

# Loan Product Steering in Mortgage Markets

Sumit Agarwal, Gene Amromin, Itzhak Ben-David, and Douglas D. Evanoff<sup>†</sup>

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## *ABSTRACT*

Accusations of unscrupulous lender behavior—e.g., predatory lending—abounded during the housing boom of the 2000s. Such behavior is said to have generated significant social costs as borrowers were misled into accepting loans with inferior characteristics relative to the mortgage products that they should have qualified for. However, there is little hard evidence of such behavior and few estimates of the true effect of such behavior. Much of the research to date is based on anecdotal evidence or analyzes differential loan terms for broad groups of borrowers that are thought to have been targeted for such lending behavior. We employ a more direct methodology and test whether a particular form of this behavior existed during the housing boom: credit steering toward predatory-like loan terms. With this steering, the broker or real estate professional encourages the home buyer to access credit from a particular lender that provides the credit, but at unattractive terms. We find evidence of such behavior. That is, we find evidence consistent with lenders steering higher-quality borrowers to affiliates that provide subprime-like loans. These borrowers were charged 40-60 bps higher APR, and were 2% points less likely to default compared to similar borrowers who were not steered to such loans—consistent with the steered borrowers receiving inferior loans given their qualifications. Delving deeper, we find that the loans with steered borrowers were more likely to be privately securitized and steering was not concentrated solely among the large banks. Our results are, to our knowledge, the first explicit evidence of systematic mortgage lending abuse during the run-up in the housing markets.

**Keywords:** Mortgages, mortgage steering, subprime crisis, predatory lending, household finance

**JEL Classification:** D12, D18, G18, G21, K2

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<sup>†</sup>Agarwal is from the National University of Singapore, Amromin and Evanoff from the Federal Reserve Bank of Chicago, Ben-David from Fisher College of Business, The Ohio State University, and NBER. The authors thank Caitlin Kearns for outstanding research assistance and Han Choi for editorial assistance. They also thank Viral Acharya, Gadi Barlevy, Zahi Ben-David, Mike Berry, Jason Keller, Steve Kuehl, Elizabeth Laderman, Mitchell Petersen, Amit Seru, Greg Udell, Alicia Williams and Marva Williams for numerous constructive discussions. The views expressed in this paper are those of the authors and may not reflect those of the Federal Reserve Bank of Chicago or the Federal Reserve System.

## 1. Introduction

At the height of the housing market boom of the 2000s, accusations of unscrupulous lender behavior abounded.<sup>1</sup> Examples included excessive fees, high interest rates, prepayment penalties, and clauses barring borrowers from seeking judicial redress for predatory behavior by lenders (Engel and McCoy 2002). Yet, the vast majority of the evidence was anecdotal or came from select examples of regulatory enforcement actions or isolated lawsuits. Some research was undertaken to evaluate whether particular groups were targeted with predatory loan terms (Goldstein, 2002; Staten and Elliehausen, 2001; Immergluck and Smith, 2003). However, there was no comprehensive, methodical evaluation of the presence of such behavior.

We take an alternative approach and attempt to directly identify such behavior. We do it for a subsample of financial institutions that have not typically been closely associated with such lending behavior as have other lenders; we evaluate commercial banks instead of brokers and independent mortgage companies. We look for evidence that lenders may have unjustifiably steered borrowers to an affiliate of a financial organization that specialized in high-risk loans. In this paper, we study bank holding companies (BHCs) and their affiliated mortgage lenders for evidence of such lending behavior.

Specifically, our thought experiment is as follows. A borrower enters a lending institution seeking a loan and is told that they do not qualify for the specific loan applied for, but would qualify for another loan product from another affiliate of the organization. The applicant is therefore ‘steered’ to the affiliate and reapplies for another loan. To evaluate such behavior, we first need to identify loan applicants for which there is evidence consistent with the borrower having been steered to a subprime lender. Since we cannot identify these steered borrowers directly in the data, we develop an algorithm to detect steering. To do this, we consider mortgage loan applications that match on a number of characteristics, which are denied by one lender that is an affiliate of a bank holding company, only to be approved within a relatively short time period by a different lender specializing in high-risk lending *that is also* an affiliate of the same bank holding company. We consider the mortgages made under these circumstances to be “steered loans.”

Steering potential borrowers in this way is not necessarily nefarious. In fact, this lending behavior could enhance welfare if it enabled borrowers with somewhat blemished credentials to access

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<sup>1</sup> If you google “unscrupulous lenders” you get over 500,000 ‘hits’. The following is just one example of the kind of stories that one can read on this topic— <http://money.msn.com/debt-management/beware-the-predatory-lending-trap-bankrate.aspx>.

credit that would be unavailable to them from standard prime lenders.<sup>2</sup> However, it could have adverse effects if the borrowers were exploited and steered toward loan products for which they were overqualified—a practice consistent with predatory lending behavior. We test for evidence of such exploitation.

We find evidence consistent with institutions steering customers to affiliated lenders that provide more-expensive loan products. Specifically, we find that steered loans have an annual percentage rate (APR) 40–60 basis points higher than that of non-steered loans after controlling for various borrower and loan characteristics. Given the average APR for the sample of loans is 6.5%, a rate 40–60 basis points differential is economically significant.<sup>3</sup> We also find that the steered customers perform better on their mortgages—consistent with them being lower-risk, better-qualified borrowers than those normally associated with their eventual loan products. Specifically, we find that the probability of steered loans being delinquent is 1.4–2.0 percentage points lower than that of non-steered loans. Again, given an average delinquency rate of 5%, this differential is also an economically significant result. Finally, we find evidence that steering behavior is not predominately a big bank phenomenon.

Additionally, we perform a number of robustness tests, which involve segmenting the loans by the size of the lending institution, as well as by whether the loans were held in portfolio, securitized through private label issuances, or securitized through the housing government-sponsored enterprises (GSEs), such as Fannie Mae and Freddie Mac. We find that steering behavior and its implications for mortgage pricing and loan performance are prevalent across both small and large lending institutions; in fact, with respect to certain characteristics the effects appear somewhat stronger among the smaller lenders. Finally, our results show that banks are more likely to steer loans that they eventually securitize through private label issuances, compared with those that they hold in portfolio or those they securitize through the housing GSEs. We also find that conditional on the steered loans being securitized through private label issuances, such loans have a higher APR and are less likely to default *ex post*.<sup>4</sup>

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<sup>2</sup> In some of the mortgage literature, ‘steering’ by definition means that the customer is *inappropriately* guided toward a particular loan product. We are taking a broader definition and will later evaluate whether there is evidence of inappropriateness.

<sup>3</sup> Agarwal, Rosen and Yao (2012) find that a significant fraction of consumers refinance their mortgage at an interest rate differential of 40 basis points.

<sup>4</sup> We also analyze this issue by individual years (2001–06), both for pricing and loan performance. We find similar results; however, because of sample size limitations, the results do not have statistical power for delinquencies. Using the universe of non-steered loans as the control sample and thus increasing the sample size, we do find similar effects by individual years.

Our paper directly contributes to the growing literature that finds evidence linking the creation of the real estate bubble in the early 2000s to misaligned incentives of intermediaries—e.g., Keys, Mukherjee, Seru, and Vig (2010, 2012), Ben-David (2011, 2012), Berndt, Hollifield, and Sandas (2010), Agarwal, Ben-David, and Yao (2012), Agarwal and Ben-David (2012), and Jiang, Nelson, and Vytlačil (2011).

Additionally, our paper contributes to the broader literature on the mortgage crisis. This literature addresses a number of issues. One group of studies explores factors explaining potential causes of the mortgage crisis—e.g., Mian and Sufi (2009), Mayer, Pence, and Sherlund (2009), Agarwal and Ben-David (2012), Agarwal, Ben-David, and Yao (2012), and Agarwal, Chang and Yavas (2012). Also included in this group are studies of predatory lending and concerns that mortgage activity may have become excessive during the run-up to the crisis—e.g., Engel and McCoy (2002), Federal Deposit Insurance Corporation (2006), Garver (2001), Financial Crisis Inquiry Commission (2010) and Gilreath (1999).

Another group of studies focuses on the aftermath of the crisis: e.g., Piskorski, Seru, and Vig (2010) and Agarwal, Amromin, Ben-David, Chomsisengphet, and Evanoff (2011, 2012) compare the role of securitization on foreclosure and loan modification activity by mortgage servicers, while Campbell, Gilio, and Pathak (2011) evaluate the impact of foreclosures on neighborhood house prices.<sup>5</sup>

The rest of the paper is organized as follows. In the next section, we discuss the literature on mortgage customer steering. In Section 3, we develop our data and lay out our methodology. Our empirical findings are presented in Section 4, and we discuss our conclusions in Section 5.

## **2. Mortgage Steering**

Mortgage market steering typically involves realtors restricting the neighborhoods shown to certain potential home buyers. Such behavior can result in taste-based discrimination or statistical discrimination and distort the spatial patterns of housing demand by white and minority home buyers in such a way as to perpetuate neighborhood segregation—see Ondrich, Ross, and Yinger (2003). Such practices are illegal based on the Fair Housing Amendments Act of 1988 and numerous state laws.

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<sup>5</sup> Related studies evaluate the role of the Community Reinvestment Act (Dahl, Evanoff, and Spivey, 2010; Litan, Nicolas, Belsky and Haag, 2000), redlining on credit access (Cohen-Cole 2011; Brevoort 2011), less traditional means of accessing credit (Morgan, Strain, and Seblani, 2012; Morse, 2011), and political influence in mortgage markets (Mian, Sufi, and Trebbi, 2010a, 2010b; Igan, Mishra, and Tressel, 2009; Duchin and Sosyura, 2010; and Agarwal, Amromin, Ben-David, and Dinc (2012).

However, in recent years, a different form of steering in housing markets—namely, credit steering—has emerged. Here, the broker or real estate professional encourages the home buyer to access credit from a particular lender. Such behavior may be helpful for borrowers because they may have limited knowledge of credit alternatives and could be steered toward viable credit sources. In fact, we impose no ex ante value judgment on customer steering. It could be beneficial if borrowers are able to access credit they may not have otherwise received and if that credit is accurately priced based on their credentials. Additionally, lenders could be “carrying” customers in a manner consistent with the Petersen-Rajan (1994) relationship banking model. However, we typically think that mortgage finance is more of a production process that emphasizes “hard” information (i.e., quantitative information that is easy to store and transmit in impersonal ways such as credit model scores based on income and other verifiable factors) rather than “soft” information (e.g., information accessible to loan originators, but difficult to completely summarize in a numeric score) to determine if the applicant qualifies for the loan.<sup>6</sup>

However, such steering has recently been associated with predatory lending. The concern is that the lender may not have the borrower’s best interest in mind and may “gouge” the borrower—i.e., charge fees in excess of what the borrower actually qualifies for. The forms this could take are numerous and could even have the “steerer” receiving remuneration based on the excessiveness of the contracted terms.<sup>7</sup> While there were significant claims about credit steering during the housing run-up to the financial crisis, little empirical analysis of such behavior has been completed. The research most closely associated with the credit steering analyzes the qualifications of subprime borrowers and finds evidence suggesting that between 10%–35% of these borrowers had credentials that should have qualified them for prime loans (Freddie Mac 1996). Barr (2005) argues that some of these borrowers “may have been steered to higher cost lenders.”

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<sup>6</sup> Soft information does play a large role in small business loans as opposed to mortgage loans—see Agarwal and Hauswald (2010) and Berger and Udell (2002).

<sup>7</sup> Renuart (2004) argues that steering may have played a larger role in mortgage rate determination than did borrower risk. For examples of excessive terms see [www.justice.gov/opa/pr/2012/May/12-crt-695.html](http://www.justice.gov/opa/pr/2012/May/12-crt-695.html) and [www.federalreserve.gov/newsevents/press/enforcement/20110720a.htm](http://www.federalreserve.gov/newsevents/press/enforcement/20110720a.htm). Restrictions on mortgage compensation schemes to address the steering of customers into higher-priced loans (yield spread premiums) were introduced in 2011 through new Federal Reserve rules instituted under its authority to enforce the Truth in Lending Act. Restrictions were also imposed in the Dodd–Frank Wall Street Reform and Consumer Protection Act.

Again, such steering could be negative if the lender is misleading the borrowers—i.e., taking advantage of the uninformed. However, we should have the information and ability to determine if the lender is taking advantage of borrowers by analyzing the borrowers' qualifications, resulting contract terms, and actual performance of their loans. If steering is abusive, then one would expect that the steered borrowers would be better qualified than others in the pool of borrowers getting the same loan product. Similarly, since they are better qualified, one would expect their ex post performance to be better than others obtaining the same mortgage product (e.g., fewer mortgage delinquencies and a lower loan default rate). We attempt to fill the research gap by testing for evidence of credit steering and its effects during the recent housing boom.

Steering (in the abusive sense) has been included in the predatory lending literature. However, even the broader predatory lending literature is rather limited. In the 1990s, anecdotal evidence of such lending behavior was frequently discussed in mortgage markets. The feeling was that unregulated, renegade mortgage companies of limited scope were involved in such behavior. Regulated depository institutions, it was thought, would not incur the reputational risk to get actively involved in such behavior. However, during the late 1990s, a number of mortgage company acquisitions were made that positioned the depository institutions to be able to take a role in this rather lucrative, albeit questionable, line of business.<sup>8</sup> For a more in-depth discussion of the evolution of the high-risk lending business, see Litan, et al. (2000), Bolton, Freixas, and Shapiro (2007), Bond, Musto, and Yilmaz (2009), Bostic et al. (2008, 2012); Center for Responsible Lending (2009), Choi (2011), Federal Deposit Insurance Corporation (2006), Engel and McCoy (2002), Garver (2001), Gilreath (1999), Litan (2001), Stock (2001), White (2004) and Rokakis (2008). For discussions of how mortgage steering is targeted at unsophisticated borrowers, see Renuart (2004), Saunders (2003), Eakes (2000), and Brown (2003).

One can question why depository institutions would steer a mortgage customer to an affiliate instead of independently acting on the application.<sup>9</sup> The depository institution should be quite capable of

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<sup>8</sup> For a discussion of how mortgage company subsidiaries may have been used to avoid regulatory burden during the run up in the housing market see Demyanyk and Loutskina (2012). Our findings suggest that the current nature of regulation may not have been as effective in preventing such behavior by lenders (see Agarwal et al. 2012 for a detailed overview of regulatory system).

<sup>9</sup>The use of a holding company affiliate (instead of the bank) for non-prime lending appears relatively commonplace. Somplatsky-Jarman (2003) discusses community group efforts to curb predatory lending practices. He describes dialogues with a number of subprime lenders, "all of which have been subsidiaries of depository holding companies." Also see Stein and Libby (2001).

distinguishing between applicants of different quality and steering them toward in-house products. However, there may still be a number of reasons to steer these applications to an affiliate. First, there could be efficiencies involved with concentrating subprime lending into one affiliate. These efficiencies could result from expertise in processing higher-risk applicants; i.e., efficiencies may be realized as one group of mortgage evaluators specialize in analyzing high-risk applicants with more difficult credit backgrounds. Second, pushing high-risk loans to a particular affiliate could insulate the more heavily regulated depository institution from the decisions of the specialized affiliate. Thus, the organization could argue that affiliates are independent entities in an attempt to limit reputational risk associated with high-risk lending. Finally, by having a physically separate affiliate that is not subject to a daily presence of supervisory oversight, the specialized affiliate would be able to operate more effectively in deciding on the contractual terms of high-risk, or misguided, mortgage applicants.

To analyze the potential for, as well as the impact of, steering mortgage applicants, we take a three-step approach. We first identify loan applicants for which there is evidence consistent with them being steered. Since we do not have the identity of borrowers in the loan data, we are required to develop a methodology to indirectly identify them. We do this by finding mortgage applicants that were denied credit at one lending institution and matching them (using rather austere criteria) to a mortgage applicant with similar characteristics who soon after received a loan at a lending institution that specializes in high-risk/predatory lending *and* was affiliated with the lending institution that originally denied their loan application.<sup>10</sup> Based on the similarities for both borrowers and lenders, we assume these are the same applicants and consider them our steered sample.<sup>11</sup> It is this cross-organizational steering that we are trying to capture. Our second step is to generate a control sample with similar characteristics to those of the steered sample for purposes of comparison.<sup>12</sup> Finally, we combine the two samples and analyze the resulting sample to see if there are meaningful differences between the two groups; we measure performance by the APR on the mortgage, the type of mortgage and various

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<sup>10</sup> We discuss our criteria for inclusion in the steered group in detail later. We also include borrowers that withdrew their application in the Home Mortgage Disclosure Act (HMDA) data, but soon after obtained a loan at a high-risk lending affiliate.

<sup>11</sup> There may be concerns that our methodology is capturing mortgage applicants that were not actually steered, but simply were only able to receive a mortgage by going through the search process and eventually finding a lender willing to extend credit. That the willing lender is affiliated with the original lender that denied the loan may simply be happenstance. However, as we show later, if this were the case, it actually works against us finding any impact from credit steering.

<sup>12</sup> In auxiliary analysis, we also used the universe of non-steered borrowers as the control sample and found similar results to those presented here. These results are presented in Section 4.2.

mortgage characteristics granted, the performance of the mortgagee on the loan (default and delinquency rates), among other factors.

It is important to emphasize that we are not attempting to identify all instances of credit steering. Steering could take numerous forms—including in-house steering, where the lender would recommend inappropriate mortgage products—beyond what we evaluate. Rather, we test for the presence of one form where the applicant is steered within a banking organization, and we then test for evidence that the affiliate provides inferior loan terms relative to what the applicant appears to qualify for. What we evaluate may not even be illegal because it may not involve a protected class of borrowers. Nevertheless, most would consider it to be predatory in nature. We are looking for evidence consistent with lending behavior where there is *both* differential treatment and a resulting disparate impact. Next we describe our data and discuss our methodology in more detail.

### **3. Data, Coverage across Data Sets, and Descriptive Statistics**

#### *3.1. Data Sources*

Our basic data are provided by LPS Applied Analytics, Inc. (LPS) and include loan-level information collected from residential mortgage servicers. As of July 2008, the data set included loans from nine of the top ten servicers, and represented around two-thirds of the mortgage market in the United States. The information is collected from mortgage servicers and includes government agency and non-agency mortgage-backed securities as well as loans held in portfolio.

The LPS data provides extensive information about the loan, property, and borrower characteristics at the time of mortgage origination. Property-related variables include appraisal amount, geographic location, and property type (single-family residence, condo, or other type of property). Loan characteristics include origination amount, term to maturity, lien position, loan type (i.e., whether or not the loan is conventional), loan purpose (purchase or refinance), and the coupon rate on the mortgage. Credit-risk-related variables include the borrower's debt-to-income ratio, FICO credit score, loan-to-value (LTV) ratio at origination, and the level of documentation provided.

Beyond the LPS information that is available at origination, dynamically updated loan information subsequent to origination is also included, enabling one to monitor loan performance. Variables of interest include coupon rates (which change for adjustable-rate mortgages (ARMs), and have the potential to change with loan modifications), delinquency status (current, 31–60 days delinquent, 61–90 days



delinquent, over 91 days delinquent, foreclosure, REO,<sup>13</sup> or paid off), investor type (held in portfolio, private securitization, or “public” securitization via the housing GSEs),<sup>14</sup> and the actual principal balance as well as the scheduled principal balance if the borrower pays according to the original terms of the loan. The data include bank holding company information that allows us to link banks and their affiliates to specific banking organizations—which is a critical step in our research. This enables us to test for steering within banking organizations.

However, the LPS data significantly under-represents certain mortgage types. We therefore augment LPS information using CoreLogic LoanPerformance Securities (LP) data, which provides information on securitized subprime mortgages sold to non-GSEs. However, while LP’s coverage is superior for the non-prime market, LP data only contain information on securitized loans (thus, these data do not have any information on the subprime loans held in portfolio). LP data do, however, have similar detailed information concerning characteristics at the time of origination and performance over time.

We also utilize information from the Home Mortgage Disclosure Act (HMDA) data. The merging of the loan-level LPS and LP data with HMDA data provides additional information on the borrower, lender, and loan market characteristics. For example, the merged data provide socioeconomic and demographic information on the borrower and allow us to control for lender differences—e.g., the number and dollar value of loans originated by a lender in a given market in a given time period.

Finally, to explicitly identify subprime loans, we incorporate information from HMDA and the U.S. Department of Housing and Urban Development (HUD). The HMDA data include a “high-cost” loan designation and considers a loan to be subprime if the spread between the loan’s coupon and the standard index rate is higher than a certain margin. Relying on this measure alone may lead to undercounting the adjustable-rate subprime loans with low teaser rates, which eventually adjust to high rates (following the initial contract period). HUD also develops a list of lenders known to specialize in subprime mortgages. Using this information to identify subprime loans should normally capture all loans originated by these lenders in a given period, although these lenders could also make some prime loans. Using this measure also ignores subprime loans originated by lenders whose main business is in the prime mortgage area, but

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<sup>13</sup> REO stands for real estate owned. Here the lender has taken ownership of the collateral property on which the loan was originally based.

<sup>14</sup>The public securitizations can be through Government National Mortgage Association (Ginnie Mae), Federal National Mortgage Association (Fannie Mae), Federal Home Loan Mortgage Corporation (Freddie Mac), Ginnie Mae via buyout loans, Local Housing Authority, or Federal Home Loan Banks).

who have occasional forays into the subprime market.<sup>15</sup> We combine the various data sets and use both measures of subprime lending to better capture the subprime market.

### *3.2 Sample Construction*

To identify the steered loans, we start with HMDA loan application data for the 1998–2006 period. The HMDA data encompass nearly all mortgage lending activity in each year, with some exceptions for small and rural institutions that do not fall under the mandatory filing requirements. Since the HMDA data include the exact action taken and the date of that action for each application, we can determine whether a withdrawal or denial precedes the origination of a nearly identical loan by a different, but affiliated lender in the same U.S. Census tract. To develop our steered group, we impose rather strict criteria on pairs of applications. These applications are allowed a difference in action date of no more than 31 days and are required to match on applicant race, applicant sex, loan type (conventional or backed by the Federal Housing Administration [FHA] or administered by the U.S. Department of Veterans Affairs [VA]), loan purpose, Census tract, and occupancy type. We also match iteratively on loan amount and applicant income—by first identifying and removing the sample pairs with no difference in amount or income and then increasing the window by \$1,000 and matching again. We continue this process up to a maximum differential of \$5,000.<sup>16</sup> This matching process produces approximately three million unique pairs of loan applications. In order to determine whether a relationship exists between the two lenders, we match the HMDA lender identifier for each application to its highest holder (i.e., the highest bank holding company) in the Call Report data. If the lenders are affiliated with the same highest holder, the lenders are classified as related.

Since HMDA data do not include information on key risk characteristics of the borrower (such as the FICO score), loan terms, or loan performance, we match the originated loan in each pair of applications to mortgage-level data from LPS and LP, which collect loan characteristics at origination from mortgage servicers and track the performance of these loans over time. The approved HMDA loan applications in our sample are matched to the mortgage-level data on the origination date, zip code, loan amount, loan type, loan purpose, occupancy type, and lien.

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<sup>15</sup> Use of this combination to identify subprime loans is common in the literature; see Agarwal, Chang and Yavas (2012) who use a similar identification methodology, and Mayer and Pence (2009), who provide an excellent summary on the details of the definitions of subprime loans—those based on the HMDA high-priced loans criterion, as well as those identified through the HUD lender list.

<sup>16</sup> The thought is that the borrower may receive a slightly different loan amount or report a marginally different income based on the interaction with the initial lender.

The risk characteristics of the steered loans (those that were rejected by the initial lender and subsequently approved by a different but related lender) differ significantly from those of the broader universe of mortgage loans. For this reason, we develop a control group whose mortgage applications were also initially denied but then approved within a short time period by another lender *not* affiliated with the holding company that originally denied the loan. We match each steered loan to a non-steered loan based on applicant income, loan amount, FICO score, LTV ratio, loan purpose, loan type, occupancy type, state, and origination date.<sup>17</sup> Thus, we are matching on a number of dimensions in an attempt to create a control (non-steered) group that differs little from the treatment (steered) group outside of the process by which the borrowers received their loans. Our final sample consists of approximately 13,000 steered loans and 13,000 non-steered loans.

### *3.3 Descriptive Statistics*

Figure 1 shows kernel density estimates of the steered and non-steered samples based on four of the continuous variables in our analysis—loan applicant income, loan amount, FICO score, and the LTV ratio. As seen in the figure, the control and treatment samples are observationally indistinguishable from each other. The formal statistical test confirms that the two samples are essentially the same in terms of the observables.

Next, we look at a broader sample of observable characteristics of the steered and non-steered loans. Table 1 provides the descriptive statistics. First, we see that the unconditioned mean for APR for the steered loans is 6.73% and for the non-steered loans is 6.44%—a difference of 30 basis points (i.e., 5%). This is statistically and economically significant. Next, we find that the delinquency rate for steered loans is 4% and for non-steered loans is 5%—a difference of 1 percentage point (i.e., 20%), which is also statistically and economically significant. Looking across other loan attributes, we find that steered loans generally have what can be described as “inferior characteristics.” For instance, they are more likely to receive an adjustable-rate mortgage (ARM) loan (68% of steered loans compared to 29% of non-steered loans), an interest-only (IO) loan, and a pre-payment penalty, and also have low documentation. Next we more carefully analyze the differences between the two groups.

## **4. Empirical Results**

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<sup>17</sup> We require that applicant income and loan amount be within 25%, FICO score within 25 points, LTV ratio within 5 percentage points and origination date within 90 days.

Once we develop a sample of borrowers who were steered toward affiliated lenders, we conduct regression analysis evaluating borrower and loan contract characteristics to determine whether that group of borrowers is indeed different from other borrowers. In doing so, we control for an array of influences, including various fixed effects. Our basic regression specifications are of the following form:

$$Response_{ijt} = \alpha + \beta Steered_{jt} + \gamma FixedEffects_t + \delta BorrowerControls_j + \theta LoanControls_{ijt} + \varepsilon_{ijt}, \quad (1)$$

where  $Response_{ijt}$  is the loan-level response variable, such as the APR on loans, default status of loans, etc.;  $Steered_{jt}$  is a dummy variable that receives the value of 1.0 if the loan is identified as a steered loan and 0 otherwise; and  $FixedEffects_t$  account for time effects (quarterly effects), geographic effects (state effects), and bank effects. In the empirical analysis, the fixed effects that are accounted for vary across specifications;  $BorrowerControls_j$  are a set of borrower characteristics, such as borrower income and FICO score; and  $LoanControls_{ijt}$  are a set of loan-specific characteristics (such as LTV ratio at mortgage origination), a refinance dummy, conventional loan dummy, owner-occupied dummy, balloon loan dummy, interest-only loan dummy, and a low documentation dummy. Our analysis covers the 2001–06 period. In all regressions we cluster errors at the state level.<sup>18</sup>

#### 4.1 Baseline Results

We first evaluate the role of various control variables, which we described previously, on the APR of loans generated. These results are presented in Table 2. We are particularly interested in the effect of the borrower having characteristics consistent with her having been steered on the loan’s APR—our *Steered* variable. The various columns represent alternative specifications controlling for additional loan or borrower characteristics and fixed effects.

Results from all specifications suggest that having been steered results in significantly higher loan costs. In our most basic specification (Column 1), we find that steered borrowers pay 48 basis points more than do similar borrowers that do not show signs of having been steered. This differential is both statistically and economically significant. For our sample, the average APR for mortgages is 6.5%; thus, a 48 basis points differential is nearly an 8% surcharge on the mortgage. Stated differently, the differential is material as it reflects a shift of 0.32 standard deviations in the distribution of APR (see Table 1).

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<sup>18</sup> Clustering allows for an arbitrary covariance structure of error terms over time within each state and, thus, adjusts standard error estimates for serial correlation. This corrects for a potentially serious inference problem—see Bertrand, Duflo, and Mullainathan (2004).

Alternatively, in a study of factors determining mortgage refinancing behavior, Agarwal, Rosen and Yao (2012) found that a significant fraction of consumers were willing to refinance their mortgage at an interest rate differential of 40 basis points. Thus, the differential appears to be significant enough to drive consumer behavior when borrowers are free to make a conscious financial choice. In the current analysis, the steered borrower may not be aware of the viable options she may choose from, but the 40 basis points differential could have a significant impact on the financial viability of the borrower. Again, this differential between the average APR of steered loans and that of non-steered loans appears to be both statistically and economically significant.

This differential in the average APR is rather persistent across the various specifications presented in Table 2. In the first four columns, the results control for both geographic (state) and time fixed effects (quarters). In the last four columns, bank fixed effects are also controlled for. Not surprisingly, the differential is smaller once bank fixed effects are accounted for. If our steering story is accurate, then each bank is making a conscious decision as to whether it participates in such behavior. One would expect the bank effects to partially capture this behavior. However, even after controlling for the additional bank-specific effect, our basic model (Column 5) still results in a 27 basis points differential if there is evidence that the borrower could have been steered to the affiliate subprime lender. As we progress through Columns 1–4 and Columns 5–8, we add additional controls to the specification to see if the differential can be attributed to these additional factors. Again, the differential persists and actually increases with some of the specifications as we better control for the additional influences. The differential ranges from 27 basis points to 66 basis points, depending on the controls included.

The additional control variables in Table 2 generally influence the APR in the expected manner. For example, the APR for refinance loans are generally lower, suggesting that borrowers may more aggressively shop mortgage options and be more experienced because they have already taken out and carried a mortgage. A preferential rate is also given if the property is owner-occupied and if the borrower has a higher FICO score. So-called teaser mortgages, e.g., interest-only mortgage products, are shown to have lower APRs at origination, but they obviously increase relatively soon when the teaser characteristics are adjusted away.

An alternative means to evaluate the role of steering on the terms of the mortgage is to view its impact on mortgage characteristics. In Table 3 we show how the probability of having certain loan characteristics is influenced by steering. Again, the table is divided into two sections with the results in Table 3A controlling for geographic and time fixed effects, while those in Table 3B also account for bank fixed effects. In analyzing Table 3A, along with the associated seven related loan characteristics, we find

that the probability of having what most would consider less desirable loan characteristics increases significantly with steering. For example, the probability of obtaining an adjustable-rate mortgage is 40.7% greater if there is evidence consistent with steering (Column 1). Steering also significantly increases the probability of there being a pre-payment penalty associated with the mortgage (Column 6), and it increases the probability of obtaining an interest-only mortgage (Column 4); such loan characteristics, some would argue, may trap the borrower into an undesirable financial condition. Somewhat surprisingly, the effects are remarkably persistent even after accounting for the bank fixed effects, as seen in Table 3B.<sup>19</sup> Again, there is a much higher probability of the steered borrower obtaining a mortgage with what are typically thought to be less desirable characteristics.

We earlier argued that steering could be desirable if the applicants were directed toward loan products that were accurately priced (given the particular characteristics of the borrowers), enabling these applicants to obtain mortgages when otherwise they may have been precluded from the mortgage market. Essentially, this implies such applicants were steered to the subprime market because this was their only viable option on account of their having subprime qualifications. Alternatively, steering would not be desirable if the applicants were misled, perhaps because of a lack of financial sophistication, and directed to more expensive, less attractive products than they should have legitimately qualified for. To test if we can distinguish between these two possibilities, we compare the performance of the steered mortgages to other mortgages held by similarly qualified applicants that do not show evidence of being steered. That is, we compare the performance of our steered subsample with the matched sample.<sup>20</sup> Summary statistics for the performance variables are included in Table 1.

The findings depicted in Table 4 support the argument that steered borrowers were misled into purchasing mortgage products for which they were overqualified. This resulted in them performing significantly better on their mortgages than non-steered peers receiving similar products. The basic results (Table 4, Column 1) suggest that the probability of the steered loans becoming delinquent is 1.4 percentage points lower for borrowers steered toward subprime affiliates. This differential is both statistically and economically significant given that the average probability of becoming delinquent is 5.0%. This corresponds to a 28% lower probability of the steered loans becoming delinquent. Thus, steered borrowers

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<sup>19</sup> The one exception is the influence on the loan having a balloon payment associated with it. What effect there appears to be in the results presented in Column 2 of Table 3B are totally accounted for—and actually reversed—once the bank fixed effects are incorporated.

<sup>20</sup> As with the vast majority of the results, we generate similar findings to those shown in Table 4 when using the universe of non-steered mortgages instead of the matched sample. Again, however, we prefer the matched sample because we consider it a cleaner test of our hypotheses.

not only pay more for their loans (Table 2), but they perform better than others obtaining the same loan product. Both findings are consistent with the steered borrower being misled by the lender, and this practice is consistent with predatory lending behavior.

Most of the alternative specifications in Table 4 generate even greater differences in loan performance by steered borrowers. In fact, nonperformance falls from 5% for the average loan to as low as 1.6% (approximately a 68% improvement) for certain model specifications. Thus, the effect persists even after controlling for a number of additional influences. Again, this finding is consistent with the steered borrowers being guided toward inferior loan products for which they are overqualified.

#### *4.2 Heterogeneity – The role of securitization and bank size*

Up to this point we have discussed our general findings for the presence and role of credit steering. The findings are consistent with predatory behavior by lenders. Steered borrowers pay higher loan rates, agree to contracts with inferior credit terms, and perform better than their non-steered peers with similar loan contracts. Next we run an array of additional tests to check for robustness of our findings and to further address how steering may affect lender behavior. We are particularly interested in what banks do with the new loans. Are the steered loans more likely to be held in portfolio, securitized via the housing GSEs or securitized via private label issuances? Does the APR of steered loans, already shown to be higher than that of the non-steered loans that make up the control group, vary by whether they are held in portfolio or securitized? Does the general performance of the steered (and non-steered) loans vary with whether they are held in portfolio or securitized? Finally, do the findings differ by the size of the lending institution? Next we discuss these issues and attempt to extract additional details about the lending and securitization decisions of the institutions involved in steering and high-risk lending.

We first evaluate how lenders allocate steered loans. We consider their tendency to hold them in portfolio or to rid them from the balance sheet by utilizing alternative means to sell or securitize the loans. If we find that steered loans are treated differently than non-steered ones then perhaps the lender is holding these higher-quality, higher-earning loans in portfolio to take advantage of the superior characteristics of the loans. Alternatively, perhaps a cottage industry developed in which such loans are generated with an explicit objective of satisfying investor demand for higher-quality loans to be securitized. This strong investor demand was commonly understood to exist during the run-up to the housing market crash.<sup>21</sup> In fact, it may be that the steering process allowed the lending firm access to a

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<sup>21</sup> To elaborate, our sample period includes the early 2000s, when securitization was in its development phase; i.e., private label securities. It may be that during this time, originators had to present higher-quality loans to get counterparties to

cheap form of credit enhancement for the pool of loans.<sup>22</sup> Instead of providing collateral or other forms of credit enhancement to the pool, the originator could provide evidence of a higher quality pool of loans that were generated from the steering activity. Thus it may have been that access to the cheap credit enhancement—the cost of the enhancement borne by the borrower, with the benefits reaped by the originator—was the original reason for the steering behavior. Finally, for capital arbitrage purposes, firms may hold higher risk mortgage loans in portfolio because they have a higher expected return and require a fixed capital charge unrelated to the riskiness of the loan. For both theoretical and empirical evidence consistent with higher quality loans being securitized see Saunders (2003), Song and Thakor (2009), Greenbaum and Thakor (1987), and Agarwal, Chang and Yavas (2012).

In Columns 1, 3, and 5 of Table 5A, we provide estimates for our basic model describing how new loans are allocated by lenders. We produce three independent regressions addressing the potential for new loans to be held in portfolio, securitized via the housing GSEs, or securitized via private label issuance. As with the rest of our analysis, we are most interested in determining what happens to steered loans. The results in Table 5A indicate that steered loans have a much greater propensity to be placed in private securitizations. This could partially result from the relatively higher quality of the loans, as discussed before, satisfying the growing demands of investors in the marketplace. There is less of a potential for the steered loans to be sold to the GSEs, perhaps because of the more objective and stricter criteria for satisfying GSE standards.<sup>23</sup> Finally, there is a strong tendency to not hold the steered loans in portfolio. This could result from capital arbitrage efforts and/or an explicit objective of generating such loans to satisfy the securitization demands of the marketplace. Again, it was common knowledge during the 2000s that investors were aggressively searching for securitized mortgage pools.

In columns 2, 4, and 6 of Table 5A, we conduct similar analysis controlling for additional influences (bank fixed effects). While the magnitude of the role of steering differs, the rank order of influences across the options remains the same: a stronger tendency to distribute steered loans into private

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participate in the securitization process. Indeed, during the early days of securitization the concern was that the originating bank would cherry-pick and securitize higher-quality loans and hold the lower quality loans on the bank's books and let the Federal Deposit Insurance Corporation reap any losses. To dispel that concern, it could be that both originators and securitizers found it in their self interest to develop a close, long-term (repeat-game), working relationship and encourage a steady flow of higher-quality loans.

<sup>22</sup> For a discussion of the role of credit enhancements in securitization see Mandel, Morgan and Wei (2012) and Ashcraft and Schuermann (2008).

<sup>23</sup> This does not mean that the GSE criteria are stricter or correspond to higher-quality loans; rather, they are just less flexible and more detailed.



securitizations (rather than into public securitizations via the housing GSEs) and very little desire to hold the items in portfolio.

Next we reevaluate the tendency for the APR to be higher for steered loans (as shown in Table 2) and whether that is affected by how the loan is allocated. Given the strong preference for steered loans to be pooled in private label placements, we would expect that these loans would likely have higher APRs. A higher return on steered loans—in combination with their tendency to be of higher quality (i.e., having fewer inferior characteristics and lower average default rates)—would make them attractive to securitizers because they would increase the overall quality of the loan pools.

From the results in Table 5B, Column 1, we can calculate the role of allocation or “placement” on the APR of the steered loans. That is, we calculate  $\partial (APR) / \partial (placement)$ , where the placement alternatives are private label placement, public (housing GSE) placement, or portfolio “placement” (i.e., being held in portfolio). We find a significantly higher APR if the loans are placed in private securitized pools; i.e., such loans have an average APR 36 basis points higher than that for portfolio-held loans and nearly 70 basis points higher than that for loans sold to the GSEs. We generate similar findings from the results in Column 2 of Table 5B, which additionally control for bank fixed effects; i.e., loans that are placed in private securitized pools have an average APR 14 basis points higher than that of loans held in portfolio and 76 basis points higher than that of loans sold to the GSEs. These results suggest that private securitization markets require a higher APR, perhaps to limit the previously discussed inherent frictions in the securitization process—at least during the period we analyze. They are also consistent with steering being an inexpensive form of credit enhancement for the pooled assets.

We can also evaluate the results in Table 5B to see how the placement of steered loans affects their APR. Namely, we are interested in  $\partial (APR) / \partial (Steered)$ —where *Steered* is our indicator of steered loans—and how this measure differs for the three placement options. Thus,

$$\partial (APR) / \partial (Steered) \text{ for loans held in portfolio} = 0.62,$$

$$\partial (APR) / \partial (Steered) \text{ for loans sold to the GSEs} = 0.15, \text{ and}$$

$$\partial (APR) / \partial (Steered) \text{ for loans placed in private securitized pools} = 0.41.$$

Given that only the relative positions matter, the average APR of steered loans held in portfolio is shown to be 21 basis points higher than that of steered loans placed in private securitized pools and 47 basis points higher than that of steered loans sold to the GSEs. This order was not expected, but may be influenced by a relatively few outlier loans held in portfolio (perhaps loans that could not be unloaded to

the securitized market). However, when we control for bank fixed effects (Column 2 of Table 5B), we obtain spreads that align with the expectations:

$$\partial (APR) / \partial (Steered) \text{ for loans held in portfolio} = 0.25,$$

$$\partial (APR) / \partial (Steered) \text{ for loans sold to the GSEs} = -0.02, \text{ and}$$

$$\partial (APR) / \partial (Steered) \text{ for loans placed in private securitized pools} = 0.48.$$

That is, steered loans that are in private placements have an average APR 50 basis points higher than that of steered loans sold to the GSEs and 23 basis points higher than that of steered loans held in portfolio. Again, these results align with the expectations and suggest the steered loans may be used to improve the overall quality of the pool of assets in the private securitizations.<sup>24</sup>

In addition to evaluating the pricing effects, we can also determine the relationship between steering, loan placement, and loan performance.<sup>25</sup> In Table 5D, we present results from analyzing the relationships initially considered in Table 4, but now we also account for loan placement. That is, we address the question of whether the influence of steering varies based on the loan placement. From the results in Table 5D, Column 1, we note:

$$\partial (default) / \partial (Steered) \text{ for loans held in portfolio} = -0.007,$$

$$\partial (default) / \partial (Steered) \text{ for loans sold to the GSEs} = -0.017, \text{ and}$$

$$\partial (default) / \partial (Steered) \text{ for loans placed in private securitized pools} = -0.025.$$

And from Table 5D, Column 2, we note:

$$\partial (default) / \partial (Steered) \text{ for loans held in portfolio} = -0.017,$$

$$\partial (default) / \partial (Steered) \text{ for loans sold to the GSEs} = -0.004, \text{ and}$$

$$\partial (default) / \partial (Steered) \text{ for loans placed in private securitized pools} = -0.024.$$

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<sup>24</sup> We also analyze the potential for securitization and placement of steered loans to be associated with different loan characteristics—similar to the analysis earlier discussed in Table 3. While not discussed here, the results of this analysis are included in Table 5C.

<sup>25</sup> The discussion here emphasizes the association between the factors considered and is not implying causation.

Thus, results from both specifications indicate that steered loans sold into private securitized pools have the lowest probability of default, although the differences are relatively minor. This is one more bit of evidence that higher-earning, better-quality loans are typically allocated to private securitizations.

Finally, we also evaluate differences in the role of steering by bank size. It is not obvious whether one would expect small or large banks to be more involved in steering and extracting rents from unsophisticated or naïve consumers. One view holds that large banks have the scale to carve out a high-risk, predatory lending operation as a result of the sheer volume of originations. Similarly, they should have the technical capability. However, they also face significant costs via reputational risk if they become associated with questionable lending practices. Additionally, they have extensive financial wealth and resources (i.e., ‘deep pockets’) and, as such, could be ideal candidates for legal action should their lending practices become suspect. In fact, Somplatsky-Jarman (2003) argues that larger banks developed relatively good lending practices in order to protect their reputation and avoid regulatory scrutiny. He argues that community groups instead had growing concerns with small lenders. The extent of steering across institutions of different size and the associated mortgage market practices can be examined empirically.<sup>26</sup>

In Table 6A, we present results from a regression explaining loan APR, as in Table 2 earlier, only now allowing for differences by lender size. We divide banks into two size categories based on whether they have more or less than \$75 billion in assets and identify the larger banks with a binary variable. From the results in Table 6A, we again find that steering is associated with higher APRs. However, we do see differences across bank size. Larger banks are associated with lower APRs on average, conditioned on the included control variables. While they do impose higher APRs on steered borrowers, the premium is less than that found for smaller banks. The results are similar in all columns, which differ in the control variables and fixed effects controlled for. Thus, the results suggest that as larger banks steer customers they do not extract as much from them in the form of a higher APR, compared with their smaller counterparts.<sup>27</sup>

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<sup>26</sup> In fact, Somplatsky-Jarman (2003) argues that small lenders developed what were thought to be some of the more egregious lending practices.

<sup>27</sup> The *Large Bank* binary is excluded in Column 2 because the size measure is highly correlated with the bank fixed effects measure. Thus, for the specification in Column 2 we can only account for size effects for the steered loans.

In our earlier analysis, we also showed that steered loans were of higher quality (with lower default and delinquency rates) than were non-steered loans of similarly qualified borrowers.<sup>28</sup> To continue the analysis of lender size, in Table 6C we evaluate the role of bank size on the performance of steered loans. Again, the expected influence of lender size is not obvious; large banks have to balance the potential short-term financial gains with the potential long-term adverse effects on their reputations for participating in steering. Unlike the difference found in the APR charged by large and smaller banks (Table 6A), we find no differences in loan quality based exclusively on lending bank size. However, again, for most specifications we find that steered loans were generally higher-quality loans. We also find that loans steered by larger banks were generally of even higher quality (although this coefficient is not statistically significant for some specifications). Thus, in general, the results reported earlier tend to hold up for both large and small institutions. If anything, the influence of steering on APR appears to be somewhat greater for the smaller institutions than for the large ones, suggesting that steering practices were not strictly a large bank phenomena.

### *4.3 Robustness and Extensions*

Here we conduct robustness tests to reinforce our confidence in our findings. Throughout the study, we conduct analysis on a matched sample of loans that were originally denied by one lender and subsequently accepted by either an affiliate of the original lending organization or by an unaffiliated lender. While it seems unlikely, it is possible that borrowers whom we define as steered had inferior credit profiles and could only get loans at the predatory affiliate while the borrowers who went to an unaffiliated lender were of superior quality. If this is the case, then at origination we could expect that the loan APR for the borrowers who went to the affiliated lender to be higher, although this still does not explain why steered borrowers would have lower default rates. However, we test for this possibility next. Additionally, it is possible that the steered borrowers who obtained their loans from the predatory lender received a positive ex post shock relative to the borrowers who were not steered. In that case, the steered borrowers' default rates would be lower. By matching the two groups on observables, we are eliminating the ex ante differences in their credit quality.

While we believe these possibilities seem far-fetched, we can address the concerns empirically to verify the robustness of our results. In additional regressions reported in the Appendix, we use the universe of non-steered loans as our control group. That is, there is no matching to the steered sample in

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<sup>28</sup> We also allow for bank size to be associated with different loan characteristics. While not discussed here, the results are included in Table 6B.

this analysis. Tables A1, A2, and A3 report similar regressions as in Tables 2, 3, and 4, only allowing for the larger ‘control group’. Our sample size is much larger in this analysis, giving us additional statistical strength; and our results are virtually identical. If anything, the results are stronger. They suggest that steered borrowers going to predatory lenders receive higher APRs and the ex post probability of default is much lower than for the non-steered loans. This increases our confidence in our general findings.

Another potential concern one might raise is that our matching algorithm to develop the steered group is flawed. That is, there may be error in our matching process and perhaps all we are showing are spurious correlations. However, this actually works against us finding significant results. If the loans were indeed not steered, then there is little reason for them to carry higher APRs and lower default rates as would be expected with steering that exploits borrowers. To show this, in Table A4 of the Appendix analyze a sample of loans where we *randomly* match two loans within the same bank holding company—one that was denied by a lender and another one that was subsequently approved by a high-risk lender of the organization (they likely will not be the same applicant/loan). If the loans were not actually steered then we have no reason to expect these loans to carry higher APRs or lower default rates. That is, to the extent that we are misidentifying steered loans, it should bias against us finding any relationship between ‘steering’ and loan characteristics. The results in Table 4A using the randomly drawn steered sample show that for both the APR and the default regression the (randomly allocated) *Steered* dummy variable is statistically and economically insignificant. That is, when we create pure random matches, we get no impact from the *Steered* variable. We also created a number of alternative steered samples that are less random; i.e., we match on one variable, then on two variables, etc., from our matching criteria. When we do this, for the steered samples tested we get a monotonic improvement in the performance of the *Steered* variable as we decrease the randomness of the criteria for selecting the steering group. This gives us confidence that our identification strategy for steered loans is appropriate and that our findings are not a result of spurious correlations.

## 5. Summary and Conclusions

During the housing boom of the 2000s, there were frequent accusations of unscrupulous lender behavior. However, there has been little research that has methodically evaluated the housing market data to find systematic evidence of such behavior. We attempt to fill this research void. We look for evidence that depository institutions may have steered borrowers to a high-risk/predatory affiliate, which charged higher rates and provided inferior loan products than what the borrower was qualified for.

Specifically, we develop a sample of borrowers with features consistent with having been inappropriately (based on their characteristics) steered toward a subprime lender. To do this we look at

mortgage loan applicants that are denied credit by one lender that is an affiliate of a holding company, only to be approved within a relatively short period by another lender that specializes in subprime lending *that is also an affiliate* of the same holding company that denied the original loan request. These “steered loans” have the potential to be provided with terms that exploit the unsophisticated borrower. We test for evidence consistent with such exploitation by comparing the pricing and performance of these loans to that of other non-steered mortgages with similar characteristics.

We find evidence consistent with institutions steering customers to affiliated lenders that provide more expensive loan products. Specifically, we find that steered loans pay 40 to 60 basis points higher APR than non-steered loans within a state and calendar quarter. This is economically significant given that the average APR for the loans is 6.5%. We also find these steered customers perform better on their mortgages (fewer delinquencies and lower loan default rates)—consistent with them being lower-risk, better-qualified borrowers than those normally associated with the loan product received. Specifically, we find that the probability of steered loans being delinquent is 1.4–2.0 percentage points lower than that of the non-steered loans; given an average delinquency rate of 5%, this differential is an economically significant result. We also find that steered loans are often placed in private securitized pools—much more so than being held in portfolio or sold to the housing GSEs. This is consistent with the steering taking place in an attempt to satisfy the demands of investors looking for highly rated mortgage-back securities. The findings are consistent with steering being used as an inexpensive form of credit enhancement (or to eliminate the need for additional enhancement) to market mortgage pools.

Thus, in general, the findings are consistent with predatory lending practices leading up to the collapse of the housing market. While lending terms have tightened significantly following the collapse of the housing market, once markets recover there may be a tendency for such lending practices to creep back into the lending mix. Statistical analysis, such as that shown here, and other similar techniques to capture alternative forms of steering behavior, could be implemented to monitor the problem.<sup>29</sup>

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<sup>29</sup> In fact, similar analysis is currently used by bank examiners to test for the presence of discriminatory lending practices.

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**Table 1: Summary statistics**

Variable	Non-steered Sample			Steered Sample		
	N	Mean	SD	N	Mean	SD
ARM flag	13203	0.29	0.46	13245	0.68	0.47
Balloon flag	13252	0.03	0.18	13252	0.01	0.11
Buydown flag	13252	0.01	0.08	13252	0.00	0.03
IO flag	13105	0.10	0.31	13118	0.28	0.45
Jumbo flag	13252	0.06	0.25	13252	0.08	0.28
Pre-payment penalty flag	12634	0.16	0.36	13126	0.28	0.45
Loan term, months	13252	328.78	72.93	13252	333.17	68.37
First observed interest rate (APR)	13251	6.44	1.58	13252	6.73	1.35
90-day delinquency within 2 years	13252	0.05	0.21	13252	0.04	0.20
Refi flag	13252	0.58	0.49	13252	0.58	0.49
Conventional flag	13252	0.99	0.08	13252	0.99	0.08
Owner-occupied flag	13252	0.95	0.22	13252	0.95	0.22
FICO score	9850	708.99	52.45	12250	709.21	51.82
Income, \$1000s	11581	74.65	51.49	12738	83.47	74.35
Loan amount, \$1000s	13252	177.49	132.20	13252	185.06	139.78
Low documentation flag	5354	0.30	0.46	5412	0.51	0.50
Missing documentation flag	13252	0.60	0.49	13252	0.59	0.49
Grade B or C flag	13252	0.07	0.26	13252	0.02	0.14

This table shows summary statistics for two samples of loans originated between 1998-2006. All loans have been matched to a previous loan application in HMDA that was initially denied by a lender or withdrawn by the applicant. The ‘steered loans’ sample consists of loans ultimately approved by a high-risk lender that is affiliated (via a holding company) with the lender that originally denied the loan; i.e., our *Steered* = 1.0. Each loan with *Steered*=1 has been matched on loan and borrower characteristics to a similar loan for which there is no evidence of steering (*Steered*=0) which constitutes our ‘Non-steered’ sample. Default is defined as 90-day delinquency, foreclosure, short sale, or REO within two years of origination.

**Table 2: Determinants of the initial mortgage interest rate**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Initial interest rate (mean= 6.54%)							
Steered flag	0.480*** (0.000)	0.656*** (0.000)	0.480*** (0.000)	0.610*** (0.000)	0.269*** (0.000)	0.302*** (0.000)	0.139*** (0.008)	0.286*** (0.000)
Refi flag	-0.275*** (0.000)	-0.356*** (0.000)	-0.261*** (0.000)	-0.152*** (0.000)	-0.141* (0.051)	-0.258*** (0.000)	-0.174*** (0.001)	-0.072* (0.091)
Conventional flag	0.802*** (0.000)	1.254*** (0.000)	0.911*** (0.000)	0.950*** (0.000)	0.921*** (0.000)	1.227*** (0.000)	0.848*** (0.000)	0.890*** (0.000)
Owner-occupied flag	-0.120** (0.020)	-0.253*** (0.000)	-0.004 (0.952)	-0.062 (0.332)	-0.226*** (0.000)	-0.283*** (0.000)	-0.022 (0.795)	-0.076 (0.330)
FRM flag	0.481*** (0.000)	0.569*** (0.000)	0.209*** (0.004)	0.254*** (0.000)	0.729*** (0.000)	0.624*** (0.000)	0.260*** (0.002)	0.299*** (0.000)
FICO score		-0.005*** (0.000)	-0.005*** (0.000)	-0.003*** (0.000)		-0.004*** (0.000)	-0.004*** (0.000)	-0.003*** (0.000)
Balloon flag		1.602*** (0.000)	1.036*** (0.000)	1.059*** (0.000)		1.403*** (0.000)	0.916*** (0.000)	0.828*** (0.000)
Buydown flag		0.400*** (0.000)	0.336*** (0.003)	0.401*** (0.000)		0.440*** (0.000)	0.403*** (0.000)	0.467*** (0.000)
Interest only flag		-0.284*** (0.000)	-0.262*** (0.000)	-0.260*** (0.000)		-0.359*** (0.000)	-0.341*** (0.000)	-0.343*** (0.000)
Jumbo flag		-0.279*** (0.000)	0.145*** (0.004)	0.191*** (0.000)		-0.189*** (0.000)	0.181*** (0.001)	0.200*** (0.000)
Pre-payment penalty flag		0.554*** (0.000)	0.505*** (0.000)	0.313*** (0.000)		0.653*** (0.000)	0.638*** (0.000)	0.446*** (0.000)
Log borrower income			0.425*** (0.000)	0.427*** (0.000)			0.401*** (0.000)	0.405*** (0.000)
Log loan amount			-0.811*** (0.000)	-0.800*** (0.000)			-0.734*** (0.000)	-0.728*** (0.000)
LTV ratio > 85%				0.319*** (0.000)				0.314*** (0.000)
Low documentation Flag				-0.100** (0.033)				-0.092*** (0.008)
Missing documentation Flag				0.374*** (0.000)				0.292*** (0.000)
Grade B or C				1.377*** (0.000)				1.385*** (0.000)
Fixed effects:	State* Qtr	State* Qtr	State* Qtr	State* Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr
Observations	26448	21501	18559	18404	26448	21501	18559	18404
R-squared	0.261	0.343	0.407	0.450	0.535	0.545	0.589	0.614
Adj. R-squared	0.228	0.311	0.376	0.421	0.354	0.409	0.460	0.493
Number of banks	582	465	418	416	582	465	418	416

This table shows results of an OLS model of the initial interest rate on matched loans originated between 1998-2006. The originated loans in this sample have been matched to a previous loan application in HMDA that was initially denied by the lender or withdrawn by the applicant. *Steered* is equal to one if the lender that denied the first loan application is affiliated with the lender (a subprime lender) that ultimately originated the loan. Each loan with *Steered*=1 has been matched on loan and borrower characteristics to a similar loan with *Steered*=0. Robust standard errors are clustered at the state level; p-values are in parentheses.

**Table 3A: Estimates of initial mortgage loan terms/characteristics**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ARM flag	Balloon flag	Buydown flag	IO flag	Jumbo flag	PP penalty flag	Term>30 years
Mean:	0.552	0.012	0.004	0.215	0.082	0.240	0.020
Steered flag	0.407*** (0.000)	-0.025*** (0.000)	-0.007*** (0.000)	0.178*** (0.000)	0.012*** (0.005)	0.172*** (0.000)	-0.002 (0.488)
Refi flag	-0.045*** (0.000)	-0.014*** (0.000)	0.000 (0.984)	-0.139*** (0.000)	-0.012** (0.020)	0.061*** (0.000)	0.003* (0.077)
Conventional flag	0.364*** (0.000)	0.014*** (0.003)	-0.039 (0.115)	0.148*** (0.001)	-0.001 (0.934)	0.176*** (0.000)	0.023*** (0.004)
Owner-occupied flag	-0.163*** (0.000)	0.027*** (0.000)	0.003** (0.034)	-0.003 (0.749)	0.074*** (0.004)	-0.061*** (0.003)	-0.003 (0.456)
FICO score	-0.000 (0.140)	-0.000*** (0.006)	-0.000 (0.360)	0.000*** (0.000)	-0.000 (0.709)	-0.000*** (0.000)	-0.000*** (0.004)
Log borrower income	-0.093*** (0.000)	0.025*** (0.000)	-0.001 (0.109)	-0.064*** (0.000)	0.128*** (0.000)	0.018 (0.126)	-0.007* (0.053)
Log loan amount	0.308*** (0.000)	-0.041*** (0.000)	0.003*** (0.000)	0.161*** (0.000)	0.138*** (0.001)	0.019 (0.226)	0.022*** (0.001)
LTV ratio > 85%	-0.052*** (0.000)	-0.002 (0.409)	0.002 (0.137)	-0.086*** (0.000)	-0.032*** (0.000)	0.012 (0.245)	0.000 (0.903)
Low documentation flag	0.086*** (0.000)	-0.009*** (0.000)	-0.002 (0.201)	0.035*** (0.000)	-0.001 (0.702)	-0.023** (0.021)	0.002 (0.539)
Missing documentation flag	-0.009 (0.614)	0.010*** (0.000)	0.001 (0.156)	-0.033*** (0.000)	-0.023*** (0.004)	0.034*** (0.002)	0.002 (0.492)
Grade B or C	0.247*** (0.000)	-0.023*** (0.000)	-0.006*** (0.000)	-0.002 (0.879)	0.004 (0.551)	0.570*** (0.000)	0.081*** (0.000)
Fixed effects:	State*Qtr	State*Qtr	State*Qtr	State*Qtr	State*Qtr	State*Qtr	State*Qtr
Observations	18861	18872	18872	18802	18872	18461	18872
R-squared	0.464	0.114	0.090	0.203	0.378	0.276	0.092
Adj. R-squared	0.434	0.065	0.040	0.160	0.343	0.237	0.042
Number of banks	427	427	427	425	427	417	427

This table shows results of an OLS model of loan terms on matched loans originated between 1998-2006. The originated loans in this sample have been matched to a previous loan application in HMDA that was initially denied by the lender or withdrawn by the applicant. *Steered flag* is equal to one if the lender that denied the first loan application is affiliated with the lender that ultimately originated the loan. Each loan with *Steered*=1 has been matched on loan and borrower characteristics to a similar loan with *Steered*=0. Robust standard errors are clustered at the state level; p-values are in parentheses.

**Table 3B: Estimates of initial mortgage loan terms/characteristics  
(accounting for bank fixed effects)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ARM flag	Balloon flag	Buydown flag	IO flag	Jumbo flag	PP penalty flag	Term>30 years
Mean:	0.552	0.012	0.004	0.215	0.082	0.240	0.020
Steered flag	0.342*** (0.000)	0.004** (0.043)	-0.014*** (0.000)	0.120*** (0.000)	0.011* (0.072)	0.149*** (0.000)	0.007** (0.012)
Refi flag	-0.010 (0.220)	-0.007*** (0.000)	0.001 (0.454)	-0.146*** (0.000)	-0.011* (0.075)	0.077*** (0.000)	0.006*** (0.002)
Conventional flag	0.392*** (0.000)	0.002 (0.832)	-0.023 (0.298)	0.148*** (0.006)	-0.019 (0.385)	0.193*** (0.000)	0.021*** (0.007)
Owner-occupied flag	-0.177*** (0.000)	0.015*** (0.000)	0.002 (0.156)	0.007 (0.651)	0.076** (0.010)	-0.072*** (0.009)	-0.009* (0.100)
FICO score	0.000 (0.743)	-0.000 (0.221)	-0.000 (0.475)	0.000*** (0.000)	0.000 (0.301)	-0.000*** (0.000)	-0.000** (0.048)
Log borrower income	-0.123*** (0.000)	0.016*** (0.000)	-0.001 (0.218)	-0.075*** (0.000)	0.131*** (0.000)	-0.002 (0.908)	-0.011** (0.026)
Log loan amount	0.305*** (0.000)	-0.026*** (0.000)	0.003*** (0.002)	0.167*** (0.000)	0.147*** (0.002)	0.012 (0.530)	0.024*** (0.007)
LTV ratio > 85%	-0.039*** (0.000)	0.001 (0.751)	0.001 (0.456)	-0.086*** (0.000)	-0.033*** (0.000)	0.022 (0.106)	0.001 (0.784)
Low documentation Flag	0.083*** (0.000)	0.001 (0.581)	-0.002 (0.399)	0.047*** (0.000)	-0.012** (0.034)	-0.025** (0.020)	-0.003 (0.383)
Missing documentation Flag	0.068*** (0.000)	0.007*** (0.000)	-0.000 (0.822)	-0.023* (0.073)	-0.025** (0.017)	0.096*** (0.000)	0.014*** (0.003)
Grade B or C	0.193*** (0.001)	0.006 (0.311)	-0.006*** (0.009)	-0.031 (0.181)	0.009 (0.308)	0.566*** (0.000)	0.073*** (0.000)
Fixed effects:	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr
Observations	18861	18872	18872	18802	18872	18461	18872
R-squared	0.656	0.550	0.433	0.339	0.487	0.474	0.254
Adj. R-squared	0.542	0.400	0.245	0.122	0.317	0.308	0.007
Number of banks	427	427	427	425	427	417	427

This table shows results of an OLS model of loan terms, which includes bank fixed-effects, on matched loans originated between 1998-2006. The originated loans in this sample have been matched to a previous loan application in HMDA that was initially denied by the lender or withdrawn by the applicant. *Steered flag* is equal to one if the lender that denied the first loan application is affiliated with the lender that ultimately originated the

loan. Each loan with *Steered*=1 has been matched on loan and borrower characteristics to a similar loan with *Steered*=0. Robust standard errors are clustered at the state level; p-values are in parentheses.

**Table 4: OLS estimates of loan default**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	90-day delinquency within 2 years (mean=0.05)							
Steered flag	-0.014*** (0.000)	-0.018*** (0.000)	-0.020*** (0.000)	-0.005 (0.263)	-0.029*** (0.000)	-0.033*** (0.000)	-0.034*** (0.000)	-0.016** (0.027)
Refi flag	-0.020*** (0.006)	-0.028*** (0.000)	-0.027*** (0.000)	-0.017*** (0.002)	-0.018** (0.015)	-0.026*** (0.001)	-0.024*** (0.001)	-0.013** (0.025)
Conventional flag	-0.058** (0.041)	-0.040 (0.231)	-0.051 (0.183)	-0.049 (0.205)	-0.091** (0.044)	-0.073 (0.130)	-0.085 (0.110)	-0.085 (0.110)
Owner-occupied flag	0.011* (0.077)	0.005 (0.431)	0.001 (0.840)	-0.005 (0.478)	0.010 (0.173)	0.003 (0.600)	-0.002 (0.869)	-0.008 (0.367)
FRM flag	-0.025*** (0.000)	-0.014*** (0.000)	-0.013*** (0.003)	-0.008* (0.084)	-0.018*** (0.000)	-0.010** (0.043)	-0.010 (0.144)	-0.005 (0.445)
FICO score		-0.001*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)		-0.001*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)
Balloon flag		0.084 (0.144)	0.083 (0.116)	0.091* (0.073)		0.113 (0.113)	0.125* (0.093)	0.120* (0.096)
Buydown flag		-0.048** (0.026)	-0.041 (0.107)	-0.031 (0.202)		-0.061** (0.041)	-0.062* (0.084)	-0.053 (0.134)
Interest only flag		0.017** (0.017)	0.015** (0.030)	0.014** (0.042)		0.015* (0.063)	0.013 (0.116)	0.012 (0.148)
Jumbo flag		-0.006 (0.409)	-0.008 (0.447)	-0.006 (0.523)		-0.002 (0.802)	-0.006 (0.601)	-0.005 (0.665)
Pre-payment penalty flag		0.031*** (0.001)	0.029*** (0.002)	0.009 (0.180)		0.032*** (0.001)	0.029*** (0.004)	0.008 (0.251)
Log borrower income			0.007 (0.247)	0.007 (0.183)			0.004 (0.471)	0.004 (0.430)
Log loan amount			-0.001 (0.761)	0.002 (0.567)			0.003 (0.493)	0.005 (0.298)
LTV ratio > 85%				0.022*** (0.000)				0.026*** (0.000)
Low documentation flag				0.008 (0.126)				0.001 (0.901)



Missing documentation flag					0.008*				0.020**
					(0.076)				(0.010)
Grade B or C					0.152***				0.162***
					(0.000)				(0.000)
	Fixed effects:	State*Qtr	State*Qtr	State*Qtr	State*Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr
Observations		26448	21501	18559	18404	26448	21501	18559	18404
R-squared		0.076	0.102	0.109	0.125	0.272	0.260	0.275	0.287
Adj. R-squared		0.034	0.059	0.062	0.079	-0.012	0.040	0.048	0.063
Number of banks		582	465	418	416	582	465	418	416

This table shows results of an OLS model of loan default on matched loans originated between 1998-2006. The originated loans in this sample have been matched to a previous loan application in HMDA that was initially denied by the lender or withdrawn by the applicant. *Steered flag* is equal to one if the lender that denied the first loan application is affiliated with the lender that ultimately originated the loan. Each loan with *Steered*=1 has been matched on loan and borrower characteristics to a similar loan with *Steered*=0. Robust standard errors are clustered at the state level; p-values are in parentheses.

**Table 5A: OLS estimates of loan ‘allocation’**

	(1)	(2)	(3)	(4)	(5)	(6)
	Portfolio		Private		Public	
Mean:	0.398		0.426		0.173	
Steered flag	-0.373*** (0.000)	-0.078*** (0.000)	0.394*** (0.000)	0.184*** (0.000)	-0.017 (0.152)	-0.106*** (0.000)
Refi flag	0.027*** (0.006)	-0.012 (0.197)	0.018 (0.146)	0.056*** (0.000)	-0.044*** (0.000)	-0.043*** (0.001)
Conventional flag	-0.082 (0.182)	-0.089 (0.112)	-0.001 (0.980)	-0.056 (0.262)	0.200*** (0.000)	0.195*** (0.000)
Owner-occupied flag	0.021 (0.112)	-0.001 (0.936)	-0.010 (0.559)	-0.015 (0.469)	-0.002 (0.876)	0.018 (0.169)
FICO score	0.000*** (0.000)	0.000 (0.144)	-0.001*** (0.000)	-0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Log borrower income	0.022*** (0.005)	0.039*** (0.000)	0.059*** (0.000)	0.040*** (0.000)	-0.081*** (0.000)	-0.079*** (0.000)
Log loan amount	-0.043*** (0.000)	-0.037*** (0.000)	0.015* (0.057)	0.026*** (0.003)	0.028** (0.012)	0.012 (0.308)
LTV ratio > 85%	0.018 (0.129)	-0.002 (0.800)	-0.026* (0.055)	-0.028** (0.050)	0.010 (0.382)	0.032** (0.016)
Low documentation	0.005 (0.772)	-0.003 (0.783)	-0.011 (0.466)	-0.019 (0.141)	0.007 (0.520)	0.023** (0.041)
Missing documentation	-0.043** (0.028)	-0.030*** (0.001)	0.011 (0.579)	-0.012 (0.371)	0.028*** (0.010)	0.041*** (0.000)
Grade B or C	0.025 (0.224)	-0.015 (0.468)	0.118*** (0.000)	0.146*** (0.001)	-0.141*** (0.000)	-0.130*** (0.000)
Fixed effects:	State*Qtr	State*Qtr *Bank	State*Qtr	State*Qtr *Bank	State*Qtr	State*Qtr *Bank
Observations	18734	18734	18734	18734	18734	18734
R-squared	0.249	0.609	0.246	0.463	0.130	0.405
Adj. R-squared	0.208	0.481	0.204	0.288	0.082	0.211
Number of banks	417	417	417	417	417	417

This table shows results of an OLS model of loan allocation between held in portfolio, private securitization and public securitization, on matched loans originated between 1998-2006. The originated loans in this sample have been matched to a previous loan application in HMDA that was initially denied by the lender or withdrawn by the applicant. *Steered flag* is equal to one if the lender that denied the first loan application is affiliated with the lender that ultimately originated the loan. Each loan with *Steered*=1 has been matched on loan and borrower characteristics to a similar loan with *Steered*=0. Robust standard errors are clustered at the state level; p-values are in parentheses.

**Table 5B: OLS estimates of initial interest rate with securitization controls**

	(1)	(2)
	Interest rate	
Mean:	6.544	
Steered flag	0.629*** (0.000)	0.251*** (0.000)
Relationship * Private securitized	-0.216*** (0.000)	0.136** (0.035)
Relationship * Public securitized	-0.473*** (0.000)	-0.274*** (0.001)
Private securitized flag	0.571*** (0.000)	0.009 (0.873)
GSE securitized flag	0.076* (0.050)	-0.269*** (0.000)
Refi flag	-0.173*** (0.000)	-0.095** (0.019)
Conventional flag	1.039*** (0.000)	1.023*** (0.000)
Owner-occupied flag	-0.050 (0.442)	-0.068 (0.374)
FRM flag	0.289*** (0.000)	0.340*** (0.000)
FICO score	-0.003*** (0.000)	-0.002*** (0.000)
Balloon flag	1.031*** (0.000)	0.807*** (0.000)
Buydown flag	0.283*** (0.006)	0.452*** (0.000)
Interest only flag	-0.284*** (0.000)	-0.341*** (0.000)
Jumbo flag	0.078** (0.034)	0.079** (0.048)
Pre-payment penalty flag	0.208*** (0.005)	0.351*** (0.000)
Log borrower income	0.397*** (0.000)	0.370*** (0.000)
Log loan amount	-0.761*** (0.000)	-0.693*** (0.000)
LTV ratio > 85%	0.337*** (0.000)	0.336*** (0.000)
Low documentation	-0.087** (0.026)	-0.077** (0.015)
Missing documentation	0.367*** (0.000)	0.327*** (0.000)
Grade B or C	1.393*** (0.000)	1.415*** (0.000)
	Fixed effects:	
Observations	State*Qtr 18352	State*Qtr*Bank 18352
R-squared	0.481	0.627
Adj. R-squared	0.453	0.511
Number of banks	415	415

This table shows results of an OLS model of initial loan interest rates accounting for how the loan is allocated. These are matched loans originated between 1998-2006. The originated loans in this sample have been matched to a previous loan application in HMDA that was initially denied by the lender or withdrawn by the applicant. *Steered flag* is equal to one if the lender that denied the first loan application is affiliated with the lender that ultimately originated the loan. Each loan with *Steered*=1 has been matched on loan and borrower characteristics to a similar loan with *Steered*=0. Robust standard errors are clustered at the state level; p-values are in parentheses.

**Table 5C: Estimates of initial mortgage loan terms/characteristics, with securitization controls**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	ARM flag		Balloon flag		Buydown flag		IO flag		Jumbo flag		PP penalty flag		Term>30 years	
Mean:	0.551		0.012		0.004		0.215		0.082		0.239		0.020	
Steered flag	0.247*** (0.000)	0.192*** (0.000)	-0.027*** (0.000)	-0.001 (0.742)	-0.005*** (0.000)	-0.011*** (0.000)	0.153*** (0.000)	0.116*** (0.000)	0.016*** (0.002)	0.015 (0.146)	0.140*** (0.000)	0.069*** (0.009)	-0.006 (0.327)	-0.004 (0.293)
Steered *Private	0.162*** (0.000)	0.208*** (0.000)	-0.010 (0.100)	0.002 (0.737)	-0.011*** (0.009)	-0.010 (0.142)	-0.051*** (0.002)	-0.043* (0.068)	-0.015 (0.181)	-0.028* (0.064)	0.034 (0.137)	0.153*** (0.000)	0.005 (0.354)	0.022*** (0.000)
Steered *Public	0.267*** (0.000)	0.242*** (0.000)	0.019*** (0.000)	0.018** (0.037)	0.000 (0.898)	-0.001 (0.688)	0.108*** (0.000)	0.091** (0.010)	-0.025*** (0.002)	-0.021 (0.287)	-0.065** (0.017)	-0.001 (0.973)	0.005 (0.409)	0.007 (0.195)
Private securitized flag	0.046*** (0.009)	-0.081*** (0.001)	0.010* (0.095)	-0.001 (0.861)	0.011** (0.012)	0.009 (0.144)	0.095*** (0.000)	0.050*** (0.003)	0.021*** (0.003)	0.022** (0.033)	0.062*** (0.000)	-0.086*** (0.000)	-0.001 (0.798)	-0.019** (0.012)
GSE securitized Flag	-0.149*** (0.000)	-0.213*** (0.000)	-0.019*** (0.000)	-0.018** (0.046)	-0.002 (0.530)	0.001 (0.873)	-0.023** (0.016)	-0.050** (0.016)	-0.062*** (0.009)	-0.080** (0.037)	-0.072*** (0.000)	-0.148*** (0.000)	-0.013*** (0.000)	-0.018*** (0.000)
Refi flag	-0.043*** (0.000)	-0.011* (0.090)	-0.014*** (0.000)	-0.007*** (0.000)	0.000 (0.977)	0.001 (0.584)	-0.136*** (0.000)	-0.144*** (0.000)	-0.016*** (0.002)	-0.015** (0.014)	0.052*** (0.000)	0.069*** (0.000)	0.003 (0.181)	0.005*** (0.004)
Conventional flag	0.355*** (0.000)	0.392*** (0.000)	0.015*** (0.001)	0.002 (0.761)	-0.039 (0.118)	-0.023 (0.314)	0.137*** (0.001)	0.146*** (0.007)	0.015 (0.402)	0.001 (0.980)	0.200*** (0.000)	0.219*** (0.000)	0.025*** (0.003)	0.022*** (0.004)
Owner-occupied flag	-0.163*** (0.000)	-0.173*** (0.000)	0.026*** (0.000)	0.015*** (0.000)	0.002** (0.040)	0.002 (0.177)	-0.007 (0.520)	0.006 (0.728)	0.074*** (0.003)	0.077*** (0.010)	-0.055*** (0.008)	-0.066** (0.019)	-0.004 (0.411)	-0.009 (0.131)
FICO score	-0.000 (0.411)	0.000 (0.528)	-0.000*** (0.006)	-0.000 (0.232)	-0.000 (0.713)	-0.000 (0.494)	0.000*** (0.000)	0.000*** (0.000)	0.000 (0.614)	0.000 (0.145)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.004)	-0.000* (0.051)
Log borrower income	-0.101*** (0.000)	-0.130*** (0.000)	0.024*** (0.000)	0.016*** (0.000)	-0.002* (0.054)	-0.001 (0.202)	-0.063*** (0.000)	-0.074*** (0.000)	0.121*** (0.000)	0.124*** (0.000)	0.003 (0.774)	-0.016 (0.249)	-0.008** (0.027)	-0.012** (0.015)
Log loan amount	0.301*** (0.000)	0.300*** (0.000)	-0.041*** (0.000)	-0.026*** (0.000)	0.004*** (0.000)	0.003*** (0.001)	0.160*** (0.000)	0.166*** (0.000)	0.140*** (0.001)	0.148*** (0.002)	0.019 (0.243)	0.012 (0.545)	0.022*** (0.001)	0.024*** (0.007)
LTV ratio > 85%	-0.052*** (0.000)	-0.037*** (0.000)	-0.002 (0.362)	0.001 (0.738)	0.002 (0.123)	0.001 (0.449)	-0.087*** (0.000)	-0.087*** (0.000)	-0.030*** (0.000)	-0.030*** (0.000)	0.016 (0.149)	0.028** (0.042)	-0.000 (0.911)	0.001 (0.780)
Low documentation	0.087*** (0.000)	0.085*** (0.000)	-0.009*** (0.000)	0.001 (0.538)	-0.002 (0.207)	-0.002 (0.406)	0.034*** (0.000)	0.047*** (0.000)	-0.002 (0.645)	-0.010* (0.074)	-0.021** (0.039)	-0.021** (0.044)	0.002 (0.495)	-0.003 (0.391)
Missing documentation	-0.004 (0.849)	0.070*** (0.000)	0.010*** (0.000)	0.007*** (0.000)	0.001 (0.286)	-0.000 (0.778)	-0.036*** (0.000)	-0.026** (0.038)	-0.021*** (0.007)	-0.022** (0.032)	0.040*** (0.000)	0.105*** (0.000)	0.003 (0.302)	0.015*** (0.002)
Grade B or C	0.227*** (0.000)	0.186*** (0.001)	-0.027*** (0.000)	0.004 (0.485)	-0.008*** (0.000)	-0.008** (0.015)	-0.017 (0.126)	-0.043* (0.078)	-0.007 (0.296)	-0.006 (0.362)	0.555*** (0.000)	0.562*** (0.000)	0.079*** (0.000)	0.072*** (0.001)
Fixed effects:	State*Qtr	State*Qtr *Bank	State*Qtr	State*Qtr *Bank	State*Qtr	State*Qtr *Bank	State*Qtr	State*Qtr *Bank	State*Qtr	State*Qtr *Bank	State*Qtr	State*Qtr *Bank	State*Qtr	State*Qtr *Bank
Observations	18806	18806	18817	18817	18817	18817	18748	18748	18817	18817	18409	18409	18817	18817
R-squared	0.486	0.666	0.117	0.550	0.093	0.433	0.209	0.340	0.389	0.495	0.305	0.491	0.092	0.247
Adj. R-squared	0.457	0.556	0.068	0.402	0.042	0.247	0.166	0.125	0.355	0.330	0.267	0.332	0.042	0.000
Banks	426	426	426	426	426	426	424	424	426	426	416	416	426	426

This table shows results of an OLS model of loan terms on HMDA-McDash matched loans originated from 1998 to 2006. The originated loans in this sample have been matched to a previous loan application in HMDA that was denied by the lender or withdrawn by the applicant. *Relationship between lenders* flag is equal to one if the lender that denied the first loan application shares a highest holder with the lender that ultimately originated the loan. Each loan with *Relationship*=1 has been matched on loan and borrower characteristics to a similar loan with *Relationship*=0. Robust standard errors are clustered at the state level; p-values are in parentheses.

**Table 5D: OLS estimates of loan default with securitization controls**

	(1)	(2)
Mean = 0.050	90-day delinquency within 2 years	
Steered flag	-0.007 (0.172)	-0.017* (0.079)
Steered * Private securitized	-0.018* (0.068)	-0.007 (0.746)
Steered * Public securitized	0.010 (0.205)	0.013 (0.331)
Private securitized flag	0.030*** (0.000)	0.017 (0.274)
GSE securitized flag	-0.002 (0.642)	-0.005 (0.631)
Refi flag	-0.017*** (0.002)	-0.013** (0.024)
Conventional flag	-0.049 (0.202)	-0.085 (0.112)
Owner-occupied flag	-0.006 (0.428)	-0.008 (0.351)
FRM flag	-0.006 (0.176)	-0.004 (0.576)
FICO score	-0.000*** (0.000)	-0.000*** (0.000)
Balloon flag	0.089* (0.075)	0.119* (0.096)
Buydown flag	-0.037 (0.137)	-0.054 (0.115)
Interest only flag	0.012* (0.074)	0.011 (0.162)
Jumbo flag	-0.008 (0.433)	-0.005 (0.619)
Pre-payment penalty flag	0.007 (0.279)	0.008 (0.238)
Log borrower income	0.007 (0.219)	0.004 (0.430)
Log loan amount	0.003 (0.445)	0.005 (0.303)
LTV ratio > 85%	0.022*** (0.000)	0.026*** (0.000)
Low documentation	0.008 (0.128)	0.001 (0.881)
Missing documentation	0.007* (0.099)	0.019** (0.013)
Grade B or C	0.150*** (0.000)	0.159*** (0.000)
	Fixed effects:	
	State*Qtr	State*Qtr*Bank
Observations	18352	18352
R-squared	0.127	0.287
Adj. R-squared	0.080	0.065
Number of banks	415	415

This table shows results of an OLS model of loan default accounting for how the loan is allocated. These are matched loans originated between 1998-2006. The originated loans in this sample have been matched to a previous loan application in HMDA that was initially denied by the lender or withdrawn by the applicant. *Steered flag* is equal to one if the lender that denied the first loan application is affiliated with the lender that ultimately originated the loan. Each loan with *Steered*=1 has been matched on loan and borrower characteristics to a similar loan with *Steered*=0. Robust standard errors are clustered at the state level; p-values are in parentheses

**Table 6A: OLS estimates of initial interest rate accounting for bank size**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Initial interest rate							
Mean:	6.579	6.538	6.544	6.541	6.579	6.538	6.544	6.541
Steered flag	0.573*** (0.000)	0.745*** (0.000)	0.604*** (0.000)	0.724*** (0.000)	0.506*** (0.000)	0.536*** (0.000)	0.411*** (0.000)	0.564*** (0.000)
Steered*Large bank	-0.226*** (0.000)	-0.269*** (0.000)	-0.326*** (0.000)	-0.309*** (0.000)	-0.399*** (0.000)	-0.409*** (0.000)	-0.474*** (0.000)	-0.484*** (0.000)
Large bank flag	-0.492*** (0.000)	-0.485*** (0.000)	-0.461*** (0.000)	-0.456*** (0.000)				
Refi flag	-0.225*** (0.000)	-0.331*** (0.000)	-0.234*** (0.000)	-0.126*** (0.000)	-0.140* (0.054)	-0.257*** (0.000)	-0.174*** (0.001)	-0.071* (0.094)
Conventional flag	0.816*** (0.000)	1.273*** (0.000)	0.924*** (0.000)	0.965*** (0.000)	0.929*** (0.000)	1.238*** (0.000)	0.863*** (0.000)	0.905*** (0.000)
Owner-occupied flag	-0.128** (0.019)	-0.257*** (0.000)	-0.001 (0.984)	-0.060 (0.329)	-0.226*** (0.000)	-0.283*** (0.000)	-0.023 (0.788)	-0.077 (0.324)
FRM flag	0.556*** (0.000)	0.642*** (0.000)	0.293*** (0.000)	0.334*** (0.000)	0.744*** (0.000)	0.643*** (0.000)	0.281*** (0.001)	0.321*** (0.000)
FICO score		-0.005*** (0.000)	-0.005*** (0.000)	-0.003*** (0.000)		-0.004*** (0.000)	-0.004*** (0.000)	-0.003*** (0.000)
Balloon flag		1.469*** (0.000)	0.903*** (0.000)	0.944*** (0.000)		1.394*** (0.000)	0.908*** (0.000)	0.820*** (0.000)
Buydown flag		0.459*** (0.000)	0.401*** (0.000)	0.463*** (0.000)		0.427*** (0.000)	0.400*** (0.000)	0.464*** (0.000)
Interest only flag		-0.297*** (0.000)	-0.279*** (0.000)	-0.277*** (0.000)		-0.358*** (0.000)	-0.341*** (0.000)	-0.344*** (0.000)
Jumbo flag		-0.284*** (0.000)	0.126*** (0.006)	0.172*** (0.000)		-0.188*** (0.000)	0.180*** (0.001)	0.199*** (0.000)
Pre-payment penalty flag		0.599*** (0.000)	0.552*** (0.000)	0.356*** (0.000)		0.655*** (0.000)	0.640*** (0.000)	0.448*** (0.000)
Log borrower income			0.420*** (0.000)	0.421*** (0.000)			0.400*** (0.000)	0.404*** (0.000)
Log loan amount			-0.802*** (0.000)	-0.790*** (0.000)			-0.733*** (0.000)	-0.727*** (0.000)
LTV ratio > 85%				0.315*** (0.000)				0.312*** (0.000)
Low documentation flag				-0.090* (0.052)				-0.083** (0.020)
Missing documentation flag				0.359*** (0.000)				0.283*** (0.000)

Grade B or C				1.379*** (0.000)				1.395*** (0.000)	
	Fixed effects:	State* Qtr	State* Qtr	State* Qtr	State* Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr
Observations		26448	21501	18559	18404	26448	21501	18559	18404
R-squared		0.287	0.367	0.432	0.474	0.537	0.546	0.590	0.616
Adj. R-squared		0.255	0.337	0.402	0.445	0.356	0.411	0.462	0.496
Number of banks		582	465	418	416	582	465	418	416

This table shows results of an OLS model of initial loan interest rates accounting for bank size. These are matched loans originated between 1998-2006. The originated loans in this sample have been matched to a previous loan application in HMDA that was initially denied by the lender or withdrawn by the applicant. *Steered flag* is equal to one if the lender that denied the first loan application is affiliated with the lender that ultimately originated the loan. Each loan with *Steered=1* has been matched on loan and borrower characteristics to a similar loan with *Steered=0*. Robust standard errors are clustered at the state level; p-values are in parentheses.



**Table 6B: Estimates of loan terms/terms, accounting for bank size**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	ARM flag	Balloon flag	Buydown flag	IO flag	Jumbo flag	PP penalty flag	Term>30 years							
Mean:	0.552	0.126	0.004	0.215	0.082	0.240	0.020							
Steered flag	0.536*** (0.000)	0.464*** (0.000)	-0.021*** (0.000)	0.007** (0.013)	-0.008*** (0.000)	-0.012*** (0.003)	0.202*** (0.000)	0.161*** (0.000)	0.019*** (0.008)	0.012 (0.334)	0.163*** (0.000)	0.168*** (0.000)	0.001 (0.483)	0.008*** (0.008)
Steered	-0.278*** (0.000)	-0.219*** (0.000)	-0.012** (0.045)	-0.007* (0.057)	0.002 (0.524)	-0.004 (0.511)	-0.062*** (0.008)	-0.074** (0.048)	-0.015** (0.035)	-0.002 (0.905)	0.028 (0.284)	-0.034 (0.203)	-0.007 (0.245)	-0.001 (0.846)
*Large bank														
Large bank flag	0.034** (0.018)		-0.010* (0.092)		-0.001 (0.774)		-0.043*** (0.009)		-0.002 (0.713)		0.030 (0.145)		0.005** (0.050)	
Refi flag	-0.038*** (0.000)	-0.009 (0.246)	-0.013*** (0.000)	-0.007*** (0.000)	0.000 (0.991)	0.001 (0.448)	-0.135*** (0.000)	-0.145*** (0.000)	-0.011** (0.023)	-0.011* (0.076)	0.058*** (0.000)	0.077*** (0.000)	0.003* (0.092)	0.006*** (0.002)
Conventional flag	0.357*** (0.000)	0.395*** (0.000)	0.014*** (0.002)	0.002 (0.822)	-0.039 (0.115)	-0.023 (0.300)	0.147*** (0.000)	0.149*** (0.005)	-0.002 (0.916)	-0.019 (0.384)	0.177*** (0.000)	0.193*** (0.000)	0.023*** (0.004)	0.021*** (0.007)
Owner-occupied flag	-0.159*** (0.000)	-0.176*** (0.000)	0.027*** (0.000)	0.015*** (0.000)	0.003** (0.034)	0.002 (0.145)	-0.002 (0.878)	0.008 (0.632)	0.074*** (0.004)	0.076** (0.011)	-0.061*** (0.002)	-0.072*** (0.009)	-0.003 (0.455)	-0.009* (0.099)
FICO score	-0.000 (0.118)	0.000 (0.745)	-0.000*** (0.006)	-0.000 (0.220)	-0.000 (0.377)	-0.000 (0.472)	0.000*** (0.000)	0.000*** (0.000)	-0.000 (0.722)	0.000 (0.301)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.004)	-0.000*** (0.048)
Log borrower income	-0.091*** (0.000)	-0.122*** (0.000)	0.025*** (0.000)	0.016*** (0.000)	-0.001* (0.098)	-0.001 (0.220)	-0.064*** (0.000)	-0.075*** (0.000)	0.128*** (0.000)	0.131*** (0.000)	0.019 (0.120)	-0.002 (0.916)	-0.007* (0.055)	-0.011** (0.026)
Log loan amount	0.298*** (0.000)	0.303*** (0.000)	-0.042*** (0.000)	-0.026*** (0.000)	0.003*** (0.000)	0.003*** (0.001)	0.159*** (0.000)	0.166*** (0.000)	0.137*** (0.001)	0.147*** (0.002)	0.020 (0.187)	0.012 (0.543)	0.022*** (0.001)	0.024*** (0.007)
LTV ratio > 85%	-0.051*** (0.000)	-0.039*** (0.000)	-0.002 (0.422)	0.001 (0.756)	0.002 (0.137)	0.001 (0.460)	-0.085*** (0.000)	-0.086*** (0.000)	-0.032*** (0.000)	-0.033*** (0.000)	0.012 (0.260)	0.022 (0.107)	0.000 (0.896)	0.001 (0.785)
Low documentation	0.088*** (0.000)	0.086*** (0.000)	-0.009*** (0.000)	0.001 (0.559)	-0.002 (0.194)	-0.002 (0.416)	0.037*** (0.000)	0.048*** (0.000)	-0.001 (0.740)	-0.012** (0.032)	-0.023** (0.019)	-0.025** (0.022)	0.002 (0.552)	-0.003 (0.384)
Missing documentation	-0.007 (0.689)	0.063*** (0.000)	0.010*** (0.000)	0.007*** (0.000)	0.001 (0.158)	-0.000 (0.764)	-0.034*** (0.000)	-0.025* (0.051)	-0.023*** (0.003)	-0.025** (0.019)	0.035*** (0.001)	0.095*** (0.000)	0.002 (0.439)	0.014*** (0.003)
Grade B or C	0.234*** (0.000)	0.196*** (0.001)	-0.023*** (0.000)	0.006 (0.304)	-0.006*** (0.000)	-0.006*** (0.010)	-0.001 (0.925)	-0.030 (0.194)	0.003 (0.612)	0.009 (0.311)	0.569*** (0.000)	0.567*** (0.000)	0.080*** (0.000)	0.073*** (0.000)
Fixed effects:	State*Qtr	State*Qtr *Bank	State*Qtr	State*Qtr *Bank	State*Qtr	State*Qtr *Bank	State*Qtr	State*Qtr *Bank	State*Qtr	State*Qtr *Bank	State*Qtr	State*Qtr *Bank	State*Qtr	State*Qtr *Bank
Observations	18861	18861	18872	18872	18872	18872	18802	18802	18872	18872	18461	18461	18872	18872
R-squared	0.481	0.660	0.117	0.550	0.090	0.433	0.208	0.340	0.378	0.487	0.278	0.474	0.092	0.254
Adj. R-squared	0.452	0.547	0.068	0.400	0.040	0.245	0.165	0.123	0.343	0.317	0.239	0.309	0.042	0.007
Banks	427	427	427	427	427	427	425	425	427	427	417	417	427	427

This table shows results of an OLS model of loan characteristics accounting for bank size differentials. These are matched loans originated between 1998-2006. The originated loans in this sample have been matched to a previous loan application in HMDA that was initially denied by the lender or withdrawn by the applicant. *Steered flag* is equal to one if the lender that denied the first loan application is affiliated with the lender that ultimately originated the loan. Each loan with *Steered*=1 has been matched on loan and borrower characteristics to a similar loan with *Steered*=0. Robust standard errors are clustered at the state level; p-values are in parentheses.

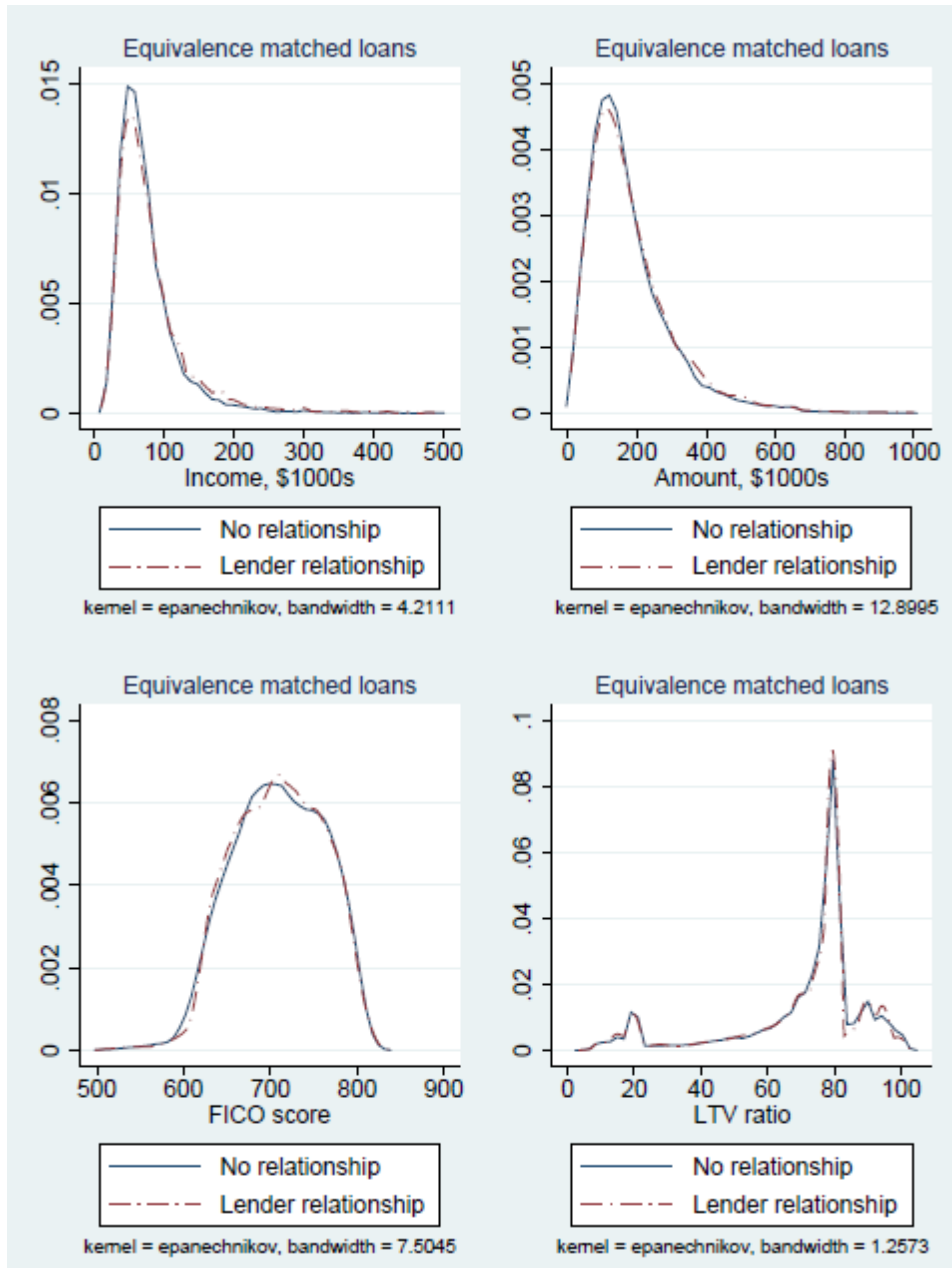
**Table 6C: Estimates of loan default accounting for bank size**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	90-days delinquent within 2 years							
Mean:	0.045	0.050	0.050	0.050	0.045	0.050	0.050	0.050
Steered flag	-0.011*** (0.000)	-0.013*** (0.006)	-0.012** (0.037)	0.001 (0.853)	-0.023** (0.017)	-0.022** (0.034)	-0.016 (0.158)	0.005 (0.639)
Steered*Large bank	-0.007 (0.347)	-0.009 (0.261)	-0.015 (0.108)	-0.011 (0.183)	-0.012 (0.410)	-0.018 (0.215)	-0.032* (0.083)	-0.037** (0.038)
Large bank flag	0.000 (0.972)	0.002 (0.592)	0.004 (0.375)	0.003 (0.511)				
Refi flag	-0.019*** (0.005)	-0.028*** (0.000)	-0.027*** (0.000)	-0.017*** (0.002)	-0.018** (0.015)	-0.026*** (0.001)	-0.024*** (0.001)	-0.013** (0.026)
Conventional flag	-0.058** (0.040)	-0.040 (0.230)	-0.051 (0.181)	-0.049 (0.203)	-0.091** (0.045)	-0.073 (0.131)	-0.084 (0.113)	-0.084 (0.113)
Owner-occupied flag	0.011* (0.076)	0.005 (0.431)	0.002 (0.837)	-0.005 (0.481)	0.010 (0.173)	0.003 (0.601)	-0.002 (0.864)	-0.008 (0.364)
FRM flag	-0.024*** (0.000)	-0.012*** (0.000)	-0.012*** (0.010)	-0.007 (0.140)	-0.017*** (0.001)	-0.009* (0.078)	-0.009 (0.221)	-0.003 (0.618)
FICO score		-0.001*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)		-0.001*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)
Balloon flag		0.083 (0.144)	0.082 (0.117)	0.091* (0.075)		0.113 (0.113)	0.125* (0.095)	0.119* (0.098)
Buydown flag		-0.047** (0.028)	-0.040 (0.115)	-0.030 (0.217)		-0.061** (0.038)	-0.062* (0.079)	-0.053 (0.128)
Interest only flag		0.017** (0.017)	0.015** (0.030)	0.014** (0.040)		0.015* (0.062)	0.013 (0.117)	0.012 (0.149)
Jumbo flag		-0.006 (0.405)	-0.008 (0.436)	-0.006 (0.514)		-0.002 (0.804)	-0.006 (0.602)	-0.005 (0.663)
Pre-payment penalty flag		0.031*** (0.001)	0.030*** (0.002)	0.010 (0.158)		0.032*** (0.001)	0.029*** (0.005)	0.008 (0.253)
Log borrower income			0.007 (0.244)	0.007 (0.183)			0.004 (0.476)	0.004 (0.435)
Log loan amount			-0.001 (0.767)	0.002 (0.569)			0.003 (0.490)	0.005 (0.290)
LTV ratio > 85%				0.022*** (0.000)				0.026*** (0.000)
Low documentation flag				0.008 (0.117)				0.002 (0.831)
Missing documentation				0.008*				0.019**

flag					(0.075)				(0.013)
Grade B or C					0.151***				0.163***
					(0.000)				(0.000)
	Fixed effects:	State* Qtr	State* Qtr	State* Qtr	State* Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr
Observations		26448	21501	18559	18404	26448	21501	18559	18404
R-squared		0.076	0.102	0.109	0.126	0.272	0.260	0.276	0.288
Adj. R-squared		0.034	0.059	0.062	0.079	-0.012	0.040	0.049	0.064
Number of banks		582	465	418	416	582	465	418	416

This table shows results of an OLS model of bank default accounting for bank size. These are matched loans originated between 1998-2006. The originated loans in this sample have been matched to a previous loan application in HMDA that was initially denied by the lender or withdrawn by the applicant. *Steered flag* is equal to one if the lender that denied the first loan application is affiliated with the lender that ultimately originated the loan. Each loan with *Steered*=1 has been matched on loan and borrower characteristics to a similar loan with *Steered*=0. Robust standard errors are clustered at the state level; p-values are in parentheses.

Figure 1: Kernel densities



This figure shows the kernel density distributions of income, loan amount, FICO score, and LTV ratio at origination of HMDA-McDash matched loans originated from 1998 to 2006. The originated loans in this sample have been matched to a previous loan application in HMDA that was denied by the lender or withdrawn by the applicant. *Steered flag* is equal to one if the lender that denied the first loan application is affiliated with the lender that ultimately originated the loan. Each loan with *Steered*=1 has been matched on loan and borrower characteristics to a similar loan with *Steered*=0.

**Appendix Table A1: Estimates of the initial interest rate (APR) with a broader control group**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Initial interest rate (mean= 6.73%)							
Steered flag	0.480*** (0.000)	0.656*** (0.000)	0.506*** (0.000)	0.793*** (0.000)	0.174*** (0.000)	0.312*** (0.000)	0.166*** (0.000)	0.494*** (0.000)
Refi flag	-0.129*** (0.000)	-0.283*** (0.000)	-0.236*** (0.000)	-0.151*** (0.000)	-0.117*** (0.001)	-0.243*** (0.000)	-0.189*** (0.000)	-0.110*** (0.000)
Conventional flag	0.222*** (0.000)	0.594*** (0.000)	0.487*** (0.000)	0.464*** (0.000)	0.171*** (0.001)	0.575*** (0.000)	0.496*** (0.000)	0.458*** (0.000)
Owner-occupied flag	-0.301*** (0.000)	-0.344*** (0.000)	-0.181*** (0.000)	-0.226*** (0.000)	-0.305*** (0.000)	-0.321*** (0.000)	-0.156*** (0.000)	-0.200*** (0.000)
FRM flag	0.456*** (0.000)	0.554*** (0.000)	0.242*** (0.001)	0.403*** (0.000)	0.621*** (0.000)	0.636*** (0.000)	0.319*** (0.000)	0.453*** (0.000)
FICO score		-0.006*** (0.000)	-0.006*** (0.000)	-0.004*** (0.000)		-0.005*** (0.000)	-0.005*** (0.000)	-0.003*** (0.000)
Balloon flag		1.030*** (0.000)	0.870*** (0.000)	0.902*** (0.000)		0.619*** (0.000)	0.459*** (0.000)	0.408*** (0.000)
Buydown flag		0.661*** (0.000)	0.540*** (0.000)	0.714*** (0.000)		0.633*** (0.000)	0.491*** (0.000)	0.690*** (0.000)
Interest only flag		-0.521*** (0.000)	-0.482*** (0.000)	-0.485*** (0.000)		-0.539*** (0.000)	-0.505*** (0.000)	-0.524*** (0.000)
Jumbo flag		-0.131*** (0.000)	0.260*** (0.000)	0.255*** (0.000)		-0.127*** (0.000)	0.228*** (0.000)	0.222*** (0.000)
Pre-payment penalty flag		0.503*** (0.000)	0.472*** (0.000)	0.245*** (0.000)		0.642*** (0.000)	0.620*** (0.000)	0.349*** (0.000)
Log borrower income			0.239*** (0.000)	0.243*** (0.000)			0.231*** (0.000)	0.235*** (0.000)
Log loan amount			-0.553*** (0.000)	-0.528*** (0.000)			-0.526*** (0.000)	-0.500*** (0.000)
LTV ratio > 85%				0.256*** (0.000)				0.245*** (0.000)
Low documentation flag				-0.058* (0.055)				-0.044** (0.018)
Missing documentation Flag				0.353*** (0.000)				0.304*** (0.000)
Grade B or C				1.743*** (0.000)				1.694*** (0.000)
Fixed effects:	State* Qtr	State* Qtr	State* Qtr	State* Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr
Observations	302998	225723	189229	188117	302998	225723	189229	188117
R-squared	0.334	0.405	0.442	0.503	0.541	0.555	0.580	0.618
Adj. R-squared	0.330	0.400	0.437	0.498	0.464	0.492	0.518	0.562

Number of banks                    2193            1736            1610            1606            2193            1736            1610            1606

This table shows results of an OLS model of initial loan interest rates accounting for how the loan is allocated. These are loans originated between 1998-2006. The steered loans in this sample have been matched to a previous loan application in HMDA that was initially denied by the lender or withdrawn by the applicant. *Steered flag* is equal to one if the lender that denied the first loan application is affiliated with the lender that ultimately originated the loan. *Steered=0* includes the universe of loans in our data that did not show signs of being steered. Robust standard errors are clustered at the state level; p-values are in parentheses.

**Appendix Table A2-A: Estimates of loan terms/characteristics with a broader control group**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ARM flag	Balloon flag	Buydown flag	IO flag	Jumbo flag	PP penalty flag	Term>30 years
Mean:	0.421	0.011	0.004	0.145	0.134	0.248	0.019
Steered flag	0.392*** (0.000)	-0.026*** (0.000)	-0.005*** (0.000)	0.162*** (0.000)	0.071*** (0.000)	0.221*** (0.000)	-0.005* (0.058)
Refi flag	-0.050*** (0.000)	-0.011*** (0.000)	-0.003*** (0.000)	-0.106*** (0.000)	-0.023*** (0.000)	0.062*** (0.000)	0.009** (0.020)
Conventional flag	0.068*** (0.000)	0.018*** (0.000)	-0.048*** (0.000)	0.041*** (0.000)	-0.009 (0.267)	0.101*** (0.000)	0.008*** (0.000)
Owner-occupied flag	-0.164*** (0.000)	0.013*** (0.000)	0.000 (0.328)	0.021 (0.403)	0.117*** (0.000)	-0.055*** (0.000)	-0.010** (0.012)
FICO score	-0.000*** (0.000)	-0.000*** (0.000)	0.000 (0.788)	0.000*** (0.005)	-0.000** (0.041)	-0.000*** (0.000)	-0.000*** (0.003)
Log borrower income	-0.079*** (0.000)	0.014*** (0.000)	-0.002*** (0.000)	-0.050*** (0.000)	0.118*** (0.000)	0.009 (0.394)	-0.004*** (0.004)
Log loan amount	0.253*** (0.000)	-0.019*** (0.000)	0.002*** (0.000)	0.110*** (0.000)	0.166*** (0.000)	0.017 (0.181)	0.016*** (0.000)
LTV ratio > 85%	-0.021*** (0.000)	-0.006*** (0.000)	0.001 (0.386)	-0.059*** (0.000)	-0.048*** (0.000)	0.018*** (0.000)	0.003*** (0.000)
Low documentation flag	0.075*** (0.000)	-0.005*** (0.000)	-0.000 (0.346)	0.041*** (0.000)	-0.018*** (0.000)	-0.072*** (0.000)	0.001 (0.659)
Missing documentation flag	-0.019 (0.219)	0.012*** (0.000)	0.001* (0.097)	-0.032*** (0.000)	0.008*** (0.004)	0.019*** (0.007)	0.004*** (0.007)
Grade B or C	0.343*** (0.000)	-0.013*** (0.000)	-0.005*** (0.000)	0.015*** (0.007)	0.024*** (0.000)	0.585*** (0.000)	0.035*** (0.000)
Fixed effects:	State*Qtr	State*Qtr	State*Qtr	State*Qtr	State*Qtr	State*Qtr	State*Qtr
Observations	201345	201460	201460	197355	201460	190653	201460
R-squared	0.573	0.039	0.059	0.239	0.502	0.317	0.086
Adj. R-squared	0.569	0.031	0.050	0.232	0.498	0.310	0.078
Number of banks	1732	1733	1733	1710	1733	1625	1733

This table shows results of an OLS model of initial loan terms/characteristics. These are loans originated between 1998-2006. The steered loans in this sample have been matched to a previous loan application in HMDA that was initially denied by the lender or withdrawn by the applicant. *Steered flag* is equal to one if the lender that denied the first loan application is affiliated with the lender that ultimately originated the loan. *Steered=0* includes the universe of loans in our data that did not show signs of being steered. Robust standard errors are clustered at the state level; p-values are in parentheses.

**Appendix Table A2-B: Estimates of loan terms/  
characteristics with a broader control group and  
controlling for bank fixed effects**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ARM flag	Balloon flag	Buydown flag	IO flag	Jumbo flag	PP penalty flag	Term>30 years
Mean:	0.421	0.011	0.004	0.145	0.134	0.248	0.019
Steered flag	0.355*** (0.000)	-0.000 (0.744)	-0.010*** (0.000)	0.119*** (0.000)	0.054*** (0.000)	0.189*** (0.000)	0.006** (0.033)
Refi flag	-0.040*** (0.000)	-0.007*** (0.000)	-0.003*** (0.000)	-0.112*** (0.000)	-0.021*** (0.000)	0.062*** (0.000)	0.011** (0.019)
Conventional flag	0.047*** (0.004)	0.013*** (0.000)	-0.050*** (0.000)	0.045*** (0.000)	-0.018* (0.057)	0.060*** (0.000)	0.004*** (0.001)
Owner-occupied flag	-0.161*** (0.000)	0.011*** (0.000)	-0.000 (0.738)	0.024 (0.400)	0.124*** (0.000)	-0.054*** (0.002)	-0.012** (0.012)
FICO score	-0.000*** (0.000)	-0.000*** (0.003)	-0.000 (0.716)	0.000*** (0.007)	0.000 (0.965)	-0.000*** (0.000)	-0.000* (0.071)
Log borrower income	-0.092*** (0.000)	0.013*** (0.000)	-0.002*** (0.000)	-0.056*** (0.000)	0.126*** (0.000)	-0.002 (0.857)	-0.005*** (0.005)
Log loan amount	0.250*** (0.000)	-0.017*** (0.000)	0.002*** (0.000)	0.112*** (0.000)	0.173*** (0.000)	0.018 (0.171)	0.018*** (0.000)
LTV ratio > 85%	-0.009* (0.059)	-0.005*** (0.000)	0.000 (0.610)	-0.061*** (0.000)	-0.053*** (0.000)	0.015*** (0.001)	0.004*** (0.001)
Low documentation flag	0.081*** (0.000)	0.003*** (0.000)	-0.002*** (0.000)	0.049*** (0.000)	-0.018*** (0.000)	-0.006 (0.431)	-0.001 (0.645)
Missing documentation flag	0.045*** (0.002)	0.007*** (0.000)	0.001 (0.289)	-0.024* (0.077)	0.002 (0.708)	0.065*** (0.000)	0.011*** (0.002)
Grade B or C	0.326*** (0.000)	0.006** (0.023)	-0.008*** (0.000)	0.004 (0.614)	0.025*** (0.000)	0.629*** (0.000)	0.037*** (0.000)
Fixed effects:	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr
Observations	201345	201460	201460	197355	201460	190653	201460
R-squared	0.667	0.298	0.250	0.298	0.543	0.513	0.156
Adj. R-squared	0.614	0.185	0.129	0.187	0.469	0.440	0.020
Number of banks	1732	1733	1733	1710	1733	1625	1733

This table shows results of an OLS model of initial loan terms/characteristics and allowing for bank fixed effects. These are loans originated between 1998-2006. The steered loans in this sample have been matched to a previous loan application in HMDA that was initially denied by the lender or withdrawn by the applicant. *Steered flag* is equal to one if the lender that denied the first loan application is affiliated with the lender that ultimately originated the loan. *Steered=0* includes the universe of loans in our data that did not show signs of being steered. Robust standard errors are clustered at the state level; p-values are in parentheses.

**Appendix Table A3: Estimates of loan default with a broader control group**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	90-day delinquency within 2 years (mean=0.041)							
Steered flag	-0.025*** (0.000)	-0.023*** (0.000)	-0.025*** (0.000)	-0.009*** (0.003)	-0.033*** (0.000)	-0.027*** (0.000)	-0.028*** (0.000)	-0.009** (0.013)
Refi flag	-0.014*** (0.000)	-0.021*** (0.000)	-0.022*** (0.000)	-0.017*** (0.000)	-0.013*** (0.000)	-0.020*** (0.000)	-0.021*** (0.000)	-0.015*** (0.000)
Conventional flag	-0.053*** (0.000)	-0.024*** (0.000)	-0.021*** (0.000)	-0.024*** (0.000)	-0.050*** (0.000)	-0.019*** (0.002)	-0.018*** (0.010)	-0.019** (0.011)
Owner-occupied flag	0.016*** (0.000)	0.009** (0.025)	0.011* (0.067)	0.008 (0.160)	0.016*** (0.000)	0.009** (0.020)	0.010* (0.085)	0.007 (0.203)
FRM flag	-0.034*** (0.000)	-0.023*** (0.000)	-0.023*** (0.000)	-0.014*** (0.000)	-0.025*** (0.000)	-0.014*** (0.001)	-0.013*** (0.000)	-0.004 (0.184)
FICO score		-0.001*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)		-0.001*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)
Balloon flag		0.063*** (0.001)	0.066*** (0.000)	0.067*** (0.000)		0.037** (0.011)	0.038*** (0.008)	0.032** (0.022)
Buydown flag		-0.009 (0.264)	-0.004 (0.677)	0.008 (0.361)		-0.003 (0.806)	0.004 (0.684)	0.018 (0.106)
Interest only flag		0.003* (0.082)	0.002 (0.425)	0.002 (0.392)		0.005** (0.020)	0.004 (0.230)	0.003 (0.263)
Jumbo flag		0.006 (0.224)	0.001 (0.799)	0.001 (0.868)		0.008* (0.070)	0.003 (0.537)	0.003 (0.519)
Pre-payment penalty flag		0.022*** (0.000)	0.022*** (0.000)	0.009** (0.041)		0.028*** (0.000)	0.028*** (0.000)	0.012*** (0.007)
Log borrower income			0.003 (0.312)	0.003 (0.205)			0.001 (0.682)	0.001 (0.624)
Log loan amount			0.001 (0.527)	0.003 (0.116)			0.004 (0.150)	0.005* (0.058)
LTV ratio > 85%				0.013***				0.018***



	(0.000)	(0.000)
Low documentation flag	0.003 (0.361)	-0.000 (0.998)
Missing documentation flag	0.013*** (0.000)	0.023*** (0.000)
Grade B or C	0.100*** (0.000)	0.097*** (0.000)

	Fixed effects:	State*Qtr	State*Qtr	State*Qtr	State*Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr	State*Bank *Qtr
Observations		303005	225723	189229	188117	303005	225723	189229	188117
R-squared		0.067	0.093	0.096	0.104	0.174	0.183	0.191	0.197
Adj. R-squared		0.061	0.085	0.087	0.095	0.036	0.069	0.072	0.079
Number of banks		2193	1736	1610	1606	2193	1736	1610	1606

This table shows results of an OLS model of loan default. These are loans originated between 1998-2006. The steered loans in this sample have been matched to a previous loan application in HMDA that was initially denied by the lender or withdrawn by the applicant. *Steered flag* is equal to one if the lender that denied the first loan application is affiliated with the lender that ultimately originated the loan. *Steered=0* includes the universe of loans in our data that did not show signs of being steered. Robust standard errors are clustered at the state level; p-values are in parentheses.

**Appendix Table A4: Falsification Test the Random matching of ‘steered’ loans, with a broader control group**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	90-day delinquency within 2 years				Initial interest rate			
Steered flag	0.000 [0.913]	-0.001 [0.900]	-0.000 [0.989]	0.002 [0.717]	-0.015 [0.624]	-0.003 [0.938]	0.012 [0.721]	0.038 [0.112]
Refi flag	-0.005** [0.040]	-0.010*** [0.001]	-0.011*** [0.003]	-0.008** [0.018]	-0.135*** [0.000]	-0.203*** [0.000]	-0.204*** [0.000]	-0.149*** [0.000]
Conventional flag	-0.040*** [0.000]	-0.021*** [0.000]	-0.018*** [0.000]	-0.022*** [0.000]	0.026 [0.171]	0.280*** [0.000]	0.302*** [0.000]	0.180*** [0.000]
Owner-occupied flag	0.009*** [0.006]	0.004 [0.132]	0.003 [0.542]	-0.002 [0.629]	-0.102** [0.040]	-0.146*** [0.000]	-0.019 [0.271]	-0.113*** [0.000]
FRM flag	-0.012*** [0.003]	-0.003 [0.392]	-0.003 [0.441]	-0.000 [0.877]	0.573*** [0.000]	0.732*** [0.000]	0.634*** [0.000]	0.680*** [0.000]
FICO score		-0.000*** [0.000]	-0.000*** [0.000]	-0.000*** [0.000]		-0.004*** [0.000]	-0.004*** [0.000]	-0.002*** [0.000]
Balloon flag		0.016** [0.024]	0.016** [0.028]	0.018** [0.011]		0.666*** [0.000]	0.403*** [0.000]	0.403*** [0.000]
Buydown flag		-0.014* [0.066]	-0.011 [0.166]	-0.008 [0.286]		0.668*** [0.000]	0.631*** [0.000]	0.679*** [0.000]
Interest only flag		-0.004 [0.427]	-0.006 [0.431]	-0.002 [0.788]		0.220*** [0.000]	0.274*** [0.000]	0.327*** [0.000]
Jumbo flag		0.000 [0.963]	0.004* [0.083]	0.006*** [0.009]		-0.168*** [0.000]	0.250*** [0.000]	0.303*** [0.000]
Pre-payment penalty flag		0.053*** [0.000]	0.056*** [0.000]	0.009 [0.240]		0.533* [0.055]	0.480* [0.072]	-0.493*** [0.004]
Log borrower income			-0.006* [0.099]	-0.005 [0.105]			0.126*** [0.000]	0.138*** [0.000]
Log loan amount			0.001 [0.793]	0.003 [0.272]			-0.478*** [0.000]	-0.433*** [0.000]
LTV ratio > 85%				0.010*** [0.005]				0.161*** [0.000]
Low documentation				-0.006 [0.297]				-0.148*** [0.000]
Missing documentation				0.014*** [0.001]				0.357*** [0.000]
Grade B or C				0.127*** [0.000]				2.616*** [0.000]
Constant	0.063*** [0.000]	0.330*** [0.000]	0.406*** [0.000]	0.298*** [0.000]	6.354*** [0.000]	8.571*** [0.000]	12.735*** [0.000]	10.620*** [0.000]
Observations	168794	108848	91606	90802	168784	108847	91605	90801
R-squared	0.254	0.273	0.287	0.299	0.650	0.654	0.683	0.753
Adjusted R-squared	0.040	0.078	0.076	0.090	0.549	0.561	0.589	0.679
Number of banks	2046	1571	1520	1517	2046	1571	1520	1517

This table shows results of OLS models of the initial loan rate and loan default. These are loans originated between 1998-2006. Default is defined as 90-day delinquency, foreclosure, short sale, or REO within two years of origination. The steered loans in this sample have been matched to a previous loan application in HMDA that was initially denied by the lender or withdrawn by the applicant. *Steered flag* is equal to one if the lender that denied the first loan application is affiliated with the lender that

ultimately originated the loan. The loan is then **matched randomly** to generate a control sample where *Steered flag* = 0. Robust standard errors are clustered at the state level; p-values are in parentheses. State, quarter and bank fixed effects are included.