Do Financial Counseling Mandates Improve Mortgage Choice and Performance? Evidence from a Legislative Experiment

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ABSTRACT

We explore the effects of mandatory third-party review of mortgage contracts on the terms, availability, and performance of mortgage credit. Our study is based on a legislative experiment in which the State of Illinois required 'high-risk' mortgage applicants acquiring or refinancing properties in 10 specific zip codes to submit loan offers from state-licensed lenders to review by HUD-certified financial counselors. We document that the legislation led to declines in both the supply of and demand for credit in the treated areas. Controlling for the salient characteristics of the remaining borrowers and lenders, we find that the legislation succeeded in reducing ex post default rates among counseled borrowers by 3 to 4 percentage points (about 30% decline). We attribute this result to actions of lenders responding to the presence of external review and, to a lesser extent, to counseled borrowers renegotiating their loan terms. We also find that the legislation pushed some borrowers to choose less risky loan products in order to avoid counseling.

Keywords*:* Financial literacy, Counseling, Subprime crisis, Household finance
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1. Introduction

In the wake of the subprime mortgage crisis, policymakers have been urged to increase their intervention in credit markets (see Sheila Bair's testimony to the House Financial Services Committee, 2007). In particular, the leading policy initiatives include tightening the oversight on lenders (Federal Truth in Lending Act, Regulation Z) and providing mandatory financial counseling to certain borrowers (President Obama's *Homeownership Affordability and Stability Plan of 2009*). Although it has been shown that these programs may slow down market activity (Bates and Van Zandt, 2007), their effects on mortgage choice and performance, and their overall effectiveness are still debated.

In this paper we study the effects of the legislative mandate for third-party review of mortgage contracts implemented in a pilot program in Cook County, Illinois, between September 2006 and January 2007. The program required 'high-risk' mortgage applicants acquiring or refinancing properties in 10 Chicago zip codes to submit loan offers from state-licensed lenders to review by HUD-certified loan counselors.[1] The same requirement applied to applicants who chose certain mortgage products deemed "risky" by legislators. The empirical setting of this legislative natural experiment allows us to study the program's outcomes and isolate the driving forces behind the effects.

In particular, the unorthodox *geographic* focus of the legislation makes it easy to identify the control and treatment groups for econometric analysis of mandatory counseling. In contrast to loan-based programs, the geographic mandate makes it nearly impossible for lenders and households to disguise the terms of the transaction to eschew the regulation. Consequently, we construct a control group of neighborhoods similar to the treated zip codes in pre-pilot foreclosure rates, and borrower and mortgage characteristics to conduct a difference-in-differences analysis.[2] Since the legislation applied only to a select group of financial intermediaries and borrowers, we are able to derive further identification from variation in loan terms and performance *within* zip codes at given points in time.

[1] HUD is the US Department of Housing and Urban Development.

[2] Our results are robust to alternative control group specifications.

Our analysis provides a series of results about the effects of financial advice on behavior of low- and moderate-income households and on lender response to mandatory loan counseling programs. In particular, we find that mandatory counseling limited both the demand for new mortgages and the supply of credit, and hampered real estate market activity in the treated areas. In the 10 treated zip codes, the legislation caused up to a 65% drop in the number of applications, a 35% decline in the number of active lenders, and about 47% decline in the number of originated purchase-related mortgages and 77% decline in the number of originated refinancing mortgages. The decline was especially severe in refinancing transactions perhaps because of their voluntary nature and because the legislation targeted required counseling on frequent refinancing. These reductions were concentrated in segments of the market most affected by the legislation – low-credit-quality borrowers served by state-licensed mortgage banks.

Our key result is that the legislation resulted in substantially lower ex post default rates and somewhat better loan choices among counseled borrowers that remained in the market. These results hold after controlling for improvements in the credit quality of the borrower pool and for changes in the composition of the pool of available lenders. Specifically, the 12-month default rates declined by between 3 and 4 percentage point among counseled borrowers (a 25% to 35% improvement relative to the average pre-treatment default rate or the contemporaneous default rate of the control group).

Financial counseling mandates are often thought to work by providing better information to financially unsophisticated households. However, such mandates often have another important aspect in that they subject financial intermediaries to a certain degree of oversight by an outside party. In the case studied here, the legislation interjected counselors in the loan application process. This provided an incentive for lenders to screen out lower-quality borrowers in order to protect themselves from possible legal and regulatory action. On balance, we find more evidence in support of the effectiveness of the oversight threat than information per se.

In particular, we obtain only weak evidence on the *direct* effect of information received in counseling sessions. Based on individual counseling records of one agency, we estimate a

stronger propensity to renegotiate loan terms for borrowers who are advised that their loans are "unaffordable," as compared to ones for whom the counselor finds "no issues" with the loan offer.[3] Yet, we detect almost no *aggregate* effect of counseling on interest rates and propensity to take out risky loans (as defined by the legislation), such as adjustable rate hybrid mortgages, and mortgages with prepayment penalty–the most common areas of concern for counseling agencies.

We find stronger evidence for *indirect* effects of the counseling requirement on mortgage origination and mortgage decision making. First, we document a spike in rejection rates of mortgage applications by lenders who are subject to the legislation during the treatment period, with rejection rates returning to their normal level as soon as the law is rescinded. This pattern is partially due to the temporary exit of lenders with loose screening practices from the treated area, and partially due to tighter screening by the remaining lenders. Second, we find a sizable decline in the prevalence of low-documentation mortgages. We attribute this change to counselors' demand that borrowers bring their income documentation to the counseling session. Both of these responses are consistent with the hypothesis that third-party review of mortgage offers led to more thorough screening. Third, we find that borrowers that could avoid counseling by selecting less risky products did so. Fourth, we report that counseled borrowers rejected fewer mortgage offers. Since we do not detect an aggregate improvement in loan terms, it is possible that borrowers give up shopping around for mortgages to avoid additional counseling sessions.

In general, our results suggest that the threat of oversight and the imposition of transaction and compliance costs of counseling, rather than the information contained in counseling sessions, served as a catalyst for change in borrower decision making and in lender behavior, ultimately leading to lower default rates. The legislation shrank the market: both the supply of mortgages and the demand for credit declined dramatically. It also affected the composition of originated mortgages by forcing lenders to shy away from low-documentation loans, and by forcing borrowers to avoid products that trigger counseling. Moreover, the

[3] This analysis is carried out on a small subsample of counseled borrowers that were hand-matched with the Cook County deeds data and mortgage servicer records. We are working on obtaining access to the aggregate data on pre- and post-counseling session mortgage terms.

legislation appears to have lessened the degree of competition among lenders due to the counseling requirement associated with additional mortgage offers.

Our paper contributes to two strands of research on the effect of mortgage choice on housing market outcomes. The first stresses the role of financial education in enabling more informed choices by households.[4] For instance, Lusardi (2007, 2008) voices concern that many consumers who enter into complex financial contracts, such as mortgages, are financially illiterate. Households may borrow too much at a high rate without realizing future consequences (Agarwal, Driscoll, Gabaix, and Laibson, 2007) or may have a hard time recalling the terms of their mortgage contracts (Bucks and Pence, 2008). Moore (2003) finds that respondents with poor financial literacy are more likely to have costly mortgages. It has also been argued that insufficient financial sophistication contributed to a growing number of households in bankruptcy and foreclosure when housing market conditions deteriorated (White, 2007). Stark and Choplin (2009) present survey evidence that borrowers fail to read and understand contracts and are thus prone to exploitation by industry professionals. Although there is a shared sense that household financial literacy is inadequate and the resulting mistakes are consequential, there is less agreement on whether financial education programs are an effective means of addressing this shortcoming.[5]

The second strand focuses on regulatory oversight and corresponding changes in incentives for various market participants. For instance, Keys, Mukherjee, Seru, and Vig (2008) show that the incentives associated with the securitization process result in lax screening by mortgage originators. Ben-David (2008) finds that intermediaries expand the mortgage market by helping otherwise ineligible borrowers to engage in misrepresentation of asset valuations to

[4] This literature is motivated by Bernheim (1995, 1998), who was among the first to document low levels of financial literacy among consumers. One of the starkest illustrations of shortfalls in financial literacy was demonstrated by Lusardi and Mitchell (2006, 2008) who provided evidence of consumer inability to perform even simple interest-rate calculations.

[5] For instance, Bernheim, Garrett and Maki (2001) find that high school financial education mandates have an appreciable effect on asset accumulation later in life. However, a recent paper by Cole and Shastry (2008) that uses a larger dataset and a different empirical specification fails to detect any effect of such programs on household participation in financial markets.

obtain larger mortgages. Rajan, Seru, and Vig (2008) show that soft information about borrowers is lost as the chain of intermediaries in the origination process becomes longer, leading to a decline in quality of originated mortgages.

The rest of the paper proceeds as follows. Section 2 describes the mandatory counseling program in detail. Section 3 outlines our methodology and the data used to test the hypotheses. Section 4 presents empirical results on the effects of the program on the mortgage market while Section 5 evaluates the relative importance of different channels in attaining these effects. Section 6 summarizes and discusses policy implications.

2. Illinois Predatory Lending Database Pilot Program (HB 4050)

2.1 Description of the Pilot Program

In 2005, the Illinois legislature passed a bill intended to curtail predatory lending. Although the state had a number of anti-predatory provisions in place, they were based on loan characteristics, in line with prevailing practices elsewhere in the country. Some political leaders in Illinois became concerned at the apparent ease with which the trigger criteria for the anti-predatory programs could be avoided by creative loan packaging. For instance, balloon mortgages targeted by regulations were replaced with adjustable rate mortgages with short fixed rate terms and steep reset slopes (the so-called 2/28 and 3/27 hybrid ARMs).[6] Consequently, the legislature sought to shift focus from policing loan issuers to educating the borrowers.

To that effect, the legislation sponsored by the Illinois House Speaker Michael Madigan mandated financial counseling for mortgage loan applicants whose credit scores were sufficiently low (or product choices were sufficiently risky) to identify them as "high-risk borrowers." The legislation set the FICO threshold for mandatory counseling at 620, with an additional provision that borrowers with FICO scores in the 621-650 range be subject for counseling *if* they chose certain "high-risk" mortgage products. Such mortgages were defined to

[6] For a detailed analysis of the impact of the state anti-predatory lending laws on the type of mortgage products used in the market, see Bostic, Chomsisengphet, Engel, McCoy, Pennington-Cross, and Wachter (2008).

include interest-only loans, loans with interest rate adjustments within three years, loans underwritten on the basis of "stated" income, and repeat refinancings within the last 12 months. Borrowers were subject to counseling *regardless* of their FICO score if they took out loans with prepayment penalties, loans that allowed negative amortization, or loans that had closing costs in excess of five percent. The proposal was modeled on a successful FHA program run in the 1970's (Merrick, 2007), and it generated a lot of excitement among Illinois lawmakers.

The program was meant to run as a four-year pilot in select parts of Cook County that covers the metropolitan Chicago area, after which its coverage could be expanded. In spite of vocal opposition from community-based groups and affected lenders, Illinois politicians clamored to have their districts included in the pilot (ibid.). This choice looked particularly ironic in retrospect, given the eventual response of the population in the pilot areas. In the end, the bill (titled HB 4050) was passed on the last day of the 2005 legislative session.

HB 4050 mandated that each of the "high-risk borrowers" attend a counseling session with one of the HUD-certified loan counseling agencies. The determination of the need for such a session was made on the day of the application, and the borrower had 10 days to fulfill the requirement. The goal of these sessions, lasting one to two hours, was to discuss the terms of the loan offer for a home purchase or refinancing and to explain their meaning and consequences to the prospective borrower. The counselors were not supposed to advise borrowers about their optimal mortgage choice in the sense of Campbell and Coco (2003) but rather to warn them against common pitfalls. The counselor was also expected to verify the loan application information about the *borrower* (e.g. income and expenses). At the end of the session the counselor was required to record a number of "recommendations" about the loan, such as whether the lender charged excessive fees, whether the loan interest rate was "in excess of market rate", whether the borrower understood the transaction, could afford the loan, etc.

Both the interview and the independent collection of data on borrower income and expenses allowed counselors to form an assessment of borrower creditworthiness that potentially went beyond what was conveyed by the lender. Effectively, the counselors were able to elicit

private information that was not necessarily used by lenders to make approval and/or pricing decisions, and make it a matter of public record by entering their recommendations in the State-maintained database. This may well have induced the lenders to screen better prior to referring approved applications to counseling for the fear of regulatory (e.g. license revocation) or legal (e.g. class action lawsuits) response. It should be noted that none of the recommendations was binding in the sense that borrowers could *always* choose to proceed with the loan offer at hand.

HB 4050 stipulated that the $300 cost of the session be borne by the mortgage originator, and not the borrower. However, even if the direct costs of counseling were intended to be shouldered by the lender, HB 4050 imposed other burdens on borrowers. Those included finding the time to attend the counseling session, the psychological costs of potentially exposing their ignorance, and the implicit surrender of the future option to complain or sue for being misled by the lender. Finally, by lengthening the expected amount of time until closing, HB 4050 could force borrowers to pay for longer credit lock periods, raising the cost of the loan.

As mentioned earlier, only loans offered by state-licensed mortgage lenders were subject to this requirement, as the State lacks legal authority to regulate any federally-chartered institutions and generally exempts such institutions and state-chartered banks from mortgage licensing. However, lending in disadvantaged neighborhoods has been done primarily through the state-licensed mortgage bankers that presented themselves as a local and nimble alternative to the more traditional bank lenders.[7] Consequently, the legislation was likely to increase the regulatory burden on the very entities providing credit in the selected pilot areas. The possibility that this could result in credit rationing prompted many observers to voice concern on the potential effect of HB 4050 on housing values in the selected zip codes.

HB 4050 imposed a substantial compliance burden on lenders as well. In addition to the cost of counseling (assuming it was not "recovered" through other loan charges), lenders had to

[7] Using the HMDA data described in greater detail in section 4, we estimate that state-licensed mortgage bankers accounted for 56% of mortgage loans originations in the HB 4050 zip codes during 2005.

make sure that the certification requirements of HB 4050 were implemented fully.[8] Otherwise, lenders could potentially lose the right to foreclose on the property. Finally, lenders reportedly feared losing some of their ability to steer borrowers toward high margin products.

A report by the non-profit Housing Action Illinois (2007) summarized the counselors' assessment of HB 4050. Over the course of the pilot, about 1,200 borrowers received counseling. In 9% of the cases, mortgages were deemed to have "indications of fraud". About half of the borrowers were advised that they could not, or were close to not being able to afford the loan. For 22% of the borrowers, loan rates were determined to be more than 300 basis points above the market rate. For 9% of the borrowers, the counselors found a discrepancy between the loan documents and the verbal description of the mortgage by the prospective borrowers. And perhaps most alarmingly, an "overwhelming majority of borrowers who were receiving adjustable rate loans" did not understand that their mortgage payment was not fixed over the life of the loan.

The geographic focus of the legislation differed substantially from typical regulatory approaches that required counseling for certain loan types and did not apply uniformly to a particular area (Bates and Van Zandt, 2007). This feature of the legislation generated considerable opposition from community activists and residents and prompted several lawsuits. Since the selected pilot areas were overwhelmingly (82%) populated by Hispanic and African-American residents, the selection prompted heated accusations of discriminatory intent on the part of lawmakers. As mortgage bankers threatened to withdraw from the pilot zip codes en masse, and as the rising tide of concerns about subprime mortgages began to have both demand and supply effects in the real estate market, the opposition to HB 4050 reached fever pitch.[9] The pilot program was suspended indefinitely in January 2007, after only 20 weeks of operation.

[8] Under HB 4050, title companies did not receive a "Safe Harbor" provision for "good faith compliance with the law." As a result, any clerical errors at any point in the loan application process could potentially invalidate the title resulting in loss of lender right to foreclose on a non-performing loan. According to the Cook County Recorder of Deeds, even federally-regulated lenders had to procure a certificate of *exemption* from HB 4050 to obtain a clean title. Consequently, *all* lenders were affected to at least some degree by the legislation.

[9] The record of a public hearing held on November 27, 2006 provides a good illustration of the acrimony surrounding HB 4050 (it is available at http://www.idfpr.com/newsrls/032107HB4050PublicMeeting112706.pdf).

2.2 How Was the Pilot Program Area Selected?

The HB 4050 bill instructed the State regulatory body (Department of Financial and Professional Regulation, IDFPR) to designate a pilot area on the basis of "the high rate of foreclosure on residential home mortgages that is primarily the result of predatory lending practices." The pilot area announced by the Department in February 2006 encompassed ten contiguous zip codes on the Southwest side of Chicago (the solid areas in Figure 1).[10] Four of these ten zip codes were located in Speaker Madigan's district.

Table 1 summarizes some of the key demographic and mortgage characteristics for the pilot area and the broader Cook County market. The table is based on the data on securitized non-prime mortgages originated in Cook County (the Loan Performance dataset described in greater detail below). As can be seen in the top panel, at the time of IDFPR decision the selected zips indeed had substantially higher delinquency and default rates than the county as a whole (columns (1) and (2)). The pilot zip codes are also predominantly minority-populated and have much higher rates of unemployment and poverty (Panel B). A simple comparison of the total number of loans in the LoanPerformance data (Panel A) and homeowners (Panel B) strongly suggests that the HB 4050 area has a disproportional share of subprime and Alt-A mortgages.

2.3 Constructing a Control Zip Code Group

However, this set of pilot zip codes was far from unique in satisfying HB 4050 selection guidelines. We use this fact in constructing our control group.

To mimic the regulators' (vague) criteria we identify a set of comparable zip codes as one with the smallest geometric distance from HB 4050 zips in terms of default and delinquency rates, borrower FICO scores, debt-service-to-income (DTI) and loan-to-value (LTV) ratios, and house values. This is done subject to three constraints – the zip codes must lie within Cook County, the selection is based on mortgage characteristics originated in 2005 prior to the

[10] The selected zip codes are: 60620, 60621, 60623, 60628, 60629, 60632, 60636, 60638, 60643, and 60652.

announcement of the treatment area by IDFPR, each zip code had at least 500 mortgages in LoanPerformance in 2005, and the total number of loans in these "comparable" zips is similar to that for the HB 4050 zips.[11] In other words, we sort zip codes according to the geometric distance of these six variables computed at the zip code level (scaled by standard deviation). We keep adding zip codes until we reach the total number of mortgage originated in 2005 in the HB 4050 zip codes.

This set of "comparable" zip codes (shown by the striped area in Figure 1) is used as one of the control samples in our empirical analysis. At a first glance, these zips are also disproportionately reliant on subprime mortgage products, and are comprised of economically disadvantaged and minority-populated areas. Judging by the stated legislative guidelines alone, these areas could have plausibly been selected for HB 4050 treatment.[12]

3. Data and Empirical Setup

3.1 Data Used in the Study

Our study relies on several complementary sources of data that cover the calendar years 2005-2007. First, we use data collected under the Home Mortgage Disclosure Act (HMDA) to assess elements of supply and demand for credit. Ideally, we would rely on the loan application and counseling data collected under the statutory authority of HB 4050 to analyze credit demand. In its absence, however, we turn to HMDA as the next best source of information on loan application volume, rejection rates, etc. Using information from HUD as well as hand-collected data, we are able to distinguish between lenders who specialize in prime and subprime loans, as well as between lenders that are licensed by the State and those who are exempt from licensing. Since the effects of the legislation were likely to be felt most acutely by state-licensed subprime

[11] In an earlier version of the paper, the set of "comparable" zip codes was selected subject to an additional constraint of being within City of Chicago limits. All of the results reported below are robust to the definition of the control area. We have tried a number of other selection criteria for the control zip codes, The results are robust to the selection criteria.

[12] The "HB 4050-control" area includes transactions from the following zip codes: 60104, 60120,60153, 60194, 60443, 60453, 60473, 60477, 60478, 60609, 60617, 60619, 60624, 60637, 60644, and 60649.

lenders, we use this list to refine our analysis. Furthermore, the HMDA data allows us to examine how the HB 4050 affected the credit supply along the extensive margin, i.e., to identify lenders that left the market altogether. In addition, we use Census data and Internal Revenue Service data to control for zip code level characteristics of income and population composition.

Next we employ the Cook County Recorder of Deeds database to obtain information on all actual transactions (mediated by agents or sold by owner) that took place in Cook County, including basic information about the associated mortgages.

We also use the First American CoreLogic LoanPerformance database to assess the effect of HB 4050 on the composition and performance of mortgages originated in the treated zip codes. This dataset is the main source of loan-level information available for subprime mortgages. According to LoanPerformance, their database covered over 90% of securitized subprime mortgages as of 2006. The database includes detailed borrower and loan information such as FICO scores, debt-service-to-income (DTI) and loan-to-value (LTV) ratios, zip code, and home characteristics, as well as mortgage terms such as maturity, product type (e.g., fixed or adjustable rate mortgage), interest rate, and interest rate spread. It also includes information on whether a given loan has a prepayment penalty, allows negative amortization, and whether it required full documentation in underwriting. These and other characteristics of LoanPerformance data are summarized in Table 1, Panel C. FICO scores are used extensively by lenders to assess the creditworthiness of the borrower and set the appropriate loan terms. For the purposes of our study, the FICO scores also allow us to determine which borrowers in the treated zip codes were automatically or conditionally subject to loan counseling (see the discussion in Section 2 for details).[13]

[13] We replicate our results using the loan-level data from LPS Applied Analytics (formerly known as McDash). The LPS data contain information similar to that in LoanPerformance with the important distinction that it is not limited to subprime securitized loans. Since the majority of loans in HB 4050 zip codes were made to subprime borrowers and the vast majority of those were securitized, both databases cover substantially similar transactions. However, using LoanPerformance forces us to focus on the subset of loans directly affected by legislation by default. This allows for a sharper test of the effects of the counseling mandate and limits concerns about selection described more fully in Section 3.2.

Finally, we received a sample of counseling data from one of the agencies that provided counseling services during the HB 4050. The data includes information on 212 original mortgage offers that applicants received from lenders. We matched these data to HMDA and LoanPerformance, based on approximate date, location, and mortgage amount and type. Overall, we perfectly matched 99 (47%) observations.[14] We use this dataset to gauge the extent to which counseling had a direct effect on mortgage selection.

3.2. Design of Tests: Difference-in-Differences Micro-Level Analysis

Our empirical analysis is designed to exploit cross-sectional and temporal variation in a difference-in-differences framework. Specifically, our tests measure the difference in response of various variables (e.g., default status, interest rate, etc.) as a function of whether the property was in a zip code included in the mandatory counseling program. Our regressions include both time controls and cross-sectional controls, as in classic difference-in-differences analysis.

Our basic specification regressions have the following form:

$$(1) \qquad Response_{ijt} = \alpha + \beta\, Treatment_{jt} + \gamma\, Time\ dummies_t + \delta\, Zip\ dummies_j + \theta\, Controls_{ijt} + \varepsilon_{ijt},$$

where $Response_{ijt}$ is the response variable at the transaction level (e.g., status of loan i). $Treatment_{jt}$ is a dummy variable that receives the value of 1 if zip code j is subject to mandatory counseling in month t and 0 otherwise. $Time\ dummies_t$ and $Zip\ code\ dummies_j$ capture fixed time and location effects. In all the regressions, we cluster errors at the zip code level.[15] The set of controls varies with the underlying data source, but it includes variables such as loan-to-value ratios at origination, borrower FICO score, current loan interest rate, etc.

[14] Note that for unmatched observations we do not know whether they were unmatched because of noise in the data or because these applicants pulled away their mortgage application.

[15] Doing so allows for an arbitrary covariance structure of error terms over time within each zip code and thus adjusts standard error estimates for serial correlation. As the number of treatment zip codes is fairly large, this is an effective method of correcting a potentially serious inference problem (Bertrand, Duflo, and Mullainathan, 2004).

We are concerned about selection effects in the treated zip codes. In particular, the set of HB 4050 zip codes is patently non-random, but rather concentrates on low-income neighborhoods in which foreclosure rates were high at the outset. The problem with selecting such zip codes is that there is a possibility that they have different resilience to economic shocks unrelated to treatment. For example, it is possible that prices in low-income areas were more sensitive to the general price decline following the housing market peak around November 2006.

We offer two solutions for the treatment zip code selection. First, we use the design of the pilot project and separate the effect of treatment across FICO groupings, while also allowing time and zip fixed effects to vary with FICO group. Effectively, we are treating each zip code as consisting of three sub-"locations", only some of which are subject to mandatory counseling. This approach has the advantage of retaining the structure of standard difference-in-differences analysis while also exploiting the within zip code heterogeneity in treatment. By interacting time dummies with FICO groups, we also allow the effect of shocks to vary with the creditworthiness of the borrower, thereby alleviating some of the selection concerns.[16] The regression specification that we therefore run is:

$$
\begin{aligned}
(2)\quad Response_{ijt} = {} & \alpha + \beta_1 (Treatment_{jt} \times Low\text{-}FICO_{ijt}) + \beta_2 (Treatment_{jt} \times Mid\text{-}FICO_{ijt}) \\
& + \beta_3 (Treatment_{jt} \times High\text{-}FICO_{ijt}) \\
& + \gamma_1 (Month\ dummies_t \times Low\text{-}FICO_{ijt}) + \gamma_2 (Month\ dummies_t \times Mid\text{-}FICO_{ijt}) \\
& + \gamma_3 (Month\ dummies_t \times High\text{-}FICO_{ijt}) \\
& + \delta_1 (Zip\ code_j \times Low\text{-}FICO_{ijt}) + \delta_2 (Zip\ code_j \times Mid\text{-}FICO_{ijt}) \\
& + \delta_3 (Zip\ code_j \times High\text{-}FICO_{ijt}) + \theta\ Controls_{ijt} + \varepsilon_{ijt}.
\end{aligned}
$$

For some variables of interest, such as the application volume or application approval status, data limitations prevent us from using FICO scores to mitigate sample selection concerns. In those instances, we include time dummies interacted with the log of the average zip code

[16] For robustness, we also evaluate a specification with a full set of time and zip code interactions. In this case, identification derives strictly from within zip code variation across FICO groups at a point in time. As reported in section 5.3 below, the main results remain qualitatively the same with this approach.

income, as reported by the IRS. In the same spirit as the FICO group interactions, this set of controls allows the effects of time-varying economic shocks to vary with zip code income.

As a second solution to non-random sample selection, we conduct our tests using three alternative control groups. We first compare transactions in the treated zip codes to transactions in the entire Cook County area (excluding the HB 4050 zips) (the "Full" sample). We also compare transactions with a control group comprised of 16 zip codes unaffected by HB 4050 that are similar to the treated areas as described in the previous section (the "Control" sample). These alternative zip codes are highlighted in Figure 1 (dotted areas) and are summarized in the rightmost column of Table 1.[17] Finally, to account for self-selection of lenders out of the treated zip codes, we put together a sample that includes only lenders who remained active in the HB 4050 zips (the "Active" sample).[18] This part of the analysis is holding the population of lenders constant; that is, we will be identifying treatment effects unrelated to the change in the composition of lenders. In each of these cases, we are evaluating the performance and characteristics of securitized subprime and alt-A mortgages contained in the LoanPerformance data.

3.3. Summary of Testable Hypotheses

We use the setup described in the previous section to test a number of hypotheses. As discussed earlier, HB 4050 increased the costs of engaging in mortgage transactions and providing lending services. Consequently, we expect the legislation to restrict both the demand for and supply of lending, particularly in the directly affected market segments – subprime borrowers and state-regulated mortgage bankers. These effects may be simultaneous and mutually reinforcing and may occur along both extensive and intensive margins (e.g. lender exit and loan rejection rates).

[17] It would be ideal to look at transactions that lie on either side of the border between HB 4050 and control zip codes to tease out the effect of the counseling mandate. Unfortunately, we do not have street addresses for mortgages in the LoanPerformance data.

[18] The exact definition of an "active lender" is provided in section 4.1.

Since the stated goal of the pilot program was to reduce foreclosures, we next evaluate the performance of transactions carried out under the new regime. If the intervention was at all effective, we would expect to find improvements in ex post mortgage performance among the counseled population, particularly low-FICO households. We subject the findings to a number of robustness checks on identification approach, functional form, and choice of sample and control.

The documented change in performance could come from a number of sources – exit of predatory lenders, removal of less creditworthy borrowers, borrower ability to negotiate better loan terms, or to make better product choices. We evaluate each of these possibilities in turn.

Each of the above actions could come about through a number of channels associated with the counseling mandate. We identify three such channels: the direct information effect of counseling, the transaction costs of fulfilling the counseling requirement, and the threat of regulatory or legal action (e.g. license revocation or class action lawsuits). The data and the design of the legislation allow us to test the relative importance of these channels.

In particular, if HB 4050 succeeded in furnishing better information through counseling sessions, its effects should be most pronounced in mortgage characteristics (e.g. lower LTV and loan spreads) of the *counseled* borrowers. Absent the evidence of successful loan renegotiations, we would expect to see an increase in rejection of loan offers by the counseled borrowers. In contrast, we would not expect better information to have any effect on levels of loan applications since they are filed prior to any counseling.

Information can be furnished not only through counseling sessions, but also by mere designation of certain products as "risky" in the sense that their selection triggers counseling. These designations are publicly known and may constitute a credible signal to avoid such mortgage products. If this signaling effect is at work, we would expect the incidence of "risky" product choices to decline for *all* FICO groups in the treated zip codes.

On the other hand, product selection can also be driven by the desire to avoid counseling and its associated costs. In this case, members of a given FICO group would avoid products that trigger counseling for *their* group. That is, one would expect a reduction in refinancing of recent

mortgages by mid-FICO households, but not high-FICO ones. Similarly, both mid- and high-FICO households (but not low-FICO ones) would be expected to choose fewer negative amortization loans and mortgages with prepayment penalty.

Turning to lenders, one possibility for their decision to exit the market is inability to make a profit in the presence of the $300 counseling fee. If this were the case, we would expect to see greater lender rejection of low-value loans, since their compensation is typically proportional to the value of originated loans.

Another possibility that was discussed earlier is that lenders are fearful of the consequences of the oversight of their actions by counselors and, implicitly, by the State. In this case, we would expect the lenders to tighten their screening of prospective borrowers, allowing fewer "doubtful" cases to enter the counseling process. This would be reflected in a temporary spike in rejection rates among the affected lenders during the HB 4050 period. Our final test of the oversight channel focuses on availability of low-doc loans. Under HB 4050, lenders have little reason to offer low-doc loans to any but high-FICO borrowers, since counseling would elicit income and expenses information and furnish it to the State-run database.

These hypotheses form the backbone of analysis in Sections 4 and 5 below.

4. Effects of HB 4050 on Mortgage Market Composition and Mortgage Performance

4.1 Exit of Borrowers and Lenders

We measure mortgage market activity in the wake of HB 4050 as the volume of loan applications captured in the HMDA database.[19] Figure 2a depicts the total number of loan applications in the treated zip codes (the solid line) and in the comparable set of zip codes ("Control", indicated by the dashed line).[20] This information is reported in two panels that further

[19] We count all HMDA records associated with owner-occupied properties that have one of the following action codes: originated, denied, approved but not taken, withdrawn, and incomplete. Purchased loans are excluded because of uncertainty about the timing of the initial loan application. When purchased loans are added to the set of applications, the time patterns are effectively unchanged.

[20] The results with the control group defined as all non-HB 4050 Cook County zip codes are qualitatively similar and are available upon request.

subdivide application volumes by state-licensed lenders that specialize in subprime loans and all other lenders (labeled "exempt lenders" in the figure). These panels capture a number of key trends related to the legislation. In both panels there is a substantial and statistically significant drop in the number of applications in the treated area around the time the regulation became effective (September 1, 2006). In contrast, the volumes in the control area remained relatively flat for much of the HB 4050 period, before beginning a rapid market-wide decline in subprime mortgage originations early in 2007.

The decline in loan application volume is most pronounced among state-licensed mortgage bankers specializing in subprime loans. For such lenders, the application volume dropped from nearly 4,000 in August 2006 to 2,341 in September. Although this decline may potentially be exaggerated by the run-up of applications in anticipation of the regulation, it is clearly not present in the control sample. Following the repeal of HB 4050, activity levels in both geographic areas converged nearly instantaneously, and proceeded to plummet jointly to levels less than one-sixth of those in the market heyday.

Although not shown in Figure 2a, HMDA data provide additional insight into lender specialization. While the vast majority of subprime lending was done by state-licensed mortgage lenders, most prime lending was done by entities exempt from the state licensing requirement, and thus from HB 4050. This specialization, and the lack of any appreciable upward trend in the number of applications filed by lenders exempt from HB 4050 (the right-hand panel) are consistent with the scenario in which low FICO borrowers were the ones most adversely affected by the treatment and were not able to switch to the non-treated lenders.

Similar results are presented in regression form in Table 2, Panel A. These regressions are run at the zip code-month level. Columns (1) and (2) show that loan application volume in treated zip codes declined by about 65% among lenders most affected by the regulation. In contrast, application volumes declined by much less among other lenders, some of whom were also subject to regulation, e.g., state-licensed lenders that originated negative amortization mortgages to prime borrowers (columns (4) and (5)).

Panels B and C further differentiate between applications for mortgage refinancing and home purchases. We document a substantially greater decline in applications for refinancing filed by subprime lenders. We attribute this difference to the voluntary nature of refinancing decisions versus home purchase financing. Home buyers who need to relocate are bound to take a mortgage; conversely, for existing homeowners, refinancing is an optional stand-alone action. The disparity between the decline in origination rates of purchase- and refinancing-related mortgages indicates about the extent of the burden that counseling sets on borrowers.

Some of this decline in loan applications could be traced to much publicized lender withdrawals. We can tackle the question of market exit by counting the number of unique lenders filing HMDA reports before, during, and after the treatment period in both the treated and the control geographic areas. To be counted as an "active lender" in a given geographic area, a HMDA reporting institution must originate a total of at least 20 loans over a given five-month period.[21] The results of this simple exercise are reported in Panel A of Table 3. The table shows a substantial decline in the number of lenders in treated zip codes. The magnitude of this decline is much greater and strongly statistically different from the pattern observed in the control area. The table also confirms that lender exit was disproportionately concentrated among state-licensed lenders specializing in subprime mortgages. These results corroborate the hypothesis that the mandatory counseling requirement resulted not just in the reduction of demand for credit, but also in the abrupt exit of relatively large lenders from the affected zip codes.

It is worth noting that some of the subprime lenders that exited the pilot areas appear to have returned as soon as HB 4050 was rescinded. Figure 2b illustrates the rapid run-up in loan applications filed by those lenders.

This identification of "active lenders" allows us to check whether the drop off in loan applications in Table 2 is due entirely to lender exit. Columns (4) and (6) of Table 2 show that restricting the sample to lenders that remained *active* in the HB 4050 area still generates a

[21] The five-month period is chosen to match the duration of HB 4050. The 20 loan originations threshold is the same for the 16-zip control and the 10-zip HB 4050 area because both area contain roughly the same number of originations by construction. None of the patterns depends on the choice of the threshold level or geographic area.

substantial (albeit smaller) drop in application volume. In other words, fewer applications were filed even with lenders that did not shut down their operations in HB 4050 zips. The applications for refinancing declined more, suggesting that the portfolio mix among the remaining lenders shifted to purchase loans.[22]

We further assess whether the lenders who stayed in the market have different characteristics than the ones that exited following implementation of HB 4050. Panel B of Table 3 compares those two types of lenders, based on characteristics of their mortgage originations prior to HB 4050. Although lenders who remained in the market are statistically different from those who exited on almost every dimension, the differences are relatively small economically. The remaining lenders are more heavily tilted towards low-FICO score population, with somewhat lower shares of adjustable-rate and interest-only mortgages. One substantial difference, however, is in rejection rates. Lenders that stayed in the market had much higher pre-HB 4050 rejection rates than those who left, which could indicate more stringent screening practices. We will return to this point in Section 5.5.

Finally, we examine whether borrowers that were subject to counseling were more likely to be rationed from the market. In Figures 3a and 3b we compare the distribution of borrowers that originated their loans before and during the HB 4050 period across FICO ranges. There is a pronounced shift to the right in the FICO score distribution during the treatment period in the HB 4050 zip codes. The share of loans originated for borrowers with sub-620 FICO scores in treated areas shrank by 10 percentage points relative to the pre-HB 4050 period. In contrast, the FICO distribution in the comparable (untreated) sample remains virtually unchanged.

In unreported analysis, we evaluate these changes in borrower credit quality in a regression framework, with one of the specifications limiting the sample to financial institutions that remained active in the HB 4050 zip codes during the treatment period. The restricted sample

[22] We count 11 state-licensed subprime lenders that satisfy this definition of "active" in the HB 4050 zip codes. This number refers to the number of lenders funding loans and filing HMDA reports. According to the Housing Action Illinois (2007) report, these lenders were represented by more than 300 mortgage brokers. This correspondence looks less surprising when one realizes that the list of active lenders includes such large entities as Countrywide, Washington Mutual, and Argent.

also shows a sizable improvement in borrower credit quality in HB 4050 zip codes, indicating that the change was not entirely due to the exit of lenders that catered to low-FICO borrowers.

4.2 Default Rates

Perhaps the main goal of HB 4050 was to reduce the extent to which borrowers defaulted and had their properties foreclosed on. To measure loan performance we flag borrowers that default within one year following origination.[23] The set of controls includes zip code fixed effects interacted with three FICO range indicators, and calendar month fixed effects interacted with three FICO range indicators. In addition, the regressions include controls for borrower characteristics (investor flag, FICO score, second-home owner flag) and contract characteristics (documentation level, logged property valuation, LTV, and indicator variables for ARM loans, refinancing loans, and loans with negative amortization or prepayment penalties).

The results of difference-in-difference tests are reported in the top panel of Table 4. They show that treated borrowers were indeed substantially less likely to default on their debt. Default rates on loans originated by low-FICO borrowers treated under HB 4050 declined by between 3 and 4 percentage points (the pre-HB 4050 default rate among such borrowers was 10.8%). In other words, the ex post default rate among counseled borrowers in the treated area declined by about 25% to 35%. In contrast, there is no measurable effect of HB 4050 for high- or mid-FICO score borrowers.

As discussed in Section 3.2, we estimate the difference-in-differences specification of equation (2) for two samples: the full sample of loans originated in Cook County (columns (1)-(5) of Table 4A), and the sample restricted to HB 4050 and "control" zip codes (columns (6)-(10) of Table 4A). The results are qualitatively the same, although the control sample has somewhat lower statistical significance.

[23] A loan is considered delinquent if it is 30 or 60 days past due in the first 12 months since the first mortgage payment date. A loan is considered defaulted if it is 90+ days past due, in bankruptcy, in foreclosure, or is real-estate owned (REO) status in the first 12 months since the first mortgage payment date.

The decline in borrower defaults could be driven by factors other than financial counseling, such as by changes in the composition of borrowers or of lenders. One possibility is that the "predatory" lenders that previously accepted less qualified borrowers simply exited the market following the legislation and "bad" loans were avoided. As a consequence, default rates decreased for the remaining pool of borrowers. We test for this possibility by limiting the sample to lenders that remained active during the HB 4050 period. We do this both for the full and control samples (column (3) and (8), respectively). The results indicate that our conclusions remain fully robust to this restriction. Even among loans made by this static group of lenders, there is a marked decline in ex post defaults for HB 4050 originations.

Another potential interpretation of the results is that risky borrowers self-selected out of the market or were rejected by lenders (as shown in Figures 3a and 3b). All of the specifications in Panel A already control for borrower credit scores, implying that the improvement in performance is not due solely to higher FICO scores of the remaining borrowers. However, it is possible that the FICO score does not capture some of the relevant information on creditworthiness. To test this, we include a control for the loan spread paid by borrowers in the mortgage default regression that should capture additional information on borrower riskiness.[24] We find that the inclusion of loan spread has virtually no effect of results (columns (2) and (7)).

As a test of our identification strategy, we estimate a specification with a full set of interactions between zip code and time dummies. This setting allows us to identify the effects of HB 4050 by exploiting within zip code heterogeneity in applicability of the counseling requirement. This specification represents a triple difference-in-differences estimator, with the additional set of differences taken with respect to performance of the omitted (high-FICO) group. The results shown in columns (4) and (9) once again indicate a statistically and economically significant effect of HB 4050. To test the importance of the functional form assumptions, we rerun the regressions in a probit framework despite the critique of Ai and Norton (2003). The

[24] For ARMs, LoanPerformance provides the relevant data item. For fixed-rate mortgages (FRMs), Loan Spread is calculated as the difference between the contract interest rate and the matching-maturity Treasury.

results in columns (5) and (10) (presented for the mean transaction) indicate the likelihood of default is lower by about 2.0%. Although the results are slightly weaker in a probit framework, they remain statistically and economically significant. Finally, we estimated a simple difference-in-differences specification of equation (1) on FICO score subsamples, to obtain a slightly more flexible variant of estimates reported in Panel A. The results shown in Panel B indicate a strong effect of HB 4050 on defaults in the low-FICO subsample, but not the others.

In sum, we find that the financial counseling requirement reduced delinquency and default rates in the treated area. The effect on default is impressive in its economic magnitude and does not seem to be driven solely by documented changes in the borrower and lender pools.

5. Disentangling the Effects of Information, Costs, and Oversight

Our results in the previous section show that HB 4050 program had a strong contractionary effect on the mortgage market in affected zip codes. Still, the pilot program appears to have accomplished one of its stated goals – the low-FICO borrowers that remained in the market and went through counseling experienced sharply lower default rates. In this section we analyze the factors that could have led to the improvement in performance. In particular, we consider changes in borrower ability to make better product choices or negotiate better loan terms, and changes in lender underwriting practices. We will use each of these actions to try to differentiate between the direct information effect of counseling, the transaction costs of fulfilling the counseling requirement, and the threat of regulatory or legal action.

5.1 Mortgage Terms

According to Housing Action Illinois (2007), common counselors' recommendations were that mortgage applicants take on too much debt at excessive interest rates. As a result, one would expect that treated borrowers would try to reduce their leverage levels and negotiate better loan terms. If the pilot program worked by providing better information through counseling sessions, its effects should be most pronounced in mortgage terms of the *counseled* borrowers.

The top panel of Table 5 presents evidence of changes in the borrowers' Loan-to-Value (LTV) ratios during the treatment period. For each dependent variable, we estimate a difference-in-differences specification for the full Cook County sample, the control sample, and the control sample restricted to lenders that stayed active in the HB 4050 areas. We find that for low-FICO borrowers that were counseled, there was a modest decrease in LTV (columns (1)-(3)) and a reduced likelihood of taking out a loan with greater than 80% LTV (columns (4)-(6)). The average LTV of treated borrowers declined by fewer than 2 percentage points (the pre-HB 4050 mean LTV was about 84 percent). The likelihood of taking a highly-leveraged mortgage declined by 6 to 7 percentage points in the treated FICO group, compared to a pre-treatment mean of 54 percent. In contrast, we find no material changes in LTV ratios of mid- and high-FICO borrowers.

The lower panel of Table 5 explores a somewhat different measure of borrowers' debt burden by looking at the Debt-Service-to-Income (DTI) ratio in columns (1) to (3). This variable captures borrowers' ability to service existing loan obligation and is often used as a proxy for mortgage affordability. With the exception of the constant lender sample we find that low-FICO borrowers in HB 4050 zip codes had a modest decrease in DTI although, once again, the magnitude of the improvement is fairly small (the pre-HB 4050 mean DTI was 40 percent). There is less evidence that mid- and high-FICO borrowers in HB 4050 zips had any change in their DTI ratios. Finally, we investigate whether interest rate spreads of counseled borrowers were lower. Regression results in columns (4) to (6) in panel B show that there was no material effect of HB 4050 on loan spreads of the low- and mid-FICO groups. However, we find statistically significant, if small, improvements in spreads for high-FICO borrowers.

In sum, the analysis of loan terms contains some evidence of the beneficial effects of information obtained in counseling sessions. Although debt burdens improve somewhat for counseled borrowers, the economic magnitude of these effects is fairly small. We find no evidence that counseled borrowers were able to negotiate lower loan spreads. Instead, it is the

high-FICO borrowers that are typically exempt from counseling that are able to obtain (slightly) better loan rates.

5.2 Direct Evidence of Loan Renegotiations

The results in the preceding section suggest that HB 4050 did not improve the bargaining power of low- and mid-FICO borrowers. However, we can learn more about the actions of counseled borrowers by comparing the initial loan offers reviewed by counselors and the final originated loan. In particular, we assess whether counseled borrowers changed their original choice following the counseling session.

To do so, we obtain detailed counseling session information from one of the counseling agencies providing services under HB 4050. For each borrower that could be identified (99 out of 216), we compared the original terms (as recorded by the agency) to mortgage details as recorded in LoanPerformance dataset.[25] Table 6, Panel A, presents a breakdown of these mortgage offers organized by counselor recommendation. Of the initial mortgage offers, only two were rejected by borrowers following counseling. The majority of the remaining reviewed offers (54 out of 97) received a "no issues" entry, indicating that the counselor had no concerns about affordability, understanding, or disclosure in the original offer. Yet, 20 of those loans did become modified after counseling, with 15 obtaining lower monthly payments. The share of loans modified post-counseling is markedly higher for "problematic" recommendations, as nearly two-thirds of "unaffordable" or "fraudulent" loans were renegotiated.

Looking more closely into the specifics of renegotiated "problem" loans highlights some of the complexities in establishing a direct mapping between counseling recommendations and the eventual loan choice. Some contract changes appear incongruous with the recommendation. For example, some "unaffordable" loans were renegotiated to loans with shorter amortization

[25] To match counseling records with those in LoanPerfromance database, we first use the property address and counseling date to obtain the amount of originated loan in the Recorder of Deeds database. We then use the loan amount, counseling and loan recording dates, and the applicant's FICO score to find a matching loan in the LP data. Since these data sources contain different dates, and FICO scores can move by a few points between counseling and origination dates, the exact matching rate is less than 50 percent.

periods or longer resets. This may have made such choices less risky, but also less affordable at the time of origination. Although counselors commonly recommended fixed rate mortgages as the best means to lessen the risk of mortgage obligations, very few borrowers (less than 20 percent) switched away from their original ARM offers. In fact, almost as many borrowers went from fixed rate mortgages to ARMs, as the other way around. Among those renegotiating their ARM deals, extending reset periods (by going from, say 2/28 to 3/27 loans) was also nearly as common as shortening them. Thus, it may not be surprising that, on average, counseling did not appear to change debt burden and interest costs of originated mortgages substantially (Table 5).

An open question then is whether the evidence in this small sample of treated borrowers is consistent with direct information effects of counseling. On the one hand, the nearly 50 percent share of loans renegotiated post counseling appears very high. On the other, if we assume that recorded recommendations reflect relevant information provided by counselors, the fact that many loan changes do not seem to line up with such recommendations throws cold water on the hypothesis of direct information effects.

5.3 Borrower Rejection of Loan Offers

HB 4050 also required further sessions for each mortgage offer from a new lender or a renegotiated offer from the original lender that worsened the initial terms. Hence, if counseling is regarded as a burden instead of a source of valuable information, we would anticipate fewer rejections of loan offers by treated population. Conversely, we would expect to see a spike in loan rejections by better informed borrowers if they cannot renegotiate their loan terms.

Table 6, Panel B presents a test of these hypotheses using aggregate HMDA applications data. The regressions are run at the loan level, with borrower rejection of a loan offer as the dependent variable. The table shows that rejection of mortgages by borrowers actually *declined* during the HB 4050 period by about 6 percentage points among subprime lenders, and by about 2 percentage points for exempt lenders. Note, however, that borrower rejection rate appears to be

unchanged among subprime lenders that remained in the HB 4050 zip codes (column (3)). This suggests that such lenders were somewhat different than the ones who exited the market.

This finding is remarkable since the majority of the counseled were advised that they cannot afford the loan and/or that they should seek alternative mortgage offers (see discussion in Section 2.1). Since we find little evidence of significant improvement in loan terms following counseling (e.g., loan spread), a likely explanation for decrease in rejection rate is that borrowers preferred to accept the offer at hand and not to return for further counseling with offers from a different lender.

This result is consistent with the idea that decisions of low-FICO borrowers were not influenced as much by information presented in counseling sessions as they were by the costs of obtaining an alternative loan offer. For such borrowers, the costs of compliance likely outweighed the expected benefits of new offers. This finding also appears to reflect the limits of bargaining power and ability to act on new information by this subset of borrowers. Finally, this result also removes concerns that the incentives of counselors led them to convince borrowers to reject loans which ultimately resulted in low origination volume.

5.4 Product Choice

From our interviews with a number of counselors involved in HB 4050 we know that borrowers were typically warned about risks associated with hybrid ARM loans or loans carrying prepayment penalties. However, the information pertaining to broad product choices was provided not only through counseling sessions, but also by the fact that the legislation signaled that certain products were "risky" as their selection triggered counseling. Hence, analyzing changes in product selection in HB 4050 zips can help us differentiate between the effects of counselor information, signaling, and borrowers' desire to avoid compliance costs of counseling.

To do this, we again estimate difference-in-differences regressions of borrower choice of a particular mortgage contract, omitting the set of contract controls. If the information effect is at work, we would expect the low-FICO borrowers to shift away from products highlighted by

counselors. In the case of signaling, we would expect the incidence of "risky" product choices to decline for *all* FICO groups in the treated zip codes. If product selection is driven by cost avoidance, members of a given FICO group would avoid products that trigger counseling for *their* group. That is, we would expect a fewer refinancings of recent mortgages by mid-FICO households, but not high-FICO ones. Similarly, we would expect both mid- and high-FICO households (but not low-FICO ones) to choose fewer negative amortization loans and mortgages with prepayment penalty.

Table 7 presents the results of this exercise. As reported in the top panel, we find no evidence that low-FICO borrowers who mandatorily attended counseling stayed away from either hybrid ARMs (columns (1)-(3)) or loans with prepayment penalties (columns (4)-(6)). Instead, we find a lower prevalence of hybrid ARMs among mid-FICO borrowers in pilot areas (who would be subject to counseling if they took out such contracts) and high-FICO borrowers (who would not be). Taking a loan with a prepayment penalty triggers counseling for all borrowers, but only high-FICO borrowers in HB 4050 zips reduce their use of such products. Although these results are consistent with both signaling and cost avoidance, they do not support the hypothesis of direct information effects.

The striking result here is that treated (low-FICO) borrowers did not, on average, materially change their product mix as a result of counseling. The ones that did alter their product choice appreciably were the mid- and high-FICO borrowers who would thereby be able to eschew counseling. In other words, the regulator achieved the goal of risk reduction by threatening counseling and not by the content of counseling.

The results thus far point to the limited ability (or willingness) of the low-FICO borrowers to act on counseling information. Yet, we find strong evidence of improvement in their ex post performance. One remaining possibility is that the counseling mandate caused lenders to modify their behavior as well. We consider this in the following section.

5.5 Changes in Lender Behavior

In this section we analyze the response of lenders who *stayed* in the market to the increased oversight of their actions by counselors and, implicitly, by the State. If lenders are apprehensive of the consequences of such oversight, we would expect them to tighten their screening of prospective borrowers, allowing fewer "doubtful" cases to enter the counseling process. Such behavior would be reflected in a temporary spike in rejection rates among the affected lenders during the HB 4050 period. In the same vein, we would expect lenders affected by HB 4050 to cut back on offering low-documentation loans. Under HB 4050, there is little reason to offer such loans to any but high-FICO borrowers, as income and expenses information would be gathered during counseling and then furnished to the State-run database.

The simple time series of Figure 4a indeed show a dramatic spike in the rejection rates of state-licensed mortgage bankers issuing subprime loans in the pilot area. This does not occur among similar lenders in control areas or among lenders exempt from HB 4050. This spike comes from two sources: exit of loose-screening lenders and further tightening of underwriting standards by the ones that remain active during HB 4050.

The first source is illustrated by the time series in Figure 4b that show the decomposition of lender rejection rates in the HB 4050 area between active and non-active lenders, as defined in Section 4.1. The subprime lenders that ultimately remained active experienced a very fast run-up in their rejection rates in the 6 months *prior* to implementation of HB 4050. During this time, their rejection rates went from about 30 percent to 50 percent (solid line, left panel) while their application volumes remained unchanged (Figure 2b). In contrast, the lenders that left the HB 4050 zips kept rejecting applications at just above the 20 percent rate (the dashed line, left panel), and then left the market altogether. Consequently, the total rejection rate spikes with the onset of HB 4050, as the lenders with tighter screening are the only ones left. The rejection rate comes down when HB 4050 is rescinded as the lenders with looser screening practices come back to the market (Figure 2b).

The further tightening of lending standards by the lenders that stayed in the pilot zip codes is captured by the regression results in Table 8. As seen in column (3) of Panel A, the rejection rates rise by an additional 4.5 percentage points among active subprime lenders. When we do not restrict the regression sample to such lenders, the spike in rejection rates is greater, in line with the decomposition in Figure 4b.

Earlier we found that state-licensed lenders that specialize in subprime loans were more likely to exit the market than lenders exempt from HB 4050. One possible explanation for lender exit is inability to make a profit in the presence of the $300 counseling fee. If this were the case, we would expect to see greater lender rejection of low-dollar-value loans, since lender compensation is roughly proportional to the value of originated loans. We test this hypothesis by testing whether smaller loans (measured as logged mortgage size) are more likely to be rejected during the HB 4050 treatment. Table 8, Panel B, shows that there is no empirical support for this hypothesis: small mortgages were not subject to higher rejection rate.

Finally, we look at changes in availability of low-documentation loans under the counseling mandate. The results, reported in the lower panel of Table 7, show substantially lower likelihood of low-documentation mortgages for low-FICO borrowers. This is not surprising, as document review by counselors made such loan offers difficult to defend. The results for mid- and high-FICO borrowers are somewhat mixed.

6. Conclusion

Mandated financial counseling and increased oversight on lenders (anti-predatory legislation) are important policy tools being considered for implementation following the meltdown of the housing market in 2007-2008.[26] Both policies impose restrictions on free contracting between borrowers and lenders. As such, they can be expected to shrink credit markets, in particular for the financially disadvantaged segments of the population.

[26] As announced on June 17, 2009 by President Obama, a new Consumer Financial Protection Agency will be created to protect consumers across the financial sector from unfair, deceptive, and abusive practices. See http://online.wsj.com/public/resources/documents/reform.pdf.

In this paper, we evaluate the impact of financial counseling by analyzing the outcome of a pilot project that implemented mandated counseling and increased oversight on mortgage lenders in Chicago in late 2006. The design of the pilot allows us to disentangle the effects of financial education on the behavior of borrowers from those of increased oversight on lenders.

Our main results show that the legislation had material effects on market composition of both lenders and borrowers, on borrower default rates, and on borrowers' and lenders' behavior. We find that the pilot caused low-FICO score borrowers and lenders with relatively lax approval standards to exit the market. Yet, controlling for observable characteristics of the remaining borrowers and holding the sample of remaining lenders constant, we find that mortgage default and delinquency rates declined dramatically. Loan terms for counseled borrowers improved as well, albeit only marginally. While the product choice for the low-FICO borrowers did not change appreciably (the borrower group always subject to counseling), we find that mid- and high-FICO borrowers switched toward products that did not subject them to counseling.

Our results are consistent with the explanation that the threat of third-party oversight and the desire to avoid the costs of counseling, and not the informational content of counseling as such, had a substantial effect both on borrowers and lenders. We find that borrowers altered their mortgage choice to minimize interaction with the counselors. Specifically, borrowers who could eschew counseling did so by choosing less risky products. Those who were required to attend counseling did not appear, on average, to follow the counselor's advice, and appear to have only limited bargaining power in renegotiations. They also tended to not walk away from the original offer following counseling and reapply for a restructured mortgage, which would have required another counseling session. Furthermore, we find evidence consistent with lenders rejecting borrowers more often based on unobservable characteristics when loan proposals were reviewed by third-party counselors.

The finding that loan quality improved in response to changes in lender and borrower behavior, and apparently not from the information provided at counseling sessions, is consistent with 'disclosure effect.' That is, realizing that the terms of loans would be more carefully

scrutinized by counselors, lenders appear to have fine tuned their lending model and rejected applications they may have previously accepted. The scoring model was changed to avoid public scrutiny. Thus it was the disclosure of additional information that generated the desired results.

Legislators enacted the counseling mandate with a goal of decreasing predatory lending practices that trapped home buyers in mortgages they could not afford. Thus they should have expected the decrease in mortgage activity and would have been pleased with the resulting higher quality loans. However, evaluating the overall welfare effect of this intervention requires weighing the benefits of fewer foreclosures against changes in utility incurred by the excluded borrowers and lenders.[27] It is further complicated by the various distortions that already exist in the housing market resulting from unique tax treatment, zoning restrictions, etc., and potential externalities produced by individual housing decisions. Although difficult to quantify, recent research (e.g., Carlin and Gervais, 2008) focus on the modeling of welfare effects of certain policy choices in household financial markets.

Our results suggest several policy recommendations. First, the paper shows that counseling is perceived as a burden by borrowers. Hence, many borrowers either stay away from the market altogether (as in the case of refinancing versus home-purchasing mortgages) or substitute to mortgages with lower risk in order to avoid counseling.

Second, the content of counseling has only small value to borrowers. Despite intense renegotiations following counseling, the aggregate effect of counseling on mortgage decisions is nominal. One likely possibility is that mortgage applicants cannot negotiate well with mortgage brokers who steer them between products without real improvement.

Third, the mere presence of the regulator in the marketplace and the third-party review of mortgages seem to have large effect on the quality of mortgages originated. We observe that low-quality lenders exit the market, and the quality of loans originated by the remaining lenders increases.

[27] There have been attempts to theoretically model the welfare effects of policy choices in household financial markets; see Carlin and Gervais (2008), Bolton, Freixas and Shapiro (2007), and Carlin (2008).

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Table 1. Summary Statistics

Panel A: Characteristics of HB 4050 and Control Zip Codes used in Control Group Selection (1/2005-12/2005)

	HB4050 ZIPs (n = 15,216)		Control ZIPs (n = 14,384)		Rest of Cook County (n = 53,152)	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
FICO	627.7	62.9	627.8	63.5	650.5	63.8 ***
Default (x 100)	8.65	27.66	9.07	29.08	5.39	23.34 ***
Delinquency (x 100)	28.83	45.06	29.44	45.63	21.58	41.65 ***
LTV (%)	84.14	11.86	84.26	12.24	82.51	12.71 ***
Debt Service-to-Income (%)	39.94	9.08	40.30	9.25 ***	40.35	8.59 ***
log(Valuation)	12.124	0.31	12.16	0.36 ***	12.44	0.43 ***

*, **, *** represent statistically significance difference from the means of the HB 4050 zip codes at the 10%, 5%, and 1% level, respectively.

Panel B: Zip Code Demographics (2006 Census)

	HB 4050 ZIPs (10 zip codes)	Control ZIPs (16 zip codes)	Rest of Cook County (148 zip codes)
Total population (18 plus)	499,966	541,057	3,694,142
Total # of households	220,274	267,154	1,857,687
Total # of homeowners	131,759	145,431	1,098,086
<u>Population-weighted ZIP code averages</u>			
Share of minority households (%)	81.5	70.6	38.7
Unemployment rate (%)	13.9	11.9	6.8
Below poverty rate (%)	16.7	15.9	10.0
Share on public assistance (%)	9.3	8.2	4.0

Table 1. Summary Statistics (Continued)

Panel C: Summary Statistics of LoanPerformance Data (1/2005-12/2007)

	HB 4050 ZIPs (n = 28,983)		Control ZIPs (n = 29,789)		Rest of Cook County (n = 109,007)	
	Mean	StdDev	Mean	StdDev	Mean	StdDev
Default (x 100)	11.48	31.88	12.17	32.69	7.71	26.67
FICO	630.93	63.18	630.10	63.51	651.70	66.86
FICO < 621 (%)	43.35	49.56	35.76	47.93	31.79	46.56
620 < FICO < 651 (%)	19.89	39.92	19.75	39.81	18.46	38.79
LTV (%)	83.91	12.24	84.06	12.33	82.33	13.15
Debt Service-to-Income (%)	40.50	9.15	41.00	9.01	40.86	8.74
log(Valuation)	12.17	0.41	12.22	0.41	12.50	0.62
Refinance (%)	59.70	49.05	59.31	49.13	56.60	49.56
Refinance Cashout (%)	52.45	49.94	51.21	49.99	45.20	49.77
Prepayment Penalty (%)	19.30	39.46	19.05	39.27	15.19	35.89
Negative amortization (%)	0.26	5.05	0.47	6.82	1.00	9.97
Full Doc (%)	43.96	49.63	41.34	49.24	55.14	49.74
Borrower is Investor (%)	18.77	39.04	16.73	37.33	10.55	30.72
Second Home (%)	0.33	5.75	0.41	6.36	0.75	8.60
ARM mortgage (x 100)	77.41	41.82	77.74	41.60	77.40	41.82
IO mortgage (x 100)	12.08	32.59	13.83	34.52	24.76	43.16
Loan Spread (%)	4.62	1.40	4.67	1.44	4.30	1.61

Panel D: Summary Statistics of HMDA Data (1/2005-12/2007)

	HB 4050 ZIPs (n = 220,170)		Control ZIPs (n = 233,065)		Rest of Cook County (n = 1,022,859)	
	Mean	StdDev	Mean	StdDev	Mean	StdDev
Total Originations	93,015		101,111		558,595	
Mortgage amount ($k)	144.34	98.18	156.33	177.81	218.99	303.27
Income ($k)	69.61	70.27	76.94	84.79	108.18	148.31
Rejection rate (%)	32.50	46.84	30.91	46.21	22.94	42.05
Refinance (%)	61.66	48.62	57.88	49.38	54.14	49.83
Second lien loans (%)	17.82	38.27	18.21	38.60	18.09	38.49

Table 2. Effects of HB 4050 on Market Activity: Application and Transaction Volume (Source: HMDA)

	State-Licensed Lenders Specializing in Subprime loans			All Other Lenders		
	Full	Control	Active	Full	Control	Active
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Dependent: log(# Applications)					
HB 4050	-0.653***	-0.665***	-0.219***	-0.082***	-0.079***	-0.023
	(0.033)	(0.037)	(0.046)	(0.017)	(0.021)	(0.025)
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Zip Code FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5474	936	936	5504	936	936
Adj. R^2	0.955	0.977	0.954	0.971	0.961	0.954
	Panel B: Dependent: log(# Originated Purchase-Related Mortgages)					
HB 4050	-0.466***	-0.578***	-0.158*	-0.067**	-0.121***	-0.048
	(0.049)	(0.050)	(0.082)	(0.030)	(0.036)	(0.038)
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Zip Code FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5239	933	932	5497	936	936
Adj. R^2	0.885	0.946	0.927	0.915	0.878	0.844
	Panel C: Dependent: log(# Originated Refinancing Mortgages)					
HB 4050	-0.773***	-0.758***	-0.270***	-0.090***	-0.066***	-0.014
	(0.040)	(0.047)	(0.049)	(0.016)	(0.021)	(0.027)
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Zip Code FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5449	936	936	5493	936	936
Adj. R^2	0.935	0.961	0.914	0.970	0.960	0.956

Table 3. Effects of HB 4050 on Credit Supply

Panel A: Supply of Credit -- Total Number of Active Lenders (Source: HMDA)

	State-Licensed Lenders Specializing in Subprime loans		All Other Lenders	
	HB 4050	Control	HB 4050	Control
pre-HB 4050 (9/05 - 8/06)	33	30	84	90
HB 4050 (9/06 - 1/07)	11	26***	65	81***
post-HB 4050 (2/07 - 6/07)	17	16	61	78

active lenders are defined as those originating at least 20 loans in a given five-month period in a particular geographic area.
*** means statistically different from the number of active lenders in the HB 4050 zip code at 1 percent level.

Panel B: Which Lenders Stayed in the Market?[#]

(Pre-HB 4050 characteristics: January 2006 – August 2006)

	Stayed in the Market (N = 76)		Left the Market (N = 41)		
(Source: HMDA)	Mean	Std Error	Mean	Std Error	Stat sig.
Average # originations	235.91	31.96	105.84	19.91	***
Mortgage amount ($k)	133.09	4.82	144.01	4.60	***
Income ($k)	71.43	1.57	80.33	3.90	***
Refi (%)	60.07	3.18	52.24	3.85	***
Rejection rate (%)	25.09	2.05	20.58	1.90	***
Second liens / Total originations (%)	23.70	2.06	21.11	2.15	***

	Stayed in the Market (N = 16)		Left the Market (N = 17)		
(Source: LoanPerformance)	Mean	Std Error	Mean	Std Error	Stat sig.
Delinquency (%)	11.71	4.61	11.27	5.35	
Default (%)	31.69	9.99	31.30	7.53	
Loan Spread (%)	4.68	1.14	4.81	0.78	
Low FICO (%)	34.34	19.26	42.97	14.67	*
Mid FICO (%)	21.80	10.53	22.12	4.71	
Low Documentation (%)	52.58	16.12	47.36	12.31	
Mortgage size ($)	234871	34124	228300	21240	
LTV (%)	83.96	4.38	83.01	4.23	
FICO	641.82	29.53	629.94	22.79	
ARM Mortgages (%)	86.96	11.95	79.29	17.88	***
IO Mortgages (%)	20.85	20.14	11.12	11.89	**
Refi (%)	53.46	14.98	60.46	15.69	*
Refi Cashout (%)	44.23	16.56	54.16	15.16	***
Prepayment Penalty (%)	12.75	13.59	17.53	19.71	

Mean lender characteristics averaged across lenders in a given group (stayed in the market, left the market)

Table 4. Effects of HB 4050 on Mortgage Performance

Panel A: Default Rates in Treated Areas (Source: LoanPerformance)

	Dependent variable: Default (x 100)									
	Sample: Full					Sample: Control				
				Within					Within	
			Active	Zip Code	Probit[#]			Active	Zip Code	Probit[#]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
HB 4050 x Low FICO	-2.78**	-2.79**	-4.24**	-3.95***	-1.60**	-3.16*	-3.14*	-4.42**	-4.02**	-1.97*
	(1.30)	(1.33)	(1.72)	(1.33)	(0.70)	(1.62)	(1.65)	(2.05)	(1.67)	(1.03)
HB 4050 x Mid FICO	1.17	1.17	2.58	0.34	0.44	-0.92	-0.96	1.39	-1.54	-0.23
	(1.92)	(1.93)	(2.40)	(1.89)	(1.15)	(2.21)	(2.23)	(2.92)	(2.27)	(1.46)
HB 4050 x High FICO	0.37	0.47	-0.40		-0.70	0.21	0.33	-1.74		0.79
	(1.41)	(1.38)	(1.31)		(0.88)	(1.66)	(1.64)	(1.93)		(1.38)
FICO	-0.05***	-0.04***	-0.04***	-0.04***	-0.06***	-0.06***	-0.06***	-0.06***	-0.06***	-0.07***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)
Margin (%)		1.05***					1.15***			
		(0.07)					(0.13)			
Borrower Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Contract Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Property Type Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month * FICO Range FE	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes
Zip Code * FICO Range FE	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes
FICO Range FE				Yes					Yes	
Zip Code * Month FE				Yes					Yes	
Observations	166832	166825	64301	166832	166832	58350	58350	24245	58350	58350
Adj. R^2	0.06	0.06	0.06	0.05	0.0922	0.08	0.08	0.08	0.08	0.118

[#]Probit coefficients (marginal effects for the average borrower) are multiplied by 100.

The set of controls includes the following variables:
contract controls (flags for low doc loans, negative amortization loan, interest only loan, loan with a prepayment penalty, refinance loan, cashout refinance)
borrower controls (FICO score, log of appraised value, LTV ratio, investor flag, second mortgage flag)

Table 4. Effects of HB 4050 on Mortgage Performance (Continued)

Panel B: Default Rates in Treated Areas, by FICO Range (Source: LoanPerformance)

	Dependent variable: Default (x 100)					
	Sample: Full			Sample: Control		
	Low FICO	Mid FICO	High FICO	Low FICO	Mid FICO	High FICO
	(1)	(2)	(3)	(4)	(5)	(6)
HB 4050	-2.73**	1.22	0.59	-3.19*	-0.94	0.39
	(1.33)	(1.94)	(1.39)	(1.65)	(2.27)	(1.67)
FICO	-0.07***	-0.07***	-0.03***	-0.08***	-0.08**	-0.04***
	(0.00)	(0.02)	(0.00)	(0.01)	(0.03)	(0.01)
Margin (%)	0.69***	1.04***	1.28***	0.74***	1.27***	1.48***
	(0.13)	(0.17)	(0.11)	(0.21)	(0.34)	(0.28)
Borrower Controls	Yes	Yes	Yes	Yes	Yes	Yes
Property Type FE	Yes	Yes	Yes	Yes	Yes	Yes
Month * FICO Range FE	Yes	Yes	Yes	Yes	Yes	Yes
Zip Code * FICO Range FE	Yes	Yes	Yes	Yes	Yes	Yes
Zip Code * Month FE						
Observations	60062	31586	75177	25598	11571	21181
Adj. R^2	0.05	0.07	0.07	0.07	0.09	0.09

Table 5. Effects of HB 4050 on Mortgage Leverage and Spread

Panel A: Mortgage Leverage (Source: LoanPerformance)

	Loan-to-Value (%)			I(LTV > 80%) x 100		
	Full	Control	Active	Full	Control	Active
	(1)	(2)	(3)	(4)	(5)	(6)
HB 4050 x Low FICO	-1.64***	-1.48***	-1.16*	-6.95***	-7.32***	-5.83**
	(0.37)	(0.44)	(0.58)	(1.79)	(1.99)	(2.29)
HB 4050 x Mid FICO	-0.23	0.62	0.77	1.67	3.24	1.95
	(0.37)	(0.47)	(0.53)	(2.02)	(2.64)	(2.93)
HB 4050 x High FICO	-0.37	-0.13	-0.97	-2.86**	-2.38	-4.31
	(0.33)	(0.45)	(0.70)	(1.41)	(1.76)	(2.89)
Contract Controls	Yes	Yes	Yes	Yes	Yes	Yes
Borrower Controls	Yes	Yes	Yes	Yes	Yes	Yes
Property Type FE	Yes	Yes	Yes	Yes	Yes	Yes
Date * FICO Range FE	Yes	Yes	Yes	Yes	Yes	Yes
Zipcode * FICO Range FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	166832	58350	24245	166832	58350	24245
Adj. R^2	0.19	0.19	0.24	0.08	0.06	0.10

Panel B: Debt Service-to-Income and Loan Spread (Source: LoanPerformance)

	Debt-Service-to-Income (%)			Loan Spread (bp)		
	Full	Control	Active	Full	Control	Active
	(1)	(2)	(3)	(4)	(5)	(6)
HB 4050 x Low FICO	-0.73**	-0.82**	-0.40	-8.08	-4.15	-6.96
	(0.36)	(0.38)	(0.38)	(5.06)	(4.89)	(4.88)
HB 4050 x Mid FICO	-0.58	-0.52	-1.75*	-1.01	-2.24	-12.49**
	(0.68)	(0.70)	(0.92)	(3.31)	(3.04)	(4.83)
HB 4050 x High FICO	-0.37	-0.45	-0.81*	-14.20***	-12.29***	-12.05***
	(0.37)	(0.44)	(0.45)	(4.46)	(3.76)	(4.24)
Contract Controls	Yes	Yes	Yes	Yes	Yes	Yes
Borrower Controls	Yes	Yes	Yes	Yes	Yes	Yes
Property Type FE	Yes	Yes	Yes	Yes	Yes	Yes
Date * FICO Range FE	Yes	Yes	Yes	Yes	Yes	Yes
Zipcode * FICO Range FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	115340	41792	20322	166832	58350	24245
Adj. R^2	0.07	0.07	0.07	0.45	0.51	0.41

The set of controls includes the following variables:
contract controls (flags for low doc loans, negative amortization loan, interest only loan, loan with a prepayment penalty, refinance loan, cashout refinance)
borrower controls (FICO score, log of appraised value, LTV ratio, investor flag, second mortgage flag)

Table 6. Effects of Counseling on Borrower Behavior

Panel A: Counseling Outcome (Source: Counseling Agency)

		Counselor recommendation				
Category	Total Mortgages	No issues	Cannot afford or close to it	Indicia of fraud	Loan above market rate	Seek another bid
Total matched originations	97	54	23	14	4	2
No changes at all	50	34	8	5	1	2
Loans with changes post counseling	47	20	15	9	3	0
(percent with changes)		37%	65%	64%	75%	0%
Lower monthly payments		15	9	4	3	0
(percent of all changed loans)		75%	60%	44%	100%	-
Switch from ARM to fixed		1	5	2	0	0
(percent of all changed loans)		5%	33%	22%	0%	-
Lower interest rate		14	10	3	3	-
(percent of all changed loans)		70%	67%	33%	100%	

Panel B: Are Applicants More Likely to Reject Mortgage Offers? (Source: HMDA)

	Dependent: I(Applicant Rejects Offer) x 100					
	State-Licensed Lenders Specializing in Subprime loans			All Other Lenders		
	Full	Control	Active	Full	Control	Active
	(1)	(2)	(3)	(4)	(5)	(6)
HB 4050	-0.060***	-0.057***	0.004	-0.017***	-0.018**	-0.015**
	(0.006)	(0.007)	(0.008)	(0.006)	(0.007)	(0.007)
log(Mortgage)	0.028***	0.027***	0.009***	0.001	0.009***	0.003
	(0.002)	(0.003)	(0.002)	(0.001)	(0.002)	(0.002)
log(Income)	0.017	0.014	0.002	0.007	0.029**	0.029*
	(0.012)	(0.014)	(0.023)	(0.007)	(0.012)	(0.015)
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE x log(income)	Yes	Yes	Yes	Yes	Yes	Yes
Zip Code FE	Yes	Yes	Yes	Yes	Yes	Yes
Zip Code FE x log(income)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	434722	166439	79649	955936	261350	194644
Adj. R^2	0.015	0.016	0.024	0.006	0.008	0.009

Table 7. Mortgage Product Choice

Panel A: Selection of Contracts that Subject Borrower to Counseling (Source: LoanPerformance)

	I(Hybrid) x 100			I(Prepay Penalty) x 100		
	Full	Control	Active	Full	Control	Active
	(1)	(2)	(3)	(4)	(5)	(6)
HB 4050 x Low FICO	0.41	1.55	2.87	1.36	1.95	3.46
	(2.10)	(2.67)	(3.35)	(1.83)	(1.98)	(2.61)
HB 4050 x Mid FICO	-6.37***	-6.49**	-9.80**	0.41	-0.38	-0.07
	(1.93)	(2.42)	(3.65)	(1.36)	(1.88)	(3.00)
HB 4050 x High FICO	-8.71***	-8.64***	-9.35***	-7.33***	-3.91**	-4.49**
	(1.14)	(1.33)	(2.58)	(1.30)	(1.51)	(1.62)
Borrower Controls	Yes	Yes	Yes	Yes	Yes	Yes
Property Type Controls	Yes	Yes	Yes	Yes	Yes	Yes
Month * FICO Range FE	Yes	Yes	Yes	Yes	Yes	Yes
Zip Code * FICO Range FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	166832	58350	24245	166832	58350	24245
Adj. R^2	0.28	0.19	0.15	0.03	0.03	0.05

Panel B: Availability of Low-Doc Loans (Source: LoanPerformance)

	I(Low Doc) x 100		
	Full	Control	Active
	(1)	(2)	(3)
HB 4050 x Low FICO	-4.95***	-4.50***	-3.79**
	(1.38)	(1.51)	(1.47)
HB 4050 x Mid FICO	-6.05***	-2.84	-3.49
	(2.03)	(2.54)	(3.24)
HB 4050 x High FICO	-2.52*	-3.70**	-1.61
	(1.33)	(1.48)	(3.20)
Borrower Controls	Yes	Yes	Yes
Property Type Controls	Yes	Yes	Yes
Month * FICO Range FE	Yes	Yes	Yes
Zip Code * FICO Range FE	Yes	Yes	Yes
Observations	166832	58350	24245
Adj. R^2	0.18	0.17	0.16

Table 8. Lender Rejection Behavior

Panel A: Were Lenders More Likely to Reject Mortgages? (Source: HMDA)

	Dependent: I(Lender Rejects Application) x 100					
	State-Licensed Lenders Specializing in Subprime loans			All Other Lenders		
	Full	Control	Active	Full	Control	Active
	(1)	(2)	(3)	(4)	(5)	(6)
HB 4050	0.126***	0.121***	0.045***	0.023***	0.031***	0.027***
	(0.013)	(0.014)	(0.011)	(0.005)	(0.006)	(0.007)
log(Mortgage)	0.004**	0.007**	-0.001	-0.021***	-0.027***	-0.026***
	(0.002)	(0.003)	(0.003)	(0.001)	(0.002)	(0.003)
log(Income)	-0.090***	-0.072***	-0.065*	-0.041***	-0.063***	-0.074***
	(0.010)	(0.016)	(0.036)	(0.006)	(0.015)	(0.020)
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE x log(income)	Yes	Yes	Yes	Yes	Yes	Yes
Zip Code FE	Yes	Yes	Yes	Yes	Yes	Yes
Zip Code FE x log(income)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	434722	166439	79649	955936	261350	194644
Adj. R^2	0.023	0.022	0.070	0.050	0.030	0.029

Panel B: Were Small Loans More Likely to Be Rejected? (Source: HMDA)

	Dependent: I(Lender Rejects Application) x 100					
	State-Licensed Lenders Specializing in Subprime loans			All Other Lenders		
	Full	Control	Active	Full	Control	Active
	(1)	(2)	(3)	(4)	(5)	(6)
HB 4050	0.194***	0.188**	0.030	0.167***	0.063	0.038
	(0.062)	(0.076)	(0.090)	(0.041)	(0.057)	(0.058)
log(Mortgage)	0.004**	0.007***	-0.001	-0.021***	-0.026***	-0.026***
	(0.002)	(0.002)	(0.003)	(0.001)	(0.002)	(0.003)
x HB 4050	-0.009	-0.012	0.004	-0.011**	-0.006	-0.003
	(0.011)	(0.010)	(0.010)	(0.005)	(0.005)	(0.006)
log(Income)	-0.090***	-0.073***	-0.065*	-0.041***	-0.063***	-0.074***
	(0.010)	(0.016)	(0.036)	(0.006)	(0.015)	(0.020)
x HB 4050	-0.006	-0.002	-0.001	-0.023**	-0.001	0.001
	(0.018)	(0.022)	(0.024)	(0.009)	(0.013)	(0.014)
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE x log(income)	Yes	Yes	Yes	Yes	Yes	Yes
Zip Code FE	Yes	Yes	Yes	Yes	Yes	Yes
Zip Code FE x log(income)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	434722	166439	79649	955936	261350	194644
Adj. R^2	0.023	0.022	0.070	0.050	0.030	0.029

Figure 1. HB 4050 Treatment (Shaded) and Control (Striped) Zip Codes

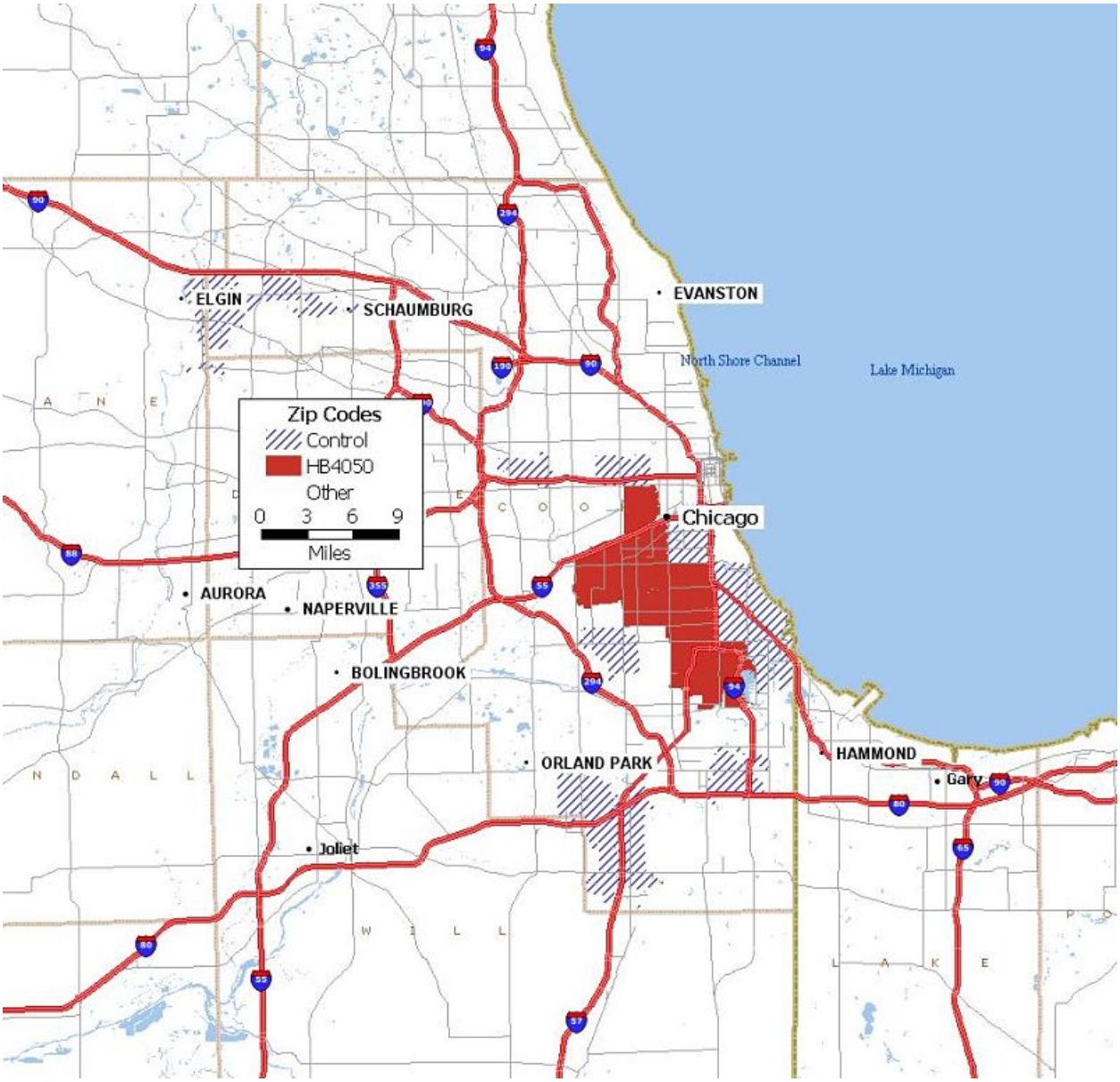

Figure 2a. Number of HMDA Loan Application Filings in HB 4050 and Control Areas: Lenders Subject to HB 4050 vs. Exempt Lenders (Source: HMDA)

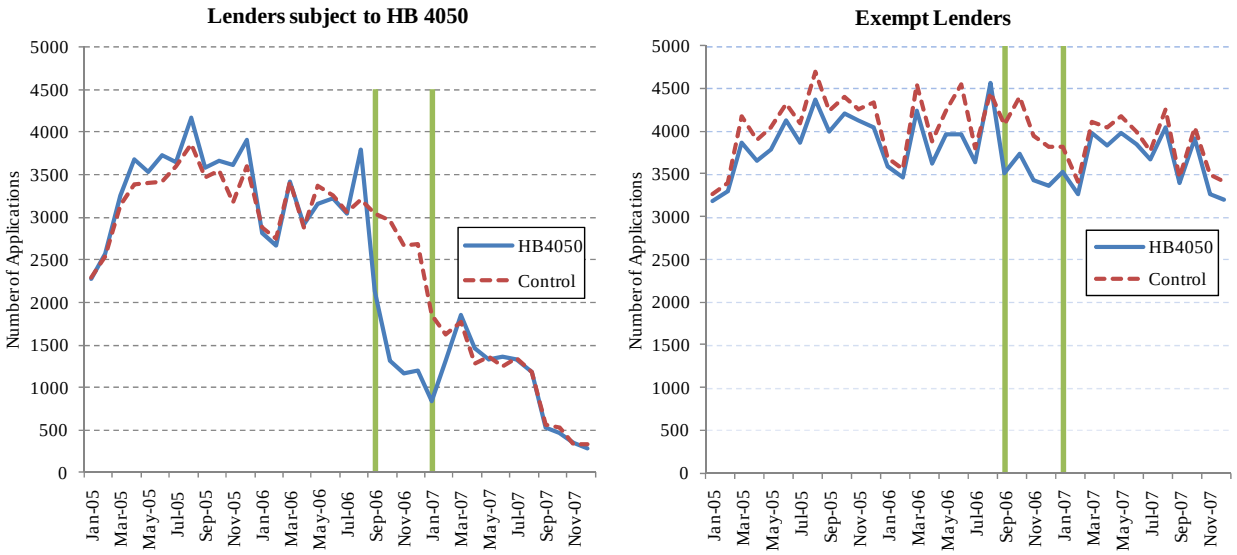

Figure 2b. Number of HMDA Loan Application Filings in HB 4050 Area: Lenders that Remained Active and Those who Exited (Source: HMDA)

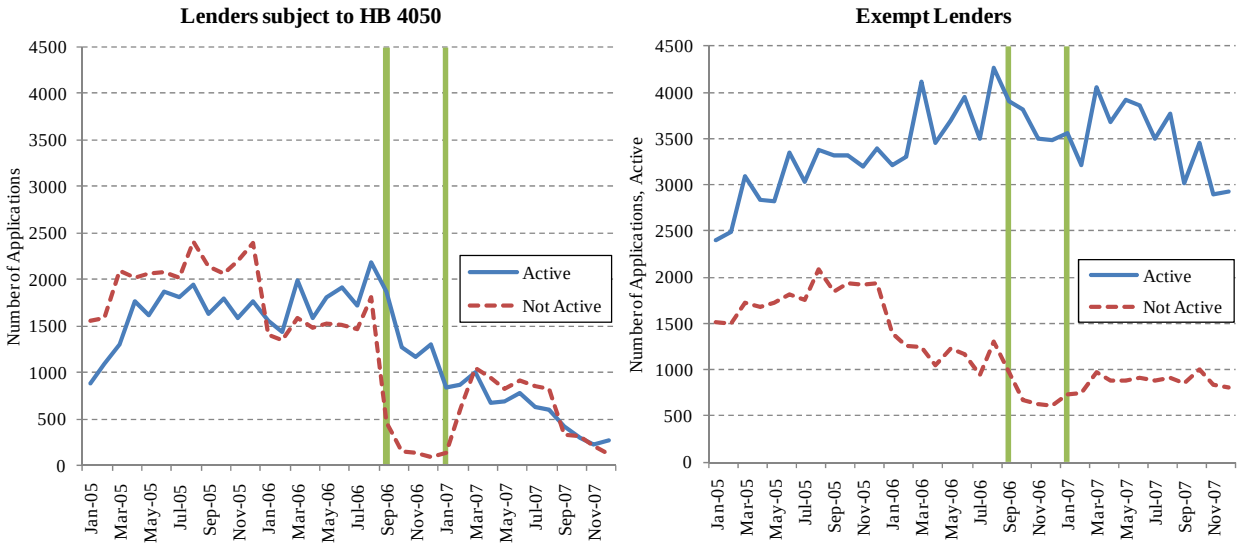

Figure 3a. Cumulative Distribution of FICO Scores of Mortgages Originated Before the HB 4050 Period (1/2005 – 8/2006) (Source: LoanPerformance)

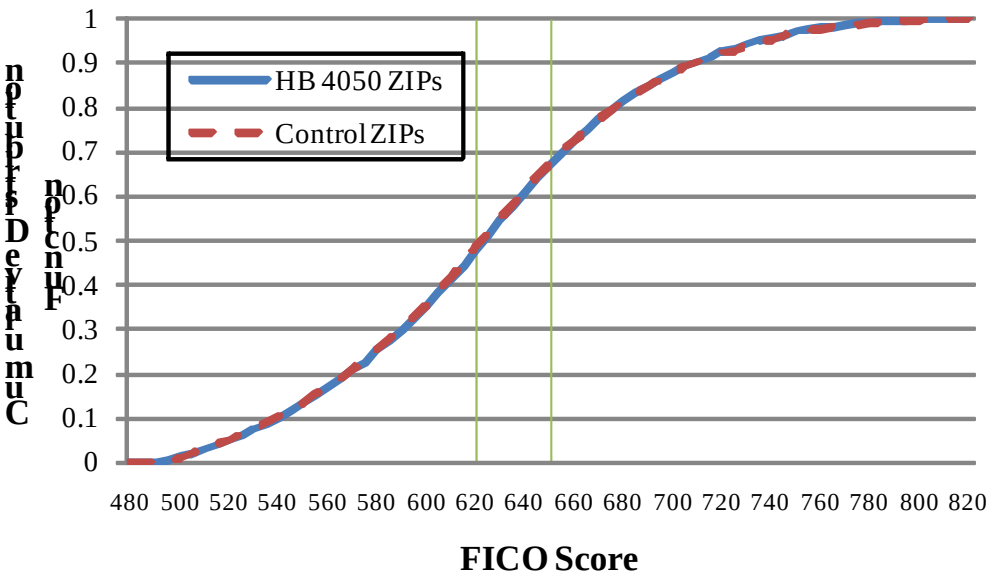

Figure 3b. Cumulative Distribution of FICO Scores of Mortgages Originated During the HB 4050 Period (9/2006 – 1/2007) (Source: LoanPerformance)

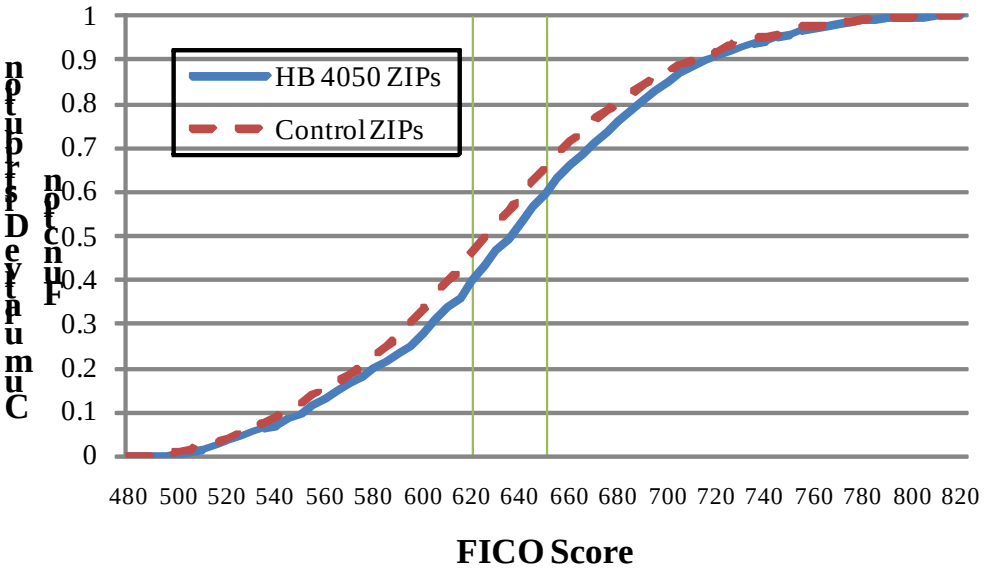

Figure 4a. Shares of HMDA-Reported Applications Rejected by Lenders: Lenders Subject to HB 4050 vs. Exempt Lenders (Source: HMDA)

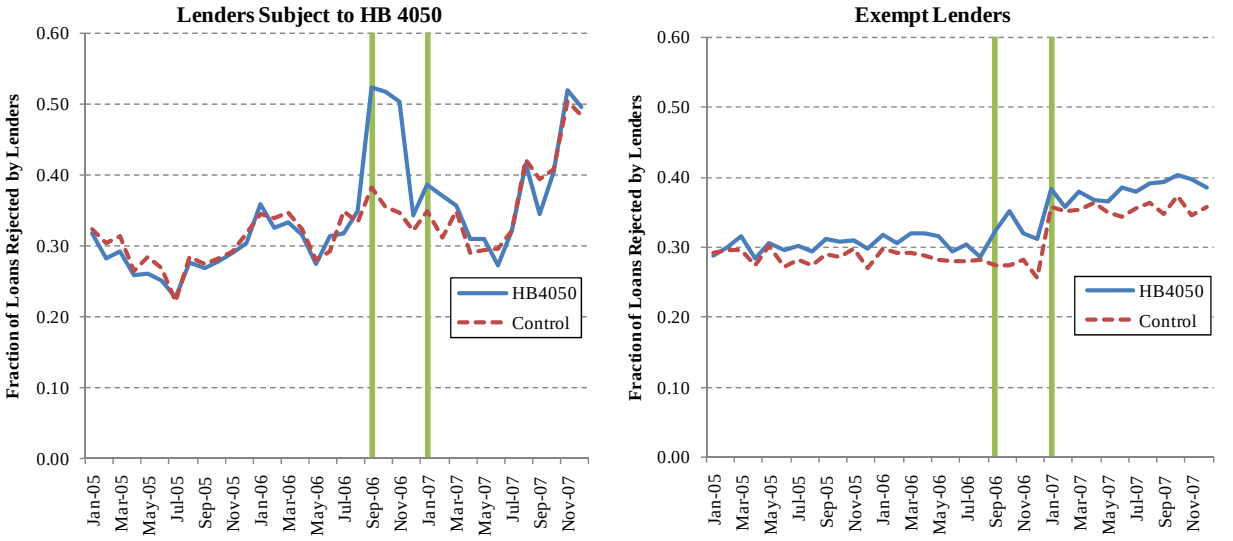

Figure 4b. Shares of HMDA-Reported Applications Rejected by Lenders: Lenders that Remained Active and those who Exited Pilot Areas (Source: HMDA)