



Differences in subprime loan pricing across races and neighborhoods[☆]



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ABSTRACT

We investigate whether race and ethnicity influenced subprime loan pricing during 2005, the peak of the subprime mortgage expansion. We combine loan-level data on the performance of non-prime securitized mortgages with individual- and neighborhood-level data on racial and ethnic characteristics for metropolitan areas in California and Florida. Using a model of rate determination that accounts for predicted loan performance, we evaluate the differences in subprime mortgage rates in terms of racial and ethnic groups and neighborhood characteristics. We find evidence of adverse pricing for Blacks and Hispanics. The evidence of adverse pricing is strongest for purchase mortgages and mortgages originated by non-depository institutions.

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1. Introduction

Financial and technological innovation in underwriting processes has altered the manner through which discrimination may manifest in mortgage markets. Research on the role of income and race on consumer lending of mortgages originated prior to 1995, when mortgages were usually underwritten manually, found strong evidence that lenders

were denying credit more frequently to Black households than to White households with similar observable characteristics.² After 1995, risk-based pricing of credit, rather than mere credit allocation, may have become an alternative channel for discrimination, particularly in the subprime market where lenders were much less likely to sell the loan to government-sponsored enterprises and were thus less constrained by firm cutoffs on variables such as loan-to-value ratios, loan size, and credit scores. In a world where lenders cope with credit risk by rationing credit, discrimination manifests itself primarily in loan denials. In contrast, when borrowers choose among several different sets of loan terms, each with a different price, minorities may be able to obtain credit but may have to pay a higher price for it.

Mortgage laws consider various notions of discrimination (see Ladd, 1998). Two broad classes of discriminatory behavior are *disparate treatment* and *disparate impact*. The former is manifest when lenders apply different pricing rules based on individual racial or neighborhood characteristics. The latter occurs when policies that do not explicitly take racial or neighborhood characteristics into account result in disparities among racial groups because race is correlated with other variables that may be used in underwriting, even when they are not necessarily good predictors of loan performance. Mortgage laws also prohibit

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² The seminal study is by Munnell et al. (1996). Ross and Yinger (2002) provide a comprehensive overview and analysis of the literature surrounding that study; see also Duca and Rosenthal (1993), Ladd (1998), Bostic and Redfearn (2004), Elul (2004), and Yavas (2004).

lenders from denying loans or charging higher rates or fees to borrowers based on the racial composition of neighborhoods.

In this paper we use data on non-prime mortgages that originated in 2005 in California and Florida to examine the influence of race and ethnicity on loan pricing across eight popular subprime mortgage products. We evaluate the presence of loan pricing disparities among minorities, relative to White borrowers, by analyzing the effect of race and neighborhood characteristics separately on: (1) the assessment by lenders of borrowers' risk profiles in an actuarial stage and (2) the interest rate determination in an underwriting stage. We use this approach (inspired from a proposal outlined in *Ross and Yinger, 2002*), to detect disparate treatment and disparate impact in loan pricing in a Bayesian framework of model selection. We also use this approach to detect adverse pricing differences in terms of the racial composition and income of neighborhoods. Additionally, we analyze whether Blacks and Hispanics face more subtle forms of adverse loan pricing. For example, as suggested by *Ross and Tootell (2004)*, lenders may require Black and Hispanic borrowers to purchase private mortgage insurance when they would not require a White borrower with a similar risk profile to do so.

While we find adverse pricing effects in most of the products we examine, the economic magnitude of these effects is relatively small, when compared with other studies of loan pricing. In particular, for the most popular mortgage product, 30-year adjustable rate mortgages, we find that Black and Hispanic borrowers face interest rates 12 and 29 basis points higher, respectively, than other borrowers. We also find evidence of income- or race-based neighborhood pricing disparities in seven of the eight mortgage products we analyze, including the most popular mortgage product, but these effects are considerably smaller: a 10-percentage-point increase in the neighborhood share of minorities is associated with, at worst, a 1.4 basis-point increase in interest rates. These effects are much smaller than the adverse pricing effects found in other lending markets, such as the peer-to-peer personal loan market analyzed in *Pope and Sydnor (2011a)* and *Ravina (2012)*. The smaller magnitude of the effects in our study is likely due to more stringent regulation of the mortgage market than the peer-to-peer personal lending market. A portion, but certainly not all, of the adverse pricing effects can be explained by differences in default and prepayment behavior by minorities and households in low-income neighborhoods or neighborhoods with a high proportion of minorities.

Our findings are consistent with anecdotal evidence regarding subprime loan pricing practices inferred from recent settlements of the U.S. Department of Justice against some of the largest subprime mortgage originators on allegations of unfair lending practices during the period from 2004 through 2009.³ The complaints by the Department of Justice alleged that Black and Hispanic retail and wholesale borrowers "were charged higher fees and interest rates because of their race or national origin, and not because of the borrowers' creditworthiness or other objective criteria related to borrower risk." The Department of Justice also alleged that these lenders steered Black and Hispanic borrowers into subprime mortgages when non-Hispanic White borrowers with similar credit profiles received prime loans.⁴

The adverse pricing we describe may not necessarily reflect explicit discrimination or bias on the part of lenders, and in our analysis we offer some alternative explanations. For example, we find that borrower awareness of the mortgage market and differential access to mortgage market channels may influence some of the pricing differences that we uncover. More precisely, we find that the effect of race and neighborhood characteristics differs substantially by the type of loan (purchase or refinancing). There is much less evidence of adverse pricing in refinancings than in purchase mortgages. Because borrowers that

refinance by definition have more experience with the mortgage market than borrowers taking out purchase mortgages, the difference in the results for purchase and refinance mortgages suggests that some of the adverse pricing facing minorities and households in traditionally underserved areas is due to differences in their ability to find the best possible rate rather than discrimination on the part of originators. Also, traditionally underserved borrowers may not have ready access or knowledge of different lenders' programs and the inexperienced may not actively seek out the best rate.

Furthermore, we find that adverse pricing is more prevalent among non-depository institutions. This result suggests that mortgage market channels play an important role in explaining the pricing disparities facing traditionally underserved borrowers. Mortgage brokers may be marketing expensive mortgages aggressively in minority neighborhoods. Conditional on receiving a mortgage from a depository institution, however, traditionally underserved households do not seem to experience pricing disparities, compared with White borrowers. We cannot, however, eliminate the possibility that the difference in our results for depository institutions is a result of greater regulatory scrutiny of depository institutions than of mortgage brokers.

For the reasons discussed above, and the anecdotal evidence notwithstanding, we are unable to decisively conclude that the adverse pricing we find is due to deliberate lender discrimination. Rather, the relatively small effects we find can perhaps be viewed as a victory for mortgage regulation since the 1980s and 1990s when there was substantial evidence of discrimination against minorities (see *Ross and Yinger, 2002*).

Our study is related to that of *Haughwout et al. (2009)* who examine 2/28 mortgages that originated in August 2005 for the entire United States but find no evidence of adverse loan pricing from race and ethnicity. Our paper, however, differs from that of *Haughwout et al. (2009)* in four important ways. First, our methodology allows us to detect both disparate impact and disparate treatment and to identify statistical adverse pricing. In contrast, the methodology of *Haughwout et al. (2009)* is aimed only at detecting disparate treatment, without exploring the source of potential disparities across racial groups. Second, in our approach we also emphasize detecting income- and race-based pricing differences across neighborhoods. Third, we analyze whether Blacks and Hispanics face more subtle forms of rate disparities regarding prepayment penalty or private mortgage insurance requirements. Finally, we examine eight different mortgage products whereas *Haughwout, Mayer, and Tracy* confine their analysis to one category. Although the mortgage categories in both studies are not directly comparable (our product definitions emphasize the amortization term of the mortgage), we do not find evidence of racial disparities in adjustable rate mortgages with interest-only payments for the first two years, consistent with the findings of *Haughwout, Mayer, and Tracy*. However, we do find evidence of neighborhood income-based disparities in this category.

Our paper is also related to a recent audit study of adverse pricing in the mortgage market (*Hanson et al., 2013*). We view our results as complementary to those of *Hanson, Hawley, Martin, and Liu*, although the audit study provides more conclusive evidence of discrimination than our approach. The advantage of our approach relative to an audit study, however, is that we can detect adverse pricing due to disparate impact. Furthermore, it is difficult with audit studies to distinguish between adverse pricing due to statistical discrimination and adverse pricing that is unrelated to differences in loan performance across race or neighborhoods.

A much larger literature examines the effect of race and ethnicity on outcomes in other markets. Recent contributions attempting to detect statistical discrimination in particular include *Altonji and Pierret (2001)*, *Pope and Sydnor (2011b)*, and *Chandra and Staiger (2010)*. *Altonji and Pierret (2001)* develop a method to test for the presence of statistical discrimination in the labor market. *Pope and Sydnor (2011b)* present an approach similar in spirit in ours but better suited to the labor market than the mortgage market. *Chandra and Staiger*

³ See <http://www.justice.gov/opa/pr/2012/July/12-dag-869.html> and <http://www.justice.gov/opa/pr/2011/December/11-ag-1694.html>.

⁴ While the analysis of steering is beyond the scope of our paper, preliminary inspection of our data does not suggest evidence of this phenomenon.

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