Exhibit 84:

Expert Report of Ian Ayers

Previously filed under seal (Docket No. 131)

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

BEVERLY ADKINS, CHARMAINE WILLIAMS, REBECCA PETTWAY, RUBBIE McCOY, WILLIAM YOUNG, on behalf of themselves and all others similarly situated, and MICHIGAN LEGAL SERVICES, Plaintiffs, v. MORGAN STANLEY, MORGAN STANLEY & CO. LLC, MORGAN STANLEY ABS CAPITAL I INC., MORGAN STANLEY MORTGAGE CAPITAL INC., and MORGAN STANLEY MORTGAGE CAPITAL HOLDINGS LLC, Defendants.	Case No. 1:12-cv-7667-VEC **CLASS CERTIFICATION REPORT OF IAN AYRES**

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I. INTRODUCTION

1. I have been asked by counsel for Beverly Adkins, Charmaine Williams, Rebecca Pettway, Rubbie McCoy, and William Young, on behalf of themselves and all others similarly situated, ("Plaintiffs") to analyze Plaintiffs' claims that Morgan Stanley's loan purchasing, pooling, and securitization policies adversely impacted African-American borrowers. I have reviewed the Complaint for this case filed October 15, 2012 in the Southern District of New York.[1] This and other materials that I rely upon in forming my opinions are listed in Appendix 1.

2. Plaintiffs allege that Morgan Stanley discriminated against African-American borrowers through its policies with respect to its orchestration of mortgages originated by New Century Mortgage Company ("New Century"). More specifically, plaintiffs have alleged that Morgan Stanley "effectively dictated the types of loans that New Century issued, requiring as a condition of the companies' lucrative business relationship that a large percentage of New Century's loans have certain dangerous characteristics."[2] These loans were especially hazardous to borrowers due to their combination of multiple high-risk features.[3] Counsel for plaintiffs have asked me to examine whether these loans with multiple high-risk features were more likely to have been imposed on African-American borrowers than white borrowers. These allegations have been brought pursuant to the Fair Housing Act (FHA).[4]

3. Plaintiffs have brought an action on behalf of the following class: "All African-American individuals who, between 2004 and 2007, resided in the Detroit region (as defined

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[1] Class Action Complaint, *Adkins v. Morgan Stanley*, No. 1:12-cv-7667-HB (S.D. N.Y.) [hereinafter *Complaint*].

[2] *Id.* ¶2.

[3] *Id.* ¶3.

[4] *Id.* ¶¶8, 236-273. Plaintiffs originally brought claims under the Equal Credit Opportunity Act (ECOA) and Michigan's Elliot-Larsen Civil Rights Act (ELCRA), but the Court granted Defendant's motion to dismiss the ECOA and ELCRA claims. Opinion & Order, *Adkins v. Morgan Stanley*, No. 1:12-cv-7667-HB (S.D. N.Y.) (July 25, 2013).

herein) and received Combined-Risk Loans from New Century"[5] (hereinafter referred to as the "Class" or "Class Members"). A "Combined-Risk Loan" is defined in the Complaint as a loan that meets "the definition of high-cost loan under HMDA and also contain two or more of the following high-risk terms: (a) the loan was issued based upon the 'stated income,' rather than the verified income, of the borrower; (b) the debt-to-income ratio exceeds 55%; (c) the loan-to-value ratio exceeds or equals 90%; (d) the loan has an adjustable interest rate; (e) the loan has 'interest only' payment features; (f) the loan has negative loan amortization features; (g) the loan has 'balloon' payment features; and/or (h) the loan imposes prepayment penalties."[6] The "Detroit region" is defined as the nine counties comprising the Detroit metropolitan area: Genesee, Lapeer, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne counties in Michigan.[7]

II. QUALIFICATIONS

4. I am the William K. Townsend Professor at Yale Law School, and a Professor at Yale's School of Management. I was the editor of the Journal of Law, Economics and Organization for seven years. I have previously taught at Harvard, Illinois, Northwestern, Stanford, and Virginia law schools and have been a research fellow of the American Bar Foundation. In 2006, I was elected to the American Academy of Arts and Sciences. I regularly teach courses in Contract Law and Quantitative Corporate Finance. I received my B.A. in Russian Studies and economics and J.D. from Yale University and my Ph.D. in economics from M.I.T.

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[5] *Complaint*, at ¶229.
[6] *Id.* ¶34.
[7] *Id.* ¶116.

5. I am the co-author of a widely-adopted contracts casebook, *Studies in Contract Law*, which is now in its 8th edition. In the Spring of 2010, together with Barry Nalebuff, I published a book with Basic Books on retirement investments entitled *Lifecycle Investing: A New, Safe, and Audacious Way to Improve the Performance of Your Retirement Portofilio*. My book with Gregory Klass, *Insincere Promises: The Law of Misrepresented Intent*, won the 2006 Scribes book award "for the best work of legal scholarship published during the previous year." I have published 11 books and over 100 articles on a wide range of topics.

6. I am the author of several empirical studies: *Does Affirmative Action Reduce the Number of Black Lawyers?*, 57 Stanford Law Review 1807 (2005) (with Richard Brooks); *To Insure Prejudice: Racial Disparities in Taxicab Tipping*, 114 Yale Law Journal 1613 (2005) (with Fred Vars and Nasser Zakariya); *A Separate Crime of Reckless Sex*, 72 University of Chicago Law Review 599 (2005) (with Katharine Baker); *Shooting Down the More Guns, Less Crime Hypothesis*, 55 Stanford Law Review 1193 (2003) (with John J. Donohue III); *Measuring the Positive Externalities from Unobservable Victim Precaution: An Empirical Analysis of Lojack*, 113 Quarterly Journal of Economics 43 (1998) (with Steven D. Levitt); *Pursuing Deficit Reduction Through Diversity: How Affirmative Action at the FCC Increased Auction Competition*, 48 Stanford Law Review 761 (1996) (with Peter Cramton); *A Market Test for Race Discrimination in Bail Setting*, 46 Stanford Law Review 987 (1994) (with Joel Waldfogel); and *Racial Equity in Renal Transplantation: The Disparate Impact of HLA-Based Allocation*, 270 Journal of American Medical Association 1352 (1993) (with Robert Gaston, Laura Dooley, and Arnold Diethelm). Each of these articles include econometric analysis. In particular, I have worked substantially with large data sets, including bank data.

7. I have attached (as Appendix 1) a list of documents that I have considered for my

work on this case.[8]

8. My curriculum vitae is included as Appendix 2. I have previously testified as an expert witness in a variety of antitrust, contract, and civil rights cases – including several concerning discretionary markups of auto loans[9] and mortgage lending. I have attached a list of cases on which I have given sworn testimony (Appendix 3).

9. I file this report in my individual capacity and have no financial stake in the outcome of this case. My hourly rate in this matter is $650. My compensation is not contingent on any action or event resulting from the analyses, opinions or conclusions in, or the use of, this report.

III. SUMMARY OF CONCLUSIONS

10. For the reasons detailed in this report, I conclude that Defendants and the New Century bankruptcy liquidation trustee maintain sufficient data concerning New Century's borrowers to permit statistical examination of the impact of lending policies as required by a disparate impact case. In addition, my analysis of the data provided to Plaintiffs provides statistically significant evidence that is consistent with the hypothesis that African-American borrowers were more likely to have received Combined-Risk Loans than white borrowers with similar characteristics. I arrive at my conclusions by employing several well-recognized and reliable statistical tests and techniques on the information maintained by New Century[10] and Morgan Stanley that has been produced to Plaintiffs.

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[8] Consultants from Precision Economics provided substantial assistance in the preparation of this report.

[9] See Ian Ayres, *Market Power and Inequality: A Competitive Conduct Standard for Assessing When Disparate Impacts are Justified*, 95 CAL. L. REV. 669 (2007) (available at http://islandia.law.yale.edu/ayres/Market%20Failure%20and%20Inequality.doc).

[10] New Century filed for bankruptcy in April 2007, and that the materials to which I refer as having been produced by or maintained by New Century have actually been produced by the liquidating trustee for the New

11. Table 1 shows the difference in likelihood (represented by the odds ratio[11]) that an African-American borrower would receive a Combined-Risk Loan, relative to a non-Hispanic white borrower with similar characteristics, from 2004 to 2007. I also measure the differences in likelihoods of African Americans receiving high-cost loans (as defined by HMDA and described below) relative to non-Hispanic white borrowers. I measure these differences (1) because high costs are the attribute common to all Combined-Risk Loans, (2) because New Century originated a sizable number of high-cost loans that did not meet the definition of a Combined-Risk Loan (as described below), and (3) because disparities in high-cost lending are commonly analyzed by regulators and researchers, as evidenced by the high-cost attribute being the sole loan-level pricing attribute that is publicly reported by regulators.[12]

Century Liquidating Trust and Reorganized New Century Warehouse Corporation. See, e.g., Defendants' Notice of Third-Party Subpoena, Jan. 14, 2014.

[11] The "odds ratio" is a standard statistical measure of the difference in likelihood of an outcome for a given subgroup relative to the likelihood of the same outcome for another subgroup. In Table 1, the Combined-Risk Loan odds ratio is the ratio of (1) the odds for an African-American borrower receiving a Combined-Risk Loan to (2) the odds of a non-Hispanic white borrower receiving a Combined-Risk Loan. This concept is discussed in more detail below.

[12] As I discuss below, these results are based on models that exclude loans purchased by New Century through its correspondent lending channel.

TABLE 1: SUMMARY OF AFRICAN-AMERICAN RACIAL DISPARITIES IN PRODUCT PLACEMENT, RELATIVE TO NON-HISPANIC WHITE BORROWERS (ODDS RATIOS & MARGINAL EFFECTS), 2004-2007

	All New Century Loans		New Century Loans Purchased by Morgan Stanley	
	Nationwide	Detroit Region	Nationwide	Detroit Region
Odds Ratio				
Combined Risk	1.231	1.347	1.148	1.362
High-Cost	1.500	2.119	1.373	2.136
Predicted Likelihood % of Given Loan for Borrower with Average Non-Race Characteristics				
Combined Risk, Non-Hispanic White	48.5%	82.7%	54.0%	81.7%
Combined Risk, African-American	53.7%	86.5%	57.4%	85.8%
High-Cost, Non-Hispanic White	77.1%	92.8%	80.1%	88.4%
High-Cost, African-American	83.5%	96.5%	84.6%	94.2%

12. As Table 1 shows, even after controlling for more than 15 categories of non-race factors discussed below, the odds that an African-American borrower would receive a Combined-Risk Loan from New Century was 1.231 times greater than that of a similarly situated non-Hispanic white borrower nationwide. In the Detroit region, the odds that an African-American borrower would receive a Combined-Risk Loan was 1.347 times greater than that of a non-Hispanic white borrower in the Detroit region with similar characteristics. All the disparities in Table 1 are statistically significant at the 99% confidence level.[13]

[13] As I discuss below, I use logistic regression analysis to measure disparities in product placement. In statistical terms, if the z-statistic for the logistic regression coefficient for the African-American explanatory variable is greater than 1.645, then the disparity is statistically significant at the 90% confidence level. If the z-statistic is greater than 1.960, then the disparity is statistically significant at the 95% confidence level. If the z-statistic is greater than 2.575, then the disparity is statistically significant at the 99% confidence level.

13. Table 1 also shows the likelihood of receiving a Combined Risk Loan for the hypothetical African-American borrower and non-Hispanic white borrower, both of whom have identical non-race characteristics that match the "average" for all borrowers in the given sample. For example, nationwide, the hypothetical African American had a 53.7% likelihood of receiving a Combined-Risk Loan, as opposed to the 48.5% likelihood for a non-Hispanic white borrower with identical non-race characteristics. Each of the differences between the likelihoods of receiving a Combined-Risk Loan for African Americans and non-Hispanic whites are statistically significant at the 99% confidence level.

14. These disparities persist when measured only for New Century loans purchased by Morgan Stanley. Nationwide, the odds of an African-American borrower receiving a Combined-Risk Loan that was purchased by Morgan Stanley was 1.148 times the odds of a non-Hispanic white borrower with similar characteristics receiving a Combined-Risk Loan that was purchased by Morgan Stanley. Among New Century loans in the Detroit region purchased by Morgan Stanley, the odds that an African-American borrower would receive a Combined-Risk Loan was 1.362 times the odds that a similarly situated non-Hispanic white borrower would receive a Combined-Risk Loan. Again, these disparities are statistically significant at the 99% confidence level.

15. Table 1 also shows the statistically significant disparities in the likelihood of African-American borrowers receiving high-cost loans. Nationwide, the odds of an African-American borrower receiving a high-cost loan from New Century was 1.500 times the odds of a non-Hispanic white borrower with similar characteristics receiving a high-cost loan from New Century. In the Detroit region, this odds ratio is 2.119. These disparities are statistically

significant at the 99% confidence level. Therefore, robust disparities persist when measuring the attribute common to all Combined-Risk Loans.

16. Among only those New Century loans purchased by Morgan Stanley, African-Americans were also more likely to receive high-cost loans that white borrowers with similar characteristics. Nationwide, the odds of an African-American borrower receiving a high-cost loan that was purchased by Morgan Stanley was 1.373 times the odds of a non-Hispanic white borrower with similar characteristics receiving a high-cost loan that was purchased by Morgan Stanley. Among New Century loans in the Detroit region purchased by Morgan Stanley, the odds that an African-American borrower would receive a high-cost loan was 2.136 times the odds that a similarly situated non-Hispanic white borrower would receive a high-cost loan. Again, these disparities are statistically significant at the 99% confidence level.

17. Table 1 provides substantial statistical evidence that African-American borrowers were more likely than non-Hispanic white borrowers to receive Combined-Risk Loans and high-cost loans.

18. My report is organized as follows. In Section IV, I give an overview of the appropriate methodology for statistical analysis in discrimination cases. In Section V, by using the internal data on New Century's mortgage originations and borrower characteristics produced by New Century and Morgan Stanley, I report statistical evidence that is consistent with the hypothesis of the disparate racial impact on African-Americans through New Century's Combined-Risk Loans. In Section VI, I examine the named Plaintiffs in this case and show that their situations are typical of other Class members in that they suffered disparate impact resulting from placement into Combined-Risk Loans.

19. My review of materials and data is continuing, and I reserve the right to modify my opinions as new materials emerge.

IV. BACKGROUND ON STATISTICAL ANALYSIS OF RACIAL DISPARITIES

20. Standard statistical tests, such as regression analysis, are available to test whether the policies of Morgan Stanley likely resulted in unjustified disparate impacts on African Americans such that African Americans were more likely to be placed in Combined-Risk Loans than non-Hispanic whites with similar risk characteristics.

A. Mortgage Industry Overview

1. Overview

21. The capital markets played an increasingly important role in financing residential mortgages in the United States in the years leading up to the financial crisis of 2007-2008. For many decades, under a variety of programs overseen by government sponsored enterprises such as the Federal National Mortgage Association (Fannie Mae) and Federal Home Loan Mortgage Corporation (Freddie Mac), conforming loans (or prime loans) have been repackaged into mortgage-backed securities (MBS) in a process known as securitization and funded through the capital markets. Since the mid 1990's, non-conforming residential mortgages (subprime, Alt-A and jumbo) have had access to capital market funding, initially through securitization transactions sponsored by private firms but later with support from expanded programs of the government sponsored enterprises.[14] Access to capital market funding sparked a dramatic increase in particular in the origination of subprime residential mortgages, with annual

[14] Adam B. Ashcraft & Til Schuermann, *Understanding the Securitization of Subprime Mortgage Credit*, Federal Reserve Bank of New York Staff Report No. 318 (Mar. 2008).

originations ballooning from an estimated $190 billion in 2001 to $600 billion and in 2006.[15] Over the same period, the percentage of subprime loans sold into the capital markets also expanded dramatically. By the mid 2000's, an estimated 75 percent of all new subprime loans were sold into the capital markets.[16] New Century was the second largest originator of subprime residential loans (in terms of loan amounts) each year from 2003 to 2006.[17] Despite originating loans for just over two months in 2007, New Century still ranked as the 13th largest subprime mortgage originator for the entire year of 2007.[18]

22. The emergence of capital market funding for the full spectrum of residential mortgages transformed the business model of many residential mortgage lenders in the United States. Traditionally, mortgage lenders made loans and then held them on their balance sheet. Under the capital market funding model upon which securitization depends, loan originators hold loans only for a brief period of time before selling the loans to mortgage pool assemblers who then resell large pools of mortgages to capital market investors in securitization transactions.[19] With this "originate to distribute" model, many major mortgage originators sell substantially all of their mortgage loans shortly after origination. When these loan originators make an individual mortgage loan, they have quite accurate estimates of the price at which that loan can be sold into the secondary market, based on a relatively limited number of factors concerning the type of loan (e.g., loan amount, fixed or adjustable rate terms, maturity, and loan purpose – home purchase or refinance), characteristics of the borrower (credit score, income-to-debt service ratios, loan-to-

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[15] *Id.* at 2.

[16] *Id.*

[17] Inside Mortgage Finance Publications, Inc., *The 2009 Mortgage Market Statistical Annual, Volume 1* (2009), at 214-220. New Century ranked as the 4th largest subprime originator in 2002, and the eight largest subprime originator in 2001. *Id*. at 221-222.

[18] *Id*. at 212.

[19] Kathleen C. Engel & Patricia A. McCoy, *Turning a Blind Eye: Wall Street Finance of Predatory Lending*, 75 FORDHAM L. REV. 102 (2007).

value ratio of the loan), geographic location (e.g., state), and a limited number of loan features (e.g., prepayment penalties and repricing formulas for adjustable rate mortgages).[20] Through the period at issue in this litigation, major mortgage originators constantly monitored the secondary mortgage market to ascertain changes that may affect the value of the loans that the firms are about to originate and used that information to update the pricing of their new mortgage originations. Under this originate-to-distribute business model, originator profits depend largely on the difference between the secondary market value of a loan at the time of origination and the originator's cost of making the loan, including most significantly the principal amount of the loan extended to the borrower and the credit risk factors associated with the loan.

23. Morgan Stanley ranked as the one of the fourteen largest non-agency issuers of subprime MBS from 2004 to 2006, and ranked as the third largest issuer in 2007.[21] Morgan Stanley also ranked as one of the top five underwriters of non-agency subprime MBS each year from 2002 to 2007.[22] New Century heavily relied on this originate-to-distribute model of funding through the capital markets.[23] Accordingly, New Century operated on a funding model that was dependent on secondary market pricing, and all of the information necessary for the market to value New Century mortgages, including their credit risk and loan structure, was communicated to potential investors in the form of loan-level data.

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[20] See Robert B. Avery et al., *Credit Risk, Credit Scoring, and the Performance of Home Mortgages*, FED. RES. BULL., July 1996, at 621; Alan M. White, *Risk-Based Mortgage Pricing: Present & Future Research*, 15 HOUSING POL'Y DEBATE 503 (2004). See also Howell E. Jackson, *Loan-Level Disclosure in Securitization Transactions: A Problem with Three Dimensions*, in MOVING FORWARD: THE FUTURE OF CONSUMER CREDIT AND MORTGAGE FINANCE (Brookings Press 2011), *available* at http://ssrn.com/abstract=1649657.

[21] Inside Mortgage Finance Publications, Inc., *The 2009 Mortgage Market Statistical Annual, Volume 2* (2009), at 137-144.

[22] *Id.*

[23] *See, e.g.*, New Century Financial Corp., SEC Form 10-K for Year Ended Dec. 31, 2005, filed Mar. 16, 2006, at 1 [hereinafter *New Century 2005 10-K*] ("We have historically sold our loans through both whole loan sales and securitizations structured as sales. Since 2003, we have also retained a portion of our loan production for investment on our balance sheet through securitizations structured as financings rather than sales.").

24. A system of Federal regulations governed the disclosure of information to borrowers in residential mortgage originations during the Class period. For example, in order to assist in identifying potential patterns of discriminatory lending practices, lenders have been required under HMDA Regulation C since 2004 to collect and report the spread between the Annual Percentage Rate ("APR") on a loan and a benchmark measure.[24] Beginning in 2004, that benchmark measure was the yield on Treasury securities of comparable maturity. The spread between the APR and the Treasury yield would be reported if the spread was equal to or greater than 3.0 percentage points for a first-lien loan (or 5.0 percentage points for a subordinate-lien loan). This benchmark remained in effect until late 2009, several years after New Century's bankruptcy.[25] In my analysis, I similarly define a loan to be "high-cost" if the rate spread between the loan's APR and the Treasury yield is equal to or greater than 3 percentage points for first-lien loans, or is equal to or greater than 5 percentage points for subordinate lien loans.

2. African Americans Often Have Been Shown to Receive Less Favorable Loan Terms than Whites with Similar Risk Characteristics through Lenders' Reverse Redlining Practices

25. Over the past two decades, a large number of academic studies have explored the relationship between borrower race and the availability or the cost of obtaining residential

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[24] Federal Financial Institutions Examination Council, *History of HMDA,* http://www.ffiec.gov/hmda/history2.htm.

[25] In December 2008, the Federal Reserve Board published a final rule to amend Regulation C to revise the rules for reporting price information on higher-priced loans. The rules were conformed to the definition of "higher-priced mortgage loan"' adopted by the Federal Reserve Board under Regulation Z (Truth in Lending) in July of 2008. Under the final rule amending Regulation C in 2008, a lender is required to report the spread between the loan's APR and a survey-based estimate of APRs currently offered on prime mortgage loans of a comparable type (called the "APR rate spread") if the spread was equal to or greater than 1.5 percentage points for a first-lien loan (or 3.5 percentage points for a subordinate-lien loan). See Federal Financial Institutions Examination Council, *History of HMDA,* http://www.ffiec.gov/hmda/history2.htm. Lenders were required to comply with this revised reporting threshold for applications taken on or after October 1, 2009 and loans that closed on or after January 1, 2010.

mortgage loans in the United States. Two literature reviews can be found in White (2009)[26] and Courchane (2007).[27] As explained in greater detail in these reviews, early academic studies focused on the relationship between mortgage denials and the racial composition of neighborhoods.[28] Early studies also included audit tests of lenders. For example, a 1999 study by the Urban Institute found that minorities were offered mortgages at higher rates than whites in similar circumstances.[29] The Urban Institute findings were based in part on paired audit testing conducted by the National Fair Housing Alliance that was carried out by people of different racial and ethnic backgrounds in a sample of seven cities. Each group of testers - including one white and one or more minorities - told lenders they had similar credit histories, incomes and financial histories, and had the same type of mortgage needs. The testing found that minorities were less likely to receive information about loan products, and received less time and information from loan officers. Most importantly for our purposes, this audit study found that minorities "were quoted higher interest rates in most of the cities where tests were conducted."[30]

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[26] Alan M. White, *Borrowing While Black: Applying Fair Lending Laws to Risk-Based Mortgage Pricing*, 60 S. CAROLINA L. REV. 677 (2009).

[27] See Marsha J. Courchane, *The Pricing of Home Mortgage Loans to Minority Borrowers: How Much of the APR Differential Can We Explain?*, 29 J. REAL EST. RES. 399 (2007). In her own analysis of loan costs, Dr. Courchane finds statistically significant disparities between loan costs for minority borrowers when compared to white borrowers. Although this aspect of Dr. Courchane's analysis is consistent with other studies of mortgage loan cost disparities, I have reservations concerning certain aspects of her methodology.

[28] *See, e.g*, Alicia H. Munnell et al., *Mortgage Lending in Boston: Interpreting HMDA Data*, 86 AM. ECON. REV. 25 (1996).

[29] Margery Austin Turner & Felicity Skidmore, the Urban Institute, MORTGAGE LENDING DISCRIMINATION: A REVIEW OF EXISTING EVIDENCE (1999).

[30] *Id*. at 2. See also *id*. at 30-31 (interest rate offered African Americans statistically greater than those offered whites only in Atlanta tests). The report also found:

"One early analytic study found discrimination against blacks and Hispanics in interest rates and loan fees but not in loan maturities. Another also found discrimination against blacks in the setting of interest rates. Both studies used extensive statistical controls to isolate the effect of race and ethnicity from the effects of other factors. Two more recent studies examine discrimination in overages, defined as the excess of the final contractual interest rate over the lender's official rate when it first commits to a loan. Both of these studies find cases in which the overages charged to black and Hispanic borrowers are higher than those charged white customers by a small but statistically significant amount." *Id*. at 13.

26. These earlier studies were suggestive of significant racial effects, but suffered from an absence of controls for credit risk and other underwriting considerations when examining substantially large samples of actual loan originations as opposed to more limited audit tests. Over time, as government reporting requirements improved and litigation and various investigations offered more complete data sets, researchers were able to include a number of these controls in their studies and developed more complete empirical models of the residential mortgage origination process. Some focused on the impact of race on the rate spreads between a benchmark Treasury rate and the APR and found statistically significant racial disparities.[31] Later studies expanded this analysis by controlling for loan channels, and found reduced, but still statistically significant racial effect on the APR of mortgage loans.[32] Yet other studies found statistically and economically significant racial disparities in the amount of compensation earned by mortgage brokers on residential mortgage originals and in FHA closing costs charged to borrowers.[33]

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[31] See Robert B. Avery et al., *New Information Reported Under HMDA and Its Application in Fair Lending Enforcement*, FED. RES. BULL., Summer 2005, at 344; Debbie Gruenstein Bocian, Keith S. Ernst, & Wei Li, Center for Responsible Lending, *Unfair Lending: The Effect of Race & Ethnicity on the Price of Subprime Mortgages* 3 (May 31, 2008), *available at* http://www.responsiblelending.org/mortgage-lending/research-analysis/rr011-Unfair_Lending-0506.pdf. See also Allen J. Fishbein & Patrick Woodall, Consumer Federation of America, *Subprime Cities: Patterns of Geographic Disparity in Subprime Lending* (Sept. 2005), *available at* http://www.consumerfed.org/pdfs/Subprimecities090805.pdf; and Allen J. Fishbein & Patrick Woodall, Consumer Federation of America, *Subprime Locations: Patterns of Geographic Disparity in Subprime Lending* (Sept. 2006), *available at* http://www.consumerfed.org/pdfs/SubprimeLocationsStudy090506.pdf (finding correlations between race and participation in subprime loan markets).

[32] See Courchane, *supra* note 27; but see White, *supra* note 26, at 685-686 (questioning the appropriateness of controlling for loan channels). See also Michael LaCour-Little, *The Pricing of Mortgages by Brokers: An Agency Problem?*, 31 J. REAL EST. RES. 235 (2009) (finding racial effects on note rates in some but not all models based on a sample of loans within conforming loan size parameters).

[33] See Howell E. Jackson & Laurie Burlingame, *Kickbacks or Compensation: The Case of Yield Spread Premiums*, 12 STANFORD J. L. BUS. & FIN. 289 (2007); Susan E. Woodward, U.S. Department of Housing & Urban Development, *A Study of Closing Costs for FHA Mortgages* (2008), *available at* http://www.huduser.org/Publications/pdf/FHA_closing_cost.pdf.

B. Introduction to Testing for Discrimination

27. Regression analysis is a statistical method for determining the relationship that exists in a set of data between a variable to be explained—called the "dependent variable"—and one or more "explanatory variables." The type of regression analysis I use to evaluate discrimination in loan product placement is known as "logistic" regression. In this case, the dependent variable is a binary variable representing whether the consumer received a given loan product with predatory characteristics. The explanatory variables in the logistic regression for product placement include the race and ethnicity of the borrower and other non-race characteristics of the borrower and property that affect the probability that a borrower receives a given loan product. The logistic regression model will show whether African-American borrowers were more likely to receive Combined-Risk Loans than non-Hispanic white borrowers even after controlling for plausible non-race characteristics.

28. The appropriate test for assessing whether there is a *prima facie* disparate racial impact in loan product placement is both simple and straightforward. One must compare the average likelihood of African-American New Century borrowers being placed into loans with predatory terms to the likelihood of non-Hispanic white New Century borrowers being placed into those loans. To the extent one finds that the likelihood of an African-American New Century borrower receiving a type of loan product is statistically larger than the likelihood of a non-Hispanic white New Century borrower receiving that type of loan product, one can conclude that New Century's product placement policy resulted in disparate racial impact. In Section V of this report, I present statistics consistent with disparate racial impact.

C. Tests for Disparate Impact Are Amenable to Aggregate Statistical Analysis

29. It is also possible with aggregate data to use regression analysis to statistically analyze whether disparate racial impact persists after adjusting for appropriate explanatory

factors. If, after including these variables in the regression, the racial disparity remains and is statistically significant at a given confidence level, then one can reject the null hypothesis that African Americans and white borrowers were placed into Combined-Risk Loans with equal likelihood.

30. The kinds of regressions that are appropriate for this analysis – what economists call logistic regressions with an appropriate number of right-hand side variables – are standard and generally accepted statistical techniques. In my experience, these are the forms of statistical analysis that government agencies and academic experts generally employ to detect discriminatory lending practices in financial institutions. And, particularly since the HMDA amendments went into effect in 2004, borrower APRs as defined under the Truth-in-Lending Act is the most common measure of the cost of borrowing in these analyses.[34]

31. Notice that the controls generally used turn on a person's ability to perform their part of the bargain – in the case of fair lending claims, that is primarily the capacity of the borrower to repay the loan according to its terms. In the credit context, other scholars have similarly applied a performance standard for determining what characteristics are relevant:

> Discrimination occurs whenever the terms of a transaction are affected by personal characteristics of the participants that are not relevant to the transaction. In credit markets, discrimination on the basis of race and/or gender exist if loan approval rates or interest rates charged differ across groups with equal ability to repay.[35]

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[34] For presentations by a Federal Reserve Board economist identifying APRs as an appropriate dependent variable and outlining a methodology comparable to the one employed in this report, see Lynn Gottschalk, *Fair Lending Modeling of Pricing Decisions* (Sept. 10, 2008), *available at* http://www.occ.treas.gov/flc/2008/Lynn%20Gottschalk.pdf.

[35] David G. Blanchflower, Phillip B. Levine, & David J. Zimmerman, *Discrimination in the Small Business Credit Market*, 85 REV. ECON. & STAT. 930 (Nov. 2003).

Again, it is legitimate to control for factors that relate to a person's probable performance of her contractual commitment – which in the credit context is chiefly whether or not the loan will be repaid:

> Discrimination may be apparent if banks approve loans to equally credit-worthy African-American and white-owned firms, but charge the African-American-owned firms a higher rate of interest.[36]

Focusing on creditworthiness or the likelihood of repayment is also consistent with a standard that focuses on a decisionmaker's costs. Borrowers who fail to pay off their loans can impose substantial costs on a lender. It would be appropriate in analyzing a lender's decisions about a borrower's cost of borrowing to control for factors that affect the likely costs of default.

32. The centralized electronic databases maintained by New Century and Morgan Stanley include abundant and comprehensive evidence of the basis on which New Century and Morgan Stanley evaluated individual borrowers' creditworthiness. This electronic data would allow New Century and Morgan Stanley to statistically evaluate factors related to the borrower's credit history, the loan collateral, the borrower's "capacity" to borrow and the borrower's stability.

33. The credit industry is in many ways unique in amassing centralized and aggregate data on the creditworthiness of individual borrowers. The use of statistical "credit scoring" systems to determine whether to grant a loan and at what rate is well established and has largely replaced more subjective determinations. As one reviewer of the credit scoring approach noted:

> The arrival of credit cards in the late 1960s made the banks and other credit card issuers realize the usefulness of credit scoring. The number of people applying for credit cards each day made it impossible both in economic and manpower terms to do anything but automate the lending decision. When these organizations used credit scoring, they found that it also was a much better predictor than any judgmental scheme and default rates would drop by 50% or more ...

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[36] *Id*. at 940.

> The event that ensured the complete acceptance of credit scoring was the passing of the Equal Credit Opportunity Acts (ECOA 1975, ECOA 1976) in the US in 1975 and 1976.[37]

Regulation B of ECOA comprehensively regulates the workings of "credit scoring systems" to assess creditworthiness:

> To qualify as an *empirically derived, demonstrably and statistically sound, credit scoring system*, the system must be: (i) Based on data that are derived from an empirical comparison of sample groups of the population of creditworthy and noncreditworthy applicants who applied for credit within a reasonable preceding period of time; (ii) Developed for the purpose of evaluating the creditworthiness of applicants with respect to the legitimate business interests of the creditor utilizing the system (including, but not limited to, minimizing bad debt losses and operating expenses in accordance with the creditor's business judgment); (iii) Developed and validated using accepted statistical principles and methodology; and (iv) Periodically revalidated by the use of appropriate statistical principles and methodology and adjusted as necessary to maintain predictive ability.[38]

34. Through the data on New Century's loan originations, I can reliably control for any creditworthiness variables that could influence the cost of the mortgage to the borrower. This is an industry where, except for discretionary pricing and product placement:

- loan pricing decisions are made by automated systems of regularly updated rate sheets used for wholesale and retail lending channels, and
- loan pricing decisions are based on the formulaic application of objective, statistically-validated criteria, which also determine the price at which loans are sold into the secondary market.

The whole purpose of this centralized credit pricing process is to base credit determinations on arms-length, objective criteria whose validity can be periodically assessed with aggregate statistical analysis.

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[37] Lyn C. Thomas, *A Survey of Credit and Behavioural Scoring: Forecasting Financial Risk of Lending to Consumers*, 16 INT'L J. FORECASTING 149, 151 (2000).

[38] Regulation B (Equal Credit Opportunity), 12 C.F.R. § 202.2 (p) (2009).

V. A STATISTICAL ANALYSIS OF MORGAN STANLEY'S DATA SHOWS EVIDENCE OF ADVERSE IMPACT BY RACE

35. In this section, I describe the mortgage loan-level data provided to Plaintiffs, which is evidence that I use to show disparate impact.

A. Overview of New Century and Morgan Stanley Data

36. Plaintiffs have been provided more than thirty files containing data from Morgan Stanley's database of loan-level data on 297,921 nationwide loans that were originated by New Century from 2000 through 2007 (99% of which were originated in 2002 or later) and were purchased by Morgan Stanley in 2002 or later.[39] Collectively, I refer to the data in these files as "Morgan Stanley's loan database" or "MS Data". Plaintiffs have also been provided documentation from Defendants' counsel describing the data contained in Morgan Stanley's loan database.[40] Morgan Stanley's loan database includes data about the applicants and the applicants' properties that Morgan Stanley used in its purchasing and securitization process. The database also includes details about the characteristics of the loans, including loan interest rates and the loan product.

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[39] MS00030251-270; MS00555830-841; MS00699611; MS02614379. The loan-level data for loans purchased by Morgan Stanley in 2002 and 2003 (MS02614379) is limited to loans that Morgan Stanley securitized in 2002 and 2003. See Letter from John DeGenova, WilmerHale, to Nicole D. Sugnet, Lieff, Cabraser, Heimann & Bernstein, LLP (Mar. 26, 2014), at 2.

[40] Letter from Danielle Conley, WilmerHale, to Rachel J. Geman, Lieff, Cabraser, Heimann & Bernstein, LLP (Mar. 8, 2013); Letter from Allison Snyder, WilmerHale, to Nicole D. Reynolds, Lieff, Cabraser, Heimann & Bernstein, LLP (Apr. 1, 2013); Letter from Danielle Conley, WilmerHale, to Nicole D. Reynolds, Lieff, Cabraser, Heimann & Bernstein, LLP (June 3, 2013); Letter from Danielle Conley, WilmerHale, to Nicole Reynolds, Lieff, Cabraser, Heimann & Bernstein, LLP (Aug. 6, 2013); Letter from Danielle Conley, WilmerHale, to Nicole Reynolds, Lieff, Cabraser, Heimann & Bernstein, LLP (Aug. 30, 2013); Letter from Noah Levine, WilmerHale, to Nicole D. Reynolds, Lieff, Cabraser, Heimann & Bernstein, LLP (Sept. 24, 2013); E-Mail from John DeGenova, WilmerHale, to Nicole D. Reynolds, Lieff, Cabraser, Heimann & Bernstein, LLP (Dec. 4, 2013); Letter from Noah Levine, WilmerHale, to Nicole D. Reynolds, Lieff, Cabraser, Heimann & Bernstein, LLP (Jan. 15, 2014); Letter from Noah Levine, WilmerHale, to Rachel Geman, Lieff, Cabraser, Heimann & Bernstein, LLP (Jan. 21, 2014); Letter from John DeGenova, WilmerHale, to Nicole D. Sugnet, Lieff, Cabraser, Heimann & Bernstein, LLP (Mar. 28, 2014).

37. Plaintiffs have also been provided four files containing data from New Century's database of loan-level data on 913,832 nationwide loans that were originated by New Century from 2004 to 2007, as well as 10,156 loans in the Detroit region originated by New Century from 2002 to 2003.[41] These files include loans that were sold to Morgan Stanley, loans that were sold to other investors, and loans that were held by New Century either for its own portfolio or for its own securitizations. Collectively, I refer to the data in these files as "New Century's loan database" or "NC Data." Plaintiffs have also been provided limited documentation from New Century's bankruptcy liquidation trustee describing the data contained in New Century's loan database.[42] New Century's loan database includes much of the same information concerning borrower and loan characteristics that is contained in Morgan Stanley's loan database. Some of the fields present in New Century's database that are not included in the Morgan Stanley data production are the loan APR, borrower names, the field *investor_name* (presumably the name of the purchaser of the loan after it was originated), and the race and ethnicity of the borrowers.

38. Both the New Century and Morgan Stanley loan databases include a field for the unique loan identifier, which I use to merge the two databases together into what I refer to as the "MS-NC Loan Database" or "MS-NC Data."[43] Both databases also include fields for the property address, city, state, and zip code. By geocoding this address data to determine the

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[41] NC_Adkins_MS 0003932; NC_Adkins_MS 0004215; NC_Adkins_MS 0019406; NC_Adkins_MS 0019407.

[42] Letter from Maria A. Arnott, Hahn & Hessen, to Larry Schwartztol, American Civil Liberties Union, and Danielle Conley, WilmerHale (Aug. 30, 2013); Letter from Maria A. Arnott, Hahn & Hessen, to Larry Schwartztol, American Civil Liberties Union (Oct. 22, 2013); Letter from Maria A. Arnott, Hahn & Hessen, to Skye L. Perryman, WilmerHale, and Larry Schwartztol, American Civil Liberties Union (Mar. 6, 2014); Letter from Maria A. Arnott, Hahn & Hessen, to Larry Schwartztol, American Civil Liberties Union (Apr. 2, 2014).

[43] The unique loan identifier in Morgan Stanley's loan database is *LOANID*. The unique loan identifier in New Century's loan database is *loan_no*.

metropolitan area in which each address is located, I am able to determine whether the loan was originated for a property in the nine-county Detroit region that comprises the Class area.[44]

39. To verify that the Morgan Stanley loan database generally covers the loans purchased by Morgan Stanley from New Century, I compare the loan matches between the two databases and the value of the *investor_name* field for those matched loans. Tables 2 and 3 show the rate of loan matches between the two databases and the incidence of the *investor_name* field from the New Century database for loans identified in either the Morgan Stanley or New Century databases as having been originated from 2004 to 2007.[45]

[44] To determine the metropolitan area in which each property is located, I either (1) geocode the property address using the TomTom Global Geocoder service (http://geocoder.tomtom.com) and match the resulting county to the Census list of counties in metropolitan areas (U.S. Census Bureau, Census 2010 Summary File 1; U.S. Census Bureau, *Metropolitan and Micropolitan Statistical Areas and Components, Dec. 2009*, https://www.census.gov/population/metro/files/lists/2009/List1.txt), (2) match the zip code for the property to Census data on zip code tabulation areas wholly within a metropolitan area (U.S. Census Bureau, 2010 ZCTA to Metropolitan and Micropolitan Statistical Areas Relationship File, http://www.census.gov/geo/maps-data/data/docs/rel/zcta_cbsa_rel_10.txt; U.S. Census Bureau, *Explanation of the 2010 ZCTA to Metropolitan and Micropolitan Statistical Areas Relationship File*, http://www.census.gov/geo/maps-data/data/pdfs/rel/explanation_zcta_cbsa_rel_10.pdf), or (3) looking up addresses and zip codes on web services such as the Federal Financial Institutions Examination Council, *FFIEC Geocoding/Mapping System*, http://www.ffiec.gov/geocode/Default.aspx, Google Maps (http://maps.google.com), Zillow (http://www.zillow.com), and Proximity One (http://proximityone.com/zipequiv.htm) to identify counties and metropolitan areas.

[45] I use the fields *DATEORIG* and *acct_fund_date* as the origination dates in the Morgan Stanley and New Century loan databases, respectively.

TABLE 2: CORRELATION BETWEEN PRESENCE OF LOANS IN MORGAN STANLEY & NEW CENTURY LOAN DATABASES & THE NEW CENTURY DATABASE INVESTOR NAME, 2004-2007

	# Loans in MS Data		# Loans Not in MS Data		Total	
Investor Name from NC Data	**Nationwide**	**Detroit Region**	**Nationwide**	**Detroit Region**	**Nationwide**	**Detroit Region**
Morgan Stanley	183,051	3,937	477	433	183,528	4,370
Other investor name	687	14	613,770	11,533	614,457	11,547
In NC Data, but no investor name given	283	3	115,565	98	115,848	101
Not present in NC data	17	0	0	0	17	0
Total	184,038	3,954	729,812	12,064	913,850	16,018

Note: I classify a loan as having "Morgan Stanley" as an investor name in the NC Data if the *investor_name* field value in any of the NC Data file productions are "MORGAN", "Rewrite - Morgan Stanley", "MS", "MSTANLEY", "Morgan Stanley MRA", or "Morgan Stanley Sale".
Sources: MS-NC Data.

TABLE 3: CORRELATION BETWEEN PRESENCE OF LOANS IN MORGAN STANLEY & NEW CENTURY LOAN DATABASES & THE NEW CENTURY DATABASE INVESTOR NAME, 2004-2007

	Nationwide	Detroit Region
% of Loans in MS Data that are in NC Data with Morgan Stanley Listed as Investor Name	99.5%	99.6%
% of Loans in Not in MS Data that are in NC Data with Morgan Stanley Listed as Investor Name	0.07%	3.59%
% of Loans in NC Data with Morgan Stanley Listed as Investor Name that are in MS Data	99.7%	90.1%
% of Loans in MS Data that Are Not in NC Data	0.01%	0.00%

40. Based on the tabulations in Tables 2 and 3, the data produced by Morgan Stanley for 2004-2007 loan originations appears to generally correspond to the loans identified by New Century as having Morgan Stanley as the investor. In addition, virtually all (99.9%) of the 2004-2007 loans produced by Morgan Stanley are present in the New Century loan database. *For purposes of my analysis, I assume that any loan present in both the Morgan Stanley and New Century loan databases was a New Century loan purchased by Morgan Stanley. I further assume that any loan not present in the Morgan Stanley loan database is a loan that was not purchased by Morgan Stanley. Finally, because loan APR and borrower race and ethnicity are either (1)*

omitted from the Morgan Stanley loan database, or (2) present in the Morgan Stanley loan database but with missing values for most loans, I only include loans in my analysis if they are present in the New Century loan database.

41. The New Century loan database includes a field *source_code_desc*, which appears to correspond to the business channel through which New Century originated the loan. Table 4 summarizes the entries for this field for 2004-2007 loan originations.

TABLE 4: NEW CENTURY LOAN ORIGINATIONS BY CHANNEL, 2004-2007

	All NC Loans		**MS Purchases**	
Channel (*source_code_desc*)	Nationwide	Detroit Region	Nationwide	Detroit Region
Wholesale Standard	655,487	11,773	135,374	2,925
Retail Standard	136,592	1,527	21,126	339
Correspondent-Flow	121,033	2,706	27,503	689
Commercial Standard	673	11	0	0
Correspondent-Bulk	40	0	15	0
No Entry	5	0	2	0
100.0	1	0	0	0
Concurrent	1	0	0	0
Total	913,832	16,017	184,020	3,953
Total, excluding Correspondent-Flow & Correspondent-Bulk	792,759	13,311	156,502	3,264

42. New Century, like many lenders at the time, used correspondent lenders. New Century describes its relationship with its correspondent lenders in its 2005 10-K:

> Our Wholesale Division also purchases funded loans on an individual or "flow" basis from independent mortgage bankers and financial institutions known as correspondent lenders. We review an application for approval from each lender that seeks to sell us a funded loan. We also review their financial condition and licenses. We require each mortgage banker to enter into a purchase and sale agreement with us containing customary representations and warranties regarding the loans the mortgage banker will sell to us. These representations and warranties are comparable

> to those given by us to the purchasers of our loans. Once the correspondent lender is approved, we re-underwrite each loan we purchase from them.[46]

I have been asked to exclude correspondent loans from my main analysis. However, Appendices 6 and 7 include results from my disparate impact models that show similar disparities if correspondent loans were included in the analysis.[47] In addition, because nationwide data for New Century's loan originations has been produced for only the period 2004 to 2007, I focus my analysis through the remainder of this report on New Century loans originated from 2004 to 2007.

43. The data provided to date is sufficient to test for adverse impact of Combined-Risk Loans and the attribute common to all Combined-Risk Loans: high cost pricing. Nevertheless, I reserve the right to modify my analysis should additional data become available.

1. Racial Demographics of New Century's Borrowers

44. New Century's loan database includes information on the race and ethnicity of the borrower and co-borrower.[48] These race classifications appear to follow the conventions set forth through HMDA data filing requirements.[49] Before 2004, loan applicant race and ethnicity were

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[46] *New Century 2005 10-K*, *supra* note 23, at 6.

[47] See Model (2-AllCh) in Appendices 6, 7, and 8.

[48] Morgan Stanley's database also includes fields on borrower and co-borrower race and ethnicity. However, the field for borrower race (*BORPRACE*) and co-borrower race (*BORCRACE*) each have no value for 80% of the 2004-2007 loans in the nationwide Morgan Stanley data. There is no data present in the fields for borrower and co-borrower ethnicity (*BORPETHNICITY* and *BORCETHNICITY*) for 96% of the 2004-2007 loans in the nationwide Morgan Stanley data. On the other hand, the borrower race and borrower ethnicity fields (*borr_ethnicity_code* and *borr_race_code*) in the New Century database have no data for less than 0.1% of the 2004-2007 loan originations in the nationwide New Century data. The New Century database has missing values for the co-borrower race and ethnicity (*coborr_race_code* and *coborr_ethnicity_code*) for 16% of the loans in the nationwide New Century data. Nearly all of the 2004-2007 loans with missing values in the co-borrower race & ethnicity fields are 2004 loans.

[49] A comparison of the race and ethnicity fields from the New Century database to the publicly-available HMDA data on a sample of loans from the nationwide New Century loan database shows that the codes in New Century's race and ethnicity fields generally match the codes for race and ethnicity in the HMDA data. See Appendix 4 for details. Therefore, I use the race and ethnicity fields from the New Century database for my analysis, and I assume the values in those fields correspond to the HMDA race and ethnicity code definitions for the year in which the loan was originated.

identified in a single variable according to the HMDA standards.[50] The six HMDA race classifications for loans before 2004 were American Indian or Alaska Native, Asian or Pacific Islander, Black, Hispanic, White, or Other. Beginning in 2004, HMDA records ethnicity and race in separate variables. The two ethnicity options consisted of Hispanic or Latino, or not Hispanic or Latino. Therefore, an applicant can be identified with both a race and an ethnicity beginning in 2004. For example, an applicant can be identified as being both African American and Hispanic.[51] Before 2004, that applicant could only be identified as either African American or Hispanic, but not both.

45. For all loans (pre-2004 and post-2004), the race and ethnicity can be recorded by the lender as not provided if the application was not taken in-person and the applicant failed to give a response to the race or ethnicity questions on the loan application. If the applicant was "not a natural person" (such as a business), then the race and ethnicity was recorded as "Not applicable".[52]

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[50] For a discussion of the changes in HMDA reporting standards for race and ethnicity, *see* Federal Reserve, *Frequently Asked Questions about the New HMDA Data* (Mar. 31, 2005), *available at* http://www.federalreserve.gov/boarddocs/press/bcreg/2005/20050331/attachment.pdf.

[51] The HMDA standards also allow for applicants and co-applicants to be assigned to multiple race classifications beginning in 2004. However, New Century's database only includes one race each for the borrower and co-borrower. According to the public HMDA data, only 0.5% of New Century's loan originations from 2004 to 2006 had either the borrower or co-borrower reporting multiple races. (The publicly-available HMDA data does not include New Century's 2007 loan originations because New Century, as a bankrupt institution, did not report HMDA data for 2007.) Therefore, the omission of the additional race codes from New Century's database should not materially affect my analysis.

[52] *See, e.g.*, Federal Financial Institutions Examination Council, *A Guide to HMDA Reporting: Getting It Right!* (2006 ed.), at A-5 – A-7, *available at* http://www.ffiec.gov/Hmda/pdf/2006guide.pdf. Applicants could also be classified according to HMDA standards as "Not applicable" under other circumstances if the loan application was taken in 2003 but final action on the loan did not occur until 2004 or later. See *SUPPLEMENT I TO PART 203—Staff Commentary*, Regulation C (Home Mortgage Disclosure), 12 C.F.R. § 203.4(a)(iv)(B)(3) (2009).

46. For purposes of my basic analysis of discrimination by borrower race,[53] I assign each loan to a single race based on the race and ethnicity of the borrower or co-borrower in New Century's loan database in a sequential order. First, I classify the race of a loan as "African American" if the race given for either the borrower or co-borrower is African American. Next, I classify the race of a loan as "Hispanic" if (1) the ethnicity of the borrower or co-borrower is "Hispanic or Latino", and (2) I do not classify the loan as "African American". I classify the race of a loan as "Asian or Pacific Islander" if (1) the race given for either the borrower or co-borrower is Asian, Hawaiian, or Pacific Islander, and (2) I do not classify the loan as "African American" or "Hispanic". I classify the race of a loan as "American Indian" if (1) the race given for either the borrower or co-borrower is American Indian or Alaskan Native, and (2) I do not classify the loan as "African American", "Hispanic", or "Asian or Pacific Islander". I classify the race of a loan as "White" if (1) the race listed for the borrower or co-borrower is White, (2) any other races listed for the borrower and co-borrower are unknown or missing, and (3) I do not classify the loan as "African American", "Hispanic", "Asian or Pacific Islander", or "American Indian". I classify the race of all other loans as "Missing". Table 4 shows the breakdown of the loans in New Century's loan database by year of origination based on this racial classification.

[53] In Models (3) and (4) of Appendices 6 and 7, I analyze alternative racial/ethnic classifications of loans, which do not affect the substance of the findings of disparate impact in my basic analysis.

TABLE 5: RACIAL COMPOSITION OF BORROWERS IN NEW CENTURY'S LOAN DATABASE, 2004-2007

All NC Loans, Nationwide

Year of Origination	African Amer.	Hispanic	Amer. Indian	Asian or Pac. Isl.	Missing	White	Total
2004	34,729	50,159	2,705	11,870	12,370	102,311	214,144
2005	44,124	63,207	1,815	14,636	17,103	125,824	266,709
2006	54,777	61,226	1,269	13,144	15,729	130,263	276,408
2007	6,080	7,170	130	1,500	4,590	16,028	35,498
Total	**139,710**	**181,762**	**5,919**	**41,150**	**49,792**	**374,426**	**792,759**
% of Total	**17.6%**	**22.9%**	**0.7%**	**5.2%**	**6.3%**	**47.2%**	**100.0%**

NC Loans Purchased by MS, Nationwide

Year of Origination	African Amer.	Hispanic	Amer. Indian	Asian or Pac. Isl.	Missing	White	Total
2004	12,116	15,353	975	3,464	4,059	34,308	70,275
2005	4,906	6,464	154	1,325	1,712	12,227	26,788
2006	13,075	14,195	314	2,793	1,694	26,684	58,755
2007	153	168	3	26	63	271	684
Total	**30,250**	**36,180**	**1,446**	**7,608**	**7,528**	**73,490**	**156,502**
% of Total	**19.3%**	**23.1%**	**0.9%**	**4.9%**	**4.8%**	**47.0%**	**100.0%**

All NC Loans, Detroit Region

Year of Origination	African Amer.	Hispanic	Amer. Indian	Asian or Pac. Isl.	Missing	White	Total
2004	1,743	112	36	98	93	2,664	4,746
2005	1,639	79	27	57	131	2,019	3,952
2006	2,126	78	11	52	89	1,768	4,124
2007	223	8	1	10	54	193	489
Total	**5,731**	**277**	**75**	**217**	**367**	**6,644**	**13,311**
% of Total	**43.1%**	**2.1%**	**0.6%**	**1.6%**	**2.8%**	**49.9%**	**100.0%**

NC Loans Purchased by MS, Detroit Region

Year of Origination	African Amer.	Hispanic	Amer. Indian	Asian or Pac. Isl.	Missing	White	Total
2004	687	36	16	30	26	978	1,773
2005	239	8	3	8	13	199	470
2006	524	32	5	9	15	429	1,014
2007	5	0	0	0	0	2	7
Total	**1,455**	**76**	**24**	**47**	**54**	**1,608**	**3,264**
% of Total	**44.6%**	**2.3%**	**0.7%**	**1.4%**	**1.7%**	**49.3%**	**100.0%**

47. As Table 4 shows, 17.6% of the nationwide loans I analyze from the MS-NC Data were made to African Americans, and 43.1 percent of the Detroit region loans I analyze were made to African Americans. More than 139,700 New Century loans were made to African-American borrowers nationwide from 2004 to 2007, and more than 30,200 of these loans were purchased by Morgan Stanley. More than 5,700 New Century loans were made to African-American borrowers from 2004 to 2007 in the Detroit region, and more than 1,400 of these loans were purchased by Morgan Stanley.[54]

2. Loan Characteristics Included in Morgan Stanley and New Century's Data

48. Both the Morgan Stanley loan database and the New Century loan database include numerous variables related to the characteristics of the borrower, home, and loan. Home characteristics include the type of property (such as single-family, condo, or manufactured housing) and whether the property will be owner-occupied. Borrower characteristics (besides race and ethnicity) include the debt-to-income ratio, credit score, and whether the borrower is self-employed.

49. Loan characteristics in the database include the loan amount, the purpose of the loan (such as purchase, cash-out refinance, or rate and term refinance), the term length of the loan (10-year, 15-year, 30-year, etc.), the presence of a prepayment penalty, whether the loan has an interest-only term, whether the loan has a fixed rate or an adjustable rate, whether the loan has a balloon payment, and the lien status of the loan (first lien or subordinate lien). The New Century loan database also categorizes each loan by one of 33 unique loan program descriptions

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[54] Concerns about the "Missing" race observations can be mitigated by applying well-accepted statistical methods to the New Century loan-level data to impute borrower race for the loans with missing information. *See, e.g.*, Gary King et al., *Analyzing Incomplete Political Science Data: An Alternative Algorithm for Multiple Imputation*, 95 AM. POL. SCI. REV. 49 (2001). There is no reason to assume that instances of "missing" race are anything but random, and no reason to assume that knowledge of the actual borrower races of these loans would affect the racial disparities measured in my analysis below.

in the *program_desc_1* field. These descriptions include "2 Year Rate, LIBOR Based," "30Yr Fixed", and "Interest Only - 2Yr." Morgan Stanley's loan database categorizes each loan by one of 25 unique loan program description codes in the *CDPRODUCT* field. Descriptions for these loan product codes include "Fixed – 30 Year", "ARM - 2 Year/6 Month 30/40", and "ARM - 2 Year/6 Month." [55]

50. Because both the Morgan Stanley and New Century loan databases' coverage for certain characteristics overlap, I examine the values for these characteristics in both databases to determine which values to use in my analysis. Table 6 is a comparison of the data for selected characteristics from the Morgan Stanley and New Century databases.

[55] Letter from Danielle Conley, WilmerHale, to Nicole D. Reynolds, Lieff, Cabraser, Heimann & Bernstein, LLP (June 3, 2013).

TABLE 6: DIFFERENCES BETWEEN VALUES FOR LOAN CHARACTERISTICS COMMON TO BOTH MORGAN STANLEY & NEW CENTURY DATA PRODUCTION, 2004-2007

Field	% of 156,502 Loans in Both Morgan Stanley & New Century Nationwide Data with Missing Data for Given Characteristic		% of Loans in Both Morgan Stanley & New Century National Data with Unequal Values
	Morgan Stanley Field	New Century Field	
FICO	0.00%	0.05%	0.09%
Loan-to-value (LTV)	0.00%	0.00%	1.43%
Combined loan to value (CLTV)	0.00%	0.00%	21.84%
Debt-to-income (DTI)	0.00%	0.04%	2.39%
Housing debt-to-income (HTI)	0.34%	0.37%	2.08%
Loan purpose	0.00%	0.08%	0.26%
Occupancy	0.00%	0.00%	0.00%
Property type	0.00%	0.00%	0.06%
Lien status	0.00%	0.00%	0.00%
Documentation type	0.00%	0.00%	0.04%
Self-employment	0.15%	0.19%	1.28%
State	0.00%	0.00%	0.00%
Origination Date	0.00%	0.00%	0.44%
Origination Month	0.00%	0.00%	0.17%
Origination Year	0.00%	0.00%	0.03%
Fixed vs. ARM	0.00%	0.00%	0.01%
Interest-only presence	0.00%	0.00%	0.00%
Balloon	0.00%	0.00%	0.00%
Prepayment penalty presence	0.00%	0.00%	2.49%
Loan term	0.00%	0.00%	0.06%
Loan amount	0.00%	0.00%	0.02%

51. For characteristics with overlapping information in the Morgan Stanley and New Century databases, Table 6 shows that (1) the values for the fields corresponding to those characteristics are typically non-missing in both databases, and (2) the values in the New Century loan database are generally equal to the values in the Morgan Stanley database, with the exception of the combined loan-to-value ratio (CLTV). A substantial share (70%) of the loans with unequal values for CLTV in the two databases show (1) a CLTV value of 100% in the New Century data, (2) a CLTV value of 80% in the Morgan Stanley data, and (3) a concurrently

originated loan number in the New Century data. These loans with unequal CLTVs likely represent the first-lien loan portion of a combined first-lien and subordinate-lien loan origination in which the borrower did not make a down payment, borrowed 80% of the home price in the first-lien loan, and borrowed 20% of the home price in the subordinate lien loan. Therefore, it is likely that the New Century CLTV is the accurate figure, as CLTV is a measure that captures the sum of all loans made by the borrower on the property. Therefore, in the analysis described below, I use the characteristic for a given loan as described in the New Century loan database, unless that information is missing from the New Century loan database. In those instances, I use the information from the Morgan Stanley loan database.[56]

52. Appendix 5 includes summary statistics of the borrower, home, and loan characteristics contained in the MS-NC Data. Should Morgan Stanley or New Century produce additional variables or loan data to Plaintiffs that would be appropriate to incorporate in a disparate impact analysis, I will update my analysis accordingly.

B. Identifying Combined-Risk and High-Cost Loans

53. A variety of loan terms can artificially increase the risk of borrower default by increasing, for example, the chance that the borrower's periodic payment will increase to an amount that the borrower is not able to repay or refinance. The relevant terms in this case are as follows:

- High-cost loans: High-cost loans, as defined pursuant to HMDA regulations, have a higher risk of default due to their higher costs to borrowers (through upfront fees, higher monthly payments, or a combination of both) than loans that are not high-cost.

[56] As a sensitivity test, I also present results from separate regressions in Appendices 6 and 7 for which only New Century data fields (Model (9)) or only Morgan Stanley data fields (Model (10)) are used to construct the dependent and explanatory variables, when available, and find that this choice does not affect the substance of the findings of disparate impact in my basic analysis.

- Adjustable-rate mortgages ("ARMs"): ARMs have a higher risk of default due to the possibility of increasing future monthly payments that may outstrip the ability of the borrower to pay.

- Interest-only periods: These loans have lower initial payments during the interest-only period, during which only the interest portion of a loan payment must be made. However, once the interest-only period ends, the borrower is subject to an increase in the monthly payment amount that may outstrip the ability of the borrower to pay.

- Balloon payments: Loans with balloon payments feature initial monthly payments based on a longer loan term, but require a balloon payment at the end of the loan term to make up for the remaining loan principal that was not paid from the initial lower payments. Similar to interest-only loans, borrowers with balloon payments are subject to payment of an amount that may outstrip the borrower's ability to pay. New Century stated in its 2004 10-K that it did not offer loans with balloon payments at that time "[i]n an effort to prevent the origination of loans containing unfair terms or involving predatory practices."[57] The New Century loan database shows that New Century began originating loans with balloon payments in 2005.

- Negative amortization features: Often called "option ARMs" or "pick-a-payment" loans in the mortgage industry, these loans allow borrowers to make lower monthly payments than what would normally be required. However, the unpaid interest rolls into the principal of the loan, resulting in the principal balance of the loan *increasing* over time. Additional interest accrues on this increased principal, and at some point the borrower will face a payment shock once he is obliged to start paying off this increased principal. In its 2004 10-K, New Century stated that it did not offer loans with negative amortization features at that time "[i]n an effort to prevent the origination of loans containing unfair terms or involving predatory practices."[58] The New Century loan database suggests that New Century began originating loans with negative amortization in 2005.[59]

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[57] New Century Financial Corp., SEC Form 10-K for Year Ended Dec. 31, 2004, filed Mar. 16, 2005, at 23.

[58] *Id.*

[59] I identify loans beginning with the term "Option Loan" in the *program* field of the New Century loan database as potentially having negative amortization features. The earliest loans with an "Option Loan" program in New Century's loan database were originated in 2005.

- Prepayment penalties: Borrowers with prepayment penalties face an additional hurdle to refinancing a loan should they experience a payment shock. If the borrower wishes to prepay the loan before the prepayment penalty period has ended, then the borrower must pay the lender a penalty fee. This fee serves as an additional cost to borrowers who may wish to exit a risky loan. In the Handbook of Fair Lending for the Office of the Comptroller of the Currency ("OCC"), prepayment penalties are specifically cited as an indicator of potentially discriminatory lending:

> Significant differences in the number of originations of higher-priced loans or loans with potentially negative consequences for borrowers (e.g., non-traditional mortgages, prepayment penalties, lack of escrow requirements) in areas with relatively high concentrations of residents of a particular racial or national origin group compared with areas with relatively low concentrations of residents of such racial or national origin group.[60]

- Stated income documentation requirements: Lenders such as New Century may have originated loans based on "stated" income, rather than fully documented and verified income, in order to qualify borrowers for loan products they may not otherwise be able to afford.[61] Brokers and loan officers may have placed borrowers into "stated" income loans where the stated income was higher than the borrowers' actual income.

- High debt-to-income ratios (DTI): A borrower with a high DTI would be servicing debt with much of his income, leaving him vulnerable to payment shock if any of his circumstances changed (including, but not limited to, monthly loan payment changes, employment changes, or health changes).

- High loan-to-value ratios (LTV): A high LTV can indicate that a borrower has less "skin in the game" and would thus be more likely to default (with little equity to risk) than a borrower with a lower LTV.[62] In addition, a borrower would be less able to refinance should he experience a payment shock early in the life of the loan when he has little equity.

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[60] Office of the Comptroller of the Currency, *Fair Lending, Comptroller's Handbook* (Jan. 2010), available at http://www.occ.gov/publications/publications-by-type/comptrollers-handbook/Fair%20Lending%20Handbook.pdf, at 28.

[61] See, e.g., *Complaint*, at ¶44-50.

[62] Austin Kelly, *"Skin in the Game": Zero Down Payment Mortgage Default*, 17 J. HOUSING RES. 75 (2008); Ian Ayres and Joshua Mitts, *Three Proposals for Regulating the Distribution of Home Equity*, YALE J. REG. (forthcoming 2014), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2161545.

54. I classify a loan in the MS-NC loan database as a "Combined-Risk Loan" if it meets the criteria for such a loan as described in the Complaint: it must be high-cost *and* it must have at least two other predatory characteristics (stated-income documentation, debt-to-income ratio exceeding 55%, loan-to-value ratio of at least 90%, adjustable rates, interest-only periods, balloon payments, and prepayment penalties).[63] I define a loan to be "high-cost" if the rate spread between the loan's APR and the yield on Treasury securities of comparable maturity is equal to or greater than 3 percentage points for first-lien loans, or is equal to or greater than 5 percentage points for subordinate lien loans.[64] Figure 1 shows the distribution of these types of loans among all New Century loans and just those purchased by Morgan Stanley, both in the Detroit region and nationwide.

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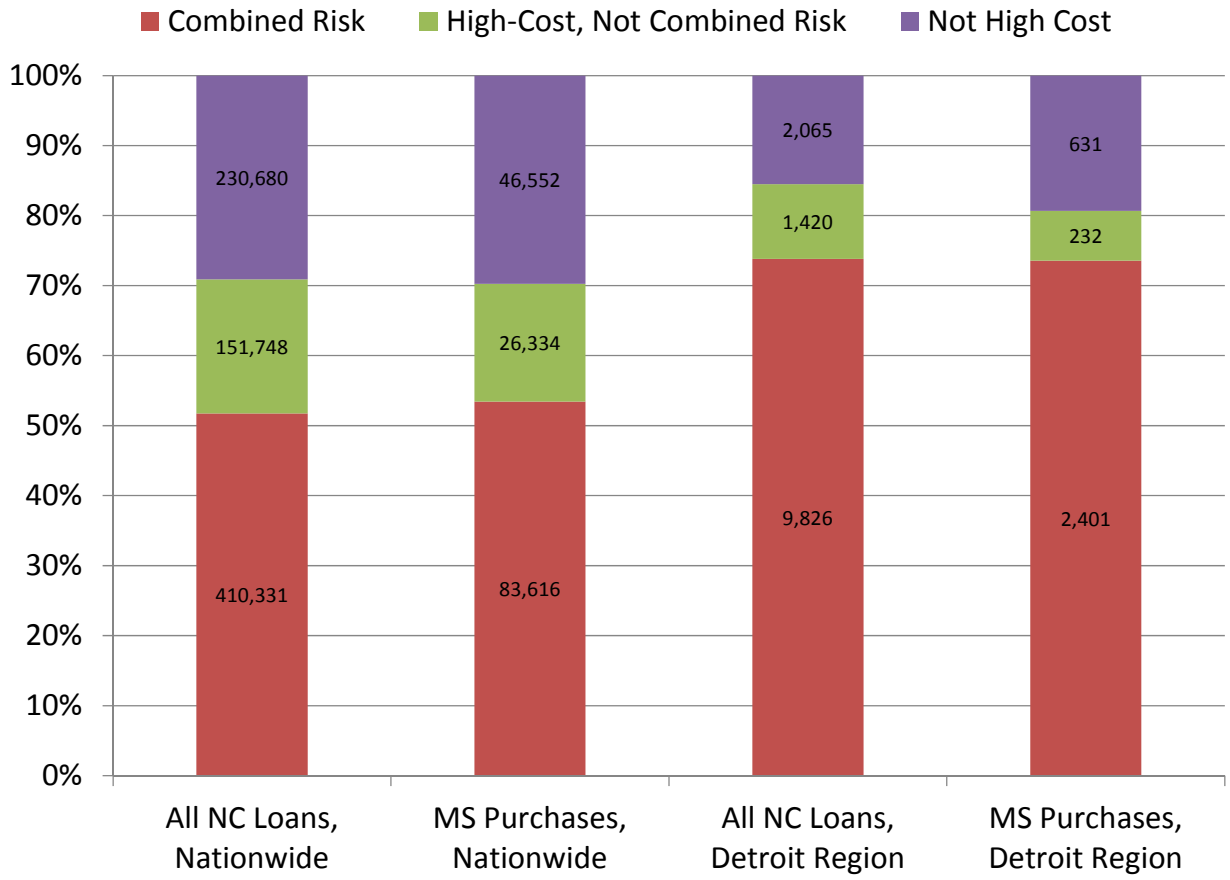
[63] I am unable to identify fields in the MS-NC loan database that indicate whether a loan had negative amortization features. The presence of the word "Option" in the *program* field in New Century's loan database may suggest that a loan has negative amortization features, but this term is only present in the *program* field for less than 0.2% of the loans in my analysis. Furthermore, all loans with the word "Option" in the *program* field are also classified as being ARMs and having interest-only terms. Because negative amortization loans are typically interest-only ARMs, loans with negative amortization features likely include at least two of the other high-risk features identified by Plaintiffs. Therefore, my methodology likely classifies all high-cost loans with negative amortization features as Combined-Risk Loans.

[64] The APR for each loan is reported in the New Century loan database. I determine the Treasury yield based on the origination date of the loan, the loan term (e.g., 30 years, 20 years, 10 years), and the Treasury yield used by the Federal Financial Institutions Examination Council (FFIEC) for that loan term and origination date. I use the origination date, even though HMDA regulations stipulate that the rate lock date be used, because the rate lock date is missing for 92% of the loans in the New Century loan database. For dates after December 15, 2005, the Treasury yields are published at Federal Financial Institutions Examination Council, *OLD FFIEC Rate Spread Calculator*, http://www.ffiec.gov/ratespread/oldcalc.aspx; Federal Financial Institutions Examination Council, *Treasury Securities of Comparable Maturity under Regulation C*, http://www.ffiec.gov/ratespread/YieldTable.CSV. For Treasury yields before December 15, 2005, I use the Treasury yields published by the Federal Reserve. See Federal Reserve Statistical Release H.15, Data Download Program, http://www.federalreserve.gov/datadownload/Choose.aspx?rel=H.15.

FIGURE 1: NEW CENTURY'S COMBINED-RISK AND HIGH-COST LOANS, 2004-2007



55. As Figure 1 shows, just over 50% of New Century's 2004-2007 nationwide loan originations were Combined-Risk Loans. Figure 1 also shows that approximately 70% of its 2004-2007 nationwide loan originations were high-cost loans. These shares are approximately the same when only loans purchased by Morgan Stanley are considered. In the Detroit region, 74% of New Century's 2004-2007 loan originations were Combined-Risk Loans, and 84% were high-cost loans.

56. Table 7 shows the share of New Century loan originations that were Combined-Risk Loans and high-cost loans, by year of origination.

TABLE 7: NEW CENTURY'S COMBINED-RISK AND HIGH-COST LOANS, BY YEAR

Year	All NC Loans			
	Nationwide		Detroit Region	
	% Combined-Risk Loans	% High-Cost Loans	% Combined-Risk Loans	% High-Cost Loans
2004	32%	47%	57%	66%
2005	60%	81%	81%	94%
2006	58%	79%	85%	96%
2007	56%	76%	83%	94%
Total	**52%**	**71%**	**74%**	**84%**

Year	MS Purchases			
	Nationwide		Detroit Region	
	% Combined-Risk Loans	% High-Cost Loans	% Combined-Risk Loans	% High-Cost Loans
2004	32%	44%	60%	67%
2005	71%	90%	89%	97%
2006	71%	92%	90%	98%
2007	70%	95%	86%	100%
Total	**53%**	**70%**	**74%**	**81%**

57. Table 7 shows that the incidence of Combined-Risk Loans and high-cost loans increased substantially from 2004 to 2005. Table 7 also shows that Combined-Risk Loans and high-cost loans comprised a greater share of Morgan Stanley's purchases of New Century loans from 2005 to 2007 than they did of New Century's overall portfolio of originations. Nationwide, more than 70% of the 2005-2007 New Century loans purchased by Morgan Stanley were Combined-Risk Loans, and more than 90% of the 2005-2007 New Century loans purchased by Morgan Stanley were high-cost loans. Nearly 90% of the 2005-2007 New Century loans purchased by Morgan Stanley in the Detroit region were Combined Risk Loans, and nearly all New Century loans in the Detroit region from 2005 to 2007 were high-cost loans.

58. Table 8 shows the incidence of the attributes of Combined-Risk Loans among Combined-Risk Loans, high-cost loans, and loans that are not high cost.

TABLE 8: RISK ATTRIBUTES OF NEW CENTURY 2004-2007 NATIONWIDE LOAN ORIGINATIONS

	High-Cost				
	All High-Cost	Combined-Risk	High-Cost, Not Combined-Risk	Not High-Cost	Total
# of Loans	562,079	410,331	151,748	230,674	792,759
% with LTV ≥ 90%	19.7%	26.1%	2.5%	15.8%	18.6%
% with DTI > 55%	0.3%	0.4%	0.1%	1.7%	0.7%
% with Stated Doc	43.1%	52.3%	18.5%	29.6%	39.2%
% ARM	67.2%	85.0%	19.1%	34.3%	57.6%
% Interest-Only	14.7%	20.1%	0.1%	12.9%	14.2%
% Balloon	16.8%	22.8%	0.6%	3.4%	12.9%
% Prepayment Penalty	66.7%	79.4%	32.5%	59.0%	64.5%

59. The most common characteristics of Combined-Risk Loans shown in Table 8 are adjustable rates and prepayment penalties. Table 8 shows that 85.0% of Combined-Risk Loans were ARMs, and 79.4% of Combined-Risk Loans had prepayment penalties. Other than high DTI, Combined-Risk Loans have a higher incidence of the risky attributes shown in Table 8 than loans that are not Combined-Risk.

60. Figure 1 and Table 8 also show that New Century originated more than 150,000 high-cost loans that were not Combined-Risk Loans. The high-cost attribute of loans is a typical measure used by regulators to detect discrimination.[65] Although I focus my analysis below on racial disparities in Combined-Risk Loans, I also analyze below whether African-American borrowers were more likely to receive high-cost loans than non-Hispanic white borrowers, regardless of whether those high-cost loans were Combined-Risk Loans.

[65] See, e.g., Federal Reserve, *Frequently Asked Questions about the New HMDA Data* (Mar. 31, 2005), at 5, *available at* http://www.federalreserve.gov/boarddocs/press/bcreg/2005/20050331/attachment.pdf.

C. Mean Comparisons Show that African-American Borrowers Were More Likely to Receive Combined-Risk Loans than White Borrowers with Similar Risk Characteristics

61. As I discussed above, regression analysis is the primary tool I use to estimate disparity in product placement to minorities for Combined-Risk Loans and high-cost loans because regression analysis can control for the loans' risk-based characteristics and other characteristics that could plausibly influence loan pricing and product placement. Before performing the regression analysis, I first examine the simple mean incidence of product placement for African-American borrowers and non-Hispanic white borrowers.

62. Table 9 shows the number of New Century originations to African-American borrowers that were Combined-Risk Loans or high-cost loans. Table 9 also shows, among Combined-Risk Loans and high-cost loans, the number of unique borrower or co-borrower names that are identified as African-American in the MS-NC Data. For example, Table 8 shows that there are 4,633 unique names identified as African-American borrowers or co-borrowers among the 4,620 Combined-Risk Loan originated by New Century to African-Americans in the Detroit region from 2004 to 2007.

TABLE 9: NUMBER OF NEW CENTURY'S 2004-2007 COMBINED-RISK LOANS & HIGH-COST LOANS MADE TO AFRICAN-AMERICAN BORROWERS AND CO-BORROWERS

	Nationwide		Detroit Region	
	All NC Loans	MS Purchases	All NC Loans	MS Purchases
# of Combined-Risk Loans Made to African-Americans	79,541	17,090	4,620	1,149
# of Unique Names for Borrowers/Co-Borrowers Identified as African-Americans among Combined-Risk Loans	77,529	18,974	4,633	1,221
# of High-Cost Loans Made to African-Americans	112,279	23,292	5,228	1,280
# of Unique Names for Borrowers/Co-Borrowers Identified as African-Americans among High-Cost Loans	97,583	25,257	5,061	1,361

63. Table 10 shows the share of New Century originations to African-American borrowers and non-Hispanic white borrowers nationwide and in the Detroit region that were Combined-Risk Loans.

TABLE 10: PERCENT OF NEW CENTURY'S 2004-2007 LOANS THAT WERE COMBINED-RISK LOANS, BY BORROWER RACE

Year	All NC Loans					
	Nationwide			Detroit Region		
	African American	Non-Hispanic White	*Odds Ratio*	African American	Non-Hispanic White	*Odds Ratio*
2004	37%	31%	1.286***	66%	52%	1.817***
2005	61%	56%	1.226***	85%	79%	1.529***
2006	65%	54%	1.616***	89%	82%	1.758***
2007	65%	52%	1.743***	87%	82%	1.543
Total	**57%**	**48%**	**1.411*** **	**81%**	**69%**	**1.899*** **

Year	MS Purchases					
	Nationwide			Detroit Region		
	African American	Non-Hispanic White	*Odds Ratio*	African American	Non-Hispanic White	*Odds Ratio*
2004	36%	32%	1.214***	67%	56%	1.596***
2005	68%	69%	0.984	87%	91%	0.651
2006	71%	69%	1.105***	91%	89%	1.340
2007	69%	68%	1.085	80%	100%	-
Total	**56%**	**51%**	**1.226*** **	**79%**	**69%**	**1.694*** **

Note: *** Statistically significant at 99% confidence level.

64. Table 10 shows that the share of loans made to African-Americans that are Combined-Risk Loans is greater than the share of loans made to non-Hispanic whites that are Combined-Risk Loans, except for Morgan Stanley purchases of 2005 loans and Morgan Stanley purchases of 2007 loans in the Detroit region. For example, Table 10 shows that 66% of New Century loans made to African Americans in 2004 in the Detroit region were Combined-Risk Loans, whereas 52% of New Century loans made to non-Hispanic whites in 2004 in the Detroit region were Combined-Risk Loans.

65. Table 10 also includes a statistic known as the "odds ratio." In Table 10, the odds ratio is the ratio of (1) the odds for an African-American borrower receiving a Combined-Risk Loan to (2) the odds of a non-Hispanic white borrower receiving a Combined-Risk Loan. The

odds ratio for African-Americans is equal to $(p_{m,s}/(1- p_{m,s})) / (p_{w,s}/(1- p_{w,s}))$, where $p_{m,s}$ is the percentage of loan originations made to African-American borrowers in the given sample that were Combined-Risk Loans, and $p_{w,s}$ is the percentage of loan originations made to non-Hispanic white borrowers in the given sample that were Combined-Risk Loans. For example, in Table 10, the odds ratio of 1.817 for all New Century African-American borrowers in the Detroit region is equal to (0.66/(1-0.66))/(0.52/(1-0.52)). An odds ratio greater than 1 indicates that the share of African-Americans who received a Combined-Risk Loan is greater than the share of non-Hispanic whites who received Combined-Risk Loans.

66. Table 10 also indicates whether the odds ratio measure of disparity—that is, the difference between the odds ratio and 1—is statistically significant. Among all New Century borrowers, Table 10 shows that the differences in the percentages of African-Americans and whites receiving Combined-Risk Loans from New Century were statistically significant in each year at the 99% confidence level nationwide. In the Detroit region, the differences in the percentages of African-Americans and whites receiving Combined-Risk Loans from New Century were statistically significant in each year from 2004 to 2006 at the 99% confidence level.

67. Table 11 is analogous to Table 10, but shows the percentage share of New Century originations to African-American borrowers and non-Hispanic white borrowers in the Detroit region that were high-cost loans.

TABLE 11: PERCENT OF NEW CENTURY'S 2004-2007 LOANS THAT WERE HIGH-COST LOANS, BY BORROWER RACE

Year	All NC Loans					
	Nationwide			Detroit Region		
	African American	Non-Hispanic White	*Odds Ratio*	African American	Non-Hispanic White	*Odds Ratio*
2004	56%	47%	1.451***	76%	59%	2.223***
2005	87%	78%	1.908***	97%	92%	3.215***
2006	89%	75%	2.757***	98%	94%	3.469***
2007	88%	72%	2.851***	97%	94%	1.865
Total	**80%**	**68%**	**1.892*** **	**91%**	**79%**	**2.705*** **

Year	MS Purchases					
	Nationwide			Detroit Region		
	African American	Non-Hispanic White	*Odds Ratio*	African American	Non-Hispanic White	*Odds Ratio*
2004	53%	44%	1.439***	77%	60%	2.212***
2005	92%	89%	1.359***	97%	95%	2.055
2006	93%	91%	1.309***	98%	97%	1.479
2007	97%	96%	1.252	100%	100%	-
Total	**77%**	**69%**	**1.507*** **	**88%**	**74%**	**2.528*** **

Note: *** Statistically significant at 99% confidence level.

68. Table 11 shows that a greater share of African-Americans received high-cost loans than non-Hispanic whites in each year for all New Century loans nationwide, in the Detroit region, and for only loans purchased by Morgan Stanley. Nearly all of these differences are statistically significant at the 99% confidence level.

D. Regression Models Show that African-American Borrowers Were More Likely to Be Placed in Combined-Risk Loans and High-Cost Loans

69. As discussed above, regression analysis is the method by which I measure disparities because regression analysis can control for the risk-based attributes that lenders use in a race-neutral underwriting process. As I discussed above, a regression model is a mathematical equation that measures the relationship between a "dependent variable" and numerous "explanatory" variables. In the regression model I employ here for Combined-Risk Loans, the "dependent variable" is a binary variable equal to 1 if the loan was a Combined-Risk Loan and

"0" if the loan was not a Combined-Risk Loan. Similarly, in the regression models I employ for high-cost loans, the dependent variable is equal to 1 if the loan was a high-cost loan and "0" if the loan was not a high-cost loan. I use the racial identity of the borrowers, objective risk-based characteristics of the borrowers, and other plausible factors to explain product placement.

70. New Century and Morgan Stanley's own data and the existing academic literature inform my choices of the characteristics to use as appropriate control variables in the regressions. Major explanatory variables considered in the literature include the applicant's credit score, the type of the property, the loan-to-value ratio, the combined loan-to-value ratio, the debt-to-income ratio, the lien position of the loan, the level of documentation provided by the applicant, and the purpose of the loan.[66] The explanatory variables in the regression model could also include the month in which the loan was originated and the location of the property in terms of broad geographic boundaries such as states and metropolitan areas.

71. Estimating the regression model on the MS-NC loan database determines the marginal effect of each explanatory characteristic (including the borrower's race) on the likelihood that the borrower receives a Combined-Risk Loan or high-cost loan.[67] As long as the marginal effects of the African-American borrower variables, in terms of odds ratios, are greater than one and statistically significant, then the model will show that Morgan Stanley and New Century's policies resulted in disparate impact against minorities.

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[66] *See, e.g.*, Debbie Gruenstein Bocian, Keith S. Ernst, & Wei Li, Center for Responsible Lending, *Unfair Lending: The Effect of Race & Ethnicity on the Price of Subprime Mortgages* (May 31, 2008), available at http://www.responsiblelending.org/mortgage-lending/research-analysis/rr011-Unfair_Lending-0506.pdf; Marsha J. Courchane, *The Pricing of Home Mortgage Loans to Minority Borrowers: How Much of the APR Differential Can We Explain?*, 29 J. REAL EST. RES. 399 (2007); Howell E. Jackson & Laurie Burlingame, *Kickbacks or Compensation: The Case of Yield Spread Premiums*, 12 STANFORD J. L. BUS. & FIN. 289 (2007); Elaine Fortowsky & Michael LaCour-Little, *Credit Scoring and Disparate Impact*, Working Paper, Wells Fargo Home Mortgage, *available at* http://fic.wharton.upenn.edu/fic/lacour.pdf.

[67] In this report, I estimate all regression models with robust standard errors to account for any potential heteroscedasticity in the error term.

72. Table 12 shows the marginal effect of being an African-American borrower (relative to being a similarly situated non-Hispanic white borrower) on the likelihood of receiving a Combined-Risk Loan as measured by estimating logistic regressions using different sets of explanatory variables over the available data in the MS-NC loan database. Each number (or "odds ratio") measuring the marginal effect of race in Table 12 can be interpreted as the marginal increment by which the odds of an African-American borrower exceeded the odds of a non-Hispanic white borrower counterpart in receiving a Combined-Risk Loan.

TABLE 12: ODDS RATIOS FROM LOGISTIC REGRESSIONS FOR LIKELIHOOD OF RECEIVING A COMBINED-RISK LOAN, 2004-2007

	All NC Loans			
	Nationwide		Detroit Region	
	(1) Borrower Race Only	(2) Disparate Impact Controls	(1) Borrower Race Only	(2) Disparate Impact Controls
Odds Ratio	1.411***	1.231***	1.899***	1.347***
(P-Value)	(0.000)	(0.000)	(0.000)	(0.000)
# Loans in Sample	792,759	792,499	13,311	13,303

	MS Purchases			
	Nationwide		Detroit Region	
	(1) Borrower Race Only	(2) Disparate Impact Controls	(1) Borrower Race Only	(2) Disparate Impact Controls
Odds Ratio	1.226***	1.148***	1.694***	1.362***
(P-Value)	(0.000)	(0.000)	(0.000)	(0.004)
# Loans in Sample	156,502	156,293	3,264	3,242

Note: *** Statistically significant at 99% confidence level.
Coefficients and p-values for other explanatory variables are shown in Appendix 6. The non-race explanatory variables for the models with Disparate Impact Controls are:

- Lien status
- FHA/VA
- HELOC
- FICO
- Loan-to-value ratio (LTV)
- Combined loan-to-value ratio (CLTV)
- Debt-to-income ratio (DTI)
- Housing debt-to-income ratio (HTI)
- Documentation type (Full, Limited, or Stated)
- Property & occupancy type
- Loan purpose
- Self-employed borrower
- State
- Metropolitan area (CBSA)
- Month of origination

73. As Table 12 shows, African-American borrowers were more likely to receive Combined-Risk Loans than non-Hispanic white borrowers. Model (1) shows that the odds of an African-American borrower receiving a Combined-Risk Loan in the Detroit region is 1.899 times the odds of a non-Hispanic white borrower receiving a Combined-Risk Loan. However,

this result does not take into account any non-race characteristics, such as the borrower's credit score and other underwriting variables, that might provide a plausible business justification for the placement of the borrower in a Combined-Risk Loan. Model (2), however, does include these explanatory control variables. Even when controlling for a host of underwriting variables that might provide business justified, non-discriminatory explanations for the product placement (such as credit score, loan-to-value ratio, loan purpose, and the occupancy and property type), the odds ratio is 1.347 and is statistically significant at the 99% confidence level. The Model (2) result, which I have labeled as a "disparate impact" specification, implies that the odds of receiving a Combined-Risk Loan for an African-American borrower was 1.347 times the odds for a non-Hispanic white borrower with similar characteristics.

74. The remaining odds ratios reported in Table 12 are analogous to the results just discussed. When disparities are measured on a nationwide basis, or only for loans purchased by Morgan Stanley, the African-American odds ratios remain greater than 1 and statistically significant at the 99% confidence level. These results show that the odds of receiving a Combined-Risk Loan for African-American borrowers were greater than the odds for non-Hispanic white borrowers with similar characteristics.

75. Table 13 reports in parallel fashion the same analysis except, instead of investigating the likelihood of receiving a Combined-Risk Loan, it investigates the likelihood of receiving a high-cost loan.

TABLE 13: ODDS RATIOS FROM LOGISTIC REGRESSIONS FOR LIKELIHOOD OF RECEIVING A HIGH-COST LOAN, 2004-2007

	All NC Loans			
	Nationwide		Detroit Region	
	(1) Borrower Race Only	(2) Disparate Impact Controls	(1) Borrower Race Only	(2) Disparate Impact Controls
Odds Ratio	1.892***	1.500***	2.705***	2.119***
(P-Value)	(0.000)	(0.000)	(0.000)	(0.000)
# Loans in Sample	792,753	792,160	13,311	13,295

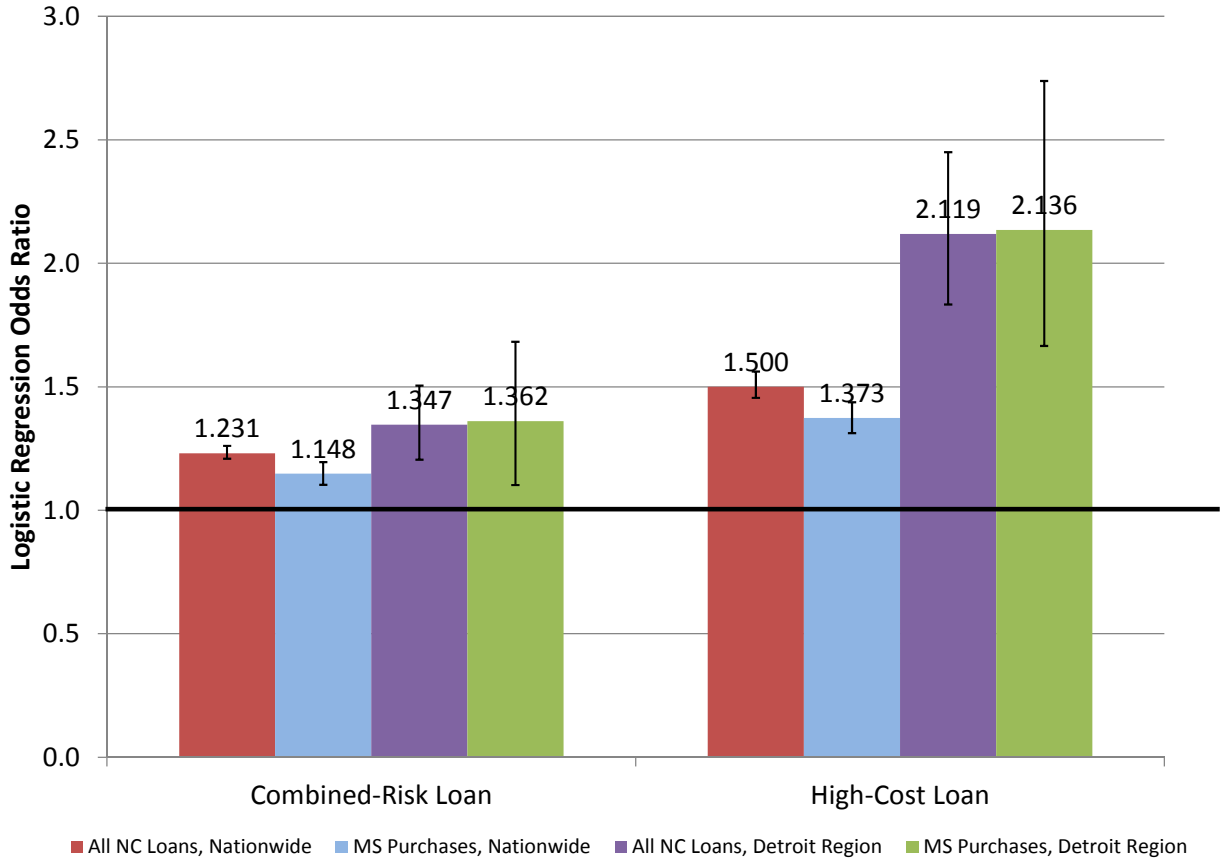
	MS Purchases			
	Nationwide		Detroit Region	
	(1) Borrower Race Only	(2) Disparate Impact Controls	(1) Borrower Race Only	(2) Disparate Impact Controls
Odds Ratio	1.507***	1.373***	2.528***	2.136***
(P-Value)	(0.000)	(0.000)	(0.000)	(0.000)
# Loans in Sample	156,502	155,670	3,264	2,976

Note: *** Statistically significant at 99% confidence level.
Coefficients and p-values for other explanatory variables are shown in Appendix 7. The non-race explanatory variables for the models with Disparate Impact Controls are shown in Table 12.

76. Table 13 shows that African-American borrowers were more likely to receive high-cost loans than non-Hispanic white borrowers with similar characteristics. For example, Table 13 shows that the odds of receiving a high cost loan for an African-American borrower in the Detroit region is 2.119 times the odds for a non-Hispanic white borrower with similar characteristics. The remaining odds ratios reported in Table 13 are analogous. When disparities are measured on a nationwide basis, or only for loans purchased by Morgan Stanley, the African-American odds ratios remain greater than 1 and statistically significant at the 99% confidence level. These results show that the odds of receiving a High-Cost Loan for African-American borrowers were greater than the odds for non-Hispanic white borrowers with similar characteristics. These disparities, as well as the disparities in placement of African-Americans

into Combined-Risk Loans and the 95% confidence intervals for these disparities, are illustrated in Figure 2.

FIGURE 2: LIKELIHOOD OF RECEIVING COMBINED-RISK LOANS AND HIGH-COST LOANS, AFRICAN-AMERICAN BORROWERS VS. NON-HISPANIC WHITE BORROWERS



77. The results from Tables 12 and 13 and Figure 2 can also be expressed in terms of the variation in the percentage likelihood of a borrower receiving a Combined-Risk Loan or a high-cost loan, based on the borrower's race. Table 14 shows the likelihood of receiving a Combined-Risk Loan or a high-cost loan, as predicted by the logistic regressions presented in Models (2) in Tables 12 and 13, for the hypothetical borrower who has the *average* of all non-race characteristics for the loans used in the regressions.

TABLE 14: PREDICTED LIKELIHOOD OF AVERAGE BORROWER RECEIVING A COMBINED-RISK LOAN OR HIGH-COST LOAN FOR AFRICAN-AMERICAN BORROWERS VS. NON-HISPANIC WHITE BORROWERS, 2004-2007

*% Likelihood of **Combined-Risk Loan** for Borrower with Average Non-Race Characteristics*		
	All NC Loans	
Borrower Race	*Nationwide*	*Detroit Region*
Non-Hispanic White	48.5%	82.7%
African American	53.7%***	86.5%***
	MS Purchases	
	Nationwide	*Detroit Region*
Non-Hispanic White	54.0%	81.7%
African American	57.4%***	85.8%***
*% Likelihood of **High-Cost** Loan for Borrower with Average Non-Race Characteristics*		
	All NC Loans	
Borrower Race	*Nationwide*	*Detroit Region*
Non-Hispanic White	77.1%	92.8%
African American	83.5%***	96.5%***
	MS Purchases	
Borrower Race	*Nationwide*	*Detroit Region*
Non-Hispanic White	80.1%	88.4%
African American	84.6%***	94.2%***

Statistical significance between likelihood for African-American borrowers and non-Hispanic white borrowers is indicated by:
*** Statistically significant at 99% confidence level.

Table 14 shows that an African-American New Century borrower with average non-race characteristics had a 53.7% likelihood of receiving a Combined-Risk Loan, while a similarly situated non-Hispanic white borrower faced only a 48.5% likelihood of received a Combined-Risk Loan. Table 14 also shows that an African-American New Century borrower in the Detroit region with average non-race characteristics (among New Century's Detroit region borrowers) had an 86.5% likelihood of receiving a Combined-Risk Loan, while a similarly situated non-Hispanic white borrower faced only an 82.7% likelihood of received a Combined-Risk Loan. The asterisks in the table connote that these disparities are highly statistically significant.

Analogous significant disparities can be seen in the relative likelihood of receiving a high-cost loan. For each subset of loans shown in Table 14, the differences in these likelihoods for African-American borrowers and the likelihoods for non-Hispanic white borrowers are statistically significant at the 99% confidence level.

78. In addition to estimating the regression models shown in Tables 12 and 13, I also estimate separate regressions for each individual year, separate regressions using different specifications, and separate regressions using different samples of loans to check the robustness of my results. Appendices 6 and 7 include the odds ratios for African Americans when estimating these alternative regressions, and they show that statistically significant disparities remain for nearly all of the national samples measured.

79. The statistical evidence from my regression analysis is consistent with the hypothesis that Morgan Stanley and New Century engaged in race-contingent practices as alleged by Plaintiffs. Morgan Stanley and New Century's data shows that African-American borrowers had a statistically higher chance of being subjected to Combined-Risk Loans and high-cost loans than similarly situated non-Hispanic white borrowers.

VI. ANALYSIS OF THE NAMED PLAINTIFFS' LOANS

80. Using information provided in the Complaint, I have identified the loans for the individual named Plaintiffs Beverly Adkins, Charmaine Williams, Rebecca Pettway, Rubbie McCoy, and William Young in the Morgan Stanley and New Century data produced to Plaintiffs.[68] Each of the named Plaintiffs is an African-American borrower who obtained a New

[68] *Complaint*, ¶¶123-204.

Century loan between the class period (2004 and 2007).[69] The data for each named Plaintiff's loan includes the APR, data on other characteristics of Combined-Risk Loans, and data on the risk-based characteristics controlled for in the regressions in Section V. The data shows that each named Plaintiff received a Combined-Risk Loan from New Century for a property in the Detroit region.

81. Because the odds ratios for the African-American indicator variables are greater than one and statistically significant (as shown in Section V), the members of the proposed Class were more likely to receive Combined-Risk Loans than non-Hispanic white borrowers with similar risk characteristics. Because each of the named Plaintiffs is an African-American borrower who received a Combined-Risk Loan, the named Plaintiffs' claims are typical of the claims of the Class.

VII. CONCLUSION

82. In summary, Morgan Stanley and New Century's loan-level data show robust and statistically significant evidence of racial disparities against African-American borrowers. Based on credible and generally-accepted statistical methods, I find that African-American borrowers were more likely to receive Combined-Risk Loans and High-Cost loans than non-Hispanic white borrowers with similar credit-risk characteristics, both in the Detroit region and nationwide. These disparities persist even when only measured for those loans purchased by Morgan Stanley.

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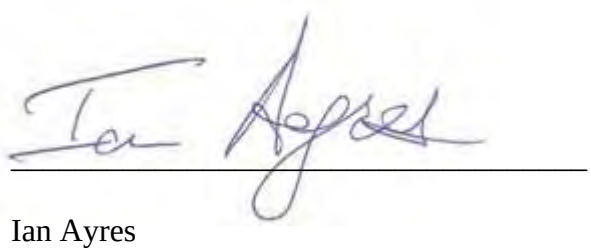
[69] *Id*.; MS-NC Data. Among the named plaintiffs, the data shows that Ms. Pettway's loan was acquired by Morgan Stanley. The race codes for all but one of the named Plaintiffs correspond to the HMDA race code for African Americans. The borrower and co-borrower race codes in New Century's loan database for Ms. Adkins's loan correspond to the HMDA race codes for white. Although there may be errors in the MS-NC Data, there is no reason to assume that these errors are anything but random, and no reason to assume that the racial disparities measured in my analysis would change if these errors were corrected.

Thus, there is credible statistical evidence that African-Americans suffered disparate impact from the lending policies of Morgan Stanley and New Century.

* * *

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on June 27, 2014.



Ian Ayres

APPENDIX 1: MATERIALS RELIED UPON

Pleadings & Orders:

- Class Action Complaint, *Adkins v. Morgan Stanley*, No. 1:12-cv-7667-HB (S.D. N.Y.) (Oct. 15, 2012).
- Opinion & Order, Adkins v. Morgan Stanley, No. 1:12-cv-7667-HB (S.D. N.Y.) (July 25, 2013).
- Defendants' Notice of Third-Party Subpoena, Jan. 14, 2014.

SEC Filings

- New Century Financial Corp., SEC Form 10-K for Year Ended Dec. 31, 2004, filed Mar. 16, 2005.
- New Century Financial Corp., SEC Form 10-K for Year Ended Dec. 31, 2005, filed Mar. 16, 2006.

Publicly-Available Data

- U.S. Census Bureau, Census 2010 Summary File 1.
- U.S. Census Bureau, *2010 Census Summary File 1, Technical Documentation*, Sept. 2012.
- U.S. Census Bureau, *Metropolitan and Micropolitan Statistical Areas and Components, Dec. 2009*, https://www.census.gov/population/metro/files/lists/2009/List1.txt.
- U.S. Census Bureau, 2010 Census Tract Relationship Files, http://www.census.gov/geo/maps-data/data/tract_rel_download.html.
- U.S. Census Bureau, *Explanation of the 2010 Census Tract Relationship File*, http://www.census.gov/geo/maps-data/data/pdfs/rel/tractrelfile.pdf.
- U.S. Census Bureau, *File Format and Record Layouts for the 2010 Census Tract Relationship Files*, http://www.census.gov/geo/maps-data/data/tract_rel_layout.html.
- U.S. Census Bureau, 2010 ZCTA to Metropolitan and Micropolitan Statistical Areas Relationship File, http://www.census.gov/geo/maps-data/data/docs/rel/zcta_cbsa_rel_10.txt.
- U.S. Census Bureau, *Explanation of the 2010 ZCTA to Metropolitan and Micropolitan Statistical Areas Relationship File*, http://www.census.gov/geo/maps-data/data/pdfs/rel/explanation_zcta_cbsa_rel_10.pdf.
- Federal Financial Institutions Examination Council, *OLD FFIEC Rate Spread Calculator*, http://www.ffiec.gov/ratespread/oldcalc.aspx.
- Federal Financial Institutions Examination Council, *Treasury Securities of Comparable Maturity under Regulation C*, http://www.ffiec.gov/ratespread/YieldTable.CSV.
- Federal Financial Institutions Examination Council, *FFIEC Geocoding/Mapping System*, http://www.ffiec.gov/geocode/Default.aspx.
- Federal Financial Institutions Examination Council, *History of HMDA*, http://www.ffiec.gov/hmda/history2.htm.
- Federal Financial Institutions Examination Council, HMDA Loan Application Register (LAR) and Transmittal Sheet (TS) Data, 2004, 2005, 2006, 2007.
- Federal Reserve Statistical Release H.15, Data Download Program, http://www.federalreserve.gov/datadownload/Choose.aspx?rel=H.15.

Data Produced by Defendants & New Century Liquidating Trustee

- MS00030251-270.
- MS00555830-841.
- MS00699611.
- MS02614379.
- NC_Adkins_MS 0003932.
- NC_Adkins_MS 0004215.
- NC_Adkins_MS 0019406.

- NC_Adkins_MS 0019407.

Letters, E-Mails, and Other Correspondences

- Letter from Danielle Conley, WilmerHale, to Rachel J. Geman, Lieff, Cabraser, Heimann & Bernstein, LLP (Mar. 8, 2013).
- Letter from Allison Snyder, WilmerHale, to Nicole D. Reynolds, Lieff, Cabraser, Heimann & Bernstein, LLP (Apr. 1, 2013).
- Letter from Danielle Conley, WilmerHale, to Nicole D. Reynolds, Lieff, Cabraser, Heimann & Bernstein, LLP (June 3, 2013).
- Letter from Danielle Conley, WilmerHale, to Nicole Reynolds, Lieff, Cabraser, Heimann & Bernstein, LLP (Aug. 6, 2013).
- Letter from Danielle Conley, WilmerHale, to Nicole Reynolds, Lieff, Cabraser, Heimann & Bernstein, LLP (Aug. 30, 2013).
- Letter from Maria A. Arnott, Hahn & Hessen, to Larry Schwartztol, American Civil Liberties Union, and Danielle Conley, WilmerHale (Aug. 30, 2013).
- Letter from Noah Levine, WilmerHale, to Nicole D. Reynolds, Lieff, Cabraser, Heimann & Bernstein, LLP (Sept. 24, 2013).
- Letter from Maria A. Arnott, Hahn & Hessen, to Larry Schwartztol, American Civil Liberties Union (Oct. 22, 2013).
- E-Mail from John DeGenova, WilmerHale, to Nicole D. Reynolds, Lieff, Cabraser, Heimann & Bernstein, LLP (Dec. 4, 2013).
- Letter from Noah Levine, WilmerHale, to Nicole D. Reynolds, Lieff, Cabraser, Heimann & Bernstein, LLP (Jan. 15, 2014).
- Letter from Noah Levine, WilmerHale, to Rachel Geman, Lieff, Cabraser, Heimann & Bernstein, LLP (Jan. 21, 2014).
- Letter from Maria A. Arnott, Hahn & Hessen, to Skye L. Perryman, WilmerHale, and Larry Schwartztol, American Civil Liberties Union (Mar. 6, 2014).
- Letter from John DeGenova, WilmerHale, to Nicole D. Sugnet, Lieff, Cabraser, Heimann & Bernstein, LLP (Mar. 26, 2014).
- Letter from John DeGenova, WilmerHale, to Nicole D. Sugnet, Lieff, Cabraser, Heimann & Bernstein, LLP (Mar. 28, 2014).
- Letter from Maria A. Arnott, Hahn & Hessen, to Larry Schwartztol, American Civil Liberties Union (Apr. 2, 2014).

Laws, Regulations, and Other Government Publications:

- Regulation B (Equal Credit Opportunity), 12 C.F.R. § 202 et seq. (2009).
- Regulation C (Home Mortgage Disclosure), 12 C.F.R. § 203 et seq. (2009).
- Regulation Z (Truth in Lending), 12 C.F.R. § 226 et seq. (2009).
- Truth in Lending Act, 15 U.S.C. §1606 et seq. (2006).
- Civil Rights Act of 1991, 42 U.S.C. § 2000e-2 (k) (1)(A)(i) (2006).
- Fair Housing Act, 42 U.S.C. § 3601 et seq.
- Federal Reserve, *Frequently Asked Questions about the New HMDA Data* (Mar. 31, 2005), *available at* http://www.federalreserve.gov/boarddocs/press/bcreg/2005/20050331/attachment.pdf.
- Federal Financial Institutions Examination Council, *A Guide to HMDA Reporting: Getting It Right!* (2006 ed.), *available at* http://www.ffiec.gov/Hmda/pdf/2006guide.pdf.
- Office of the Comptroller of the Currency, *Fair Lending, Comptroller's Handbook* (Jan. 2010), available at http://www.occ.gov/publications/publications-by-type/comptrollers-handbook/Fair%20Lending%20Handbook.pdf.

Trade Publications

- Inside Mortgage Finance Publications, Inc., *The 2009 Mortgage Market Statistical Annual, Volume 1* (2009).
- Inside Mortgage Finance Publications, Inc., *The 2009 Mortgage Market Statistical Annual, Volume 2* (2009).

Academic Articles, Other Studies & Presentations:

- Adam B. Ashcraft & Til Schuermann, *Understanding the Securitization of Subprime Mortgage Credit*, Federal Reserve Bank of New York Staff Report No. 318 (Mar. 2008).
- Robert B. Avery et al., *Credit Risk, Credit Scoring, and the Performance of Home Mortgages*, FED. RES. BULL., July 1996.
- Robert B. Avery et al., *New Information Reported Under HMDA and Its Application in Fair Lending Enforcement*, FED. RES. BULL., Summer 2005.
- Ian Ayres, *Market Power and Inequality: A Competitive Conduct Standard for Assessing When Disparate Impacts are Justified*, 95 CAL. L. REV. 669 (2007) (available at http://islandia.law.yale.edu/ayres/Market%20Failure%20and%20Inequality.doc).
- Ian Ayres and Joshua Mitts, *Three Proposals for Regulating the Distribution of Home Equity*, YALE J. REG. (forthcoming 2014), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2161545.
- David G. Blanchflower, Phillip B. Levine, & David J. Zimmerman, *Discrimination in the Small Business Credit Market*, 85 REV. ECON. & STAT. 930 (Nov. 2003).
- Marsha J. Courchane, *The Pricing of Home Mortgage Loans to Minority Borrowers: How Much of the APR Differential Can We Explain?*, 29 J. REAL EST. RES. 399 (2007).
- Kathleen C. Engel & Patricia A. McCoy, *Turning a Blind Eye: Wall Street Finance of Predatory Lending*, 75 FORDHAM L. REV. 102 (2007).
- Allen J. Fishbein & Patrick Woodall, Consumer Federation of America, *Subprime Cities: Patterns of Geographic Disparity in Subprime Lending* (Sept. 2005), *available at* http://www.consumerfed.org/pdfs/Subprimecities090805.pdf.
- Allen J. Fishbein & Patrick Woodall, Consumer Federation of America, *Subprime Locations: Patterns of Geographic Disparity in Subprime Lending* (Sept. 2006), *available at* http://www.consumerfed.org/pdfs/SubprimeLocationsStudy090506.pdf.
- Elaine Fortowsky & Michael LaCour-Little, *Credit Scoring and Disparate Impact*, Working Paper (Dec. 2001), available at http://fic.wharton.upenn.edu/fic/lacour.pdf.
- Lynn Gottschalk, *Fair Lending Modeling of Pricing Decisions* (Sept. 10, 2008), *available at* http://www.occ.treas.gov/flc/2008/Lynn%20Gottschalk.pdf.
- Debbie Gruenstein Bocian, Keith S. Ernst, & Wei Li, Center for Responsible Lending, *Unfair Lending: The Effect of Race & Ethnicity on the Price of Subprime Mortgages* (May 31, 2008), available at http://www.responsiblelending.org/mortgage-lending/research-analysis/rr011-Unfair_Lending-0506.pdf.
- Howell E. Jackson & Laurie Burlingame, *Kickbacks or Compensation: The Case of Yield Spread Premiums*, 12 STANFORD J. L. BUS. & FIN. 289 (2007).
- Howell E. Jackson, *Loan-Level Disclosure in Securitization Transactions: A Problem with Three Dimensions*, in MOVING FORWARD: THE FUTURE OF CONSUMER CREDIT AND MORTGAGE FINANCE (Brookings Press 2011), *available* at http://ssrn.com/abstract=1649657.
- Austin Kelly, *"Skin in the Game": Zero Down Payment Mortgage Default*, 17 J. HOUSING RES. 75 (2008).
- Gary King et al., *Analyzing Incomplete Political Science Data: An Alternative Algorithm for Multiple Imputation*, 95 AM. POL. SCI. REV. 49 (2001).
- Michael LaCour-Little, *The Pricing of Mortgages by Brokers: an Agency Problem?*, 31 J. REAL EST. RES. 235 (2009).
- Alicia H. Munnell et al., *Mortgage Lending in Boston: Interpreting HMDA Data*, 86 AM. ECON. REV. 25 (1996).

- Lyn C. Thomas, *A Survey of Credit and Behavioural Scoring: Forecasting Financial Risk of Lending to Consumers*, 16 INT'L J. FORECASTING 149 (2000).
- Margery Austin Turner & Felicity Skidmore, the Urban Institute, MORTGAGE LENDING DISCRIMINATION: A REVIEW OF EXISTING EVIDENCE (1999).
- Alan M. White, *Risk-Based Mortgage Pricing: Present & Future Research*, 15 HOUSING POL'Y DEBATE 503 (2004).
- Alan M. White, *Borrowing While Black: Applying Fair Lending Laws to Risk-Based Mortgage Pricing*, 60 S. CAROLINA L. REV. 677 (2009).
- Susan E. Woodward, U.S. Department of Housing & Urban Development, *A Study of Closing Costs for FHA Mortgages* (2008), *available at* http://www.huduser.org/Publications/pdf/FHA_closing_cost.pdf.

Web Sites:

- TomTom Global Geocoder, http://geocoder.tomtom.com.
- TomTom Global Geocoder, Company User/Admin Documentation.
- Google Maps, http://maps.google.com.
- Zillow, http://www.zillow.com.
- Proximity One, http://proximityone.com/zipequiv.htm.

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EDUCATION

Ph.D. (Economics) Massachusetts Institute of Technology, 1988.
Major Fields: Industrial Organization, Econometrics.
Dissertation: Essays on Vertical Foreclosure, Cartel Stability and the Structural Determinants of Oligopolistic Behavior.

J.D. Yale Law School, 1986.
Articles Editor, Yale Law Journal.

B.A. Yale University, 1981.
Majors: Russian and East European Studies (Distinction).
Economics (Distinction).
Summa Cum Laude, 1981.
Phi Beta Kappa, 1980.

PROFESSIONAL APPOINTMENTS

William K. Townsend Professor, Yale Law School, 1994 - present.

Professor, Yale School of Management, 1994 - present.

Anne Urowsky Professorial Fellow, 2009 – present.

Research Associate, National Bureau of Economic Research, 2005 - present.

Editor, JOURNAL OF LAW, ECONOMICS AND ORGANIZATION, 2002 - 2009.

Adviser, The Center for Cost-Effective Consumerism, 2008 – present.

Robert B. and Candice J. Haas Visiting Professor, Harvard Law School, Winter Term 2008.

Visiting Professor, University of Illinois, School of Law, 1997-98.

Lecturer, University of Toronto, Faculty of Law, January 1995.

Professor, Stanford Law School, 1992 - 1994.

Lecturer, University of Illinois, School of Law, Summers 1994 and 1995.

Board of Editors, SUPREME COURT ECONOMIC REVIEW, 1993 - .
Lecturer, University of Iowa, School of Law, January Term 1993.

Lecturer, Moscow State Institute of International Relations (MGIMO) -- Cardozo Law Institute, Summer 1992.

Visiting Professor, Yale Law School, Fall 1991.

Visiting Professor, University of Virginia, School of Law,
Fall 1990 - Spring 1991.

Guest Scholar, Brookings Institution, Summer 1990 - Spring 1991.

Associate Professor, Northwestern University, School of Law,
1990 - 1991; (Assistant Professor, 1987-1990).

Research Fellow, American Bar Foundation, 1987 - 1991.

Scholar in Residence, Sonnenschein Nath and Rosenthal - Summer 1990.

Associate Editor, *Law and Social Inquiry*, 1990.

Clerk to the Honorable James K. Logan, Tenth Circuit Court of Appeals, 1986-1987.

Olin Summer Research Fellow, Yale Law School Program in Law, Economics, and Public Policy, May to August 1986.

COURSES TAUGHT

Antitrust, Civil Rights, Commercial Law, Contracts, Corporations, Corporate Finance, Intellectual Property, Law and Economics, Empirical Law and Economics, LGBT Litigation Seminar, Property, Quantitative Methods.

PUBLIC INTEREST

Rothe Dev. Corp. v. United States, SA-98-CA-1011-EP, U.S. District Court Western District of Texas, testifying expert concerning narrow tailoring of affirmative action in government procurement, 1999.

Advisor, Justice and Commerce Departments on post-Adarand review of Affirmative Action, 1998.

Member, Board of Directors, Yale Law School Early Learning Center, 1996 - 1997.

Member, Board of Directors, East Palo Alto Community Law Project, 1993 - 1994.

In re Insurance Antitrust Litigation, consulting expert; regarding antitrust claims of 17 state Attorneys General against major commercial insurers, 1988 - 1991.

Counsel in Illinois post-conviction petition, *People v. Titone*, 83-C-127, 1988 to 1992 (Death sentence vacated September 7, 1990; argued claims concerning underlying conviction to Illinois Supreme Court, March 14, 1992).

New Haven Battered Women's Temporary Restraining Order Project, September 1985 to April 1986.

Harvard Prison Legal Assistance Project, October 1983 to May 1984.

Legal Services of Western Missouri, June to August 1983.

Jerome Frank Legal Services Organization, January 1983 to October 1984.

PUBLICATIONS

Books

STUDIES IN CONTRACT LAW (8th edition, Foundation Press, 2012) (with Greg Klass).

THE $500 DIET: WEIGHT LOSS FOR PEOPLE WHO ARE COMMITTED TO CHANGE (Kindle Select, 2011).

CARROTS AND STICKS: UNLOCK THE POWER OF INCENTIVES TO GET THINGS DONE (Bantam Books, 2010).

LIFECYCLE INVESTING: A NEW, SAFE, AND AUDACIOUS WAY TO IMPROVE THE PERFORMANCE OF YOUR RETIREMENT PORTFOLIO (Basic Books, 2010) (with Barry Nalebuff).

STUDIES IN CONTRACT LAW (7th edition, Foundation Press, 2008) (with Richard E. Speidel).

SUPER CRUNCHERS: WHY THINKING-BY-NUMBERS IS THE NEW WAY TO BE SMART (BANTAM

BOOKS 2007).

Excerpt: How Computers Routed the Experts, Financial Times (August 31, 2007).

STRAIGHTFORWARD: HOW TO MOBILIZE HETEROSEXUAL SUPPORT FOR GAY RIGHTS (PRINCETON UNIVERSITY PRESS 2005) (with Jennifer Gerarda Brown).

INSINCERE PROMISES: THE LAW OF MISREPRESENTED INTENT (YALE UNIVERSITY PRESS, 2005) (with Gregory Klass).

OPTIONAL LAW: THE STRUCTURE OF LEGAL ENTITLEMENTS (UNIVERSITY OF CHICAGO PRESS, 2005).

WHY NOT?: HOW TO USE EVERYDAY INGENUITY TO SOLVE PROBLEMS BIG AND SMALL (Harvard Business School Press, 2003) (with Barry Nalebuff) *also published in Portugese* as "Você Pode Tudo" (Negocio Editora), *in Spanish* as " ¿Y por que NO" (Empresa Activa), *in Korean* (Sejong), *in Japanese* (Hankyu), *in Chinese* (The Commercial Press), *in Bulgarian* (Klasika and Still), *in Chinese* (China Times), *in Estonian* (Tanapaev), *in Italian* (Il Sole), *in Korean* (Sejong Books), *in Russian* (Williams Publishing), and *in Thai* (AR Business Press).

Book Excerpt: Ideas Waiting to Happen, FORBES 127 (Oct. 27 2003) (with Barry Nalebuff).

Book Excerpt: A Role on the Board for the 'Loyal Opposition,' DIRECTORS & BOARDS 32 (Fall 2003).

Book Excerpt: Problem Solving: What Would Croesus Do?, DARWIN (Nov. 2003).

STUDIES IN CONTRACT LAW (6th edition, Foundation Press, 2003) (with Edward J. Murphy & Richard E. Speidel).

VOTING WITH DOLLARS: A NEW PARADIGM FOR CAMPAIGN FINANCE (with Bruce Ackerman) (Yale University Press) (2002).

PERVASIVE PREJUDICE?: UNCONVENTIONAL EVIDENCE OF RACE AND GENDER DISCRIMINATION (University of Chicago Press, 2002).

STUDIES IN CONTRACT LAW (5th edition, Foundation Press, 1997) (with Edward J. Murphy & Richard E. Speidel).

RESPONSIVE REGULATION: TRANSCENDING THE DEREGULATION DEBATE (OXFORD UNIVERSITY PRESS 1992) (with John Braithwaite).

Scholarly Articles and Chapters

Beyond Diversification: The Pervasive Problem of Excessive Fees and "Dominated Funds" in 401(k) Plans, YALE LAW JOURNAL (forthcoming 2014) (with Quinn Curtis).

Unhappy Meals: Sex Discrimination in Toy Choice at McDonald's, WILLIAM & MARY JOURNAL OF WOMEN AND THE LAW (forthcoming 2014) (with Antonia Rose Ayres-Brown).

Evidence and Extrapolation: Mechanisms for Regulating Off-Label Uses of Drugs and Devices, DUKE LAW JOURNAL (forthcoming 2014) (with Ryan Abbott).

A Randomized Experiment Assessing the Accuracy of Microsoft's "Bing It On" Challenge Claims, 26 LOYOLA LAW REVIEW 1 (2014) (with Emad Atiq, Sheng Li, Michelle Lu, Christine Tsang, & Tom Maher).

The Chastain Effect: Using Title IX to Measure the Causal Effect of Participating in High School Sports on Adult Women's Social Lives, JOURNAL OF SOCIO-ECONOMICS (forthcoming 2014) (with Phoebe Clarke).

Anti-Herding Regulation, HARVARD BUSINESS LAW REVIEW (forthcoming 2014) (with Joshua Mitts).

Skeletons in the Database: An Early Analysis of the CFPB's Consumer Complaints FORDHAM JOURNAL OF CORPORATE & FINANCIAL LAW (forthcoming 2014) (with Jeff Lingwall, & Sonia Steinway).

Protecting Consumer Investors by Facilitating "Improved Performance" Competition, University of ILLINOIS LAW REVIEW (forthcoming 2014) (with Quinn Curtis).

Measuring Fiduciary and Investor Losses in 401(k) Plans (working paper 2013) (with Quinn Curtis).

The No Reading Problem in Consumer Contract Law, STANFORD LAW REVIEW (forthcoming 2013) (with Alan Schwartz).

Tops, Bottoms, and Versatiles: What Straight Views of Penetrative Preferences Could Mean for Sexuality Claims Under Price Waterhouse, 123 YALE LAW JOURNAL 714 (2013) (with Richard Luedeman).

Three Proposals for Regulating the Distribution of Home Equity, YALE JOURNAL ON REGULATION (forthcoming 2013) (with Joshua Mitts).

Diversification Across Time, 39 JOURNAL OF PORTFOLIO MANAGEMENT 73 (Winter 2013) (with Barry Nalebuff).

Information Escrows, 111 MICHIGAN LAW REVIEW 145 (2012) (with Cait Unkovic).

Anti-Incentives: The Power of Resisted Temptation, EUROPEAN FINANCIAL REVIEW 40 (February-March 2012).

Regulating Opt Out: An Economic Theory of Altering Rules, 121 YALE LAW JOURNAL 2032 (2012).

Race Effects on eBay, working paper (2011) (with Mahzarin Banaji and Christine Jolls).

Randomizing Law, 159 UNIVERSITY OF PENNSYLVANIA LAW REVIEW 929 (2011) (with Michael Abramowicz & Yair Listokin).

Testing for Discrimination and the Problem of "Included Variable Bias," working paper (2010).

Meador Lecture: Using Commitment Contracts to Further Ex Ante *Freedoms: The Twin Problems of Substitution and Ego Depletion*, 62 ALABAMA LAW REVIEW 811 (2011).

Commitment Bonds, 100 GEORGETOWN LAW JOURNAL 605 (2012) (with Michael Abramowicz).

The Erasure of the Affirmative Action Debate in the Age of Obama, in THE OBAMAS AND A (POST) RACIAL AMERICA (Gregory Parks & Matthew Hughey, eds. Oxford University Press) (2011).

Theodicy and the Law, 78 UMKC Law Review 1023 (2010).

Optimal Voting Rules for Two-member Tenure Committees, 36 SOCIAL CHOICE & WELFARE 323 (2011) (with Colin Rowat and Nasser Zakariya).

Schwartz Lecture, Never Say No: The Law, Economics and Psychology of Counteroffers, 25 OHIO STATE JOURNAL ON DISPUTE RESOLUTION 603 (2010).

Yet Another Refutation of the More Guns, Less Crime Hypothesis – With Some Help From Moody and Marvell, 6 ECON. J. WATCH 35 (2009) (with John Donohue).

More Guns, Less Crime Fails Again: The Latest Evidence from 1977 – 2006, 6 ECON. J. WATCH 218 (2009) (with John Donohue).

Evidence from Two Large Field Experiments that Peer Comparison Feedback Can Reduce Residential Energy Usage, 29 JOURNAL OF LAW, ECONOMICS AND ORGANIZATION 992 (2013) (with Sophie Raseman & Alice Shih).

Yet Another Refutation of the More Guns, Less Crime Hypothesis – With Some Help From Moody and Marvell, 6 ECON. JOURNAL WATCH 35-59 (January 2009) (with John J. Donohue, III).

A Study of Racially Disparate Outcomes in the Los Angeles Police Department, prepared for the ACLU of Southern California, *available at* www.aclu-sc.org (October 2008) (with Jonathan Borowsky).

Options and Epidemics, DAEDALUS 118 (Spring 2008).

Tradable Patent Rights, 60 STANFORD LAW REVIEW 863 (2007) (with Gideon Parchomovsky).

Privatizing Employment Protection, 49 ARIZONA LAW REVIEW 587 (2007) (with Jennifer Gerarda Brown).

Market Power and Inequality: A Competitive Conduct Standard for Assessing When Disparate Impacts are Justified, 95 CALIFORNIA LAW REVIEW 669 (2007).

Comment on Jolls's *Behavioral Law and Economics*, in BEHAVIORAL ECONOMICS AND ITS APPLICATIONS (Peter Diamond & Hannu Vartiainen, eds., 2007).

Seeing Significance: Is the 95% Probability Range Easier to Perceive?, 20 CHANCE 11 (Winter 2007) (with Antonia Ayres-Brown & Henry Ayres-Brown).

Written Statement, Disparity Studies as Evidence of Discrimination in Federal Contracting, U.S. COMMISSION ON CIVIL RIGHTS (May 2006).

The Secret Refund Booth, 73 UNIVERSITY OF CHICAGO LAW REVIEW 1107 (2006) (with Bruce Ackerman), published in Spanish in MAS ALLA DEL ACCESO A LA INFORMACION 282 (John M. Ackerman ed. 2008).

New Rules for Promissory Fraud, 48 ARIZONA LAW REVIEW 957 (2006) (with Gregory Klass).

Don't Tell, Don't Ask: Narrow Tailoring After Grutter *and* Gratz, 85 TEXAS LAW REVIEW 517 (2006) (with Sydney Foster).

Ya-HUH: There Are and Should Be Penalty Defaults, 33 FLORIDA STATE UNIVERSITY LAW REVIEW 589 (2006).

Promissory Fraud, 78 NEW YORK STATE BAR ASSOCIATION JOURNAL 26 (May 2006) (with Gregory Klass).

Menus Matter, 73 UNIVERSITY OF CHICAGO LAW REVIEW 3 (2006).

First Amendment Bargains, 18 YALE J. L & HUMANITIES 178 (2006).

Mark(et)ing Nondiscrimination: Privatizing ENDA with a Certification Mark, 104 MICHIGAN LAW REVIEW 1639 (2006) (with Jennifer Gerarda Brown).

Institutional and Evolutionary Failure and Economic Development in the Middle East, 30 YALE JOURNAL OF INTERNATIONAL LAW 397 (2005) (with Jonathan Macey).

Does Affirmative Action Reduce the Number of Black Lawyers?, 57 STANFORD LAW REVIEW 1807 (2005) (with Richard Brooks).

A Separate Crime of Reckless Sex, 72 UNIVERSITY OF CHICAGO LAW REVIEW 599 (2005) (with Katharine Baker).

To Insure Prejudice: Racial Disparities in Taxicab Tipping, 114 YALE LAW JOURNAL 1613 (2005) (with Fred Vars and Nasser Zakariya).

Discrimination in Consummated Car Purchases, in HANDBOOK ON EMPLOYMENT DISCRIMINATION RESEARCH: RIGHTS AND REALITIES 137 (Springer 2005).

The Inclusive Command: Voluntary Integration of Sexual Minorities into the U.S. Military, 103 MICHIGAN LAW REVIEW 150 (2004) (with Jennifer Gerarda Brown).

Should Heterosexuals Boycott Marriage?, ISSUES IN LEGAL SCHOLARSHIP, Single-Sex Marriage (2004): Article 2, http://www.bepress.com/ils/iss5/art2 (with Jennifer Gerarda Brown).

Promissory Fraud Without Breach, 2004 WISCONSIN LAW REVIEW 507 (2004) (with Gregory Klass).

Three Tests for Measuring Unjustified Disparate Impacts in Organ Transplantation: The Problem of "Included Variable" Bias, 48 PERSPECTIVES IN BIOLOGY AND MEDICINE S68 (2005).

The Brennan Center Jorde Symposium Issue on BRUCE ACKERMAN & IAN AYRES, VOTING

WITH DOLLARS: A NEW PARADIGM FOR CAMPAIGN FINANCE REFORM, 91 CALIFORNIA LAW REVIEW 641 (2003) and *The New Paradigm Revisited*, 91 CALIFORNIA LAW REVIEW 743 (2003) (with Bruce Ackerman).

Symposium Issue on IAN AYRES, PERVASIVE PREJUDICE?: UNCONVENTIONAL EVIDENCE OF RACE AND GENDER DISCRIMINATION (2002), 55 STANFORD LAW REVIEW 2267 (2003) and *Is Discrimination Elusive?*, 55 STANFORD LAW REVIEW 2419 (2003)

Symposium Issue Commentaries on BRUCE ACKERMAN & IAN AYRES, VOTING WITH DOLLARS: A NEW PARADIGM FOR CAMPAIGN FINANCE REFORM, 37 UNIVERSITY OF RICHMOND LAW REVIEW 935 (2003) and *Why a New Paradigm?*, 37 UNIVERSITY OF RICHMOND LAW REVIEW 1147 (2003) (with Bruce Ackerman).

Shooting Down the More Guns, Less Crime Hypothesis, 55 STANFORD LAW REVIEW 1193 (2003) (with John J. Donohue III).

The Latest Misfires in Support of the More Guns, Less Crime Hypothesis, 55 STANFORD LAW REVIEW 1371 (2003) (with John J. Donohue III).

Marketing Privacy, 20 YALE JOURNAL ON REGULATION 77 (2003) (with Matthew Funk).

Correlated Values in the Theory of Property and Liability Rules, 32 JOURNAL OF LEGAL STUDIES 121 (2003) (with Paul Goldbart).

Valuing Modern Contract Scholarship, 112 YALE LAW JOURNAL 881 (2003).

Outcome Tests of Racial Disparities in Police Practices, 4 JOURNAL OF THE JUSTICE RESEARCH & STATICS ASSOCIATION 131 (2002).

Internalizing Outsider Trading, 101 MICHIGAN LAW REVIEW 313 (2002) (with Stephen Choi).

Optimal Delegation and Decoupling in the Design of Liability Rules, 100 MICHIGAN LAW REVIEW 1 (2001) (with Paul Goldbart).

Using Public Affirmative Action to Remedy Private Discrimination (with Frederick E. Vars) Chapter 2 in NYU WORKING PAPERS ON LABOR AND EMPLOYMENT LAW: 1998-1999 35 (2001).

A Dilution Mechanism for Valuing Corporations in Bankruptcy, 111 YALE LAW JOURNAL 83 (2001) (with Barry E. Adler).

Substitutes for Insider Trading, 54 STANFORD LAW REVIEW 235 (2001) (with Joe Bankman).

2000 MONSANTO LECTURE IN TORT REFORM AND JURISPRUDENCE: *Using Tort Settlement To Cartelize*, 34 VALPARAISO UNIVERSITY LAW REVIEW 595 (2000).

Disclosure versus Anonymity In Campaign Finance, in DESIGNING DEMOCRATIC INSTITUTIONS, XLII NOMOS 19 (Ian Shapiro & Stephen Macedo, eds.2000).

Economics of Affirmative Action, in 2 ENCYCLOPEDIA OF THE AMERICAN CONSTITUTION 848 (Leonard W. Levy & Kenneth L. Karst, eds., 2d ed. 2000)

Empire or Residue: Competing Visions of the Contractual Canon, in LEGAL CANONS 47 (J.M. Balkin and S. Levinson, eds.) (2000).

Threatening Inefficient Performance, 44 EUROPEAN ECONOMIC REVIEW 818 (2000) (with Kristin Madison).

Determinants of Citations to Articles in Elite Law Review, 29 JOURNAL OF LEGAL STUDIES 427 (2000) (with Fredrick E. Vars).

Taking Issue With Issue Advocacy, 85 VIRGINIA LAW REVIEW 1793 (1999).

Nondiscretionary Concealed Weapons Laws: A Case Study of Statistics, Standards of Proof and Public Policy, 1 AMERICAN LAW AND ECONOMICS REVIEW 436 (1999) (with John J. Donohue III).

Threatening Inefficient Performance of Injunctions and Contracts, 148 UNIVERSITY OF PENNSYLVANIA LAW REVIEW 45 (1999) (with Kristin Madison).

The Employment Contract, 8 KANSAS JOURNAL OF LAW AND PUBLIC POLICY 71 (1999) (with Stewart Schwab).

Comment [on "The Tobacco Deal" by Jeremy Bulow & Paul Klemperer], in BROOKINGS PAPERS ON ECONOMIC ACTIVITY: MICROECONOMICS 395 (1998).

*Eroding Entitlements as Litigation Commitment,*66 UNIVERSITY OF CHICAGO LAW REVIEW 836 (1999).

Majoritarian v. Minoritarian Defaults, 51 STANFORD LAW REVIEW 1591 (1999) (with Robert Gertner).

1998 LADD LECTURE: *Empire or Residue: Competing Visions of the Contractual Canon*, 26 FLORIDA STATE LAW REVIEW 897 (1999).

Discrediting the Free Market, 66 UNIVERSITY OF CHICAGO LAW REVIEW 273 (1999).

Limiting Patentees' Market Power Without Reducing Innovation Incentives: The Perverse Benefits of Uncertainty and Non-Injunctive Remedies, 97 MICHIGAN LAW REVIEW 985 (1999) (with Paul Klemperer).

When Does Private Discrimination Justify Public Affirmative Action? 1998 COLUMBIA LAW REVIEW 1577 (1998) (with Fredrick E. Vars).

1998 MONSANTO LECTURE IN TORT REFORM AND JURISPRUDENCE: *Protecting Property With Puts,* 32VALPARAISO UNIVERSITY LAW REVIEW 793 (1998).

"Pro-competitive Executive Compensation" as a Condition for Approval of Mergers that Simultaneously Exploit Consumers and Enhance Efficiency, 19 CANADIAN COMPETITION RECORD 18 (Spring 1998) (with Stephen F. Ross).

The Donation Booth: Mandating Donor Anonymity to Disrupt the Market for Political Influence, 50 STANFORD LAW REVIEW 837 (1998) (with Jeremy Bulow) republished as *La Donacion Secreta: Evitar que los candidatos sepan quienes son sus donantes permite desaticular el trafico de influencias,* 83 ESTUDIOS PUBLICOS 67 (2001).

Measuring the Positive Externalities from Unobservable Victim Precaution: An Empirical Analysis of Lojack, 113 QUARTERLY JOURNAL OF ECONOMICS 43 (1998) (with Steven D. Levitt).

Default Rules for Incomplete Contracts, THE NEW PALGRAVE DICTIONARY OF ECONOMICS AND THE LAW, Vol. A-D 585 (Peter Newman, ed., 1998).

Three Proposals To Harness Private Information in Contract, 21 HARVARD JOURNAL OF LAW AND PUBLIC POLICY 135 (1997).

The Twin Faces of Judicial Corruption: Extortion and Bribery, 74 DENVER UNIVERSITY LAW REVIEW 1231 (1997).

Never Confuse Efficiency With A Liver Complaint, 1997 WISCONSIN LAW REVIEW 503 (1997).

Common Knowledge As A Barrier to Negotiation, 44 UCLA LAW REVIEW 1631 (1997) (with Barry Nalebuff).

Legal Entitlements as Auctions: Property Rules, Liability Rules, and Beyond, 106 YALE LAW JOURNAL 703 (1997) (with Jack Balkin).

Narrow Tailoring, 43 UCLA LAW REVIEW 1781 (1996).

Pushing the Envelope: Antitrust Implications of the Envelope Theorem, 17 MISSISSIPPI COLLEGE LAW REVIEW 21 (1996). *See also* ELECTRONIC DISCUSSION, 17 MISSISSIPPI COLLEGE LAW REVIEW 91, 93, 102 (1996).

Comment on Painter, 65 FORDHAM LAW REVIEW 201 (1996).

The Q-Word As Red Herring: Why Disparate Impact Liability Does Not Induce Hiring Quotas, 74 TEXAS LAW REVIEW 1485 (1996) (with Peter Siegelman).

Review, *Overcoming Law*, by Richard A. Posner, 40 AMERICAN JOURNAL OF LEGAL HISTORY 371 (1996).

Pursuing Deficit Reduction Through Diversity: How Affirmative Action at the FCC Increased Auction Competition, 48 STANFORD LAW REVIEW 761 (1996) (with Peter Cramton).

Supply Side Inefficiencies and Competitive Federalism, in INTERNATIONAL REGULATORY COMPETITION AND COORDINATION: PERSPECTIVES ON ECONOMIC REGULATION IN EUROPE AND THE UNITED STATES (Oxford University Press, 1996) (McCahery, Baratton et al. eds.)

Distinguishing Between Consensual and Nonconsensual Advantages of Liability Rules, 105 YALE LAW JOURNAL 235 (1995) (with Eric Talley).

Further Evidence of Discrimination in New Car Negotiations and Estimates of Its Cause, 94 MICHIGAN LAW REVIEW 109 (1995).

Review, *The Limits of Freedom of Contract*, by Michael J. Trebilcock, 33 JOURNAL OF ECONOMIC LITERATURE. 865 (1995).

HLA Matching in Renal Transplantation, 332 THE NEW ENGLAND JOURNAL OF MEDICINE 752 (1995) (with Robert Gaston and Mark Deierhoi).

Solomonic Bargaining: Dividing A Legal Entitlement To Facilitate Coasean Trade, 104 YALE LAW JOURNAL 1027 (1995) (with Eric Talley).

Supply-Side Inefficiencies in Corporate Charter Competition: Lessons from Patents, Yachting and Bluebooks, 43 KANSAS LAW REVIEW 541 (1995).

Race and Gender Discrimination in Negotiation For the Purchase of a New Car, 84 AMERICAN ECONOMIC REVIEW 304 (1995) (with Peter Siegelman).

Alternative Grounds: Epstein's Discrimination Analysis in Other Market Settings, 31 UNIVERSITY OF SAN DIEGO LAW REVIEW 67 (1994).

A Market Test for Race Discrimination in Bail Setting, 46 STANFORD LAW REVIEW 987 (1994) (with Joel Waldfogel).

Preliminary Thoughts on Optimal Tailoring of Contractual Rules, 3 SOUTHERN CALIFORNIA INTERDISCIPLINARY LAW JOURNAL 1 (1993).

Relational Investing And Agency Theory, 15 CARDOZO LAW REVIEW 1033 (1994) (with Peter Cramton).

Economic Rationales For Mediation. 80 VIRGINIA LAW REVIEW 323 (1994) (with Jennifer Gerarda Brown).

Mutual and Unilateral Mistake in Contract Law, 22 JOURNAL OF LEGAL STUDIES 309 (1993) (with Eric Rasmusen).

Racial Equity in Renal Transplantation: The Disparate Impact of HLA-Based Allocation, 270 JOURNAL OF AMERICAN MEDICAL ASSOCIATION 1352 (1993) (with Robert Gaston, Laura Dooley and Arnold Diethelm). *Response to letters-to-the-editors*, 271 JOURNAL OF AMERICAN MEDICAL ASSOCIATION 269 (1994).

Unequal Racial Access to Kidney Transplantation, 46 VANDERBILT LAW REVIEW 805 (1993) (with Laura Dooley and Robert Gaston).

Making a Difference: The Contractual Contributions of Easterbrook and Fischel, 59 UNIVERSITY OF CHICAGO LAW REVIEW 1391 (1992), reprinted in 35 *Corporate Practice Commentator* 65 (1993).

Designing Responsive Regulatory Institutions, 2 THE RESPONSIVE COMMUNITY 41 (1992) (with John Braithwaite).

Judging Close Corporations in the Age of Statutes, 70 WASHINGTON UNIVERSITY LAW QUARTERLY 365 (1992).

Partial Industry Regulation: A Monopsony Standard for Consumer Protection, 80 CALIFORNIA LAW REVIEW 13 (1992) (with John Braithwaite).

Strategic Contractual Inefficiency and the Optimal Choice of Legal Rules, 101 YALE LAW JOURNAL 729 (1992) (with Rob Gertner).

The Possibility of Inefficient Corporate Contracts, 60 CINCINNATI LAW REVIEW 387

(1991).

Three Approaches to Modelling Corporate Games: Some Observations, 60 CINCINNATI LAW REVIEW 419 (1991).

Tripartism: Regulatory Capture and Empowerment, 16 LAW AND SOCIAL INQUIRY 435 (1991) (with John Braithwaite).

Pregnant With Embarrassments: An Incomplete Theory of the Seventh Amendment, 26 VALPARAISO UNIVERSITY LAW REVIEW 385 (1991).

Back to Basics: Regulating How Corporations Speak to the Market, 77 VIRGINIA LAW REVIEW 945 (1991).

Fair Driving: Gender and Race Discrimination in Retail Car Negotiations, 104 HARVARD LAW REVIEW 817 (1991).

Optimal Pooling in Claims Resolution Facilities, 53 LAW AND CONTEMPORARY PROBLEMS 159 (1990).

"I'll Sell It To You at Cost:" Legal Methods to Promote Retail Markup Disclosure, 84 NORTHWESTERN LAW REVIEW 1047 (1990) (with F. Clayton Miller).

Analyzing Stock Lockups: Do Target Treasury Sales Foreclose or Facilitate Takeover Auctions?, 90 COLUMBIA LAW REVIEW 682 (1990).

Playing Games with the Law, 42 STANFORD LAW REVIEW 1291 (1990).

Unlocking the Stock Lockup in Mobil v. Marathon Oil, 1 JOURNAL OF MERGER AND ACQUISITION ANALYSIS 37 (1990).

Filling Gaps in Incomplete Contracts: An Economic Theory of Default Rules, 99 YALE LAW JOURNAL 87 (1989) (with Robert Gertner), *reprinted* 7 PEKING UNIVERSITY LAW REVIEW 17 (2005).

A Private Revolution: Markovits and Markets, 64 CHICAGO-KENT LAW REVIEW 861 (1989).

The Economics of the Insurance Antitrust Suits: Toward an Exclusionary Theory, 63 TULANE LAW REVIEW 971 (1989) (with Peter Siegelman) reprinted 4 NATIONAL INSURANCE LAW REVIEW 1 (1990) and 4 INSURANCE LAW ANTHOLOGY 501 (1989-1990).

Determinants of Airline Carrier Conduct, 8 INTERNATIONAL REVIEW OF LAW & ECONOMICS, 187 (1988).

A Theoretical Fox Meets Empirical Hedgehogs: Competing Approaches to Accident Economics, 82 NORTHWESTERN LAW REVIEW 837 (1988).

Halfway Home, 13 LAW AND SOCIAL INQUIRY 413 (1988).

How Cartels Punish: A Structural Theory of Self-Enforcing Collusion, 87 COLUMBIA LAW REVIEW 295 (1987).

Posner's Symphony No. 3: Thinking About the Unthinkable, 39 STANFORD LAW REVIEW 791 (1987) (with John Donohue).

Rationalizing Antitrust Cluster Markets, 95 YALE LAW JOURNAL 109 (1985).

Popular Press

Blog Contributor: Freakonomics and Balinization.

The U.S. Hypocrisy Over Russia's Anti-gay Laws, WASHINGTON POST, January 31, 2014 (with William Eskridge).

Canceling the Shutdown, Playing by the Rules, LOSANGELESTIMES.COM (Oct 4, 2013) (with Bruce Ackerman).

How the Internet Can Save Journalism, HUFFINGTON POST (August 7, 2013) (with Bruce Ackerman).

How Congress Can Overrule Citizens United, HUFFINGTON POST (February 8, 2012) (with Bruce Ackerman).

Don't Tax the Rich. Tax Inequality Itself, NEW YORK TIMES A29 (December 18, 2011) (with Aaron S. Edlin).

Paying Students to Quit Law School, SLATE (November 18, 2011) (with Akhil Reed Amar).

How to Hire A Federal Watchdog, WASHINGTON POST (June 23, 2011).

Did Egypt's Rising Economy Lead to Hosni Mubarak's Fall?, POLITICO (Feb. 18, 2011) (with Jonathan Macey).

Bring on the Share Economy, FORBES (Sept. 13, 2010) (with Barry Nalebuff).

Make a Commitment, FORBES (August 30, 2010) (with Barry Nalebuff).

Despite Court Ruling, Congress Can Still Limit Campaign Finance, WASHINGTON POST (Jan. 26, 2010) (with Bruce Ackerman).

Winning the Audit Lottery, FORBES (Nov. 30, 2009) (with Barry Nalebuff).

A Market Test for Credit Cards, FORBES (June 25, 2009) (with Barry Nalebuff).

Crazy Eddie's House Sale, SLATE http://www.slate.com/id/2219369/ (June 1, 2009) (with Daniel Markovits).

Why not nominate vice justices for the Supreme Court?, LOS ANGELES TIMES (May 7, 2009) (with Akhil Reed Amar).

A Voluntary Gas Tax, FORBES (March 16, 2009) (with Barry Nalebuff).

A National Endowment for Journalism, THE GUARDIAN (February 13, 2009) (with Bruce Ackerman).

Your Personal Climate Exchange, FORBES (November 24, 2008) (with Barry Nalebuff).

The LAPD and Racial Profiling, LOS ANGELES TIMES (Oct. 23, 2008).

Sell the Conventions, FORBES (Oct. 13, 2008) (with Barry Nalebuff).

Adam Smith Meets Climate Change, SLATE www.slate.com/id/2200911/ (September 25, 2008) (with Doug Kysar).

New Jingles May Be Coins in Your Pocket, MARKETPLACE (July 21, 2008) (public radio commentary with Barry Nalebuff).

An Equity Kicker, FORBES 113 (May 19, 2008) (with Barry Nalebuff).

Mining Unconscious Wisdom, HARVARD BUSINESS REVIEW (March 1, 2008).

Lose Weight? Bet On It, LOS ANGELES TIMES (Jan. 27, 2008).

Where Money Is No Object, THE GUARDIAN (Jan. 26, 2008) (with Bruce Ackerman).

The New Green, FORBES 119 (Jan. 7, 2008) (with Barry Nalebuff).

A Roundtable Discussion: Citizenship & the Sciences, 2 RHI: PROMOTING ACTIVE

CITIZENSHIP 68 (2007).

Give Freakonomics a Chance," THE ECONOMIST'S VOICE, Vol. 4 : Iss. 5, Article 1. Available at: http://www.bepress.com/ev/vol4/iss5/art1.

Prepare to be Super-Crunched, THE TIMES HIGHER EDUCATION SUPPLEMENT 18 (Oct. 26, 2007).

Now, The Customer's Always Managed (Oct. 8, 2007) (public radio commentary with Barry Nalebuff).

Experiment, FORBES 103 (Sept. 3, 2007) (with Barry Nalebuff).

Streamline Tax Filing, YALE LAW REPORT 48 (Summer 2007).

Did You Use That Gift Card or Rebate? (Aug. 9, 2007) (public radio commentary with Barry Nalebuff).

You Found a Better Idea, PARADE (July 8, 2007) (with Barry Nalebuff).

Down With Plutocrats and Fat Cat Donors, SLATE www.slate.com/id/2169025 (June 25, 2007) (with Bruce Ackerman).

Cupid and Colleges, FORBES 87 (May 9, 2007) (with Barry Nalebuff).

For Many, Forms Could Be a Lot Less Taxing, (April 16, 2007) (public radio commentary with Barry Nalebuff).

Do You Have A Better Idea?, PARADE (March 25, 2007) (with Barry Nalebuff).

For the Love of the Game, FORBES 54 (March 12, 2007) (with Barry Nalebuff).

Environmental Atonement, FORBES 87 (Dec. 25, 2006) (with Barry Nalebuff).

Skin in the Game, FORBES 156 (Nov. 13, 2006) (with Barry Nalebuff).

The Hollow Promise: Sexual Orientation Nondiscrimination Policies, 24 ASSOCIATION OF CORPORATE COUNSEL DOCKET 48 (Oct. 2006) (with Richard F. Ober, Jr.).

Promises, not policies, YALE ALUMNI MAGAZINE 32 (Sept./Oct. 2006).

A Way to Stop Pretexting (Sept. 11, 2006) (public radio commentary with Barry Nalebuff).

Easy Savings, FORBES 146 (Sept. 4, 2006) (with Barry Nalebuff).
Give NY's Poor What They Need Most: A Voice, NEW YORK DAILY NEWS (August 14, 2006) (with Bruce Ackerman).

How To Strengthen Shareholder Democracy (July 6, 2006) (public radio commentary with Barry Nalebuff).

The Knicks Boldly Go Where Companies Have Not, NEW YORK TIMES (July 2, 2006) (with John J. Donohue III).

The Ticket to Savings, FORBES 176 (May 22, 2006) (Barry Nalebuff).

Secret Political Donations Can End the Secret Deal, FINANCIAL TIMES 23 (April 27, 2006) (with Bruce Ackerman).

When the Blind See Better, FORBES 141 (Feb. 13, 2006) (with Barry Nalebuff).

Mortgage Your Retirement, FORBES 150 (Nov. 14, 2005) (with Barry Nalebuff).

End Tipping? (Oct. 5, 2005) (public radio commentary with Barry Nalebuff).

Just What the Professor Ordered, NEW YORK TIMES A27 (Sept. 16, 2005).

Justice Roberts Should Sell His Stock (Sept. 14, 2005) (public radio commentary with Barry Nalebuff).

Promises to Keep, FORBES 78 (July 4, 2005) (with Barry Nalebuff).

Opting for Equality (June 30, 2005) (public radio commentary with Barry Nalebuff).

The Joy of Ambiguity, THE ADVOCATE www.advocate.com/print_article.asp?id=18249 (June 29, 2005) (with Jennifer Gerarda Brown).

Better Benchmarking (June 21, 2005) (public radio commentary with Barry Nalebuff).

Guest blogger www.lessig.org/blog/ (June 2005)

Privatizing Gay Rights with Non-discrimination Promises Instead of Policies, THE ECONOMIST'S VOICE, Vol. 2: No. 2, http://www.bepress.com/ev/vol2/iss2/art11 (2005) (with Jennifer Gerarda Brown).

Straight, Not Narrow: How Straight Couples Can Support Gay Marriage, NEW HAVEN ADVOCATE (June 16, 2005) (with Jennifer Gerarda Brown).

Separate, Unequal: How Civil Unions Fall Short of Marriage, HARTFORD COURANT A13 (June 10, 2005).

Warning: We Discriminate, ALTERNET www.alternet.org/rights/22030/ (May 17, 2005) (with Jennifer Gerarda Brown).

Peer Pressure, FORBES 135 (April 11, 2005) (with Barry Nalebuff).

Looking Out For No. 2: A Modest Proposal for Single-Use Toilets, SLATE www.slate.com/id/2114441 (March 7, 2005).

Ask Iraqi Voters: Do You Want Us To Stay?, HARTFORD COURANT (Jan. 28. 2005) (with Barry Nalebuff).

Stop Thief, FORBES 88 (Jan. 10, 2005) (with Barry Nalebuff).

Going Soft on Microsoft? The EU's Antitrust Case and Remedy, THE ECONOMISTS' VOICE, Vol. 2: No. 2, Article 4, www.bepress/ev/vol2/iss2/art4/ (2005) (with Barry Nalebuff).

Encouraging Suggestive Behavior, HARVARD BUSINESS REVIEW (December 1, 2004) (with Barry Nalebuff).

Anonymously Yours, WORTH 32 (November 2004).

Cable Bundling (Nov. 19, 2004) (public radio commentary with Barry Nalebuff).

Race, Tips and Economics, FORBES 136 (Nov. 1, 2004) (with Barry Nalebuff).

Microsoft I: A Remedy Worthy of Solomon, INTERNATIONAL HERALD TRIBUNE (Oct. 11, 2004) (with Barry Nalebuff).

Going, Going, Google, THE WALL STREET JOURNAL A12 (August 20, 2004) (with Barry Nalebuff).

Cellphone Sleuth (Aug. 20, 2004) (public radio commentary with Barry Nalebuff).

Throwaway Tickets, FORBES 52 (August 18, 2004) (with Barry Nalebuff).

A Donation Booth? (June 23, 2004) (public radio commentary with Barry Nalebuff).

Say Goodbye to TIVO (June 9, 2004) (public radio commentary with Barry Nalebuff).

Dialing for Thieves, FORBES 76 (April 19, 2004) (with Barry Nalebuff).

Getting Iraq to Undermine OPEC (April 6, 2004) (public radio commentary with Barry Nalebuff).

The Wrong Ticket to Ride, NEW YORK TIMES A29 (March 24, 2004) (with Barry Nalebuff).

Benefits of Non-Transparency (Feb. 23, 2004) (public radio commentary with Barry Nalebuff).

Don't Sell Us Short, FORBES 57 (Feb. 2, 2004) (with Barry Nalebuff).

Principled Problem Solving: Letting Constraints Filter and Guide Your Thinking Can Often Be the Best Way to Reach Truly Creative Solutions, 14 SCIENTIFIC AMERICAN MIND 96 (2004) (with Barry Nalebuff).

System Down: McCain-Feingold Helped Doom the Current Model of Public Financing for Campaigns. Fixing it will Take Some Imagination, THE AMERICAN PROSPECT ON LINE (Dec. 12, 2003) (with Bruce Ackerman) available at www.prospect.org.

It Beats a CD, FORB ES 160 (Dec. 8, 2003) (with Barry Nalebuff).

Who's Right? (Nov. 10, 2003) (public radio commentary with Barry Nalebuff).

Why Legislating Low Tuitions for State Colleges Is a Mistake: They Just Subsidize the Rich, WRIT FINDLAW'S LEGAL COMMENTARY (October 30, 2003) (with Aaron Edlin) http://writ.news.findlaw.com/commentary/20031030_ayres.html.

In Praise of Honest Pricing, 45 MIT SLOAN MANAGEMENT REVIEW 24 (Fall 2003) (with Barry Nalebuff).

Want to Call Me? Pay Me!, WALL STREET JOURNAL A24 (Oct. 8, 2003) (with Barry Nalebuff).

Making Ideas Take Flight, BUSINESS 2.0 133 (Oct. 2003) (with Barry Nalebuff).

Dialing for Dollars, NEW YORK TIMES A29 (Sept. 30, 2003).

Blackboxes For Cars (Sept. 16, 2003) (public radio commentary with Barry Nalebuff).

Exactly Who's in the Right in this Labor Dispute? YALE DAILY NEWS 2 (Sept. 4, 2003) (with Barry Nalebuff).

Sarbanes/Oxley's First Birthday (July 30, 2003) (public radio commentary with Barry Nalebuff).

Blackbox for Cars, FORBES 83 (August 11, 2003) (with Barry Nalebuff).

Patriot Dollars Put Money Where the Voters Are, L.A. TIMES at 15 (July 17, 2003) (with Bruce Ackerman).

An Educated Consumer. FORBES 95 (June 09, 2003) (with Barry Nalebuff).

Charity Begins At Schedule A, NEW YORK TIMES, p. A21, col. 1 (April 15, 2003) (with Barry Nalebuff).

Make Car Insurance Fairer, FORBES 154 (March 17, 2003) (with Barry Nalebuff).

Pay Per Mile Auto Insurance (Feb. 25, 2003) (public radio commentary with Barry Nalebuff).

Spoiling Spam (Dec.24, 2002) (public radio commentary with Barry Nalebuff).

The Virtues of a Virtual Strike, FORBES 128 (Oct. 25, 2002) (with Barry Nalebuff).

Virtual Strikes (Oct. 4, 2002) (public radio commentary with Barry Nalebuff).
Price-Protect Your Home, FORBES 101 (Sept 16, 2002) (with Barry Nalebuff).

Disclosing Hidden Fees to Consumers (Aug. 28, 2002) (public radio commentary with Barry Nalebuff).

An Alternative to Expensing Stock Options (July 24, 2002) (public radio commentary with Barry Nalebuff).

Campaign Reform's Worst Enemy, NEW YORK TIMES, p. A19, col. 2 (July 6, 2002) (with Bruce Ackerman).

Opt-Out Advertising, FORBES 164 (June 20, 2002) (with Barry Nalebuff).

A Community of Ideas, FORBES 173 (May 9, 2002) (with Barry Nalebuff).

If Telemarketers Paid For Your Time, FORBES 225 (April 15, 2002) (with Barry Nalebuff).

A Viable Alternative to Breaking up Microsoft: *Compulsory Licensing That Would Make Microsoft Compete With Its Past Self,* WRIT FINDLAW'S LEGAL COMMENTARY (April 10,

2002) (with Aaron Edlin) http://writ.news.findlaw.com/commentary/20020410_edlin.html

Connecticut's Speeder-Friendly Crackdown, NEW YORK TIMES, p. A19, col. 2 (August 31, 2001) (with Barry Nalebuff).

Should Campaign Donors Be Identified?, 24 REGULATION 12 (Summer 2001), *excerpted as A Real Solution: Make Donors Anonymous,* NATIONAL REVIEW ONLINE (July 12, 2001) http://www.nationalreview.com/comment/comment-ayres071201.shtml.

Why Telemarketers Should Pay Us, HARTFORD COURANT, P. A15, col. 3 (May 10, 2001) (with Matthew Funk).

Lectures vs. Laptops, NEW YORK TIMES, p. A25, col. 2 (March 20, 2001).

Monetize Labor Practices, 26 BOSTON REVIEW 18 (February-March 2001) (available at http://bostonreview.mit.edu/BR26.1/ayres.html), *reprinted in* Archon Fung, Dara O'Rourke, & Charles Sabel, CAN WE PUT AN END TO SWEATSHOPS 80 (Beacon Press 2001)

Why Prosecute Linda Tripp?, NEW YORK TIMES P. A17, col. 1 (August 10, 1999).

Remedying Private Discrimination: Following the 'Anderson' Model, LOS ANGELES TIMES M2, col. 3 (April 26, 1998).

The Donation Booth, 22 BOSTON REVIEW 26 (December-January 1997-98) (with Jeremy Bulow) (available at http://bostonreview.mit.edu/BR22.6/ayres.html), *reprinted in* 47 YALE LAW REPORT 62 (2000) and THE NEWS-GAZETTE, B1 (Sept. 27, 1998).

Breaking Windows: Why the Justice Department Should Go After the Microsoft Monopoly, THE NEW REPUBLIC 18 (Nov. 17, 1997).

Car Buying, Made Simpler, NEW YORK TIMES F12 (April 13, 1997) (with Peter Schuck).

Aid Diversity, and the Treasury, NEW YORK TIMES F13 (May 21, 1995) (with Peter Cramton).

Price and Prejudice, THE NEW REPUBLIC 30 (July 6, 1992).

Colleges in Collusion, THE NEW REPUBLIC 19 (October 16, 1989).

NAMED LECTURES

The W. D. Carpenter Lecture, "Diversifying Time: Why Buying Stock With Borrowed Money Can Reduce Risk?," Middlebury College, Department of Economics, April 26, 2010.

The Meador Lecture, "Freedom and Commitment," University of Alabama, School of Law, April 19, 2010.

The 46th Henry J. Miller Lecture, "Barriers to Diversification," Georgia State University, School of Law, March 18, 2010.

The Schwartz Lecture on Dispute Resolution, "Never Say No: The Law, Economics and Psychology of Counteroffers," Ohio State University, Moritz College of Law, April 2, 2009.

The Biddle Lecture, "A New Test for Race Discrimination," Harvard Law School, November 12, 2008.

The Hart Lecture, "The Secret Refund Booth," Georgetown University Law Center, March 22, 2006.

The Henry Schneider Lecture, "Mark(et)ing Nondiscrimination," Columbia Law School, March 8, 2005.

The Hazard Lecture, "Can Creativity be Taught?: Why Not!," Pembroke Hill High School, September 17, 2004.

The John M. Olin Lecture in Law and Economics, "Why Not?: Can Legal Creativity Be Taught?," Michigan Law School, September 11, 2003.

The Monsanto Lecture in Tort Reform and Jurisprudence, "Using Tort Settlement To Cartelize," Valparaiso University, School of Law, March 26, 2000.

The John M. Olin Public Lecture in Law and Economics, "Coveting Thy Neighbor's Stock: Substitute Trading as Evasion and as Policy Tool," University of Toronto, September 24, 1999.

The Ladd Lecture, "Empire or Residue: Competing Visions of the Contractual Canon," Florida State College of Law, October 22, 1998.

The Monsanto Lecture in Tort Reform and Jurisprudence, "Protecting Property with Puts," Valparaiso University, School of Law, March 26, 1998.

Inaugural Lecture for William K. Townsend Chair, "Solomonic Bargaining," Yale Law School, November 15, 1994.

The Mirikitani Lecture in Law and Economics, "Back to Basics," University of Hawaii, March 9, 1990.

PROFESSIONAL MEMBERSHIP

James W. Cooper Fellow, Connecticut Bar Foundation, 2009 – present.

Fellow, American Academy of Arts & Sciences, 2006 - present.

Member, American Law Institute, 1997 - present.

Board of Directors, American Law and Economic Association, 1995-1999.

Admitted, Illinois Bar, 1987.

AWARDS

Scribes Book Award (INSINCERE PROMISES) – "for the best work of legal scholarship published during the previous year," 2006

Research in the Public Interest, The Center for Public Representation, 1991.

ACTIVITIES

1st Place, Law and Society Association -- 5 kilometer fun run, 1989, 2002 and 2003.

Completed 1984 Boston marathon in 3 hours, 12 minutes.

Whiffenpoofs, 1980-81.

Yale Russian Chorus, 1977-80.

Semester in Soviet Union, Moscow's Pushkin Institute, Spring 1979.

CURRENT AS OF APRIL 1, 2014

APPENDIX 3: CASES IN WHICH IAN AYRES HAS TESTIFIED OR WRITTEN A DISCLOSED REPORT

1. Saint-Jean v. Emigrant Mortgage Co. (2013) No. 1:11-cv-02122-SJ (E.D. N.Y.) (testifying expert; re: disparate impact and disparate treatment of mortgage lending practices).

2. In Re: Bank of America Home Affordable Modification Program (HAMP) Contract Litigation (2013), No. 1:10-md-02193-RWZ (D. Mass.) (testifying expert; re: mortgage modification policies).

3. In Re: CitiMortgage, Inc. Home Mortgage Affordable Modification Program ("HAMP") Litigation (2013), No. 11-md-2274-DSF (PLAx) (C.D. Cal.) (testifying expert; re: mortgage modification policies).

4. In re JPMorgan Chase Mortgage Modification Litigation (2012), No. 11-md-02290-RGS (D. Mass.) (testifying expert; re: mortgage modification policies).

5. Reso v. Artisan Partners Limited Partnership (2012) No. 2:11-cv-00873-JPS (E.D. Wis.) (testifying expert; re: competition in the mutual fund industry).

6. Guerra v. GMAC LLC (2011) No. 2:08-cv-01297-LDD (E.D. Pa.) (testifying expert; re: disparate impact of discretionary pricing policies).

7. In re Wells Fargo Mortgage Lending Practices Litigation (2010) No. 08-CV-01930-MMC (JL) (N.D. Cal.) (submitted declaration responding to a motion to exclude the testimony of another expert re: disparate impact of discretionary pricing policies).

8. In re Countrywide Financial Mortgage Lending Practices Litigation (2010) MDL No. 1974 (W.D. Ky.) (testifying expert; re: disparate impact of discretionary pricing policies).

9. Barrett v. Option One Mortgage Corp. (2010) No. 08-10157 (D. Mass.) (testifying expert; re: disparate impact of discretionary pricing policies).

10. In re First Franklin Financial Corp. Litigation (2010) No. C08-01515JW (HRL) (N.D. Ca.) (testifying expert; re: disparate impact of discretionary pricing policies).

11. In re Federated Mutual Funds Excessive Fee Litigation (2009) Consolidated No. 2:04-cv-352-DSC (W.D. Pa.) (testifying expert; re: competition in the mutual fund industry).

12. Connecticut Podiatric Medical Association v. Health Net of Connecticut (2008) No. X01-CV-05-005900-S (CT SUP. CT.) (analyzed business justifications for discriminatory pricing in reimbursement rates paid to podiatrists and medical doctors).

13. INEOS Fluor Americas LLC, v. Honeywell International Inc. (2006) Civil Action No.: 06-189-SLR (DC. Del.) (expert concerning competition in the market for hydrofluoric acid).

14. Techold Participações S.A. v. Telecom Italia International N.V. (2006) International Chamber of Commerce Arbitration Nos.: 13960/CCO, 14048/CCO, 14376/CCO and 14393/CCO (expert concerning breach of corporate fiduciary duties).

15. Regarding Cayuga Nation's Land in Trust Application (2006) (expert concerning economic impact of placing certain lands in trust).

16. Blanchard & Co. v. Barrick Gold Corp. (2005) NO.: 02-3721 c/w 04-2610 (E.D. Louisiana) (expert concerning derivative trading strategies).

17. Claybrooks v. Primus Automotive Financial Services, Inc. (2005) No. 3-02-0382(M.D. Tenn.) (Testifying expert concerning disparate impact of finance markups).

18. Owens v. Nationwide Mutual Insurance Co. (2005) No. 3-03CV1184-H (N.D. Texas) (expert concerning disparate impact of credit scoring mechanism).

19. Russell v. Bank One (2004), No. 3-02-0365 (M.D. Tenn.) (testifying expert concerning disparate impact of finance markups).

20. Fishback and Willis vs. AHFC (2004), No. 3-02-0490 (M.D.Tenn.) (Testifying expert concerning disparate impact of finance markups).

21. Smith v. CFC (2004) No. 00-6003 (D.N.J.) (expert concerning disparate impact of finance markups).

22. Jones v. FMCC (2004) No. 00 CIV 8330 (S.D.N.Y.) (testifying expert concerning disparate impact of finance markups).

23. Coleman v. GMAC (2003) No. 3-98-0211 (M.D. Tenn) (testifying expert concerning disparate impact of finance markups).

24. Monsanto v. Scruggs (2002) Civil Action No. 3:00CV-161-P-A (N.D. Miss) (testifying expert concerning GM seed antitrust and patent abuse claims).

25. Rodriguez v. FMCC (2002) No. 01 C 8526 (N.D. Ill.) (submitted report concerning disparate impact of finance markups).

26. Cisco System, Inc (2001) (transfer pricing report prepared for IRS).

27. Cason v. Nissan Motor Acceptance Corp (2001) 3-98-0223 (M.D. Tenn.) (testifying expert concerning disparate impact of finance markups).

28. Star Scientific v. Steve Carter (2001) IP01-0838 C T/G (S. D. Indiana) (testifying expert concerning MSA qualifying statute).

29. Johnson v. City of Tulsa (2001) 94-C-39-H (N.D. Okla.) (submitted report concerning racial profiling by Tulsa Police Department).

30. Wisconsin v. Rent-a-Center (2000) (testifying expert concerning rent-to-own transaction).

31. Dynalantic Corp. v. United States Department of Defense (1999) (submitted report concerning narrow tailoring of affirmative action in government procurement).

32. Colon v. Rent-a-Center (1999) (wrote report concerning rent-to-own transaction).

33. Rothe Dev. Corp. v. United States, (1999) (testifying expert concerning narrow tailoring of affirmative action in government procurement).

34. Chiron Corp. v. Hoffman-La Roche (1999) (submitted report concerning interpretation of contract releasing certain claims concerning Hepatitis C patent).

35. Teledyne v. Boeing (1998) (testifying expert re: contractual and antitrust issues of Apache attack Helicopter fuselage procurement).

36. Connecticut Municipal Electric Energy Cooperative v. Connecticut Light & Power Co. (February 1998) (submitted report concerning interpretation of Life-of-Unit nuclear power output contract).

37. F. Buddie Contracting Ltd. v. Cuyahoga Community College District (March 1998) (submitted expert report re: narrow tailoring of procurement affirmative action plan).

38. Lufkin v. IDES and CMS (January 1998) (consulting expert; re: disparate impact and Equal Pay Act challenge to Illinois compensation plan).

39. DOJ's PCS Auction Investigation (June 1997) (non-testifying expert on competitive effects of auction bidding strategies).

40. Cassandra Burney et al. v. Rent-a-Center (1996-97) (testifying expert; re: excess interest charged in rent-to-own agreements).

41. Mother Bertha Music, Ltd. v. Bourne Music Ltd. (May 1996) (consulting expert; re: interpretation of copyright assignment contract).

42. U.S. v. Christopher Barnes (March 1996) (testifying expert, re: statistical representation of minorities in federal criminal venires).

43. U.S. v. John M. Purdy, Jr. (February 1996) (testifying expert; re: statistical representation of minorities in federal criminal venires).

44. Johnson v. Apple (July 1994) (testifying expert; re: disparate treatment and damages).

45. Williams v. Du Pont (July 1993) (affidavit expert; re: appropriate prejudgement interest rate).

46. AT&T (September 1993) (consulting expert; re: appropriate preconditions for lifting interexchange restriction).

47. James E. Gilleran, et al. v. Deno Evangelista, et al. (October 1992) (testifying expert; re: fiduciary duties of officers and directors).

48. Neiman Marcus Group v. Federated Department Stores (January 1992) (consulting expert; re: covenant not to compete).

49. In re Fare Box Litigation (1989) (testifying expert; re: relevant market and merger to monopoly).

50. In re Insurance Antitrust Litigation (1988 - 1991) consulting expert; re: antitrust claims of 17 state Attorneys General against major commercial insurers.

APPENDIX 4: COMPARING NEW CENTURY RACE & ETHNICITY CODES WITH PUBLIC HMDA DATA

When producing New Century's loan-level data to Plaintiffs, the liquidating trustee for the New Century bankruptcy could not confirm with certainty the meanings of the New Century race and ethnicity field codes. To confirm that the New Century field codes in the MS-NC Data correspond to the field code definitions used for HMDA reporting purposes in the year in which the loan was originated, I merge the MS-NC Data with the publicly available HMDA data on New Century loan originations and compare the race and ethnicity codes in the NC Data to the race and ethnicity codes in the public HMDA data. If the codes match for all or nearly all of the loans, then I can conclude that the definitions of the race codes in the NC Data are the same as the definitions for the race codes in the public HMDA data. The steps outlined in this section apply *only* to my confirmation of the meanings of race and ethnicity codes in the MS-NC Data. For purposes of estimating regressions in my disparate impact analysis, I do *not* limit the sample of loans in the manner described in this appendix, nor do I standardize loan characteristics to match HMDA data as described in this appendix.

To merge MS-NC Data with public HMDA data, I first extract all loan originations and loan purchases made by New Century from the public HMDA Loan Application Register (LAR) and Transmittal Sheet (TS) data for loans originated or purchased from 2003 to 2006.[70] I identify these loans in the public HMDA data as any loans with a respondent ID of 7900200006 (corresponding to New Century Mortgage Corp.) or 1556900003 (corresponding to Home123 Corp., formerly Anyloan Co., for which New Century Financial Corp. was identified in the

[70] Federal Financial Institutions Examination Council, HMDA Loan Application Register (LAR) and Transmittal Sheet (TS) Data, 2003, 2004, 2005, 2006. Because New Century filed for bankruptcy in early 2007, no 2007 loan originations or purchases are available for New Century from the 2007 public HMDA data.

HMDA data as the parent institution), and an action taken code of 1 (loan originated) or 6 (loan purchased by the institution).

Once I extract the public HMDA data on New Century loan originations and purchases, I merge this HMDA data with the NC Data produced in this case. The characteristics on which I merge the public HMDA data with NC Data are:

1. Year
2. Loan type (conventional, FHA, VA, or FSA/RHS)
3. Property type
4. Loan purpose
5. Occupancy status
6. Loan amount (rounded to nearest $000)
7. Action type (originated or purchased)
8. Geographic location (state, county, and Census tract)

Before merging the data, I standardize the fields in the NC Data so that the standardized NC Data codes will match the codes in the public HMDA data. For example, for the occupancy status, the public HMDA data only reports whether the property is owner-occupied or not owner-occupied. However, the NC Data gives more detail on non-owner-occupied properties, such as whether the property was a second home or an investment property. When standardizing codes for a given characteristic in the MS-NC data to match the HMDA data codes, I use the information from the NC Data when present; otherwise, I use the information from the MS Data.

To identify the Census tract and the county[71] of the property, I use the information obtained from the TomTom geocoding service for the property addresses, as described above in Section V.A. For purposes of merging with public HMDA data to confirm race code meanings, I limit the sample of MS-NC Data loans to those for which the TomTom geocoding service returned the most accurate geocoding accuracy level—the exact latitude and longitude of the property address.[72] I use the U.S. Census Bureau tract relationship files to identify the 2000 Census tracts (the geographic component reported in the public HMDA data) that correspond to each 2010 block reported by the TomTom geocoding service.[73] For purposes of confirming the meaning of race codes, I only include a loan from the MS-NC Data in the merge with public HMDA data if the property is located in a Census 2010 block that corresponds to only one Census 2000 tract.[74]

Once I standardize the codes in the MS-NC Data to match the codes in the public HMDA data, I merge the loans in the MS-NC Data with the loans in the public HMDA data. Among the matched loans, I only keep unique one-to-one matches (where a single loan in the MS-NC Data has the same characteristics as a single loan in the public HMDA data, and vice versa). Among

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[71] The MS-NC Data includes some data fields with some county information, but the county names are not standardized in these fields.

[72] Lower levels of geocoding accuracy include the latitude and longitude coordinates of the closest cross-street intersection, the coordinates for an interpolation of the house address if the given house number was along a range of house numbers for the street included in TomTom's database, and coordinates for the postal zip code. See TomTom Global Geocoder, Company User/Admin Documentation.

[73] U.S. Census Bureau, 2010 Census Tract Relationship Files, http://www.census.gov/geo/maps-data/data/tract_rel_download.html; U.S. Census Bureau, *Explanation of the 2010 Census Tract Relationship File*, http://www.census.gov/geo/maps-data/data/pdfs/rel/tractrelfile.pdf; U.S. Census Bureau, *File Format and Record Layouts for the 2010 Census Tract Relationship Files*, http://www.census.gov/geo/maps-data/data/tract_rel_layout.html.

[74] Because of Census boundary changes, some Census 2010 blocks are located within multiple Census 2000 tracts.

these unique matches, Table 4-1 summarizes the rate at which the race and ethnicity codes in the public HMDA data match the race and ethnicity codes in the NC Data.[75]

TABLE 4-1: MATCH RATE OF MS-NC DATA RACE/ETHNICITY CODES WITH PUBLIC HMDA DATA RACE/ETHNICITY CODES

Race/ Ethnicity Field	Period	Number of Uniquely Matched Loans in MS-NC Data - HMDA Public Data Merge	% with Same Code for Given Race/Ethnicity Field in Public HMDA Data & MS-NC Data	Number of Uniquely Matched Loans in MS-NC Data - HMDA Public Data Merge with Codes Present in Given Race/Ethnicity Field	% with Same Code for Given Race/Ethnicity Field in Public HMDA Data & MS-NC Data
Borrower Ethnicity	2003	4,445	100.0%	0	
	2004 (Jan-Jun)	41,635	91.6%	41,442	92.1%
	2004 (Jul-Dec)	25,930	98.7%	25,930	98.7%
	2005	36,552	99.7%	36,552	99.7%
	2006	66,893	99.9%	66,892	99.9%
Borrower Race	2003	4,445	100.0%	4,445	100.0%
	2004 (Jan-Jun)	41,635	91.9%	41,635	91.9%
	2004 (Jul-Dec)	25,930	98.5%	25,930	98.5%
	2005	36,552	99.7%	36,552	99.7%
	2006	66,893	99.9%	66,891	99.9%
Co-Borrower Ethnicity	2003	4,445	100.0%	0	
	2004 (Jan-Jun)	41,635	34.0%	15,748	89.8%
	2004 (Jul-Dec)	25,930	50.6%	13,559	96.9%
	2005	36,552	98.8%	36,493	99.0%
	2006	66,893	99.7%	66,880	99.8%
Co-Borrower Race	2003	4,445	23.2%	1,031	100.0%
	2004 (Jan-Jun)	41,635	33.5%	15,522	89.9%
	2004 (Jul-Dec)	25,930	50.5%	13,392	97.8%
	2005	36,552	98.8%	36,493	99.0%
	2006	66,893	99.7%	66,878	99.8%

As Table 4-1 shows, nearly all the loans in the merged data with race and ethnicity codes present in the MS-NC Data have the same borrower and coborrower race and ethnicity codes as the public HMDA data. Table 4-1 shows that the codes in New Century's race and ethnicity

[75] For loans in the public HMDA data with multiple races reported for a given borrower or co-borrower, only the first race reported for that borrower or co-borrower is considered for the comparison of HMDA codes to MS-NC Data codes.

fields generally match the codes for race and ethnicity in the HMDA data. Therefore, in my disparate impact analysis, I use the race and ethnicity fields from the New Century database, and I assume the values in those fields correspond to the HMDA race and ethnicity code definitions for the year in which the loan was originated.

Appendix 5A: Summary Statistics for New Century's 2004-2007 Originations, All New Century Loans, Nationwide

Variable	Obs	Mean	Std. Dev.	Min	Max
High Cost	792,753	70.9%	45.4%	0%	100%
Combined-Risk	792,759	51.8%	50.0%	0%	100%
APR	792,753	9.325	1.741	0.710	22.850
APR Rate Spread	792,753	4.468	1.772	-4.120	17.930
Race (Primary Classification)					
American Indian	792,759	0.7%	8.6%	0%	100%
Asian, Hawaiian, or Pacific Islander	792,759	5.2%	22.2%	0%	100%
African American	792,759	17.6%	38.1%	0%	100%
Hispanic	792,759	22.9%	42.0%	0%	100%
Missing	792,759	6.3%	24.3%	0%	100%
Non-Hispanic White	792,759	47.2%	49.9%	0%	100%
Race (Alternative Classification #1)					
American Indian, non-Hispanic	792,759	0.7%	8.6%	0%	100%
American Indian, Hispanic	792,759	0.5%	7.0%	0%	100%
Asian, Hawaiian, or Pacific Islander, non-Hispanic	792,759	5.2%	22.2%	0%	100%
Asian, Hawaiian, or Pacific Islander, Hispanic	792,759	0.3%	5.8%	0%	100%
African American, non-Hispanic	792,759	17.2%	37.8%	0%	100%
African American, Hispanic	792,759	0.4%	6.3%	0%	100%
White, Hispanic	792,759	6.3%	24.3%	0%	100%
White, Non-Hispanic	792,759	1.5%	12.2%	0%	100%
Missing, Non-Hispanic	792,759	47.2%	49.9%	0%	100%
Missing, Hispanic	792,759	20.6%	40.4%	0%	100%
Race (Alternative Classification #2)					
Any ethnicity Hispanic	792,759	23.3%	42.3%	0%	100%
Any race African-American	792,759	17.6%	38.1%	0%	100%
Any race Asian or Hawaiian/Pacific Islander	792,759	5.6%	23.0%	0%	100%
Any race American Indian	792,759	1.3%	11.2%	0%	100%
Any race White	792,759	68.8%	46.3%	0%	100%
Missing race	792,759	6.3%	24.3%	0%	100%
Business channel					
100.0	792,754	0.0%	0.1%	0%	100%
Commercial Standard	792,754	0.1%	2.9%	0%	100%
Concurrent	792,754	0.0%	0.1%	0%	100%
Retail Standard	792,754	17.2%	37.8%	0%	100%
Wholesale Standard	792,754	82.7%	37.8%	0%	100%
FHA or VA	792,759	0.7%	8.6%	0%	100%
HELOC	792,759	0.2%	3.9%	0%	100%
Loan Program Description (NC Data field *program_desc_1*)					
1 Mo LIBOR	792,756	0.0%	0.2%	0%	100%
10Yr Balloon	792,756	0.1%	3.5%	0%	100%
1Yr ARM	792,756	0.0%	0.8%	0%	100%
2 Year Rate, LIBOR Based	792,756	29.2%	45.4%	0%	100%
2Yr ARM - 30YrTerm/40Amort	792,756	9.1%	28.8%	0%	100%
2Yr ARM - 30YrTerm/50Amort	792,756	0.3%	5.7%	0%	100%
2nd TDs	792,756	1.9%	13.7%	0%	100%
3 Year Rate, LIBOR Based	792,756	3.5%	18.3%	0%	100%
30Yr Fixed	792,756	27.3%	44.6%	0%	100%
3Yr ARM - 30YrTerm/40Amort	792,756	1.4%	11.8%	0%	100%
3Yr ARM - 30YrTerm/50Amort	792,756	0.0%	1.9%	0%	100%
40FIX - 30yrTerm	792,756	1.8%	13.4%	0%	100%
5 Year Rate, LIBOR Based	792,756	0.6%	7.8%	0%	100%
50FIX - 30yrTerm	792,756	0.1%	2.6%	0%	100%
6 Month Rate, LIBOR Based	792,756	0.0%	1.0%	0%	100%
7Yr ARM	792,756	0.0%	1.4%	0%	100%
ARM - Prime	792,756	0.0%	1.7%	0%	100%
Fixed Rate	792,756	5.1%	22.0%	0%	100%
Fixed Rate - Prime	792,756	5.1%	22.0%	0%	100%
HELOC	792,756	0.2%	3.9%	0%	100%
Interest Only	792,756	0.1%	2.8%	0%	100%

Appendix 5A: Summary Statistics for New Century's 2004-2007 Originations, All New Century Loans, Nationwide

Variable	Obs	Mean	Std. Dev.	Min	Max
Interest Only - 10Yr	792,756	0.2%	4.9%	0%	100%
Interest Only - 10Yr/30 FIX	792,756	0.7%	8.4%	0%	100%
Interest Only - 10Yr/40 FIX	792,756	0.0%	0.6%	0%	100%
Interest Only - 2Yr	792,756	6.0%	23.7%	0%	100%
Interest Only - 2Yr/5IO	792,756	4.2%	20.1%	0%	100%
Interest Only - 3Yr	792,756	1.2%	11.0%	0%	100%
Interest Only - 3Yr/5IO	792,756	1.2%	11.0%	0%	100%
Interest Only - 5Yr	792,756	0.1%	3.9%	0%	100%
Interest Only - 5Yr/10IO	792,756	0.0%	1.7%	0%	100%
Interest Only - 5Yr/30FIX	792,756	0.2%	4.0%	0%	100%
Interest Only - 5Yr/7IO	792,756	0.1%	3.7%	0%	100%
Interest Only - 7Yr	792,756	0.0%	1.2%	0%	100%
Loan Characteristics					
Fixed-Rate	792,759	40.6%	49.1%	0%	100%
Adjustable Rate (ARM)	792,759	57.6%	49.4%	0%	100%
Unknown if fixed-rate or adjustable rate	792,759	1.7%	13.0%	0%	100%
Interest-Only	792,759	14.2%	34.9%	0%	100%
Balloon	792,759	12.9%	33.5%	0%	100%
Loan Term (months)	792,759	352.3	34.1	120.0	480.0
120 months	792,759	0.1%	3.1%	0%	100%
180 months	792,759	1.8%	13.4%	0%	100%
240 months	792,759	3.5%	18.5%	0%	100%
300 months	792,759	0.5%	6.8%	0%	100%
356 months	792,759	0.0%	0.1%	0%	100%
357 months	792,759	0.0%	0.4%	0%	100%
358 months	792,759	0.0%	0.3%	0%	100%
359 months	792,759	0.0%	0.1%	0%	100%
360 months	792,759	93.7%	24.3%	0%	100%
420 months	792,759	0.1%	2.8%	0%	100%
480 months	792,759	0.3%	5.3%	0%	100%
Prepayment Penalty	792,759	64.5%	47.9%	0%	100%
Loan Amount ($000)	792,759	$180.1	$136.1	$1.2	$3,325.0
Lien Status					
First lien	792,759	81.1%	39.1%	0%	100%
Subordinate lien	792,759	18.9%	39.1%	0%	100%
Lien Status = 3	792,759	0.0%	1.4%	0%	100%
Lien Status = 4	792,759	0.0%	0.6%	0%	100%
Lien Status = 5	792,759	0.0%	0.2%	0%	100%
Credit Score	791,278	631.9	64.5	411.0	843.0
Missing Credit Score	792,759	0.2%	4.3%	0%	100%
Credit Score < 500	792,759	0.0%	1.6%	0%	100%
500 ≤ Credit Score < 520	792,759	3.8%	19.2%	0%	100%
520 ≤ Credit Score < 540	792,759	4.8%	21.3%	0%	100%
540 ≤ Credit Score < 560	792,759	5.7%	23.2%	0%	100%
560 ≤ Credit Score < 580	792,759	6.2%	24.0%	0%	100%
580 ≤ Credit Score < 600	792,759	9.8%	29.8%	0%	100%
600 ≤ Credit Score < 620	792,759	11.9%	32.4%	0%	100%
620 ≤ Credit Score < 640	792,759	13.3%	34.0%	0%	100%
640 ≤ Credit Score < 660	792,759	13.1%	33.8%	0%	100%
660 ≤ Credit Score < 680	792,759	9.8%	29.7%	0%	100%
680 ≤ Credit Score < 700	792,759	6.9%	25.4%	0%	100%
700 ≤ Credit Score < 720	792,759	4.7%	21.1%	0%	100%
720 ≤ Credit Score < 740	792,759	3.4%	18.1%	0%	100%
740 ≤ Credit Score < 760	792,759	2.5%	15.7%	0%	100%
760 ≤ Credit Score < 780	792,759	1.9%	13.8%	0%	100%
Credit Score ≥ 780	792,759	1.8%	13.4%	0%	100%
Loan-to-Value Ratio (%)	792,748	68.3	25.9	0.4	106.7
LTV missing	792,759	0.0%	0.4%	0%	100%
LTV ≤ 60%	792,759	25.0%	43.3%	0%	100%

Appendix 5A: Summary Statistics for New Century's 2004-2007 Originations, All New Century Loans, Nationwide

Variable	Obs	Mean	Std. Dev.	Min	Max
60% < LTV ≤ 70%	792,759	7.0%	25.5%	0%	100%
70% < LTV ≤ 80%	792,759	36.8%	48.2%	0%	100%
LTV > 80%	792,759	31.2%	46.3%	0%	100%
Combined Loan-to-Value Ratio (%)	792,754	87.4	14.7	0.0	177.5
CLTV missing	792,759	0.0%	0.3%	0%	100%
CLTV ≤ 60%	792,759	6.0%	23.8%	0%	100%
60% < CLTV ≤ 70%	792,759	6.9%	25.3%	0%	100%
70% < CLTV ≤ 80%	792,759	17.4%	37.9%	0%	100%
CLTV > 80%	792,759	69.7%	46.0%	0%	100%
Debt-to-Income (DTI) Ratio (%)	785,760	43.0	954.3	0.0	594,305.0
DTI missing	792,759	0.9%	9.4%	0%	100%
DTI ≤ 36%	792,759	27.9%	44.8%	0%	100%
36% < DTI ≤ 50%	792,759	66.1%	47.3%	0%	100%
DTI > 50%	792,759	5.1%	22.1%	0%	100%
Housing Debt-to-Income (HTI) Ratio (%)	781,952	31.2	568.9	0.0	283,105.0
HTI missing	792,759	1.4%	11.6%	0%	100%
HTI ≤ 28%	792,759	43.8%	49.6%	0%	100%
28% < HTI ≤ 33%	792,759	17.2%	37.7%	0%	100%
33% < HTI ≤ 40%	792,759	20.8%	40.6%	0%	100%
HTI > 40%	792,759	16.9%	37.5%	0%	100%
Loan Purpose					
Purchase	792,759	47.7%	49.9%	0%	100%
Cash-Out Refinance	792,759	42.6%	49.5%	0%	100%
Rate-Term Refinance	792,759	9.6%	29.5%	0%	100%
Unknown purpose	792,759	0.1%	2.2%	0%	100%
Occupancy					
Primary	792,759	90.7%	29.0%	0%	100%
Second Home	792,759	2.5%	15.7%	0%	100%
Investment	792,759	6.8%	25.1%	0%	100%
Property Type					
Single Family	792,759	72.1%	44.9%	0%	100%
Multi-Family (2-4)	792,759	5.8%	23.5%	0%	100%
Multi-Family (5+)	792,759	0.1%	2.8%	0%	100%
Condo	792,759	7.7%	26.6%	0%	100%
Industrial	792,759	0.0%	0.6%	0%	100%
Manufactured home	792,759	0.2%	5.0%	0%	100%
Mixed Use	792,759	0.0%	0.7%	0%	100%
Office	792,759	0.0%	0.7%	0%	100%
PUD	792,759	14.1%	34.8%	0%	100%
Retail building	792,759	0.0%	0.8%	0%	100%
Occupancy & Property Type					
Primary, Single Family	792,759	66.7%	47.1%	0%	100%
Primary, Multi-Family (2-4)	792,759	4.3%	20.3%	0%	100%
Primary, Multi-Family (5+)	792,759	0.0%	1.0%	0%	100%
Primary, Condo	792,759	6.6%	24.9%	0%	100%
Primary, Manufactured home	792,759	0.2%	4.9%	0%	100%
Primary, Mixed Use	792,759	0.0%	0.3%	0%	100%
Primary, Office	792,759	0.0%	0.1%	0%	100%
Primary, PUD	792,759	12.8%	33.4%	0%	100%
Primary, Retail building	792,759	0.0%	0.1%	0%	100%
Second Home, Single Family	792,759	1.3%	11.3%	0%	100%
Second Home, Multi-Family (2-4)	792,759	0.0%	1.6%	0%	100%
Second Home, Multi-Family (5+)	792,759	0.0%	0.3%	0%	100%
Second Home, Condo	792,759	0.5%	7.0%	0%	100%
Second Home, Manufactured home	792,759	0.0%	0.9%	0%	100%
Second Home, PUD	792,759	0.7%	8.4%	0%	100%
Investment, Single Family	792,759	4.1%	19.8%	0%	100%
Investment, Multi-Family (2-4)	792,759	1.5%	12.1%	0%	100%
Investment, Multi-Family (5+)	792,759	0.1%	2.6%	0%	100%

Appendix 5A: Summary Statistics for New Century's 2004-2007 Originations, All New Century Loans, Nationwide

Variable	Obs	Mean	Std. Dev.	Min	Max
Investment, Condo	792,759	0.5%	7.4%	0%	100%
Investment, Industrial	792,759	0.0%	0.6%	0%	100%
Investment, Mixed Use	792,759	0.0%	0.7%	0%	100%
Investment, Office	792,759	0.0%	0.7%	0%	100%
Investment, PUD	792,759	0.5%	7.3%	0%	100%
Investment, Retail building	792,759	0.0%	0.8%	0%	100%
Documentation Type					
Full	792,759	58.6%	49.3%	0%	100%
Limited	792,759	2.2%	14.7%	0%	100%
Stated	792,759	39.2%	48.8%	0%	100%
Self-employed borrower or co-borrower present	792,759	22.6%	41.8%	0%	100%
Self-employed borrower or co-borrower presence unknown	792,759	0.1%	3.9%	0%	100%
Co-Borrower presence	792,759	33.0%	47.0%	0%	100%
State					
Alaska (AK)	792,759	0.2%	4.4%	0%	100%
Alabama (AL)	792,759	0.5%	7.4%	0%	100%
Arkansas (AR)	792,759	0.5%	7.3%	0%	100%
Arizona (AZ)	792,759	3.9%	19.3%	0%	100%
California (CA)	792,759	25.0%	43.3%	0%	100%
Colorado (CO)	792,759	2.4%	15.2%	0%	100%
Connecticut (CT)	792,759	1.0%	9.9%	0%	100%
District of Columbia (DC)	792,759	0.2%	4.6%	0%	100%
Delaware (DE)	792,759	0.1%	3.5%	0%	100%
Florida (FL)	792,759	9.2%	29.0%	0%	100%
Georgia (GA)	792,759	2.3%	14.8%	0%	100%
Hawaii (HI)	792,759	1.3%	11.3%	0%	100%
Iowa (IA)	792,759	0.4%	6.4%	0%	100%
Idaho (ID)	792,759	0.6%	7.7%	0%	100%
Illinois (IL)	792,759	3.5%	18.3%	0%	100%
Indiana (IN)	792,759	1.3%	11.4%	0%	100%
Kansas (KS)	792,759	0.3%	5.7%	0%	100%
Kentucky (KY)	792,759	0.5%	6.9%	0%	100%
Louisiana (LA)	792,759	0.6%	7.7%	0%	100%
Massachusetts (MA)	792,759	2.5%	15.5%	0%	100%
Maryland (MD)	792,759	2.0%	14.0%	0%	100%
Maine (ME)	792,759	0.4%	6.6%	0%	100%
Michigan (MI)	792,759	2.4%	15.2%	0%	100%
Minnesota (MN)	792,759	1.3%	11.5%	0%	100%
Missouri (MO)	792,759	1.0%	10.1%	0%	100%
Mississippi (MS)	792,759	0.4%	6.1%	0%	100%
Montana (MT)	792,759	0.2%	4.5%	0%	100%
North Carolina (NC)	792,759	1.0%	9.8%	0%	100%
North Dakota (ND)	792,759	0.0%	2.2%	0%	100%
Nebraska (NE)	792,759	0.3%	5.8%	0%	100%
New Hampshire (NH)	792,759	0.4%	5.9%	0%	100%
New Jersey (NJ)	792,759	2.8%	16.5%	0%	100%
New Mexico (NM)	792,759	0.7%	8.6%	0%	100%
Nevada (NV)	792,759	2.3%	14.9%	0%	100%
New York (NY)	792,759	4.1%	19.8%	0%	100%
Ohio (OH)	792,759	2.3%	15.1%	0%	100%
Oklahoma (OK)	792,759	0.5%	7.0%	0%	100%
Oregon (OR)	792,759	1.6%	12.6%	0%	100%
Pennsylvania (PA)	792,759	2.3%	15.1%	0%	100%
Rhode Island (RI)	792,759	0.6%	7.7%	0%	100%
South Carolina (SC)	792,759	0.7%	8.6%	0%	100%
South Dakota (SD)	792,759	0.0%	2.2%	0%	100%
Tennessee (TN)	792,759	1.3%	11.4%	0%	100%
Texas (TX)	792,759	9.2%	28.9%	0%	100%
Utah (UT)	792,759	0.6%	7.9%	0%	100%

Appendix 5A: Summary Statistics for New Century's 2004-2007 Originations, All New Century Loans, Nationwide

Variable	Obs	Mean	Std. Dev.	Min	Max
Virginia (VA)	792,759	1.4%	11.9%	0%	100%
Vermont (VT)	792,759	0.0%	1.9%	0%	100%
Washington (WA)	792,759	2.4%	15.4%	0%	100%
Wisconsin (WI)	792,759	1.1%	10.3%	0%	100%
West Virginia (WV)	792,759	0.1%	3.3%	0%	100%
Wyoming (WY)	792,759	0.1%	2.3%	0%	100%
Origination Month					
Jan-2004	792,759	1.6%	12.7%	0%	100%
Feb-2004	792,759	1.7%	12.9%	0%	100%
Mar-2004	792,759	2.3%	14.9%	0%	100%
Apr-2004	792,759	2.2%	14.5%	0%	100%
May-2004	792,759	2.6%	16.0%	0%	100%
Jun-2004	792,759	3.1%	17.3%	0%	100%
Jul-2004	792,759	2.3%	15.1%	0%	100%
Aug-2004	792,759	2.1%	14.3%	0%	100%
Sep-2004	792,759	2.0%	14.1%	0%	100%
Oct-2004	792,759	2.2%	14.7%	0%	100%
Nov-2004	792,759	2.2%	14.8%	0%	100%
Dec-2004	792,759	2.6%	16.0%	0%	100%
Jan-2005	792,759	1.8%	13.1%	0%	100%
Feb-2005	792,759	1.8%	13.2%	0%	100%
Mar-2005	792,759	2.7%	16.2%	0%	100%
Apr-2005	792,759	2.7%	16.2%	0%	100%
May-2005	792,759	2.7%	16.1%	0%	100%
Jun-2005	792,759	2.7%	16.3%	0%	100%
Jul-2005	792,759	2.8%	16.4%	0%	100%
Aug-2005	792,759	3.7%	18.8%	0%	100%
Sep-2005	792,759	3.5%	18.5%	0%	100%
Oct-2005	792,759	3.1%	17.4%	0%	100%
Nov-2005	792,759	3.1%	17.2%	0%	100%
Dec-2005	792,759	3.2%	17.5%	0%	100%
Jan-2006	792,759	2.4%	15.3%	0%	100%
Feb-2006	792,759	2.4%	15.4%	0%	100%
Mar-2006	792,759	3.3%	17.8%	0%	100%
Apr-2006	792,759	2.8%	16.5%	0%	100%
May-2006	792,759	3.3%	18.0%	0%	100%
Jun-2006	792,759	3.6%	18.6%	0%	100%
Jul-2006	792,759	3.1%	17.5%	0%	100%
Aug-2006	792,759	3.2%	17.7%	0%	100%
Sep-2006	792,759	2.7%	16.1%	0%	100%
Oct-2006	792,759	2.7%	16.4%	0%	100%
Nov-2006	792,759	2.6%	15.8%	0%	100%
Dec-2006	792,759	2.7%	16.1%	0%	100%
Jan-2007	792,759	2.2%	14.6%	0%	100%
Feb-2007	792,759	2.0%	14.0%	0%	100%
Mar-2007	792,759	0.3%	5.5%	0%	100%

Appendix 5B: Summary Statistics for New Century's 2004-2007 Originations, Morgan Stanley Purchases, Nationwide

Variable	Obs	Mean	Std. Dev.	Min	Max
High Cost	156,502	70.3%	45.7%	0%	100%
Combined-Risk	156,502	53.4%	49.9%	0%	100%
APR	156,502	9.330	1.732	4.140	16.310
APR Rate Spread	156,502	4.405	1.780	-1.110	11.200
Race (Primary Classification)					
American Indian	156,502	0.9%	9.6%	0%	100%
Asian, Hawaiian, or Pacific Islander	156,502	4.9%	21.5%	0%	100%
African American	156,502	19.3%	39.5%	0%	100%
Hispanic	156,502	23.1%	42.2%	0%	100%
Missing	156,502	4.8%	21.4%	0%	100%
Non-Hispanic White	156,502	47.0%	49.9%	0%	100%
Race (Alternative Classification #1)					
American Indian, non-Hispanic	156,502	0.9%	9.6%	0%	100%
American Indian, Hispanic	156,502	0.5%	6.7%	0%	100%
Asian, Hawaiian, or Pacific Islander, non-Hispanic	156,502	4.9%	21.5%	0%	100%
Asian, Hawaiian, or Pacific Islander, Hispanic	156,502	0.3%	5.8%	0%	100%
African American, non-Hispanic	156,502	18.9%	39.2%	0%	100%
African American, Hispanic	156,502	0.4%	6.3%	0%	100%
White, Hispanic	156,502	4.8%	21.4%	0%	100%
White, Non-Hispanic	156,502	2.5%	15.6%	0%	100%
Missing, Non-Hispanic	156,502	47.0%	49.9%	0%	100%
Missing, Hispanic	156,502	19.8%	39.9%	0%	100%
Race (Alternative Classification #2)					
Any ethnicity Hispanic	156,502	23.5%	42.4%	0%	100%
Any race African-American	156,502	19.3%	39.5%	0%	100%
Any race Asian or Hawaiian/Pacific Islander	156,502	5.3%	22.3%	0%	100%
Any race American Indian	156,502	1.4%	11.8%	0%	100%
Any race White	156,502	67.7%	46.8%	0%	100%
Missing race	156,502	4.8%	21.4%	0%	100%
Business channel					
100.0	156,500	0.0%	0.0%	0%	0%
Commercial Standard	156,500	0.0%	0.0%	0%	0%
Concurrent	156,500	0.0%	0.0%	0%	0%
Retail Standard	156,500	13.5%	34.2%	0%	100%
Wholesale Standard	156,500	86.5%	34.2%	0%	100%
FHA or VA	156,502	0.0%	0.0%	0%	0%
HELOC	156,502	0.0%	0.0%	0%	0%
Loan Program Description (NC Data field *program_desc_1*)					
1 Mo LIBOR	156,502	0.0%	0.0%	0%	0%
10Yr Balloon	156,502	0.0%	0.0%	0%	0%
1Yr ARM	156,502	0.0%	0.0%	0%	0%
2 Year Rate, LIBOR Based	156,502	40.5%	49.1%	0%	100%
2Yr ARM - 30YrTerm/40Amort	156,502	11.2%	31.5%	0%	100%
2Yr ARM - 30YrTerm/50Amort	156,502	0.1%	2.5%	0%	100%
2nd TDs	156,502	0.0%	1.2%	0%	100%
3 Year Rate, LIBOR Based	156,502	3.3%	17.8%	0%	100%
30Yr Fixed	156,502	26.4%	44.1%	0%	100%
3Yr ARM - 30YrTerm/40Amort	156,502	1.7%	12.8%	0%	100%
3Yr ARM - 30YrTerm/50Amort	156,502	0.0%	0.8%	0%	100%
40FIX - 30yrTerm	156,502	2.1%	14.5%	0%	100%
5 Year Rate, LIBOR Based	156,502	0.1%	3.7%	0%	100%
50FIX - 30yrTerm	156,502	0.0%	0.4%	0%	100%
6 Month Rate, LIBOR Based	156,502	0.0%	0.0%	0%	0%
7Yr ARM	156,502	0.0%	0.0%	0%	0%
ARM - Prime	156,502	0.0%	0.0%	0%	0%
Fixed Rate	156,502	5.1%	21.9%	0%	100%
Fixed Rate - Prime	156,502	0.0%	0.0%	0%	0%
HELOC	156,502	0.0%	0.0%	0%	0%
Interest Only	156,502	0.0%	0.0%	0%	0%

Appendix 5B: Summary Statistics for New Century's 2004-2007 Originations, Morgan Stanley Purchases, Nationwide

Variable	Obs	Mean	Std. Dev.	Min	Max
Interest Only - 10Yr	156,502	0.2%	4.7%	0%	100%
Interest Only - 10Yr/30 FIX	156,502	0.0%	0.0%	0%	0%
Interest Only - 10Yr/40 FIX	156,502	0.0%	0.0%	0%	0%
Interest Only - 2Yr	156,502	3.9%	19.2%	0%	100%
Interest Only - 2Yr/5IO	156,502	4.1%	19.8%	0%	100%
Interest Only - 3Yr	156,502	0.4%	6.5%	0%	100%
Interest Only - 3Yr/5IO	156,502	0.9%	9.4%	0%	100%
Interest Only - 5Yr	156,502	0.0%	0.0%	0%	0%
Interest Only - 5Yr/10IO	156,502	0.0%	0.0%	0%	0%
Interest Only - 5Yr/30FIX	156,502	0.0%	2.1%	0%	100%
Interest Only - 5Yr/7IO	156,502	0.1%	2.6%	0%	100%
Interest Only - 7Yr	156,502	0.0%	0.0%	0%	0%
Loan Characteristics					
Fixed-Rate	156,502	33.7%	47.3%	0%	100%
Adjustable Rate (ARM)	156,502	66.3%	47.3%	0%	100%
Unknown if fixed-rate or adjustable rate	156,502	0.0%	0.0%	0%	0%
Interest-Only	156,502	9.6%	29.4%	0%	100%
Balloon	156,502	15.0%	35.7%	0%	100%
Loan Term (months)	156,502	352.6	33.1	120.0	480.0
120 months	156,502	0.1%	3.0%	0%	100%
180 months	156,502	2.1%	14.4%	0%	100%
240 months	156,502	2.8%	16.4%	0%	100%
300 months	156,502	0.3%	5.7%	0%	100%
356 months	156,502	0.0%	0.0%	0%	0%
357 months	156,502	0.0%	0.0%	0%	0%
358 months	156,502	0.0%	0.0%	0%	0%
359 months	156,502	0.0%	0.0%	0%	0%
360 months	156,502	94.7%	22.5%	0%	100%
420 months	156,502	0.0%	0.0%	0%	0%
480 months	156,502	0.1%	2.4%	0%	100%
Prepayment Penalty	156,502	73.0%	44.4%	0%	100%
Loan Amount ($000)	156,502	$181.2	$126.2	$13.8	$1,300.0
Lien Status					
First lien	156,502	89.2%	31.0%	0%	100%
Subordinate lien	156,502	10.8%	31.0%	0%	100%
Lien Status = 3	156,502	0.0%	0.0%	0%	0%
Lien Status = 4	156,502	0.0%	0.0%	0%	0%
Lien Status = 5	156,502	0.0%	0.0%	0%	0%
Credit Score	156,502	615.6	59.5	500.0	820.0
Missing Credit Score	156,502	0.0%	0.0%	0%	0%
Credit Score < 500	156,502	0.0%	0.0%	0%	0%
500 ≤ Credit Score < 520	156,502	5.1%	21.9%	0%	100%
520 ≤ Credit Score < 540	156,502	6.6%	24.8%	0%	100%
540 ≤ Credit Score < 560	156,502	8.0%	27.1%	0%	100%
560 ≤ Credit Score < 580	156,502	8.1%	27.3%	0%	100%
580 ≤ Credit Score < 600	156,502	11.6%	32.1%	0%	100%
600 ≤ Credit Score < 620	156,502	13.1%	33.8%	0%	100%
620 ≤ Credit Score < 640	156,502	13.7%	34.4%	0%	100%
640 ≤ Credit Score < 660	156,502	12.2%	32.7%	0%	100%
660 ≤ Credit Score < 680	156,502	8.3%	27.5%	0%	100%
680 ≤ Credit Score < 700	156,502	5.2%	22.2%	0%	100%
700 ≤ Credit Score < 720	156,502	3.3%	17.7%	0%	100%
720 ≤ Credit Score < 740	156,502	2.1%	14.4%	0%	100%
740 ≤ Credit Score < 760	156,502	1.4%	11.8%	0%	100%
760 ≤ Credit Score < 780	156,502	0.9%	9.5%	0%	100%
Credit Score ≥ 780	156,502	0.6%	7.4%	0%	100%
Loan-to-Value Ratio (%)	156,502	73.2	21.6	5.3	100.0
LTV missing	156,502	0.0%	0.0%	0%	0%
LTV ≤ 60%	156,502	17.1%	37.7%	0%	100%

Appendix 5B: Summary Statistics for New Century's 2004-2007 Originations, Morgan Stanley Purchases, Nationwide

Variable	Obs	Mean	Std. Dev.	Min	Max
60% < LTV ≤ 70%	156,502	8.0%	27.2%	0%	100%
70% < LTV ≤ 80%	156,502	38.6%	48.7%	0%	100%
LTV > 80%	156,502	36.2%	48.1%	0%	100%
Combined Loan-to-Value Ratio (%)	156,502	85.7	14.4	0.0	100.1
CLTV missing	156,502	0.0%	0.0%	0%	0%
CLTV ≤ 60%	156,502	6.3%	24.3%	0%	100%
60% < CLTV ≤ 70%	156,502	7.9%	27.0%	0%	100%
70% < CLTV ≤ 80%	156,502	20.5%	40.4%	0%	100%
CLTV > 80%	156,502	65.2%	47.6%	0%	100%
Debt-to-Income (DTI) Ratio (%)	156,500	40.1	13.9	0.1	3,216.9
DTI missing	156,502	0.0%	0.4%	0%	100%
DTI ≤ 36%	156,502	28.7%	45.2%	0%	100%
36% < DTI ≤ 50%	156,502	66.3%	47.3%	0%	100%
DTI > 50%	156,502	5.0%	21.9%	0%	100%
Housing Debt-to-Income (HTI) Ratio (%)	155,989	29.6	13.0	0.0	2,043.0
HTI missing	156,502	0.3%	5.7%	0%	100%
HTI ≤ 28%	156,502	44.2%	49.7%	0%	100%
28% < HTI ≤ 33%	156,502	17.0%	37.5%	0%	100%
33% < HTI ≤ 40%	156,502	20.7%	40.5%	0%	100%
HTI > 40%	156,502	17.9%	38.3%	0%	100%
Loan Purpose					
Purchase	156,502	40.2%	49.0%	0%	100%
Cash-Out Refinance	156,502	51.8%	50.0%	0%	100%
Rate-Term Refinance	156,502	8.1%	27.2%	0%	100%
Unknown purpose	156,502	0.0%	0.0%	0%	0%
Occupancy					
Primary	156,502	90.8%	28.9%	0%	100%
Second Home	156,502	2.1%	14.2%	0%	100%
Investment	156,502	7.1%	25.7%	0%	100%
Property Type					
Single Family	156,502	75.5%	43.0%	0%	100%
Multi-Family (2-4)	156,502	6.3%	24.3%	0%	100%
Multi-Family (5+)	156,502	0.0%	0.0%	0%	0%
Condo	156,502	6.4%	24.5%	0%	100%
Industrial	156,502	0.0%	0.0%	0%	0%
Manufactured home	156,502	0.0%	0.0%	0%	0%
Mixed Use	156,502	0.0%	0.0%	0%	0%
Office	156,502	0.0%	0.0%	0%	0%
PUD	156,502	11.8%	32.3%	0%	100%
Retail building	156,502	0.0%	0.0%	0%	0%
Occupancy & Property Type					
Primary, Single Family	156,502	70.0%	45.8%	0%	100%
Primary, Multi-Family (2-4)	156,502	4.5%	20.8%	0%	100%
Primary, Multi-Family (5+)	156,502	0.0%	0.0%	0%	0%
Primary, Condo	156,502	5.5%	22.9%	0%	100%
Primary, Manufactured home	156,502	0.0%	0.0%	0%	0%
Primary, Mixed Use	156,502	0.0%	0.0%	0%	0%
Primary, Office	156,502	0.0%	0.0%	0%	0%
Primary, PUD	156,502	10.8%	31.0%	0%	100%
Primary, Retail building	156,502	0.0%	0.0%	0%	0%
Second Home, Single Family	156,502	1.1%	10.5%	0%	100%
Second Home, Multi-Family (2-4)	156,502	0.0%	1.8%	0%	100%
Second Home, Multi-Family (5+)	156,502	0.0%	0.0%	0%	0%
Second Home, Condo	156,502	0.4%	6.0%	0%	100%
Second Home, Manufactured home	156,502	0.0%	0.0%	0%	0%
Second Home, PUD	156,502	0.5%	7.4%	0%	100%
Investment, Single Family	156,502	4.4%	20.6%	0%	100%
Investment, Multi-Family (2-4)	156,502	1.7%	13.0%	0%	100%
Investment, Multi-Family (5+)	156,502	0.0%	0.0%	0%	0%

Appendix 5B: Summary Statistics for New Century's 2004-2007 Originations, Morgan Stanley Purchases, Nationwide

Variable	Obs	Mean	Std. Dev.	Min	Max
Investment, Condo	156,502	0.5%	7.1%	0%	100%
Investment, Industrial	156,502	0.0%	0.0%	0%	0%
Investment, Mixed Use	156,502	0.0%	0.0%	0%	0%
Investment, Office	156,502	0.0%	0.0%	0%	0%
Investment, PUD	156,502	0.5%	6.8%	0%	100%
Investment, Retail building	156,502	0.0%	0.0%	0%	0%
Documentation Type					
Full	156,502	59.0%	49.2%	0%	100%
Limited	156,502	2.7%	16.3%	0%	100%
Stated	156,502	38.3%	48.6%	0%	100%
Self-employed borrower or co-borrower present	156,502	22.5%	41.8%	0%	100%
Self-employed borrower or co-borrower presence unknown	156,502	0.2%	3.9%	0%	100%
Co-Borrower presence	156,502	31.7%	46.5%	0%	100%
State					
Alaska (AK)	156,502	0.2%	4.4%	0%	100%
Alabama (AL)	156,502	0.6%	7.8%	0%	100%
Arkansas (AR)	156,502	0.6%	7.7%	0%	100%
Arizona (AZ)	156,502	3.0%	17.2%	0%	100%
California (CA)	156,502	24.3%	42.9%	0%	100%
Colorado (CO)	156,502	1.6%	12.4%	0%	100%
Connecticut (CT)	156,502	1.2%	11.0%	0%	100%
District of Columbia (DC)	156,502	0.3%	5.1%	0%	100%
Delaware (DE)	156,502	0.1%	3.5%	0%	100%
Florida (FL)	156,502	10.3%	30.3%	0%	100%
Georgia (GA)	156,502	2.0%	13.9%	0%	100%
Hawaii (HI)	156,502	1.3%	11.2%	0%	100%
Iowa (IA)	156,502	0.5%	6.8%	0%	100%
Idaho (ID)	156,502	0.6%	7.6%	0%	100%
Illinois (IL)	156,502	3.6%	18.6%	0%	100%
Indiana (IN)	156,502	1.5%	12.2%	0%	100%
Kansas (KS)	156,502	0.2%	4.8%	0%	100%
Kentucky (KY)	156,502	0.5%	7.3%	0%	100%
Louisiana (LA)	156,502	0.6%	7.4%	0%	100%
Massachusetts (MA)	156,502	2.2%	14.6%	0%	100%
Maryland (MD)	156,502	2.1%	14.5%	0%	100%
Maine (ME)	156,502	0.5%	7.2%	0%	100%
Michigan (MI)	156,502	2.9%	16.7%	0%	100%
Minnesota (MN)	156,502	1.3%	11.3%	0%	100%
Missouri (MO)	156,502	1.0%	9.7%	0%	100%
Mississippi (MS)	156,502	0.5%	6.7%	0%	100%
Montana (MT)	156,502	0.2%	4.6%	0%	100%
North Carolina (NC)	156,502	0.8%	8.9%	0%	100%
North Dakota (ND)	156,502	0.1%	2.3%	0%	100%
Nebraska (NE)	156,502	0.4%	6.0%	0%	100%
New Hampshire (NH)	156,502	0.4%	6.2%	0%	100%
New Jersey (NJ)	156,502	2.8%	16.6%	0%	100%
New Mexico (NM)	156,502	0.8%	8.8%	0%	100%
Nevada (NV)	156,502	2.1%	14.3%	0%	100%
New York (NY)	156,502	4.5%	20.8%	0%	100%
Ohio (OH)	156,502	2.8%	16.5%	0%	100%
Oklahoma (OK)	156,502	0.5%	7.2%	0%	100%
Oregon (OR)	156,502	1.3%	11.5%	0%	100%
Pennsylvania (PA)	156,502	2.8%	16.4%	0%	100%
Rhode Island (RI)	156,502	0.7%	8.1%	0%	100%
South Carolina (SC)	156,502	0.7%	8.5%	0%	100%
South Dakota (SD)	156,502	0.0%	2.2%	0%	100%
Tennessee (TN)	156,502	1.4%	11.7%	0%	100%
Texas (TX)	156,502	8.7%	28.1%	0%	100%
Utah (UT)	156,502	0.6%	7.7%	0%	100%

Appendix 5B: Summary Statistics for New Century's 2004-2007 Originations, Morgan Stanley Purchases, Nationwide

Variable	Obs	Mean	Std. Dev.	Min	Max
Virginia (VA)	156,502	1.6%	12.7%	0%	100%
Vermont (VT)	156,502	0.1%	2.2%	0%	100%
Washington (WA)	156,502	2.2%	14.8%	0%	100%
Wisconsin (WI)	156,502	1.1%	10.6%	0%	100%
West Virginia (WV)	156,502	0.1%	3.1%	0%	100%
Wyoming (WY)	156,502	0.0%	2.2%	0%	100%
Origination Month					
Jan-2004	156,502	4.9%	21.6%	0%	100%
Feb-2004	156,502	5.4%	22.6%	0%	100%
Mar-2004	156,502	5.2%	22.2%	0%	100%
Apr-2004	156,502	3.6%	18.5%	0%	100%
May-2004	156,502	4.8%	21.3%	0%	100%
Jun-2004	156,502	5.7%	23.3%	0%	100%
Jul-2004	156,502	3.5%	18.5%	0%	100%
Aug-2004	156,502	0.2%	4.8%	0%	100%
Sep-2004	156,502	2.4%	15.3%	0%	100%
Oct-2004	156,502	4.7%	21.1%	0%	100%
Nov-2004	156,502	0.9%	9.3%	0%	100%
Dec-2004	156,502	3.6%	18.7%	0%	100%
Jan-2005	156,502	0.6%	7.6%	0%	100%
Feb-2005	156,502	0.0%	0.0%	0%	0%
Mar-2005	156,502	0.0%	1.7%	0%	100%
Apr-2005	156,502	0.1%	2.8%	0%	100%
May-2005	156,502	0.3%	5.1%	0%	100%
Jun-2005	156,502	2.7%	16.2%	0%	100%
Jul-2005	156,502	0.5%	6.9%	0%	100%
Aug-2005	156,502	1.8%	13.2%	0%	100%
Sep-2005	156,502	2.5%	15.5%	0%	100%
Oct-2005	156,502	0.4%	6.4%	0%	100%
Nov-2005	156,502	4.0%	19.6%	0%	100%
Dec-2005	156,502	4.3%	20.3%	0%	100%
Jan-2006	156,502	2.6%	16.0%	0%	100%
Feb-2006	156,502	2.6%	16.0%	0%	100%
Mar-2006	156,502	4.1%	19.8%	0%	100%
Apr-2006	156,502	1.8%	13.2%	0%	100%
May-2006	156,502	3.6%	18.6%	0%	100%
Jun-2006	156,502	4.7%	21.1%	0%	100%
Jul-2006	156,502	4.4%	20.5%	0%	100%
Aug-2006	156,502	4.1%	19.9%	0%	100%
Sep-2006	156,502	3.3%	17.8%	0%	100%
Oct-2006	156,502	2.6%	15.8%	0%	100%
Nov-2006	156,502	1.8%	13.2%	0%	100%
Dec-2006	156,502	2.0%	14.1%	0%	100%
Jan-2007	156,502	0.4%	6.6%	0%	100%
Feb-2007	156,502	0.0%	0.0%	0%	0%
Mar-2007	156,502	0.0%	0.0%	0%	0%

Appendix 5C: Summary Statistics for New Century's 2004-2007 Originations, All New Century Loans, Detroit Region

Variable	Obs	Mean	Std. Dev.	Min	Max
High Cost	13,311	84.5%	36.2%	0%	100%
Combined-Risk	13,311	73.8%	44.0%	0%	100%
APR	13,311	9.839	1.608	4.255	17.784
APR Rate Spread	13,311	4.956	1.654	-1.155	13.094
Race (Primary Classification)					
American Indian	13,311	0.6%	7.5%	0%	100%
Asian, Hawaiian, or Pacific Islander	13,311	1.6%	12.7%	0%	100%
African American	13,311	43.1%	49.5%	0%	100%
Hispanic	13,311	2.1%	14.3%	0%	100%
Missing	13,311	2.8%	16.4%	0%	100%
Non-Hispanic White	13,311	49.9%	50.0%	0%	100%
Race (Alternative Classification #1)					
American Indian, non-Hispanic	13,311	0.6%	7.5%	0%	100%
American Indian, Hispanic	13,311	0.1%	3.2%	0%	100%
Asian, Hawaiian, or Pacific Islander, non-Hispanic	13,311	1.6%	12.7%	0%	100%
Asian, Hawaiian, or Pacific Islander, Hispanic	13,311	0.0%	2.1%	0%	100%
African American, non-Hispanic	13,311	42.8%	49.5%	0%	100%
African American, Hispanic	13,311	0.3%	5.2%	0%	100%
White, Hispanic	13,311	2.8%	16.4%	0%	100%
White, Non-Hispanic	13,311	0.1%	3.8%	0%	100%
Missing, Non-Hispanic	13,311	49.9%	50.0%	0%	100%
Missing, Hispanic	13,311	1.8%	13.3%	0%	100%
Race (Alternative Classification #2)					
Any ethnicity Hispanic	13,311	2.4%	15.2%	0%	100%
Any race African-American	13,311	43.1%	49.5%	0%	100%
Any race Asian or Hawaiian/Pacific Islander	13,311	1.7%	12.9%	0%	100%
Any race American Indian	13,311	0.7%	8.2%	0%	100%
Any race White	13,311	52.0%	50.0%	0%	100%
Missing race	13,311	2.8%	16.4%	0%	100%
Business channel					
100.0	13,311	0.0%	0.0%	0%	0%
Commercial Standard	13,311	0.1%	2.9%	0%	100%
Concurrent	13,311	0.0%	0.0%	0%	0%
Retail Standard	13,311	11.5%	31.9%	0%	100%
Wholesale Standard	13,311	88.4%	32.0%	0%	100%
FHA or VA	13,311	0.0%	0.9%	0%	100%
HELOC	13,311	0.0%	1.2%	0%	100%
Loan Program Description (NC Data field *program_desc_1*)					
1 Mo LIBOR	13,311	0.0%	0.0%	0%	0%
10Yr Balloon	13,311	0.0%	0.9%	0%	100%
1Yr ARM	13,311	0.0%	0.0%	0%	0%
2 Year Rate, LIBOR Based	13,311	52.5%	49.9%	0%	100%
2Yr ARM - 30YrTerm/40Amort	13,311	8.8%	28.3%	0%	100%
2Yr ARM - 30YrTerm/50Amort	13,311	0.2%	4.7%	0%	100%
2nd TDs	13,311	0.3%	5.3%	0%	100%
3 Year Rate, LIBOR Based	13,311	5.1%	22.0%	0%	100%
30Yr Fixed	13,311	16.5%	37.1%	0%	100%
3Yr ARM - 30YrTerm/40Amort	13,311	1.8%	13.1%	0%	100%
3Yr ARM - 30YrTerm/50Amort	13,311	0.0%	0.9%	0%	100%
40FIX - 30yrTerm	13,311	1.7%	12.8%	0%	100%
5 Year Rate, LIBOR Based	13,311	0.3%	5.5%	0%	100%
50FIX - 30yrTerm	13,311	0.1%	2.5%	0%	100%
6 Month Rate, LIBOR Based	13,311	0.0%	1.5%	0%	100%
7Yr ARM	13,311	0.0%	0.9%	0%	100%
ARM - Prime	13,311	0.0%	0.0%	0%	0%
Fixed Rate	13,311	4.2%	20.0%	0%	100%
Fixed Rate - Prime	13,311	1.0%	10.1%	0%	100%
HELOC	13,311	0.0%	1.2%	0%	100%
Interest Only	13,311	0.0%	0.9%	0%	100%

Appendix 5C: Summary Statistics for New Century's 2004-2007 Originations, All New Century Loans, Detroit Region

Variable	Obs	Mean	Std. Dev.	Min	Max
Interest Only - 10Yr	13,311	0.4%	6.2%	0%	100%
Interest Only - 10Yr/30 FIX	13,311	0.1%	3.1%	0%	100%
Interest Only - 10Yr/40 FIX	13,311	0.0%	0.0%	0%	0%
Interest Only - 2Yr	13,311	4.1%	19.8%	0%	100%
Interest Only - 2Yr/5IO	13,311	1.2%	10.8%	0%	100%
Interest Only - 3Yr	13,311	0.8%	8.9%	0%	100%
Interest Only - 3Yr/5IO	13,311	0.9%	9.3%	0%	100%
Interest Only - 5Yr	13,311	0.0%	1.7%	0%	100%
Interest Only - 5Yr/10IO	13,311	0.0%	1.5%	0%	100%
Interest Only - 5Yr/30FIX	13,311	0.1%	3.0%	0%	100%
Interest Only - 5Yr/7IO	13,311	0.0%	1.2%	0%	100%
Interest Only - 7Yr	13,311	0.0%	0.0%	0%	0%
Loan Characteristics					
Fixed-Rate	13,311	23.7%	42.5%	0%	100%
Adjustable Rate (ARM)	13,311	76.1%	42.7%	0%	100%
Unknown if fixed-rate or adjustable rate	13,311	0.2%	5.0%	0%	100%
Interest-Only	13,311	7.6%	26.5%	0%	100%
Balloon	13,311	12.5%	33.1%	0%	100%
Loan Term (months)	13,311	354.2	27.9	120.0	480.0
120 months	13,311	0.0%	1.7%	0%	100%
180 months	13,311	0.9%	9.3%	0%	100%
240 months	13,311	3.4%	18.1%	0%	100%
300 months	13,311	0.4%	6.4%	0%	100%
356 months	13,311	0.0%	0.0%	0%	0%
357 months	13,311	0.0%	0.0%	0%	0%
358 months	13,311	0.0%	0.0%	0%	0%
359 months	13,311	0.0%	0.0%	0%	0%
360 months	13,311	95.2%	21.3%	0%	100%
420 months	13,311	0.0%	0.0%	0%	0%
480 months	13,311	0.1%	2.9%	0%	100%
Prepayment Penalty	13,311	96.9%	17.2%	0%	100%
Loan Amount ($000)	13,311	$114.6	$81.0	$10.0	$893.8
Lien Status					
First lien	13,311	88.7%	31.7%	0%	100%
Subordinate lien	13,311	11.3%	31.7%	0%	100%
Lien Status = 3	13,311	0.0%	0.0%	0%	0%
Lien Status = 4	13,311	0.0%	0.0%	0%	0%
Lien Status = 5	13,311	0.0%	0.0%	0%	0%
Credit Score	13,309	607.5	59.7	464.0	820.0
Missing Credit Score	13,311	0.0%	1.2%	0%	100%
Credit Score < 500	13,311	0.1%	2.3%	0%	100%
500 ≤ Credit Score < 520	13,311	6.5%	24.6%	0%	100%
520 ≤ Credit Score < 540	13,311	8.2%	27.4%	0%	100%
540 ≤ Credit Score < 560	13,311	9.2%	28.9%	0%	100%
560 ≤ Credit Score < 580	13,311	9.2%	28.9%	0%	100%
580 ≤ Credit Score < 600	13,311	12.6%	33.2%	0%	100%
600 ≤ Credit Score < 620	13,311	12.8%	33.4%	0%	100%
620 ≤ Credit Score < 640	13,311	12.5%	33.0%	0%	100%
640 ≤ Credit Score < 660	13,311	10.8%	31.0%	0%	100%
660 ≤ Credit Score < 680	13,311	7.0%	25.5%	0%	100%
680 ≤ Credit Score < 700	13,311	4.5%	20.7%	0%	100%
700 ≤ Credit Score < 720	13,311	2.5%	15.7%	0%	100%
720 ≤ Credit Score < 740	13,311	1.8%	13.1%	0%	100%
740 ≤ Credit Score < 760	13,311	1.1%	10.5%	0%	100%
760 ≤ Credit Score < 780	13,311	0.8%	9.1%	0%	100%
Credit Score ≥ 780	13,311	0.5%	7.2%	0%	100%
Loan-to-Value Ratio (%)	13,311	75.6	22.1	7.9	100.0
LTV missing	13,311	0.0%	0.0%	0%	0%
LTV ≤ 60%	13,311	14.8%	35.6%	0%	100%

Appendix 5C: Summary Statistics for New Century's 2004-2007 Originations, All New Century Loans, Detroit Region

Variable	Obs	Mean	Std. Dev.	Min	Max
60% < LTV ≤ 70%	13,311	5.5%	22.8%	0%	100%
70% < LTV ≤ 80%	13,311	30.2%	45.9%	0%	100%
LTV > 80%	13,311	49.4%	50.0%	0%	100%
Combined Loan-to-Value Ratio (%)	13,311	87.8	12.0	7.9	100.0
CLTV missing	13,311	0.0%	0.0%	0%	0%
CLTV ≤ 60%	13,311	3.5%	18.3%	0%	100%
60% < CLTV ≤ 70%	13,311	5.4%	22.5%	0%	100%
70% < CLTV ≤ 80%	13,311	16.2%	36.9%	0%	100%
CLTV > 80%	13,311	74.9%	43.3%	0%	100%
Debt-to-Income (DTI) Ratio (%)	13,281	38.7	14.5	0.2	1,263.9
DTI missing	13,311	0.2%	4.7%	0%	100%
DTI ≤ 36%	13,311	35.4%	47.8%	0%	100%
36% < DTI ≤ 50%	13,311	60.8%	48.8%	0%	100%
DTI > 50%	13,311	3.6%	18.6%	0%	100%
Housing Debt-to-Income (HTI) Ratio (%)	13,200	27.0	11.9	0.0	735.4
HTI missing	13,311	0.8%	9.1%	0%	100%
HTI ≤ 28%	13,311	55.5%	49.7%	0%	100%
28% < HTI ≤ 33%	13,311	16.9%	37.4%	0%	100%
33% < HTI ≤ 40%	13,311	15.8%	36.5%	0%	100%
HTI > 40%	13,311	11.0%	31.3%	0%	100%
Loan Purpose					
Purchase	13,311	38.4%	48.6%	0%	100%
Cash-Out Refinance	13,311	50.4%	50.0%	0%	100%
Rate-Term Refinance	13,311	11.2%	31.5%	0%	100%
Unknown purpose	13,311	0.0%	0.0%	0%	0%
Occupancy					
Primary	13,311	85.4%	35.4%	0%	100%
Second Home	13,311	0.4%	6.6%	0%	100%
Investment	13,311	14.2%	34.9%	0%	100%
Property Type					
Single Family	13,311	90.2%	29.8%	0%	100%
Multi-Family (2-4)	13,311	4.7%	21.2%	0%	100%
Multi-Family (5+)	13,311	0.1%	2.6%	0%	100%
Condo	13,311	4.5%	20.8%	0%	100%
Industrial	13,311	0.0%	0.0%	0%	0%
Manufactured home	13,311	0.0%	0.0%	0%	0%
Mixed Use	13,311	0.0%	0.9%	0%	100%
Office	13,311	0.0%	0.0%	0%	0%
PUD	13,311	0.5%	7.2%	0%	100%
Retail building	13,311	0.0%	0.9%	0%	100%
Occupancy & Property Type					
Primary, Single Family	13,311	78.3%	41.2%	0%	100%
Primary, Multi-Family (2-4)	13,311	2.4%	15.2%	0%	100%
Primary, Multi-Family (5+)	13,311	0.0%	0.0%	0%	0%
Primary, Condo	13,311	4.2%	20.1%	0%	100%
Primary, Manufactured home	13,311	0.0%	0.0%	0%	0%
Primary, Mixed Use	13,311	0.0%	0.0%	0%	0%
Primary, Office	13,311	0.0%	0.0%	0%	0%
Primary, PUD	13,311	0.5%	7.0%	0%	100%
Primary, Retail building	13,311	0.0%	0.0%	0%	0%
Second Home, Single Family	13,311	0.4%	6.1%	0%	100%
Second Home, Multi-Family (2-4)	13,311	0.0%	0.9%	0%	100%
Second Home, Multi-Family (5+)	13,311	0.0%	0.0%	0%	0%
Second Home, Condo	13,311	0.1%	2.5%	0%	100%
Second Home, Manufactured home	13,311	0.0%	0.0%	0%	0%
Second Home, PUD	13,311	0.0%	0.0%	0%	0%
Investment, Single Family	13,311	11.5%	31.9%	0%	100%
Investment, Multi-Family (2-4)	13,311	2.4%	15.2%	0%	100%
Investment, Multi-Family (5+)	13,311	0.1%	2.6%	0%	100%

Appendix 5C: Summary Statistics for New Century's 2004-2007 Originations, All New Century Loans, Detroit Region

Variable	Obs	Mean	Std. Dev.	Min	Max
Investment, Condo	13,311	0.2%	4.7%	0%	100%
Investment, Industrial	13,311	0.0%	0.0%	0%	0%
Investment, Mixed Use	13,311	0.0%	0.9%	0%	100%
Investment, Office	13,311	0.0%	0.0%	0%	0%
Investment, PUD	13,311	0.0%	1.7%	0%	100%
Investment, Retail building	13,311	0.0%	0.9%	0%	100%
Documentation Type					
Full	13,311	63.7%	48.1%	0%	100%
Limited	13,311	1.1%	10.6%	0%	100%
Stated	13,311	35.2%	47.8%	0%	100%
Self-employed borrower or co-borrower presen	13,311	14.4%	35.1%	0%	100%
Self-employed borrower or co-borrower presence unknowr	13,311	0.1%	3.1%	0%	100%
Co-Borrower presence	13,311	18.5%	38.9%	0%	100%
State					
Alaska (AK)	13,311	0.0%	0.0%	0%	0%
Alabama (AL)	13,311	0.0%	0.0%	0%	0%
Arkansas (AR)	13,311	0.0%	0.0%	0%	0%
Arizona (AZ)	13,311	0.0%	0.0%	0%	0%
California (CA)	13,311	0.0%	0.0%	0%	0%
Colorado (CO)	13,311	0.0%	0.0%	0%	0%
Connecticut (CT)	13,311	0.0%	0.0%	0%	0%
District of Columbia (DC)	13,311	0.0%	0.0%	0%	0%
Delaware (DE)	13,311	0.0%	0.0%	0%	0%
Florida (FL)	13,311	0.0%	0.0%	0%	0%
Georgia (GA)	13,311	0.0%	0.0%	0%	0%
Hawaii (HI)	13,311	0.0%	0.0%	0%	0%
Iowa (IA)	13,311	0.0%	0.0%	0%	0%
Idaho (ID)	13,311	0.0%	0.0%	0%	0%
Illinois (IL)	13,311	0.0%	0.0%	0%	0%
Indiana (IN)	13,311	0.0%	0.0%	0%	0%
Kansas (KS)	13,311	0.0%	0.0%	0%	0%
Kentucky (KY)	13,311	0.0%	0.0%	0%	0%
Louisiana (LA)	13,311	0.0%	0.0%	0%	0%
Massachusetts (MA)	13,311	0.0%	0.0%	0%	0%
Maryland (MD)	13,311	0.0%	0.0%	0%	0%
Maine (ME)	13,311	0.0%	0.0%	0%	0%
Michigan (MI)	13,311	100.0%	0.0%	100%	100%
Minnesota (MN)	13,311	0.0%	0.0%	0%	0%
Missouri (MO)	13,311	0.0%	0.0%	0%	0%
Mississippi (MS)	13,311	0.0%	0.0%	0%	0%
Montana (MT)	13,311	0.0%	0.0%	0%	0%
North Carolina (NC)	13,311	0.0%	0.0%	0%	0%
North Dakota (ND)	13,311	0.0%	0.0%	0%	0%
Nebraska (NE)	13,311	0.0%	0.0%	0%	0%
New Hampshire (NH)	13,311	0.0%	0.0%	0%	0%
New Jersey (NJ)	13,311	0.0%	0.0%	0%	0%
New Mexico (NM)	13,311	0.0%	0.0%	0%	0%
Nevada (NV)	13,311	0.0%	0.0%	0%	0%
New York (NY)	13,311	0.0%	0.0%	0%	0%
Ohio (OH)	13,311	0.0%	0.0%	0%	0%
Oklahoma (OK)	13,311	0.0%	0.0%	0%	0%
Oregon (OR)	13,311	0.0%	0.0%	0%	0%
Pennsylvania (PA)	13,311	0.0%	0.0%	0%	0%
Rhode Island (RI)	13,311	0.0%	0.0%	0%	0%
South Carolina (SC)	13,311	0.0%	0.0%	0%	0%
South Dakota (SD)	13,311	0.0%	0.0%	0%	0%
Tennessee (TN)	13,311	0.0%	0.0%	0%	0%
Texas (TX)	13,311	0.0%	0.0%	0%	0%
Utah (UT)	13,311	0.0%	0.0%	0%	0%

Appendix 5C: Summary Statistics for New Century's 2004-2007 Originations, All New Century Loans, Detroit Region

Variable	Obs	Mean	Std. Dev.	Min	Max
Virginia (VA)	13,311	0.0%	0.0%	0%	0%
Vermont (VT)	13,311	0.0%	0.0%	0%	0%
Washington (WA)	13,311	0.0%	0.0%	0%	0%
Wisconsin (WI)	13,311	0.0%	0.0%	0%	0%
West Virginia (WV)	13,311	0.0%	0.0%	0%	0%
Wyoming (WY)	13,311	0.0%	0.0%	0%	0%
Origination Month					
Jan-2004	13,311	2.4%	15.2%	0%	100%
Feb-2004	13,311	2.6%	15.9%	0%	100%
Mar-2004	13,311	3.3%	17.7%	0%	100%
Apr-2004	13,311	2.8%	16.5%	0%	100%
May-2004	13,311	3.6%	18.7%	0%	100%
Jun-2004	13,311	3.9%	19.4%	0%	100%
Jul-2004	13,311	3.0%	17.1%	0%	100%
Aug-2004	13,311	3.0%	17.0%	0%	100%
Sep-2004	13,311	2.3%	15.1%	0%	100%
Oct-2004	13,311	2.6%	15.8%	0%	100%
Nov-2004	13,311	2.6%	16.0%	0%	100%
Dec-2004	13,311	3.6%	18.6%	0%	100%
Jan-2005	13,311	2.3%	14.9%	0%	100%
Feb-2005	13,311	1.9%	13.8%	0%	100%
Mar-2005	13,311	2.5%	15.7%	0%	100%
Apr-2005	13,311	2.6%	15.9%	0%	100%
May-2005	13,311	2.4%	15.2%	0%	100%
Jun-2005	13,311	2.4%	15.4%	0%	100%
Jul-2005	13,311	2.4%	15.2%	0%	100%
Aug-2005	13,311	3.2%	17.5%	0%	100%
Sep-2005	13,311	2.7%	16.3%	0%	100%
Oct-2005	13,311	2.5%	15.6%	0%	100%
Nov-2005	13,311	2.1%	14.5%	0%	100%
Dec-2005	13,311	2.6%	16.0%	0%	100%
Jan-2006	13,311	2.1%	14.2%	0%	100%
Feb-2006	13,311	2.2%	14.8%	0%	100%
Mar-2006	13,311	2.4%	15.3%	0%	100%
Apr-2006	13,311	2.1%	14.3%	0%	100%
May-2006	13,311	2.6%	16.0%	0%	100%
Jun-2006	13,311	3.2%	17.7%	0%	100%
Jul-2006	13,311	2.9%	16.7%	0%	100%
Aug-2006	13,311	3.3%	17.9%	0%	100%
Sep-2006	13,311	2.4%	15.4%	0%	100%
Oct-2006	13,311	2.6%	16.0%	0%	100%
Nov-2006	13,311	2.5%	15.7%	0%	100%
Dec-2006	13,311	2.5%	15.7%	0%	100%
Jan-2007	13,311	1.8%	13.3%	0%	100%
Feb-2007	13,311	1.6%	12.7%	0%	100%
Mar-2007	13,311	0.2%	5.0%	0%	100%

Appendix 5D: Summary Statistics for New Century's 2004-2007 Originations, Morgan Stanley Purchases, Detroit Region

Variable	Obs	Mean	Std. Dev.	Min	Max
High Cost	3,264	80.7%	39.5%	0%	100%
Combined-Risk	3,264	73.6%	44.1%	0%	100%
APR	3,264	9.618	1.633	4.668	13.974
APR Rate Spread	3,264	4.670	1.681	-0.542	9.394
Race (Primary Classification)					
American Indian	3,264	0.7%	8.5%	0%	100%
Asian, Hawaiian, or Pacific Islander	3,264	1.4%	11.9%	0%	100%
African American	3,264	44.6%	49.7%	0%	100%
Hispanic	3,264	2.3%	15.1%	0%	100%
Missing	3,264	1.7%	12.8%	0%	100%
Non-Hispanic White	3,264	49.3%	50.0%	0%	100%
Race (Alternative Classification #1)					
American Indian, non-Hispanic	3,264	0.7%	8.5%	0%	100%
American Indian, Hispanic	3,264	0.1%	3.0%	0%	100%
Asian, Hawaiian, or Pacific Islander, non-Hispanic	3,264	1.4%	11.9%	0%	100%
Asian, Hawaiian, or Pacific Islander, Hispanic	3,264	0.1%	2.5%	0%	100%
African American, non-Hispanic	3,264	44.3%	49.7%	0%	100%
African American, Hispanic	3,264	0.2%	4.9%	0%	100%
White, Hispanic	3,264	1.7%	12.8%	0%	100%
White, Non-Hispanic	3,264	0.3%	5.5%	0%	100%
Missing, Non-Hispanic	3,264	49.3%	50.0%	0%	100%
Missing, Hispanic	3,264	1.9%	13.5%	0%	100%
Race (Alternative Classification #2)					
Any ethnicity Hispanic	3,264	2.6%	15.8%	0%	100%
Any race African-American	3,264	44.6%	49.7%	0%	100%
Any race Asian or Hawaiian/Pacific Islander	3,264	1.5%	12.2%	0%	100%
Any race American Indian	3,264	0.8%	9.1%	0%	100%
Any race White	3,264	51.5%	50.0%	0%	100%
Missing race	3,264	1.7%	12.8%	0%	100%
Business channel					
100.0	3,264	0.0%	0.0%	0%	0%
Commercial Standard	3,264	0.0%	0.0%	0%	0%
Concurrent	3,264	0.0%	0.0%	0%	0%
Retail Standard	3,264	10.4%	30.5%	0%	100%
Wholesale Standard	3,264	89.6%	30.5%	0%	100%
FHA or VA	3,264	0.0%	0.0%	0%	0%
HELOC	3,264	0.0%	0.0%	0%	0%
Loan Program Description (NC Data field *program_desc_1*)					
1 Mo LIBOR	3,264	0.0%	0.0%	0%	0%
10Yr Balloon	3,264	0.0%	0.0%	0%	0%
1Yr ARM	3,264	0.0%	0.0%	0%	0%
2 Year Rate, LIBOR Based	3,264	62.9%	48.3%	0%	100%
2Yr ARM - 30YrTerm/40Amort	3,264	8.4%	27.7%	0%	100%
2Yr ARM - 30YrTerm/50Amort	3,264	0.0%	0.0%	0%	0%
2nd TDs	3,264	0.0%	0.0%	0%	0%
3 Year Rate, LIBOR Based	3,264	4.2%	20.0%	0%	100%
30Yr Fixed	3,264	12.6%	33.2%	0%	100%
3Yr ARM - 30YrTerm/40Amort	3,264	2.0%	14.1%	0%	100%
3Yr ARM - 30YrTerm/50Amort	3,264	0.0%	0.0%	0%	0%
40FIX - 30yrTerm	3,264	1.5%	12.2%	0%	100%
5 Year Rate, LIBOR Based	3,264	0.1%	3.0%	0%	100%
50FIX - 30yrTerm	3,264	0.0%	1.8%	0%	100%
6 Month Rate, LIBOR Based	3,264	0.0%	0.0%	0%	0%
7Yr ARM	3,264	0.0%	0.0%	0%	0%
ARM - Prime	3,264	0.0%	0.0%	0%	0%
Fixed Rate	3,264	2.8%	16.5%	0%	100%
Fixed Rate - Prime	3,264	0.0%	0.0%	0%	0%
HELOC	3,264	0.0%	0.0%	0%	0%
Interest Only	3,264	0.0%	0.0%	0%	0%

Appendix 5D: Summary Statistics for New Century's 2004-2007 Originations, Morgan Stanley Purchases, Detroit Region

Variable	Obs	Mean	Std. Dev.	Min	Max
Interest Only - 10Yr	3,264	0.5%	7.2%	0%	100%
Interest Only - 10Yr/30 FIX	3,264	0.0%	0.0%	0%	0%
Interest Only - 10Yr/40 FIX	3,264	0.0%	0.0%	0%	0%
Interest Only - 2Yr	3,264	3.5%	18.4%	0%	100%
Interest Only - 2Yr/5IO	3,264	0.7%	8.5%	0%	100%
Interest Only - 3Yr	3,264	0.3%	5.2%	0%	100%
Interest Only - 3Yr/5IO	3,264	0.5%	6.8%	0%	100%
Interest Only - 5Yr	3,264	0.0%	0.0%	0%	0%
Interest Only - 5Yr/10IO	3,264	0.0%	0.0%	0%	0%
Interest Only - 5Yr/30FIX	3,264	0.1%	2.5%	0%	100%
Interest Only - 5Yr/7IO	3,264	0.0%	0.0%	0%	0%
Interest Only - 7Yr	3,264	0.0%	0.0%	0%	0%
Loan Characteristics					
Fixed-Rate	3,264	17.0%	37.5%	0%	100%
Adjustable Rate (ARM)	3,264	83.0%	37.5%	0%	100%
Unknown if fixed-rate or adjustable rate	3,264	0.0%	0.0%	0%	0%
Interest-Only	3,264	5.5%	22.9%	0%	100%
Balloon	3,264	11.9%	32.4%	0%	100%
Loan Term (months)	3,264	355.8	24.4	120.0	480.0
120 months	3,264	0.0%	1.8%	0%	100%
180 months	3,264	1.0%	9.9%	0%	100%
240 months	3,264	1.8%	13.2%	0%	100%
300 months	3,264	0.5%	7.2%	0%	100%
356 months	3,264	0.0%	0.0%	0%	0%
357 months	3,264	0.0%	0.0%	0%	0%
358 months	3,264	0.0%	0.0%	0%	0%
359 months	3,264	0.0%	0.0%	0%	0%
360 months	3,264	96.7%	18.0%	0%	100%
420 months	3,264	0.0%	0.0%	0%	0%
480 months	3,264	0.0%	1.8%	0%	100%
Prepayment Penalty	3,264	98.5%	12.0%	0%	100%
Loan Amount ($000)	3,264	$115.4	$74.7	$15.0	$720.0
Lien Status					
First lien	3,264	94.9%	22.0%	0%	100%
Subordinate lien	3,264	5.1%	22.0%	0%	100%
Lien Status = 3	3,264	0.0%	0.0%	0%	0%
Lien Status = 4	3,264	0.0%	0.0%	0%	0%
Lien Status = 5	3,264	0.0%	0.0%	0%	0%
Credit Score	3,264	597.6	57.3	500.0	806.0
Missing Credit Score	3,264	0.0%	0.0%	0%	0%
Credit Score < 500	3,264	0.0%	0.0%	0%	0%
500 ≤ Credit Score < 520	3,264	7.9%	27.0%	0%	100%
520 ≤ Credit Score < 540	3,264	10.2%	30.2%	0%	100%
540 ≤ Credit Score < 560	3,264	11.6%	32.1%	0%	100%
560 ≤ Credit Score < 580	3,264	9.9%	29.8%	0%	100%
580 ≤ Credit Score < 600	3,264	13.8%	34.4%	0%	100%
600 ≤ Credit Score < 620	3,264	12.0%	32.5%	0%	100%
620 ≤ Credit Score < 640	3,264	11.3%	31.6%	0%	100%
640 ≤ Credit Score < 660	3,264	9.1%	28.8%	0%	100%
660 ≤ Credit Score < 680	3,264	6.6%	24.9%	0%	100%
680 ≤ Credit Score < 700	3,264	2.9%	16.9%	0%	100%
700 ≤ Credit Score < 720	3,264	2.0%	13.9%	0%	100%
720 ≤ Credit Score < 740	3,264	1.3%	11.1%	0%	100%
740 ≤ Credit Score < 760	3,264	0.6%	7.6%	0%	100%
760 ≤ Credit Score < 780	3,264	0.5%	7.2%	0%	100%
Credit Score ≥ 780	3,264	0.4%	6.1%	0%	100%
Loan-to-Value Ratio (%)	3,264	79.1	17.0	15.0	100.0
LTV missing	3,264	0.0%	0.0%	0%	0%
LTV ≤ 60%	3,264	9.4%	29.2%	0%	100%

Appendix 5D: Summary Statistics for New Century's 2004-2007 Originations, Morgan Stanley Purchases, Detroit Region

Variable	Obs	Mean	Std. Dev.	Min	Max
60% < LTV ≤ 70%	3,264	7.0%	25.5%	0%	100%
70% < LTV ≤ 80%	3,264	31.3%	46.4%	0%	100%
LTV > 80%	3,264	52.3%	50.0%	0%	100%
Combined Loan-to-Value Ratio (%)	3,264	85.8	12.1	18.7	100.0
CLTV missing	3,264	0.0%	0.0%	0%	0%
CLTV ≤ 60%	3,264	4.3%	20.2%	0%	100%
60% < CLTV ≤ 70%	3,264	7.0%	25.4%	0%	100%
70% < CLTV ≤ 80%	3,264	19.2%	39.4%	0%	100%
CLTV > 80%	3,264	69.5%	46.0%	0%	100%
Debt-to-Income (DTI) Ratio (%)	3,264	38.2	9.7	3.0	88.1
DTI missing	3,264	0.0%	0.0%	0%	0%
DTI ≤ 36%	3,264	37.4%	48.4%	0%	100%
36% < DTI ≤ 50%	3,264	59.0%	49.2%	0%	100%
DTI > 50%	3,264	3.5%	18.4%	0%	100%
Housing Debt-to-Income (HTI) Ratio (%)	3,252	26.6	10.3	0.0	84.1
HTI missing	3,264	0.4%	6.1%	0%	100%
HTI ≤ 28%	3,264	57.0%	49.5%	0%	100%
28% < HTI ≤ 33%	3,264	16.2%	36.9%	0%	100%
33% < HTI ≤ 40%	3,264	15.3%	36.1%	0%	100%
HTI > 40%	3,264	11.1%	31.4%	0%	100%
Loan Purpose					
Purchase	3,264	32.5%	46.9%	0%	100%
Cash-Out Refinance	3,264	57.7%	49.4%	0%	100%
Rate-Term Refinance	3,264	9.8%	29.7%	0%	100%
Unknown purpose	3,264	0.0%	0.0%	0%	0%
Occupancy					
Primary	3,264	85.4%	35.3%	0%	100%
Second Home	3,264	0.3%	5.8%	0%	100%
Investment	3,264	14.3%	35.0%	0%	100%
Property Type					
Single Family	3,264	91.0%	28.6%	0%	100%
Multi-Family (2-4)	3,264	4.5%	20.7%	0%	100%
Multi-Family (5+)	3,264	0.0%	0.0%	0%	0%
Condo	3,264	4.2%	20.0%	0%	100%
Industrial	3,264	0.0%	0.0%	0%	0%
Manufactured home	3,264	0.0%	0.0%	0%	0%
Mixed Use	3,264	0.0%	0.0%	0%	0%
Office	3,264	0.0%	0.0%	0%	0%
PUD	3,264	0.3%	5.8%	0%	100%
Retail building	3,264	0.0%	0.0%	0%	0%
Occupancy & Property Type					
Primary, Single Family	3,264	79.0%	40.8%	0%	100%
Primary, Multi-Family (2-4)	3,264	2.4%	15.3%	0%	100%
Primary, Multi-Family (5+)	3,264	0.0%	0.0%	0%	0%
Primary, Condo	3,264	3.8%	19.0%	0%	100%
Primary, Manufactured home	3,264	0.0%	0.0%	0%	0%
Primary, Mixed Use	3,264	0.0%	0.0%	0%	0%
Primary, Office	3,264	0.0%	0.0%	0%	0%
Primary, PUD	3,264	0.3%	5.2%	0%	100%
Primary, Retail building	3,264	0.0%	0.0%	0%	0%
Second Home, Single Family	3,264	0.2%	4.6%	0%	100%
Second Home, Multi-Family (2-4)	3,264	0.0%	1.8%	0%	100%
Second Home, Multi-Family (5+)	3,264	0.0%	0.0%	0%	0%
Second Home, Condo	3,264	0.1%	3.0%	0%	100%
Second Home, Manufactured home	3,264	0.0%	0.0%	0%	0%
Second Home, PUD	3,264	0.0%	0.0%	0%	0%
Investment, Single Family	3,264	11.9%	32.3%	0%	100%
Investment, Multi-Family (2-4)	3,264	2.1%	14.2%	0%	100%
Investment, Multi-Family (5+)	3,264	0.0%	0.0%	0%	0%

Appendix 5D: Summary Statistics for New Century's 2004-2007 Originations, Morgan Stanley Purchases, Detroit Region

Variable	Obs	Mean	Std. Dev.	Min	Max
Investment, Condo	3,264	0.3%	5.5%	0%	100%
Investment, Industrial	3,264	0.0%	0.0%	0%	0%
Investment, Mixed Use	3,264	0.0%	0.0%	0%	0%
Investment, Office	3,264	0.0%	0.0%	0%	0%
Investment, PUD	3,264	0.1%	2.5%	0%	100%
Investment, Retail building	3,264	0.0%	0.0%	0%	0%
Documentation Type					
Full	3,264	63.7%	48.1%	0%	100%
Limited	3,264	1.3%	11.5%	0%	100%
Stated	3,264	35.0%	47.7%	0%	100%
Self-employed borrower or co-borrower presen	3,264	14.4%	35.1%	0%	100%
Self-employed borrower or co-borrower presence unknowr	3,264	0.2%	3.9%	0%	100%
Co-Borrower presence	3,264	17.4%	37.9%	0%	100%
State					
Alaska (AK)	3,264	0.0%	0.0%	0%	0%
Alabama (AL)	3,264	0.0%	0.0%	0%	0%
Arkansas (AR)	3,264	0.0%	0.0%	0%	0%
Arizona (AZ)	3,264	0.0%	0.0%	0%	0%
California (CA)	3,264	0.0%	0.0%	0%	0%
Colorado (CO)	3,264	0.0%	0.0%	0%	0%
Connecticut (CT)	3,264	0.0%	0.0%	0%	0%
District of Columbia (DC)	3,264	0.0%	0.0%	0%	0%
Delaware (DE)	3,264	0.0%	0.0%	0%	0%
Florida (FL)	3,264	0.0%	0.0%	0%	0%
Georgia (GA)	3,264	0.0%	0.0%	0%	0%
Hawaii (HI)	3,264	0.0%	0.0%	0%	0%
Iowa (IA)	3,264	0.0%	0.0%	0%	0%
Idaho (ID)	3,264	0.0%	0.0%	0%	0%
Illinois (IL)	3,264	0.0%	0.0%	0%	0%
Indiana (IN)	3,264	0.0%	0.0%	0%	0%
Kansas (KS)	3,264	0.0%	0.0%	0%	0%
Kentucky (KY)	3,264	0.0%	0.0%	0%	0%
Louisiana (LA)	3,264	0.0%	0.0%	0%	0%
Massachusetts (MA)	3,264	0.0%	0.0%	0%	0%
Maryland (MD)	3,264	0.0%	0.0%	0%	0%
Maine (ME)	3,264	0.0%	0.0%	0%	0%
Michigan (MI)	3,264	100.0%	0.0%	100%	100%
Minnesota (MN)	3,264	0.0%	0.0%	0%	0%
Missouri (MO)	3,264	0.0%	0.0%	0%	0%
Mississippi (MS)	3,264	0.0%	0.0%	0%	0%
Montana (MT)	3,264	0.0%	0.0%	0%	0%
North Carolina (NC)	3,264	0.0%	0.0%	0%	0%
North Dakota (ND)	3,264	0.0%	0.0%	0%	0%
Nebraska (NE)	3,264	0.0%	0.0%	0%	0%
New Hampshire (NH)	3,264	0.0%	0.0%	0%	0%
New Jersey (NJ)	3,264	0.0%	0.0%	0%	0%
New Mexico (NM)	3,264	0.0%	0.0%	0%	0%
Nevada (NV)	3,264	0.0%	0.0%	0%	0%
New York (NY)	3,264	0.0%	0.0%	0%	0%
Ohio (OH)	3,264	0.0%	0.0%	0%	0%
Oklahoma (OK)	3,264	0.0%	0.0%	0%	0%
Oregon (OR)	3,264	0.0%	0.0%	0%	0%
Pennsylvania (PA)	3,264	0.0%	0.0%	0%	0%
Rhode Island (RI)	3,264	0.0%	0.0%	0%	0%
South Carolina (SC)	3,264	0.0%	0.0%	0%	0%
South Dakota (SD)	3,264	0.0%	0.0%	0%	0%
Tennessee (TN)	3,264	0.0%	0.0%	0%	0%
Texas (TX)	3,264	0.0%	0.0%	0%	0%
Utah (UT)	3,264	0.0%	0.0%	0%	0%

Appendix 5D: Summary Statistics for New Century's 2004-2007 Originations, Morgan Stanley Purchases, Detroit Region

Variable	Obs	Mean	Std. Dev.	Min	Max
Virginia (VA)	3,264	0.0%	0.0%	0%	0%
Vermont (VT)	3,264	0.0%	0.0%	0%	0%
Washington (WA)	3,264	0.0%	0.0%	0%	0%
Wisconsin (WI)	3,264	0.0%	0.0%	0%	0%
West Virginia (WV)	3,264	0.0%	0.0%	0%	0%
Wyoming (WY)	3,264	0.0%	0.0%	0%	0%
Origination Month					
Jan-2004	3,264	5.3%	22.4%	0%	100%
Feb-2004	3,264	6.7%	25.1%	0%	100%
Mar-2004	3,264	6.8%	25.1%	0%	100%
Apr-2004	3,264	4.6%	20.9%	0%	100%
May-2004	3,264	6.0%	23.8%	0%	100%
Jun-2004	3,264	7.1%	25.7%	0%	100%
Jul-2004	3,264	3.8%	19.0%	0%	100%
Aug-2004	3,264	0.2%	4.3%	0%	100%
Sep-2004	3,264	2.6%	16.0%	0%	100%
Oct-2004	3,264	5.2%	22.3%	0%	100%
Nov-2004	3,264	1.1%	10.3%	0%	100%
Dec-2004	3,264	4.9%	21.6%	0%	100%
Jan-2005	3,264	0.9%	9.7%	0%	100%
Feb-2005	3,264	0.0%	0.0%	0%	0%
Mar-2005	3,264	0.0%	1.8%	0%	100%
Apr-2005	3,264	0.1%	2.5%	0%	100%
May-2005	3,264	0.1%	3.0%	0%	100%
Jun-2005	3,264	2.4%	15.2%	0%	100%
Jul-2005	3,264	0.3%	5.8%	0%	100%
Aug-2005	3,264	1.2%	10.9%	0%	100%
Sep-2005	3,264	2.1%	14.4%	0%	100%
Oct-2005	3,264	0.2%	4.6%	0%	100%
Nov-2005	3,264	2.7%	16.2%	0%	100%
Dec-2005	3,264	4.4%	20.4%	0%	100%
Jan-2006	3,264	1.9%	13.8%	0%	100%
Feb-2006	3,264	2.4%	15.4%	0%	100%
Mar-2006	3,264	3.6%	18.5%	0%	100%
Apr-2006	3,264	0.9%	9.7%	0%	100%
May-2006	3,264	2.8%	16.5%	0%	100%
Jun-2006	3,264	4.5%	20.7%	0%	100%
Jul-2006	3,264	3.4%	18.1%	0%	100%
Aug-2006	3,264	3.7%	18.9%	0%	100%
Sep-2006	3,264	3.2%	17.6%	0%	100%
Oct-2006	3,264	1.9%	13.5%	0%	100%
Nov-2006	3,264	1.1%	10.6%	0%	100%
Dec-2006	3,264	1.6%	12.6%	0%	100%
Jan-2007	3,264	0.2%	4.6%	0%	100%
Feb-2007	3,264	0.0%	0.0%	0%	0%
Mar-2007	3,264	0.0%	0.0%	0%	0%

Notes for Appendices 5A, 5B, 5C, 5D:

- For all loan characteristics, I use the NC Data field values. If the NC data field value is missing, unknown, or was not provided, then I use the MS Data field value.
- These summary statistics do not include correspondent channel loans. I identify correspondent channel loans as loans with the string "CORRESPONDENT" appearing anywhere in the NC Data field *source_code_desc*.
- Loans with missing data for any variable are typically treated with a "missing" dummy variable for the given variable in the regressions. Although I do not do so in this report, one could also use a common, well-accepted method to impute the values for those missing variables and re-estimate the regressions with the explanatory variables based on the imputed values when the values for a variable are missing.

Sources:

- MS-NC Loan Data.
- U.S. Census Bureau, Census 2000 Summary File 1.
- U.S. Census Bureau, *2010 Census Summary File 1, Technical Documentation*, Sept. 2012.
- U.S. Census Bureau, *Metropolitan and Micropolitan Statistical Areas and Components, Dec. 2009*, https://www.census.gov/population/metro/files/lists/2009/List1.txt.
- U.S. Census Bureau, 2010 Census Tract Relationship Files, http://www.census.gov/geo/maps-data/data/tract_rel_download.html
- U.S. Census Bureau, *Explanation of the 2010 Census Tract Relationship File*, http://www.census.gov/geo/maps-data/data/pdfs/rel/tractrelfile.pdf.
- U.S. Census Bureau, *File Format and Record Layouts for the 2010 Census Tract Relationship Files*, http://www.census.gov/geo/maps-data/data/tract_rel_layout.html.
- U.S. Census Bureau, 2010 ZCTA to Metropolitan and Micropolitan Statistical Areas Relationship File, http://www.census.gov/geo/maps-data/data/docs/rel/zcta_cbsa_rel_10.txt.
- U.S. Census Bureau, *Explanation of the 2010 ZCTA to Metropolitan and Micropolitan Statistical Areas Relationship File*, http://www.census.gov/geo/maps-data/data/pdfs/rel/explanation_zcta_cbsa_rel_10.pdf.
- Federal Financial Institutions Examination Council, *OLD FFIEC Rate Spread Calculator*, http://www.ffiec.gov/ratespread/oldcalc.aspx.
- Federal Financial Institutions Examination Council, *Treasury Securities of Comparable Maturity under Regulation C*, http://www.ffiec.gov/ratespread/YieldTable.CSV.
- Federal Financial Institutions Examination Council, *FFIEC Geocoding/Mapping System*, http://www.ffiec.gov/geocode/Default.aspx.
- Federal Reserve Statistical Release H.15, Data Download Program, http://www.federalreserve.gov/datadownload/Choose.aspx?rel=H.15.
- TomTom Global Geocoder, http://geocoder.tomtom.com.
- TomTom Global Geocoder, Company User/Admin Documentation.

Appendix 6A: Odds Ratio Results of Combined-Risk Loan Logistic Regressions, All New Century Loans, Nationwide

Dependent Variable: Combined-Risk Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
Race: African American	1.411***	1.231***	1.286***	1.226***	1.630***	1.286***	1.154***	1.276***	1.210***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Race: Hispanic	1.437***	1.298***	1.073***	1.683***	1.628***	1.087***	1.344***	1.546***	1.314***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Race: American Indian	0.922***	1.083**	0.923*	1.076	1.529***	1.035	0.962	1.405***	1.104***
	(0.002)	(0.027)	(0.062)	(0.128)	(0.000)	(0.509)	(0.555)	(0.000)	(0.003)
Race: Asian or Hawaiian	1.188***	1.059***	0.844***	1.461***	1.321***	0.908***	1.128***	1.124***	1.058***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Race: Missing	0.778***	0.761***	0.928***	0.989	0.534***	1.089***	0.894***	0.535***	0.802***
	(0.000)	(0.000)	(0.000)	(0.514)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
African American, non-Hispanic									
African American, Hispanic									
American Indian, non-Hispanic									
American Indian, Hispanic									
Asian or Pacific Islander, non-Hispanic									
Asian or Pacific Islander, Hispanic									
Missing, non-Hispanic									
Missing, Hispanic									
White, Hispanic									
Any race African American									
Any race White									
Any race Hispanic									
Any race American Indian									
Any race Asian or Pacific Islander									
All races Missing									
Missing Credit Score		0.607***				3.631	0.825	0.572***	0.545***
		(0.000)				(0.142)	(0.425)	(0.000)	(0.000)
Credit Score < 620		5.192***				4.347***	4.221***	8.169***	4.991***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
620 ≤ Credit Score < 660		2.299***				1.427***	2.222***	3.655***	2.221***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Credit Score < 500									
500 ≤ Credit Score < 520									

Dependent Variable: Combined-Risk Loan	Model (2-Inv) Same as Model (2), Estimated Only on Loans Sold to Investors	Model (2-InvMiss) Same as Model (2), Estimated Only on Loans Sold to Investors & Loans with No Entry in the Investor Field	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present
Race: African American	1.118***	1.224***			1.214***	1.216***	1.157***	1.346***	1.231***
	(0.000)	(0.000)			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Race: Hispanic	1.201***	1.360***			1.209***	1.297***	1.268***	1.656***	1.298***
	(0.000)	(0.000)			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Race: American Indian	1.078*	1.145***			1.090**	1.081**	1.051	1.069**	1.082**
	(0.065)	(0.000)			(0.025)	(0.029)	(0.172)	(0.034)	(0.027)
Race: Asian or Hawaiian	1.028	1.061***			1.047***	1.063***	1.059***	1.339***	1.059***
	(0.118)	(0.000)			(0.006)	(0.000)	(0.000)	(0.000)	(0.000)
Race: Missing	1.002	0.779***			0.750***	0.767***	0.769***	0.784***	0.761***
	(0.898)	(0.000)			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
African American, non-Hispanic			1.229***						
			(0.000)						
African American, Hispanic			1.278***						
			(0.000)						
American Indian, non-Hispanic			1.081**						
			(0.029)						
American Indian, Hispanic			1.394***						
			(0.000)						
Asian or Pacific Islander, non-Hispanic			1.058***						
			(0.000)						
Asian or Pacific Islander, Hispanic			1.188***						
			(0.001)						
Missing, non-Hispanic			0.761***						
			(0.000)						
Missing, Hispanic			1.067**						
			(0.019)						
White, Hispanic			1.318***						
			(0.000)						
Any race African American				1.288***					
				(0.000)					
Any race White				1.060***					
				(0.005)					
Any race Hispanic				1.288***					
				(0.000)					
Any race American Indian				1.098***					
				(0.000)					
Any race Asian or Pacific Islander				1.128***					
				(0.000)					
All races Missing				0.803***					
				(0.000)					
Missing Credit Score	2.832***	0.515***	0.608***	0.607***	0.685***	0.610***	2.014***	0.411***	0.745***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Credit Score < 620	2.908***	5.152***	5.194***	5.194***	6.852***	5.167***		2.695***	5.193***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
620 ≤ Credit Score < 660	1.393***	2.305***	2.300***	2.299***	2.855***	2.290***		1.902***	2.300***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
Credit Score < 500							21.923***		
							(0.000)		
500 ≤ Credit Score < 520							44.702***		
							(0.000)		

Dependent Variable: Combined-Risk Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
520 ≤ Credit Score < 540									
540 ≤ Credit Score < 560									
560 ≤ Credit Score < 580									
580 ≤ Credit Score < 600									
600 ≤ Credit Score < 620									
620 ≤ Credit Score < 640									
640 ≤ Credit Score < 660									
660 ≤ Credit Score < 680									
680 ≤ Credit Score < 700									
700 ≤ Credit Score < 720									
720 ≤ Credit Score < 740									
740 ≤ Credit Score < 760									
760 ≤ Credit Score < 780									
Subordinate lien		0.341***				1.153	0.180***	0.205***	0.343***
		(0.000)				(0.434)	(0.000)	(0.000)	(0.000)
FHA/VA/RHS		0.000***						0.000***	0.000***
		(0.000)						(0.000)	(0.000)
HELOC		2.191***					1.831***	6.607***	2.038***
		(0.000)					(0.000)	(0.000)	(0.000)
LTV missing		2.202e+08***				892,304.228***			4.768
		(0.000)				(0.000)			(0.218)
LTV ≤ 60%		0.130***				0.315***	0.104***	0.074***	0.127***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
60% < LTV ≤ 70%		0.215***				0.405***	0.157***	0.130***	0.227***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
70% < LTV ≤ 80%		0.687***				0.305***	0.827***	0.728***	0.713***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
CLTV missing		0.000				0.000***			0.517
		(.)				(0.000)			(0.593)
CLTV ≤ 60%		1.322***				1.542**	0.950	1.244*	1.441***
		(0.000)				(0.017)	(0.752)	(0.060)	(0.000)
60% < CLTV ≤ 70%		1.197***				1.551***	1.057	1.039	1.204***
		(0.004)				(0.001)	(0.657)	(0.674)	(0.002)
70% < CLTV ≤ 80%		0.426***				2.013***	0.259***	0.222***	0.442***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
DTI missing		0.091***				0.941	0.021***	0.112***	0.090***
		(0.000)				(0.810)	(0.000)	(0.000)	(0.000)

Dependent Variable: Combined-Risk Loan	Model (2-Inv) Same as Model (2), Estimated Only on Loans Sold to Investors	Model (2-InvMiss) Same as Model (2), Estimated Only on Loans Sold to Investors & Loans with No Entry in the Investor Field	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present
520 ≤ Credit Score < 540							33.474***		
							(0.000)		
540 ≤ Credit Score < 560							28.652***		
							(0.000)		
560 ≤ Credit Score < 580							24.087***		
							(0.000)		
580 ≤ Credit Score < 600							14.842***		
							(0.000)		
600 ≤ Credit Score < 620							11.301***		
							(0.000)		
620 ≤ Credit Score < 640							8.605***		
							(0.000)		
640 ≤ Credit Score < 660							7.345***		
							(0.000)		
660 ≤ Credit Score < 680							5.446***		
							(0.000)		
680 ≤ Credit Score < 700							3.676***		
							(0.000)		
700 ≤ Credit Score < 720							2.984***		
							(0.000)		
720 ≤ Credit Score < 740							2.350***		
							(0.000)		
740 ≤ Credit Score < 760							1.848***		
							(0.000)		
760 ≤ Credit Score < 780							1.522***		
							(0.000)		
Subordinate lien	0.212***	0.367***	0.340***	0.341***		0.340***	0.324***	0.095***	0.341***
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
FHA/VA/RHS		0.000***	0.000***	0.000***		0.000***	0.000***	0.000***	0.000***
		(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
HELOC	1.452	2.276***	2.193***	2.188***		2.200***	2.439***	2.129***	2.191***
	(0.679)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
LTV missing	1.425	3.818	2.202e+08***	2.205e+08***	500,339.858***	2.147e+08***	4936704.869***		2.200e+08***
	(0.761)	(0.298)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
LTV ≤ 60%	0.134***	0.111***	0.130***	0.130***	0.110***	0.130***	0.137***		0.130***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
60% < LTV ≤ 70%	0.357***	0.208***	0.215***	0.215***	0.208***	0.215***	0.209***		0.215***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
70% < LTV ≤ 80%	0.639***	0.725***	0.687***	0.687***	0.731***	0.688***	0.719***		0.688***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
CLTV missing	3.666	0.748	0.000	0.000	0.000***	0.000	0.000***		0.000
	(0.393)	(0.856)	(.)	(.)	(0.000)	(.)	(0.000)		(.)
CLTV ≤ 60%	1.616***	1.597***	1.321***	1.322***	1.623***	1.306***	1.143		1.321***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.104)		(0.000)
60% < CLTV ≤ 70%	0.943	1.268***	1.197***	1.197***	1.276***	1.193***	1.083		1.196***
	(0.563)	(0.000)	(0.004)	(0.004)	(0.000)	(0.004)	(0.212)		(0.004)
70% < CLTV ≤ 80%	0.612***	0.418***	0.426***	0.426***	0.399***	0.425***	0.361***		0.426***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
DTI missing	0.461***	0.091***	0.090***	0.090***	0.127***	0.091***	0.108***		0.093***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)

Dependent Variable: Combined-Risk Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
36% < DTI ≤ 50%		0.987*				0.899***	1.010	1.032**	0.984**
		(0.093)				(0.000)	(0.482)	(0.023)	(0.027)
DTI > 50%		0.821***				0.926**	0.800***	0.835***	0.829***
		(0.000)				(0.021)	(0.000)	(0.000)	(0.000)
HTI missing		1.106**				1.071	1.142	1.055	1.085*
		(0.046)				(0.572)	(0.142)	(0.504)	(0.082)
28% < DTI ≤ 33%		1.112***				1.058***	1.111***	1.217***	1.113***
		(0.000)				(0.001)	(0.000)	(0.000)	(0.000)
33% < DTI ≤ 40%		1.261***				1.167***	1.205***	1.463***	1.261***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
HTI > 40%		1.534***				1.325***	1.412***	1.811***	1.519***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Limited Documenation		1.306***				1.309***	1.465***	1.436***	1.304***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Stated Documentation		8.674***				7.821***	13.679***	10.807***	8.632***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Cash-out refinance		0.703***				0.566***	0.535***	0.912***	0.699***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Rate-term refinance		0.615***				0.633***	0.487***	0.605***	0.616***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Refinance type unknown									
Unknown purpose		0.460***				0.418***	0.238***		0.483***
		(0.003)				(0.004)	(0.000)		(0.006)
Primary, Single Family									
Primary, Multi-Family (2-4)		1.009				0.959	1.074**	1.064**	1.009
		(0.563)				(0.129)	(0.017)	(0.029)	(0.556)
Primary, Multi-Family (5+)		0.137***					0.347	0.025***	0.125***
		(0.000)					(0.169)	(0.000)	(0.000)
Primary, Condo		0.907***				1.221***	0.882***	0.684***	0.926***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Primary, Manufactured home		0.038***					0.011***	0.061***	0.034***
		(0.000)					(0.000)	(0.000)	(0.000)
Primary, Mixed Use		25.757***				15.600***			26.737***
		(0.001)				(0.005)			(0.001)
Primary, Office									
Primary, PUD		0.874***				0.835***	0.949***	0.849***	0.881***
		(0.000)				(0.000)	(0.004)	(0.000)	(0.000)
Primary, Retail building									
Second Home, Single Family		1.626***				1.175**	1.600***	2.280***	1.588***
		(0.000)				(0.048)	(0.000)	(0.000)	(0.000)
Second Home, Multi-Family (2-4)		1.568***				0.886	1.281	3.748***	1.432**
		(0.007)				(0.750)	(0.433)	(0.000)	(0.020)
Second Home, Multi-Family (5+)									
Second Home, Condo		1.181***				1.142	1.025	1.431***	1.196***
		(0.000)				(0.332)	(0.780)	(0.000)	(0.000)

Dependent Variable: Combined-Risk Loan	Model (2-Inv) Same as Model (2), Estimated Only on Loans Sold to Investors	Model (2-InvMiss) Same as Model (2), Estimated Only on Loans Sold to Investors & Loans with No Entry in the Investor Field	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present
36% < DTI ≤ 50%	0.953***	0.987*	0.987*	0.987*	0.984*	0.993	0.967***		0.987*
	(0.000)	(0.096)	(0.094)	(0.091)	(0.063)	(0.381)	(0.000)		(0.095)
DTI > 50%	0.912***	0.827***	0.822***	0.821***	0.775***	0.828***	0.780***		0.821***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
HTI missing	1.075	1.083	1.106**	1.107**	1.034	1.079	1.080		1.106**
	(0.240)	(0.115)	(0.045)	(0.043)	(0.548)	(0.129)	(0.141)		(0.044)
28% < DTI ≤ 33%	1.078***	1.122***	1.112***	1.113***	1.080***	1.093***	1.097***		1.113***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
33% < DTI ≤ 40%	1.189***	1.295***	1.261***	1.262***	1.212***	1.225***	1.235***		1.261***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
HTI > 40%	1.368***	1.575***	1.533***	1.536***	1.479***	1.472***	1.493***		1.535***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
Limited Documenation	1.267***	1.308***	1.306***	1.307***	1.451***	1.294***	1.282***		1.306***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
Stated Documentation	10.424***	8.797***	8.676***	8.685***	6.078***	8.436***	8.823***		8.669***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
Cash-out refinance	0.498***	0.753***	0.703***	0.702***	0.682***	0.711***	0.634***	0.455***	0.703***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Rate-term refinance	0.655***	0.636***	0.615***	0.615***	0.572***	0.624***	0.591***	0.416***	0.615***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Refinance type unknown									0.652**
									(0.046)
Unknown purpose	0.445**	0.561*	0.461***	0.460***	0.429***	0.471***	0.403***	0.266***	
	(0.014)	(0.072)	(0.003)	(0.003)	(0.001)	(0.004)	(0.000)	(0.000)	
Primary, Single Family									
Primary, Multi-Family (2-4)	0.979	1.010	1.009	1.010	1.100***	0.994	1.055***	1.139***	1.009
	(0.232)	(0.537)	(0.575)	(0.518)	(0.000)	(0.683)	(0.001)	(0.000)	(0.558)
Primary, Multi-Family (5+)	2.865	0.128***	0.137***	0.137***	0.167***	0.137***	0.182***	0.062***	0.137***
	(0.575)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)
Primary, Condo	1.157***	0.892***	0.907***	0.907***	0.956***	0.884***	0.926***	0.906***	0.907***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
Primary, Manufactured home		0.037***	0.039***	0.038***	0.035***	0.039***	0.045***	0.017***	0.038***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Primary, Mixed Use	19.956***	26.487***	27.195***	26.235***	34.083***	27.412***	34.167***	2.251	25.737***
	(0.003)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.325)	(0.001)
Primary, Office									
Primary, PUD	1.019*	0.864***	0.875***	0.874***	0.911***	0.880***	0.908***	0.859***	0.874***
	(0.097)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Primary, Retail building									
Second Home, Single Family	1.397***	1.607***	1.627***	1.628***	1.831***	1.606***	1.800***	1.641***	1.626***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Second Home, Multi-Family (2-4)	1.131	1.512**	1.569***	1.573***	2.135***	1.535***	1.792***	1.701***	1.569***
	(0.500)	(0.021)	(0.007)	(0.007)	(0.000)	(0.010)	(0.000)	(0.001)	(0.007)
Second Home, Multi-Family (5+)									
Second Home, Condo	1.523***	1.199***	1.182***	1.180***	1.278***	1.160***	1.334***	1.075*	1.180***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.082)	(0.000)

Dependent Variable: Combined-Risk Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
Second Home, Manufactured home		0.075***						0.113***	0.065***
		(0.000)						(0.006)	(0.000)
Second Home, PUD		1.597***				0.822	1.587***	2.389***	1.543***
		(0.000)				(0.176)	(0.000)	(0.000)	(0.000)
Investment, Single Family		2.145***				2.025***	2.069***	2.431***	2.110***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (2-4)		2.150***				1.933***	1.968***	2.641***	2.107***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (5+)		3.476***				0.643	6.207***		3.444***
		(0.000)				(0.114)	(0.000)		(0.000)
Investment, Condo		1.814***				2.310***	1.334***	1.903***	1.779***
		(0.000)				(0.000)	(0.001)	(0.000)	(0.000)
Investment, Industrial		31.586***				14.914***	24.057***		30.257***
		(0.000)				(0.000)	(0.000)		(0.000)
Investment, Mixed Use		17.581***				8.919***	25.258***		17.462***
		(0.000)				(0.002)	(0.000)		(0.000)
Investment, Office		23.651***				3.920**	134.175***		22.806***
		(0.000)				(0.042)	(0.000)		(0.000)
Investment, PUD		1.534***				1.809***	1.306***	1.753***	1.505***
		(0.000)				(0.000)	(0.004)	(0.000)	(0.000)
Investment, Retail building		75.602***				15.614***	212.182***		71.571***
		(0.000)				(0.000)	(0.000)		(0.000)
Self-employed borrower or co-borrower present		1.177***				0.916***	0.997	1.498***	1.159***
		(0.000)				(0.000)	(0.872)	(0.000)	(0.000)
Self-employed borrower or co-borrower presence unknown		1.013				0.928	0.405***	13.381***	0.932
		(0.887)				(0.492)	(0.000)	(0.000)	(0.355)
Co-Borrower presence									
Constant	0.937***	0.091***	0.452***	1.279***	1.162***	0.028***	3.636**	4.320***	0.107***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.026)	(0.005)	(0.000)
Observations	792,759	792,499	214,144	266,709	311,906	213,900	265,194	311,528	913,605
Pseudo R^2	0.00679	0.37146	0.00204	0.00820	0.01723	0.27646	0.39623	0.45593	0.36731

Robust p-values in parentheses
*** Statistically significant at 1% confidence level (p<0.01)
** Statistically significant at 5% confidence level (p<0.05)
* Statistically significant at 10% confidence level (p<0.1)
Coefficients and p-values for origination month, state, and metropolitan area (CBSA) are excluded from this table for brevity.

Dependent Variable: Combined-Risk Loan	Model (2-Inv) Same as Model (2), Estimated Only on Loans Sold to Investors	Model (2-InvMiss) Same as Model (2), Estimated Only on Loans Sold to Investors & Loans with No Entry in the Investor Field	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present
Second Home, Manufactured home		0.072***	0.076***	0.075***	0.075***	0.077***	0.101***	0.024***	0.075***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Second Home, PUD	1.502***	1.587***	1.600***	1.599***	1.780***	1.588***	1.792***	1.674***	1.597***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Single Family	2.068***	2.020***	2.145***	2.147***	2.463***	2.114***	2.452***	2.102***	2.146***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (2-4)	1.904***	2.088***	2.149***	2.154***	2.451***	2.107***	2.473***	1.914***	2.149***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (5+)	1.881***	3.585***	3.527***	3.494***	4.301***	3.619***	5.246***	0.697***	3.474***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Investment, Condo	2.111***	1.650***	1.813***	1.814***	2.275***	1.779***	2.180***	1.497***	1.813***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Industrial	14.565***	29.513***	31.608***	31.598***	43.583***	33.394***	59.003***	5.610***	31.562***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Investment, Mixed Use	9.902***	17.086***	17.689***	17.652***	23.059***	18.070***	23.668***	3.466**	17.566***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.011)	(0.000)
Investment, Office	10.782***	23.030***	23.662***	23.664***	30.618***	24.729***	39.298***	4.605***	23.640***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, PUD	1.953***	1.391***	1.535***	1.535***	1.855***	1.519***	1.872***	1.531***	1.532***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Retail building	33.228***	74.314***	75.746***	75.742***	87.070***	79.772***	112.819***	12.406***	75.488***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Self-employed borrower or co-borrower present	1.005	1.201***	1.176***	1.176***	1.187***	1.165***	1.148***	2.664***	1.178***
	(0.624)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Self-employed borrower or co-borrower presence unknown	0.612***	1.019	1.014	1.013	0.978	1.049	1.009	0.682***	0.990
	(0.000)	(0.836)	(0.879)	(0.884)	(0.809)	(0.594)	(0.919)	(0.000)	(0.911)
Co-Borrower presence						0.847***			
						(0.000)			
Constant	0.147***	0.099***	0.094***	0.087***	0.085***	0.098***	0.028***	0.210***	0.091***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	643,711	759,109	792,499	792,499	637,132	792,499	792,499	792,499	792,499
Pseudo R^2	0.38923	0.37641	0.37153	0.37145	0.33846	0.37201	0.38677	0.26731	0.37136

Robust p-values in parentheses
*** Statistically significant at 1% confidence level (p<0.01)
** Statistically significant at 5% confidence level (p<0.05)
* Statistically significant at 10% confidence level (p<0.1)
Coefficients and p-values for origination month, state, and metropolitan area (CBSA) are excluded from this table for brevity.

Appendix 6B: Odds Ratio Results of Combined-Risk Loan Logistic Regressions, Morgan Stanley Purchases, Nationwide

Dependent Variable: Combined-Risk Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
Race: African American	1.226***	1.148***	1.214***	0.984	1.105***	1.279***	0.978	1.052	1.155***
	(0.000)	(0.000)	(0.000)	(0.647)	(0.000)	(0.000)	(0.696)	(0.177)	(0.000)
Race: Hispanic	1.235***	1.165***	0.962*	1.611***	1.340***	1.060**	1.164***	1.324***	1.205***
	(0.000)	(0.000)	(0.068)	(0.000)	(0.000)	(0.046)	(0.007)	(0.000)	(0.000)
Race: American Indian	0.602***	0.941	0.674***	1.075	1.075	0.816**	1.416	0.860	0.962
	(0.000)	(0.419)	(0.000)	(0.685)	(0.561)	(0.033)	(0.164)	(0.416)	(0.578)
Race: Asian or Hawaiian	1.061**	0.980	0.778***	1.374***	1.358***	0.897**	0.984	1.088	1.001
	(0.014)	(0.557)	(0.000)	(0.000)	(0.000)	(0.037)	(0.882)	(0.249)	(0.970)
Race: Missing	0.881***	1.012	0.892***	1.148**	1.035	1.157***	0.894	0.896	1.006
	(0.000)	(0.717)	(0.002)	(0.015)	(0.525)	(0.001)	(0.161)	(0.172)	(0.843)
African American, non-Hispanic									
African American, Hispanic									
American Indian, non-Hispanic									
American Indian, Hispanic									
Asian or Pacific Islander, non-Hispanic									
Asian or Pacific Islander, Hispanic									
Missing, non-Hispanic									
Missing, Hispanic									
White, Hispanic									
Any race African American									
Any race White									
Any race Hispanic									
Any race American Indian									
Any race Asian or Pacific Islander									
All races Missing									
Missing Credit Score									
Credit Score < 620		3.485***				4.575***	3.289***	3.230***	3.413***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
620 ≤ Credit Score < 660		1.406***				1.321***	1.601***	1.549***	1.398***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Credit Score < 500									
500 ≤ Credit Score < 520									

Dependent Variable: Combined-Risk Loan	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present	Model (10) Same as Model (2), Using Only MS Field Values When Both NC and MS Fields are Present
Race: African American			1.141***	1.144***	1.094***	1.170***	1.148***	1.184***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Race: Hispanic			1.099***	1.164***	1.163***	1.436***	1.165***	1.216***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Race: American Indian			0.945	0.941	0.913	0.867**	0.942	0.927
			(0.471)	(0.419)	(0.230)	(0.033)	(0.430)	(0.289)
Race: Asian or Hawaiian			0.950	0.980	0.980	1.228***	0.980	1.011
			(0.157)	(0.564)	(0.572)	(0.000)	(0.559)	(0.731)
Race: Missing			1.011	1.014	0.993	1.075**	1.013	0.974
			(0.759)	(0.684)	(0.842)	(0.020)	(0.710)	(0.389)
African American, non-Hispanic	1.150***							
	(0.000)							
African American, Hispanic	1.106							
	(0.347)							
American Indian, non-Hispanic	0.939							
	(0.406)							
American Indian, Hispanic	1.224**							
	(0.039)							
Asian or Pacific Islander, non-Hispanic	0.978							
	(0.519)							
Asian or Pacific Islander, Hispanic	1.020							
	(0.857)							
Missing, non-Hispanic	1.009							
	(0.802)							
Missing, Hispanic	0.921*							
	(0.092)							
White, Hispanic	1.205***							
	(0.000)							
Any race African American		1.341***						
		(0.000)						
Any race White		1.181***						
		(0.000)						
Any race Hispanic		1.178***						
		(0.000)						
Any race American Indian		1.119**						
		(0.021)						
Any race Asian or Pacific Islander		1.110						
		(0.117)						
All races Missing		1.188***						
		(0.001)						
Missing Credit Score							2.907***	
							(0.000)	
Credit Score < 620	3.488***	3.487***	4.279***	3.483***		1.933***	3.483***	3.318***
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
620 ≤ Credit Score < 660	1.407***	1.406***	1.624***	1.405***		1.127***	1.405***	1.363***
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
Credit Score < 500								
500 ≤ Credit Score < 520					19.173***			
					(0.000)			

Dependent Variable: Combined-Risk Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
520 ≤ Credit Score < 540									
540 ≤ Credit Score < 560									
560 ≤ Credit Score < 580									
580 ≤ Credit Score < 600									
600 ≤ Credit Score < 620									
620 ≤ Credit Score < 640									
640 ≤ Credit Score < 660									
660 ≤ Credit Score < 680									
680 ≤ Credit Score < 700									
700 ≤ Credit Score < 720									
720 ≤ Credit Score < 740									
740 ≤ Credit Score < 760									
760 ≤ Credit Score < 780									
Subordinate lien		0.166*** (0.000)				2.799*** (0.001)	0.011*** (0.000)	0.044*** (0.000)	0.145*** (0.000)
FHA/VA/RHS									
HELOC									
LTV missing									
LTV ≤ 60%		0.196*** (0.000)				0.137*** (0.000)	0.507 (0.320)	0.081*** (0.000)	0.220*** (0.000)
60% < LTV ≤ 70%		0.415*** (0.000)				0.417*** (0.000)	0.176*** (0.006)	0.297*** (0.004)	0.431*** (0.000)
70% < LTV ≤ 80%		0.604*** (0.000)				0.305*** (0.000)	0.450*** (0.000)	0.802*** (0.000)	0.631*** (0.000)
CLTV missing									
CLTV ≤ 60%		1.529 (0.106)				3.948*** (0.000)	0.233** (0.034)	1.398 (0.527)	1.399 (0.193)
60% < CLTV ≤ 70%		1.081 (0.689)				1.724** (0.024)	1.026 (0.967)	0.642 (0.301)	1.055 (0.768)
70% < CLTV ≤ 80%		0.765*** (0.000)				2.254*** (0.000)	0.466*** (0.000)	0.290*** (0.000)	0.764*** (0.000)
DTI missing									

Dependent Variable: Combined-Risk Loan	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present	Model (10) Same as Model (2), Using Only MS Field Values When Both NC and MS Fields are Present
520 ≤ Credit Score < 540					12.801***			
					(0.000)			
540 ≤ Credit Score < 560					10.108***			
					(0.000)			
560 ≤ Credit Score < 580					7.503***			
					(0.000)			
580 ≤ Credit Score < 600					4.434***			
					(0.000)			
600 ≤ Credit Score < 620					3.233***			
					(0.000)			
620 ≤ Credit Score < 640					2.538***			
					(0.000)			
640 ≤ Credit Score < 660					2.140***			
					(0.000)			
660 ≤ Credit Score < 680					1.852***			
					(0.000)			
680 ≤ Credit Score < 700					1.546***			
					(0.000)			
700 ≤ Credit Score < 720					1.498***			
					(0.000)			
720 ≤ Credit Score < 740					1.349***			
					(0.006)			
740 ≤ Credit Score < 760					1.383***			
					(0.005)			
760 ≤ Credit Score < 780					1.327**			
					(0.020)			
Subordinate lien	0.164***	0.165***		0.166***	0.175***	0.064***	0.166***	1.746
	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.475)
FHA/VA/RHS								
HELOC								
LTV missing								
LTV ≤ 60%	0.197***	0.197***	0.238***	0.196***	0.191***		0.196***	0.021***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
60% < LTV ≤ 70%	0.416***	0.415***	0.441***	0.416***	0.371***		0.415***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
70% < LTV ≤ 80%	0.603***	0.603***	0.606***	0.605***	0.652***		0.604***	0.252
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.327)
CLTV missing								
CLTV ≤ 60%	1.516	1.520	1.285	1.525	1.290		1.530	17.236***
	(0.114)	(0.111)	(0.332)	(0.109)	(0.372)		(0.106)	(0.000)
60% < CLTV ≤ 70%	1.078	1.079	1.033	1.076	0.965		1.081	4133625.182
	(0.699)	(0.694)	(0.865)	(0.706)	(0.856)		(0.689)	(.)
70% < CLTV ≤ 80%	0.767***	0.766***	0.756***	0.764***	0.561***		0.765***	2.233
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.568)
DTI missing							0.956	
							(0.920)	

Dependent Variable: Combined-Risk Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
36% < DTI ≤ 50%		0.923***				0.888***	0.965	0.968	0.927***
		(0.000)				(0.000)	(0.460)	(0.364)	(0.000)
DTI > 50%		0.898***				0.913	0.838**	1.047	0.912***
		(0.003)				(0.101)	(0.047)	(0.466)	(0.004)
HTI missing		1.395**				1.334	1.686	1.299	1.339**
		(0.012)				(0.130)	(0.234)	(0.296)	(0.016)
28% < DTI ≤ 33%		1.071***				1.060**	1.153**	1.135***	1.078***
		(0.001)				(0.043)	(0.011)	(0.002)	(0.000)
33% < DTI ≤ 40%		1.190***				1.146***	1.162**	1.303***	1.200***
		(0.000)				(0.000)	(0.011)	(0.000)	(0.000)
HTI > 40%		1.391***				1.300***	1.382***	1.453***	1.402***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Limited Documenation		1.394***				1.338***	1.489***	1.535***	1.392***
		(0.000)				(0.000)	(0.008)	(0.000)	(0.000)
Stated Documentation		8.906***				6.949***	27.887***	28.461***	8.678***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Cash-out refinance		0.491***				0.513***	0.289***	0.363***	0.489***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Rate-term refinance		0.662***				0.556***	0.422***	0.481***	0.662***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Refinance type unknown									
Unknown purpose									
Primary, Single Family									
Primary, Multi-Family (2-4)		0.942*				0.922*	1.223*	0.989	0.960
		(0.087)				(0.094)	(0.074)	(0.877)	(0.209)
Primary, Multi-Family (5+)									
Primary, Condo		1.257***				1.319***	1.219**	1.234***	1.246***
		(0.000)				(0.000)	(0.025)	(0.001)	(0.000)
Primary, Manufactured home									
Primary, Mixed Use									
Primary, Office									
Primary, PUD		0.993				0.850***	1.061	1.240***	0.980
		(0.766)				(0.000)	(0.383)	(0.000)	(0.355)
Primary, Retail building									
Second Home, Single Family		1.481***				1.113	1.268	1.723***	1.484***
		(0.000)				(0.467)	(0.226)	(0.000)	(0.000)
Second Home, Multi-Family (2-4)		1.192				0.758	0.637	9.811**	1.147
		(0.638)				(0.681)	(0.452)	(0.048)	(0.707)
Second Home, Multi-Family (5+)									
Second Home, Condo		1.747***				0.920	1.724*	2.487***	1.682***
		(0.000)				(0.729)	(0.082)	(0.000)	(0.000)

Dependent Variable: Combined-Risk Loan	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present	Model (10) Same as Model (2), Using Only MS Field Values When Both NC and MS Fields are Present
36% < DTI ≤ 50%	0.922***	0.922***	0.917***	0.924***	0.921***		0.922***	0.930***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
DTI > 50%	0.899***	0.899***	0.883***	0.900***	0.845***		0.898***	0.905***
	(0.003)	(0.003)	(0.001)	(0.003)	(0.000)		(0.003)	(0.003)
HTI missing	1.397**	1.398**	1.434**	1.386**	1.390**		1.386**	1.252*
	(0.012)	(0.011)	(0.015)	(0.014)	(0.015)		(0.013)	(0.062)
28% < DTI ≤ 33%	1.071***	1.072***	1.059***	1.066***	1.060***		1.071***	1.066***
	(0.001)	(0.001)	(0.009)	(0.002)	(0.005)		(0.001)	(0.001)
33% < DTI ≤ 40%	1.189***	1.191***	1.163***	1.180***	1.160***		1.190***	1.195***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
HTI > 40%	1.388***	1.392***	1.369***	1.374***	1.329***		1.392***	1.376***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
Limited Documenation	1.395***	1.394***	1.467***	1.392***	1.396***		1.395***	1.353***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
Stated Documentation	8.922***	8.932***	7.202***	8.837***	9.357***		8.903***	7.915***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
Cash-out refinance	0.491***	0.491***	0.467***	0.493***	0.467***	0.400***	0.491***	0.454***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Rate-term refinance	0.662***	0.661***	0.597***	0.665***	0.646***	0.530***	0.661***	0.640***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Refinance type unknown							0.713	
							(0.296)	
Unknown purpose								
Primary, Single Family								
Primary, Multi-Family (2-4)	0.942*	0.944*	0.989	0.938*	0.993	1.078**	0.942*	0.937**
	(0.084)	(0.096)	(0.760)	(0.066)	(0.837)	(0.019)	(0.084)	(0.048)
Primary, Multi-Family (5+)								
Primary, Condo	1.258***	1.258***	1.283***	1.248***	1.277***	1.198***	1.257***	1.240***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Primary, Manufactured home								
Primary, Mixed Use								
Primary, Office								
Primary, PUD	0.994	0.992	1.014	0.994	1.029	0.976	0.993	0.973
	(0.791)	(0.748)	(0.591)	(0.817)	(0.244)	(0.272)	(0.778)	(0.243)
Primary, Retail building								
Second Home, Single Family	1.483***	1.485***	1.690***	1.475***	1.513***	1.733***	1.483***	1.493***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Second Home, Multi-Family (2-4)	1.189	1.188	1.460	1.189	1.356	1.264	1.193	1.207
	(0.642)	(0.644)	(0.346)	(0.641)	(0.409)	(0.532)	(0.637)	(0.601)
Second Home, Multi-Family (5+)								
Second Home, Condo	1.749***	1.749***	1.876***	1.733***	1.794***	1.820***	1.749***	1.740***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Dependent Variable: Combined-Risk Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
Second Home, Manufactured home									
Second Home, PUD		1.569***				0.807	1.681*	1.801***	1.468***
		(0.000)				(0.395)	(0.074)	(0.000)	(0.000)
Investment, Single Family		2.039***				1.855***	2.441***	2.893***	2.016***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (2-4)		1.985***				1.918***	2.110***	2.980***	2.002***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (5+)									
Investment, Condo		1.934***				1.916***	1.834	2.517***	1.892***
		(0.000)				(0.000)	(0.146)	(0.000)	(0.000)
Investment, Industrial									
Investment, Mixed Use									
Investment, Office									
Investment, PUD		1.927***				1.678***	2.523**	3.273***	1.850***
		(0.000)				(0.000)	(0.015)	(0.000)	(0.000)
Investment, Retail building									
Self-employed borrower or co-borrower present		1.059***				0.945**	0.818***	1.029	1.059***
		(0.003)				(0.041)	(0.002)	(0.468)	(0.001)
Self-employed borrower or co-borrower presence unknown		0.689*				0.594***	0.062***		0.630***
		(0.070)				(0.010)	(0.000)		(0.004)
Co-Borrower presence									
Constant	1.059***	0.062***	0.463***	2.185***	2.208***	0.000***	17534765.796	6.734	0.104***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(.)	(0.158)	(0.000)
Observations	156,502	156,293	70,275	26,788	59,439	69,850	26,158	58,881	183,831
Pseudo R^2	0.00272	0.38492	0.00218	0.00679	0.00259	0.26428	0.42876	0.47878	0.38432

Robust p-values in parentheses
*** Statistically significant at 1% confidence level (p<0.01)
** Statistically significant at 5% confidence level (p<0.05)
* Statistically significant at 10% confidence level (p<0.1)
Coefficients and p-values for origination month, state, and metropolitan area (CBSA) are excluded from this table for brevity.

Dependent Variable: Combined-Risk Loan	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present	Model (10) Same as Model (2), Using Only MS Field Values When Both NC and MS Fields are Present
Second Home, Manufactured home								
Second Home, PUD	1.573***	1.574***	2.240***	1.565***	1.575***	1.953***	1.568***	1.487***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Single Family	2.038***	2.041***	2.217***	2.032***	2.356***	2.169***	2.039***	1.885***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (2-4)	1.985***	1.990***	2.151***	1.975***	2.337***	1.905***	1.985***	1.906***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (5+)								
Investment, Condo	1.931***	1.933***	2.194***	1.920***	2.171***	2.005***	1.935***	1.907***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Industrial								
Investment, Mixed Use								
Investment, Office								
Investment, PUD	1.934***	1.934***	2.157***	1.916***	2.167***	2.293***	1.926***	1.925***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Retail building								
Self-employed borrower or co-borrower present	1.057***	1.057***	1.033	1.056***	1.049**	2.506***	1.059***	1.084***
	(0.005)	(0.004)	(0.120)	(0.005)	(0.013)	(0.000)	(0.003)	(0.000)
Self-employed borrower or co-borrower presence unknown	0.696*	0.693*	0.717*	0.695*	0.703*	0.563***	0.644**	0.633***
	(0.078)	(0.075)	(0.095)	(0.077)	(0.099)	(0.001)	(0.017)	(0.003)
Co-Borrower presence				0.953***				
				(0.002)				
Constant	0.065***	0.054***	0.065***	0.064***	0.037***	0.210***	0.063***	0.089***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Observations	156,293	156,293	139,374	156,293	156,293	156,295	156,295	166,278
Pseudo R^2	0.38508	0.38499	0.37908	0.38496	0.40157	0.29789	0.38493	0.36726

Robust p-values in parentheses
*** Statistically significant at 1% confidence level (p<0.01)
** Statistically significant at 5% confidence level (p<0.05)
* Statistically significant at 10% confidence level (p<0.1)
Coefficients and p-values for origination month, state, and metropolitan area (CBSA) are excluded from this table for brevity.

Appendix 6C: Odds Ratio Results of Combined-Risk Loan Logistic Regressions, All New Century Loans, Detroit Region

Dependent Variable: Combined-Risk Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
Race: African American	1.899***	1.347***	1.817***	1.529***	1.736***	1.716***	1.031	0.861	1.313***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.793)	(0.246)	(0.000)
Race: Hispanic	1.431**	1.170	1.351	2.130**	1.373	1.295	1.018	0.795	1.165
	(0.012)	(0.413)	(0.125)	(0.035)	(0.317)	(0.250)	(0.968)	(0.662)	(0.383)
Race: American Indian	1.174	1.195	1.480	0.958	2.448	1.819	0.541	1.489	1.551
	(0.534)	(0.638)	(0.255)	(0.927)	(0.392)	(0.135)	(0.248)	(0.709)	(0.224)
Race: Asian or Hawaiian	0.814	0.750	0.942	1.460	0.467***	0.954	3.109*	0.198***	0.860
	(0.152)	(0.176)	(0.770)	(0.303)	(0.006)	(0.856)	(0.070)	(0.000)	(0.456)
Race: Missing	0.884	0.543***	0.883	0.922	0.455***	0.553**	0.844	0.233***	0.670***
	(0.277)	(0.000)	(0.555)	(0.705)	(0.000)	(0.013)	(0.553)	(0.000)	(0.000)
African American, non-Hispanic									
African American, Hispanic									
American Indian, non-Hispanic									
American Indian, Hispanic									
Asian or Pacific Islander, non-Hispanic									
Asian or Pacific Islander, Hispanic									
Missing, non-Hispanic									
Missing, Hispanic									
White, Hispanic									
Any race African American									
Any race White									
Any race Hispanic									
Any race American Indian									
Any race Asian or Pacific Islander									
All races Missing									
Missing Credit Score		0.699						1.074	0.887
		(0.788)						(0.946)	(0.931)
Credit Score < 620		4.700***				4.396***	5.074***	8.893***	4.436***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
620 ≤ Credit Score < 660		1.988***				1.473***	2.897***	3.703***	1.807***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Credit Score < 500									
500 ≤ Credit Score < 520									

Dependent Variable: Combined-Risk Loan	Model (2-Inv) Same as Model (2), Estimated Only on Loans Sold to Investors	Model (2-InvMiss) Same as Model (2), Estimated Only on Loans Sold to Investors & Loans with No Entry in the Investor Field	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present
Race: African American	1.282***	1.286***			1.288***	1.312***	1.241***	1.187***	1.347***
	(0.000)	(0.000)			(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Race: Hispanic	1.059	1.067			1.195	1.166	1.178	1.284	1.171
	(0.767)	(0.737)			(0.368)	(0.427)	(0.406)	(0.137)	(0.412)
Race: American Indian	1.912*	1.918*			1.086	1.182	1.035	0.995	1.193
	(0.096)	(0.093)			(0.834)	(0.664)	(0.931)	(0.987)	(0.641)
Race: Asian or Hawaiian	0.744	0.760			0.639**	0.751	0.784	0.764	0.750
	(0.198)	(0.224)			(0.018)	(0.178)	(0.240)	(0.172)	(0.176)
Race: Missing	0.690***	0.688***			0.515***	0.545***	0.553***	0.561***	0.544***
	(0.004)	(0.003)			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
African American, non-Hispanic			1.349***						
			(0.000)						
African American, Hispanic			1.042						
			(0.936)						
American Indian, non-Hispanic			1.195						
			(0.638)						
American Indian, Hispanic			1.548						
			(0.454)						
Asian or Pacific Islander, non-Hispanic			0.750						
			(0.175)						
Asian or Pacific Islander, Hispanic			0.516						
			(0.271)						
Missing, non-Hispanic			0.543***						
			(0.000)						
Missing, Hispanic			1.458						
			(0.592)						
White, Hispanic			1.137						
			(0.547)						
Any race African American				1.392					
				(0.408)					
Any race White				1.036					
				(0.930)					
Any race Hispanic				1.120					
				(0.545)					
Any race American Indian				0.771					
				(0.535)					
Any race Asian or Pacific Islander				1.267					
				(0.633)					
All races Missing				0.562					
				(0.172)					
Missing Credit Score	0.862	0.896	0.699	0.698		0.665	3.709	1.202	1.948
	(0.914)	(0.936)	(0.788)	(0.787)		(0.761)	(0.297)	(0.952)	(0.546)
Credit Score < 620	4.218***	4.416***	4.700***	4.698***	7.221***	4.676***		2.364***	4.696***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
620 ≤ Credit Score < 660	1.681***	1.750***	1.989***	1.988***	2.445***	1.972***		1.602***	1.988***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
Credit Score < 500							7.711**		
							(0.049)		
500 ≤ Credit Score < 520							70.847***		
							(0.000)		

Dependent Variable: Combined-Risk Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
520 ≤ Credit Score < 540									
540 ≤ Credit Score < 560									
560 ≤ Credit Score < 580									
580 ≤ Credit Score < 600									
600 ≤ Credit Score < 620									
620 ≤ Credit Score < 640									
640 ≤ Credit Score < 660									
660 ≤ Credit Score < 680									
680 ≤ Credit Score < 700									
700 ≤ Credit Score < 720									
720 ≤ Credit Score < 740									
740 ≤ Credit Score < 760									
760 ≤ Credit Score < 780									
Subordinate lien		0.210**				4.255	0.032***	0.000	0.146***
		(0.021)				(0.207)	(0.003)	(.)	(0.002)
FHA/VA/RHS									
HELOC		2.782							2.279
		(0.261)							(0.370)
LTV missing									
LTV ≤ 60%		0.210**				0.058**	0.196	276,671.519***	0.297*
		(0.021)				(0.013)	(0.152)	(0.000)	(0.054)
60% < LTV ≤ 70%		0.529				1.274	0.093***	0.748	0.515
		(0.395)				(0.837)	(0.007)	(0.755)	(0.340)
70% < LTV ≤ 80%		0.464***				0.276***	0.567***	0.674*	0.523***
		(0.000)				(0.000)	(0.006)	(0.059)	(0.000)
CLTV missing									
CLTV ≤ 60%		1.705				15.788**	0.662	0.000***	1.215
		(0.431)				(0.017)	(0.720)	(0.000)	(0.758)
60% < CLTV ≤ 70%		0.853				0.669	1.687	0.250	0.834
		(0.833)				(0.735)	(0.556)	(0.147)	(0.796)
70% < CLTV ≤ 80%		1.049				3.218***	0.398***	0.284***	1.049
		(0.645)				(0.000)	(0.000)	(0.000)	(0.621)
DTI missing		0.433				6.654	0.050**	0.028***	0.401
		(0.230)				(0.187)	(0.040)	(0.006)	(0.182)

Dependent Variable: Combined-Risk Loan	Model (2-Inv) Same as Model (2), Estimated Only on Loans Sold to Investors	Model (2-InvMiss) Same as Model (2), Estimated Only on Loans Sold to Investors & Loans with No Entry in the Investor Field	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present
520 ≤ Credit Score < 540							67.773***		
							(0.000)		
540 ≤ Credit Score < 560							43.332***		
							(0.000)		
560 ≤ Credit Score < 580							33.973***		
							(0.000)		
580 ≤ Credit Score < 600							14.557***		
							(0.000)		
600 ≤ Credit Score < 620							10.159***		
							(0.000)		
620 ≤ Credit Score < 640							8.709***		
							(0.000)		
640 ≤ Credit Score < 660							9.296***		
							(0.000)		
660 ≤ Credit Score < 680							6.062***		
							(0.000)		
680 ≤ Credit Score < 700							4.818***		
							(0.000)		
700 ≤ Credit Score < 720							5.631***		
							(0.000)		
720 ≤ Credit Score < 740							3.131***		
							(0.001)		
740 ≤ Credit Score < 760							2.230**		
							(0.031)		
760 ≤ Credit Score < 780							1.762		
							(0.141)		
Subordinate lien	0.239**	0.239**	0.210**	0.210**		0.201**	0.171**	0.081***	0.210**
	(0.016)	(0.015)	(0.021)	(0.021)		(0.018)	(0.017)	(0.000)	(0.021)
FHA/VA/RHS									
HELOC	2.216	2.482	2.784	2.791		2.610	3.878*	2.970	2.782
	(0.375)	(0.309)	(0.260)	(0.259)		(0.294)	(0.097)	(0.427)	(0.261)
LTV missing									
LTV ≤ 60%	0.169***	0.173***	0.210**	0.209**	0.124**	0.221**	0.294*		0.209**
	(0.003)	(0.003)	(0.021)	(0.021)	(0.016)	(0.027)	(0.097)		(0.021)
60% < LTV ≤ 70%	0.346	0.350	0.528	0.528	0.493	0.549	0.516		0.528
	(0.153)	(0.153)	(0.395)	(0.394)	(0.301)	(0.435)	(0.355)		(0.394)
70% < LTV ≤ 80%	0.560***	0.560***	0.464***	0.464***	0.520***	0.469***	0.497***		0.463***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
CLTV missing									
CLTV ≤ 60%	1.915	1.875	1.703	1.705	3.069	1.596	0.945		1.704
	(0.275)	(0.288)	(0.432)	(0.431)	(0.203)	(0.493)	(0.939)		(0.432)
60% < CLTV ≤ 70%	1.343	1.309	0.852	0.853	0.923	0.813	0.628		0.854
	(0.694)	(0.717)	(0.832)	(0.834)	(0.908)	(0.789)	(0.519)		(0.834)
70% < CLTV ≤ 80%	1.050	1.032	1.049	1.049	0.919	1.030	0.702***		1.051
	(0.661)	(0.772)	(0.648)	(0.645)	(0.422)	(0.775)	(0.001)		(0.634)
DTI missing	0.478	0.327	0.434	0.433	0.761	0.441	0.575		0.430
	(0.431)	(0.161)	(0.231)	(0.230)	(0.654)	(0.240)	(0.449)		(0.225)

Dependent Variable: Combined-Risk Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
36% < DTI ≤ 50%		0.955				0.871*	1.123	0.955	0.914
		(0.453)				(0.091)	(0.392)	(0.749)	(0.104)
DTI > 50%		1.390**				1.368	1.436	1.398	1.142
		(0.027)				(0.164)	(0.202)	(0.237)	(0.298)
HTI missing		0.361**				0.211**	0.353	0.650	0.395**
		(0.014)				(0.045)	(0.222)	(0.695)	(0.010)
28% < DTI ≤ 33%		0.956				0.870	0.904	1.262	0.952
		(0.535)				(0.167)	(0.513)	(0.138)	(0.445)
33% < DTI ≤ 40%		1.056				0.906	1.128	1.506**	1.084
		(0.481)				(0.365)	(0.480)	(0.018)	(0.245)
HTI > 40%		1.018				0.852	0.987	1.425*	1.040
		(0.849)				(0.254)	(0.946)	(0.075)	(0.627)
Limited Documenation		1.236				1.032	2.539***	1.859	1.307
		(0.265)				(0.913)	(0.002)	(0.398)	(0.142)
Stated Documentation		12.333***				7.136***	120.999***	95.628***	12.322***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Cash-out refinance		0.599***				0.628***	0.564***	0.510***	0.534***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Rate-term refinance		0.598***				0.593***	0.469***	0.349***	0.608***
		(0.000)				(0.001)	(0.000)	(0.000)	(0.000)
Refinance type unknown									
Unknown purpose									
Primary, Single Family									
Primary, Multi-Family (2-4)		1.884***				2.378***	1.285	2.074*	1.544**
		(0.002)				(0.001)	(0.520)	(0.062)	(0.020)
Primary, Multi-Family (5+)									
Primary, Condo		0.936				0.836	0.789	1.512*	0.933
		(0.566)				(0.322)	(0.354)	(0.054)	(0.501)
Primary, Manufactured home									
Primary, Mixed Use									
Primary, Office									
Primary, PUD		0.609				0.410	0.656	1.007	0.556**
		(0.107)				(0.184)	(0.345)	(0.989)	(0.026)
Primary, Retail building									
Second Home, Single Family		1.192				1.036	0.539	1.287	1.412
		(0.638)				(0.952)	(0.475)	(0.702)	(0.331)
Second Home, Multi-Family (2-4)									
Second Home, Multi-Family (5+)									
Second Home, Condo		3.940*					2.820		6.303**
		(0.071)					(0.145)		(0.019)

Dependent Variable: Combined-Risk Loan	Model (2-Inv) Same as Model (2), Estimated Only on Loans Sold to Investors	Model (2-InvMiss) Same as Model (2), Estimated Only on Loans Sold to Investors & Loans with No Entry in the Investor Field	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present
36% < DTI ≤ 50%	0.902*	0.896*	0.955	0.955	0.972	0.964	0.957		0.955
	(0.100)	(0.078)	(0.458)	(0.452)	(0.668)	(0.554)	(0.482)		(0.454)
DTI > 50%	1.134	1.125	1.392**	1.391**	1.394**	1.413**	1.235		1.382**
	(0.372)	(0.396)	(0.026)	(0.027)	(0.044)	(0.020)	(0.168)		(0.029)
HTI missing	0.537	0.482*	0.360**	0.361**	0.331***	0.350**	0.341**		0.360**
	(0.167)	(0.082)	(0.014)	(0.014)	(0.004)	(0.010)	(0.018)		(0.014)
28% < DTI ≤ 33%	0.929	0.944	0.956	0.956	0.918	0.932	0.924		0.955
	(0.311)	(0.425)	(0.533)	(0.539)	(0.280)	(0.332)	(0.283)		(0.526)
33% < DTI ≤ 40%	1.154*	1.165**	1.056	1.057	0.974	1.018	1.003		1.055
	(0.064)	(0.047)	(0.480)	(0.475)	(0.757)	(0.819)	(0.965)		(0.489)
HTI > 40%	1.032	1.042	1.017	1.017	0.939	0.968	0.932		1.019
	(0.730)	(0.645)	(0.855)	(0.851)	(0.539)	(0.726)	(0.448)		(0.837)
Limited Documenation	1.251	1.232	1.236	1.237	1.158	1.251	1.292		1.236
	(0.294)	(0.325)	(0.267)	(0.263)	(0.487)	(0.240)	(0.186)		(0.266)
Stated Documentation	13.807***	13.365***	12.336***	12.334***	5.257***	11.906***	12.488***		12.317***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
Cash-out refinance	0.519***	0.527***	0.599***	0.599***	0.558***	0.612***	0.563***	0.485***	0.599***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Rate-term refinance	0.606***	0.610***	0.599***	0.599***	0.530***	0.614***	0.604***	0.381***	0.598***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Refinance type unknown									
Unknown purpose									
Primary, Single Family									
Primary, Multi-Family (2-4)	1.744***	1.756***	1.883***	1.885***	1.944***	1.835***	2.086***	1.910***	1.882***
	(0.009)	(0.007)	(0.002)	(0.002)	(0.002)	(0.002)	(0.000)	(0.000)	(0.002)
Primary, Multi-Family (5+)									
Primary, Condo	0.891	0.918	0.936	0.937	1.006	0.920	0.996	0.919	0.937
	(0.291)	(0.434)	(0.565)	(0.568)	(0.964)	(0.471)	(0.974)	(0.459)	(0.569)
Primary, Manufactured home									
Primary, Mixed Use									
Primary, Office									
Primary, PUD	0.558*	0.579*	0.609	0.609	0.640	0.629	0.747	0.618	0.610
	(0.054)	(0.067)	(0.107)	(0.107)	(0.168)	(0.129)	(0.306)	(0.104)	(0.108)
Primary, Retail building									
Second Home, Single Family	1.489	1.415	1.192	1.191	0.826	1.170	1.340	1.212	1.192
	(0.292)	(0.343)	(0.639)	(0.640)	(0.637)	(0.673)	(0.433)	(0.656)	(0.638)
Second Home, Multi-Family (2-4)									
Second Home, Multi-Family (5+)									
Second Home, Condo	5.247**	5.409**	3.938*	3.941*		3.710*	3.504	4.568	3.945*
	(0.033)	(0.032)	(0.071)	(0.071)		(0.086)	(0.116)	(0.152)	(0.071)

Dependent Variable: Combined-Risk Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
Second Home, Manufactured home									
Second Home, PUD									
Investment, Single Family		2.505***				2.454***	3.343***	1.904**	2.594***
		(0.000)				(0.000)	(0.000)	(0.016)	(0.000)
Investment, Multi-Family (2-4)		3.080***				2.798***	2.133	3.760**	3.511***
		(0.000)				(0.000)	(0.143)	(0.020)	(0.000)
Investment, Multi-Family (5+)		3.040				0.909			2.967
		(0.243)				(0.933)			(0.256)
Investment, Condo		6.760**				2.644			7.725**
		(0.025)				(0.247)			(0.024)
Investment, Industrial									
Investment, Mixed Use									
Investment, Office									
Investment, PUD									
Investment, Retail building									
Self-employed borrower or co-borrower present		0.751***				0.631***	0.749	1.039	0.778***
		(0.003)				(0.000)	(0.274)	(0.875)	(0.004)
Self-employed borrower or co-borrower presence unknown		0.708				0.244**			0.749
		(0.613)				(0.023)			(0.462)
Co-Borrower presence									
Constant	2.190***	0.180***	1.062	3.652***	4.493***	0.110***	6.497***	6.206***	0.176***
	(0.000)	(0.000)	(0.121)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	13,311	13,303	4,746	3,952	4,613	4,743	3,939	4,588	16,007
Pseudo R^2	0.01674	0.35351	0.01462	0.00765	0.02066	0.25182	0.43908	0.48185	0.34791

Robust p-values in parentheses
*** Statistically significant at 1% confidence level (p<0.01)
** Statistically significant at 5% confidence level (p<0.05)
* Statistically significant at 10% confidence level (p<0.1)
Coefficients and p-values for origination month, state, and metropolitan area (CBSA) are excluded from this table for brevity.

Dependent Variable: Combined-Risk Loan	Model (2-Inv) Same as Model (2), Estimated Only on Loans Sold to Investors	Model (2-InvMiss) Same as Model (2), Estimated Only on Loans Sold to Investors & Loans with No Entry in the Investor Field	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present
Second Home, Manufactured home									
Second Home, PUD									
Investment, Single Family	2.285***	2.330***	2.507***	2.504***	3.119***	2.476***	3.112***	2.911***	2.504***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (2-4)	3.838***	3.945***	3.073***	3.088***	3.593***	3.002***	3.963***	3.008***	3.079***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (5+)	2.409	3.253	3.042	3.034	3.820	3.472	6.305*	0.307	3.048
	(0.452)	(0.328)	(0.243)	(0.244)	(0.133)	(0.203)	(0.052)	(0.172)	(0.242)
Investment, Condo			6.759**	6.770**	9.582***	6.544**	10.812***	6.310**	6.755**
			(0.025)	(0.024)	(0.003)	(0.027)	(0.002)	(0.042)	(0.025)
Investment, Industrial									
Investment, Mixed Use									
Investment, Office									
Investment, PUD									
Investment, Retail building									
Self-employed borrower or co-borrower present	0.781**	0.811**	0.751***	0.750***	0.784***	0.752***	0.786**	2.279***	0.751***
	(0.014)	(0.035)	(0.003)	(0.003)	(0.007)	(0.003)	(0.012)	(0.000)	(0.003)
Self-employed borrower or co-borrower presence unknown	0.619	0.613	0.707	0.705	0.519	0.694	0.628	0.761	0.791
	(0.352)	(0.332)	(0.612)	(0.608)	(0.206)	(0.586)	(0.495)	(0.626)	(0.715)
Co-Borrower presence						0.795***			
						(0.000)			
Constant	0.175***	0.168***	0.179***	0.174***	0.163***	0.192***	0.041***	0.524***	0.180***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.000)
Observations	12,994	13,091	13,303	13,303	11,789	13,303	13,303	13,303	13,303
Pseudo R^2	0.35812	0.35588	0.35357	0.35351	0.30491	0.35436	0.38360	0.25754	3102.67630

Robust p-values in parentheses
*** Statistically significant at 1% confidence level (p<0.01)
** Statistically significant at 5% confidence level (p<0.05)
* Statistically significant at 10% confidence level (p<0.1)
Coefficients and p-values for origination month, state, and metropolitan area (CBSA) are excluded from this table for brevity.

Appendix 6D: Odds Ratio Results of Combined-Risk Loan Logistic Regressions, Morgan Stanley Purchases, Detroit Region

Dependent Variable: Combined-Risk Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
Race: African American	1.694***	1.362***	1.596***	0.651	1.315	1.612***	0.370*	0.777	1.370***
	(0.000)	(0.004)	(0.000)	(0.180)	(0.203)	(0.000)	(0.055)	(0.444)	(0.001)
Race: Hispanic	1.264	1.151	1.117	0.654	0.898	0.982	0.553		1.106
	(0.379)	(0.627)	(0.748)	(0.699)	(0.846)	(0.957)	(0.592)		(0.721)
Race: American Indian	0.752	0.751	0.621			0.557			1.003
	(0.503)	(0.585)	(0.348)			(0.288)			(0.995)
Race: Asian or Hawaiian	1.180	1.085	1.043			1.035			1.359
	(0.616)	(0.848)	(0.910)			(0.940)			(0.466)
Race: Missing	1.173	0.737	1.088	0.514	0.834	0.721	0.524	0.212*	1.155
	(0.605)	(0.375)	(0.834)	(0.411)	(0.815)	(0.417)	(0.680)	(0.073)	(0.585)
African American, non-Hispanic									
African American, Hispanic									
American Indian, non-Hispanic									
American Indian, Hispanic									
Asian or Pacific Islander, non-Hispanic									
Asian or Pacific Islander, Hispanic									
Missing, non-Hispanic									
Missing, Hispanic									
White, Hispanic									
Any race African American									
Any race White									
Any race Hispanic									
Any race American Indian									
Any race Asian or Pacific Islander									
All races Missing									
Missing Credit Score									
Credit Score < 620		4.579***				4.621***	13.983**	6.233***	5.063***
		(0.000)				(0.000)	(0.011)	(0.000)	(0.000)
620 ≤ Credit Score < 660		1.462**				1.298	4.561	2.779**	1.605***
		(0.020)				(0.178)	(0.136)	(0.048)	(0.001)
Credit Score < 500									
500 ≤ Credit Score < 520									

Dependent Variable: Combined-Risk Loan	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present	Model (10) Same as Model (2), Using Only MS Field Values When Both NC and MS Fields are Present
Race: African American			1.341***	1.360***	1.294**	1.166	1.362***	1.438***
			(0.009)	(0.005)	(0.020)	(0.125)	(0.004)	(0.000)
Race: Hispanic			1.189	1.152	1.262	1.063	1.153	1.270
			(0.587)	(0.625)	(0.469)	(0.826)	(0.623)	(0.390)
Race: American Indian			0.737	0.750	0.725	0.552	0.751	0.850
			(0.553)	(0.585)	(0.595)	(0.172)	(0.586)	(0.760)
Race: Asian or Hawaiian			0.970	1.086	1.189	1.085	1.085	1.331
			(0.934)	(0.847)	(0.701)	(0.839)	(0.849)	(0.493)
Race: Missing			0.719	0.737	0.639	0.921	0.739	1.001
			(0.350)	(0.376)	(0.176)	(0.812)	(0.380)	(0.998)
African American, non-Hispanic	1.352***							
	(0.005)							
African American, Hispanic								
American Indian, non-Hispanic	0.751							
	(0.585)							
American Indian, Hispanic								
Asian or Pacific Islander, non-Hispanic	1.083							
	(0.851)							
Asian or Pacific Islander, Hispanic	0.281							
	(0.136)							
Missing, non-Hispanic	0.737							
	(0.374)							
Missing, Hispanic	0.937							
	(0.925)							
White, Hispanic	1.195							
	(0.592)							
Any race African American		2.077						
		(0.185)						
Any race White		1.524						
		(0.441)						
Any race Hispanic		1.357						
		(0.300)						
Any race American Indian		1.514						
		(0.526)						
Any race Asian or Pacific Islander		1.287						
		(0.720)						
All races Missing		1.127						
		(0.853)						
Missing Credit Score								
Credit Score < 620	4.593***	4.589***	6.127***	4.578***		2.961***	4.582***	5.196***
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
620 ≤ Credit Score < 660	1.468**	1.464**	1.748***	1.461**		1.352*	1.463**	1.532***
	(0.019)	(0.019)	(0.001)	(0.020)		(0.059)	(0.020)	(0.006)
Credit Score < 500								
500 ≤ Credit Score < 520					10.754***			
					(0.009)			

Dependent Variable: Combined-Risk Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
520 ≤ Credit Score < 540									
540 ≤ Credit Score < 560									
560 ≤ Credit Score < 580									
580 ≤ Credit Score < 600									
600 ≤ Credit Score < 620									
620 ≤ Credit Score < 640									
640 ≤ Credit Score < 660									
660 ≤ Credit Score < 680									
680 ≤ Credit Score < 700									
700 ≤ Credit Score < 720									
720 ≤ Credit Score < 740									
740 ≤ Credit Score < 760									
760 ≤ Credit Score < 780									
Subordinate lien		0.084**				0.184			0.052***
		(0.030)				(0.129)			(0.010)
FHA/VA/RHS									
HELOC									
LTV missing									
LTV ≤ 60%		0.825				1.084	0.024***	0.138***	1.137
		(0.864)				(0.940)	(0.000)	(0.002)	(0.909)
60% < LTV ≤ 70%		2.351				3.290	0.035***	0.407	2.314
		(0.422)				(0.260)	(0.001)	(0.237)	(0.429)
70% < LTV ≤ 80%		0.568***				0.409***	1.206	0.550	0.631***
		(0.001)				(0.000)	(0.821)	(0.280)	(0.003)
CLTV missing									
CLTV ≤ 60%		0.679				0.786			0.438
		(0.733)				(0.824)			(0.468)
60% < CLTV ≤ 70%		0.335				0.336			0.330
		(0.307)				(0.305)			(0.298)
70% < CLTV ≤ 80%		1.560**				2.508***	0.483	0.623	1.451**
		(0.028)				(0.000)	(0.479)	(0.458)	(0.043)
DTI missing									

Dependent Variable: Combined-Risk Loan	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present	Model (10) Same as Model (2), Using Only MS Field Values When Both NC and MS Fields are Present
520 ≤ Credit Score < 540					10.976***			
					(0.009)			
540 ≤ Credit Score < 560					4.663*			
					(0.084)			
560 ≤ Credit Score < 580					5.343*			
					(0.062)			
580 ≤ Credit Score < 600					2.555			
					(0.285)			
600 ≤ Credit Score < 620					1.284			
					(0.777)			
620 ≤ Credit Score < 640					1.049			
					(0.957)			
640 ≤ Credit Score < 660					1.073			
					(0.937)			
660 ≤ Credit Score < 680					0.622			
					(0.594)			
680 ≤ Credit Score < 700					0.744			
					(0.746)			
700 ≤ Credit Score < 720					1.042			
					(0.964)			
720 ≤ Credit Score < 740					0.877			
					(0.895)			
740 ≤ Credit Score < 760					0.262			
					(0.174)			
760 ≤ Credit Score < 780					1.116			
					(0.913)			
Subordinate lien	0.084**	0.084**		0.084**	0.024***	0.102***	0.083**	0.156***
	(0.031)	(0.030)		(0.030)	(0.002)	(0.000)	(0.030)	(0.000)
FHA/VA/RHS								
HELOC								
LTV missing								
LTV ≤ 60%	0.818	0.828	0.864	0.832	3.173		0.832	0.530***
	(0.858)	(0.866)	(0.900)	(0.870)	(0.327)		(0.870)	(0.006)
60% < LTV ≤ 70%	2.340	2.361	2.488	2.368	2.407		2.367	0.826
	(0.424)	(0.419)	(0.399)	(0.419)	(0.424)		(0.418)	(0.324)
70% < LTV ≤ 80%	0.569***	0.566***	0.565***	0.568***	0.603***		0.568***	0.801**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)		(0.001)	(0.038)
CLTV missing								
CLTV ≤ 60%	0.673	0.669	0.679	0.673	0.139*		0.675	
	(0.727)	(0.723)	(0.742)	(0.727)	(0.098)		(0.729)	
60% < CLTV ≤ 70%	0.337	0.333	0.323	0.332	0.220		0.332	
	(0.310)	(0.304)	(0.298)	(0.304)	(0.169)		(0.303)	
70% < CLTV ≤ 80%	1.555**	1.562**	1.564**	1.558**	1.017		1.562**	
	(0.029)	(0.028)	(0.027)	(0.029)	(0.934)		(0.027)	
DTI missing								

Dependent Variable: Combined-Risk Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
36% < DTI ≤ 50%		0.954				0.939	0.249*	1.124	0.885
		(0.686)				(0.628)	(0.054)	(0.747)	(0.237)
DTI > 50%		1.226				0.836	1.916	5.198	1.035
		(0.476)				(0.600)	(0.672)	(0.195)	(0.888)
HTI missing		0.665							0.680
		(0.763)							(0.780)
28% < DTI ≤ 33%		0.764*				0.804	0.425	0.617	0.810*
		(0.057)				(0.180)	(0.328)	(0.228)	(0.094)
33% < DTI ≤ 40%		0.865				0.817	0.499	0.843	0.967
		(0.349)				(0.255)	(0.315)	(0.710)	(0.803)
HTI > 40%		0.836				0.830	0.908	0.740	0.815
		(0.319)				(0.382)	(0.912)	(0.552)	(0.209)
Limited Documenation		1.141				1.006			1.001
		(0.738)				(0.991)			(0.997)
Stated Documentation		7.241***				5.679***			6.659***
		(0.000)				(0.000)			(0.000)
Cash-out refinance		0.540***				0.616***	0.165**	0.275***	0.468***
		(0.000)				(0.002)	(0.036)	(0.008)	(0.000)
Rate-term refinance		0.596***				0.509***	0.139*	0.321**	0.617***
		(0.005)				(0.004)	(0.055)	(0.028)	(0.004)
Refinance type unknown									
Unknown purpose									
Primary, Single Family									
Primary, Multi-Family (2-4)		2.142**				2.117**	1.331		1.855*
		(0.023)				(0.043)	(0.802)		(0.059)
Primary, Multi-Family (5+)									
Primary, Condo		0.918				0.841	0.179		0.950
		(0.710)				(0.563)	(0.134)		(0.799)
Primary, Manufactured home									
Primary, Mixed Use									
Primary, Office									
Primary, PUD		0.182**							0.343
		(0.018)							(0.113)
Primary, Retail building									
Second Home, Single Family		0.557				0.377			1.342
		(0.413)				(0.297)			(0.685)
Second Home, Multi-Family (2-4)									
Second Home, Multi-Family (5+)									
Second Home, Condo									

Dependent Variable: Combined-Risk Loan	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present	Model (10) Same as Model (2), Using Only MS Field Values When Both NC and MS Fields are Present
36% < DTI ≤ 50%	0.959	0.954	0.955	0.955	0.957		0.956	0.877
	(0.719)	(0.683)	(0.696)	(0.693)	(0.715)		(0.700)	(0.221)
DTI > 50%	1.231	1.225	1.160	1.227	1.083		1.219	1.207
	(0.467)	(0.478)	(0.616)	(0.474)	(0.790)		(0.490)	(0.474)
HTI missing	0.676	0.671	0.607	0.664	0.985		0.666	0.662
	(0.773)	(0.768)	(0.719)	(0.762)	(0.993)		(0.764)	(0.760)
28% < DTI ≤ 33%	0.763*	0.766*	0.716**	0.763*	0.735**		0.764*	0.792*
	(0.056)	(0.059)	(0.023)	(0.057)	(0.035)		(0.057)	(0.079)
33% < DTI ≤ 40%	0.871	0.868	0.773	0.863	0.814		0.863	0.932
	(0.373)	(0.362)	(0.108)	(0.347)	(0.193)		(0.340)	(0.624)
HTI > 40%	0.835	0.837	0.775	0.833	0.775		0.833	0.833
	(0.317)	(0.323)	(0.177)	(0.319)	(0.166)		(0.308)	(0.287)
Limited Documenation	1.145	1.138	1.198	1.142	1.261		1.140	1.058
	(0.730)	(0.743)	(0.664)	(0.736)	(0.579)		(0.739)	(0.883)
Stated Documentation	7.174***	7.260***	5.522***	7.228***	8.019***		7.221***	6.260***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
Cash-out refinance	0.541***	0.541***	0.504***	0.541***	0.490***	0.531***	0.540***	0.543***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Rate-term refinance	0.596***	0.597***	0.530***	0.597***	0.554***	0.434***	0.592***	0.591***
	(0.005)	(0.005)	(0.001)	(0.005)	(0.002)	(0.000)	(0.004)	(0.003)
Refinance type unknown								
Unknown purpose								
Primary, Single Family								
Primary, Multi-Family (2-4)	2.138**	2.126**	2.162**	2.139**	2.710***	2.309***	2.127**	2.408***
	(0.023)	(0.024)	(0.027)	(0.023)	(0.005)	(0.008)	(0.023)	(0.008)
Primary, Multi-Family (5+)								
Primary, Condo	0.922	0.924	1.070	0.917	0.894	0.922	0.917	0.973
	(0.726)	(0.733)	(0.799)	(0.707)	(0.627)	(0.722)	(0.709)	(0.904)
Primary, Manufactured home								
Primary, Mixed Use								
Primary, Office								
Primary, PUD	0.182**	0.182**	0.175***	0.182**	0.265*	0.373*	0.182**	0.282*
	(0.018)	(0.018)	(0.009)	(0.018)	(0.077)	(0.078)	(0.018)	(0.084)
Primary, Retail building								
Second Home, Single Family	0.568	0.553	0.347	0.557	0.598	0.540	0.558	0.982
	(0.433)	(0.409)	(0.138)	(0.414)	(0.476)	(0.559)	(0.416)	(0.982)
Second Home, Multi-Family (2-4)								
Second Home, Multi-Family (5+)								
Second Home, Condo								

Dependent Variable: Combined-Risk Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
Second Home, Manufactured home									
Second Home, PUD									
Investment, Single Family		2.084***				1.978***		1.171	2.516***
		(0.000)				(0.002)		(0.780)	(0.000)
Investment, Multi-Family (2-4)		2.921**				2.139			3.312***
		(0.010)				(0.116)			(0.002)
Investment, Multi-Family (5+)									
Investment, Condo									
Investment, Industrial									
Investment, Mixed Use									
Investment, Office									
Investment, PUD									
Investment, Retail building									
Self-employed borrower or co-borrower present		0.811				0.698*	0.832	1.645	0.881
		(0.238)				(0.063)	(0.885)	(0.531)	(0.431)
Self-employed borrower or co-borrower presence unknown		0.121**				0.102***			0.238*
		(0.011)				(0.005)			(0.062)
Co-Borrower presence									
Constant	2.216***	0.138***	1.253***	10.706***	7.796***	0.106***	32.045**	29.187**	0.121***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.038)	(0.032)	(0.000)
Observations	3,264	3,242	1,773	459	1,007	1,762	266	545	3,928
Pseudo R^2	0.01108	0.30636	0.00949	0.00673	0.00300	0.20269	0.31849	0.16234	0.30529

Robust p-values in parentheses
*** Statistically significant at 1% confidence level (p<0.01)
** Statistically significant at 5% confidence level (p<0.05)
* Statistically significant at 10% confidence level (p<0.1)
Coefficients and p-values for origination month, state, and metropolitan area (CBSA) are excluded from this table for brevity.

Dependent Variable: Combined-Risk Loan	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present	Model (10) Same as Model (2), Using Only MS Field Values When Both NC and MS Fields are Present
Second Home, Manufactured home								
Second Home, PUD								
Investment, Single Family	2.083***	2.082***	2.325***	2.083***	2.520***	2.789***	2.084***	2.763***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (2-4)	2.937***	2.929**	3.054***	2.917**	3.400***	3.101***	2.921**	2.933***
	(0.010)	(0.010)	(0.008)	(0.010)	(0.003)	(0.003)	(0.010)	(0.005)
Investment, Multi-Family (5+)								
Investment, Condo								
Investment, Industrial								
Investment, Mixed Use								
Investment, Office								
Investment, PUD								
Investment, Retail building								
Self-employed borrower or co-borrower present	0.811	0.815	0.705**	0.811	0.861	2.199***	0.813	0.846
	(0.237)	(0.250)	(0.033)	(0.239)	(0.389)	(0.000)	(0.242)	(0.317)
Self-employed borrower or co-borrower presence unknown	0.121**	0.122**	0.134**	0.122**	0.099***	0.197	0.188***	0.212**
	(0.011)	(0.012)	(0.016)	(0.012)	(0.002)	(0.155)	(0.008)	(0.039)
Co-Borrower presence				0.986				
				(0.914)				
Constant	0.138***	0.090***	0.124***	0.139***	0.198*	0.259***	0.138***	0.101***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.087)	(0.001)	(0.000)	(0.000)
Observations	3,232	3,242	3,077	3,242	3,242	3,242	3,240	3,525
Pseudo R^2	0.30616	0.30650	0.29585	0.30636	0.34069	0.23592	746.14940	820.95680

Robust p-values in parentheses
*** Statistically significant at 1% confidence level (p<0.01)
** Statistically significant at 5% confidence level (p<0.05)
* Statistically significant at 10% confidence level (p<0.1)
Coefficients and p-values for origination month, state, and metropolitan area (CBSA) are excluded from this table for brevity.

Appendix 7A: Odds Ratio Results of High-Cost Loan Logistic Regressions, All New Century Loans, Nationwide

Dependent Variable: High-Cost Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
Race: African American	1.892***	1.500***	1.451***	1.908***	2.771***	1.422***	1.445***	1.597***	1.490***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Race: Hispanic	1.299***	1.377***	0.931***	1.552***	1.838***	1.122***	1.392***	1.682***	1.404***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Race: American Indian	0.859***	1.166***	0.926*	1.101	1.894***	1.054	1.080	1.644***	1.198***
	(0.000)	(0.000)	(0.051)	(0.103)	(0.000)	(0.281)	(0.315)	(0.000)	(0.000)
Race: Asian or Hawaiian	0.928***	1.142***	0.693***	1.058***	1.163***	0.967	1.195***	1.307***	1.149***
	(0.000)	(0.000)	(0.000)	(0.008)	(0.000)	(0.214)	(0.000)	(0.000)	(0.000)
Race: Missing	0.611***	0.708***	0.780***	0.699***	0.398***	1.061**	0.837***	0.520***	0.733***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.016)	(0.000)	(0.000)	(0.000)
African American, non-Hispanic									
African American, Hispanic									
American Indian, non-Hispanic									
American Indian, Hispanic									
Asian or Pacific Islander, non-Hispanic									
Asian or Pacific Islander, Hispanic									
Missing, non-Hispanic									
Missing, Hispanic									
White, Hispanic									
Any race African American									
Any race White									
Any race Hispanic									
Any race American Indian									
Any race Asian or Pacific Islander									
All races Missing									
Missing Credit Score		0.813***					1.613**	0.996	0.732***
		(0.010)					(0.017)	(0.972)	(0.000)
Credit Score < 620		14.651***				7.009***	17.512***	33.806***	13.826***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
620 ≤ Credit Score < 660		3.650***				1.923***	3.969***	6.359***	3.521***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Credit Score < 500									
500 ≤ Credit Score < 520									

Dependent Variable: High-Cost Loan	Model (2-Inv) Same as Model (2), Estimated Only on Loans Sold to Investors	Model (2-InvMiss) Same as Model (2), Estimated Only on Loans Sold to Investors & Loans with No Entry in the Investor Field	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present
Race: African American	1.326***	1.514***			1.617***	1.474***	1.362***	1.634***	1.501***
	(0.000)	(0.000)			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Race: Hispanic	1.239***	1.445***			1.419***	1.377***	1.344***	1.685***	1.377***
	(0.000)	(0.000)			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Race: American Indian	1.182***	1.270***			1.196***	1.165***	1.088**	1.137***	1.165***
	(0.000)	(0.000)			(0.000)	(0.000)	(0.032)	(0.000)	(0.000)
Race: Asian or Hawaiian	1.125***	1.148***			1.139***	1.150***	1.149***	1.349***	1.142***
	(0.000)	(0.000)			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Race: Missing	0.945***	0.707***			0.692***	0.717***	0.712***	0.715***	0.708***
	(0.000)	(0.000)			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
African American, non-Hispanic			1.501***						
			(0.000)						
African American, Hispanic			1.477***						
			(0.000)						
American Indian, non-Hispanic			1.166***						
			(0.000)						
American Indian, Hispanic			1.436***						
			(0.000)						
Asian or Pacific Islander, non-Hispanic			1.142***						
			(0.000)						
Asian or Pacific Islander, Hispanic			1.295***						
			(0.000)						
Missing, non-Hispanic			0.708***						
			(0.000)						
Missing, Hispanic			1.257***						
			(0.000)						
White, Hispanic			1.389***						
			(0.000)						
Any race African American				1.442***					
				(0.000)					
Any race White				0.973					
				(0.181)					
Any race Hispanic				1.353***					
				(0.000)					
Any race American Indian				1.090***					
				(0.000)					
Any race Asian or Pacific Islander				1.091***					
				(0.008)					
All races Missing				0.685***					
				(0.000)					
Missing Credit Score	7.504***	0.739***	0.813***	0.812***	0.748***	0.822**	2.841***	0.576***	0.949
	(0.000)	(0.000)	(0.010)	(0.010)	(0.001)	(0.015)	(0.000)	(0.000)	(0.490)
Credit Score < 620	8.327***	15.195***	14.652***	14.652***	15.561***	14.567***		9.541***	14.648***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
620 ≤ Credit Score < 660	2.219***	3.885***	3.651***	3.649***	3.065***	3.633***		3.202***	3.651***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
Credit Score < 500							32.811***		
							(0.000)		
500 ≤ Credit Score < 520							892.665***		
							(0.000)		

Dependent Variable: High-Cost Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
520 ≤ Credit Score < 540									
540 ≤ Credit Score < 560									
560 ≤ Credit Score < 580									
580 ≤ Credit Score < 600									
600 ≤ Credit Score < 620									
620 ≤ Credit Score < 640									
640 ≤ Credit Score < 660									
660 ≤ Credit Score < 680									
680 ≤ Credit Score < 700									
700 ≤ Credit Score < 720									
720 ≤ Credit Score < 740									
740 ≤ Credit Score < 760									
760 ≤ Credit Score < 780									
Subordinate lien		4.061***				12.242***	2.804***	2.685***	4.133***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
FHA/VA/RHS		0.017***					0.002***	0.013***	0.017***
		(0.000)					(0.000)	(0.000)	(0.000)
HELOC		0.573***					0.804*	1.787***	0.523***
		(0.000)					(0.075)	(0.000)	(0.000)
LTV missing		1255317.611***				2350718.233***			1096981.265***
		(0.000)				(0.000)			(0.000)
LTV ≤ 60%		0.377***				0.565***	0.209***	0.262***	0.365***
		(0.000)				(0.003)	(0.000)	(0.000)	(0.000)
60% < LTV ≤ 70%		0.485***				0.619***	0.296***	0.316***	0.497***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
70% < LTV ≤ 80%		1.109***				0.381***	1.371***	1.259***	1.142***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
CLTV missing		0.000***				0.000***			0.000***
		(0.000)				(0.000)			(0.000)
CLTV ≤ 60%		0.757***				1.571**	0.682***	0.406***	0.815***
		(0.000)				(0.020)	(0.005)	(0.000)	(0.003)
60% < CLTV ≤ 70%		0.764***				1.550***	0.679***	0.431***	0.779***
		(0.000)				(0.001)	(0.000)	(0.000)	(0.000)
70% < CLTV ≤ 80%		0.464***				2.704***	0.233***	0.186***	0.470***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
DTI missing		0.247***				1.008	0.084***	0.480***	0.229***
		(0.000)				(0.975)	(0.000)	(0.000)	(0.000)

Dependent Variable: High-Cost Loan	Model (2-Inv) Same as Model (2), Estimated Only on Loans Sold to Investors	Model (2-InvMiss) Same as Model (2), Estimated Only on Loans Sold to Investors & Loans with No Entry in the Investor Field	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present
520 ≤ Credit Score < 540							345.347***		
							(0.000)		
540 ≤ Credit Score < 560							142.882***		
							(0.000)		
560 ≤ Credit Score < 580							82.987***		
							(0.000)		
580 ≤ Credit Score < 600							39.799***		
							(0.000)		
600 ≤ Credit Score < 620							26.348***		
							(0.000)		
620 ≤ Credit Score < 640							17.784***		
							(0.000)		
640 ≤ Credit Score < 660							11.899***		
							(0.000)		
660 ≤ Credit Score < 680							6.944***		
							(0.000)		
680 ≤ Credit Score < 700							4.028***		
							(0.000)		
700 ≤ Credit Score < 720							3.013***		
							(0.000)		
720 ≤ Credit Score < 740							2.334***		
							(0.000)		
740 ≤ Credit Score < 760							1.865***		
							(0.000)		
760 ≤ Credit Score < 780							1.510***		
							(0.000)		
Subordinate lien	6.081***	4.112***	4.058***	4.064***		4.054***	4.397***	1.691***	4.061***
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
FHA/VA/RHS		0.017***	0.017***	0.017***		0.017***	0.010***	0.018***	0.017***
		(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
HELOC	0.063***	0.605***	0.573***	0.572***		0.579***	0.663***	0.545***	0.572***
	(0.006)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
LTV missing	2931212.374***	609,815.273***	1253304.104***	1257726.031***	392,966.061***	1212700.930***	169,400.135***		1253506.589***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
LTV ≤ 60%	0.240***	0.359***	0.377***	0.377***	0.167***	0.378***	0.360***		0.377***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
60% < LTV ≤ 70%	0.589***	0.490***	0.485***	0.485***	0.292***	0.485***	0.431***		0.486***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
70% < LTV ≤ 80%	1.079***	1.202***	1.108***	1.109***	1.000	1.110***	1.114***		1.109***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.997)	(0.000)	(0.000)		(0.000)
CLTV missing	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***		0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
CLTV ≤ 60%	1.695***	0.819***	0.757***	0.758***	1.578***	0.746***	0.657***		0.757***
	(0.000)	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
60% < CLTV ≤ 70%	0.934	0.775***	0.764***	0.763***	1.219***	0.762***	0.664***		0.762***
	(0.498)	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)		(0.000)
70% < CLTV ≤ 80%	0.730***	0.436***	0.464***	0.464***	0.472***	0.464***	0.364***		0.464***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
DTI missing	0.617***	0.261***	0.247***	0.247***	0.142***	0.250***	0.287***		0.250***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)

Dependent Variable: High-Cost Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
36% < DTI ≤ 50%		0.997				0.895***	1.028*	1.051***	0.992
		(0.698)				(0.000)	(0.074)	(0.001)	(0.330)
DTI > 50%		0.661***				0.857***	0.649***	0.560***	0.674***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
HTI missing		1.088				0.983	1.023	1.136	1.089
		(0.126)				(0.874)	(0.820)	(0.174)	(0.102)
28% < DTI ≤ 33%		1.104***				1.034**	1.129***	1.169***	1.109***
		(0.000)				(0.035)	(0.000)	(0.000)	(0.000)
33% < DTI ≤ 40%		1.278***				1.137***	1.239***	1.488***	1.277***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
HTI > 40%		1.564***				1.281***	1.432***	1.940***	1.539***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Limited Documenation		1.346***				1.104***	1.638***	2.688***	1.356***
		(0.000)				(0.001)	(0.000)	(0.000)	(0.000)
Stated Documentation		3.694***				3.449***	5.246***	3.672***	3.722***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Cash-out refinance		0.955***				0.705***	0.757***	1.564***	0.916***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Rate-term refinance		0.558***				0.613***	0.434***	0.538***	0.565***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Refinance type unknown									
Unknown purpose		2.794***				1.502*	0.698		2.995***
		(0.000)				(0.080)	(0.187)		(0.000)
Primary, Single Family									
Primary, Multi-Family (2-4)		1.062***				0.979	1.154***	1.317***	1.052***
		(0.000)				(0.415)	(0.000)	(0.000)	(0.001)
Primary, Multi-Family (5+)		0.208***					0.468	0.113***	0.192***
		(0.000)					(0.329)	(0.000)	(0.000)
Primary, Condo		0.899***				1.281***	0.878***	0.649***	0.921***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Primary, Manufactured home		0.680***					0.155***	1.263*	0.621***
		(0.000)					(0.000)	(0.052)	(0.000)
Primary, Mixed Use		15.621***				7.790***			16.430***
		(0.001)				(0.010)			(0.001)
Primary, Office									
Primary, PUD		0.657***				0.726***	0.752***	0.604***	0.673***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Primary, Retail building									
Second Home, Single Family		1.523***				1.170**	1.768***	2.009***	1.508***
		(0.000)				(0.044)	(0.000)	(0.000)	(0.000)
Second Home, Multi-Family (2-4)		1.500**				0.986	1.566	2.483***	1.465**
		(0.030)				(0.968)	(0.205)	(0.007)	(0.030)
Second Home, Multi-Family (5+)									
Second Home, Condo		1.374***				1.357**	1.480***	1.672***	1.397***
		(0.000)				(0.022)	(0.000)	(0.000)	(0.000)

Dependent Variable: High-Cost Loan	Model (2-Inv) Same as Model (2), Estimated Only on Loans Sold to Investors	Model (2-InvMiss) Same as Model (2), Estimated Only on Loans Sold to Investors & Loans with No Entry in the Investor Field	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present
36% < DTI ≤ 50%	0.939***	1.005	0.997	0.997	0.947***	1.006	0.969***		0.997
	(0.000)	(0.600)	(0.698)	(0.689)	(0.000)	(0.453)	(0.000)		(0.694)
DTI > 50%	0.731***	0.659***	0.661***	0.661***	0.591***	0.669***	0.587***		0.661***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
HTI missing	0.993	1.070	1.088	1.088	1.064	1.050	1.067		1.088
	(0.925)	(0.225)	(0.126)	(0.124)	(0.313)	(0.376)	(0.280)		(0.126)
28% < DTI ≤ 33%	1.042***	1.111***	1.104***	1.105***	1.089***	1.074***	1.084***		1.105***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
33% < DTI ≤ 40%	1.155***	1.305***	1.277***	1.279***	1.258***	1.222***	1.248***		1.278***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
HTI > 40%	1.284***	1.590***	1.563***	1.565***	1.575***	1.468***	1.507***		1.564***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
Limited Documenation	1.292***	1.382***	1.346***	1.347***	1.418***	1.326***	1.295***		1.346***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
Stated Documentation	3.998***	3.655***	3.695***	3.697***	3.572***	3.538***	3.914***		3.692***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
Cash-out refinance	0.622***	0.994	0.955***	0.955***	0.959***	0.971***	0.817***	0.580***	0.956***
	(0.000)	(0.495)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Rate-term refinance	0.610***	0.576***	0.559***	0.558***	0.559***	0.569***	0.510***	0.380***	0.558***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Refinance type unknown									3.194***
									(0.000)
Unknown purpose	2.128***	3.394***	2.801***	2.795***	2.216***	2.898***	2.109***	1.540*	
	(0.009)	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.004)	(0.066)	
Primary, Single Family									
Primary, Multi-Family (2-4)	1.000	1.071***	1.062***	1.063***	1.060***	1.037**	1.153***	1.166***	1.062***
	(0.992)	(0.000)	(0.000)	(0.000)	(0.002)	(0.028)	(0.000)	(0.000)	(0.000)
Primary, Multi-Family (5+)	3.944	0.200***	0.208***	0.208***	0.209***	0.207***	0.288***	0.085***	0.208***
	(0.435)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.006)	(0.000)	(0.000)
Primary, Condo	1.267***	0.877***	0.899***	0.899***	1.013	0.864***	0.917***	0.894***	0.899***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.399)	(0.000)	(0.000)	(0.000)	(0.000)
Primary, Manufactured home		0.667***	0.681***	0.680***	0.322***	0.691***	0.819*	0.398***	0.679***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.071)	(0.000)	(0.000)
Primary, Mixed Use	13.094***	16.868***	16.011***	15.584***	21.356***	17.123***	26.669***	3.058	15.622***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.142)	(0.001)
Primary, Office									
Primary, PUD	0.797***	0.651***	0.657***	0.656***	0.647***	0.664***	0.686***	0.663***	0.657***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Primary, Retail building									
Second Home, Single Family	1.270***	1.493***	1.523***	1.524***	1.656***	1.500***	1.787***	1.430***	1.523***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Second Home, Multi-Family (2-4)	1.028	1.448*	1.499**	1.505**	2.106***	1.444**	1.838***	1.473**	1.501**
	(0.899)	(0.060)	(0.030)	(0.028)	(0.000)	(0.046)	(0.002)	(0.032)	(0.029)
Second Home, Multi-Family (5+)									
Second Home, Condo	1.865***	1.395***	1.375***	1.372***	1.405***	1.345***	1.649***	1.168***	1.373***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Dependent Variable: High-Cost Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
Second Home, Manufactured home		0.411**					0.132	0.972	0.368***
		(0.014)					(0.108)	(0.947)	(0.005)
Second Home, PUD		1.272***				1.036	1.466***	1.973***	1.249***
		(0.000)				(0.811)	(0.000)	(0.000)	(0.000)
Investment, Single Family		3.302***				2.460***	3.385***	5.170***	3.279***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (2-4)		3.163***				2.412***	3.637***	5.412***	3.125***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (5+)		2.323***				0.381***	4.893***		2.360***
		(0.000)				(0.000)	(0.000)		(0.000)
Investment, Condo		3.104***				3.519***	2.627***	3.605***	3.076***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Investment, Industrial		33.724***				12.298***	33.819***		33.683***
		(0.000)				(0.000)	(0.000)		(0.000)
Investment, Mixed Use		16.917***				8.565***	14.385***		16.936***
		(0.000)				(0.001)	(0.001)		(0.000)
Investment, Office		16.574***				2.239	107.603***		16.411***
		(0.000)				(0.207)	(0.000)		(0.000)
Investment, PUD		2.036***				2.014***	1.609***	3.184***	2.054***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Investment, Retail building		55.630***				9.948***	155.027***		54.130***
		(0.000)				(0.000)	(0.000)		(0.000)
Self-employed borrower or co-borrower present		1.228***				0.942***	1.023	1.655***	1.211***
		(0.000)				(0.000)	(0.195)	(0.000)	(0.000)
Self-employed borrower or co-borrower presence unknown		1.122				1.082	0.502***	5.685***	1.056
		(0.173)				(0.417)	(0.000)	(0.000)	(0.420)
Co-Borrower presence									
Constant	2.164***	0.030***	0.871***	3.608***	3.023***	0.022***	3.479	1.071	0.035***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.157)	(0.924)	(0.000)
Observations	792,753	792,160	214,144	266,703	311,906	213,846	265,254	309,414	913,346
Pseudo R^2	0.01383	0.34332	0.00618	0.01309	0.04153	0.29799	0.30227	0.43461	0.34103

Robust p-values in parentheses
*** Statistically significant at 1% confidence level (p<0.01)
** Statistically significant at 5% confidence level (p<0.05)
* Statistically significant at 10% confidence level (p<0.1)
Coefficients and p-values for origination month, state, and metropolitan area (CBSA) are excluded from this table for brevity.

Dependent Variable: High-Cost Loan	Model (2-Inv) Same as Model (2), Estimated Only on Loans Sold to Investors	Model (2-InvMiss) Same as Model (2), Estimated Only on Loans Sold to Investors & Loans with No Entry in the Investor Field	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present
Second Home, Manufactured home		0.413**	0.412**	0.411**	0.390***	0.433**	0.617	0.155***	0.411**
		(0.015)	(0.014)	(0.014)	(0.009)	(0.020)	(0.204)	(0.000)	(0.014)
Second Home, PUD	1.032	1.269***	1.274***	1.273***	1.341***	1.266***	1.502***	1.257***	1.273***
	(0.586)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Single Family	3.060***	3.216***	3.302***	3.303***	3.391***	3.245***	4.153***	2.854***	3.303***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (2-4)	2.598***	3.066***	3.163***	3.168***	3.451***	3.079***	4.009***	2.578***	3.162***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (5+)	1.367**	2.461***	2.340***	2.321***	2.438***	2.451***	4.182***	0.663***	2.324***
	(0.025)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Condo	3.842***	2.851***	3.104***	3.104***	3.295***	3.028***	4.121***	2.235***	3.102***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Industrial	17.410***	34.670***	33.737***	33.718***	44.277***	36.512***	76.531***	8.808***	33.740***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Mixed Use	9.701***	17.367***	17.016***	16.916***	21.507***	17.357***	27.912***	5.012***	16.921***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)	(0.000)
Investment, Office	7.509***	16.928***	16.575***	16.579***	18.131***	17.588***	33.370***	5.401***	16.591***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, PUD	2.637***	1.994***	2.037***	2.036***	1.888***	2.019***	2.706***	1.749***	2.035***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Retail building	23.530***	58.586***	55.634***	55.700***	68.034***	59.638***	98.269***	16.035***	55.666***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Self-employed borrower or co-borrower present	1.000	1.267***	1.227***	1.227***	1.197***	1.210***	1.187***	2.101***	1.228***
	(0.981)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Self-employed borrower or co-borrower presence unknown	0.915	1.135	1.122	1.123	1.253**	1.172*	1.128	0.825**	1.126
	(0.284)	(0.106)	(0.171)	(0.168)	(0.017)	(0.057)	(0.175)	(0.013)	(0.152)
Co-Borrower presence						0.785***			
						(0.000)			
Constant	0.037***	0.027***	0.030***	0.031***	0.026***	0.034***	0.008***	0.063***	0.030***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	643,107	758,802	792,160	792,160	636,760	792,160	792,160	792,160	792,160
Pseudo R^2	0.35763	0.34742	0.34334	0.34327	0.38012	0.34456	0.38653	0.29485	0.34327

Robust p-values in parentheses
*** Statistically significant at 1% confidence level (p<0.01)
** Statistically significant at 5% confidence level (p<0.05)
* Statistically significant at 10% confidence level (p<0.1)
Coefficients and p-values for origination month, state, and metropolitan area (CBSA) are excluded from this table for brevity.

Appendix 7B: Odds Ratio Results of High-Cost Loan Logistic Regressions, Morgan Stanley Purchases, Nationwide

Dependent Variable: High-Cost Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
Race: African American	1.507***	1.373***	1.439***	1.359***	1.310***	1.497***	1.098	1.140**	1.411***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.219)	(0.013)	(0.000)
Race: Hispanic	1.103***	1.253***	0.912***	1.307***	1.242***	1.169***	1.262***	1.355***	1.310***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Race: American Indian	0.578***	1.058	0.820***	1.014	1.061	0.972	1.382	0.753	1.070
	(0.000)	(0.448)	(0.003)	(0.956)	(0.772)	(0.737)	(0.285)	(0.219)	(0.331)
Race: Asian or Hawaiian	0.792***	1.042	0.628***	0.776***	0.926	0.965	0.992	1.167*	1.070**
	(0.000)	(0.257)	(0.000)	(0.003)	(0.258)	(0.483)	(0.951)	(0.094)	(0.045)
Race: Missing	0.713***	1.042	0.768***	0.840**	0.891	1.145***	0.866	0.851	1.006
	(0.000)	(0.244)	(0.000)	(0.025)	(0.169)	(0.002)	(0.135)	(0.111)	(0.848)
African American, non-Hispanic									
African American, Hispanic									
American Indian, non-Hispanic									
American Indian, Hispanic									
Asian or Pacific Islander, non-Hispanic									
Asian or Pacific Islander, Hispanic									
Missing, non-Hispanic									
Missing, Hispanic									
White, Hispanic									
Any race African American									
Any race White									
Any race Hispanic									
Any race American Indian									
Any race Asian or Pacific Islander									
All races Missing									
Missing Credit Score									
Credit Score < 620		7.552***				6.324***	11.654***	16.907***	7.354***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
620 ≤ Credit Score < 660		1.788***				1.481***	2.292***	2.943***	1.774***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Credit Score < 500									
500 ≤ Credit Score < 520									

Dependent Variable: High-Cost Loan	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present	Model (10) Same as Model (2), Using Only MS Field Values When Both NC and MS Fields are Present
Race: African American			1.444***	1.365***	1.272***	1.366***	1.373***	1.414***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Race: Hispanic			1.288***	1.253***	1.270***	1.439***	1.253***	1.314***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Race: American Indian			1.102	1.059	0.991	0.981	1.057	1.058
			(0.217)	(0.444)	(0.911)	(0.786)	(0.456)	(0.428)
Race: Asian or Hawaiian			1.051	1.042	1.042	1.195***	1.041	1.065*
			(0.210)	(0.249)	(0.266)	(0.000)	(0.263)	(0.068)
Race: Missing			1.083**	1.044	1.019	1.081**	1.042	0.995
			(0.035)	(0.217)	(0.606)	(0.023)	(0.241)	(0.877)
African American, non-Hispanic	1.378***							
	(0.000)							
African American, Hispanic	1.195							
	(0.145)							
American Indian, non-Hispanic	1.058							
	(0.448)							
American Indian, Hispanic	1.333***							
	(0.007)							
Asian or Pacific Islander, non-Hispanic	1.041							
	(0.260)							
Asian or Pacific Islander, Hispanic	1.252**							
	(0.042)							
Missing, non-Hispanic	1.041							
	(0.248)							
Missing, Hispanic	1.236***							
	(0.000)							
White, Hispanic	1.254***							
	(0.000)							
Any race African American		1.304***						
		(0.000)						
Any race White		0.957						
		(0.252)						
Any race Hispanic		1.229***						
		(0.000)						
Any race American Indian		0.988						
		(0.800)						
Any race Asian or Pacific Islander		1.019						
		(0.781)						
All races Missing		0.993						
		(0.889)						
Missing Credit Score							6.296***	
							(0.001)	
Credit Score < 620	7.551***	7.550***	7.903***	7.548***		5.661***	7.546***	7.329***
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
620 ≤ Credit Score < 660	1.788***	1.788***	1.629***	1.788***		1.562***	1.787***	1.760***
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
Credit Score < 500								
500 ≤ Credit Score < 520					172.073***			
					(0.000)			

Dependent Variable: High-Cost Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
520 ≤ Credit Score < 540									
540 ≤ Credit Score < 560									
560 ≤ Credit Score < 580									
580 ≤ Credit Score < 600									
600 ≤ Credit Score < 620									
620 ≤ Credit Score < 640									
640 ≤ Credit Score < 660									
660 ≤ Credit Score < 680									
680 ≤ Credit Score < 700									
700 ≤ Credit Score < 720									
720 ≤ Credit Score < 740									
740 ≤ Credit Score < 760									
760 ≤ Credit Score < 780									
Subordinate lien		6.574*** (0.000)				58.908*** (0.000)	0.675 (0.557)	1.014 (0.984)	5.464*** (0.000)
FHA/VA/RHS									
HELOC									
LTV missing									
LTV ≤ 60%		0.328*** (0.000)				0.159*** (0.000)	0.619 (0.472)	0.483 (0.292)	0.369*** (0.000)
60% < LTV ≤ 70%		0.594*** (0.006)				0.509*** (0.004)	0.237** (0.019)	0.762 (0.592)	0.586*** (0.003)
70% < LTV ≤ 80%		0.851*** (0.000)				0.323*** (0.000)	1.059 (0.543)	3.058*** (0.000)	0.900*** (0.000)
CLTV missing									
CLTV ≤ 60%		1.819** (0.021)				6.392*** (0.000)	0.331* (0.100)	0.372 (0.153)	1.590* (0.071)
60% < CLTV ≤ 70%		1.253 (0.240)				2.139*** (0.001)	1.047 (0.940)	0.312** (0.023)	1.262 (0.200)
70% < CLTV ≤ 80%		1.116*** (0.000)				3.501*** (0.000)	0.443*** (0.000)	0.159*** (0.000)	1.060** (0.036)
DTI missing									

Dependent Variable: High-Cost Loan	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present	Model (10) Same as Model (2), Using Only MS Field Values When Both NC and MS Fields are Present
520 ≤ Credit Score < 540					66.904***			
					(0.000)			
540 ≤ Credit Score < 560					29.807***			
					(0.000)			
560 ≤ Credit Score < 580					17.505***			
					(0.000)			
580 ≤ Credit Score < 600					8.267***			
					(0.000)			
600 ≤ Credit Score < 620					5.297***			
					(0.000)			
620 ≤ Credit Score < 640					3.678***			
					(0.000)			
640 ≤ Credit Score < 660					2.606***			
					(0.000)			
660 ≤ Credit Score < 680					1.970***			
					(0.000)			
680 ≤ Credit Score < 700					1.531***			
					(0.000)			
700 ≤ Credit Score < 720					1.338***			
					(0.008)			
720 ≤ Credit Score < 740					1.291**			
					(0.025)			
740 ≤ Credit Score < 760					1.182			
					(0.165)			
760 ≤ Credit Score < 780					1.297**			
					(0.039)			
Subordinate lien	6.574***	6.590***		6.608***	7.762***	2.130***	6.569***	44.094***
	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.004)
FHA/VA/RHS								
HELOC								
LTV missing								
LTV ≤ 60%	0.328***	0.327***	0.389***	0.327***	0.304***		0.328***	0.053**
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)		(0.000)	(0.026)
60% < LTV ≤ 70%	0.594***	0.594***	0.586***	0.597***	0.472***		0.595***	0.234
	(0.006)	(0.006)	(0.007)	(0.007)	(0.000)		(0.006)	(0.408)
70% < LTV ≤ 80%	0.851***	0.851***	0.763***	0.852***	0.862***		0.851***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(.)
CLTV missing								
CLTV ≤ 60%	1.818**	1.823**	1.497	1.813**	1.434		1.817**	11.896*
	(0.021)	(0.020)	(0.153)	(0.022)	(0.212)		(0.021)	(0.061)
60% < CLTV ≤ 70%	1.253	1.254	1.262	1.245	1.060		1.250	3.309
	(0.240)	(0.238)	(0.246)	(0.253)	(0.779)		(0.244)	(0.495)
70% < CLTV ≤ 80%	1.116***	1.116***	1.192***	1.114***	0.732***		1.115***	5149344.490***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
DTI missing							1.617	
							(0.367)	

Dependent Variable: High-Cost Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
36% < DTI ≤ 50%		0.902***				0.876***	0.964	0.925	0.901***
		(0.000)				(0.000)	(0.568)	(0.109)	(0.000)
DTI > 50%		0.769***				0.884**	0.707***	0.734***	0.774***
		(0.000)				(0.016)	(0.001)	(0.000)	(0.000)
HTI missing		1.418**				1.376*	4.381**	0.981	1.430**
		(0.019)				(0.072)	(0.020)	(0.960)	(0.012)
28% < DTI ≤ 33%		1.035				1.032	1.147*	1.035	1.048**
		(0.120)				(0.259)	(0.069)	(0.533)	(0.023)
33% < DTI ≤ 40%		1.158***				1.137***	1.049	1.224***	1.176***
		(0.000)				(0.000)	(0.523)	(0.000)	(0.000)
HTI > 40%		1.304***				1.248***	1.263***	1.280***	1.315***
		(0.000)				(0.000)	(0.004)	(0.000)	(0.000)
Limited Documenation		1.242***				1.133**	1.623**	1.922***	1.250***
		(0.000)				(0.015)	(0.010)	(0.000)	(0.000)
Stated Documentation		3.578***				3.250***	8.425***	6.592***	3.569***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Cash-out refinance		0.607***				0.649***	0.393***	0.502***	0.587***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Rate-term refinance		0.584***				0.546***	0.302***	0.338***	0.601***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Refinance type unknown									
Unknown purpose									
Primary, Single Family									
Primary, Multi-Family (2-4)		0.933*				0.912**	0.957	1.155	0.930**
		(0.052)				(0.046)	(0.745)	(0.139)	(0.032)
Primary, Multi-Family (5+)									
Primary, Condo		1.354***				1.337***	1.439***	1.588***	1.322***
		(0.000)				(0.000)	(0.001)	(0.000)	(0.000)
Primary, Manufactured home									
Primary, Mixed Use									
Primary, Office									
Primary, PUD		0.707***				0.692***	0.779***	0.743***	0.722***
		(0.000)				(0.000)	(0.003)	(0.000)	(0.000)
Primary, Retail building									
Second Home, Single Family		1.246**				1.060	1.392	1.276*	1.258***
		(0.012)				(0.680)	(0.163)	(0.091)	(0.006)
Second Home, Multi-Family (2-4)		0.782				0.733	0.760	0.865	0.860
		(0.535)				(0.615)	(0.770)	(0.808)	(0.687)
Second Home, Multi-Family (5+)									
Second Home, Condo		1.817***				0.894	3.129**	3.000***	1.970***
		(0.000)				(0.635)	(0.023)	(0.001)	(0.000)

Dependent Variable: High-Cost Loan	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present	Model (10) Same as Model (2), Using Only MS Field Values When Both NC and MS Fields are Present
36% < DTI ≤ 50%	0.902***	0.902***	0.866***	0.904***	0.899***		0.901***	0.890***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
DTI > 50%	0.769***	0.769***	0.736***	0.772***	0.692***		0.768***	0.787***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
HTI missing	1.418**	1.418**	1.561***	1.401**	1.505**		1.403**	1.347**
	(0.019)	(0.019)	(0.003)	(0.023)	(0.012)		(0.022)	(0.031)
28% < DTI ≤ 33%	1.035	1.036	1.048*	1.026	1.012		1.036	1.036*
	(0.122)	(0.118)	(0.053)	(0.256)	(0.599)		(0.113)	(0.094)
33% < DTI ≤ 40%	1.158***	1.158***	1.154***	1.142***	1.111***		1.158***	1.169***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
HTI > 40%	1.304***	1.305***	1.342***	1.278***	1.208***		1.305***	1.299***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
Limited Documenation	1.243***	1.243***	1.263***	1.240***	1.243***		1.243***	1.240***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
Stated Documentation	3.579***	3.579***	3.681***	3.533***	4.068***		3.576***	3.529***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
Cash-out refinance	0.607***	0.607***	0.582***	0.612***	0.552***	0.538***	0.607***	0.617***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Rate-term refinance	0.584***	0.584***	0.512***	0.589***	0.545***	0.500***	0.582***	0.586***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Refinance type unknown							1.411	
							(0.134)	
Unknown purpose								
Primary, Single Family								
Primary, Multi-Family (2-4)	0.933*	0.934*	0.934*	0.926**	1.022	1.028	0.932*	0.935*
	(0.054)	(0.057)	(0.077)	(0.031)	(0.559)	(0.425)	(0.050)	(0.053)
Primary, Multi-Family (5+)								
Primary, Condo	1.353***	1.353***	1.414***	1.336***	1.423***	1.308***	1.354***	1.333***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Primary, Manufactured home								
Primary, Mixed Use								
Primary, Office								
Primary, PUD	0.707***	0.706***	0.718***	0.708***	0.725***	0.705***	0.708***	0.710***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Primary, Retail building								
Second Home, Single Family	1.246**	1.246**	1.622***	1.238**	1.290***	1.373***	1.246**	1.280***
	(0.013)	(0.012)	(0.000)	(0.015)	(0.008)	(0.000)	(0.012)	(0.004)
Second Home, Multi-Family (2-4)	0.782	0.784	1.203	0.780	0.903	0.819	0.783	0.845
	(0.534)	(0.539)	(0.627)	(0.527)	(0.799)	(0.601)	(0.537)	(0.665)
Second Home, Multi-Family (5+)								
Second Home, Condo	1.816***	1.814***	2.001***	1.795***	1.985***	1.964***	1.819***	1.872***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Dependent Variable: High-Cost Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
Second Home, Manufactured home									
Second Home, PUD		0.905				0.949	2.351**	0.713**	0.871
		(0.454)				(0.835)	(0.031)	(0.038)	(0.269)
Investment, Single Family		2.720***				2.218***	5.858***	7.315***	2.758***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (2-4)		2.478***				2.222***	4.793***	6.699***	2.514***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (5+)									
Investment, Condo		3.536***				2.912***	8.507***	13.892***	3.512***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Investment, Industrial									
Investment, Mixed Use									
Investment, Office									
Investment, PUD		2.417***				1.903***	7.015**	4.447***	2.500***
		(0.000)				(0.000)	(0.012)	(0.000)	(0.000)
Investment, Retail building									
Self-employed borrower or co-borrower present		1.038*				0.966	0.764***	1.036	1.048**
		(0.074)				(0.217)	(0.000)	(0.503)	(0.017)
Self-employed borrower or co-borrower presence unknown		0.961				0.904	0.270		1.004
		(0.799)				(0.537)	(0.145)		(0.971)
Co-Borrower presence									
Constant	2.222***	0.014***	0.796***	7.944***	10.544***	0.005***	19731902.179	1.165	0.023***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.239)	(0.915)	(0.000)
Observations	156,502	155,670	70,275	26,788	59,439	69,910	24,833	55,408	183,227
Pseudo R^2	0.00687	0.39929	0.00708	0.00424	0.00223	0.27894	0.31151	0.32009	0.40284

Robust p-values in parentheses
*** Statistically significant at 1% confidence level (p<0.01)
** Statistically significant at 5% confidence level (p<0.05)
* Statistically significant at 10% confidence level (p<0.1)
Coefficients and p-values for origination month, state, and metropolitan area (CBSA) are excluded from this table for brevity.

Dependent Variable: High-Cost Loan	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present	Model (10) Same as Model (2), Using Only MS Field Values When Both NC and MS Fields are Present
Second Home, Manufactured home								
Second Home, PUD	0.905	0.905	1.831***	0.900	0.860	1.076	0.905	0.889
	(0.454)	(0.455)	(0.000)	(0.430)	(0.287)	(0.575)	(0.453)	(0.376)
Investment, Single Family	2.720***	2.721***	2.838***	2.704***	3.506***	2.858***	2.722***	2.753***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (2-4)	2.477***	2.482***	2.694***	2.458***	3.270***	2.478***	2.479***	2.538***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (5+)								
Investment, Condo	3.535***	3.533***	3.884***	3.494***	4.500***	3.568***	3.542***	3.672***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Industrial								
Investment, Mixed Use								
Investment, Office								
Investment, PUD	2.417***	2.417***	2.475***	2.398***	2.833***	2.644***	2.418***	2.595***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Retail building								
Self-employed borrower or co-borrower present	1.038*	1.038*	1.022	1.034	1.026	1.801***	1.038*	1.034
	(0.075)	(0.075)	(0.328)	(0.109)	(0.242)	(0.000)	(0.075)	(0.106)
Self-employed borrower or co-borrower presence unknown	0.961	0.960	1.053	0.973	1.068	0.844	0.956	0.997
	(0.798)	(0.795)	(0.750)	(0.863)	(0.709)	(0.250)	(0.754)	(0.983)
Co-Borrower presence				0.926***				
				(0.000)				
Constant	0.014***	0.015***	0.013***	0.015***	0.008***	0.030***	0.014***	0.018***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	155,670	155,670	138,834	155,670	155,670	155,672	155,672	165,770
Pseudo R^2	0.39930	0.39926	0.42878	0.39941	0.44495	0.37085	0.39937	0.40086

Robust p-values in parentheses
*** Statistically significant at 1% confidence level (p<0.01)
** Statistically significant at 5% confidence level (p<0.05)
* Statistically significant at 10% confidence level (p<0.1)
Coefficients and p-values for origination month, state, and metropolitan area (CBSA) are excluded from this table for brevity.

Appendix 7C: Odds Ratio Results of High-Cost Loan Logistic Regressions, All New Century Loans, Detroit Region

Dependent Variable: High-Cost Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
Race: African American	2.705***	2.119***	2.223***	3.215***	3.219***	2.248***	2.205***	1.405	2.241***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.127)	(0.000)
Race: Hispanic	1.342*	1.233	1.457*	1.343	1.289	1.426	1.261	1.014	1.503**
	(0.076)	(0.332)	(0.068)	(0.529)	(0.626)	(0.141)	(0.639)	(0.983)	(0.047)
Race: American Indian	1.241	1.555	1.569	1.135		1.918	0.427		2.215**
	(0.481)	(0.275)	(0.216)	(0.864)		(0.105)	(0.280)		(0.039)
Race: Asian or Hawaiian	0.681**	0.753	0.883	0.944	0.262***	0.843	2.613	0.114***	0.874
	(0.013)	(0.157)	(0.549)	(0.903)	(0.000)	(0.482)	(0.104)	(0.000)	(0.480)
Race: Missing	1.066	0.530***	0.999	0.990	0.328***	0.632*	0.773	0.169***	0.659***
	(0.634)	(0.000)	(0.997)	(0.976)	(0.000)	(0.065)	(0.506)	(0.000)	(0.003)
African American, non-Hispanic									
African American, Hispanic									
American Indian, non-Hispanic									
American Indian, Hispanic									
Asian or Pacific Islander, non-Hispanic									
Asian or Pacific Islander, Hispanic									
Missing, non-Hispanic									
Missing, Hispanic									
White, Hispanic									
Any race African American									
Any race White									
Any race Hispanic									
Any race American Indian									
Any race Asian or Pacific Islander									
All races Missing									
Missing Credit Score		0.085***						0.469	0.106**
		(0.006)						(0.436)	(0.013)
Credit Score < 620		15.500***				8.492***	27.514***	95.529***	13.720***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
620 ≤ Credit Score < 660		3.795***				2.302***	6.188***	7.989***	3.448***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Credit Score < 500									
500 ≤ Credit Score < 520									

Dependent Variable: High-Cost Loan	Model (2-Inv) Same as Model (2), Estimated Only on Loans Sold to Investors	Model (2-InvMiss) Same as Model (2), Estimated Only on Loans Sold to Investors & Loans with No Entry in the Investor Field	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present
Race: African American	2.356***	2.353***			2.152***	2.049***	1.981***	1.908***	2.122***
	(0.000)	(0.000)			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Race: Hispanic	1.364	1.379			1.317	1.245	1.346	1.308	1.233
	(0.151)	(0.137)			(0.226)	(0.316)	(0.203)	(0.197)	(0.331)
Race: American Indian	2.856***	2.860***			1.570	1.561	1.305	1.329	1.555
	(0.009)	(0.009)			(0.287)	(0.281)	(0.550)	(0.447)	(0.275)
Race: Asian or Hawaiian	0.885	0.900			0.685*	0.756	0.798	0.761	0.754
	(0.576)	(0.624)			(0.079)	(0.164)	(0.248)	(0.182)	(0.158)
Race: Missing	0.696**	0.694**			0.554***	0.534***	0.574***	0.541***	0.530***
	(0.026)	(0.022)			(0.001)	(0.000)	(0.002)	(0.000)	(0.000)
African American, non-Hispanic			2.125***						
			(0.000)						
African American, Hispanic			1.140						
			(0.841)						
American Indian, non-Hispanic			1.557						
			(0.275)						
American Indian, Hispanic									
Asian or Pacific Islander, non-Hispanic			0.753						
			(0.157)						
Asian or Pacific Islander, Hispanic			0.114***						
			(0.006)						
Missing, non-Hispanic			0.530***						
			(0.000)						
Missing, Hispanic			2.085						
			(0.315)						
White, Hispanic			1.172						
			(0.495)						
Any race African American				1.740					
				(0.194)					
Any race White				0.822					
				(0.644)					
Any race Hispanic				1.145					
				(0.527)					
Any race American Indian				0.593					
				(0.251)					
Any race Asian or Pacific Islander				1.451					
				(0.504)					
All races Missing				0.435*					
				(0.069)					
Missing Credit Score	0.108**	0.112**	0.085***	0.084***		0.078***	0.576	0.168*	0.853
	(0.015)	(0.017)	(0.006)	(0.006)		(0.005)	(0.545)	(0.075)	(0.892)
Credit Score < 620	14.891***	15.504***	15.563***	15.480***	13.795***	15.415***		10.818***	15.477***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
620 ≤ Credit Score < 660	3.492***	3.640***	3.806***	3.793***	2.860***	3.752***		3.384***	3.792***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
Credit Score < 500							13.939		
							(0.107)		
500 ≤ Credit Score < 520							1,128.180***		
							(0.000)		

Dependent Variable: High-Cost Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
520 ≤ Credit Score < 540									
540 ≤ Credit Score < 560									
560 ≤ Credit Score < 580									
580 ≤ Credit Score < 600									
600 ≤ Credit Score < 620									
620 ≤ Credit Score < 640									
640 ≤ Credit Score < 660									
660 ≤ Credit Score < 680									
680 ≤ Credit Score < 700									
700 ≤ Credit Score < 720									
720 ≤ Credit Score < 740									
740 ≤ Credit Score < 760									
760 ≤ Credit Score < 780									
Subordinate lien		7.411				18.909***	6.320	0.312	5.474
		(0.138)				(0.000)	(0.165)	(0.547)	(0.177)
FHA/VA/RHS									
HELOC		0.082**							0.060***
		(0.013)							(0.006)
LTV missing									
LTV ≤ 60%		0.391				0.334	0.109*	2.281	0.546
		(0.484)				(0.131)	(0.096)	(0.675)	(0.628)
60% < LTV ≤ 70%		0.728				1.608	0.087***	0.298	0.689
		(0.649)				(0.660)	(0.005)	(0.167)	(0.567)
70% < LTV ≤ 80%		0.533***				0.281***	0.698	0.977	0.617***
		(0.000)				(0.000)	(0.180)	(0.941)	(0.000)
CLTV missing									
CLTV ≤ 60%		1.728				4.359**	1.341	0.027*	1.396
		(0.687)				(0.044)	(0.832)	(0.059)	(0.792)
60% < CLTV ≤ 70%		0.856				0.781	1.503	0.197*	0.944
		(0.826)				(0.819)	(0.645)	(0.088)	(0.931)
70% < CLTV ≤ 80%		1.131				3.569***	0.262***	0.116***	1.179
		(0.310)				(0.000)	(0.000)	(0.000)	(0.142)
DTI missing		0.977				7.323	0.655	5.926	0.758
		(0.971)				(0.196)	(0.753)	(0.135)	(0.662)

Dependent Variable: High-Cost Loan	Model (2-Inv) Same as Model (2), Estimated Only on Loans Sold to Investors	Model (2-InvMiss) Same as Model (2), Estimated Only on Loans Sold to Investors & Loans with No Entry in the Investor Field	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present
520 ≤ Credit Score < 540							745.320***		
							(0.000)		
540 ≤ Credit Score < 560							220.706***		
							(0.000)		
560 ≤ Credit Score < 580							139.929***		
							(0.000)		
580 ≤ Credit Score < 600							70.736***		
							(0.000)		
600 ≤ Credit Score < 620							41.777***		
							(0.000)		
620 ≤ Credit Score < 640							31.067***		
							(0.000)		
640 ≤ Credit Score < 660							22.339***		
							(0.000)		
660 ≤ Credit Score < 680							10.133***		
							(0.000)		
680 ≤ Credit Score < 700							7.046***		
							(0.000)		
700 ≤ Credit Score < 720							6.775***		
							(0.000)		
720 ≤ Credit Score < 740							4.063***		
							(0.000)		
740 ≤ Credit Score < 760							2.845***		
							(0.005)		
760 ≤ Credit Score < 780							2.557**		
							(0.011)		
Subordinate lien	9.773	9.147	7.470	7.442		6.635	3.989	3.484***	7.417
	(0.115)	(0.119)	(0.137)	(0.137)		(0.165)	(0.375)	(0.000)	(0.138)
FHA/VA/RHS									
HELOC	0.053***	0.068***	0.082**	0.083**		0.074**	0.108***	0.113*	0.082**
	(0.005)	(0.008)	(0.013)	(0.013)		(0.011)	(0.008)	(0.087)	(0.013)
LTV missing									
LTV ≤ 60%	0.318	0.328	0.391	0.390	0.270	0.447	0.813		0.390
	(0.425)	(0.429)	(0.484)	(0.483)	(0.245)	(0.552)	(0.894)		(0.483)
60% < LTV ≤ 70%	0.427	0.442	0.729	0.727	0.587	0.767	0.716		0.726
	(0.218)	(0.233)	(0.651)	(0.647)	(0.469)	(0.711)	(0.686)		(0.647)
70% < LTV ≤ 80%	0.635***	0.639***	0.533***	0.533***	0.502***	0.542***	0.514***		0.532***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
CLTV missing									
CLTV ≤ 60%	2.293	2.201	1.716	1.727	2.481	1.495	0.612		1.715
	(0.568)	(0.580)	(0.692)	(0.688)	(0.425)	(0.769)	(0.755)		(0.692)
60% < CLTV ≤ 70%	1.662	1.568	0.852	0.856	1.038	0.800	0.560		0.857
	(0.469)	(0.517)	(0.821)	(0.827)	(0.961)	(0.760)	(0.488)		(0.828)
70% < CLTV ≤ 80%	1.220	1.187	1.127	1.131	1.188	1.103	0.722***		1.134
	(0.123)	(0.180)	(0.324)	(0.310)	(0.174)	(0.422)	(0.010)		(0.300)
DTI missing	1.053	0.771	0.983	0.977	0.915	1.011	1.218		0.978
	(0.950)	(0.713)	(0.978)	(0.971)	(0.895)	(0.987)	(0.782)		(0.973)

Dependent Variable: High-Cost Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
36% < DTI ≤ 50%		0.861**				0.847*	0.804	0.728	0.866**
		(0.042)				(0.055)	(0.244)	(0.203)	(0.029)
DTI > 50%		1.182				1.234	0.852	1.049	0.886
		(0.381)				(0.388)	(0.695)	(0.923)	(0.447)
HTI missing		0.239***				0.251**	0.297	0.067***	0.277***
		(0.000)				(0.026)	(0.243)	(0.003)	(0.001)
28% < DTI ≤ 33%		1.014				0.880	1.319	1.376	0.947
		(0.872)				(0.228)	(0.214)	(0.239)	(0.484)
33% < DTI ≤ 40%		1.058				0.898	1.731**	1.728*	1.035
		(0.544)				(0.343)	(0.038)	(0.079)	(0.683)
HTI > 40%		1.089				0.929	1.510	1.068	1.172
		(0.471)				(0.614)	(0.181)	(0.850)	(0.135)
Limited Documenation		1.065				0.904	3.418		1.153
		(0.796)				(0.744)	(0.120)		(0.536)
Stated Documentation		4.268***				3.933***	5.721***	3.807***	4.351***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Cash-out refinance		0.664***				0.704***	0.608**	0.557**	0.560***
		(0.000)				(0.001)	(0.014)	(0.025)	(0.000)
Rate-term refinance		0.479***				0.554***	0.398***	0.184***	0.477***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Refinance type unknown									
Unknown purpose									
Primary, Single Family									
Primary, Multi-Family (2-4)		2.398***				2.897***	1.278	1.919	2.167***
		(0.002)				(0.000)	(0.698)	(0.360)	(0.003)
Primary, Multi-Family (5+)									
Primary, Condo		0.922				0.885	0.702	1.132	0.897
		(0.598)				(0.551)	(0.325)	(0.737)	(0.435)
Primary, Manufactured home									
Primary, Mixed Use									
Primary, Office									
Primary, PUD		0.514**				0.344*	1.061	1.812	0.460***
		(0.042)				(0.081)	(0.930)	(0.202)	(0.008)
Primary, Retail building									
Second Home, Single Family		0.825				0.965	0.691	1.136	0.833
		(0.658)				(0.957)	(0.729)	(0.850)	(0.649)
Second Home, Multi-Family (2-4)									
Second Home, Multi-Family (5+)									
Second Home, Condo									

Dependent Variable: High-Cost Loan	Model (2-Inv) Same as Model (2), Estimated Only on Loans Sold to Investors	Model (2-InvMiss) Same as Model (2), Estimated Only on Loans Sold to Investors & Loans with No Entry in the Investor Field	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present
36% < DTI ≤ 50%	0.875*	0.867*	0.864**	0.862**	0.820**	0.872*	0.834**		0.861**
	(0.078)	(0.056)	(0.048)	(0.044)	(0.010)	(0.065)	(0.020)		(0.042)
DTI > 50%	0.915	0.905	1.185	1.183	1.159	1.211	0.998		1.171
	(0.620)	(0.572)	(0.373)	(0.379)	(0.456)	(0.316)	(0.994)		(0.405)
HTI missing	0.337**	0.297***	0.240***	0.240***	0.217***	0.227***	0.253***		0.239***
	(0.021)	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)		(0.000)
28% < DTI ≤ 33%	0.930	0.956	1.013	1.015	1.008	0.980	0.984		1.013
	(0.415)	(0.606)	(0.887)	(0.864)	(0.930)	(0.819)	(0.863)		(0.883)
33% < DTI ≤ 40%	1.113	1.133	1.060	1.058	1.025	1.005	1.023		1.055
	(0.262)	(0.187)	(0.532)	(0.544)	(0.800)	(0.962)	(0.817)		(0.566)
HTI > 40%	1.167	1.181	1.087	1.088	1.070	1.013	0.971		1.093
	(0.200)	(0.163)	(0.479)	(0.475)	(0.584)	(0.912)	(0.807)		(0.451)
Limited Documenation	1.307	1.289	1.061	1.066	1.013	1.091	1.169		1.064
	(0.343)	(0.365)	(0.809)	(0.792)	(0.960)	(0.722)	(0.555)		(0.797)
Stated Documentation	4.525***	4.423***	4.266***	4.269***	4.206***	4.058***	4.723***		4.263***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
Cash-out refinance	0.527***	0.534***	0.665***	0.664***	0.652***	0.684***	0.597***	0.589***	0.663***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Rate-term refinance	0.471***	0.473***	0.481***	0.480***	0.471***	0.495***	0.457***	0.347***	0.480***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Refinance type unknown									
Unknown purpose									
Primary, Single Family									
Primary, Multi-Family (2-4)	3.022***	3.069***	2.401***	2.401***	2.273***	2.319***	3.016***	2.645***	2.397***
	(0.000)	(0.000)	(0.002)	(0.002)	(0.004)	(0.002)	(0.000)	(0.000)	(0.002)
Primary, Multi-Family (5+)									
Primary, Condo	0.824	0.874	0.921	0.923	0.943	0.901	0.986	0.876	0.922
	(0.201)	(0.368)	(0.594)	(0.605)	(0.733)	(0.501)	(0.931)	(0.378)	(0.600)
Primary, Manufactured home									
Primary, Mixed Use									
Primary, Office									
Primary, PUD	0.430**	0.465**	0.514**	0.514**	0.371***	0.536*	0.700	0.551*	0.516**
	(0.014)	(0.024)	(0.042)	(0.042)	(0.006)	(0.054)	(0.268)	(0.061)	(0.043)
Primary, Retail building									
Second Home, Single Family	0.918	0.874	0.827	0.823	0.677	0.803	1.048	0.704	0.825
	(0.849)	(0.754)	(0.661)	(0.655)	(0.387)	(0.608)	(0.924)	(0.440)	(0.658)
Second Home, Multi-Family (2-4)									
Second Home, Multi-Family (5+)									
Second Home, Condo									

Dependent Variable: High-Cost Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
Second Home, Manufactured home									
Second Home, PUD									
Investment, Single Family		4.685***				3.331***	6.560***	15.640***	4.809***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (2-4)		7.632***				4.525***			7.202***
		(0.000)				(0.000)			(0.000)
Investment, Multi-Family (5+)		4.530				0.734			4.502
		(0.110)				(0.798)			(0.107)
Investment, Condo		10.250***				4.453*			10.383***
		(0.001)				(0.064)			(0.003)
Investment, Industrial									
Investment, Mixed Use									
Investment, Office									
Investment, PUD									
Investment, Retail building									
Self-employed borrower or co-borrower present		0.787**				0.636***	0.984	2.602***	0.806**
		(0.015)				(0.000)	(0.957)	(0.009)	(0.018)
Self-employed borrower or co-borrower presence unknown		0.605				0.313**			0.606
		(0.375)				(0.036)			(0.230)
Co-Borrower presence									
Constant	3.843***	0.066***	1.449***	11.018***	15.905***	0.068***	5.680**	5.569**	0.068***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.031)	(0.032)	(0.000)
Observations	13,311	13,295	4,746	3,952	4,601	4,743	3,857	4,408	15,996
Pseudo R^2	0.03290	0.39442	0.02421	0.03213	0.06074	0.28867	0.30507	0.46173	0.38839

Robust p-values in parentheses
*** Statistically significant at 1% confidence level (p<0.01)
** Statistically significant at 5% confidence level (p<0.05)
* Statistically significant at 10% confidence level (p<0.1)
Coefficients and p-values for origination month, state, and metropolitan area (CBSA) are excluded from this table for brevity.

Dependent Variable: High-Cost Loan	Model (2-Inv) Same as Model (2), Estimated Only on Loans Sold to Investors	Model (2-InvMiss) Same as Model (2), Estimated Only on Loans Sold to Investors & Loans with No Entry in the Investor Field	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present
Second Home, Manufactured home									
Second Home, PUD									
Investment, Single Family	4.503***	4.689***	4.703***	4.686***	4.642***	4.662***	6.362***	5.294***	4.679***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (2-4)	6.430***	6.793***	7.570***	7.624***	7.595***	7.409***	11.003***	7.245***	7.624***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (5+)	3.918	5.252	4.539	4.506	4.480	5.447*	10.570***	0.603	4.529
	(0.194)	(0.126)	(0.110)	(0.111)	(0.131)	(0.086)	(0.010)	(0.592)	(0.110)
Investment, Condo			10.259***	10.375***	9.544***	9.828***	17.604***	11.292***	10.232***
			(0.001)	(0.001)	(0.002)	(0.002)	(0.000)	(0.004)	(0.002)
Investment, Industrial									
Investment, Mixed Use									
Investment, Office									
Investment, PUD									
Investment, Retail building									
Self-employed borrower or co-borrower present	0.816*	0.850	0.787**	0.787**	0.729***	0.792**	0.817**	1.556***	0.788**
	(0.054)	(0.119)	(0.015)	(0.015)	(0.002)	(0.018)	(0.046)	(0.000)	(0.015)
Self-employed borrower or co-borrower presence unknown	0.654	0.680	0.602	0.594	0.543	0.593	0.486	0.580	0.628
	(0.394)	(0.438)	(0.369)	(0.358)	(0.283)	(0.348)	(0.204)	(0.288)	(0.401)
Co-Borrower presence						0.732***			
						(0.000)			
Constant	0.057***	0.056***	0.065***	0.080***	0.073***	0.072***	0.010***	0.113***	0.066***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	12,948	13,083	13,281	13,295	11,789	13,295	13,295	13,295	13,295
Pseudo R^2	0.39787	0.39449	0.39480	0.39455	0.41016	0.39587	0.44258	0.35809	2753.81659

Robust p-values in parentheses
*** Statistically significant at 1% confidence level (p<0.01)
** Statistically significant at 5% confidence level (p<0.05)
* Statistically significant at 10% confidence level (p<0.1)
Coefficients and p-values for origination month, state, and metropolitan area (CBSA) are excluded from this table for brevity.

Appendix 7D: Odds Ratio Results of High-Cost Loan Logistic Regressions, Morgan Stanley Purchases, Detroit Region

Dependent Variable: High-Cost Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
Race: African American	2.528***	2.136***	2.212***	2.055	1.486	2.299***	1.499e+24***	0.591	2.197***
	(0.000)	(0.000)	(0.000)	(0.171)	(0.360)	(0.000)	(0.000)	(0.327)	(0.000)
Race: Hispanic	1.405	1.058	1.047		0.888	1.007		3.760	1.329
	(0.247)	(0.874)	(0.896)		(0.910)	(0.986)		(0.301)	(0.394)
Race: American Indian	0.839	0.881	0.856			0.789			1.103
	(0.699)	(0.802)	(0.760)			(0.638)			(0.847)
Race: Asian or Hawaiian	1.131	1.178	1.151			1.105			1.605
	(0.724)	(0.673)	(0.715)			(0.818)			(0.201)
Race: Missing	1.521	0.963	1.258		0.401	0.987		0.027	0.959
	(0.238)	(0.931)	(0.582)		(0.396)	(0.978)		(0.142)	(0.893)
African American, non-Hispanic									
African American, Hispanic									
American Indian, non-Hispanic									
American Indian, Hispanic									
Asian or Pacific Islander, non-Hispanic									
Asian or Pacific Islander, Hispanic									
Missing, non-Hispanic									
Missing, Hispanic									
White, Hispanic									
Any race African American									
Any race White									
Any race Hispanic									
Any race American Indian									
Any race Asian or Pacific Islander									
All races Missing									
Missing Credit Score									
Credit Score < 620		8.931***				6.601***	2.869e+108***	205.069***	10.105***
		(0.000)				(0.000)	(0.000)	(0.000)	(0.000)
620 ≤ Credit Score < 660		2.146***				1.696***	5.349e+76***	9.785***	2.371***
		(0.000)				(0.009)	(0.000)	(0.001)	(0.000)
Credit Score < 500									
500 ≤ Credit Score < 520									

Dependent Variable: High-Cost Loan	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present	Model (10) Same as Model (2), Using Only MS Field Values When Both NC and MS Fields are Present
Race: African American			2.151***	2.142***	2.059***	1.842***	2.136***	2.221***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Race: Hispanic			1.179	1.052	1.310	0.980	1.058	1.145
			(0.638)	(0.886)	(0.519)	(0.955)	(0.873)	(0.686)
Race: American Indian			0.916	0.882	0.816	0.750	0.881	1.024
			(0.862)	(0.804)	(0.730)	(0.563)	(0.802)	(0.963)
Race: Asian or Hawaiian			0.999	1.177	1.306	1.080	1.178	1.405
			(0.999)	(0.676)	(0.527)	(0.839)	(0.673)	(0.347)
Race: Missing			0.907	0.963	0.786	1.130	0.964	1.141
			(0.826)	(0.931)	(0.577)	(0.778)	(0.932)	(0.710)
African American, non-Hispanic	2.124***							
	(0.000)							
African American, Hispanic								
American Indian, non-Hispanic	0.880							
	(0.802)							
American Indian, Hispanic								
Asian or Pacific Islander, non-Hispanic	1.175							
	(0.679)							
Asian or Pacific Islander, Hispanic	0.126**							
	(0.014)							
Missing, non-Hispanic	0.961							
	(0.926)							
Missing, Hispanic	0.786							
	(0.732)							
White, Hispanic	1.188							
	(0.694)							
Any race African American		2.649*						
		(0.100)						
Any race White		1.240						
		(0.713)						
Any race Hispanic		1.159						
		(0.691)						
Any race American Indian		1.323						
		(0.679)						
Any race Asian or Pacific Islander		1.208						
		(0.786)						
All races Missing		1.195						
		(0.807)						
Missing Credit Score								
Credit Score < 620	8.929***	8.920***	8.712***	8.943***		6.867***	8.932***	9.814***
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
620 ≤ Credit Score < 660	2.145***	2.146***	1.953***	2.153***		2.013***	2.147***	2.252***
	(0.000)	(0.000)	(0.001)	(0.000)		(0.000)	(0.000)	(0.000)
Credit Score < 500								
500 ≤ Credit Score < 520					90.730***			
					(0.000)			

Dependent Variable: High-Cost Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
520 ≤ Credit Score < 540									
540 ≤ Credit Score < 560									
560 ≤ Credit Score < 580									
580 ≤ Credit Score < 600									
600 ≤ Credit Score < 620									
620 ≤ Credit Score < 640									
640 ≤ Credit Score < 660									
660 ≤ Credit Score < 680									
680 ≤ Credit Score < 700									
700 ≤ Credit Score < 720									
720 ≤ Credit Score < 740									
740 ≤ Credit Score < 760									
760 ≤ Credit Score < 780									
Subordinate lien		15.778***				17.882***	2.458e+132	6.631*	13.786**
		(0.009)				(0.004)	(.)	(0.079)	(0.022)
FHA/VA/RHS									
HELOC									
LTV missing									
LTV ≤ 60%		0.244				0.316	0.000***	0.053***	0.255
		(0.177)				(0.242)	(0.000)	(0.002)	(0.233)
60% < LTV ≤ 70%		2.118				2.498	0.000***	0.164	1.755
		(0.558)				(0.451)	(0.000)	(0.635)	(0.695)
70% < LTV ≤ 80%		0.499***				0.365***	1.671e+43***	1.160	0.573***
		(0.000)				(0.000)	(0.000)	(0.871)	(0.002)
CLTV missing									
CLTV ≤ 60%		3.702				3.727			3.693
		(0.207)				(0.180)			(0.252)
60% < CLTV ≤ 70%		0.674				0.681			0.715
		(0.759)				(0.752)			(0.816)
70% < CLTV ≤ 80%		2.270***				3.543***	0.000***	0.103*	2.080***
		(0.000)				(0.000)	(0.000)	(0.068)	(0.001)
DTI missing									

Dependent Variable: High-Cost Loan	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present	Model (10) Same as Model (2), Using Only MS Field Values When Both NC and MS Fields are Present
520 ≤ Credit Score < 540					70.068***			
					(0.000)			
540 ≤ Credit Score < 560					19.867***			
					(0.000)			
560 ≤ Credit Score < 580					18.261***			
					(0.000)			
580 ≤ Credit Score < 600					10.100***			
					(0.000)			
600 ≤ Credit Score < 620					3.815**			
					(0.020)			
620 ≤ Credit Score < 640					3.409**			
					(0.033)			
640 ≤ Credit Score < 660					2.834*			
					(0.072)			
660 ≤ Credit Score < 680					1.121			
					(0.847)			
680 ≤ Credit Score < 700					1.493			
					(0.527)			
700 ≤ Credit Score < 720					2.300			
					(0.211)			
720 ≤ Credit Score < 740					2.454			
					(0.230)			
740 ≤ Credit Score < 760					0.319			
					(0.231)			
760 ≤ Credit Score < 780					1.512			
					(0.600)			
Subordinate lien	16.086***	15.872***		16.093***	9.906	3.773***	15.746***	4.175***
	(0.008)	(0.008)		(0.008)	(0.142)	(0.000)	(0.009)	(0.000)
FHA/VA/RHS								
HELOC								
LTV missing								
LTV ≤ 60%	0.240	0.244	0.688	0.239	0.517		0.245	0.955
	(0.173)	(0.176)	(0.752)	(0.170)	(0.673)		(0.177)	(0.852)
60% < LTV ≤ 70%	2.103	2.117	3.402	2.059	1.355		2.123	1.349
	(0.562)	(0.558)	(0.266)	(0.573)	(0.869)		(0.557)	(0.161)
70% < LTV ≤ 80%	0.502***	0.498***	0.481***	0.497***	0.488***		0.499***	0.910
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.413)
CLTV missing								
CLTV ≤ 60%	3.675	3.677	1.312	3.796	1.330		3.696	
	(0.211)	(0.210)	(0.821)	(0.198)	(0.855)		(0.208)	
60% < CLTV ≤ 70%	0.681	0.673	0.421	0.696	0.645		0.673	
	(0.765)	(0.758)	(0.434)	(0.778)	(0.811)		(0.757)	
70% < CLTV ≤ 80%	2.253***	2.271***	2.382***	2.281***	1.401		2.270***	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.173)		(0.000)	
DTI missing								

Dependent Variable: High-Cost Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
36% < DTI ≤ 50%		0.858				0.913	0.000***	1.329	0.849
		(0.244)				(0.509)	(0.000)	(0.689)	(0.160)
DTI > 50%		1.229				1.135	0.000		1.108
		(0.545)				(0.731)	(.)		(0.729)
HTI missing									
28% < DTI ≤ 33%		0.738*				0.754*	0.000***	1.012	0.703**
		(0.058)				(0.100)	(0.000)	(0.988)	(0.014)
33% < DTI ≤ 40%		0.916				0.869	0.000***	1.485	0.950
		(0.609)				(0.447)	(0.000)	(0.689)	(0.736)
HTI > 40%		0.803				0.916	8.117e+22***	0.270*	0.841
		(0.301)				(0.693)	(0.000)	(0.072)	(0.368)
Limited Documenation		1.154				1.077			1.125
		(0.777)				(0.894)			(0.799)
Stated Documentation		4.202***				3.842***			3.876***
		(0.000)				(0.000)			(0.000)
Cash-out refinance		0.597***				0.650**	0.000***	0.167**	0.515***
		(0.001)				(0.010)	(0.000)	(0.016)	(0.000)
Rate-term refinance		0.458***				0.451***	0.000***	0.119***	0.480***
		(0.000)				(0.001)	(0.000)	(0.004)	(0.000)
Refinance type unknown									
Unknown purpose									
Primary, Single Family									
Primary, Multi-Family (2-4)		2.169*				2.429**	0.000		2.127*
		(0.062)				(0.032)	(.)		(0.064)
Primary, Multi-Family (5+)									
Primary, Condo		0.983				0.935	0.000		0.901
		(0.955)				(0.843)	(.)		(0.685)
Primary, Manufactured home									
Primary, Mixed Use									
Primary, Office									
Primary, PUD		0.127***							0.135***
		(0.002)							(0.004)
Primary, Retail building									
Second Home, Single Family		0.405				0.263			0.659
		(0.212)				(0.147)			(0.556)
Second Home, Multi-Family (2-4)									
Second Home, Multi-Family (5+)									
Second Home, Condo									

Dependent Variable: High-Cost Loan	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present	Model (10) Same as Model (2), Using Only MS Field Values When Both NC and MS Fields are Present
36% < DTI ≤ 50%	0.859	0.858	0.853	0.856	0.818		0.858	0.825
	(0.247)	(0.245)	(0.232)	(0.237)	(0.152)		(0.245)	(0.103)
DTI > 50%	1.229	1.231	1.226	1.225	0.986		1.227	1.095
	(0.545)	(0.542)	(0.554)	(0.551)	(0.969)		(0.549)	(0.761)
HTI missing								
28% < DTI ≤ 33%	0.737*	0.740*	0.753*	0.742*	0.727*		0.738*	0.709**
	(0.058)	(0.061)	(0.087)	(0.065)	(0.063)		(0.058)	(0.020)
33% < DTI ≤ 40%	0.926	0.918	0.891	0.923	0.870		0.915	0.945
	(0.653)	(0.617)	(0.508)	(0.644)	(0.450)		(0.606)	(0.721)
HTI > 40%	0.804	0.803	0.777	0.811	0.752		0.802	0.825
	(0.302)	(0.302)	(0.245)	(0.329)	(0.201)		(0.298)	(0.323)
Limited Documenation	1.165	1.150	1.124	1.152	1.549		1.154	1.029
	(0.761)	(0.782)	(0.825)	(0.781)	(0.426)		(0.778)	(0.950)
Stated Documentation	4.177***	4.211***	4.169***	4.229***	4.972***		4.200***	3.710***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
Cash-out refinance	0.600***	0.599***	0.580***	0.595***	0.517***	0.697**	0.597***	0.632***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.011)	(0.001)	(0.001)
Rate-term refinance	0.459***	0.460***	0.423***	0.457***	0.397***	0.398***	0.458***	0.482***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Refinance type unknown								
Unknown purpose								
Primary, Single Family								
Primary, Multi-Family (2-4)	2.154*	2.156*	2.201*	2.178*	3.415***	2.501**	2.164*	2.537**
	(0.065)	(0.064)	(0.058)	(0.060)	(0.007)	(0.023)	(0.062)	(0.024)
Primary, Multi-Family (5+)								
Primary, Condo	0.986	0.989	1.087	0.986	0.967	0.987	0.983	0.997
	(0.963)	(0.970)	(0.788)	(0.963)	(0.911)	(0.963)	(0.955)	(0.993)
Primary, Manufactured home								
Primary, Mixed Use								
Primary, Office								
Primary, PUD	0.128***	0.127***	0.115***	0.126***	0.179***	0.264**	0.127***	0.196**
	(0.002)	(0.002)	(0.001)	(0.002)	(0.009)	(0.018)	(0.002)	(0.016)
Primary, Retail building								
Second Home, Single Family	0.410	0.403	0.401	0.401	0.502	0.478	0.405	0.534
	(0.219)	(0.211)	(0.217)	(0.203)	(0.219)	(0.324)	(0.212)	(0.369)
Second Home, Multi-Family (2-4)								
Second Home, Multi-Family (5+)								
Second Home, Condo								

Dependent Variable: High-Cost Loan	Model (1) Borrower Race Only	Model (2) Disparate Impact Controls	Model (1-2004) Same as Model (1), 2004 Loans Only	Model (1-2005) Same as Model (1), 2005 Loans Only	Model (1-2006-07) Same as Model (1), 2006-2007 Loans Only	Model (2-2004) Same as Model (2), 2004 Loans Only	Model (2-2005) Same as Model (2), 2005 Loans Only	Model (2-2006-07) Same as Model (2), 2006-2007 Loans Only	Model (2-AllCh) Same as Model (2), Include Loans from All Channels (Including Correspondent)
Second Home, Manufactured home									
Second Home, PUD									
Investment, Single Family		3.201***				2.652***			3.954***
		(0.000)				(0.000)			(0.000)
Investment, Multi-Family (2-4)		3.238**				2.712*			3.761***
		(0.022)				(0.060)			(0.005)
Investment, Multi-Family (5+)									
Investment, Condo									
Investment, Industrial									
Investment, Mixed Use									
Investment, Office									
Investment, PUD									
Investment, Retail building									
Self-employed borrower or co-borrower present		0.641**				0.614**	0.000		0.728*
		(0.016)				(0.013)	(.)		(0.060)
Self-employed borrower or co-borrower presence unknown		0.262*				0.226*			0.569
		(0.097)				(0.061)			(0.414)
Co-Borrower presence									
Constant	2.893***	0.067***	1.501***	18.900***	34.917***	0.074***	1.397e+171***	0.149	0.051***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.316)	(0.000)
Observations	3,264	2,976	1,773	438	1,007	1,762	240	381	3,794
Pseudo R^2	0.03005	0.34416	0.02413	0.01419	0.00770	0.22592	0.97641	0.44069	0.35999

Robust p-values in parentheses
*** Statistically significant at 1% confidence level (p<0.01)
** Statistically significant at 5% confidence level (p<0.05)
* Statistically significant at 10% confidence level (p<0.1)
Coefficients and p-values for origination month, state, and metropolitan area (CBSA) are excluded from this table for brevity.

Dependent Variable: High-Cost Loan	Model (3) Same as Model (2), but Use Alternative Race Classification # 1	Model (4) Same as Model (2), but Use Alternative Race Classification # 2	Model (5) Same as Model (2), Exclude Subordinate Lien Loans, FHA/VA loans, & HELOCs	Model (6) Same as Model (2), Add Coborrower Control	Model (7) Same as Model (2), Include More Detailed FICO Controls	Model (8) Same as Model (2), Drop LTV, CLTV, DTI, HTI, Documentation Type Controls	Model (9) Same as Model (2), Using Only NC Field Values When Both NC and MS Fields are Present	Model (10) Same as Model (2), Using Only MS Field Values When Both NC and MS Fields are Present
Second Home, Manufactured home								
Second Home, PUD								
Investment, Single Family	3.205***	3.194***	3.194***	3.204***	4.004***	4.311***	3.201***	4.134***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment, Multi-Family (2-4)	3.251**	3.243**	3.246**	3.256**	4.076***	3.669***	3.238**	3.508***
	(0.021)	(0.022)	(0.021)	(0.022)	(0.005)	(0.006)	(0.022)	(0.009)
Investment, Multi-Family (5+)								
Investment, Condo								
Investment, Industrial								
Investment, Mixed Use								
Investment, Office								
Investment, PUD								
Investment, Retail building								
Self-employed borrower or co-borrower present	0.638**	0.644**	0.622**	0.641**	0.670**	1.457**	0.642**	0.756
	(0.014)	(0.017)	(0.011)	(0.015)	(0.031)	(0.012)	(0.016)	(0.107)
Self-employed borrower or co-borrower presence unknown	0.260*	0.263*	0.256*	0.262*	0.210	0.327	0.278*	0.477
	(0.094)	(0.097)	(0.094)	(0.098)	(0.123)	(0.198)	(0.090)	(0.264)
Co-Borrower presence				1.049				
				(0.748)				
Constant	0.067***	0.054***	0.069***	0.066***	0.046***	0.088***	0.067***	0.050***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	2,966	2,976	2,826	2,976	2,976	2,988	2,974	3,290
Pseudo R^2	0.34400	0.34417	0.34804	0.34420	0.40125	0.29988	549.07018	664.19145

Robust p-values in parentheses
*** Statistically significant at 1% confidence level (p<0.01)
** Statistically significant at 5% confidence level (p<0.05)
* Statistically significant at 10% confidence level (p<0.1)
Coefficients and p-values for origination month, state, and metropolitan area (CBSA) are excluded from this table for brevity.

APPENDIX 8: NOTES ON REGRESSION MODELS IN APPENDICES 6 & 7

- Model (1): Estimated using only race control variables.

- Model (2): Estimated using appropriate control variables for a disparate impact analysis of product placement. The categories of control variables are listed in the note to Table 12. Coefficients and p-values for origination month, state, and metropolitan area (CBSA) explanatory variables are excluded from the appendices for brevity.

- Model (1-2004): Same as Model (1), but estimated only for 2004 loan originations.

- Model (1-2005): Same as Model (1), but estimated only for 2005 loan originations.

- Model (1-2006-07): Same as Model (1), but estimated only for 2006 and 2007 loan originations. I include 2007 loan originations with 2006 loan originations on the year-specific "2006-07" models because New Century originated a relatively small number of loans in 2007 relative to other years, as shown in Table 5.

- Model (2-2004): Same as Model (2), but estimated only for 2004 loan originations.

- Model (2-2005): Same as Model (2), but estimated only for 2005 loan originations.

- Model (2-2006-07): Same as Model (2), but estimated only for 2006 and 2007 loan originations. I include 2007 loan originations with 2006 loan originations on the year-specific "2006-07" models because New Century originated a relatively small number of loans in 2007 relative to other years, as shown in Table 5.

- Model (2-AllCh): Same as Model (2), but the regression sample includes loans from all channels (including correspondent channel loans), whereas all other models are estimated on loan samples that exclude correspondent loans.

- Model (2-Inv): Same as Model (2), but the regression sample consists only of loans (1) included in the Morgan Stanley data production, and (2) loans in the New Century data production with entries in the "investor" or "investor_name" fields of New Century's loan production, indicating that these loans were sold to investors. I exclude from the sample of Model (2-Inv) the loans that appear to have been securitized by New Century (loans with the strings "New Century" appearing in the "investor" or "investor_name" fields, or loans with "investor" or "investor_name" field values beginning with the strings "2004 NC", "2005 NC", or "2006 NC"). Model (2-Inv) is not estimated on samples consisting only of loans purchased by Morgan Stanley (Appendices 6B, 6D, 7B, and 7D) because there is no difference between Model (2) and Model (2-Inv) for these samples.

- Model (2-InvMiss): Same specification and sample as Model (2-Inv), but the sample includes loans with no value in the "investor" or "investor_name" fields of New Century's loan production. I include this specification because these loans may have been sold to outside investors, but the data was simply missing from the data produced. Model (2-InvMiss) is not estimated on samples consisting only of loans purchased by Morgan Stanley (Appendices

6B, 6D, 7B, and 7D) because there is no difference between Model (2) and Model (2-Inv) for these samples.

- Model (3): Same as Model (2), but instead of the race categories used in Model (2), each loan is assigned to a race and ethnicity separately based on the race and ethnicity of the borrower or coborrower in the MS-NC Data in a sequential order. Model (3) uses the interaction of the assigned race and ethnicity variables in place of the single race variable from Model (2). To assign each loan to an ethnicity for Model (3), I classify the ethnicity of a loan as "Hispanic" if the ethnicity of the borrower or co-borrower is "Hispanic or Latino". The loan ethnicity is classified as "non-Hispanic" if I do not classify the loan ethnicity as Hispanic. I classify the race of a loan as "African American" if the race given for either the borrower or co-borrower is African American. Next, I classify the race of a loan as "Asian or Pacific Islander" if (1) the race given for either the borrower or co-borrower is Asian, Native Hawaiian, or Other Pacific Islander, and (2) I do not classify the loan as "African American." I classify the race of a loan as "American Indian" if (1) the race given for either the borrower or co-borrower is American Indian or Alaskan Native, and (2) I do not classify the loan as "African American" or "Asian or Pacific Islander." I classify the race of a loan as "White" if (1) the race listed for the borrower or co-borrower is White, (2) any other races listed for the borrower and co-borrower are unknown or missing, and (3) I do not classify the loan as "African American", "Asian or Pacific Islander", or "American Indian." I classify the race of all other loans as "Missing."

- Model (4): Same as Model (2), but instead of the race categories used in Model (2), each loan is assigned to any race or ethnicity that appears in the data for that loan. For example, if the race of the borrower is African American and the ethnicity of the borrower is Hispanic, then the dummy variables for both "African American" and "Hispanic" are equal to 1 for that loan. If the race of the borrower is African American, the ethnicity of the borrower is non-Hispanic, the race of the co-borrower is White, and the ethnicity of the co-borrower is Hispanic, then the dummy variables for "African American", "Hispanic", and "White" are equal to 1 for that loan. In each version of Model (4) in Appendices 6 and 7, the difference between the coefficients for "Any race white" and "Any race African-American" is statistically significant at the 99% confidence level.

- Model (5): Same as Model (2), but non-first-lien loans, FHA/VA/RHS loans, and HELOCs are excluded from the regression sample.

- Model (6): Same as Model (2), but a co-borrower dummy variable is added as an explanatory variable. I do not include the presence of a co-borrower as a control variable in Model (2) because the presence or absence of a co-borrower may be questionable due to missing co-borrower race and ethnicity codes in the NC data for many 2004 loans.

- Model (7): Same as Model (2), but more FICO bins with smaller ranges of FICO scores are used as explanatory variables.

- Model (8): Same as Model (2), but the LTV, CLTV, DTI, HTI, and documentation type dummy variables are dropped as explanatory variables.

- Model (9): Same as Model (2), but NC Data fields are always used to construct explanatory variables whenever the applicable fields are present in the NC Data.

- Model (10): Same as Model (2), but MS Data fields are always used to construct explanatory variables whenever the applicable fields are present in the MS Data. Model (10) is not estimated for samples consisting of all New Century loans (Appendix 6A, 6C, 7A, and 7C) because the MS Data does not cover all New Century loan originations.