

**UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF CALIFORNIA**

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In re WELLS FARGO MORTGAGE )  
LENDING PRACTICES LITIGATION )  
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Case No. 08-CV-01930-MMC (JL)

**REPLY CLASS CERTIFICATION  
REPORT OF  
HOWELL E. JACKSON**

CONFIDENTIAL—SUBJECT TO PROTECTIVE ORDER

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## I. INTRODUCTION

1. I have been asked by Plaintiffs' counsel to review and comment upon the September 3, 2010 expert report of Professor Harold A. Black.<sup>1</sup> A list of the materials I have reviewed since submitting my initial class certification report is attached as Appendix 1.<sup>2</sup>

2. Upon review of Professor Black's report and the other materials, I continue to conclude that the statistical record in this case provides evidence Class members suffered a disparate impact as a result of Wells Fargo's mortgage pricing policies. I also conclude that disparate impact can be analyzed and demonstrated using common methods and proof, that the named Plaintiffs' claims are typical of those of the Class, and that monetary relief to the Class may be reliably estimated for each member of the Class and in the aggregate for the Class as a whole.

3. To a large degree, Professor Black's report objects to the fact that my regression analysis did not control for borrower characteristics – such as financial sophistication and negotiation skills – which may have made minority borrowers more vulnerable to Wells Fargo's Discretionary Pricing Policy for mortgage lending. In addition to failing to present any empirical evidence that these considerations are, in fact, associated with higher mortgage costs for members of the Plaintiff Class, Professor Black also fails to offer credible evidence to conclude that these factors constitute legitimate business justifications for the degree of discriminatory pricing revealed in my original analysis.

4. Professor Black also objects to the alleged omission of controls for broker costs from my analysis. In this reply report, I offer additional evidence to demonstrate that plausible

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1. Expert Report of Harold A. Black, PhD., Sept. 3, 2010 [hereinafter *Black Class Certification Report*].

2. Consultants from Oakton Partners provided assistance in the preparation of this report.

sources of differential in mortgage broker costs do not explain pricing differentials for minority borrowers of Wells Fargo.

5. Another recurring theme in Professor Black's report concerns the role of distributional channels and lines of business in the analysis of discriminatory lending practices. As explained below, my preferred approach to analyzing the data in this case is to aggregate data across business channels and lines of business and control for differences in loans through variables directly tied to loan features, borrower characteristics, and other factors that affect lender costs. Contrary to Professor Black's suggestions, my original report does include alternative formations that control specifically for loan channel and line of business and that still report statistically significant differences in mortgage pricing for minority groups. Moreover, even using Professor Black's preferred approach to analyzing the data in the case – which is to create numerous subsamples based on distribution channel and loan characteristics – his own results show statistically significant disparities between the loan costs for minorities and the loan costs for white borrowers in the subsamples containing the vast majority of the loans originated by Wells Fargo during the Class period. The disparities found by Professor Black for these loans are generally smaller than the disparities I estimated in my original report but still statistically significant.

6. Although Professor Black finds statistically significant disparities between minority and white borrower loan costs, he disregards these disparities as having small economic significance.<sup>3</sup> In this reply report, I show that these disparities are indeed economically significant.

7. Professor Black discusses the differences between the individual characteristics of the named Plaintiffs' loans and other Class members in his report. Although characteristics among

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3. *Black Class Certification Report* at 36-37.

the named Plaintiffs and Class members vary, these differences are easily controlled for in the regression models that both Professor Black and I employ. Professor Black also claims that some of the named Plaintiffs paid lower loan costs than the costs predicted by my model. However, this contention does not demonstrate that the claims of the named Plaintiffs are atypical of the claims of the Class as a whole.

8. Professor Black also objects to my methodology for estimating monetary relief to the Class. However, my approach for estimating monetary relief is manageable and can easily be modified to account for additional data maintained by Wells Fargo at the merits phase of this litigation.

## **II. OVERVIEW OF ACADEMIC LITERATURE ON MORTGAGE BROKERS**

9. A good portion of Professor Black's report consists of a fairly straightforward review of the evolution of the market for residential mortgages over the past few decades.<sup>4</sup> While I do not disagree with many aspects of his general description, the tone of his narrative is puzzlingly pollyannaish and excessively confident in the ability of market forces to eliminate consumer abuses in light of the events of the past decade and the very large body of academic work documenting the unsavory role that mortgage brokers played leading up to the subprime debacle and the ensuing financial crisis. In Professor Black's report, the mortgage industry operates under conditions of intense competition and effective regulatory constraints, which together force originators to make full and complete disclosures to borrowers, who in turn are perfectly well equipped to safeguard their own interests. In Professor Black's presentation, there is no suggestion that originators might be unfaithful to their clients or exploit individual weakness

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4. *Id.* at 9-13.

and financial illiteracy or systemically place borrowers in unsuitable and unsustainable mortgages or extract unjustified fees. This exceedingly benign perspective on the mortgage industry plays a critical role in his analysis because at the heart of his argument lies a contention that statistically significant differences in mortgage pricing for minority borrowers are most plausibly understood to be the result of differences on benign forces wholly unrelated to industry participants. In the body of this report, I will address the specific points presented in Professor Black's report, but as a preliminary matter I think it is important to review the overwhelming body of evidence—both in the form of academic papers and government initiatives—that belies Professor Black's premise that market forces and regulatory constraints during the Class period imposed effective restraints of abusive practices on the part of mortgage brokers.

10. In brief, academic research has identified and to a considerable degree corroborated empirically significant agency costs in the behavior of mortgage originators. Some work has focused on the tendency of mortgage brokers to originate lower quality loans than those produced through direct loan originations.<sup>5</sup> But an even larger body of academic work has documented the proclivity of mortgage brokers to exploit the ignorance and misunderstandings of individual borrowers to charge excessive fees and extract what's known as economic rents.<sup>6</sup> Within the

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5. See, e.g., Antje Berndt et al., *The Role of Mortgage Brokers in the Subprime Crisis* at 4 (June 30, 2010), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1573312](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1573312)) ("the marginal effect of broker profits is positive for future delinquency once we condition on characteristics of the loan, the borrower and the broker, suggesting that brokers earned high profits on loans that turned out to be riskier ex post"); Edward Golding, Richard K. Green & Douglas A. McManus, *Imperfect Information and the Housing Finance Crisis* at 10 (Feb. 2008) (Joint Center for Housing Studies, Harvard University) (noting differences in the quality of loans originated by mortgage brokers); William P. Alexander et al., *Some Loans Are More Equal than Others: Third-Party Originations and Defaults in the Subprime Mortgage Industry*, 30 REAL EST. ECON. 667 (2002) (presenting evidence from the 1990's that loans originated through mortgage brokers and other third parties are more likely to default and discussing apparent market reactions to this phenomenon). But see Todd J. Zywicki & Joseph D. Adamson, *The Law & Economics of Subprime Lending*, 80 U. COLO. L. REV. 1 (2009) (interpreting data to suggest mortgage brokers are more cost effective).

6. Michael LaCour-Little, *The Pricing of Mortgages by Brokers: An Agency Problem?*, 31 J. REAL EST. RES. 235 (2009) ("loans originated by [mortgage] brokers cost borrowers about 20 basis points more, on average, than

academic community, it is increasingly well-recognized that many individuals are not well-equipped to monitor the complex terms of residential mortgages and are especially vulnerable to opportunistic behavior on the part of mortgage brokers.<sup>7</sup> As reviewed in my initial report, a substantial body of academic work has also documented the extent to which mortgage brokers and other originators can exploit precisely the same consumer weaknesses on the part of minority borrowers to engage in discriminatory lending practices.<sup>8</sup>

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retail loans and . . . this premium is higher for lower income and lower credit quality borrowers”); Adam B. Ashcraft & Til Schuermann, *Understanding the Securitization of Subprime Credit*, Federal Reserve Bank of New York Staff Report No. 318 (Mar. 2008) (discussion by Federal Reserve Board economists of the difficulties that financially unsophisticated borrowers face in choosing among mortgages); Howell E. Jackson & Laurie Burlingame, *Kickbacks or Compensation: The Case of Yield Spread Premiums*, 12 STAN. J.L. BUS. & FIN. 289 (2007); Susan E. Woodward, *Consumer Confusion in the Mortgage Market*, Sand Hill Econometrics Paper (July 14, 2003), available at [http://www.sandhillecon.com/pdf/consumer\\_confusion.pdf](http://www.sandhillecon.com/pdf/consumer_confusion.pdf) [hereinafter *Consumer Confusion in the Mortgage Market*] (“Brokers have the advantage of experience and skill, plus information about wholesale terms that are unavailable to borrowers. . . . Brokers fees are also profoundly related to borrower education . . .”). See also Morris M. Kleiner & Richard M. Todd, *Mortgage Broker Regulations that Matter: Analyzing Earnings, Employment and Outcomes for Consumers* (Dec. 2007), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1077810](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1077810), (“Issues related to [mortgage] broker incentives and integrity have repeatedly surfaced in recent policy discussions, partly because of rising concerns about mortgage fraud.”). For a discussion of criminal behavior of mortgage brokers leading up to the subprime crisis, see Claire A. Hill, *Who Were the Villains in the Subprime Crisis, and Why it Matters*, 4 ENTREPRENEURIAL BUS. L. J. 323, 332-36 (2010).

7. See Susan E. Woodward & Robert E. Hall, *Diagnosing Consumer Confusion and Sub-Optimal Shopping Effort: Theory and Mortgage-Market Evidence* (May 2010), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1612602](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1612602), (“Mortgage loans are leading examples of transactions where experts on one side of the market take advantage of consumers’ lack of knowledge and experience.”); Eric S. Belsky & Susan Wachter, *The Public Interest in Consumer and Mortgage Credit Markets* at 16 (Mar. 2010), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1582947](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1582947), (“Lender/brokers have more information than borrowers . . . This can lead to economic rent seeking on the part of lender/originators, which can persist if the costs of obtaining accurate information are great or accurate cost information and options are not communicated to borrowers.”); Golding, Green & McManus, *supra* note 5, at 10 (“The methods of rent seeking [on the part of mortgage brokers] take two forms: identifying borrowers who are particularly incapable of understanding mortgage pricing, and exploiting the implicit moral hazard arising from being able to initiate mortgages without capital, by shopping loan applications to various lenders.”). See generally, Oren Bar-Gill, *The Law, Economics and Psychology of Subprime Mortgage Contracts*, 94 CORNELL L. REV. 1073, 1118-33 (2009).

8. See Class Certification Report of Howell E. Jackson, Aug. 6, 2010, at 16-21 [hereinafter *Jackson Class Certification Report*]. See also Alan M. White, *Borrowing While Black: Applying Fair Lending Laws to Risk-Based Mortgage Pricing*, 60 S.C.L.REV. 677, 679 (2009) (exploring a number of reasons why competitive forces may not eliminate racial disparities including facts that “[m]inority applicants are overrepresented in higher priced channels and loan product categories” and “because mortgage brokers retain the discretion to increase interest rates to certain borrowers in order to increase the brokers’ compensation.”) See also Cassandra Jones Havard, *Democratizing Credit: Examining the Structural Inequities of Subprime Lending*, 56 SYRACUSE L. REV. 233 (2006). For a recent review of the statistical studies of racial discrimination in personal finance, see Maya Sen, *Quantifying Discrimination: The Role of Race and Gender in the Awarding of Subprime Mortgage Loans* (Apr. 20, 2010), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1593183](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1593183) (reviewing work of the past decade).



11. The problematic practices of mortgage brokers have not simply been a concern of the academic community. Both Congressional leaders and regulatory authorities have also identified mortgage originations as a sector of the financial services industry warranting significant supervisory attention. For much of the past decade, both the Department of Housing and Urban Development<sup>9</sup> and the Federal Reserve Board<sup>10</sup> staff have been studying limitations in consumer understanding of disclosures with respect to compensation arrangements for mortgage originations and, in the past two years, both agencies have adopted significant reforms with even more stringent proposals under consideration. In 2008, Congress itself enacted a new statutory requirement mandating licensing and oversight of mortgage brokers at the state level<sup>11</sup> and the Dodd-Frank Wall Street Reform and Consumer Protection Act passed this summer included provisions that will prohibit the kinds of sales-force compensation arrangements that Wells Fargo employed in both its wholesale and retail mortgage distribution channels during the Class period.<sup>12</sup>

12. This extensive academic literature and more recent government initiatives are relevant to Professor Black's analysis in several respects. First, this literature belies the benign portrayal of the loan origination process. Notwithstanding Professor Black's speculation to the

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9. Department of Housing & Urban Development, Real Estate Settlement Procedures Act (RESPA): Rule To Simplify and Improve the Process of Obtaining Mortgages and Reduce Consumer Settlement Costs, Final Rule, 73 Fed. Reg. 68,204, 68,204 (Nov. 17, 2008). The RESPA reform process began with a 2002 Proposed Rule that would have provided for a revised Good Faith Estimate (GFE) to simplify settlement cost disclosures. That proposed rule was later withdrawn in 2004, but was followed by extensive commentary; years of consultation with industry, consumer, and government groups; two reports to Congress; and seven consumer and industry roundtables. Department of Housing & Urban Development, Real Estate Settlement Procedures Act (RESPA): Proposed Rule To Simplify and Improve the Process of Obtaining Mortgages and Reduce Consumer Settlement Costs, Proposed Rule, 73 Fed. Reg. 14,030, 14,030 (Mar. 14, 2008).

10. See Federal Reserve System, Truth in Lending, Proposed Rule, 73 Fed. Reg. 1,672, 1,698 (Jan. 9, 2008); Federal Reserve Board Final Rule, 73 Fed. Reg. 44,522, 44,522 (July 30, 2008) (withdrawing aspects of original proposal with respect to yield spread premiums); Federal Reserve System, Truth in Lending, 74 Fed. Reg. 43,232 (proposed Aug. 26, 2009) (to be codified at 12 C.F.R. pt. 226).

11. See The Secure and Fair Enforcement for Mortgage Licensing Act of 2008, 12 U.S.C. 5101 et seq. (2008).

12. Dodd-Frank Wall Street Reform and Consumer Protection Act, H.R. 4173 §1400-1406, 111th Cong. (2010).

contrary, it is abundantly clear that mortgage broker compensation has not invariably tracked the actual costs of loan originations nor been consistent with what most observers would consider the fair operation of market forces. Over the past decade, mortgage brokers have in many contexts exploited uninformed and unsuspecting consumers to extract excessive compensation without regards to cost. Equally important, these problems have been well publicized and subject to robust public debate since well before the beginning of the Class period in this litigation.<sup>13</sup> Wells Fargo and other residential mortgage originators making use of mortgage brokers in the 2001 to 2007 period were well aware of mounting criticisms of the practices of mortgage brokers, including a growing body of empirical evidence that mortgage brokers were charging minority borrowers higher origination fees than similarly situated white borrowers.<sup>14</sup> An unstated assumption of Professor Black's analysis—that during the Class period Wells Fargo had no reason to be suspicious that its mortgage brokers might be charging discriminatory fees to its minority

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13. See Kathleen C. Engel & Patricia A. McCoy, *A Tale of Three Markets: The Law and Economics of Predatory Lending*, 80 TEXAS L. REV. 1255, 1286-89 (2002) (identifying in detail the potentially problematic practices of mortgage brokers in light of lax regulation and poorly structured compensation regimes); see also Alexander et al., *supra* note 5 (presenting in 2002 empirical evidence of problem behavior of mortgage brokers and other third party originators in the 1990's). For an overview of regulatory debates over problematic mortgage broker compensation practices dating back to the early 2000's, see Jackson & Burlingame, *supra* note 6.

14. For example, in January 2002, the Senate Banking Committee held a public hearing on the predatory lending practices of mortgage brokers, at which many industry leaders were also present as witnesses. In that context, I testified: "While my study suggests that yield spread premiums are a very bad deal for average consumers, I believe these practices are particularly injurious to the least sophisticated members of society—groups of which the Department has historically been most protective. To test this hypothesis, I also examined the relationship between mortgage broker compensation and the racial identity of borrowers. The results indicated that mortgage brokers charged two racial groups - African-Americans and Hispanics - substantially more for settlement services than they did other borrowers. For African-Americans, the average additional charge was \$474 per loan, and for Hispanics, the average additional charge was \$580 per loan." See *Predatory Mortgage Lending Practices: Abusive Uses of Yield Spread Premiums: Hearing Before the S. Comm. on Banking, Housing & Urban Affairs*, 107th Cong. (2002) (statement of Howell E. Jackson, Finn M.W. Caspersen and Household International Professor of Law and Associate Dean for Research and Special Programs, Harvard Law School), available at [http://banking.senate.gov/02\\_01hrg/010802/jackson.htm](http://banking.senate.gov/02_01hrg/010802/jackson.htm). For a contemporaneous corroboration of my findings, see *Consumer Confusion in the Mortgage Market*, *supra* note 6, at 28 ("Race does matter, controlling for other factors, even education. African Americans pay an additional \$500 in broker fees, and Hispanic borrowers \$275 more"). See also sources cited *supra* note 9-11 (discussing government investigations of discriminatory lending practices through wholesale lending channels over the past decade).

borrowers or engaging in other abusive practices—is inconsistent with the public record. Moreover, Wells Fargo could easily have supplemented the manner in which it monitored its mortgage brokers to reduce the likelihood that its brokers and retail consultants would engage discriminatory pricing or other abusive practices.<sup>15</sup>

### **III. RESPONSE TO PROFESSOR BLACK’S OPINION #1: STATISTICAL ANALYSES OF APR PROVIDES A RELIABLE MEANS OF PROVING DISPARATE IMPACT**

13. I now turn to the substantive points made in Professor Black’s report. For ease of analysis, I organize my responses in accordance with the five opinions expressed in his report, starting with his first opinion, which contends that statistical regression analysis of borrower APRs does not provide an appropriate means of investigating discriminatory lending practices. At the outset, I should express my strong disagreement with Professor Black’s basic point. In my experience, regression analysis of borrower APRs is the most common method for testing for racial disparities in lending transactions, utilized not only by government examiners but also by both defense and plaintiff experts in ECOA litigation and routinely accepted by courts.<sup>16</sup> As explained in my initial report, APRs are designed by federal authorities to provide a single measure of all-in borrower financing costs, and when controlled by factors that legitimately affect lender costs, regression analyses of APRs provide a useful and widely accepted approach to detecting disparities in lending transactions.

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15. Apparently, Wells Fargo did attempt to monitor disparities in pricing for minority borrowers at the broker level. See generally Deposition of Tamara Denton (Jan. 22, 2009). My analysis shows that these efforts were unsuccessful and appears not to have focused on the firm’s practices in the aggregate, which is the scope of analysis in my regressions.

16. See, e.g., Lynn Gottschalk, *Fair Lending Modeling of Pricing Decisions* (Sept. 10, 2008), available at <http://www.occ.treas.gov/flc/2008/Lynn%20Gottschalk.pdf>; Order Granting Plaintiffs’ Motion for Class Certification, *Ramirez v. Greenpoint Mortgage Funding*, Case No. C08-0369 TEH (N.D. Cal. 2010); 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).

**A. Professor Black's Assertions Regarding Statistical Significance in Large Datasets Does Not Negate the Significant Disparities Measured in My Analysis**

14. As Professor Black argues, smaller disparities are more likely to be statistically significant in larger datasets than in smaller datasets.<sup>17</sup> However, Professor Black is incorrect to assert that I aggregated all loans into a single regression to “ensure statistical significance.”<sup>18</sup> For reasons explained in more detail below, my preference is to examine the data on an aggregated basis as reflected in my basic Model (4).<sup>19</sup> But in my original report, I went to considerable lengths to demonstrate that positive, statistically significant disparities were present even if loans were disaggregated by year, by retail and wholesale channels, or by prime and nonprime markets.<sup>20</sup> I also included a number of additional regression models in appendices, including ones with controls for business lines and channels. In this reply report, I offer additional models responding to various contentions of Professor Black.

15. Professor Black also argues in his report that the disparities measured in my regressions, as well as the disparities measured for the vast majority of loans within his subchannel regressions, are not “economically significant.”<sup>21</sup> However, disparities of a handful of basis points on APRs will result in substantial harm to minority borrowers and also have a materially positive impact on the bottom line of mortgage lenders like Wells Fargo.

16. By way of example, Table 1 demonstrates that, for a five basis point APR disparity (approximately equal to the disparities measured for the vast majority of loans in Professor

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17. *Black Class Certification Report*, at 15.

18. *Id.*

19. Examining data on an aggregated basis is a widely-accepted and workable statistical approach for showing disparate impact on a class-wide basis. See *Dukes v. Wal-Mart Stores, Inc.*, 603 F.3d 571, 603-604 (9th Cir. 2010) (en banc).

20. *Jackson Class Certification Report* at 41, 84.

21. *Black Class Certification Report*, at 35-37.

Black's subchannel regressions)<sup>22</sup>, a typical African American borrower would have paid \$445 more than a typical white borrower (undiscounted), while a typical Hispanic borrower would have paid \$509 more than a typical white borrower (undiscounted) over the first five years of the loan. As illustrated in Table 2, these amounts would make up a substantial proportion of a typical consumer's annual expenditures on basic staples such as food, gasoline, electricity, natural gas, and water service. While these examples assume a five basis point APR differential, the actual differential that I estimate is often much larger, especially for African American borrowers.<sup>23</sup>

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22. *Id.* at 38.

23. See, for example, *Jackson Class Certification Report* at 41.

TABLE 1: MONETARY RELIEF TO MINORITY BORROWERS USING A 5 BASIS POINT APR DISPARITY

	African Americans	Hispanics	Total
<b>Over entire loan term</b>			
Undiscounted (\$Millions)	\$590.9	\$1,005.1	<b>\$1,596.1</b>
Present Value of Relief (\$Millions)	\$457.7	\$780.7	<b>\$1,238.4</b>
<b>Over 10 years</b>			
Undiscounted (\$Millions)	\$258.5	\$450.6	<b>\$709.1</b>
Present Value of Relief (\$Millions)	\$267.4	\$464.1	<b>\$731.5</b>
<b>Over 5 years</b>			
Undiscounted (\$Millions)	\$131.3	\$230.3	<b>\$361.6</b>
<i>Number of Loans*</i>	294,983	452,471	<b>747,454</b>
<i>Avg undiscounted relief per loan over 5 years (\$)</i>	\$445	\$509	<b>\$484</b>
Present Value of Relief (\$Millions)	\$147.4	\$257.7	<b>\$405.1</b>
<i>Number of Loans*</i>	294,983	452,471	<b>747,454</b>
<i>Avg. discounted relief per loan over 5 years (\$)</i>	\$500	\$570	<b>\$542</b>

*Note:* For purposes of these illustrations, the present value (as of August 2010 when my original report was filed) of the undiscounted relief is calculated using the Treasury Constant Maturity rate as of the origination date for that loan that matches the term over which monetary relief is being calculated. For example, when calculating monetary relief over the entire loan term for a 30-year loan that originated on April 30, 2007, I use the 30-year Treasury constant maturity rate as of April 30, 2007 (4.81 percent) as the discount rate. When calculating monetary relief over 5 years for the same loan, I use the 5-year Treasury rate as of April 30, 2007 (4.51 percent) as the discount rate. The Treasury rates are available from Federal Reserve Statistical Release H.15, Data Download Program, available at <http://www.federalreserve.gov/datadownload/Choose.aspx?rel=H.15>; U.S. Treasury, Daily Treasury Long-Term Rates, available at [http://www.treas.gov/offices/domestic-finance/debt-management/interestrate/ltcompositeindex\\_historical.shtml](http://www.treas.gov/offices/domestic-finance/debt-management/interestrate/ltcompositeindex_historical.shtml). For the 30-year scenario, in which most of the harm comes in the form of disparities in future interest payments, the present value is smaller than the undiscounted value. For the 5-year and 10-year scenarios, in which most of the harm comes in the form of disparities in past interest payments, the present value is higher than the undiscounted value.

TABLE 2: MONETARY RELIEF OVER 5 YEARS IMPLIED BY 5 BASIS-POINT DISPARITY AND JACKSON MODELS RELATIVE TO HOUSEHOLD EXPENDITURES

	African Americans <sup>1</sup>	Hispanics <sup>1</sup>
Avg. Monetary Relief over 5 Years per Loan (“Disparity”) as Implied by: 5 BPS Disparity / Jackson APR Model (4) <sup>2</sup>	\$445 / \$899	\$509 / \$650
<u>Avg. Annual Consumer Expenditures, 2001-2007<sup>3</sup></u>		
Food at home	\$2,739	\$3,594
5 bps / Jackson APR Model (4) Disparity as % of expenditure	16% / 33%	14% / 18%
Gasoline and motor oil	\$1,337	\$1,757
5 bps / Jackson APR Model (4) Disparity as % of expenditure	33% / 67%	29% / 37%
Electricity	\$1,171	\$994
5 bps / Jackson APR Model (4) Disparity as % of expenditure	38% / 77%	51% / 65%
Natural gas	\$487	\$335
5 bps / Jackson APR Model (4) Disparity as % of expenditure	91% / 185%	152% / 194%
Water and other public services	\$314	\$341
5 bps / Jackson APR Model (4) Disparity as % of expenditure	142% / 287%	149% / 191%

*Notes:*

<sup>1</sup>The median annual income reported for African American and Hispanic borrowers in Wells Fargo’s loan database is \$64,000 and \$68,000, respectively. The average annual income for African American and Hispanic households in the Consumer Expenditure Survey from 2001 to 2007 is \$38,226 and \$42,577, respectively.

<sup>2</sup>The monetary relief under the Jackson APR Model (4) of \$899 (African Americans) and \$650 (Hispanics) over 5 years is found in Table 9 of my original report.

<sup>3</sup>U.S. Department of Labor, Bureau of Labor Statistics, *Consumer Expenditure Survey*, available at <http://www.bls.gov/cex/>.

17. As Table 2 shows, the disparities in loan costs over 5 years for minorities are substantial when compared to household expenditures on basic goods and services. For example, the disparity in loan costs for Hispanics over 5 years implied by a 5 basis point disparity (\$509 per loan) or my Model (4) (\$650 per loan) would pay for almost two years of the average Hispanic household’s natural gas bill. The disparity in loan costs for African Americans over 5 years implied by a 5 basis point disparity (\$445 per loan) or my Model (4) (\$899 per loan) would pay for more than a month’s worth of groceries for the average African American household. During

any time, but especially during the current period of economic hardship experienced by homeowners throughout the United States, \$445 or \$509 is an economically significant amount of relief to those borrowers' households.

18. Finally, the disparities estimated in Professor Black's APR models are economically significant relative to the overall profitability of the financial services industry. Table 3 shows the return on assets for commercial banks and savings institutions from 2000 to 2008.

**TABLE 3: FINANCIAL INDUSTRY PROFITABILITY**

Year	Commercial Banks			Savings Institutions		
	Net Income (\$ Billions)	Total Assets (\$ Billions)	Return on Avg. Assets	Net Income (\$ Billions)	Total Assets (\$ Billions)	Return on Avg. Assets
1999		\$5,735.1			\$1,148.5	
2000	\$70.8	\$6,245.6	1.18%	\$10.7	\$1,217.3	0.90%
2001	\$74.1	\$6,552.3	1.16%	\$13.3	\$1,316.8	1.05%
2002	\$89.4	\$7,076.9	1.31%	\$15.2	\$1,358.9	1.14%
2003	\$102.6	\$7,601.5	1.40%	\$18.1	\$1,474.1	1.27%
2004	\$104.0	\$8,415.6	1.30%	\$18.2	\$1,691.8	1.15%
2005	\$113.9	\$9,040.3	1.31%	\$19.9	\$1,837.9	1.13%
2006	\$128.2	\$10,091.5	1.34%	\$17.0	\$1,769.9	0.94%
2007	\$97.6	\$11,176.1	0.92%	\$2.4	\$1,857.9	0.13%
2008	\$15.3	\$12,308.9	0.13%	-\$10.8	\$1,532.3	-0.63%
Average			1.12%			0.79%

Source: FDIC, Historical Statistics on Banking (<http://www2.fdic.gov/hsob/index.asp>).

As Table 3 shows, the average return on assets (ROA) from 2000 to 2008 for commercial banks and savings institutions was 1.12 percent and 0.79 percent, respectively. Using the average ROA of 1.12 percent for commercial banks (which includes Wells Fargo), an additional 4 basis points in compensation on assets represents a 3.6 percent increase in profits. Again, I doubt that any financial institution would dismiss a 3.6 percent increase in profitability as *de minimis*.



**B. Professor Black's Assertion that, at the Class Certification Stage of Litigation, Plaintiffs Must Both Present Statistical Evidence of Discriminatory Impact and Loan-File Reviews for the Plaintiff Class Would Be Excessively Burdensome and Unwarranted**

19. Professor Black argues that statistical analysis can only be a first step in identifying disparate impact, and additional individual loan file reviews are required to proceed with class certification. This assertion, at least in my view, goes to legal standards and burdens of proof. But, as a pragmatic matter, Professor Black's approach would put an excessive and in most cases insurmountable burden on class actions of this sort with large plaintiff classes. While the burdens of collecting and analyzing large data sets with regression analyses are not inconsiderable, loan file reviews of hundreds of thousands or, as in this case, millions of borrowers are infeasible. More importantly, where, as here, lender databases include all important variables associated with the lender's costs in originating mortgages, statistical analyses should be sufficient to demonstrate a class-wide disparate impact for class certification purposes.<sup>24</sup>

**C. APR Is a Reliable Metric to Use when Measuring Disparate Impact**

20. As mentioned earlier, APRs are, in my experience, the most common measure of evaluating the cost of credit for borrowers and, indeed, the Federal Reserve Board staff has designed to measure APRs precisely to facilitate cost comparisons between different loans. Beyond his rejection of what is the most common approach to measuring borrower costs, Professor Black makes several points about APRs that strike me as either unfounded or irrelevant to the issue of class certification. For example, he states, "If minority borrowers have less ability to lower the note rate through a lack of cash resources to make an upfront payment, they will have

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24. Professor Black's views are also inconsistent with the applicable law. See *Dukes v. Wal-Mart Stores, Inc.*, 603 F.3d 571, 603-604 (9th Cir. 2010) (en banc).

the higher APR.”<sup>25</sup> This is not necessarily true – upfront finance charges are factored into APRs just as note rates are. So the effect on APRs of substituting upfront fees for note rates will depend upon the magnitude of the effects. Indeed, in my experience with mortgage lending practices over the past five decades, upfront cash payments often play a major role in pushing up APRs for minority borrowers.

21. To be sure, as Professor Black notes, APRs are not perfect measures of borrower costs, especially when analyzed on an ex-post basis when the duration of the lending transaction is known. However, the mere assertion that there are limitations in APRs does not necessarily undermine the persuasiveness of the statistical evidence of a disparate impact for minorities presented in my original report. To do that, Professor Black would have to provide evidence that the manner in which APRs were calculated for minorities systematically offsets the evidence of discriminatory lending practices presented in my initial report. Professor Black has not attempted this validation of his argument and, in fact, there are plausible grounds for believing that the structure of APR calculations may actually understate the discriminatory effect on minority borrowers.<sup>26</sup> More importantly, ex post critiques of APRs are best addressed in the damages phase of litigation, where the parties can analyze the loan servicing data and make appropriate adjustments in damage calculations.<sup>27</sup>

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25. *Black Class Certification Report* at 17.

26. For example, preliminary analysis of the dataset suggests that much of the APR differentials for the Class come from higher upfront charges as well as higher note rates. The sooner borrowers refinance, the more significant these differentials in upfront costs become. This is a matter that can be explored in greater detail at the merits phase of the case as it bears on appropriate measures of damages, which is, in my view, the appropriate stage of litigation at which to address Professor Black’s criticisms of APRs.

27. At the merits phase of this litigation, I expect to propose a methodology for tailoring individual damages along these lines.

#### D. Professor Black's Opinions Relating to Statistical Regressions as "Blunt Instruments" Do Not Preclude Class-Wide Analysis

22. Notwithstanding the wide-spread application of regression analysis in discriminatory lending litigation, Professor Black objects to the blunt nature of the tool, citing specifically the possibility that some variables – in particular, FICO scores – may have different effects for prime and nonprime loans. While there are, in my view, offsetting considerations that warrant aggregation of these two product types, what Professor Black fails to do in his report is actually examine whether the use of different FICO variables for prime and nonprime loans would eliminate the racial disparities shown in my report. Through the use of interaction terms, this is a fairly straightforward matter to address and I have done so in Table 4, which shows that statistically significant racial effects persist for both African American and Hispanic borrowers when these interaction terms (allowing for different coefficients for prime and nonprime FICO scores) are added. The racial disparity coefficients are slightly lower, but the effect remains.

TABLE 4: EFFECT OF RACE ON APR (BASIS POINTS) USING REGRESSIONS ALLOWING FOR DIFFERENT RELATIONSHIPS BETWEEN APR AND FICO IN PRIME AND NONPRIME CHANNELS

Race	Original Model (4) <sup>1</sup>	Model (4), with Prime Dummy and Prime x FICO Interaction Dummy Variables
African American	10.10*** (0.16)	7.19*** (0.14)
Hispanic	6.39*** (0.11)	5.41*** (0.10)
Observations	5,654,985	5,654,985
R-squared	70.5%	76.5%
Adjusted R-squared	70.5%	76.5%

*Note:* Robust standard errors in parentheses. Coefficients and standard errors for other explanatory variables are shown in Appendix 2.

\*\*\* Statistically significant at 1%, \*\* Statistically significant at 5%, \* Statistically significant at 10%.

<sup>1</sup> As reported in Table 6 of my original report.

<sup>2</sup> Same as Model (4) from my original report, but adding a dummy variable equal to one for prime loans and interaction dummy variables between the prime dummy variable and the FICO bin dummy variables.

**E. The Omitted Variables Cited by Professor Black Are Inappropriate to Include in a Disparate Impact Regression Analysis**

23. Professor Black also goes on at considerable length to suggest a range of additional variables, which, if added to my analysis, might have explained away the racial disparities in pricing for minority borrowers presented in my original report. Most of the additional variables cited by Professor Black are inappropriate for use in a disparate impact analysis. He also points out the possibility that mortgage broker costs might explain racial disparities uncovered in my regressions. My original report, however, included numerous controls that would likely control for many of the broker cost factors. In addition, as explained below, I present here additional statistical tests that offer additional empirical evidence that variations in costs across brokers do not explain racial disparities in Wells Fargo's mortgage lending practices.

**1. The Demand-Side Characteristics Professor Black Argues for Inclusion in the Model Are Inappropriate, and Their Inclusion Would Result in *Included* Variable Bias**

24. Professor Black argues that various demand-side characteristics, such as education, borrower bargaining power, borrower search costs, elasticity of demand, experience in the home-buying process, and financial literacy, should be controlled for when conducting any disparate impact analysis.<sup>28</sup> However, these characteristics are inappropriate to use in a disparate impact analysis because Wells Fargo has shown no legitimate business justification to charge higher prices based on these characteristics. As Professor Ian Ayres of Yale Law School has recently written, the inclusion of such demand side characteristics – when they have no bearing on lender

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28. *Black Class Certification Report* at 22-27.

costs – creates the problem of “included variable bias” in disparate impact cases, which will tend to reduce the racial disparities on grounds that are not appropriately tied to lender costs.<sup>29</sup>

25. Again, even if demand side considerations were a permissible defense to proof of discriminatory pricing in a disparate impact case, the defendant would bear the burden of presenting evidence that such factors did in fact explain racial variations in pricing – something Professor Black has not attempted. I would, however, point out how counter-intuitive such a defense would be in the context of employment anti-discrimination litigation. If a company were found to pay its female employees less than its male employees and then defended that practice on the grounds that women were poorer negotiators or tended to have higher search costs because family responsibilities forced them to stay close to home, it strikes me as implausible that a court would accept such justifications – even if provable – as legitimate justifications for gender-based wage differentials. However, that is precisely the kind of defense that Professor Black argues should be available here. Search costs, distractions from initial home purchases, financial sophistication, level of educational attainment – all of these Professor Black suggests are legitimate grounds for pricing differentials. In my view, such controls should not be considered appropriate in regression analysis for disparate impact cases. And, again notwithstanding his extensive discussion of the omitted demand-side characteristics, Professor Black does nothing more than speculate on the effects of these characteristics on my APR regressions.

26. Moreover, at various points in his report, Professor Black mistakes the significance of academic research on these issues. For example, Professor Black cites an article by Susan Woodward to support his argument that education is an important factor explaining mortgage

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29. See Ian Ayres, *Testing for Discrimination and the Problem of “Included Variable Bias”* (2010), available at <http://islandia.law.yale.edu/ayers/ayresincludedvariablebias.pdf>.

finance charges. However, Professor Black omits the important fact that Dr. Woodward shows that (1) loan defaults are unrelated to education levels in a borrower's neighborhood (implying no business justification for charging higher prices to less-educated borrowers),<sup>30</sup> and (2) racial disparities in finance charges are virtually the same whether education is included in her model or not.<sup>31</sup>

27. Professor Black also cites an article by Professor Faye Steiner stating that loan products must be controlled for in an analysis of disparate impact, implying that I did not include such groups.<sup>32</sup> However, I did control for broader product categories in my original Model (4) as well as various alternative specifications. Moreover, later in this report, I incorporate additional controls for each loan product to show that statistically significant disparities remain. I also present statistical evidence demonstrating why segmenting subsamples for distribution channels – the approach that Professor Black appears to favor – is inappropriate in a disparate impact regression.

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30. Susan E. Woodward, U.S. Department of Housing & Urban Development, *A Study of Closing Costs for FHA Mortgages* 74-75 (2008), available at [http://www.huduser.org/Publications/pdf/FHA\\_closing\\_cost.pdf](http://www.huduser.org/Publications/pdf/FHA_closing_cost.pdf).

31. *Id.* at 43, 48-49.

32. *Black Class Certification Report* at 26-27. More generally, Professor Black makes references to a number of papers that do not directly bear on regression analysis at the class certification stage of disparate impact litigation involving a single lender. See, e.g., Robert B. Avery et al., *New Information Reported Under HMDA and Its Application in Fair Lending Enforcement*, FED. RES. BULL., Summer 2005; Thomas P. Boehm, Paul D. Thistle & Alan Schlottmann, *Races and Race: An Analysis of Racial Disparities in Mortgage Rates*, HOUSING POL'Y DEBATE 109 (2006); Edward M. Gramlich, The Urban Institute, *Booms and Busts: The Case of Subprime Mortgages* (Aug. 31, 2007), available at [http://www.urban.org/UploadedPDF/411542\\_Gramlich\\_final.pdf](http://www.urban.org/UploadedPDF/411542_Gramlich_final.pdf); Michael LaCour-Little, *The Home Purchase Mortgage Preferences of Low-and-Moderate Income Households*, 35 REAL ESTATE ECON. 265 (2007); Isaac F. Megbolugbe & Man Cho, *An Empirical Analysis of Metropolitan Housing and Mortgage Markets*, 4 J. HOUSING RES. 191 (1993); Mitchell Stengel & Dennis Glennon, *Evaluating Statistical Models of Mortgage Lending Discrimination: A Bank-Specific Analysis*, Working Paper 95-3, Office of the Comptroller of the Currency, May 1995, available at <http://www.occ.treas.gov/ftp/workpaper/wp95-3.pdf>.

## 2. Cost Factors Associated with Broker Services

28. One potentially relevant cost consideration that Professor Black raises in his report is the cost of services that mortgage brokers provide in connection with loan originations.<sup>33</sup> To the extent that these costs were systematically higher for minority borrowers – a point that Professor Black does not document and a point on which I do not recall seeing any evidence in the record – then these costs could be relevant to my analysis. I do not, however, believe that this concern should diminish the force of the findings in my original report

29. To begin with—and contrary to assertions in Professor Black’s report<sup>34</sup>—I controlled for many plausible sources for these differences in origination costs in my principal regression analyses through the use of geographic and other explanatory variables, many of which are likely correlated with broker costs and effort, such as the financial status and credit quality<sup>35</sup> of borrowers and the loan-to-value ratio of loans. Moreover, the critical question is not whether there persists some degree of unexplained variation in broker costs; rather it is whether there is a difference in broker costs for *minority* borrowers that justifies the persistent and statistically significant differential prices that Wells Fargo charged minority borrowers.<sup>36</sup>

30. Also relevant to Professor Black’s point on origination costs is the absence of record keeping on the part of Wells Fargo and its distributors. A critical component of Professor Black’s argument is his assertion that there are important differences in the costs that mortgage brokers incur in originating the loans of different borrowers. Were this the case, one would expect that mortgage brokers would maintain careful records of the time expended on individual loan

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33. *Black Class Certification Report* at 20-22.

34. *Id.*

35. For example, I included controls for FICO scores, bankruptcy history, foreclosure history, and other late payment history in Model (4) of my original report.

36. As a matter of statistical analysis, costs variations that are uncorrelated with race should have no material effect on the racial disparity in APRs that my original report detected.

originations, lest the firms not appropriately compensate themselves for the effort expended on individual transactions. However, discovery has failed to uncover, at least as far as I have been able to discern, any evidence of such recording and certainly none was included in the dataset provided to me. The absence of such recordkeeping suggests that variation in origination effort across individual borrowers was not a factor in Wells Fargo's loan pricing process nor in the actions of its distributors.

31. Notwithstanding these points, it is at least theoretically possible that minority borrowers could tend to work with brokers who face higher costs than other borrowers or generally operate in markets with less vigorous competition. To explore these possibilities, I added a new set of unique dummy variables to represent each mortgage broker and then reran the principal regressions from my original report for wholesale loans, separately by year. The results are summarized below in Table 5. Adding dummy variables representing each mortgage broker reduces the regression coefficients for African American and Hispanic borrowers, but the regression coefficients are still positive and statistically significant at the one percent level. Consequently, controlling for differences in individual brokers does not explain the differences in minority APR basis points.<sup>37</sup>

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37. The decline in coefficient size for the minority dummy variables most likely reflects the racial composition of individual broker and client customers and so likely understates the actual discriminatory impact of Wells Fargo lending practices.



TABLE 5: APR BASIS POINT DISPARITIES WHEN CONTROLLING FOR POSSIBILITY OF ADDITIONAL BROKER COSTS IN THE WHOLESALE CHANNEL

	Obs	No Broker Controls <sup>1</sup>			With Broker Controls <sup>2</sup>		
		African American	Hispanic	Adj. R <sup>2</sup>	African American	Hispanic	Adj. R <sup>2</sup>
Model (4-2001W)	62,904	21.97*** (2.10)	4.85*** (1.05)	85.0%	9.33*** (1.69)	2.49*** (0.84)	92.5%
Model (4-2002W) <sup>3</sup>	143,592	16.19*** (1.07)	5.69*** (0.58)	84.9%	6.12*** (0.63)	3.90*** (0.48)	91.7%
Model (4-2003W)	333,096	8.71*** (0.52)	6.45*** (0.33)	78.4%	4.51*** (0.46)	4.12*** (0.30)	86.0%
Model (4-2004W) <sup>3</sup>	165,296	8.63*** (0.74)	4.04*** (0.55)	75.5%	3.78*** (0.56)	3.12*** (0.52)	83.2%
Model (4-2005W)	175,663	9.36*** (0.64)	4.51*** (0.48)	78.6%	5.64*** (0.67)	2.09*** (0.47)	85.0%
Model (4-2006W) <sup>3</sup>	171,136	10.80*** (0.60)	4.85*** (0.46)	89.5%	4.52*** (0.46)	2.00*** (0.42)	93.8%
Model (4-2007W)	134,138	10.64*** (0.66)	6.75*** (0.46)	83.7%	6.48*** (0.61)	3.91*** (0.46)	89.5%

Note: Robust standard errors in parentheses. Coefficients and standard errors for other explanatory variables are shown in Appendix 3.

\*\*\* Statistically significant at 1%, \*\* Statistically significant at 5%, \* Statistically significant at 10%.

<sup>1</sup>Model (4) from my original report estimated separately by year for wholesale channel loans only.

<sup>2</sup>Dummy variables are added for each of the brokers in the regression sample, as identified by the field "pm\_CLIENTID (Client or company code (use to identify the broker))":

5,039 brokers in 2001  
12,557 brokers in 2002  
24,721 brokers in 2003  
20,812 brokers in 2004  
23,240 brokers in 2005  
25,919 brokers in 2006  
21,125 brokers in 2007

<sup>3</sup>Regular standard errors (instead of robust standard errors) for Models (4-2002W), (4-2004W), and (4-2006W) with the brokers controls are given because robust standard errors are not calculable for these models with brokers controls.

**F. The “Data Gaps” Alleged by Professor Black Do Not Preclude Proof of Disparate Impact**

32. Professor Black also cites the gaps in the data set that Wells Fargo has made available for my analysis.<sup>38</sup> While I could update my analysis were Wells Fargo to provide values for the missing data, the data set currently includes a very large number of observations and is already substantially larger than most data sets used in other lending discrimination cases with which I am familiar. Moreover, Professor Black has offered no reasons to suggest why the gaps are anything but random or why their inclusion would reduce the racial disparities presented in my original report.

33. Professor Black also suggests that individual rate sheets should somehow be part of regression analysis in disparate impact litigation for mortgage lending.<sup>39</sup> In my experience, analysts do not typically use rate sheets as explanatory variables in regressions of this sort. Rather, as I did in my original report, the practice is to include variables to control for the credit and loan characteristics on which the rate sheets are based as well as controls for general market conditions of the sort employed in my original report through the month or week of rate lock. These variables that appear on individual rate sheets are included in the data set and used in the models in my original report.

**IV. RESPONSE TO PROFESSOR BLACK’S OPINION #2: DESPITE PROFESSOR BLACK’S MISCHARACTERIZATION OF MY TESTIMONY, APR REGRESSION ANALYSIS IS A RELIABLE METHOD TO EXPLAIN VARIATION ACROSS RACIAL & ETHNIC GROUPS**

34. On pages 28 to 31 of his report, Professor Black criticizes my use of “raw” differentials between mortgage pricing across racial groups.<sup>40</sup> Although my original report does

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38. *Black Class Certification Report* at 27.

39. *Id.* at 27-28.

40. *Id.* at 28-31.

include a brief review of raw differentials, this inclusion is purely for expositional purposes and my analysis and preferred Model (4) quite clearly include a very substantial number of controls. And the report and its appendices offer a very large number of alternative specifications with additional controls. The entire thrust of my analysis is to demonstrate the persistence of racial effects notwithstanding the inclusion of these controls. In short, my report is not based on “raw differentials.”

35. Professor Black also, somewhat puzzlingly, makes reference to the absence of unfavorable raw pricing disparities for Asians and other racial groups that are not included in the Plaintiff Class.<sup>41</sup> In my view, any price advantage for Asians or other racial groups does not excuse the disparities in African American and Hispanic loan prices.

**V. RESPONSE TO PROFESSOR BLACK’S OPINION #3: CONDUCTING SEPARATE ANALYSES OF DIFFERENT LOAN PRODUCTS AND CHANNELS IS INAPPROPRIATE IN DISPARATE IMPACT ANALYSIS, BUT NEVERTHELESS REVEALS SIGNIFICANT DISPARITIES**

36. In his report, Professor Black argues for a segmentation of analysis into a series of subsamples based on loan distribution channels and loan types.<sup>42</sup> Appropriate subsamples can be useful, and my original report includes a host of alternative specifications that includes subsamples for years, retail versus wholesale loans, prime versus nonprime loans, etc. But my preference, as set out in considerable detail in my original report, is to present aggregate data and to include explanatory variables that address legitimate business factors that affect lender costs of loan origination.<sup>43</sup>

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41. *Id.* at 31.

42. *Id.* at 31-38. Again, much of the academic literature that Professor Black cites does not involve issues of disparate impact litigation at issue here. See, e.g., Brent W. Ambrose & Anthony Pennington-Cross, *Local Economic Risk Factors and the Primary and Secondary Mortgage Markets*, 30 REG. SCI. URBAN ECON 683 (2000).

43. For example, Model (4) from my original report controls for whether the loan is a conventional or government (FHA/VA) loan and whether the loan is a purchase or refinance loan, two of the attributes Professor Black cites to in the subsampling section of his report. *Black Class Certification Report* at 31-33. Professor Black also

37. A number of considerations counsel in favor of this aggregate approach to data analysis. In addition to compromising the sample size, the use of individual loan products is problematic because it raises the possibility—demonstrated in other studies—that minority borrowers might be disproportionately represented in different loan channels or product types.<sup>44</sup> With such segmentation of customers, pricing differentials for similarly situated borrowers may not be detected in regression analyses that are limited to subsamples. Any possibility that minority borrowers might be distributed unevenly across Wells Fargo’s loan channels and product types is not merely theoretical. As presented in Table 6, the minority participation rate in some of the loan products that Professor Black has selected is twice as high as it is in other products.<sup>45</sup>

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refers to differences between retail and wholesale loans. *Black Class Certification Report* at 33-34. Model (4) does not control for whether the loan was a retail or wholesale loan, but a model controlling for this factor was presented as Model (20) in Appendix 5 of my original report. I also estimated Model (4) separately by retail and wholesale loans in Models (4-R) and (4-W) in Appendix 6 of my original report. Professor Black also refers to differences between prime and nonprime loans. *Black Class Certification Report* at 34-36. Model (4) does not control for whether a loan was prime or nonprime, but a model controlling for this factor (interacted with the business channels) was presented as Model (21) in Appendix 5 of my original report. I also estimated Model (4) separately by prime and nonprime loans in Models (4-P) and (4-NP) in Appendix 6 of my original report.

44. See John A. Karikari, *Neighborhood Patterns of Racial Steering in Subprime Mortgage Lending* (Sept. 2009), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1439854](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1439854) (“The estimates show that, in five of 22 major metropolitan cities (Baltimore, Chicago, Denver, Houston, and Tampa), applications for subprime loans in minority neighborhoods were more likely to be approved than applications for FHA loans, relative to non-minority (white neighborhoods – suggestions racial steering of subprime mortgage lending across these neighborhoods.”). Other academic work suggests that the costs of mortgages can vary greatly based on distribution channel. For example, researchers at the University of North Carolina at Chapel Hill found that borrowers who refinanced through mortgage brokers were more likely to receive adjustable-rate mortgages in general – with their more complex features – and high-cost ARMs in particular, than borrowers using retail lenders. Jonathan S. Spader & Roberto G. Quercia, *Mortgage Brokers and the Refinancing Transaction: Evidence from CRA Borrowers*, 10 J. REAL EST. FIN. ECON. (2009).

45. As set forth in Table 6, African-American participation rates vary from 4 to 29 percent while Hispanic participation rates vary from 7 to 22 percent.

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38. Although Plaintiffs do not allege illegal steering in this litigation, evidence of the sort presented in Table 6 counsels strongly for the aggregation of data across loan channels and product types as I present in my preferred Model (4). The better practice in my view is to control for the specific characteristics of each lending transaction (loan amount, loan characteristics, period until adjustment for adjustable mortgages, etc.) as the best way to reflect factors that legitimately affect loan quality and pricing. In my original report, I controlled for almost all of the features of loan products that Professor Black identifies as important, as well as many other controls of credit quality and underwriting risk.<sup>46</sup>

39. To perform an additional check for the significance of individual loan products on disparities, I reran the basic regression models substituting dummy variables for each of the unique loan product codes in place of the dummy variables for the 11 broader categories used in

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46. For example, Model (4) controls for the loan amount, whether the loan has a fixed or adjustable rate, the length of the adjustment period for adjustable rate loans, and the presence of an interest-only period in the loan.

my original Model (4).<sup>47</sup> The results of this analysis are presented in Table 7 below. While the regression coefficients for African American and Hispanic borrowers are typically lower when the individual product code dummy variables are utilized, the regression coefficients are all positive and statistically significant at the one percent level. Consequently, controlling for differences in loan product codes does not explain the differences in minority APRs.

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47. The original data from Wells Fargo contained 37 unique product codes, and I group three together that are all described in the data dictionary as 1-Year ARMs (ACE01, ARM01, ARM). I also add the term of the loan to the product code for loans with a product code of "FIX".

TABLE 7: APR BASIS POINT DISPARITIES WHEN CONTROLLING FOR INDIVIDUAL PRODUCT CODES

	Obs	No Control for Individual Product Codes <sup>1</sup>			With Individual Product Code Controls <sup>2</sup>		
		African American	Hispanic	Adj. R <sup>2</sup>	African American	Hispanic	Adj. R <sup>2</sup>
Model (4), all years	5,654,985	10.10*** (0.16)	6.39*** (0.11)	70.5%	8.27*** (0.14)	5.86*** (0.10)	75.6%
Model (4-2001)	528,370	8.42*** (0.50)	3.41*** (0.34)	75.6%	7.54*** (0.46)	3.06*** (0.31)	78.9%
Model (4-2002)	903,665	8.81*** (0.37)	5.67*** (0.25)	79.8%	8.43*** (0.33)	5.29*** (0.22)	84.3%
Model (4-2003)	1,409,772	7.86*** (0.27)	5.51*** (0.18)	76.8%	7.07*** (0.24)	5.15*** (0.16)	82.3%
Model (4-2004)	616,324	6.08*** (0.43)	3.19*** (0.31)	75.1%	5.46*** (0.39)	3.48*** (0.28)	79.7%
Model (4-2005)	770,517	5.31*** (0.35)	1.82*** (0.24)	67.2%	4.23*** (0.34)	1.80*** (0.23)	69.9%
Model (4-2006)	748,332	9.67*** (0.37)	4.55*** (0.27)	75.9%	6.39*** (0.31)	3.09*** (0.23)	80.9%
Model (4-2007)	678,005	6.60*** (0.34)	4.13*** (0.25)	68.2%	5.46*** (0.29)	3.29*** (0.22)	73.8%

*Note:* Robust standard errors in parentheses. Coefficients and standard errors for other explanatory variables are shown in Appendix 2.

\*\*\* Statistically significant at 1%, \*\* Statistically significant at 5%, \* Statistically significant at 10%.

<sup>1</sup>As reported in Table 6 of my original report.

<sup>2</sup>Dummy variables for each of 34 product codes are added to Model (4), and the dummy variables representing the 11 broader categories are dropped. The original data contained 37 unique product codes, and I group three together that are all described in the data dictionary as 1-Year ARMs (ACE01, ARM01, ARM). I also add the term of the loan to the product code for loans with a product code of "FIX".

40. Of course, the addition of controls for individual loan products may well disguise racial disparities with respect to similarly situated borrowers – one of several important considerations which led me not to include these controls in my preferred Model (4). To demonstrate this point, Table 8 reports the marginal effects on APR pricing estimated for particular loan products with similar loan terms. These estimates correspond to the first regression reported in Table 7. As shown in Table 8, the coefficient for the ALB26 (2-year/6-month ARM)

loan product, which is the loan product each named Plaintiff received and highlighted in bold typeface in Table 8, is extremely positive (plus 139.5 basis points) whereas most products with similar term structures (with the initial rate fixed for the first one to three years) have statistically significant negative coefficients. Most of the loan products with statistically negative coefficients are predominantly prime loans, whereas the loan products with statistically significant positive coefficients are nonprime loans. Table 8 also shows that minority borrowers comprised a much larger share of the more expensive nonprime loan products than their less expensive prime counterparts with similar term structures. For example, a very high percentage of ALB26 loans were made to African Americans (15%) and Hispanics (11%) relative to the less expensive loan products with negative coefficients. This analysis suggests that including individual loan product control variables is an example of included variable bias – their addition to the model biases the racial disparities downward because loan products that were more predominantly given to minorities have much higher coefficients than the loan products with similar terms that were less prevalent among minorities.



TABLE 8: MARGINAL EFFECTS ON APR FROM INDIVIDUAL LOAN PRODUCT CONTROL VARIABLES FOR ONE-TO-THREE-YEAR ARMS

REDACTED	Marginal Effect on APR (bps)	% Prime	% Af. Amer.	% Hisp.	% White	Mean Annual Income (\$000)	Mean FICO	Mean Loan Amount (\$000)
	-185.07***	97%	9%	10%	62%	83	668	184
	-133.13***	98%	2%	3%	52%	209	728	439
	-85.31	90%	0%	3%	17%	200	720	440
	<b>139.52***</b>	<b>0%</b>	<b>15%</b>	<b>11%</b>	<b>54%</b>	<b>72</b>	<b>613</b>	<b>165</b>
	330.88***	2%	23%	14%	48%	85	611	231
	-100.17***	100%	5%	6%	59%	130	711	276
	-180.85***	100%	2%	3%	47%	159	736	386
	34.17***	0%	11%	11%	57%	84	641	175
	257.77***	0%	13%	9%	54%	56	594	99
	-99.54***	100%	0%	1%	1%	89	661	266

*Note:* The marginal APR effects represent the coefficients for the individual product IDs for the regression shown in the third column of results in Appendix 2 and the top row of Table 7. This model is the same as my original Model (4) estimated over all loans in the data, with the exception that individual loan product controls are added, and the product category controls are removed (as discussed in note 2 of Table 7 above). Coefficients and standard errors for other explanatory variables are shown in Appendix 2.

41. Finally and tellingly, the alternative analysis of subsamples that Professor Black presents in his Table 1 does not actually refute my underlying findings of statistically significant racial disparate impacts for the vast majority of loans in the database.<sup>48</sup> Even when he fragments the data into twenty-six separate subsamples, Professor Black's analysis still suggests that the overwhelming majority of loans are located in the subchannels with statistically significant racial disparities for minority borrowers. Only the subchannels with a small number of loans have

48. *Black Class Certification Report* at 38.

negative or statistically insignificant disparities. The regressions in Professor Black's Table 1 cover 5.65 million loans. Of those 5.65 million loans, 97.6 percent are in subchannels for which Professor Black estimates statistically significant positive disparities for both African Americans and Hispanics. While the estimated coefficients for racial coefficients in the important subsamples are somewhat smaller than the ones estimated in my original report, they remain economically important for minority borrowers. Even so, Professor Black's subsampling by product and business channel is inappropriate for all the reasons stated above, and my aggregated analysis of the data is more appropriate.

#### **VI. RESPONSE TO PROFESSOR BLACK'S OPINION #4: WELLS FARGO DID MAINTAIN A DISCRETIONARY PRICING POLICY**

42. Professor Black takes issue with my discussion of Wells Fargo's Discretionary Pricing Policy.<sup>49</sup> As discussed in my original report, mortgage brokers working with Wells Fargo and the firm's retail consultants had, for the most part, some degree of discretion in pricing mortgages. Professor Black acknowledges that fact in his references to "limited discretion" and "bandwidth."<sup>50</sup> And, of course, Wells Fargo itself acknowledged the scope of discretion in the internal documents cited in my original report.<sup>51</sup> For these reasons, in my view, it is appropriate to characterize Wells Fargo as maintaining a Discretionary Pricing Policy.

#### **VII. RESPONSE TO PROFESSOR BLACK'S OPINION #5: THE TYPICALITY OF THE NAMED PLAINTIFFS' CLAIMS IS NOT CONTRADICTED BY PROFESSOR BLACK'S DISCUSSION OF THEIR INDIVIDUAL CHARACTERISTICS**

43. Professor Black also contends that named Plaintiffs in the case do not satisfy the requirements of typicality. To begin with, I disagree with Professor Black's initial assertion that

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49. *Id.* at 39-41.

50. *Id.* at 39.

51. *Jackson Class Certification Report* at 20-21.

named Plaintiffs are only typical of borrowers who participate in precisely the same loan product, here nonprime hybrid ARM ALB26 loans. I do not believe that such a limitation is appropriate nor, in my experience, have such restrictive typicality requirements been imposed in other disparate impact cases involving mortgage lending.<sup>52</sup> As demonstrated above in Table 6, Wells Fargo offered a large number of loans with very similar loan structures to the loan product received by the named Plaintiffs. To restrict analysis to borrowers of a single loan product would prevent a full analysis of pricing disparities across similarly situated consumers. Moreover, Wells Fargo's Discretionary Pricing Policy applied to a wide range of mortgage originations, which should be analyzed collectively.

44. Professor Black also contests the typicality of the named Plaintiffs – and to some degree my approach to measuring damages – on the grounds that some of the named Plaintiffs received an APR that was less than a hypothetically predicted APR that Professor Black generated by inserting the characteristics of the named Plaintiffs (other than race) and their loans in a regression estimated only for ALB26 loans.<sup>53</sup> Under my approach to damages, each member of the Plaintiff Class would be entitled to a measure of damages reflecting an estimate of the average loss to Class members.<sup>54</sup> Under the approach Professor Black apparently prefers, only those Class members with actual APRs exceeding the race-neutral APRs he predicts would be entitled to damages.

45. For several reasons, the approach presented in my original report is more appropriate. My approach offers a fairer and more effective remedy consistent with claims of

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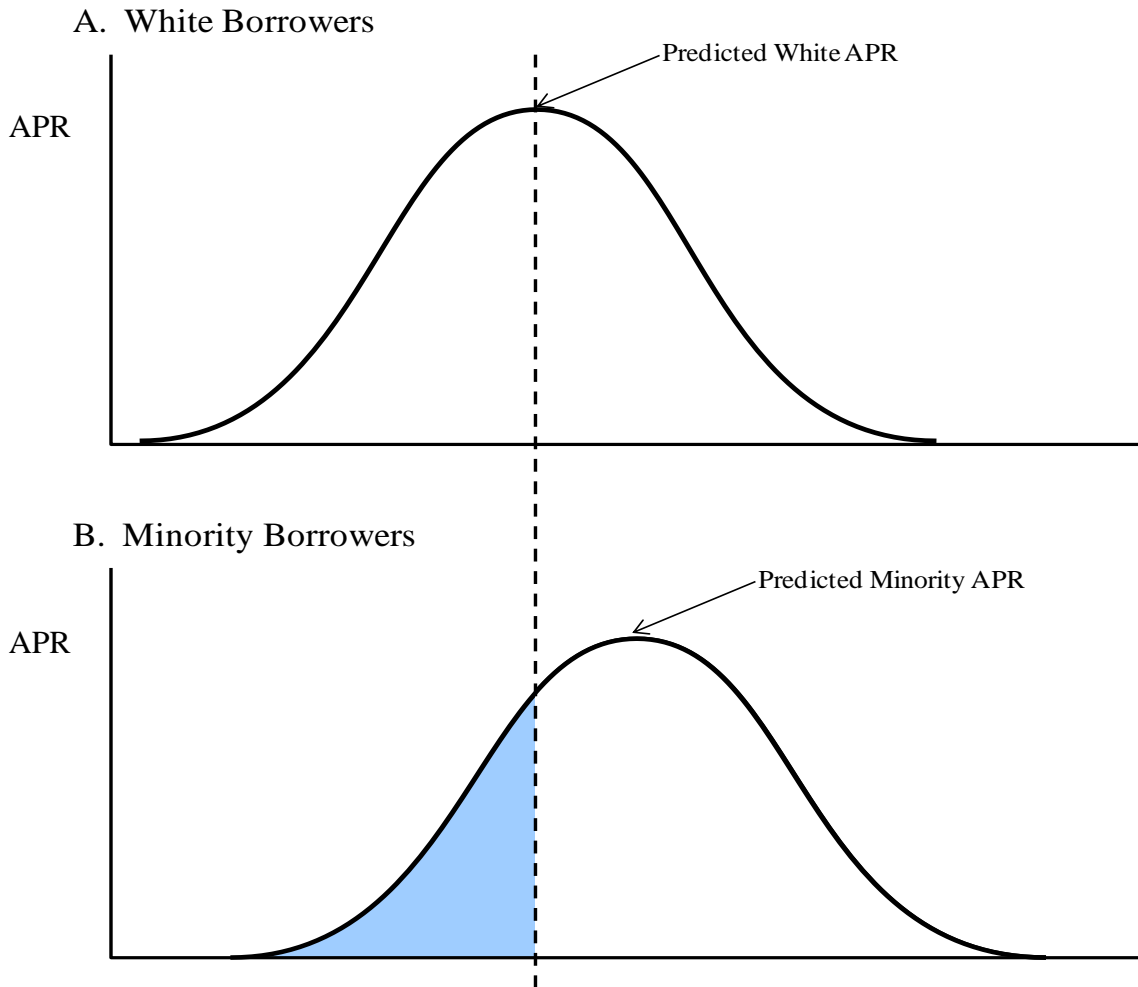
52. Order Granting Plaintiffs' Motion for Class Certification, *Ramirez v. Greenpoint Mortgage Funding*, Case No. C08-0369 TEH (N.D. Cal. 2010).

53. *Black Class Certification Report* at 44.

54. As explained in my original report, I believe we possess sufficient data to estimate damages under this approach and I am working on a model to do so.

disparate impact. To illustrate this point, consider Figure 1 (below). The Figure illustrates a pair of actual distributions of APRs for white borrowers and minorities with identical characteristics under a regression model of the sort I have used in my analyses. Because our models are not perfect—that is, because they don't explain all the variation in APRs—the actual distributions reflect a range of APRs for both whites (A) and minorities (B), but centered around two predicted APRs, which represents estimates of the APRs for both whites and minorities under the model. The predicted APR for whites is lower than the predicted APR for minorities. And the difference between those two predictions would be equal to the regression's estimate of racial disparity (in this case, on the order of 10 basis points for African Americans and something less than that for Hispanics).

FIGURE 1: DISTRIBUTION OF MINORITY APRS AS COMPARED TO WHITE APRS



46. Under Professor Black's approach, if the actual APR of a Class member is less than the APR that the model would predict for a white borrower with identical characteristics (that means in the shaded area of the distribution of actual minority APRs in Figure 1), then the Class member in question would not be entitled to relief and also should not be eligible to serve as a named Plaintiff. In my view, such an individual should be entitled to relief equal to the average damages suffered by Class members and should be entitled to serve as a named Plaintiff. I would offer several reasons. First, my approach recognizes that there will always be some variation in actual APRs that result in some borrowers getting better loan terms than our models predict. In the

absence of discrimination, some minority borrowers (as well as some white borrowers) would be in the extreme left hand side of the distribution with APRs, well below the model's predicted levels. My approach to damages—granting average relief to all members of the Class—would restore that equitable distribution, whereas Professor Black's approach would limit the ability of minority borrowers to obtain much better than predicted APRs. In essence, Professor Black's approach would keep minorities out of the extreme left side of the white-borrowers' distribution, even after compensation had been awarded. Conversely, Professor Black's approach would, in my view, overcompensate minority borrowers in the right hand side of the distribution by providing compensation awards that bring all such borrowers down to the predicted APR of white borrowers. Finally, to the extent that more educated minority borrowers are most likely to seek out legal assistance in redressing discriminatory lending practices and to the extent that these educated borrowers are more likely to negotiate somewhat better terms than others, Professor Black's approach to typicality will tend to reduce the effectiveness of civil rights enforcement in this field as it will tend to disqualify as named Plaintiffs the minority borrowers most likely to initiate litigation.

**VIII. RESPONSE TO PROFESSOR BLACK'S OPINION #6: AGGREGATE MONETARY CLASS RELIEF CAN BE COMPUTED TAKING ACCOUNT OF UPFRONT FEES AND PREPAYMENTS USING AVAILABLE DATA AND COMMON METHODOLOGY**

47. Finally, Professor Black touches briefly on the issue of the measurement of damages.<sup>55</sup> As explained above, I believe my general approach to damages offers a straightforward and fair way of providing relief to Class members. Moreover, as described in my original report, I believe it would be feasible to make adjustments for the damages of individual

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55. *Black Class Certification Report* at 44-45.

Class members to the extent that Wells Fargo can provide data on prepayment experience.<sup>56</sup> I remain prepared to present a more complete presentation on this issue at the merits phase of this litigation and believe that calculations of individual damages is feasible based on the information currently available and likely to be forthcoming in the future.

### IX. CONCLUSION

48. Professor Black's report includes no evidence that changes the underlying findings of disparate racial impact as presented in my original report. His arguments against statistical analysis of APR are contrary to standard practice. Notwithstanding Professor Black's arguments, the demand-side factors he cites are invalid for use in a disparate impact analysis and his speculation about variations in mortgage broker costs do not withstand scrutiny. I also disagree with Professor Black's arguments for modeling disparate impact separately through numerous separate subsamples based on distribution channels and loan products and with his assertion that the levels of racial disparity reported in my original report are not economically significant. Professor Black's discussion of the differences between some of the individual named Plaintiffs' loan costs and the costs predicted by a regression model does not disprove the typicality of their claims on behalf of the Class. Finally, my model for estimating monetary relief is adaptable to incorporating additional data on loan servicing as discussed in my original report.

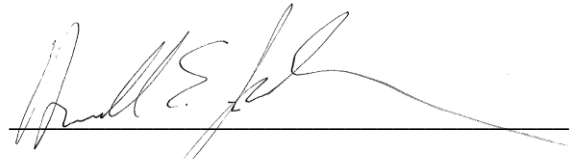
\* \* \*

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

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56. According to Wells Fargo deposition witnesses, Wells Fargo serviced the loans it originated and maintains relevant servicing data. Deposition of James Wyble at 163 (Feb. 6, 2009); Deposition of Kevin C. Kelly at 44-45, 118-120 (Jan. 8, 2009).

Executed on September 16, 2010.

A handwritten signature in black ink, appearing to read 'Howell E. Jackson', is written over a solid horizontal line. The signature is fluid and cursive, with the first name 'Howell' being the most prominent.

Howell Edmunds Jackson



**APPENDIX 1: MATERIALS RELIED UPON**

All Materials Relied Upon in the Class Certification Report of Howell E. Jackson, Aug. 6, 2010.

*Testimony:*

Expert Report of Harold A. Black, PhD., Sept. 3, 2010.

Class Certification Report of Howell E. Jackson, Aug. 6, 2010.

*Court Cases:*

*Dukes v. Wal-Mart Stores, Inc.*, 603 F.3d 571, 603-604 (9th Cir. 2010) (en banc).

Order Granting Plaintiffs' Motion for Class Certification, *Ramirez v. Greenpoint Mortgage Funding*, Case No. C08-0369 TEH (N.D. Cal. 2010).

*Data:*

U.S. Department of Labor, Bureau of Labor Statistics, *Consumer Expenditure Survey*, available at <http://www.bls.gov/cex/>.

*Laws, Regulations, and Other Government Publications:*

Department of Housing & Urban Development, Real Estate Settlement Procedures Act (RESPA): Proposed Rule To Simplify and Improve the Process of Obtaining Mortgages and Reduce Consumer Settlement Costs, Proposed Rule, 73 Fed. Reg. 14,030 (Mar. 14, 2008).

Department of Housing & Urban Development, Real Estate Settlement Procedures Act (RESPA): Rule To Simplify and Improve the Process of Obtaining Mortgages and Reduce Consumer Settlement Costs, Final Rule, 73 Fed. Reg. 68,204 (Nov. 17, 2008).

Federal Reserve System, Truth in Lending, Proposed Rule, 73 Fed. Reg. 1,672 (Jan. 9, 2008).

Federal Reserve System, Truth in Lending, Final Rule, 73 Fed. Reg. 44,522 (July 30, 2008).

The Secure and Fair Enforcement for Mortgage Licensing Act of 2008, 12 U.S.C. 5101 et seq. (2008).

Dodd-Frank Wall Street Reform and Consumer Protection Act, H.R. 4173, 111th Cong. (2010).

*Academic Articles & Other Studies, Presentations:*

William P. Alexander et al., *Some Loans Are More Equal than Others: Third-Party Originations and Defaults in the Subprime Mortgage Industry*, 30 REAL EST. ECON. 667 (2002)

Brent W. Ambrose & Anthony Pennington-Cross, *Local Economic Risk Factors and the Primary and Secondary Mortgage Markets*, 30 REG. SCI. URBAN ECON 683 (2000).

Ian Ayres, *Testing for Discrimination and the Problem of "Included Variable Bias"* (2010), available at <http://islandia.law.yale.edu/ayers/ayresincludedvariablebias.pdf>.

Oren Bar-Gill, *The Law, Economics and Psychology of Subprime Mortgage Contracts*, 94 CORNELL L. REV. 1073 (2009).

Eric S. Belsky & Susan Wachter, *The Public Interest in Consumer and Mortgage Credit Markets* (Mar. 2010).

Antje Berndt et al., *The Role of Mortgage Brokers in the Subprime Crisis* (June 30, 2010), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1573312](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1573312).

Thomas P. Boehm, Paul D. Thistle & Alan Schlottmann, *Races and Race: An Analysis of Racial Disparities in Mortgage Rates*, HOUSING POL'Y DEBATE 109 (2006).

Kathleen C. Engel & Patricia A. McCoy, *A Tale of Three Markets: The Law and Economics of Predatory Lending*, 80 TEXAS L. REV. 1255 (2002).

Edward Golding, Richard K. Green & Douglas A. McManus, *Imperfect Information and the Housing Finance Crisis* (Feb. 2008) (Joint Center for Housing Studies, Harvard University).

Edward M. Gramlich, The Urban Institute, *Booms and Busts: The Case of Subprime Mortgages* (Aug. 31, 2007), available at [http://www.urban.org/UploadedPDF/411542\\_Gramlich\\_final.pdf](http://www.urban.org/UploadedPDF/411542_Gramlich_final.pdf).

Cassandra Jones Havard, *Democratizing Credit: Examining the Structural Inequities of Subprime Lending*, 56 SYRACUSE L. REV. 233 (2006).

Claire A. Hill, *Who Were the Villains in the Subprime Crisis, and Why it Matters*, 4 ENTREPRENEURIAL BUS. L. J. 323 (2010).

John A. Karikari, *Neighborhood Patterns of Racial Steering in Subprime Mortgage Lending* (Sept. 2009), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1439854](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1439854).

- Morris M. Kleiner & Richard M. Todd, *Mortgage Broker Regulations that Matter: Analyzing Earnings, Employment and Outcomes for Consumers* (Dec. 2007), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1077810](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1077810).
- Michael LaCour-Little, *The Home Purchase Mortgage Preferences of Low-and-Moderate Income Households*, 35 REAL ESTATE ECON. 265 (2007).
- Isaac F. Megbolugbe & Man Cho, *An Empirical Analysis of Metropolitan Housing and Mortgage Markets*, 4 J. HOUSING RES. 191 (1993).
- Maya Sen, *Quantifying Discrimination: The Role of Race and Gender in the Awarding of Subprime Mortgage Loans* (Apr. 20, 2010), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1593183](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1593183).
- Jonathan S. Spader & Roberto G. Quercia, *Mortgage Brokers and the Refinancing Transaction: Evidence from CRA Borrowers*, 10 J. REAL EST. FIN. ECON. (2009).
- Mitchell Stengel & Dennis Glennon, *Evaluating Statistical Models of Mortgage Lending Discrimination: A Bank-Specific Analysis*, Working Paper 95-3, Office of the Comptroller of the Currency, May 1995, available at <http://www.occ.treas.gov/ftp/workpaper/wp95-3.pdf>.
- Susan E. Woodward, *Consumer Confusion in the Mortgage Market*, Sand Hill Econometrics Paper (July 14, 2003), available at [http://www.sandhillecon.com/pdf/consumer\\_confusion.pdf](http://www.sandhillecon.com/pdf/consumer_confusion.pdf).
- Susan E. Woodward & Robert E. Hall, *Diagnosing Consumer Confusion and Sub-Optimal Shopping Effort: Theory and Mortgage-Market Evidence* (May 2010), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1612602](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1612602).
- Todd J. Zywicki & Joseph D. Adamson, *The Law & Economics of Subprime Lending*, 80 U. COLO. L. REV. 1 (2009).



Dependent variable: APR (basis points)	Original Model (4)	Model (4), Add Prime & Prime x FICO Interactions <sup>1</sup>	Substitute Product Code Dummies for Broader Product Category Dummies from Original Model (4) <sup>2</sup>							
			Model (4)	Model (4-2001)	Model (4-2002)	Model (4-2003)	Model (4-2004)	Model (4-2005)	Model (4-2006)	Model (4-2007)
			All Years	2001 Loans	2002 Loans	2003 Loans	2004 Loans	2005 Loans	2006 Loans	2007 Loans
Prime x (580 <= FICO < 600)		-177.68*** (2.64)								
Prime x (600 <= FICO < 620)		-164.32*** (2.62)								
Prime x (620 <= FICO < 640)		-112.94*** (2.61)								
Prime x (640 <= FICO < 660)		-94.22*** (2.60)								
Prime x (660 <= FICO < 680)		-70.23*** (2.61)								
Prime x (680 <= FICO < 700)		-47.23*** (2.62)								
Prime x (700 <= FICO < 720)		-31.57*** (2.63)								
Prime x (720 <= FICO < 740)		-23.22*** (2.66)								
Prime x (740 <= FICO < 760)		-16.40*** (2.70)								
Prime x (760 <= FICO < 780)		-6.32** (2.74)								
Prime x (780 <= FICO < 800)		5.04* (2.84)								
\$0K < Loan Amount <= \$40K	76.44*** (0.56)	57.21*** (0.53)	70.34*** (0.56)	49.30*** (2.01)	70.55*** (1.49)	75.72*** (1.38)	101.32*** (1.59)	85.96*** (1.01)	47.77*** (1.40)	58.23*** (1.15)
\$40K < Loan Amount <= \$50K	53.82*** (0.49)	42.38*** (0.48)	47.29*** (0.49)	22.47*** (1.63)	46.32*** (1.29)	56.72*** (1.30)	74.30*** (1.48)	60.42*** (0.81)	22.21*** (1.28)	40.50*** (0.98)
\$50K < Loan Amount <= \$75K	35.02*** (0.44)	28.24*** (0.44)	28.65*** (0.44)	6.91*** (1.55)	28.56*** (1.23)	40.21*** (1.26)	51.59*** (1.34)	39.99*** (0.54)	-1.56 (1.05)	27.56*** (0.73)
\$75K < Loan Amount <= \$150K	11.31*** (0.42)	7.44*** (0.43)	6.31*** (0.43)	-8.49*** (1.54)	9.81*** (1.21)	20.66*** (1.25)	26.60*** (1.31)	15.63*** (0.44)	-27.19*** (0.99)	1.06 (0.65)
\$150K < Loan Amount <= \$275K	-5.75*** (0.42)	-7.62*** (0.43)	-9.43*** (0.43)	-23.37*** (1.53)	-6.13*** (1.21)	5.24*** (1.25)	8.66*** (1.30)	1.10*** (0.42)	-37.26*** (0.97)	-11.15*** (0.63)
\$275K < Loan Amount <= Conforming Limit	-11.13*** (0.42)	-11.82*** (0.43)	-14.18*** (0.43)	-25.80*** (1.99)	-12.36*** (1.22)	-2.20* (1.25)	1.19 (1.30)	-4.25*** (0.42)	-38.89*** (0.95)	-15.95*** (0.62)
Conforming Limit < Loan Amount <= \$1 Million	-11.66*** (0.41)	-11.52*** (0.43)	-12.02*** (0.43)	-3.89** (1.51)	-2.86** (1.20)	9.17*** (1.24)	4.28*** (1.28)	-0.61 (0.39)	-30.04*** (0.93)	-3.93*** (0.61)
36% < Debt-to-Income Ratio <= 50%	1.15*** (0.07)	1.08*** (0.06)	1.28*** (0.06)	0.37*** (0.14)	1.07*** (0.11)	0.90*** (0.09)	2.09*** (0.15)	1.24*** (0.13)	0.70*** (0.17)	1.67*** (0.14)
Debt-to-Income Ratio > 50%	4.10*** (0.13)	3.19*** (0.11)	0.94*** (0.12)	0.31 (0.35)	-1.52*** (0.23)	-1.66*** (0.18)	2.58*** (0.32)	-0.08 (0.28)	1.01*** (0.30)	1.94*** (0.26)
Debt-to-Income Ratio Missing	11.63*** (0.33)	9.91*** (0.30)	16.53*** (0.32)	-6.02*** (0.65)	12.17*** (0.53)	5.09*** (0.38)	-3.85*** (0.89)	43.67*** (1.01)	31.52*** (1.19)	26.67*** (1.07)
28% < Housing Debt-to-Income Ratio <= 33%	2.19*** (0.09)	0.83*** (0.08)	1.72*** (0.08)	1.07*** (0.21)	1.46*** (0.15)	2.55*** (0.13)	3.58*** (0.21)	0.60*** (0.18)	-0.38* (0.21)	0.46** (0.18)
33% < Housing Debt-to-Income Ratio <= 40%	4.74*** (0.11)	2.02*** (0.10)	3.42*** (0.10)	2.71*** (0.28)	3.00*** (0.20)	4.04*** (0.17)	4.80*** (0.26)	1.13*** (0.21)	0.67*** (0.24)	1.51*** (0.21)
Housing Debt-to-Income Ratio > 40%	8.96*** (0.16)	3.11*** (0.14)	5.56*** (0.14)	3.47*** (0.42)	3.07*** (0.28)	4.41*** (0.24)	4.12*** (0.38)	2.40*** (0.31)	2.83*** (0.33)	1.99*** (0.30)
Housing Debt-to-Income Ratio Missing	10.27*** (0.25)	7.39*** (0.22)	10.54*** (0.23)	5.84*** (0.54)	5.93*** (0.40)	8.35*** (0.30)	-0.22 (0.74)	4.39*** (0.76)	4.77*** (0.82)	2.86*** (0.72)
LTV missing	-20.24*** (0.21)	-35.64*** (0.19)	-28.77*** (0.19)	-31.81*** (7.07)	-35.20*** (1.27)	-28.76*** (0.41)	-53.08*** (0.48)	-21.27*** (0.47)	-30.56*** (0.55)	-35.52*** (0.53)
0% < LTV <= 60%	-59.98*** (0.17)	-57.27*** (0.16)	-57.53*** (0.16)	-72.09*** (0.96)	-49.54*** (0.29)	-58.50*** (0.22)	-61.24*** (0.44)	-60.22*** (0.45)	-72.33*** (0.59)	-65.58*** (0.47)
60% < LTV <= 70%	-62.25*** (0.17)	-60.50*** (0.16)	-59.62*** (0.16)	-64.77*** (0.63)	-52.33*** (0.29)	-60.99*** (0.22)	-63.86*** (0.41)	-60.88*** (0.44)	-73.16*** (0.54)	-64.34*** (0.45)

	Original Model (4)	Model (4), Add Prime & Prime x FICO Interactions <sup>1</sup>	Substitute Product Code Dummies for Broader Product Category Dummies from Original Model (4) <sup>2</sup>							
			Model (4)	Model (4-2001)	Model (4-2002)	Model (4-2003)	Model (4-2004)	Model (4-2005)	Model (4-2006)	Model (4-2007)
Dependent variable: APR (basis points)			All Years	2001 Loans	2002 Loans	2003 Loans	2004 Loans	2005 Loans	2006 Loans	2007 Loans
70% < LTV <= 80%	-60.30*** (0.14)	-60.01*** (0.13)	-60.14*** (0.12)	-59.98*** (0.42)	-55.28*** (0.19)	-62.41*** (0.32)	-63.44*** (0.32)	-64.13*** (0.33)	-75.01*** (0.33)	-63.58*** (0.28)
80% < LTV <= 90%	-14.02*** (0.19)	-19.58*** (0.17)	-17.90*** (0.17)	-27.78*** (0.54)	-18.20*** (0.35)	-24.94*** (0.25)	-19.16*** (0.44)	-9.94*** (0.44)	-13.26*** (0.47)	-9.35*** (0.40)
CLTV missing	-2.80*** (0.21)	-11.60*** (0.18)	-3.17*** (0.19)	14.01*** (1.23)	-6.94*** (0.45)	11.26*** (0.56)	1.68*** (0.39)	-9.69*** (0.39)	2.13*** (0.67)	29.96*** (0.95)
0% < CLTV <= 60%	-22.22*** (0.18)	-23.56*** (0.17)	-20.75*** (0.17)	26.88*** (1.30)	-16.02*** (0.36)	-9.70*** (0.20)	-11.73*** (0.42)	-28.51*** (0.49)	-29.64*** (0.66)	-15.66*** (0.53)
60% < CLTV <= 70%	-18.70*** (0.18)	-20.73*** (0.17)	-17.49*** (0.17)	21.28*** (0.97)	-12.40*** (0.36)	-5.53*** (0.20)	-8.75*** (0.39)	-27.17*** (0.46)	-28.60*** (0.59)	-16.62*** (0.51)
70% < CLTV <= 80%	-16.07*** (0.14)	-17.18*** (0.13)	-13.62*** (0.13)	17.16*** (0.78)	-9.78*** (0.32)	-3.23*** (0.17)	-4.48*** (0.28)	-19.49*** (0.32)	-19.47*** (0.34)	-12.23*** (0.31)
80% < CLTV <= 90%	-13.54*** (0.16)	-13.85*** (0.15)	-11.15*** (0.15)	19.40*** (0.81)	-6.08*** (0.34)	-1.68*** (0.19)	-3.38*** (0.30)	-18.25*** (0.35)	-19.17*** (0.38)	-12.55*** (0.35)
90% < CLTV <= 95%	-12.14*** (0.15)	-12.63*** (0.14)	-10.74*** (0.13)	14.44*** (0.62)	-5.99*** (0.30)	-4.76*** (0.18)	-7.13*** (0.29)	-13.75*** (0.32)	-10.92*** (0.33)	-6.85*** (0.29)
FHA Loan	-52.37*** (0.20)	-26.27*** (0.17)	-30.15*** (0.16)	6.90*** (0.59)	-6.90*** (0.35)	-17.74*** (0.26)	-40.41*** (0.50)	-56.82*** (0.51)	-68.64*** (0.49)	-29.96*** (0.41)
VA Loan	-71.55*** (0.26)	-57.73*** (0.22)	-65.03*** (0.23)	-32.71*** (0.75)	-42.01*** (0.48)	-56.82*** (0.35)	-54.62*** (0.74)	-78.73*** (0.85)	-96.65*** (0.68)	-69.25*** (0.49)
FSA/RHS Loan	-78.45*** (0.71)	-65.64*** (0.58)	-70.03*** (0.63)	-24.58*** (1.36)	-48.74*** (1.31)	-61.21*** (1.03)	-62.48*** (1.65)	-73.60*** (1.64)	-108.80*** (1.57)	-84.45*** (0.95)
Self-employed borrower or co-borrower	4.37*** (0.10)	2.40*** (0.09)	3.23*** (0.09)	2.35*** (0.20)	1.19*** (0.14)	1.38*** (0.12)	1.87*** (0.23)	2.53*** (0.22)	2.85*** (0.24)	4.53*** (0.21)
Cash-out Refi	10.23*** (0.09)	2.67*** (0.08)	8.31*** (0.09)	5.88*** (0.21)	1.31*** (0.16)	3.83*** (0.14)	10.41*** (0.24)	10.64*** (0.20)	21.47*** (0.23)	15.81*** (0.19)
Rate Term Refi	-3.82*** (0.08)	-3.04*** (0.07)	-3.10*** (0.07)	1.27*** (0.16)	-7.31*** (0.12)	-7.56*** (0.11)	-4.92*** (0.18)	-4.22*** (0.19)	5.04*** (0.23)	4.16*** (0.18)
Streamline Refi	-2.33*** (0.24)	2.00*** (0.19)	-1.82*** (0.20)	-6.57*** (0.58)	-9.27*** (0.41)	-5.94*** (0.25)	-4.87*** (0.66)	-25.72*** (0.86)	-4.88*** (1.19)	-7.58*** (0.91)
Unknown loan purpose	38.37*** (4.51)	39.32*** (3.98)	47.33*** (3.86)	36.88*** (7.67)	50.43*** (3.39)	47.35*** (5.49)	-29.49* (15.16)	19.63** (9.73)	-115.86*** (31.75)	14.84 (16.70)
Loan Term Missing	11.68*** (0.19)	14.95*** (0.16)	13.33*** (0.16)	-1.37 (5.03)	-3.83*** (1.23)	17.28*** (0.26)	10.86*** (2.19)	21.81*** (4.62)	32.46*** (10.44)	59.26*** (13.59)
Loan Term (years) <= 5	-19.30 (13.80)	-7.68 (13.64)	-15.44 (13.74)	-37.86*** (14.44)	59.45 (58.47)	112.31*** (33.03)		15.91 (56.09)	118.79* (61.27)	106.46 (183.89)
5 < Loan Term (years) <= 7	-3.11*** (0.78)	-2.31*** (0.74)	-4.04*** (0.75)	-5.07*** (0.68)	8.06*** (2.36)	40.41*** (7.89)	-8.69 (5.81)	-57.03*** (17.41)	281.40*** (15.71)	258.57*** (28.47)
7 < Loan Term (years) <= 10	-6.49*** (1.25)	3.55*** (1.26)	-0.53 (1.25)	51.26*** (5.87)	-12.04*** (2.88)	8.32*** (1.31)	-7.01* (4.25)	4.10 (9.35)	25.24 (15.58)	88.25*** (14.74)
10 < Loan Term (years) <= 15	-13.81*** (0.20)	-12.85*** (0.17)	-8.86*** (0.18)	-7.73*** (0.48)	-5.19*** (0.22)	-5.44*** (0.23)	-16.13*** (3.24)	-13.74* (7.51)	-13.85 (14.70)	50.75*** (13.01)
15 < Loan Term (years) <= 20	-5.12*** (0.28)	-1.56*** (0.25)	-3.92*** (0.26)	-5.71*** (1.07)	-2.35*** (0.36)	-4.48*** (0.30)	-10.32*** (1.92)	-0.69 (2.22)	19.00*** (2.91)	16.33*** (1.93)
20 < Loan Term (years) <= 25	4.43*** (0.38)	7.32*** (0.30)	2.30*** (0.34)	0.24 (0.67)	-1.32** (0.52)	-4.53*** (0.42)	-11.74*** (1.36)	-9.10*** (1.51)	8.59*** (2.35)	4.01*** (1.56)
Loan Term (years) > 30	-19.22*** (2.76)	-20.20*** (2.70)	-10.09*** (3.17)	-12.25*** (0.80)	23.09** (9.46)				14.91*** (3.53)	-29.10*** (5.13)
Investment, Single Family	51.20*** (0.21)	50.23*** (0.19)	51.99*** (0.20)	51.41*** (0.53)	48.02*** (0.38)	47.83*** (0.33)	42.62*** (0.50)	45.19*** (0.47)	62.03*** (0.49)	59.24*** (0.43)
Investment, Multi Family 2	46.17*** (0.43)	44.34*** (0.41)	50.06*** (0.40)	52.98*** (1.20)	48.58*** (0.75)	46.87*** (0.69)	46.26*** (1.07)	46.65*** (0.95)	61.79*** (1.04)	57.12*** (1.02)
Investment, Multi Family 3	50.47*** (0.84)	46.32*** (0.76)	53.71*** (0.82)	55.11*** (2.13)	45.71*** (1.27)	42.67*** (1.26)	57.98*** (2.28)	58.25*** (1.98)	69.44*** (2.12)	56.04*** (2.01)
Investment, Multi Family 4	49.02*** (0.64)	46.05*** (0.59)	51.86*** (0.62)	52.23*** (1.61)	43.30*** (0.90)	42.77*** (0.92)	56.31*** (1.68)	54.27*** (1.63)	66.06*** (1.76)	56.29*** (1.56)

Dependent variable: APR (basis points)	Original Model (4)	Model (4), Add Prime & Prime x FICO Interactions <sup>1</sup>	Substitute Product Code Dummies for Broader Product Category Dummies from Original Model (4) <sup>2</sup>							
			Model (4)	Model (4-2001)	Model (4-2002)	Model (4-2003)	Model (4-2004)	Model (4-2005)	Model (4-2006)	Model (4-2007)
			All Years	2001 Loans	2002 Loans	2003 Loans	2004 Loans	2005 Loans	2006 Loans	2007 Loans
Investment, Low Rise Condo	45.75*** (0.40)	44.89*** (0.36)	45.45*** (0.38)	45.71*** (0.69)	42.06*** (1.01)	40.11*** (0.96)	35.60*** (0.84)	37.96*** (0.85)	51.24*** (0.85)	52.09*** (0.75)
Investment, High Rise Condo	48.77*** (1.07)	49.18*** (1.03)	51.17*** (1.08)	48.76*** (2.67)	42.76*** (2.65)	38.64*** (1.90)	34.79*** (2.66)	38.67*** (2.58)	50.53*** (2.06)	50.73*** (1.95)
Investment, Co-op	34.72*** (2.27)	48.26*** (2.08)	44.56*** (2.22)	48.16*** (2.09)		36.00*** (0.29)			89.98*** (12.64)	56.62*** (13.01)
Primary home, Multi Family 2	8.61*** (0.30)	4.99*** (0.28)	7.50*** (0.27)	9.97*** (0.77)	8.74*** (0.50)	7.90*** (0.40)	6.25*** (0.72)	-0.49 (0.77)	9.56*** (0.75)	8.87*** (0.60)
Primary home, Multi Family 3	18.47*** (0.85)	12.81*** (0.76)	19.34*** (0.72)	17.78*** (1.82)	13.80*** (1.19)	12.53*** (1.00)	17.89*** (1.82)	17.45*** (2.39)	26.23*** (2.75)	21.34*** (1.48)
Primary home, Multi Family 4	22.04*** (1.09)	17.15*** (0.98)	21.80*** (0.94)	23.23*** (2.52)	19.35*** (1.53)	14.38*** (1.35)	22.03*** (2.56)	19.79*** (3.14)	22.18*** (3.02)	21.25*** (2.40)
Primary home, Low Rise Condo	-0.93*** (0.12)	0.25** (0.11)	0.81*** (0.11)	0.76*** (0.27)	1.21*** (0.19)	0.07 (0.15)	1.15*** (0.25)	-0.49** (0.24)	1.83*** (0.27)	0.54** (0.24)
Primary home, Townhouse (detached)	6.27*** (0.31)	11.92*** (0.27)	3.81*** (0.27)				-22.12*** (0.37)			
Primary home, High Rise Condo	3.86*** (0.31)	4.42*** (0.30)	5.12*** (0.29)	0.84 (0.66)	1.38*** (0.51)	1.53*** (0.37)	1.21** (0.55)	1.37** (0.56)	5.01*** (0.67)	3.93*** (0.57)
Primary home, Co-op	-1.89*** (0.35)	7.43*** (0.29)	2.08*** (0.32)	1.38*** (0.49)	-0.11 (0.57)	-2.11*** (0.50)	2.65*** (0.74)	-1.47** (0.63)	2.80*** (0.96)	1.94*** (0.71)
Primary home, 'P' (undefined)	17.13 (21.06)	23.99 (15.71)	13.98 (14.79)	11.26 (14.85)	25.37 (20.11)				-118.61*** (5.57)	
Second home, Single Family	6.09*** (0.15)	7.02*** (0.14)	6.94*** (0.14)	7.30*** (0.33)	4.80*** (0.24)	3.95*** (0.20)	3.45*** (0.32)	3.99*** (0.28)	8.12*** (0.34)	8.76*** (0.29)
Second home, Multi Family 2	6.45*** (1.33)	5.40*** (1.31)	8.06*** (1.24)	12.92*** (2.56)	10.89*** (1.93)	7.12*** (1.50)	3.24 (2.87)	9.49*** (2.41)	10.27*** (2.86)	13.33*** (3.21)
Second home, Multi Family 3	39.38** (16.88)	28.82 (18.06)	54.46*** (19.54)		3.63 (2.65)	-108.82*** (0.46)	76.24*** (14.32)	54.18*** (18.48)	43.29*** (15.48)	98.46*** (36.95)
Second home, Multi Family 4	29.22 (18.93)	12.96 (16.53)	27.68* (16.14)	39.79*** (1.06)	121.53*** (46.86)	-68.19 (66.38)	43.52 (29.80)	17.83 (35.57)	-19.46 (34.14)	68.04*** (17.71)
Second home, Low Rise Condo	7.27*** (0.23)	8.63*** (0.21)	8.66*** (0.21)	7.20*** (0.51)	4.10*** (0.36)	3.63*** (0.30)	3.34*** (0.48)	5.34*** (0.37)	10.26*** (0.48)	8.25*** (0.43)
Second home, High Rise Condo	16.26*** (0.51)	16.10*** (0.50)	16.94*** (0.51)	8.39*** (1.23)	6.54*** (1.01)	5.84*** (0.65)	5.39*** (0.94)	7.75*** (0.84)	12.52*** (1.15)	12.31*** (0.88)
Second home, Co-op	-10.66*** (1.09)	0.54 (1.00)	-4.78*** (1.02)	-0.88 (1.05)	46.15** (20.01)	10.51 (9.24)	10.38** (4.42)	11.91*** (2.60)	10.80*** (2.31)	3.85* (2.24)
Dome	2.50 (4.74)	4.97 (4.61)	4.12 (4.34)	25.55* (14.11)	5.71 (6.24)	10.20 (7.61)	-8.53 (8.58)	-9.01 (15.01)	7.18 (6.51)	-2.50 (7.84)
Earthen Home	5.15 (3.34)	7.53** (3.34)	5.66* (3.24)	-2.71 (5.31)	8.09* (4.81)	1.95 (3.62)	10.26* (6.00)	0.10 (4.42)	7.48 (9.67)	0.21 (7.76)
Hotel-Condo	28.75*** (3.39)	12.99*** (3.66)	27.39*** (3.46)	74.71*** (20.64)	49.90*** (13.17)	46.99*** (6.79)	58.82*** (6.07)	2.84 (5.55)	14.89* (8.42)	27.40*** (5.25)
Log Home	4.48*** (0.98)	5.95*** (0.94)	5.09*** (0.96)	-2.07 (2.87)	4.83** (2.32)	4.88*** (1.69)	-3.31 (2.47)	2.01 (1.68)	2.51 (1.79)	5.16*** (1.67)
Manufactured Home	13.59*** (0.23)	22.28*** (0.20)	17.77*** (0.21)	8.70*** (1.00)	13.96*** (0.66)	18.54*** (0.48)	19.62*** (0.46)	21.61*** (0.47)	21.65*** (0.48)	30.16*** (0.45)
Bankruptcy within 7 years present on credit report	18.10*** (0.25)	12.33*** (0.22)	12.70*** (0.22)		9.51*** (0.60)	9.80*** (0.37)	14.41*** (0.48)	14.84*** (0.51)	11.33*** (0.48)	8.22*** (0.44)
Foreclosure within 7 years present on credit report	23.94*** (0.53)	13.57*** (0.47)	17.07*** (0.48)		13.37*** (1.25)	14.33*** (0.84)	19.92*** (1.07)	18.16*** (1.10)	9.95*** (0.91)	7.35*** (0.92)
Judgement present on credit report	11.17*** (0.24)	4.57*** (0.21)	8.15*** (0.22)	25.23*** (0.71)	7.18*** (0.58)	6.99*** (0.36)	8.09*** (0.48)	7.79*** (0.50)	7.46*** (0.46)	4.60*** (0.42)
Collections present on credit report	3.41*** (0.09)	0.53*** (0.08)	2.29*** (0.09)		3.26*** (0.19)	1.08*** (0.12)	1.67*** (0.19)	4.27*** (0.20)	2.81*** (0.22)	0.23 (0.19)
Late mortgage payment present on credit report	20.49*** (0.33)	1.42*** (0.28)	12.25*** (0.29)		-23.62*** (6.65)	16.26*** (0.61)	14.51*** (0.56)	11.11*** (0.57)	13.33*** (0.49)	9.37*** (0.54)

	Original Model (4)	Model (4), Add Prime & Prime x FICO Interactions <sup>1</sup>	Substitute Product Code Dummies for Broader Product Category Dummies from Original Model (4) <sup>2</sup>							
			Model (4)	Model (4-2001)	Model (4-2002)	Model (4-2003)	Model (4-2004)	Model (4-2005)	Model (4-2006)	Model (4-2007)
Dependent variable: APR (basis points)			All Years	2001 Loans	2002 Loans	2003 Loans	2004 Loans	2005 Loans	2006 Loans	2007 Loans
Late payment (non-mortgage) present on credit report	3.75*** (0.26)	-3.99*** (0.22)	0.89*** (0.23)		23.44*** (6.68)	0.30 (0.40)	3.73*** (0.44)	3.43*** (0.48)	2.14*** (0.45)	0.19 (0.40)
Doc type: Missing/Unknown	-26.06*** (0.72)	-14.79*** (0.69)	-15.21*** (0.71)		-190.84** (82.17)	1.71 (5.85)	-8.35*** (2.84)	-26.44** (11.52)	-9.02*** (1.21)	-16.80*** (5.17)
Doc type: No Doc	-14.45*** (0.10)	-15.73*** (0.09)	-10.22*** (0.10)	-7.48*** (0.18)	3.88*** (0.20)	-0.62*** (0.20)	-10.34*** (0.26)	-3.61*** (0.22)	-2.13*** (0.29)	-6.75*** (0.28)
Doc type: Quick Doc	-25.45 (39.44)	-6.87 (43.65)	1.15 (55.58)						-1.66 (37.58)	
Doc type: Stated Income/Asset	24.92 (25.10)	-2.43 (21.23)	18.93 (24.26)						-6.18 (16.35)	60.25 (42.56)
Doc type: Substitute Doc	-30.65*** (6.93)	-22.16*** (6.95)	-24.94*** (7.68)	15.91 (30.10)				-7.37 (14.07)	-22.78*** (8.34)	28.95 (20.94)
Doc type: Verify Assets	-4.34*** (0.09)	-0.11 (0.09)	-1.25*** (0.08)	1.19*** (0.32)	0.25 (0.17)	-1.30*** (0.16)	1.41*** (0.20)	-7.77*** (0.16)	-3.26*** (0.24)	-5.54*** (0.26)
Doc type: Verify Income	-19.42*** (0.30)	-10.93*** (0.25)	-17.88*** (0.25)	0.49 (1.09)	-2.75*** (0.59)	-14.80*** (0.48)	-16.00*** (0.56)	-11.69*** (0.49)	-19.82*** (0.51)	-16.55*** (0.51)
Balloon indicator	73.65*** (0.81)	39.03*** (0.79)	-37.57** (18.95)	-46.05*** (5.42)	-2.48 (2.89)	1.47 (1.63)	52.82 (.)	-6.96 (13.29)	-6.83 (8,122.04)	-267.73 (17,375.79)
Interest-only amortization	47.58*** (0.14)	48.01*** (0.14)	47.44*** (0.14)	-5.64*** (0.77)	1.26*** (0.33)	1.22*** (0.22)	9.68*** (0.22)	8.34*** (0.24)	19.19*** (0.32)	15.60*** (0.24)
Unknown amortization type	28.03*** (0.22)	18.85*** (0.19)	19.94*** (0.19)	-2.65*** (0.31)	16.03*** (1.30)	19.12*** (0.61)	29.56*** (3.20)	43.38*** (4.94)	56.54*** (16.91)	30.71* (16.54)
Product ID: ABL26 = 2/6 LIBOR ARM/Balloon			330.88*** (18.68)						297.44 (8,467.14)	584.84 (17,027.97)
Product ID: ABL51 = 5 Year LIBOR ARM/Balloon			117.18*** (18.22)						77.60 (8,343.74)	367.05 (17,093.01)
Product ID: AL540 = 5 Yr. LIBOR ARM (40 Year)			40.60*** (5.99)						30.07*** (6.74)	72.38*** (10.05)
Product ID: ALB01 = 1/1 Yr. Adjustable Rate Mortgage (LIBOR)			-85.31 (56.77)						-140.77 (90.85)	-16.25 (71.74)
Product ID: ALB1M = 1 Month Libor ARM			-284.78*** (2.68)			-279.23*** (3.21)	-280.32*** (2.25)	-168.08*** (8.10)	-25.72 (18.20)	34.19*** (0.76)
Product ID: ALB26 = 2/6 Mo. Adjustable Rate Mortgage (LIBOR)			139.52*** (0.46)	167.84*** (4.58)	118.06*** (2.19)	123.25*** (1.31)	30.07*** (0.70)	95.41*** (0.64)	262.54*** (0.98)	318.58*** (2.54)
Product ID: ALB31 = 3/1 Yr. Adjustable rate Mortgage (LIBOR)			-180.85*** (0.32)		-203.39*** (0.29)	-217.68*** (0.29)	-167.11*** (0.83)	-18.46*** (4.40)	4.50 (8.60)	36.22*** (12.05)
Product ID: ALB36 = 3/6 Mo. Adjustable Rate Mortgage (LIBOR)			34.17*** (0.91)	105.30*** (5.77)	50.86*** (2.67)	24.75*** (1.68)	-45.20*** (1.08)	22.89*** (1.24)	146.30*** (3.33)	246.21*** (4.77)
Product ID: ALB51 = 5/1 Yr. Adjustable rate Mortgage (LIBOR)			-109.63*** (0.27)		-179.42*** (0.21)	-188.29*** (0.19)	-149.72*** (0.29)	-2.29*** (0.38)	25.65*** (0.45)	37.50*** (0.58)
Product ID: ALB56 = 5/6 Mo. Adjustable Rate Mortgage (LIBOR)			55.26*** (7.21)						-38.45*** (9.08)	111.26*** (8.90)
Product ID: ALB6M = 1 Yr. ARM with a L6 index type			-133.13*** (4.94)	13.86 (87.68)	-199.37*** (2.02)	-190.35*** (4.06)	-189.00*** (3.22)	-24.23*** (4.63)	-46.84 (47.11)	-6.10 (48.46)
Product ID: ALB71 = 7/1 Yr. Adjustable Rate Mortgage			-8.87*** (0.78)					-35.97 (24.38)	17.45*** (0.94)	32.11*** (0.92)
Product ID: ALB76 = 7/6 Mo. Adjustable Rate Mortgage (LIBOR)			14.25 (13.15)					8.70 (15.57)	69.49*** (22.88)	
Product ID: ALBT1 = 10/1 Yr. Adjustable Rate Mortgage (LIBOR)			-11.86*** (0.83)						12.83*** (1.25)	29.29*** (0.90)
Product ID: ALBT6 = 10/6 Mo. Adjustable Rate Mortgage (LIBOR)			28.83 (19.37)						35.42 (26.45)	59.98*** (10.78)
Product ID: AR331 = 3/3/1 Yr. Adjustable Rate Mortgage			257.77*** (7.10)	187.10*** (8.31)		503.89 (2,772.86)				
Product ID: ARM, ARM01, ACE01 = 1 Yr. Adjustable Rate Mortgage			-185.07*** (0.61)	-179.56*** (1.14)	-252.93*** (0.65)	-243.15*** (0.60)	-188.11*** (1.12)	-97.32*** (3.46)	-124.68*** (3.36)	-118.26*** (2.59)

	Original Model (4)	Model (4), Add Prime & Prime x FICO Interactions <sup>1</sup>	Substitute Product Code Dummies for Broader Product Category Dummies from Original Model (4) <sup>2</sup>							
			Model (4)	Model (4-2001)	Model (4-2002)	Model (4-2003)	Model (4-2004)	Model (4-2005)	Model (4-2006)	Model (4-2007)
Dependent variable: APR (basis points)			All Years	2001 Loans	2002 Loans	2003 Loans	2004 Loans	2005 Loans	2006 Loans	2007 Loans
Product ID: ARM03 = 3-Yr ARM (assumed)			-99.54*** (10.63)	-51.37 (52.15)			-141.71*** (38.48)	-143.86*** (12.06)	-120.13*** (20.53)	-62.88 (43.31)
Product ID: ARM1M = 1 Month ARM			-83.42*** (0.88)				-100.05*** (7.86)	-99.45*** (1.63)	-139.76*** (2.49)	-29.69*** (5.62)
Product ID: ARM3I = 3/1 Intermediate ARM			-100.17*** (0.29)	-104.86*** (0.40)	-175.76*** (0.22)	-176.96*** (0.23)	-145.41*** (0.41)	-32.52*** (0.90)	-13.51*** (0.91)	-26.06*** (1.01)
Product ID: ARM5I = 5/1 Intermediate ARM			-88.25*** (0.12)	-80.52*** (0.31)	-150.49*** (0.16)	-154.67*** (0.12)	-122.82*** (0.20)	0.41* (0.23)	1.05*** (0.36)	-9.73*** (0.36)
Product ID: ARM6M = 6 Month ARM			-201.35*** (2.97)					-244.48*** (3.66)		
Product ID: ARM7I = 7/1 Intermediate ARM			-77.76*** (0.12)	-77.51*** (0.28)	-127.98*** (0.16)	-131.56*** (0.12)	-104.34*** (0.20)	-1.77*** (0.21)	6.59*** (0.32)	-15.42*** (0.49)
Product ID: ARMT1 = 10/1 Intermediate ARM			-41.09*** (0.12)	-18.93*** (3.46)	-95.96*** (0.44)	-95.85*** (0.16)	-73.21*** (0.22)	1.06*** (0.21)	7.71*** (0.30)	8.22*** (0.32)
Product ID: B1530 = 15 Yr. Balloon Mortgage			60.62*** (18.94)	100.71*** (8.71)			-43.43 (.)	10.52 (15.26)	65.73 (8,098.76)	306.38 (17,229.11)
Product ID: B3040 = 30 Yr. Balloon Mortgage			70.12*** (22.31)						28.08 (8,189.47)	324.87 (17,618.64)
Product ID: BL530 = 5 Yr. Balloon Mortgage			-22.11 (16.77)		-81.04*** (4.15)		-124.60 (.)			
Product ID: BL730 = 7 Yr. Balloon Mortgage			-9.76 (15.08)	-1.72 (5.42)	-53.79*** (2.94)	-84.65*** (2.25)	-128.26 (3,913.25)		-19.36 (7,975.46)	250.70 (17,336.36)
Product ID: FIX10 = 10 Yr. Fixed			-64.18*** (1.26)	-96.00*** (5.86)	-49.79*** (2.89)	-85.34*** (1.33)	-100.29*** (4.27)	-71.53*** (9.38)	-66.83*** (15.60)	-128.62*** (14.75)
Product ID: FIX15 = 15 Yr. Fixed			-34.43*** (0.17)	-38.42*** (0.46)	-47.37*** (0.20)	-52.84*** (0.22)	-38.99*** (3.23)	-23.13*** (7.50)	-11.08 (14.70)	-75.82*** (13.01)
Product ID: FIX20 = 20 Yr. Fixed			-2.37*** (0.24)	-7.69*** (0.95)	-13.75*** (0.30)	-7.91*** (0.28)	-14.64*** (1.94)	-9.42*** (2.25)	-24.97*** (3.10)	-15.35*** (2.01)
Product ID: FIX40 = 40 Yr. Fixed			1.78 (3.22)						-24.83*** (3.67)	38.50*** (5.17)
Product ID: IRM6M = 6 Mo. Improving Rate Mortgage			38.49*** (5.38)	38.68*** (6.27)						
Product category: 1-Month to 3-Year ARM	-34.92*** (0.30)	-82.59*** (0.25)								
Product category: 5-Year ARM	-87.86*** (0.12)	-89.08*** (0.12)								
Product category: 7-Year ARM	-74.59*** (0.13)	-74.38*** (0.12)								
Product category: 10-Year ARM	-37.78*** (0.13)	-38.51*** (0.12)								
Product category: 5-Year Fixed	-127.02*** (3.23)	-95.50*** (3.15)								
Product category: 7-Year Fixed	-119.36*** (0.86)	-85.28*** (0.83)								
Product category: 10-Year Fixed	-57.56*** (1.26)	-64.53*** (1.27)								
Product category: 15-Year Fixed	-29.82*** (0.19)	-29.19*** (0.16)								
Product category: 20-Year Fixed	-0.90*** (0.26)	0.43* (0.23)								
Product category: 40-Year Fixed	7.27*** (2.82)	15.26*** (2.75)								
Escrow waived	8.02*** (0.09)	5.43*** (0.08)	5.90*** (0.09)	-2.56*** (0.20)	4.16*** (0.18)	4.15*** (0.14)	10.40*** (0.23)	8.81*** (0.19)	4.75*** (0.20)	2.00*** (0.19)
Escrow waiver unknown	-33.85*** (0.14)	-16.67*** (0.12)	-25.61*** (0.13)	-13.29*** (5.04)	-15.35*** (1.25)	-34.38*** (0.34)	-21.28*** (0.26)	-34.76*** (0.24)	-39.02*** (0.28)	-22.56*** (0.36)



	Original Model (4)	Model (4), Add Prime & Prime x FICO Interactions <sup>1</sup>	Substitute Product Code Dummies for Broader Product Category Dummies from Original Model (4) <sup>2</sup>							
			Model (4)	Model (4-2001)	Model (4-2002)	Model (4-2003)	Model (4-2004)	Model (4-2005)	Model (4-2006)	Model (4-2007)
Dependent variable: APR (basis points)			All Years	2001 Loans	2002 Loans	2003 Loans	2004 Loans	2005 Loans	2006 Loans	2007 Loans
1 <= Rate lock days <= 30	26.41*** (0.81)	17.84*** (0.73)	27.48*** (0.79)	42.33*** (0.59)		11.29*** (0.25)	-3.85*** (0.14)	0.88 (13.96)	28.06*** (0.97)	-69.84*** (7.34)
31 <= Rate lock days <= 60	18.96*** (0.81)	15.12*** (0.73)	22.37*** (0.79)	39.03*** (0.59)	-2.32*** (0.10)	10.43*** (0.25)		-1.14 (13.96)	25.50*** (0.96)	-72.78*** (7.34)
61 <= Rate lock days <= 1000	9.34*** (0.80)	2.94*** (0.72)	11.36*** (0.79)		-25.78*** (0.40)		-0.61 (0.39)	-5.14 (13.96)	20.00*** (1.03)	-86.67*** (7.33)
Float-down indicator: Executed	-11.20*** (0.24)	-15.08*** (0.23)	-13.61*** (0.23)	-33.23*** (0.80)	-38.85*** (0.52)	-25.75*** (0.40)	-0.52 (0.45)	15.30*** (0.39)	-6.96*** (0.51)	-8.50*** (0.57)
Float-down indicator: Unknown/Missing	22.76*** (0.11)	-0.43*** (0.08)	11.59*** (0.10)	10.71*** (0.35)	9.35*** (0.23)	12.88*** (0.21)	12.58*** (0.18)	15.22*** (0.20)	19.89*** (0.24)	7.62*** (0.30)
Float-down indicator: Yes	29.97*** (0.19)	23.13*** (0.18)	28.02*** (0.18)	4.75*** (0.67)	5.25*** (0.33)	8.02*** (0.23)	10.82*** (0.30)	23.64*** (0.40)	17.93*** (0.41)	12.02*** (0.39)
Lender-paid mortgage insurance	-17.92*** (0.25)	-13.66*** (0.23)	-13.81*** (0.23)	17.52*** (0.67)	4.98*** (0.48)	-4.64*** (0.47)	-14.24*** (0.92)	-12.97*** (0.67)	-24.17*** (0.81)	-26.03*** (0.32)
Combo loan indicator	-28.60*** (1.04)	-35.68*** (0.92)	-33.76*** (0.97)				-10.72*** (3.11)	-28.21*** (2.19)	-12.92*** (1.80)	-3.41** (1.45)
6 months <= Prepayment penalty <= 24 months	146.67*** (0.43)	29.03*** (0.46)	24.46*** (0.45)	146.34*** (4.83)	82.34*** (2.32)	31.48*** (1.30)	12.40*** (0.65)	-1.60** (0.63)	8.29*** (0.94)	35.52*** (2.56)
36 months <= Prepayment penalty <= 60 months	84.65*** (0.42)	-41.85*** (0.54)	93.03*** (0.41)	195.88*** (3.69)	132.90*** (1.55)	103.34*** (0.89)	31.95*** (0.82)	64.62*** (0.97)	66.63*** (0.75)	134.94*** (2.02)
Constant	743.96*** (1.34)	869.19*** (2.84)	762.35*** (1.28)	767.02*** (4.29)	788.11*** (2.83)	495.99 (2,553.54)	890.35*** (8.67)	647.31 (5,624.61)	809.70 (19,986.31)	895.87*** (7.69)
Observations	5,654,985	5,654,985	5,654,985	528,370	903,665	1,409,772	616,324	770,517	748,332	678,005
R-squared	0.70513	0.76507	0.75632	0.78963	0.84337	0.82298	0.79709	0.69935	0.80965	0.73819
Adjusted R-squared	0.70506	0.76502	0.75627	0.78918	0.84316	0.82284	0.79670	0.69888	0.80934	0.73772

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Coefficients and standard errors for rate lock month, state, and MSA excluded from this table for brevity.

<sup>1</sup> Same as Model (4) from my original report, but adding a dummy variable equal to one for prime loans and interaction dummy variables between the prime dummy variable and the FICO bin dummy variables.<sup>2</sup> Dummy variables for each of 34 product codes are added to Model (4), and the dummy variables representing the 11 broader categories are dropped. The original data contained 37 unique product codes, and I group three together that are all described in the data dictionary as 1-Year ARMs (ACE01, ARM01, ARM). I also add the term of the loan to the product code for loans with a product code of "FIX".

Appendix 3: APR Basis Point Disparities by Year for Wholesale Loans, With and Without Broker Controls (Table 5)

Dependent variable: APR (basis points)	Model (4-2001W) 2001 Wholesale Loans		Model (4-2002W) <sup>1</sup> 2002 Wholesale Loans		Model (4-2003W) 2003 Wholesale Loans		Model (4-2004W) <sup>1</sup> 2004 Wholesale Loans		Model (4-2005W) 2005 Wholesale Loans		Model (4-2006W) <sup>1</sup> 2006 Wholesale Loans		Model (4-2007W) 2007 Wholesale Loans	
	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls
African American	21.97*** (2.10)	9.33*** (1.69)	16.19*** (1.07)	6.12*** (0.63)	8.71*** (0.52)	4.51*** (0.46)	8.63*** (0.74)	3.78*** (0.56)	9.36*** (0.64)	5.64*** (0.67)	10.80*** (0.60)	4.52*** (0.46)	10.64*** (0.66)	6.48*** (0.61)
Hispanic	4.85*** (1.05)	2.49*** (0.84)	5.69*** (0.58)	3.90*** (0.48)	6.45*** (0.33)	4.04*** (0.30)	4.12*** (0.55)	3.12*** (0.52)	4.51*** (0.48)	2.09*** (0.47)	4.85*** (0.46)	2.00*** (0.42)	6.75*** (0.46)	3.91*** (0.46)
American Indian	11.13** (5.03)	6.45** (3.18)	-3.90 (2.93)	-1.91 (1.96)	-0.63 (1.29)	0.77 (1.08)	1.00 (2.31)	0.74 (1.94)	-5.00** (2.12)	-3.22* (1.85)	3.07 (2.42)	-0.01 (1.65)	-3.37* (2.01)	-2.32 (1.87)
Asian	-5.10*** (0.63)	0.20 (0.64)	-5.78*** (0.35)	-0.83* (0.46)	-5.07*** (0.28)	-1.16*** (0.29)	-4.19*** (0.43)	-1.48** (0.60)	-1.27*** (0.34)	-0.21 (0.39)	-1.52*** (0.38)	-0.61 (0.49)	-0.96** (0.39)	-0.80* (0.46)
Missing Race	5.19*** (1.02)	1.39* (0.76)	0.93* (0.52)	1.61*** (0.39)	3.92*** (0.37)	2.29*** (0.34)	5.14*** (0.57)	2.26*** (0.51)	3.72*** (0.50)	2.24*** (0.52)	3.25*** (0.50)	1.45*** (0.47)	0.82* (0.47)	0.83* (0.49)
Missing FICO	78.88*** (5.82)	34.38*** (3.54)	39.45*** (1.63)	25.24*** (0.96)	36.51*** (0.68)	25.35*** (0.60)	55.73*** (1.35)	35.70*** (1.26)	100.35*** (4.02)	83.00*** (4.37)	136.69*** (7.51)	102.74*** (2.37)	13.79 (9.89)	6.61 (8.19)
300 <= FICO < 540	334.17*** (5.76)	249.45*** (6.03)	315.31*** (4.46)	244.29*** (1.39)	176.27*** (3.12)	135.38*** (2.62)	170.53*** (2.55)	135.70*** (1.36)	193.87*** (2.86)	166.88*** (2.76)	200.55*** (3.08)	156.68*** (1.32)	73.53*** (3.29)	44.10*** (2.46)
540 <= FICO < 560	214.53*** (6.51)	136.01*** (6.14)	196.51*** (3.64)	134.79*** (1.34)	122.68*** (1.81)	87.22*** (1.99)	121.18*** (1.36)	86.79*** (1.50)	138.28*** (2.19)	109.23*** (2.09)	155.83*** (2.41)	111.22*** (1.31)	76.96*** (3.16)	48.51*** (2.38)
560 <= FICO < 580	143.73*** (5.26)	73.04*** (4.38)	124.13*** (1.15)	73.82*** (1.50)	77.40*** (1.30)	48.37*** (0.96)	80.65*** (1.51)	46.28*** (1.22)	85.69*** (1.48)	59.67*** (1.50)	109.44*** (1.40)	72.66*** (1.00)	72.04*** (1.40)	46.38*** (1.77)
580 <= FICO < 600	88.56*** (4.07)	31.87*** (2.81)	80.47*** (2.01)	39.78*** (0.99)	62.92*** (1.13)	38.15*** (0.96)	69.50*** (1.35)	39.47*** (1.17)	64.82*** (1.30)	40.37*** (1.26)	79.17*** (1.40)	47.03*** (0.96)	53.71*** (1.59)	34.40*** (1.39)
600 <= FICO < 620	47.77*** (2.87)	12.39*** (1.88)	43.33*** (1.47)	18.93*** (0.89)	39.29*** (0.83)	23.00*** (0.70)	51.57*** (1.15)	26.97*** (1.10)	50.88*** (1.10)	29.08*** (1.04)	58.45*** (1.14)	33.51*** (0.85)	38.28*** (1.17)	23.53*** (1.03)
620 <= FICO < 640	20.19*** (1.89)	3.70*** (1.33)	19.33*** (0.98)	8.02*** (0.77)	25.66*** (0.58)	16.62*** (0.51)	35.42*** (1.00)	18.68*** (1.04)	35.15*** (0.80)	16.34*** (0.77)	44.27*** (0.88)	16.75*** (0.71)	28.79*** (1.01)	18.75*** (0.89)
640 <= FICO < 660	6.24*** (1.39)	-0.60 (1.11)	5.95*** (0.77)	1.62** (0.70)	12.65*** (0.51)	8.58*** (0.45)	25.39*** (0.90)	12.87*** (1.00)	25.58*** (0.72)	10.71*** (0.70)	37.68*** (0.82)	14.08*** (0.68)	20.43*** (0.88)	14.55*** (0.81)
660 <= FICO < 680	3.11*** (1.17)	0.65 (0.96)	-0.87 (0.63)	-0.96 (0.65)	5.34*** (0.45)	3.68*** (0.40)	15.09*** (0.82)	7.44*** (0.97)	16.11*** (0.57)	7.38*** (0.54)	21.25*** (0.67)	9.18*** (0.63)	13.09*** (0.68)	11.01*** (0.64)
680 <= FICO < 700	2.69** (1.06)	0.35 (0.90)	-2.19*** (0.56)	-0.66 (0.63)	2.49*** (0.41)	1.91*** (0.37)	11.07*** (0.78)	5.71*** (0.95)	12.31*** (0.52)	6.33*** (0.49)	13.23*** (0.56)	6.87*** (0.59)	10.24*** (0.54)	8.88*** (0.52)
700 <= FICO < 720	1.50 (1.01)	-0.23 (0.86)	-2.49*** (0.51)	-0.76 (0.61)	0.68* (0.40)	0.53 (0.35)	7.63*** (0.76)	4.02*** (0.94)	8.72*** (0.49)	4.90*** (0.45)	7.78*** (0.51)	4.80*** (0.57)	7.84*** (0.51)	6.61*** (0.50)
720 <= FICO < 740	1.56 (0.99)	0.09 (0.84)	-2.57*** (0.48)	-1.06* (0.59)	-0.32 (0.38)	-0.36 (0.33)	6.92*** (0.74)	3.48*** (0.93)	6.32*** (0.47)	3.38*** (0.44)	4.52*** (0.48)	3.21*** (0.55)	4.76*** (0.48)	3.75*** (0.48)
740 <= FICO < 760	0.37 (0.96)	-0.94 (0.81)	-2.40*** (0.46)	-1.33** (0.57)	-0.92*** (0.36)	-0.93*** (0.32)	5.43*** (0.72)	2.62*** (0.92)	4.92*** (0.45)	2.98*** (0.42)	2.15*** (0.46)	1.91*** (0.55)	2.41*** (0.46)	1.77*** (0.45)
760 <= FICO < 780	-0.16 (0.95)	-1.82** (0.81)	-2.04*** (0.44)	-1.28** (0.56)	-1.72*** (0.35)	-1.48*** (0.31)	4.32*** (0.71)	2.01** (0.91)	3.00*** (0.44)	1.72*** (0.41)	1.09** (0.44)	1.13** (0.54)	0.78* (0.44)	0.00 (0.43)
780 <= FICO < 800	0.50 (0.98)	-1.44* (0.83)	-1.28*** (0.45)	-0.75 (0.58)	-1.95*** (0.36)	-1.49*** (0.32)	2.53*** (0.73)	0.72 (0.93)	1.21*** (0.44)	0.58 (0.40)	0.71 (0.43)	0.53 (0.54)	0.08 (0.43)	-0.54 (0.43)
\$0K < Loan Amount <= \$40K	125.66*** (16.13)	54.97*** (7.74)	115.33*** (9.80)	58.85*** (16.15)	104.27*** (12.81)	76.12*** (12.27)	120.22*** (5.13)	87.29*** (9.44)	128.59*** (2.18)	99.14*** (2.21)	111.09*** (2.10)	89.50*** (1.67)	54.87*** (2.74)	59.55*** (2.85)
\$40K < Loan Amount <= \$50K	63.00*** (15.82)	20.40*** (7.28)	57.65*** (9.60)	27.18* (16.13)	56.54*** (12.77)	48.95*** (12.24)	79.89*** (5.01)	64.55*** (9.42)	88.96*** (1.94)	69.92*** (1.91)	75.68*** (1.91)	65.58*** (1.63)	47.46*** (2.42)	43.59*** (2.12)
\$50K < Loan Amount <= \$75K	27.45* (15.58)	-4.12 (6.87)	23.52** (9.43)	5.84 (16.11)	24.06* (12.72)	25.75** (12.19)	46.60*** (4.85)	42.71*** (9.38)	53.60*** (1.31)	43.95*** (1.28)	40.06*** (1.24)	37.15*** (1.47)	34.47*** (1.45)	26.77*** (1.37)
\$75K < Loan Amount <= \$150K	-1.21 (15.54)	-26.95*** (6.82)	-8.67 (9.41)	-18.84 (16.10)	-5.13 (12.71)	1.51 (12.19)	14.40*** (4.81)	16.71* (9.37)	15.03*** (1.07)	11.89*** (1.07)	2.20** (1.00)	7.68*** (1.39)	2.06* (1.11)	1.97* (1.13)
\$150K < Loan Amount <= \$275K	-17.62 (15.53)	-39.69*** (6.80)	-26.66*** (9.40)	-33.97** (16.10)	-24.15* (12.71)	-14.72 (12.19)	-6.79 (4.80)	-0.22 (9.37)	-1.83* (1.03)	-2.18** (1.03)	-13.49*** (0.95)	-5.09*** (1.37)	-14.33*** (1.05)	-10.97*** (1.09)
\$275K < Loan Amount <= Conforming Limit	-22.26 (16.03)	-45.14*** (7.33)	-30.56*** (9.41)	-37.93** (16.11)	-31.23** (12.71)	-20.97* (12.19)	-15.25*** (4.81)	-6.89 (9.37)	-7.95*** (1.04)	-7.05*** (1.03)	-19.30*** (0.92)	-10.70*** (1.36)	-20.26*** (1.03)	-16.84*** (1.07)
Conforming Limit < Loan Amount <= \$1 Million	0.06 (15.51)	-15.80*** (6.79)	-31.25*** (9.40)	-34.89** (16.10)	-18.80 (12.71)	-9.42 (12.18)	-11.66** (4.79)	-5.78 (9.36)	-2.89*** (0.99)	-2.65*** (0.98)	-11.02*** (0.90)	-5.89*** (1.34)	-5.93*** (1.01)	-2.98*** (1.04)
36% < Debt-to-Income Ratio <= 50%	-1.61*** (0.56)	-0.41 (0.41)	-0.26 (0.35)	-0.24 (0.26)	1.23*** (0.22)	0.99*** (0.18)	2.06*** (0.33)	1.41*** (0.30)	0.57** (0.27)	0.18 (0.25)	1.68*** (0.29)	0.98*** (0.25)	2.08*** (0.28)	1.41*** (0.26)
Debt-to-Income Ratio > 50%	-1.04 (1.25)	-1.92** (0.92)	0.01 (0.69)	-1.59*** (0.46)	0.11 (0.44)	-0.78** (0.37)	2.31*** (0.58)	0.15 (0.49)	-3.33*** (0.51)	-2.99*** (0.48)	-1.46*** (0.51)	-1.03** (0.42)	-0.20 (0.52)	-0.72 (0.46)
Debt-to-Income Ratio Missing	28.22*** (7.73)	33.02*** (6.80)	-1.56 (1.46)	-5.21*** (1.22)	-7.41*** (0.60)	-5.02*** (0.53)	-17.60*** (1.90)	-16.22*** (1.54)	11.19*** (1.56)	1.81 (1.55)	21.32*** (1.95)	9.00*** (1.29)	15.36*** (2.07)	13.23*** (2.00)
28% < Housing Debt-to-Income Ratio <= 33%	4.30*** (0.68)	1.84*** (0.48)	3.97*** (0.41)	1.84*** (0.31)	3.54*** (0.28)	1.90*** (0.23)	4.18*** (0.40)	2.33*** (0.37)	2.00*** (0.33)	1.30*** (0.30)	2.19*** (0.34)	1.03*** (0.30)	1.13*** (0.34)	0.89*** (0.31)
33% < Housing Debt-to-Income Ratio <= 40%	7.87*** (0.84)	2.80*** (0.59)	5.43*** (0.50)	2.62*** (0.36)	5.20*** (0.33)	2.85*** (0.28)	5.68*** (0.47)	3.51*** (0.42)	3.49*** (0.37)	2.46*** (0.34)	4.57*** (0.37)	2.16*** (0.33)	3.11*** (0.36)	2.03*** (0.33)

Dependent variable: APR (basis points)	Model (4-2001W) 2001 Wholesale Loans		Model (4-2002W) <sup>1</sup> 2002 Wholesale Loans		Model (4-2003W) 2003 Wholesale Loans		Model (4-2004W) <sup>1</sup> 2004 Wholesale Loans		Model (4-2005W) 2005 Wholesale Loans		Model (4-2006W) <sup>1</sup> 2006 Wholesale Loans		Model (4-2007W) 2007 Wholesale Loans	
	No Broker	With Broker	No Broker	With Broker	No Broker	With Broker	No Broker	With Broker	No Broker	With Broker	No Broker	With Broker	No Broker	With Broker
	Controls	Controls	Controls	Controls	Controls	Controls	Controls	Controls	Controls	Controls	Controls	Controls	Controls	Controls
Housing Debt-to-Income Ratio > 40%	12.18*** (1.39)	3.87*** (0.95)	7.02*** (0.76)	3.35*** (0.49)	5.95*** (0.51)	3.21*** (0.42)	6.71*** (0.65)	5.20*** (0.54)	4.26*** (0.52)	3.05*** (0.48)	7.16*** (0.48)	3.47*** (0.41)	3.60*** (0.48)	2.82*** (0.43)
Housing Debt-to-Income Ratio Missing	3.27 (3.03)	-0.12 (2.78)	1.72 (1.23)	4.06*** (0.99)	4.00*** (0.45)	3.61*** (0.41)	-5.47*** (1.66)	-3.34** (1.37)	-0.08 (1.30)	0.02 (1.18)	5.35*** (1.59)	2.43*** (1.08)	1.62 (1.56)	4.28*** (1.44)
LTV missing			30.53* (16.78)	8.69 (21.47)	20.04 (13.33)	10.76 (7.13)	-25.06*** (5.37)	-12.54*** (3.68)	-57.01*** (5.50)	-32.85*** (6.21)	-42.62*** (4.40)	-17.68*** (2.66)	-161.17*** (24.74)	-69.70*** (21.23)
0% < LTV <= 60%	-68.98*** (2.28)	-62.34*** (1.78)	-76.87*** (0.89)	-74.31*** (0.69)	-68.00*** (0.46)	-64.92*** (0.41)	-56.72*** (0.93)	-49.87*** (0.80)	-67.22*** (0.95)	-57.26*** (0.88)	-115.26*** (1.07)	-84.96*** (1.02)	-77.71*** (1.05)	-65.16*** (1.01)
60% < LTV <= 70%	-67.27*** (2.09)	-62.81*** (1.62)	-77.65*** (0.89)	-73.38*** (0.68)	-67.77*** (0.45)	-63.33*** (0.40)	-67.88*** (0.84)	-58.13*** (0.81)	-77.29*** (0.85)	-64.49*** (0.81)	-114.16*** (1.00)	-83.66*** (0.90)	-76.33*** (0.91)	-63.69*** (0.86)
70% < LTV <= 80%	-63.56*** (1.77)	-58.61*** (1.39)	-73.66*** (0.81)	-69.13*** (0.59)	-64.80*** (0.40)	-60.55*** (0.36)	-62.28*** (0.68)	-54.90*** (0.62)	-77.33*** (0.71)	-64.10*** (0.70)	-107.53*** (0.78)	-79.26*** (0.55)	-73.68*** (0.67)	-60.81*** (0.61)
80% < LTV <= 90%	-17.20*** (2.31)	-21.62*** (1.67)	-24.75*** (1.02)	-28.65*** (0.66)	-20.85*** (0.45)	-22.03*** (0.39)	-9.83*** (0.87)	-11.37*** (0.77)	-17.41*** (0.83)	-18.12*** (0.79)	-38.22*** (0.84)	-32.53*** (0.64)	-14.04*** (0.83)	-8.10*** (0.75)
CLTV missing	-29.90*** (4.09)	-39.34*** (3.54)	-37.51*** (1.69)	-35.47*** (1.17)	5.91*** (1.66)	-17.18*** (1.58)	1.37 (1.97)	12.74*** (2.54)	-19.58*** (3.36)	-33.11*** (6.25)	-17.59*** (2.52)	-5.71*** (1.66)	22.10* (12.46)	7.32 (9.40)
0% < CLTV <= 60%	-17.09*** (4.07)	-25.69*** (3.59)	-19.48*** (1.13)	-26.48*** (0.98)	-13.76*** (1.03)	-20.78*** (1.05)	-34.73*** (1.05)	-32.44*** (0.93)	-35.02*** (0.85)	-25.72*** (0.78)	-23.46*** (0.88)	-14.47*** (0.99)	-26.17*** (0.97)	-20.07*** (0.95)
60% < CLTV <= 70%	-18.69*** (3.94)	-25.48*** (3.47)	-20.04*** (1.59)	-28.05*** (1.13)	-13.06*** (1.00)	-22.41*** (1.04)	-21.60*** (0.97)	-24.22*** (0.92)	-21.89*** (0.73)	-16.85*** (0.69)	-20.17*** (0.79)	-13.20*** (0.86)	-24.31*** (0.81)	-19.69*** (0.79)
70% < CLTV <= 80%	-19.58*** (3.77)	-26.92*** (3.35)	-17.97*** (1.55)	-28.11*** (1.08)	-9.08*** (1.02)	-21.12*** (1.02)	-16.70*** (0.85)	-19.48*** (0.76)	-13.89*** (0.52)	-11.39*** (0.46)	-15.30*** (0.46)	-10.30*** (0.52)	-16.62*** (0.47)	-14.52*** (0.45)
80% < CLTV <= 90%	-12.06*** (3.86)	-19.59*** (3.37)	-5.44*** (1.62)	-20.15*** (1.11)	0.33 (1.03)	-16.50*** (1.05)	-18.67*** (0.90)	-20.68*** (0.83)	-16.12*** (0.58)	-11.96*** (0.55)	-17.03*** (0.47)	-10.23*** (0.50)	-15.09*** (0.47)	-13.33*** (0.45)
90% < CLTV <= 95%	-11.73*** (3.23)	-18.89*** (2.91)	-10.97*** (1.52)	-24.50*** (1.05)	-8.32*** (1.08)	-20.47*** (1.05)	-18.89*** (0.82)	-19.58*** (0.66)	-12.69*** (0.66)	-10.46*** (0.63)	-15.03*** (0.59)	-9.27*** (0.46)	-12.06*** (0.52)	-8.88*** (0.46)
FHA Loan	-97.13*** (37.56)		-55.95*** (1.47)	-30.71*** (0.99)	-51.60*** (0.56)	-31.21*** (0.52)	-68.15*** (0.87)	-55.90*** (0.73)	-82.31*** (1.14)	-47.09*** (1.13)	-99.67*** (1.22)	-52.86*** (0.86)	-50.42*** (0.94)	-28.59*** (0.91)
VA Loan			-92.55*** (1.71)	-68.22*** (1.41)	-82.58*** (0.63)	-62.05*** (0.62)	-61.71*** (1.11)	-80.87*** (0.99)	-80.87*** (1.38)	-51.26*** (1.33)	-132.28*** (1.48)	-82.11*** (1.01)	-101.00*** (1.18)	-68.55*** (1.10)
FSA/RHS Loan			-52.91*** (7.64)	-39.56*** (8.43)	-74.49*** (3.35)	-61.46*** (3.63)	-59.46*** (3.12)	-42.92*** (3.62)	-58.44*** (3.76)	-39.69*** (4.02)	-141.97*** (3.31)	-88.09*** (3.06)	-105.69*** (1.80)	-77.63*** (1.92)
Self-employed borrower or co-borrower	1.33** (0.66)	-0.04 (0.49)	0.61 (0.45)	-0.92** (0.36)	1.02*** (0.38)	-0.15 (0.31)	4.15*** (0.45)	1.27*** (0.45)	4.76*** (0.31)	1.81*** (0.29)	7.24*** (0.34)	3.53*** (0.30)	5.97*** (0.32)	4.76*** (0.31)
Cash-out Refi	0.25 (0.81)	0.41 (0.57)	-0.26 (0.49)	-2.82*** (0.37)	-3.91*** (0.32)	-4.96*** (0.27)	8.25*** (0.44)	2.80*** (0.40)	9.61*** (0.32)	5.39*** (0.31)	22.42*** (0.37)	11.49*** (0.32)	19.16*** (0.41)	13.00*** (0.38)
Rate Term Refi	-7.41*** (0.66)	-3.88*** (0.48)	-8.30*** (0.42)	-6.37*** (0.35)	-14.05*** (0.29)	-11.24*** (0.25)	-8.46*** (0.38)	-6.19*** (0.38)	-1.63*** (0.33)	-0.37 (0.31)	3.71*** (0.39)	2.46*** (0.35)	4.64*** (0.34)	2.83*** (0.33)
Streamline Refi	4.23 (7.69)	28.17*** (6.65)	0.35 (1.10)	-4.53*** (0.83)	-9.63*** (0.43)	-12.18*** (0.38)	-0.03 (1.21)	0.81 (1.13)	-27.53*** (1.21)	-10.32*** (1.08)	-48.06*** (2.61)	-14.58*** (1.54)	-35.83*** (1.83)	-15.69*** (1.58)
Unknown loan purpose					30.04*** (0.97)	11.79 (8.14)								
Loan Term Missing	13.76 (9.69)	16.65* (9.31)	-12.98 (9.38)	9.05 (8.17)	-3.58** (1.76)	-1.97 (1.68)	3.93 (7.61)	-10.37 (10.34)	-16.80 (14.81)	-25.35 (19.86)	17.44 (56.40)	-3.86 (20.34)	31.44 (71.20)	66.79 (56.70)
Loan Term (years) <= 5	7.18 (28.08)	46.19 (36.60)	22.87*** (5.98)	23.29 (45.17)										
5 < Loan Term (years) <= 7	-28.29 (17.61)	-8.48 (17.03)	-18.99 (11.65)	-8.00 (20.48)	18.34** (7.83)	20.85** (8.92)	9.20 (6.92)	-11.70 (50.53)	-69.15*** (2.90)	-69.63*** (4.15)				
7 < Loan Term (years) <= 10			4.24* (2.41)	10.96*** (2.72)	9.53*** (2.17)	15.58*** (1.77)	2.92 (13.85)	14.16 (14.35)	-17.51 (20.13)	3.13 (22.91)	-22.98* (11.74)	10.51 (8.20)	73.35*** (11.57)	29.71** (13.83)
10 < Loan Term (years) <= 15	-5.42*** (1.41)	-4.39*** (1.07)	-2.81** (1.23)	-2.31* (1.26)	-0.09 (1.92)	-1.77 (1.46)	-5.21 (13.65)	-8.53 (14.03)	-30.93 (19.64)	-18.57 (22.48)	-28.04** (10.90)	-12.57* (7.40)	44.59*** (10.74)	-6.46 (13.04)
15 < Loan Term (years) <= 20	-10.53*** (3.14)	-8.33*** (2.55)	-9.46*** (1.30)	-4.55*** (1.18)	-7.59*** (0.52)	-4.30*** (0.47)	-4.09 (3.40)	7.80*** (2.27)	6.43 (6.18)	19.04 (5.94)	34.09*** (12.40)	34.09*** (7.01)	4.72 (11.54)	13.96 (9.11)
20 < Loan Term (years) <= 25			-5.86** (2.69)	-4.87** (2.45)	-5.36*** (0.94)	-1.37* (0.83)	-6.94*** (2.04)	0.50 (1.74)	-18.47*** (2.84)	-2.26 (2.55)	-25.87*** (6.36)	-8.06* (4.18)	-6.11* (3.56)	3.55 (3.70)
Loan Term (years) > 30											-15.99*** (3.03)	-24.78*** (2.38)	-28.11*** (4.44)	7.63 (6.85)
Investment, Single Family	51.41*** (1.85)	56.66*** (1.60)	41.04*** (0.98)	43.47*** (0.75)	40.75*** (0.58)	40.79*** (0.53)	38.54*** (0.88)	34.23*** (0.80)	45.96*** (0.73)	32.40*** (0.75)	66.80*** (0.74)	44.93*** (0.51)	56.59*** (0.72)	54.75*** (0.71)
Investment, Multi Family 2	54.79*** (3.41)	58.32*** (3.18)	42.53*** (1.81)	44.07*** (1.61)	40.93*** (1.17)	42.14*** (1.11)	42.99*** (1.89)	36.85*** (1.74)	46.18*** (1.42)	34.24*** (1.51)	66.25*** (1.61)	44.43*** (1.12)	50.96*** (1.92)	48.83*** (1.77)
Investment, Multi Family 3	52.72*** (4.97)	56.46*** (4.95)	40.75*** (2.24)	38.66*** (3.08)	44.31*** (1.96)	43.66*** (1.96)	61.65*** (3.69)	49.80*** (3.19)	65.83*** (2.82)	46.57*** (2.92)	86.21*** (3.15)	58.56*** (1.86)	61.61*** (3.92)	58.47*** (3.61)
Investment, Multi Family 4	61.27*** (4.07)	58.93*** (4.13)	34.73*** (1.73)	33.48*** (2.10)	41.86*** (1.47)	40.31*** (1.40)	56.32*** (2.77)	43.54*** (2.64)	66.40*** (2.35)	47.08*** (2.24)	80.70*** (2.58)	59.77*** (1.65)	59.89*** (3.03)	55.84*** (2.90)



Dependent variable: APR (basis points) Doc type: Substitute Doc	Model (4-2001W) 2001 Wholesale Loans		Model (4-2002W) <sup>1</sup> 2002 Wholesale Loans		Model (4-2003W) 2003 Wholesale Loans		Model (4-2004W) <sup>1</sup> 2004 Wholesale Loans		Model (4-2005W) 2005 Wholesale Loans		Model (4-2006W) <sup>1</sup> 2006 Wholesale Loans		Model (4-2007W) 2007 Wholesale Loans	
	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls
Doc type: Verify Assets	23.02*** (1.44)	10.94*** (1.05)	11.54*** (0.85)	4.29*** (0.53)	7.16*** (0.77)	1.75*** (0.65)	3.69*** (0.49)	3.77*** (0.51)	-9.25*** (0.28)	-4.78*** (0.27)	9.05*** (0.38)	7.36*** (0.33)	0.39 (0.37)	0.74** (0.36)
Doc type: Verify Income	-6.61 (7.63)	-31.78*** (6.62)	-5.49*** (1.22)	-2.56*** (0.90)	-17.71*** (0.81)	-2.84*** (0.65)	-18.22*** (1.11)	-10.76*** (1.00)	-13.27*** (0.65)	-10.59*** (0.64)	-8.84*** (0.70)	-6.12*** (0.68)	-8.19*** (0.85)	-6.47*** (0.76)
Balloon indicator	-19.99*** (7.33)	-51.37*** (7.79)	-15.85*** (3.15)	-34.58*** (1.47)	33.40*** (2.02)	-1.89 (2.39)	27.35*** (2.18)	8.03*** (1.64)	27.55*** (2.59)	7.45*** (2.84)	28.03*** (1.25)	7.40*** (0.88)	41.36*** (1.52)	22.75*** (1.61)
Interest-only amortization	-11.93*** (1.45)	-13.49*** (1.48)	10.69*** (0.78)	11.54*** (1.11)	3.29*** (0.76)	4.31*** (0.72)	22.68*** (0.42)	14.88*** (0.63)	9.20*** (0.35)	9.57*** (0.34)	10.64*** (0.46)	10.18*** (0.41)	9.62*** (0.32)	11.12*** (0.33)
Unknown amortization type	0.96 (1.19)	-0.94 (0.86)	18.21* (9.36)	-19.35* (10.02)	-1.88 (1.21)	-2.53** (1.26)	-3.41 (5.58)	1.43 (40.67)	20.48** (8.31)	-49.40** (24.94)	33.63 (23.28)	26.31 (27.21)	-78.01 (66.40)	
Product category: 1-Month to 3-Year ARM	-60.51*** (1.77)	-94.61*** (1.07)	-128.72*** (1.08)	-158.27*** (0.51)	-139.51*** (1.02)	-164.15*** (0.81)	-70.09*** (1.01)	-105.10*** (0.61)	55.06*** (0.94)	17.42*** (0.99)	226.20*** (1.26)	162.17*** (0.68)	276.54*** (3.07)	174.50*** (3.85)
Product category: 5-Year ARM	-73.28*** (0.76)	-82.04*** (0.61)	-144.59*** (0.49)	-152.06*** (0.45)	-156.29*** (0.49)	-155.65*** (0.27)	-122.12*** (0.46)	-122.40*** (0.43)	8.70*** (0.34)	9.51*** (0.33)	55.34*** (0.43)	59.21*** (0.46)	57.22*** (0.45)	55.10*** (0.50)
Product category: 7-Year ARM	-68.70*** (0.84)	-75.85*** (0.71)	-108.27*** (0.51)	-114.01*** (0.69)	-118.88*** (0.44)	-119.75*** (0.42)	-93.44*** (0.48)	-95.01*** (0.70)	5.01*** (0.53)	5.45*** (0.52)	45.24*** (0.49)	47.77*** (0.62)	47.46*** (0.93)	44.21*** (1.09)
Product category: 10-Year ARM	-10.66*** (3.81)	-15.00*** (3.24)	-74.95*** (1.53)	-82.98*** (2.79)	-85.97*** (0.40)	-91.47*** (0.38)	-59.47*** (0.48)	-65.62*** (0.81)	7.55*** (0.36)	6.10*** (0.34)	36.92*** (0.48)	39.73*** (0.58)	42.59*** (0.74)	37.56*** (0.84)
Product category: 5-Year Fixed			-45.71*** (3.39)	-28.49 (36.82)										
Product category: 7-Year Fixed	0.44 (16.07)	23.56 (17.57)	-37.94*** (7.61)	-12.97 (8.09)	-126.02*** (3.26)	-89.02*** (3.52)	-112.29*** (2.51)	-69.32 (46.44)						
Product category: 10-Year Fixed					-250.18*** (10.68)	-240.30*** (10.63)								
Product category: 15-Year Fixed	-37.48*** (1.31)	-35.71*** (1.01)	-47.08*** (1.21)	-45.15*** (1.25)	-58.78*** (1.91)	-57.63*** (1.46)	-42.45*** (13.64)	-36.40*** (14.03)	2.66 (19.64)	-6.94 (22.48)	8.71 (10.89)	-5.16 (7.40)	-63.19*** (10.73)	-11.08 (13.06)
Product category: 20-Year Fixed	-7.02** (2.86)	-5.61** (2.34)	-7.22*** (1.49)	-6.81*** (1.36)	-7.20*** (0.80)	-4.43*** (0.70)	-15.82*** (3.46)	-19.50*** (2.43)	5.64 (6.29)	-7.09 (6.04)	-33.54*** (12.48)	-36.80*** (7.09)	-8.78 (11.59)	-12.06 (9.19)
Product category: 40-Year Fixed											4.92 (3.46)	22.74*** (3.04)	34.84*** (4.61)	1.95 (6.98)
Escrow waived	-8.50*** (0.56)	-7.46*** (0.41)	10.18*** (0.50)	4.17*** (0.34)	9.15*** (0.42)	3.86*** (0.41)	13.38*** (0.42)	1.56*** (0.38)	9.43*** (0.34)	2.91*** (0.33)	9.55*** (0.33)	4.40*** (0.29)	6.97*** (0.35)	2.14*** (0.31)
Escrow waiver unknown	-20.35** (9.67)	-21.08** (9.30)	12.78 (9.37)	-7.82 (8.15)	-1.18 (1.31)	2.06 (1.40)	-11.62*** (1.68)	0.63 (1.54)	-5.25 (3.27)	2.69 (2.77)	6.59*** (0.84)	14.58*** (1.11)	13.26*** (1.03)	-64.20*** (4.19)
1 <= Rate lock days <= 30	10.64*** (0.67)	-2.15 (6.44)	3.16*** (0.29)		2.96*** (0.37)		-3.13*** (0.34)	-17.95*** (2.29)	-2.53 (1.91)	-1.83*** (0.26)	1.40*** (0.29)	-5.64*** (1.88)	39.01*** (2.42)	7.50*** (1.97)
31 <= Rate lock days <= 60		-6.45 (6.44)		-2.47*** (0.33)	0.01 (0.36)	-0.75*** (0.15)		-14.75*** (2.30)	-3.29* (1.91)			-3.38* (1.88)	33.36*** (2.43)	5.50*** (1.98)
61 <= Rate lock days <= 1000	-4.48 (6.83)		14.56*** (0.96)	-3.51*** (1.14)		-4.23*** (0.35)	2.95 (1.93)			11.69*** (1.55)	-6.55*** (1.70)			
Float-down indicator: Executed														
Float-down indicator: Unknown/Missing	5.06 (3.81)	5.65* (2.97)	5.26*** (0.40)	-0.49 (0.50)	8.00*** (0.29)	0.37 (0.34)	5.84*** (0.32)	0.19 (0.51)	10.50*** (0.23)	5.95*** (0.31)	15.73*** (0.24)	4.80*** (0.34)	9.45*** (0.25)	2.09*** (0.30)
Float-down indicator: Yes	1.54 (3.89)	5.91* (3.04)	-2.78*** (0.72)	-3.33*** (0.85)	0.69 (0.50)	0.04 (0.49)	-3.07*** (0.59)	-5.18*** (0.80)	-0.06 (0.55)	2.14*** (0.57)	-3.23*** (0.63)	0.70 (0.68)	1.09* (0.57)	0.58 (0.61)
Lender-paid mortgage insurance														
Combo loan indicator														
6 months <= Prepayment penalty <= 24 months	253.63*** (4.49)	1.53 (7.54)	223.79*** (2.34)	32.03*** (1.74)	211.63*** (1.82)	90.88*** (3.16)	68.01*** (1.23)	22.07*** (1.12)	18.82*** (0.93)	-16.25*** (1.26)	30.28*** (1.07)	-1.80** (0.74)	49.15*** (2.75)	32.92*** (3.91)
36 months <= Prepayment penalty <= 60 months	209.81*** (4.39)	-73.02*** (8.11)	135.15*** (2.04)	-70.91*** (1.78)	83.57*** (1.22)	-62.02*** (3.21)	10.03*** (1.01)	-50.63*** (1.24)	40.05*** (0.81)	-20.84*** (1.38)	65.25*** (0.88)	-16.32*** (0.77)	117.60*** (2.31)	13.58*** (4.24)
Constant	774.34 (34,105.59)	954.07*** (17.83)	845.21*** (14.00)	821.29 (563,065.47)	686.14 (5,394.33)	785.51*** (14.07)	568.95*** (5.71)	687.02 (379,361.11)	676.24 (.)	707.28*** (8.80)	625.22*** (56.48)	797.56 (501,453.44)	663.81 (5,047.05)	743.05*** (4.02)
Observations	62,904	62,904	143,592	143,592	333,096	333,096	165,296	165,296	175,663	175,663	171,136	171,136	134,138	134,138
R-squared	0.85226	0.93204	0.85026	0.92453	0.78473	0.87117	0.75653	0.85437	0.78708	0.87065	0.89580	0.83761	0.83807	0.91277
Adjusted R-squared	0.85027	0.92511	0.84919	0.91667	0.78402	0.86035	0.75489	0.83210	0.78572	0.84983	0.89511	0.93778	0.83675	0.89549

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Coefficients and standard errors for rate lock month, state, MSA, and broker dummy variables excluded from this table for brevity.

Dependent variable: APR (basis points)	Model (4-2001W) 2001 Wholesale Loans		Model (4-2002W) <sup>1</sup> 2002 Wholesale Loans		Model (4-2003W) 2003 Wholesale Loans		Model (4-2004W) <sup>1</sup> 2004 Wholesale Loans		Model (4-2005W) 2005 Wholesale Loans		Model (4-2006W) <sup>1</sup> 2006 Wholesale Loans		Model (4-2007W) 2007 Wholesale Loans	
	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls	No Broker Controls	With Broker Controls

In the models with broker controls, dummy variables are added for each of the brokers in the regression sample, as identified by the field "pm\_CLIENTID (Client or company code (use to identify the broker))":

- 5,039 brokers in 2001
- 12,557 brokers in 2002
- 24,721 brokers in 2003
- 20,812 brokers in 2004
- 23,240 brokers in 2005
- 25,919 brokers in 2006
- 21,125 brokers in 2007

<sup>1</sup>Regular standard errors (instead of robust standard errors) for Models (4-2002W), (4-2004W), and (4-2006W) with the broker controls are given because robust standard errors are not calculable for these models with broker controls.