster (2018) and assume a maximum R-squared of 1.3 times the R-squared from the controlled regression.

Finally, to gain a sense of the extent to which observable factors have the most explanatory power in determining whether Native Americans face a higher cost of finance, we use Oaxaca-Blinder decomposition. We perform this exercise for both the probability of having a higher-priced loan and the rate spread. This exercise allows us to determine the most significant factors that explain the higher price of finance and contribute to the unexplained component.

4 Results

4.1 American Indians and Alaska Natives relative to other populations in the 48 contiguous states, and loans in reservation census tracts and near by census tracts

Figure 1 shows that nearly 10 percent of AIAN loans were considered higher-priced as of 2010 and this rate has risen over time to over 15 percent at its peak and bit over 13 percent as of 2017. This rate is twice the rate of non-AIAN, non-Hispanic or African American loans. AIAN loans had the highest likelihood of being high cost relative to all groups until 2012, when there was large increase among African American and Hispanic higher-priced loans. However, Figure 2 shows that conditional on a loan being higher-priced, AIAN loans have by far the highest rate spread of all groups, with the rate being nearly 5 percentage points as of 2012 and 3 percentage points by 2017. This substantially higher rate spread for higher-priced AIAN loans implies that AIAN people are paying far higher interest rates for mortgage loans than non-AIAN people.

Given that the racial composition of borrowers is heavily geographically clustered and that AIAN borrowers tend to be in very different markets from African American or Hispanic borrowers, to get a better sense of whether Native Americans face a higher cost of mortgage finance within comparable geographies, we next focus the analysis on AIAN-reservation loans, AIAN-nearby loans, other-reservation loans, and other-nearby loans.

11

Most loans given to AIAN borrowers are outside reservation tracts, which can be seen in Figure A1. We can also see that the difference between the number of loans given to AIAN borrowers in and outside of reservation census tracts has substantially increased over time. This means that over time, average loan characteristics for AIAN borrowers are continually less reflective of the experiences for loans made on reservation associated census tracts. This implies it is increasingly important to distinguish between these two types of loans in order to understand the various experiences of Native Americans in mortgage lending.

Figure 3 is the same as Figure 1 but focusing only on census tracts that are associated with a reservation or census tracts bordering reservation lands. From the statistics presented in Figure 3 we can see that the proportion of AIAN-reservation loans that are considered higher-priced is significantly larger than for any other population group. As of 2012, nearly 30 percent of all mortgage loans given on reservation tracts were higher cost. This is three times the proportion of loans that are higher-priced than for any other group in reservation tracts or tracts nearby. Comparing this figure with Figure 1 also suggests that the proportion of loans that are higher-priced among AIAN loans in reservation-associated census tracts is twice that of the proportion of loans that are higher-priced among black and Hispanic borrowers.

Next, Figure 4 presents the average rate spread of loans made on and nearby reservation tracts. AIAN-reservation loans have an even higher rate spread than AIAN-nearby loans. AIAN-reservation loans have a rate spread over 5 percentage points in many years and over 6 percentage points in some years. The mean rate spread of AIAN-reservation loans is nearly double that of AIAN-nearby loans. We will call the higher rate spread on AIAN-reservation and nearby loans "the rate spread premium" for the remainder of the paper.[12]

To gain an initial sense of the extent to which these patterns might be explained by observable differences between AIAN borrowers, the types of loans acquired, or the neighborhood characteristics associated with the loan, Table 1 presents summary statistics from

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[12]Excluding loans in census tracts associated with the Navajo reservation from the sample has no qualitative impact on the results discussed in Figures 1 to 4, nor any of the results that follow.

the HMDA data stratified by loan type. From the first row, we can see that AIAN loans are much more likely to have a female as a primary applicant relative to non-AIAN loans and this is more significant for AIAN-reservation loans. From the second row, we report income in units of thousands of dollars and can see that the income of the primary applicant is much lower for AIAN loans. The average income of the primary applicant of an AIAN-reservation loan is $84,000 relative to $103,000 dollars of other-nearby loans and the average size of a AIAN-reservation loan is a little over $142,000 relative to $226,000 of other-nearby loans.

From Table 1 we also can see that AIAN loans are less likely to be conventional loans than other loans, but AIAN-reservation loans are actually significantly more likely to be conventional loans than AIAN-nearby loans. This may reflect something about the relative use of HUD Section 184 loans on reservation versus nearby lands. Previous research has suggested that there is evidence of difficulty in using HUD 184 loans on reservations and this may explain part of the difference (Laderman and Reid, 2010; Cyree et al., 2004; Kunesh, 2018b). The AIAN loans are more likely to be FHA-insured than other loans. However, AIAN-reservation loans are notably less likely to be VA-guaranteed or FSA/RHS-guaranteed.

One of the largest observable differences between all the loans given to AIAN borrowers and other borrowers is the prevalence of the loans that are for manufactured homes. AIAN-reservation loans are three times more likely to be loans for manufactured homes than AIAN-nearby loans and over six times more likely than other-nearby loans. Given the concerns about the market structure and lending practices in the manufactured housing market, particularly on reservation lands (Todd and Johnson, 2018, 2017; Baker and Wagner, 2015), this difference in the rate of loans for manufactured housing is a plausible candidate for the AIAN-borrower price premium.

We examine the extent to which we can explain the racial and geographical differences in the probability of a loan being higher-priced using a probit model and present the marginal

effects in Table 2.[13] Column (1) includes a gender indicator and we can see from the first three rows that this has little explanatory power. AIAN-nearby loans are 16.7 percent more likely to be a higher-priced loan, than other-nearby loans. AIAN-reservation loans are *55.7 percent* more likely to be higher-priced than AIAN-nearby loans, while other-reservation loans are not more likely to be higher-priced than other-nearby loans. Controlling for differences in the natural log of primary borrower income, the loan amount, and the interaction of these two in Column (2) reduces both the marginal effect of a loan being a AIAN-nearby loan or AIAN-reservation loan to 9.1 percent and 42 percent respectively. This implies that while differences in incomes and loan amounts may account for part of the difference in the higher cost of financing, they do not explain nearly the full premium.

In Column (3) we next condition on whether the loan was for a manufactured home relative to a stick-built home. This has a substantial impact on the marginal effect of a loan being an AIAN-nearby or AIAN-reservation loan. We can see the loans on manufactured homes are over 100 percent more likely to be higher-priced. Since AIAN loans are disproportionately for manufactured homes, as seen in Table 1, this explains a large amount of the racial and geographic differences in the probability of a loan being higher-priced. In fact, conditioning for gender, loan amount, income, and manufactured housing completely eliminates the higher probability of an AIAN-nearby loan being higher-priced. However, even conditioning on the loan being for a manufactured home, AIAN-reservation loans are still 25 percent more likely to be higher-priced than AIAN-nearby loans.

Column (4) controls for whether the loan is FHA-insured, VA-guaranteed, or FSA/RHS-guaranteed and this has little impact on the marginal effect of a loan being an AIAN-reservation loan. However, controlling for loan type, AIAN-nearby loans are actually less likely to be higher-priced than other-nearby loans. If many of these loans are Section 184 guaranteed loans and Section 184 loans have a lower interest rate because of lower risk

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[13]The sample size changes between Table 1 and Table 2 because some counties fixed effects are perfectly correlated with the probability of having a higher-priced loan and these observations are excluded from the models in order to have consistency across specifications within Table 2.

to the lender, it may explain the lower probability of AIAN-nearby loans being higher-priced. Column (5) controls for census tract characteristics including the natural log of the population, the percent minority residing in a tract, and the natural log of the medium family income in the tract. Controlling for these tract characteristics reduces the marginal effect of a loan being an AIAN-reservation loan to about 12 percent. Finally, Column (6) includes a set of county fixed effects and we see little change. In Table A1, we add an indicator of whether a bank is present in the county of the property associated with the loan, and we find that bank presence has little impact, suggesting that differential physical bank presence is not driving the higher-priced of AIAN loans.[14]

Table 3 repeats the exercise in Table 2 but focuses on the rate spread, conditional on having a higher-priced loan and the results are estimated using a tobit model with similar results: Conditional on having a higher-priced loan, the rate spread is higher on AIAN-nearby loans and much higher if the loan is an AIAN-reservation loan. From Column (1) we can see that AIAN-nearby higher-priced loans have a rate spread that is 0.617 percentage points higher than other-nearby loans. More dramatically, AIAN-reservation loans are over 1.3 percentage points higher than for AIAN-nearby loans. This means the loans made to AIAN borrowers for properties on reservation tracts have a rate spread that is nearly 2 percentage points higher than for other borrowers for properties nearby. From the results in Columns (2) to (6), we can see that about half the rate spread premium is explained by observable characteristics and manufacturing housing seems to again play a significant role.[15]

Since there may be order effects by progressively adding independent variables as in the models presented in Tables 2 and 3, we use a non-linear Oaxaca-Blinder decomposition. We decompose the variation explained by the various factors for the probability of a loan

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[14]These specifications have a fewer number of observations because bank presence is only available up to 2016. However, the results are qualitatively and quantitatively similar to using the full sample as seen in columns (1) and (3).

[15]Again, specifications that control for bank presence, presented in Table A1, have little impact on the results.

being higher-priced if it is an AIAN-reservation loan relative to other-reservation loans. We abstract from the censoring and assume a linear model to do the same for the models that take the rate spread conditional on the spread being greater than 1.5 as the outcome of interest. Table 4 presents the results of this exercise. The first two columns show the results for the non-linear decomposition of the probability of a loan being higher-priced and the second two show the linear decomposition for the rate spread, conditional on the loan being higher cost. Note that we restrict the analysis to only AIAN-reservation loans and other-reservation loans. In the first three rows it shows the estimated probability/average for each loan group and the difference between the probability/average that needs to be explained. The remaining columns show the amount of the coefficient that can be explained by each factor under the column headed "explained" and the difference in the influence of this factor between groups on the outcome of interest under the column headed "unexplained." The row labeled "Total" gives the amount of the difference that is "explained" by observable factors and the amount "unexplained." We can see in the first two columns that about 70 percent (-0.135/-18.79 × 100) of the difference in the probability of a loan being high cost is explained by observable factors. About 35 percent of the explained component can be accounted for by the relative prevalence of loans for manufactured homes between AIAN and other loans. About 43 percent of the explained component can be accounted for by the income of the primary borrower and loan amount. On the other hand, only about 60 percent of the difference in the rate spread (conditional on the loan being higher-priced) is explained by observable factors and nearly 34 percent of the explained difference can be accounted for by the relative prevalence of loans for manufactured homes between AIAN and other loans. In addition, a substantial part of the *unexplained* component is due to different prices faced by AIAN-reservation loans on manufactured housing. This can be seen from the large negative coefficient in row nine. We also see that a large proportion of the unexplained difference is due to the rate spread's response to tract characteristics for AIAN-reservation loans relative to other loans. This may be due to AIAN-reservation loans

16

being more likely to be made on properties that are on trust lands or in the jurisdiction of a Native governments relative to other-reservation loans within the same census tract.

The results above suggest that there are substantial unexplained differences in the interest rates made to Native Americans living on reservation lands. While institutional differences in reservation lands or discrimination may be generating the unexplained differences in the higher-priced of mortgage financing between AIAN loans for properties nearby and in reservation-associated census tracts, we cannot exclude the possibility of other unobserved characteristics of the AIAN loans (such as loan term or credit history of the primary borrower). To get a sense of how significant the differences in loan term or credit score would have to be to explain the higher cost of financing, we use the method proposed by Oster (2018). The intuition behind the Oster method is that we can bound the amount of unobservable factors in the HMDA data (such as loan term and credit score) assuming that the degree of selection on unobservables is proportional to the selection on observable factors. In other words the Oster method lets us answer the following question: If credit score and loan term were just as correlated with the difference in the cost of loans between AIAN-reservation loans and other-nearby loans as the factors observed, could the remaining unobserved difference in the cost of home loans be totally accounted for?

The results of this exercise suggest that if the selection on unobservables is as great as the selection on observables, then controlling for the unobservables could explain the full difference in the rate spread being AIAN-reservation loans and other nearby loans and in fact reverse the sign of the difference. This strongly suggests to us that further work that merges in information on loan length, and the credit score of the primary borrower is worthwhile.

4.2 Native Hawaiians and Alaska Natives as the primary borrower relative to other loans in Hawaii and Alaska Respectively

Given the institutional and historical differences between Native Hawaiians and Alaska Natives from American Indians and from each other, we consider the loan characteristics for loans where Native Hawaiians and Alaska Natives are the primary borrowers relative to other home loans originated in Hawaii and Alaska, respectively. As seen in Table 5, the first column contains the summary statistics for loans given to Native Hawaiians (Native Hawaiian loans), the second for others in Hawaii, with the third column presenting the difference between the two. The fourth column presents the summary statistics for loans given to the Alaska Natives as the primary borrower (Alaska Native loans), the fifth column for others in Alaska, and the last column presenting the difference between the two. From the first two rows, we can see that Native Hawaiian loans are more likely to have females as the primary borrower than other loans in Hawaii and similarly for Alaska Native loans relative to others. Native Hawaiian loans also have primary applicants with lower incomes as do Alaska Native loans relative to others in their respective states.

From the next few rows of the table, we can see that the loan amounts are generally much higher than for those taken out in the 48 contiguous states, reflecting the higher costs of living in Hawaii. Alaska Native and other loans in Alaska and Native Hawaiian loans are not substantially different in size and are similar in magnitude to loans taken out by non-AIANs living nearby reservations as seen in Table 1. Native Hawaiian loans are more likely to be conventional home loans due to the fact that other Hawaiian loans are far more likely to be VA-guaranteed loans, while Alaska Native loans are far less likely to be conventional loans given to their state counterparts because they are far more likely to be FHA-insured loans.

One particularly salient difference between loans made in Hawaii and Alaska relative to those living on or nearby reservation lands is the general prevalence of loans made on

manufactured homes. For example, while 31.5 percent of AIAN home loans for properties on reservation lands were for manufactured homes, only 0.001 percent of Native Hawaiian loans were. In the contiguous 48 states, about 5 percent of home loans made to non-AIANs on properties nearby reservation lands were for manufactured homes. For no group considered in Alaska or Hawaii is the percentage of home loans accounted for by manufactured homes over 0.05 percent.

The census tract characteristics of the loan property are very close between Native Hawaiian loans and other loans in Hawaii and Alaska Native loans and other loans in Alaska. The one exception is that the percentage of population in a census tract for properties of Native Hawaiian loans has a higher minority population than others in Hawaii, and similarly to others in Alaska. While the percentage of the population that identifies as a minority may seem high in Hawaii, this is consistent with the most recent Census data.[16]

Despite some of the observable differences between Native Hawaiian loans relative to others in Hawaii, as well as the differences between Native Alaskan loans relative to others in Alaska, the statistics presented in last rows of Table 5 suggest that Native Hawaiians and Native Alaskans do not face a higher probability of having a high cost loan relative to others in their states. This suggests whatever factors that are driving the higher cost of home financing for AIAN borrowers in the 48 contiguous states do not exist in the same way for Hawaiians and Alaskans.

5 Discussion, Conclusions, and Future Research

Our results suggest that loans with AIANs as the primary borrower for properties in census tracts associated with a reservations have the greatest probability of being higher-priced in the country. These loans also have the highest average rate spreads conditional on the loan being higher-priced. In other words, our results suggest that AIAN people living in census tracts associated with a reservation or nearby face the highest cost of home financing of

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[16]Only 21.8 percent of individuals in Hawaii identify as "white alone, no Hispanic or Latino" (United States Census Bureau, 2019).

any group considered. Loans given to Native people associated with reservation lands are over 55 percent more likely to be higher-priced and conditional on being higher cost, these loans have APRs over two percentage points greater than other-nearby loans. Assuming a 30 year, fixed rate mortgage with an APOR of 4.5 percent on a mortgage loan of $140,000[17] the AIAN borrowers may pay roughly $107, 000 more over the life of the loan for a home on reservation land than other non-AIAN borrowers for a home nearby.[18]

Our results are consistent with the prevalence of loans on manufactured homes being a non-trivial explanatory factor in the higher-priced of home loans. We believe further investigation around the manufactured home financing market structure may be necessary if home loans are going to be made equally affordable for AIAN borrowers. However, further research is necessary to ensure that this higher-priced of financing associated with manufactured homes is causal and not driven by other loan or borrower characteristics not available in the HMDA data. Similarly, given the results of the Oster bounding exercise, future work should try to disentangle the importance of loan length and borrower credit histories to understand the underlying causes of the higher-priced of home loans for AIAN borrowers.

Another important point that our results suggest is that trust land or jurisdictional issues *cannot* uniformly explain all the observable differences between the cost of home loans for AIANs and those non-AIANs living near by. For example, AIAN loans made on properties outside of reservation lands have a higher probability of being higher-priced unless the difference in prevalence of manufactured home purchases are accounted for. In addition, none of the observable differences between AIAN and non-AIAN loans on properties nearby reservation lands can fully explain the difference in the higher APR associated with AIAN loans off reservation lands. This implies that jurisdictional or trust land factors are likely only a part in the higher cost of home financing for AIAN borrowers.

The final finding of this research we wish to highlight is that Native Hawaiians and Alaska

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[17]This dollar amount is the average loan amount for AIAN-reservation loans.

[18]This assumes an average rate spread of 2.5 percent for non-AIAN nearby loans and 5.5 percent for AIAN-reservation loans.

Natives do not face a disproportionate cost of home loans relative to others living in the same state.[19] There are a number of possible explanations for why there American Indians face a higher price of mortgage financing while Native Hawaiians and Alaska Natives do not. First, there is a general lack of trust land in both Hawaii and Alaska and Native jurisdiction over tribal lands does not operate the same way. Second, since loans on manufactured homes are more likely to be higher-priced, and have a higher rate spread conditional on being higher-priced, the fact that Native Hawaiians and Alaska Natives do not disproportionately use manufactured homes may explain why they don't face a higher cost of mortgage financing relative to their non-Native American counterparts, unlike AIAN borrowers. There also may be multiple differences between the relative circumstances of Native American and non-Native American loans outside the contiguous 48 states on or nearby reservation lands, such as the term of the loan or the credit scores of the primary borrowers.

While the prevalence of loans on manufactured housing appears to be part of the story, further work is necessary to understand the impact of factors such as the status of the land, the term of the loan, and the perceived borrower credit risk.

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[19]A significant qualifier to this finding is that Native Hawaiians are grouped together with Pacific Islanders in the racial identification data. To the extent loans given to Pacific Islanders are substantially different from those given to Native Hawaiians, and Pacific Islanders compose a significant proportion of the population, the results on the price of mortgage financing to Native Hawaiians will be biased.

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Figures and Tables
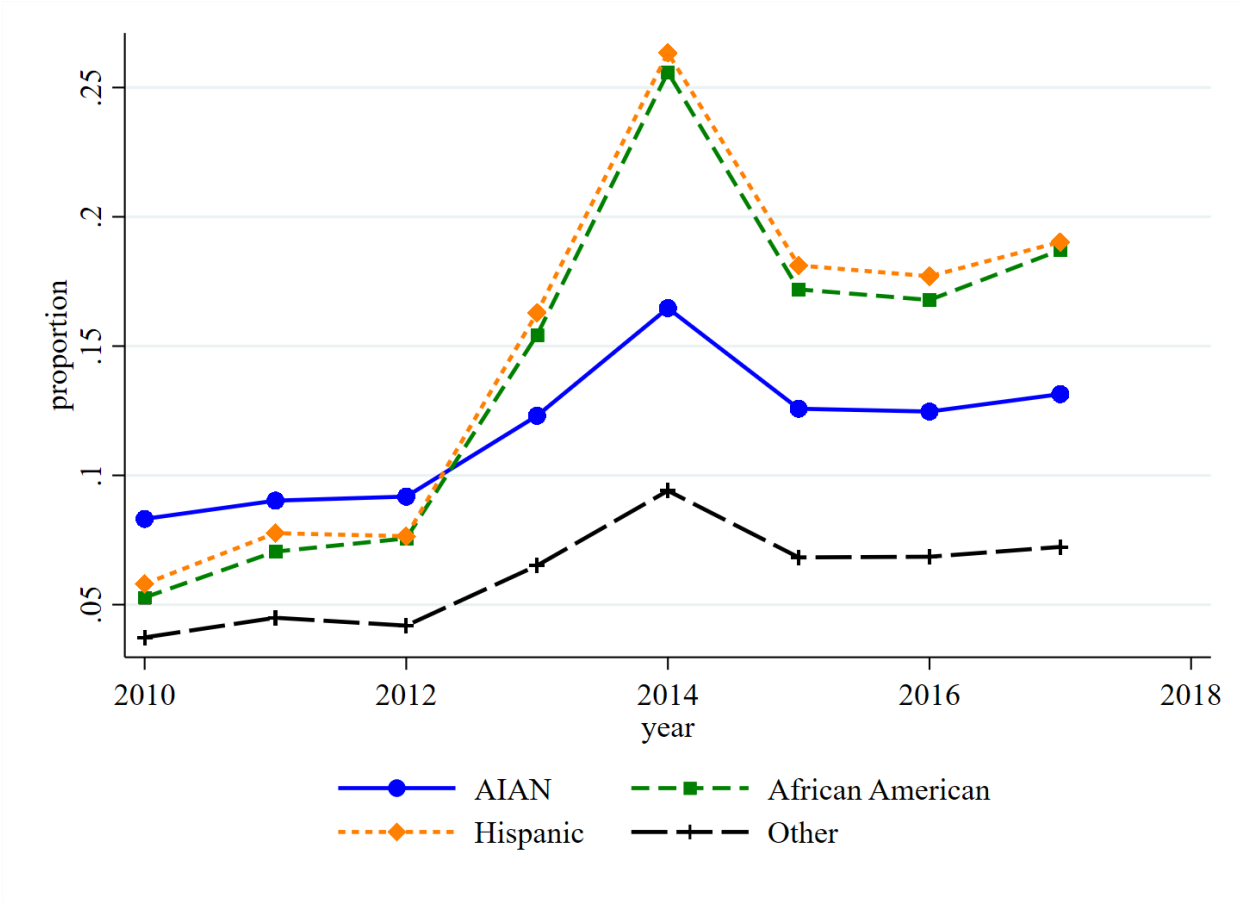
Figure 1: Proportion of mortgage loans that are higher-priced by race of primary borrower for the 48 contiguous states. AIAN is shorthand for American Indian and Alaska Native. "Other" refers to all other racial categories.
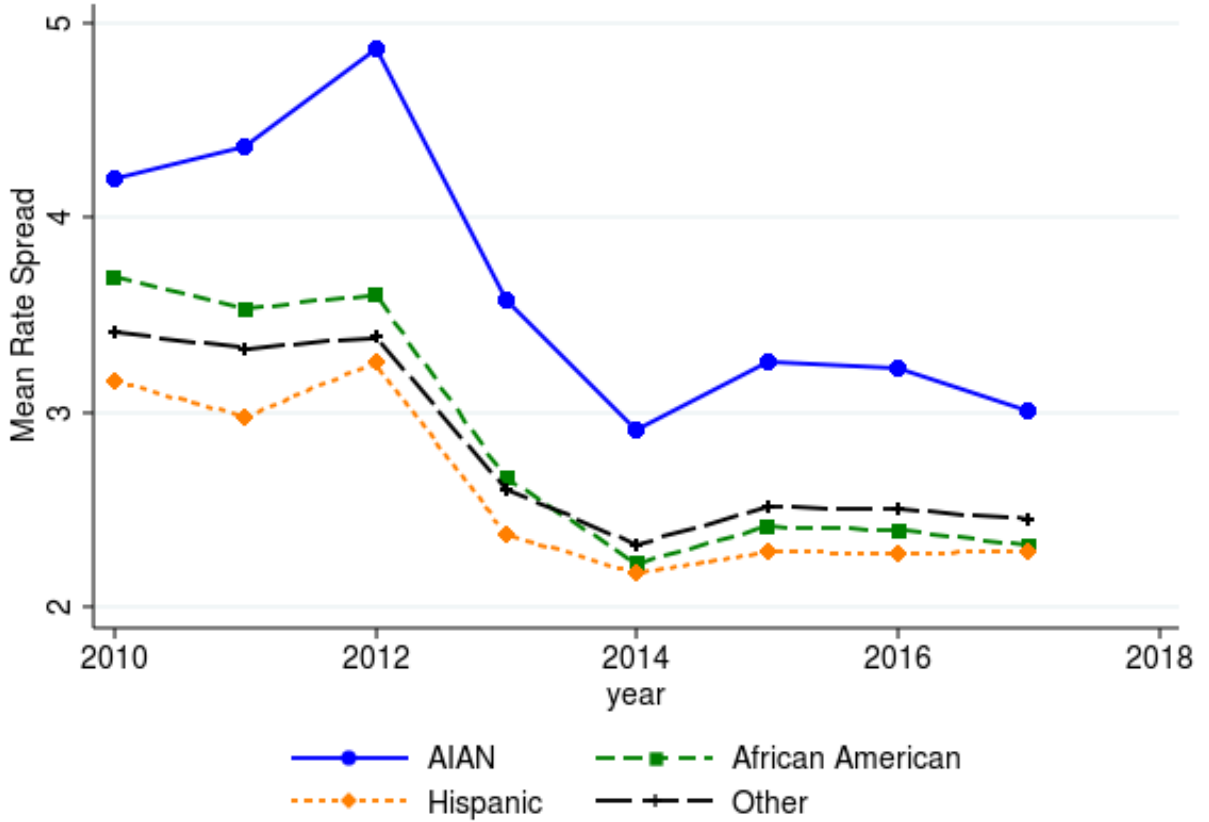
Figure 2: Mean rate spread by race of primary borrower for the 48 contiguous states, conditional on a loan being higher-priced. AIAN is shorthand for American Indian and Alaska Native. "Other" refers to all other racial categories.
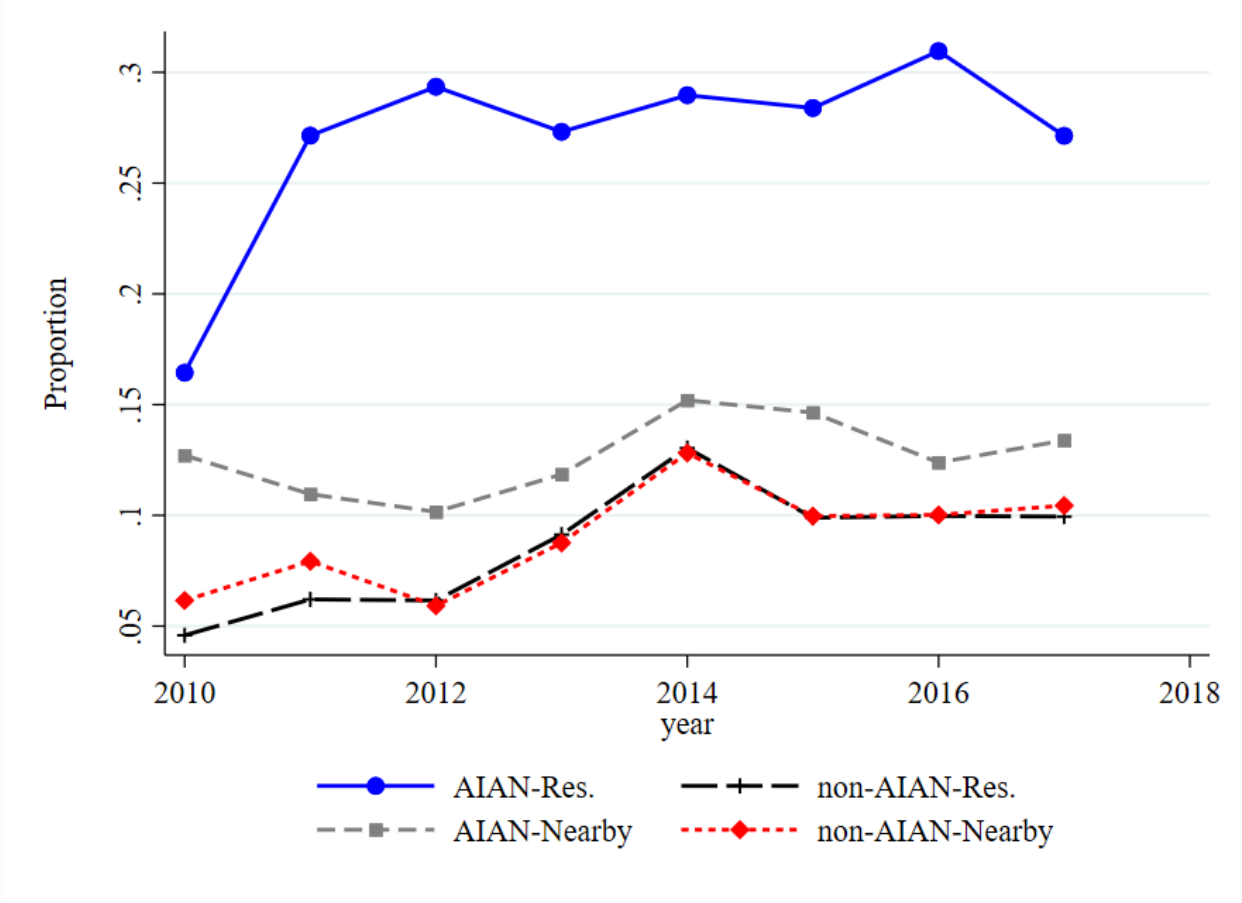
Figure 3: Proportion of mortgage loans that are higher-priced by AIAN and reservation status including only reservation-associated census tracts and nearby (bordering) census tracts.
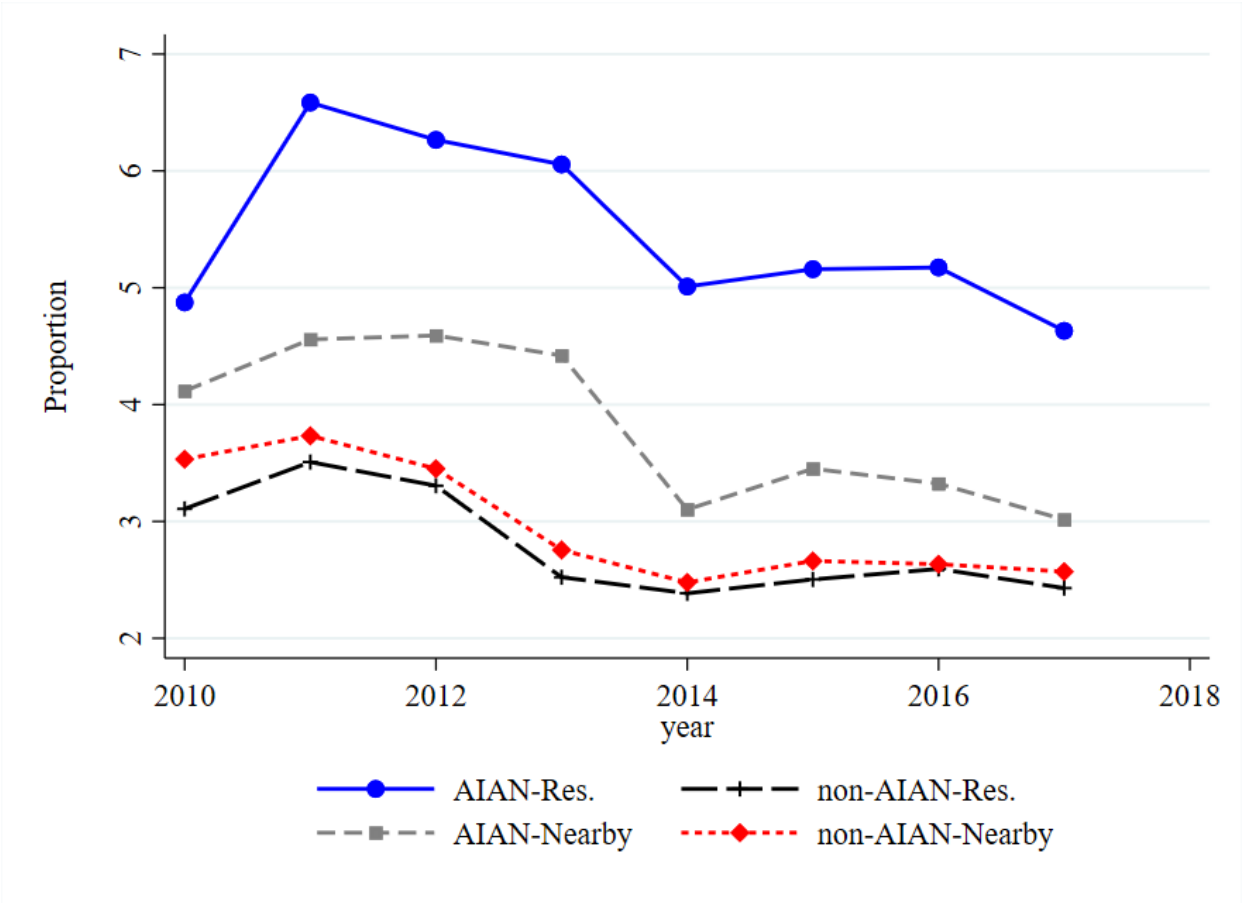
Figure 4: Mean rate spread, conditional on a loan being higher-priced by AIAN and reservation status including only reservation-associated census tracts and nearby (bordering) census tracts.

Table 1: Home Mortgage Disclosure Act summary statistics by AIAN borrower identification and loan location either in reservation or neighboring tracts, 2010-2017.

|	AIAN		Other		AIAN	AIAN - Other	AIAN - Other
	Res. Tracts	Nearby Tracts	Res. Tracts	Nearby Tracts	Res. - Nearby	Res. - Res.	Res. - Nearby
Primary Borrower Characteristics							
Females - Dummy	0.421	0.356	0.23	0.25	0.065	0.191	0.17
	(0.494)	(0.479)	(0.421)	(0.433)			
Applicant Income	84.53	90	102.45	103.57	-5.47	-17.92	-19.04
	(145.3)	(104)	(145.1)	(153.4)			
Loan Characteristics							
Higher-priced loan	0.271	0.116	0.087	0.09	0.154	0.184	0.181
	(0.444)	(0.321)	(0.282)	(0.286)			
Loan amount	142.75	195.31	209.68	226.27	-52.56	-66.93	-83.52
	(98.9)	(124.1)	(326.2)	(409.2)			
Conventional	0.511	0.417	0.628	0.623	0.093	-0.117	-0.113
	(0.5)	(0.493)	(0.483)	(0.485)			
FHA-insured	0.382	0.385	0.208	0.202	-0.003	0.174	0.18
	(0.486)	(0.487)	(0.406)	(0.401)			
VA-guaranteed	0.06	0.13	0.101	0.114	-0.07	-0.041	-0.054
	(0.237)	(0.336)	(0.302)	(0.318)			
FSA/RHS-guaranteed	0.048	0.068	0.063	0.061	-0.02	-0.015	-0.014
	(0.214)	(0.252)	(0.243)	(0.24)			
For a Manufactured home	0.315	0.097	0.079	0.056	0.218	0.236	0.259
	(0.465)	(0.296)	(0.269)	(0.231)			
Census Tract Characteristics of Loan							
Population*	4901.8	5171.13	6234.23	5375.61	-269.33	-1332.43	-473.81
	(2659.7)	(2232.8)	(4110.6)	(2480.9)			
Percent Minority*	48.42	30.12	26.97	26.62	18.3	21.45	21.81
	(31.1)	(22.1)	(21.3)	(21.9)			
Total Housing Units*	2072.4	2131.67	2769.4	2333.84	-59.27	-697	-261.44

Continued on next page

	AIAN		Other		AIAN	AIAN - Other	AIAN - Other
	Res. Tracts	Nearby Tracts	Res. Tracts	Nearby Tracts	Res. - Nearby	Res. - Res.	Res. - Nearby
	(1028.7)	(936.6)	(1411.9)	(1101.7)			
Med Fam Income*	49034.95	65745.64	58634.48	67901.35	-16710.69	-9599.53	-18866.4
	(16666.9)	(23262.6)	(18504.5)	(23763.6)			
Bank Branch Present	0.68	0.79	0.808	0.825	-0.11	-0.128	-0.145
	(0.467)	(0.407)	(0.394)	(0.38)			
Observations	4844	8421	162711	762173	13265	167555	767017

Applicant income is in thousands of dollars (nominal). Loan amounts are in thousands of dollars (nominal). Star (*) indicated this is the census tract average. Population divided by 1000. "Res" is shorthand for reservation. "Higher-priced" loan is a dummy variable for all loans with a rate spread greater than 1.5. Bank density is only available until 2016, so the sample size for bank density is 4181, 6159, 135872, and 595403 in column order.

Table 2: Probability of having a higher-priced loan: Mortgage loans made to Native Americans as the primary borrower relative to other mortgage loans on reservation or trust Census tracts and bordering census tracts

	(1)	(2)	(3)	(4)	(5)	(6)
AIAN	0.1667	0.091	0.0294	-0.0854	-0.1028	-0.0895
	(0.0293)	(0.028)	(0.0252)	(0.0283)	(0.0272)	(0.0268)
Reservation tract	-0.0169	-0.0141	-0.0512	-0.0479	-0.0684	-0.0255
	(0.0246)	(0.0213)	(0.0221)	(0.0187)	(0.0185)	(0.0211)
Reservation*AIAN	0.557	0.4245	0.2501	0.2571	0.1203	0.1339
	(0.0649)	(0.0619)	(0.0538)	(0.061)	(0.0606)	(0.0559)
Female	0.1553	0.0574	0.0744	0.0009	-0.0025	0.0106
	(0.0057)	(0.0057)	(0.0057)	(0.0057)	(0.0056)	(0.0053)
Ln(Income)		-0.5257	-0.2876	-0.47	-0.4834	-0.478
		(0.0377)	(0.0339)	(0.031)	(0.0311)	(0.0293)
Ln(Loan Amount)		-0.9865	-0.568	-0.941	-0.9521	-0.873
		(0.0403)	(0.0375)	(0.0297)	(0.0288)	(0.0267)
Ln(Income)*Ln(Loan Amount)		0.0894	0.0395	0.0996	0.1064	0.1017
		(0.0079)	(0.0074)	(0.0063)	(0.0063)	(0.0059)
Manufactured housing			1.1469	1.1607	1.1595	1.1541
			(0.0191)	(0.0207)	(0.0208)	(0.0204)
FHA-insured				0.7798	0.7429	0.7579
				(0.0174)	(0.0168)	(0.0163)
VA-guaranteed				-1.2358	-1.2518	-1.2365
				(0.0273)	(0.0275)	(0.0268)
FSA/RHS-guaranteed				-0.7218	-0.7263	-0.7777
				(0.0257)	(0.0263)	(0.0253)
Ln(Population)*					-0.0406	0.0038
					(0.0144)	(0.0129)
Percent Minority*					0.0049	0.0049
					(0.0003)	(0.0005)
Ln(Med Fam Income)*					-0.1749	-0.1517
					(0.0231)	(0.0244)
Year FE	X	X	X	X	X	X
County FE						X
Observations	886,294	886,294	886,294	886,294	886,294	886,294

A file identifying census tracts near Native American reservation census tracts was merged to the data and any loan that originated neither on a Native American tract nor on a neighboring tract was dropped. Uses probit model for the probability of having a higher cost loan (APR greater than or equal to 1.5 percentage points above the APOR). A file identifying census tracts near Native American reservation census tracts was merged to the data, and any loan that originated neither on a Native American tract NOR on a neighboring tract was dropped. The Ln(Population)* variable is the natural log of the (population divided by 1000); Ln(Income) is the natural log of the income variable; Ln(Med Fam Income) is the natural log of the Median Family income variable which is divided by 1000; Star (*) Indicates the variable is the census tract average. Marginal effects reported. Standard errors are clustered at the census tract level (1,478 clusters) and are in parentheses.

Table 3: Rate spread conditional on having a higher-priced loan: Mortgage loans made to Native Americans as the primary borrower relative to other mortgage loans on reservation or trust census tracts and bordering census tracts

	(1)	(2)	(3)	(4)	(5)	(6)
AIAN	0.6170	0.4756	0.3584	0.3820	0.3459	0.3369
	(0.0946)	(0.0828)	(0.0695)	(0.0664)	(0.0600)	(0.0538)
Reservation tract	-0.1128	-0.0783	-0.1114	-0.1106	-0.1200	-0.0108
	(0.0444)	(0.0315)	(0.0284)	(0.0291)	(0.0257)	(0.0255)
Reservation*AIAN	1.4633	1.2559	1.0190	0.9337	0.7272	0.8236
	(0.1450)	(0.1399)	(0.1216)	(0.1175)	(0.1095)	(0.1048)
Female	0.1026	0.0301	0.0327	0.0412	0.0249	0.0216
	(0.0143)	(0.0116)	(0.0111)	(0.0109)	(0.0109)	(0.0107)
Ln(Income)		-1.7202	-1.6456	-1.4430	-1.3935	-1.2179
		(0.0779)	(0.0691)	(0.0649)	(0.0647)	(0.0602)
Ln(Loan Amount)		-2.7398	-2.2743	-1.7324	-1.7747	-1.6377
		(0.0920)	(0.0827)	(0.0712)	(0.0725)	(0.0676)
Ln(Income)*Ln(Loan Amount)		0.4077	0.3870	0.3027	0.2973	0.2622
		(0.0167)	(0.0153)	(0.0136)	(0.0137)	(0.0127)
Manufactured housing			1.3263	1.2291	1.2384	1.1279
			(0.0400)	(0.0362)	(0.0359)	(0.0346)
FHA-insured				-0.6538	-0.7048	-0.6614
				(0.0259)	(0.0271)	(0.0264)
VA-guaranteed				-0.7895	-0.7760	-0.7105
				(0.0655)	(0.0634)	(0.0620)
FSA/RHS-guaranteed				-0.7848	-0.7326	-0.7598
				(0.0379)	(0.0388)	(0.0395)
Ln(Population)*					0.0800	-0.0063
					(0.0226)	(0.0180)
Percent Minority*					0.0067	0.0053
					(0.0005)	(0.0006)
Ln(Med Fam Income)*					0.1970	0.2089
					(0.0331)	(0.0366)
Year FE	X	X	X	X	X	X
County FE						X
Observations	85036	85036	85036	85036	85036	85036

A file identifying census tracts near Native American reservation census tracts was merged to the data and any loan that originated neither on a Native American tract NOR on a neighboring tract was dropped. Uses a Tobit model with a left tail censoring at 1.5. A file identifying census tracts near Native American reservation census tracts was merged to the data and any loan that originated neither on a Native American tract NOR on a neighboring tract was dropped. The Ln(Population)* variable is the natural log of the (population divided by 1000); Ln(Income) is the natural log of the income variable; Ln(Med Fam Income) is the natural log of the Median Family income variable which is divided by 1000.; Star (*) Indicates the variable is the census tract average. Marginal effects reported. Standard errors are clustered at the census tract level (477 clusters) and are in parentheses.

Table 4: Oaxaca-Blinder decomposition for differences between the probability of higher-priced mortgage loans made to Native Americans as the primary borrower in reservation-associated tracts relative to non-AIAN borrowers in reservation-associated tracts

	Probability		Rate Spread	
	overall			
non-AIAN on Res.	0.0892		2.6533	
	(0.0031)		(0.0544)	
AIAN on Res.	0.2772		5.4863	
	(0.0129)		(0.1258)	
Difference	**-0.1879**		**-2.833**	
	(0.0126)		(0.1308)	
	explained	*unexplained*	*explained*	*unexplained*
Female	-0.0004	0.0087	-0.015	-0.0155
	(0.0005)	(0.02)	(0.007)	(0.0484)
Year	0.0024	0.0078	-0.0635	0.0151
	(0.0022)	(0.0125)	(0.0207)	(0.0265)
Income/loan	-0.0586	-0.9748	-0.4275	1.8689
	(0.0269)	(1.8797)	(0.2235)	(1.6516)
Manufactured home	-0.0467	-0.1129	-0.571	-0.7957
	(0.0151)	(0.1583)	(0.0479)	(0.227)
Loan type	-0.0248	-0.0793	-0.3941	-0.1671
	(0.0086)	(0.1435)	(0.0876)	(0.142)
Tract characteristics	-0.0069	-1.3746	-0.2091	-0.9816
	(0.009)	(2.0704)	(0.0953)	(1.2342)
Constant		2.4722		-1.0768
		(4.1262)		(2.3018)
Total	**-0.135**	**-0.053**	**-1.6802**	**-1.1527**
	(0.0514)	(0.0501)	(0.2632)	(0.2819)
N non-AIAN on Res.	160000		14296	
N AIAN Res.	4833		1311	

Notes: income/loan = aggregates the component explained by ln(income), ln(loan amount) and their interaction; loan type = aggregates the component explained by loan type including FHA-insured loans, VA-guaranteed loans, and FSA/RHS-guaranteed loans; tract characteristics = aggregates the component explained by census tract characteristics including ln(Population), the percent of the population that identifies as a minority, and ln(median family income). Standard errors are clustered at the census tract level (447, and 454 clusters) and are in parentheses.

Table 5: Home Mortgage Disclosure Act summary statistics by Native Hawaiian, Others in Hawaii, Alaska Native, and Others in Alaska, 2010-2017

	Native Hawaiian	Others in Hawaii	Difference	Alaska Native	Others in Alaska	Difference
Primary Borrower Characteristics						
Females - Dummy	0.27	0.195	-0.075	0.452	0.254	-0.197
	(0.444)	(0.396)		(0.498)	(0.435)	
Applicant Income	130.002	164.04	34.004	92.363	103.539	11.234
	(166.352)	(347.13)		(91.981)	(103.264)	
Loan Characteristics						
Loan Amount	413.96	473.106	59.053	252.323	266.569	14.331
	(247.282)	(702.13)		(99.688)	(157.554)	
Conventional	0.791	0.666	-0.125	0.289	0.488	0.199
	(0.407)	(0.472)		(0.453)	(0.5)	
FHA-insured	0.068	0.063	-0.004	0.579	0.209	-0.37
	(0.251)	(0.244)		(0.494)	(0.407)	
VA-guaranteed	0.092	0.227	0.135	0.093	0.259	0.166
	(0.289)	(0.419)		(0.29)	(0.438)	
FSA/RHS-guaranteed	0.049	0.044	-0.006	0.04	0.044	0.004
	(0.216)	(0.204)		(0.196)	(0.204)	
Manufactured housing	0.0001	0.0001	-0.0000	0.004	0.003	-0.001
	(0.011)	(0.01)		(0.059)	(0.051)	
Census Tract Characteristics of Loan						
Ln(Population)*	1.538	1.596	0.057	1.655	1.668	0.013
	(0.461)	(0.536)		(0.411)	(0.404)	

Continued on next page

	Native Hawaiian	Others in Hawaii	Difference	Alaska Native	Others in Alaska	Difference
	**Table 5 – continued from previous page**
Percent Minority*	80.662	69.562	-11.118	33.344	26.933	-6.41
	(12.32)	(17.464)		(17.89)	(14.107)	
Med Fam Income*	78694.225	77429.229	-1299.679	80293.764	83112.331	2818.567
	(23534.393)	(22158.617)		(21966.124)	(24233.656)	
			Rate Spread Characteristics of Loan			
Higher-priced	0.011	0.012	0.001	0.01	0.017	0.007
	(0.102)	(0.107)		(0.099)	(0.129)	
Rate Spread	2.073	2.045	-0.028	2.373	2.456	0.082
of higher-priced loans	(0.701)	(0.684)		(1.356)	(1.077)	
Observations	33018	53175	86361	4561	61886	66740
# of higher-priced loans	348	613	961	47	1073	1120

Income in thousands of dollars (nominal); Loan amount in thousands of dollars (nominal); population divided by 1000. "Higher-priced" loan is a dummy variable for all loans with a rate spread greater than 1.5. Star (*) Indicates the variable is the census tract average.
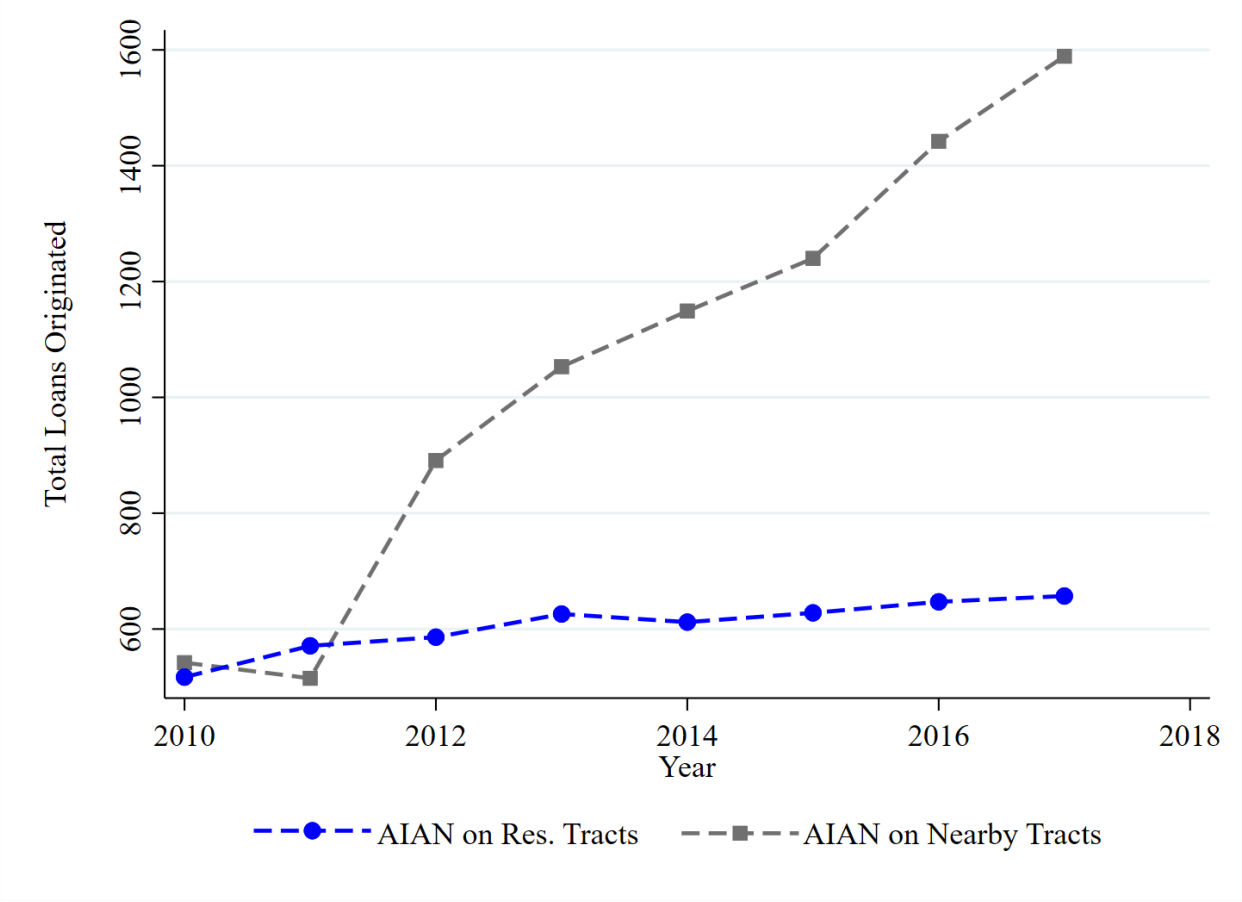
Appendix

Figure A1: Number of Loans Originating for Tribal Lands and Neighboring Tracts

Table A1: Probability of higher-priced loan and rate spread conditional on having a higher-priced loan: Accounting for bank branch presence in county

	Probability		Rate Spread	
	(1)	(2)	(1)	(2)
AIAN	-0.093	-0.093	0.35296	0.35343
	(0.0291)	(0.0291)	(0.05779)	(0.05783)
Reservation	0.005	0.005	-0.005	-0.00424
	(0.0005)	(0.0005)	(0.02684)	(0.02672)
Reservation*AIAN	-0.145	-0.146	0.77624	0.77506
	(0.0267)	(0.0267)	(0.11335)	(0.11323)
Bank Indicator		-0.215		-0.11332
		-0.0785		-0.08439
Females	0.003	0.002	0.01922	0.01909
	(0.0057)	(0.0057)	(0.0125)	(0.0125)
Ln(Income)	-0.473	-0.474	-1.15697	-1.15754
	(0.0306)	(0.0306)	(0.06585)	(0.06585)
Ln(Loan Amount)	-0.885	-0.887	-1.54846	-1.54931
	(0.028)	(0.028)	(0.07388)	(0.07387)
Ln(Income)*Ln(Loan Amount)	0.103	0.103	0.24734	0.2475
	(0.0062)	(0.0062)	(0.01398)	(0.01398)
Manufactured housing	1.176	1.176	1.15877	1.15885
	(0.0207)	(0.0207)	(0.03729)	(0.03729)
FHA-insured	0.749	0.749	-0.71085	-0.71082
	(0.0183)	(0.0183)	(0.03201)	(0.032)
VA-guaranteed	-1.259	-1.259	-0.7793	-0.77865
	(0.0301)	(0.0301)	(0.06872)	(0.06862)
FSA/RHS-guaranteed	-0.726	-0.726	-0.75722	-0.75666
	(0.0262)	(0.0261)	(0.0411)	(0.04113)
Ln(Population)*	-0.02	-0.016	-0.0142	-0.01375
	(0.0205)	(0.018)	(0.01962)	(0.01951)
% Minority on Tract	0.118	0.114	0.00608	0.00608
	(0.06)	(0.0598)	(0.00067)	(0.00067)
Ln(Med Fam Income)*	-0.009	-0.008	0.22113	0.22052
	(0.0133)	(0.0128)	(0.0418)	(0.04181)
Year FE	X	X	X	X
County FE	X	X		X
Observations	726886	726886	68110	68110

A file identifying census tracts near Native American reservation census tracts was merged to the data and any loan that originated neither on a Native American tract nor on a neighboring tract was dropped. Uses probit model for the probability of having a higher-priced loan (APR greater than or equal to 1.5 percentage points above the APOR) for the columns labeled "Probability." Uses a Tobit model with a left tail censoring at 1.5 for the columns labeled "Rate Spread". The Ln(Population)* variable is the natural log of the (population divided by 1000); Ln(Income) is the natural log of the income variable; Ln(Med Fam Income) is the natural log of the Median Family income variable which is divided by 1000. Star (*) Indicates the variable is the census tract average. Marginal affects reported. Standard errors are clustered at the census tract level and are in parentheses.

Table A2: Probability of having a higher-priced loan and rate spread conditional on having a higher cost loan: Linear models

	Probability			Rate Spread		
AIAN	0.0312	-0.0152	-0.0145	0.7954	0.3779	0.3828
	(0.0034)	(0.003)	(0.0042)	(0.0593)	(0.0455)	(0.0598)
Females	0.0277	0.0013	-0.007	0.1322	0.0239	0.0212
	(0.0007)	(0.0007)	(0.0035)	(0.0138)	(0.0107)	(0.0121)
Reservation	-0.0025	-0.0047	-0.0004	-0.1438	-0.0117	-0.0492
	(0.0008)	(0.001)	(0.0099)	(0.017)	(0.018)	(0.027)
Reservation*AIAN	0.1465	0.0417	0.0017	1.8961	0.9307	0.3612
	(0.0055)	(0.005)	(0.0008)	(0.0798)	(0.0635)	(0.1084)
Ln(Income)		-0.1343	-0.1336		-1.3797	-1.3534
		(0.0027)	(0.0058)		(0.0427)	(0.0603)
Ln(Loan Amount)		-0.1875	-0.187		-1.84995	-1.8245
		(0.0023)	(0.0058)		(0.0387)	(0.0572)
Ln(Income)*Ln(Loan Amount)		0.0274	0.0274		0.2968	0.2893
		(0.0005)	(0.0011)		(0.0089)	(0.0122)
Manufactured housing		0.3286	0.3241		1.2676	1.2399
		(0.0013)	(0.0075)		(0.0136)	(0.0354)
FHA-insured		0.1275	0.1273		-0.7446	-0.7216
		(0.0008)	(0.0034)		(0.0127)	(0.02)
VA-guaranteed		-0.0518	-0.0518		-0.7497	-0.7251
		(0.001)	(0.002)		(0.0775)	(0.0635)
FSA/RHS-guaranteed		-0.0622	-0.0621		-0.8269	-0.8163
		(0.0012)	(0.0024)		(0.0536)	(0.0429)
Ln(Population)*		-0.001	-0.002		-0.0071	-0.0069
		(0.0008)	(0.0022)		(0.0138)	(0.0232)
Percent Minority*		0.0008	0.0008		0.006	0.0035
		(0.00003)	(0.0001)		(0.0004)	(0.0009)
Ln(Med Fam Income)*		-0.0133	-0.0115		0.2364	0.2188
		(0.0015)	(0.0038)		(0.026)	(0.0447)
Year FE	X	X	X	X	X	X
County FE		X			X	
Census Tract FE			X			X
R-sqr	0.009	0.214	0.219	0.071	0.475	0.486
Observations	886320	886320	886320	85036	85036	85036

A file identifying census tracts near Native American reservation census tracts was merged to the data and any loan that originated neither on a Native American tract nor on a neighboring tract was dropped. Uses linear probability model for the probability of having a higher-priced loan (APR greater than or equal to 1.5 percentage points above the APOR) and a linear model for the rate spread conditional on having a higher-priced loan. The Ln(Population)* variable is the natural log of the (population divided by 1000). Ln(Income) is the natural log of the income variable. Ln(Med Fam Income) is the natural log of the Median Family income variable which is divided by 1000. Star (*) Indicates the variable is the census tract average. Marginal effects reported. Standard errors are clustered at the census tract level (1,478 clusters/477 clusters) and are in parentheses.