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# Mortgage shopping study overview and methodology

Know Before You Owe: Mortgage shopping study – brief #1

*This is the first in a series of research briefs on homebuying and mortgage shopping developed by the Bureau of Consumer Financial Protection's Office of Research and Division of Consumer Education and Engagement.*

# 1. Introduction

Mortgage interest rates and loan terms can vary considerably across lenders.[1] Despite this fact, many homebuyers do not comparison shop for their mortgages. In recent studies, more than 30 percent of borrowers reported not comparison shopping for their mortgage, and more than 75 percent of borrowers reported applying for a mortgage with only one lender.[2,3] Research suggests that failing to comparison shop for a mortgage costs the average homebuyer approximately $300 per year and many thousands of dollars over the life of the loan.[4] Nevertheless, the effectiveness of encouraging consumers to shop had not previously been studied. To examine whether encouraging mortgage shopping benefits consumers, researchers from the Office of Research of the Bureau of Consumer Financial Protection (Bureau) conducted a study of prospective homebuyers in 2016. The study found, among other things, that "encouraged shopping"—the additional shopping prompted by encouraging borrowers to shop—increases consumers' knowledge of the mortgage market and increases consumers' self-confidence in their ability to deal with mortgage-related issues. It also provided suggestive evidence that encouraged shopping may reduce the cost of consumers' mortgages.

The Dodd-Frank Wall Street Reform and Consumer Protection Act created the Bureau including the Office of Financial Education which "shall be responsible for developing and implementing

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[1] Alexandrov, Alexei and Koulayev, Sergei. No Shopping in the U.S. Mortgage Market: Direct and Strategic Effects of Providing Information (March 14, 2017). Bureau of Consumer Financial Protection Office of Research Working Paper No. 2017-01. Available at SSRN: https://ssrn.com/abstract=2948491

[2] Cai, Qiang and Shahdad, Sarah. What is the Mortgage Shopping Experience of Today's Homebuyer? Lessons from Recent Fannie Mae Acquisitions (April 14, 2015). Fannie Mae.

[3] Bureau of Consumer Financial Protection. National Survey of Mortgage Originations (2015).

[4] *Alexandrov, Koulayev (2017)*

initiatives intended to educate and empower consumers to make better informed financial decisions," and provide for consumers opportunities "to improve the[ir] financial situation." Bureau staff and external financial educators[5] have long theorized that a simple and effective strategy for enacting this mandate is to encourage consumers to comparison shop for financial products. The Bureau study is the first study, to our knowledge, to offer empirical support for this theory.

The Bureau study used a randomized controlled trial design—a design commonly considered the "gold standard" of research methodology because it enables researchers to infer cause-and-effect relationships. To measure the effects of encouraging shopping, the Bureau surveyed thousands of consumers in the U.S. throughout their homebuying processes during the 2016 homebuying season. Participants could voluntarily submit their anonymized mortgage documents, including official loan estimates and closing disclosures, to allow for a detailed analysis of their home prices and mortgage terms.

This research brief is the first in a series on the topic of homebuying and mortgage shopping developed by the Bureau. This brief describes the Bureau's research design and methodology. Future briefs will present the main results of the study and other insights about American homebuyers gained from the study.

[5] *See, e.g., Michelle Singletary: http://www.telegram.com/news/20160716/michelle-singletary-like-pikachu-hunt-look-high-and-low-for-best-mortgage-rate*

# 2. Methodology

## 2.1 Research design

This study was a randomized controlled trial (RCT). RCTs are valuable because they allow researchers to estimate the effects caused by a given policy (known as estimating "causation"). In contrast, many other designs often cannot estimate cause-and-effect and instead can only estimate *correlations* between a policy and observed outcomes. Correlations *may* be indicative of causation, but they may not be. The ability to estimate cause-and-effect relationships is important because learning about the effects of policy or education can be used to improve future policies or interventions.

This study assessed the effects of encouraging consumers to comparison shop for mortgages. At the beginning of the study, participants were assigned randomly to a "control group" or a "treatment group."[6] Participants in these groups were treated identically during the study except for one key difference: the treatment group was encouraged to shop for a mortgage and to engage in shopping-related behaviors (for example, obtain pre-approval letters). The control group was not encouraged to shop in this way.

Because participants were randomly assigned to these groups, any differences in outcomes between the two groups, on average, were unlikely to be due to who was in the groups. Rather, to the extent there are statistically significant differences in outcomes, the RCT design allows us

[6] Some participants were assigned to a second treatment group which was asked to use tools developed by the Bureau to help consumers with homebuying and mortgage shopping. The Bureau is using these results to improve its tools, but is not planning to publish these results at this time. Therefore, unless otherwise noted, this article and those that follow will discuss this study as if there was a single treatment group.

to conclude with confidence that these differences were caused by the encouragement to shop (or more simply, by "the shopping treatment").

The research design led us to a method of analysis called intent-to-treat (ITT). ITT produces measures of effects of the treatment (in this case, the encouragement to shop) on all consumers in the treatment group. These measures incorporate the effects (if any) on people who respond to the encouragement as well people who did not. There are two weaknesses of ITT analysis. First, by including people who do not respond to the encouragement, estimated effect sizes are often small and therefore relatively difficult to detect. Second, ITT measures actually capture two effects at once: the effectiveness of the encouragement in encouraging the action (in this case, the effectiveness of the study's messaging in encouraging shopping behavior) and the effect of the action on subsequent outcomes (for example, mortgage knowledge). If researchers are interested in the composite effects in isolation, then ITT is insufficient. The three primary strengths of ITT are: first, that ITT is simple to conduct and simple to interpret; second, that by including the entire study population in the analyses, it avoids certain types of selection bias;[7] and third, ITT estimates are often useful for evaluating policy—since policymakers cannot usually mandate how consumers respond, or who responds, to a policy, the relevant measure from a policymaker's perspective may be the average effect of the policy on the entire treatment group.[8]

To precisely estimate the effects of the encouragement, participants were surveyed multiple times throughout the study. At the beginning of the study, each participant was administered a baseline survey which provided initial measures of their opinions, beliefs, and expectations regarding the home and mortgage markets, as well as of their progress in their home and

[7] To see the value of this, Bureau researchers consider another type of analysis, treatment-on-the-treated (TOT). In TOT, the researcher only considers individuals who took the encouraged action (shopped) and compares their results to individuals who did not take the action (or took the action less). This is potentially troublesome because the people who shop may be systematically different than those who do not shop for reasons other than the encouragement. For example, they may be more educated, or wealthier, or more inclined to negotiate with their lenders. TOT estimates therefore include both the effects of treatment, but also, potentially, the effect of different types of individuals opting in to treatment compared to those who do not. This is a type of "selection bias" that is precluded by ITT analysis.

[8] For further analysis, including estimation of local average treatment effects, see Beckett and Chin (in progress).

mortgage searches. Next, participants were administered surveys every two weeks for up to three months or until they made an offer to purchase a home, which was accepted or dropped out of the study. Administering these surveys frequently allowed the study to uncover activities that participants might forget over longer periods of time, such as the specific sources they consulted to learn about mortgages. Finally, at approximately the time when participants completed the study, participants were administered a survey to ascertain final outcome measures. Comparing differences between final measures and baseline measures across the control and treatment groups allows us to estimate the effects of encouraged shopping.

## 2.2 Sample

The study's population of interest was U.S. home shoppers who were likely to take out a mortgage to buy a home in the spring or summer of 2016. To locate a sizeable group of individuals who met these eligibility criteria, the Bureau worked with Zillow,[9] an online real estate and rental marketplace that facilitates home and mortgage searches.[10] Zillow emailed individuals who had an account with Zillow and had opted-in to receiving emails and asked them to participate in a "federal research study about the experience of buying a home and finding a mortgage." Interested recipients then answered a series of questions to determine whether they were eligible for the full study (for details, see below). The full study was then explained in further detail to all eligible individuals. Before being asked to complete the baseline survey, all eligible individuals were asked if they wanted to participate in the full study. Table 1 shows the step-wise exclusions that generated the final 19,405 person sample from the approximately 5.25 million individuals originally contacted. Of the approximately 2% of recipients who opened Zillow's email, about one quarter were eligible for the study. Of those, about 90 percent opted-in to the study, and of those, about 83 percent completed the entire baseline survey.[11]

[9] The Bureau invited industry to collaborate on research and innovation projects. For more information, visit: https://www.consumerfinance.gov/about-us/project-catalyst/

[10] www.zillow.com/corp/About.htm, retrieved December, 2017

[11] Numbers in Table 1 and Table 3 include individuals who were assigned to the second treatment group.

**TABLE 1:** STUDY PARTICIPATION, BY STEP

| Steps | Number of participants | Percent retained from previous category |
|---|---|---|
| 1. Sent an email invitation | 5,249,417 | -- |
| 2. Followed emailed link to the study | 98,872 | 1.9 |
| 3. Eligible for study | 26,070 | 26.4 |
| 4. Opted into study | 23,407 | 89.8 |
| 5. Completed baseline survey | 19,405 | 82.9 |

Table 2 shows that participant demographic variables were well-balanced across the control and treatment groups. This balance tells us that the study's randomization of participants into the two groups was successful, judging by observable characteristics, and gives the researchers confidence that differences in results between the two groups are not driven by differences in who was in the groups. To understand whether the sample used in the Bureau study was similar to or different from the population of U.S. homebuyers, we compared demographic characteristics of the study sample to those in the National Survey of Mortgage Originations (NSMO).[12] NSMO data is weighted so that it approximately mirrors the population of American homebuyers. The fourth column of Table 2 can therefore be read as the approximate demographic characteristics of American mortgage-borrowers in 2015. It is difficult to make definitive comparisons because participants were able to skip demographic questions in the Bureau study. Nonetheless, it appears that the study's respondents reflect the demographics of U.S. homebuyers fairly well. Notable exceptions are that the study had fewer participants report that they are in the highest income bracket, and fewer participants report a credit score that was in the "super-prime" range. One reason for this could be that the Bureau study sampled people who anticipated buying a home, whereas the NSMO data sampled people who recently bought a home. The differences between the two datasets could therefore stem from the fact that people with more money and higher credit scores were more likely to successfully purchase homes and be represented in the NSMO. Indeed, data on who reported eventually purchasing a home in the Bureau study confirm these relationships.

[12] https://www.fhfa.gov/PolicyProgramsResearch/Programs/Pages/National-Survey-of-Mortgage-Originations.aspx

**TABLE 2:** BALANCE OF STUDY PARTICIPANTS COMPARED TO THE NATIONAL SURVEY OF MORTGAGE ORIGINATIONS, PERCENT

| Variable | Overall | Control | Treatment | NSMO, 2015 |
|---|---|---|---|---|
| Age: 18-29 | 17.8 | 17.6 | 18.7 | 17.1 |
| Age: 30-39 | 33.2 | 33.3 | 33.1 | 32.9 |
| Age: 40-49 | 20.5 | 20.4 | 20.5 | 21.1 |
| Age: 50 and older | 28.1 | 28.2 | 27.2 | 28.9 |
| Age: Not reported | 0.4 | 0.4 | 0.5 | -- |
| Race: Non-hispanic white | 69.8 | 70.0 | 70.3 | 73.1 |
| Race: Black | 9.3 | 9.8 | 8.9 | 6.3 |
| Race: Hispanic of any race | 9.3 | 9.2 | 8.9 | 9.2 |
| Race: Asian | 5.5 | 5.4 | 5.3 | 7.6 |
| Race: Other* | 4.4 | 3.9 | 4.7 | 3.8 |
| Race: Not reported | 1.7 | 1.7 | 1.8 | -- |
| Education: Less than high school | 0.7 | 0.8 | 0.6 | 1.4 |
| Education: High school or GED | 09.5 | 9.1 | 9.1 | 10.2 |
| Education: Some college** | 29.2 | 29.0 | 29.0 | 23.4 |
| Education: College graduate | 32.6 | 33.2 | 32.8 | 37.7 |
| Education: Postgraduate | 28.1 | 27.5 | 28.4 | 27.3 |
| Income: Less than $35,000 | 8.5 | 9.1 | 8.4 | 7.1 |
| Income: $35,000 to $49,999 | 12.5 | 12.8 | 12.6 | 11.6 |
| Income: $50,000 to $74,999 | 19.7 | 19.2 | 19.7 | 22.6 |
| Income: $75,000 to $99,999 | 17.4 | 17.9 | 16.8 | 17.8 |
| Income: $100,000 to $174,999 | 23.0 | 25.6 | 24.0 | 26.6 |

| Variable | Overall | Control | Treatment | NSMO, 2015 |
|---|---|---|---|---|
| Income: $175,000 or more | 9.3 | 9.4 | 9.1 | 14.3 |
| Income: Not reported | 9.3 | 9.0 | 9.4 | -- |
| Credit score: Sub-prime (<640) | 27.8 | 28.4 | 27.3 | 11.1 |
| Credit score: Prime | 26.2 | 25.9 | 26.5 | 29.6 |
| Credit score: Super-prime (720+) | 38.6 | 37.8 | 39.1 | 59.2 |
| Married | 57.2 | 57.0 | 56.3 | 63.4 |
| Repeat homebuyer | 56.5 | 56.2 | 56.1 | 55.1 |
| N | 19,405 | 6,519 | 6,414 | 6,188 |

### 2.2.1 Encouraged shopping

Participants in the treatment group received messages designed to encourage them to shop. Language in the messages was tailored to the participant's self-reported progress in their home and mortgage searches. To maximize their effectiveness, many of the messages were built upon previous research in the social sciences. For instance, existing research shows that asking people who wish to achieve a goal to make an explicit plan of action can increase the likelihood that that goal is achieved.[13] Thus, one message delivered to participants in this study asked them to make a plan. Participants who were not yet ready to submit an offer, for example, got the following message (phrases in italics varied depending on the participant's home and mortgage search progress):

[13] Milkman, Katherine L., et al. "Using implementation intentions prompts to enhance influenza vaccination rates." Proceedings of the National Academy of Sciences 108.26 (2011): 10415-10420.

> We want to remind you about the importance of shopping around for a mortgage. Based on your responses *now is a good time for you to begin asking mortgage lenders for pre-approval letters*.
> Please take a moment to come up with a plan for *getting two or more pre-approval letters*. Try to think about how you would carry out each step of your plan.
> If you've already *received two or more pre-approval letters*, make a plan for *applying for a mortgage with them*.

Encouragement messages were delivered to participants as survey items within each survey as well as within emails which otherwise requested participants to complete their next survey. Participants in the control group received identical emails but without the shopping encouragement text, and they were not administered survey items related to the shopping encouragement.

### 2.2.2 Study administration

Fielding the survey, data collection, data matching, communication with participants, participant payments, and customer support were handled by a contractor, The Fors Marsh Group (FMG).[14] FMG stripped personally identifying information from any data before they were sent to the Bureau. All communication with participants was conducted via email.

Participants began by taking the baseline survey which took about 25 minutes to complete, on average. Baseline measures are important for evaluating whether and how participants' outcomes changed over the course of the study and whether the changes differed across the treatment and control groups. After the baseline survey, participants received an e-mail asking them to complete a "check-in" survey every two weeks while they were in the study. The content of a check-in survey depended on the participant's self-reported progress in their homebuying and mortgage processes, although most surveys asked participants how, and how much, they shopped for homes and mortgages since their last survey. Participants received reminders after three and six days if they had not yet completed a given check-in survey. Participants were allowed to remain in the study if they missed one check-in survey, but those who missed two

[14] The research described in this report was funded by the Bureau under a competitive award to Fors Marsh Group (contract number CFP-13-Z-0008 TO 0006).

check-in surveys were not invited to take the subsequent survey. Table 3 is a continuation of Table 1 and shows the number of participants who completed the study as well as the number who provided Closing Disclosure information.

To increase the number of participants from whom they collected complete data, while limiting the overall burden on study participants, the Bureau invited a select group of respondents to a "follow-up" survey after the three-month check-in survey period. These respondents were chosen if, as of the time of their final check-in survey, they reported that a seller had accepted their offer on a home, but they had not finished closing on the home. This follow-up survey could be taken anytime in the next ten weeks; eligible respondents received an email every two weeks to remind them about this final survey. Participants received $5 for completing the baseline survey, $20 for completing all of the check-in surveys, and $5 for completing the follow-up survey, unless they opted to not receive payment.

The survey contained nine sections, labeled A-I (see below for descriptions of each survey section). The baseline survey contained all but the last of these sections. However, the check-in and follow-up surveys were designed to balance data collection needs with participant burden and therefore only contained sections that were relevant to a participant's self-reported progress in their home and mortgage searches. As a result, the only section included in every check-in survey was section B, and most check-in surveys took participants less than 5 minutes to complete.

## 2.3 Survey sections

Section A was an eligibility screener designed to ensure that the study was relevant for participants. Eligible respondents were those who: believed they were at least somewhat likely to purchase a home in the next three months; planned to finance their home purchase with a mortgage; were involved in financial decisions in their household; and were not professionally involved in the real estate industry (e.g., a real estate agent). If a respondent was screened out by one of these questions, they were administered a follow-up question to ensure their answer was accurate before they were deemed ineligible.

Section B, which was administered as part of every check-in survey, asked participants questions to determine how they had progressed (or regressed) in their home and mortgage processes. For example, responses to Section B would reveal whether a participant was actively searching for a home, had put an offer on a home, purchased a home, etc. A participant's responses to these

questions determined which of the subsequent survey sections would be relevant to the participant.

Sections C and D asked participants about information sources they were using for their home and mortgage shopping, respectively, and the extent to which they were using each source.

Section E included three sets of questions. The first was a "confidence" scale, designed by Bureau staff to measure participants' feelings of self-confidence related to home and mortgage search (for example, "How confident do you feel when talking to lenders?"). The second set was a "mortgage knowledge" scale designed by Bureau staff to measure participants' understanding of the mortgage process and common mortgage terms. The third set was a series of questions designed to determine the prevalence of certain incorrect beliefs, or myths, about searching for a home or mortgage. The confidence and mortgage knowledge scales were administered both during the baseline study as well as at the end of the study, so that the Bureau could compare both how a single participant's confidence and knowledge changed over time.

Section F asked participants to predict (or report) the mortgage terms they thought they would receive (or were receiving), including, for example, the loan amount and interest rate. Section G asked people these same questions but after they had obtained a mortgage. By comparing predicted and actual estimates, Bureau researchers were able to evaluate whether, and how, consumers' beliefs matched their actual mortgage experiences.

Section H collected background financial and demographic data from participants in the initial survey. These data allow us to make the statistical estimates more accurate by accounting for variation in outcome measures that may have been associated with this background data. For example, it may be the case that more educated participants are also more knowledgeable about mortgages. By including educational attainment in the statistical analysis of mortgage knowledge, Bureau researchers can account for variation in knowledge data due to education, making the estimate of the effect of encouraged shopping more precise. These background data also allow us to explore differences in outcomes across demographics.

### 2.3.1 Mortgage documents

Section I collected participants' mortgage documents. Participants who obtained a mortgage were invited to provide, on a voluntary basis, mortgage information from any loan estimates or closing disclosures that they received. Participants could provide this information to the study administrator by uploading their mortgage documents to a secure website, faxing them, or

taking a picture with a mobile device. All loan documents were stripped of any personally identifying information by a contractor before the data were sent to the Bureau.

The Bureau believed that obtaining mortgage documents would be useful given previous research indicating that consumers cannot always reliably report their mortgage information.[15] Participants who did not want to provide their documents could instead choose to answer a few questions about their mortgage, such as the loan term, amount, and interest rate. Participants who sent a Loan Estimate received and additional $5, while participants who sent a closing disclosure received an additional $10. Table 3 shows the step-wise participation rates of providing mortgage documents. About 20 percent of participants who reported closing on a home during the study, 635 participants, provided Closing Disclosures or Closing Disclosure information.

**TABLE 3:** STUDY ATTRITION, BY STEP

| Steps | Number of participants | Percent retained from previous category |
|---|---|---|
| 5. Completed baseline survey | 19,405 | 82.9 |
| 6. Provided post-study data | 8,521 | 43.9 |
| 6a. Provided post-study data and closed on a home | 3,071 | 16.3 |
| 7. Provided post-study closing disclosure data | 635 | 20.1 |

[15] Lacko, J. M., & Pappalardo, J. K. (2010). The failure and promise of mandated consumer mortgage disclosures: Evidence from qualitative interviews and a controlled experiment with mortgage borrowers. American Economic Review, 100(2), 516-21.

# 3. Conclusion

This research brief introduced the Bureau of Consumer Financial Protection's study of prospective homebuyers during 2016. The next briefs will:

1. describe the main results of the Bureau's RCT—in particular, the effects of encouraging consumers to comparison shop for their mortgages.

2. examine, in-depth, consumers' knowledge of mortgages and mortgage terms.