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## An Analysis of Low Cash-Out Refinance Rates

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# Not Cashing In on Cashing Out: An Analysis of Low Cash-Out Refinance Rates

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**Abstract**

Lowering a borrower's interest rate is one of the most effective ways to reduce a borrower's debt burden. Mortgage refinancing offers a chance to shift debt balances from high-interest loans into a low-interest mortgage through "cashing out" some of the home's equity. Using anonymized data on mortgage refinancing behavior, we find that over half of borrowers with high-interest loans and available home equity do not take advantage of their cash-out opportunities. While the cash-out "surcharge" can rationalize this pattern, we leverage a policy change at Fannie Mae that eliminated this surcharge for student-loan borrowers and find that the presence of a student loan does not significantly affect borrowers' propensity to cash out.

Keywords: mortgage refinancing, cash-out refinancing, student loans, cash-out surcharge, household finance

JEL Codes: D14, G51, G40, G53

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# 1 Introduction

Lowering a borrower's interest rate is one of the most effective ways to reduce a borrower's debt burden. The market for lowering interest rates is huge, with $1.6 trillion in mortgage refinancing in the first half of 2021 (Freddie Mac, 2021). Despite the opportunities to secure lower interest rates on debt, many borrowers do not convert high-interest debt to low-interest debt, due to many reasons, such as inertia, fixed costs, or information frictions (Agarwal et al., 2017, Berger et al., 2024). In this paper, we study behavior of borrowers who are not subject to these hurdles — the ones who have already made the decision to refinance their mortgage.

We find that more than half of refinancing mortgagors with other high-interest debt and available home equity do not cash out.[1] One obvious explanation for this lack of debt consolidation is that cash-out refinancing is often subject to an interest rate surcharge, discouraging take-up. In order to assess the importance of this cost of cash-out, we leverage a policy experiment that eliminated this surcharge for a subset of borrowers. Starting in 2016, Fannie Mae eliminated the cash-out surcharge for borrowers who used their home equity to repay their student loans. Strikingly, we find that even after this policy change, the presence of a student loan does not significantly affect borrowers' propensity to cash out.[2]

While the overall share of those who do not cash out is over one-half (see the first column in Table 1), this number may be an underestimate. A fraction of borrowers are *forced* into refinancing due to liquidity constraints, and these borrowers necessarily cash out. (This explains why the share of cash-outs is much higher in times of high mortgage interest rates — see Figure 1.) To partially address this bias, we duplicate our analysis on the subsample of borrowers whose refinancing lowers the interest rate on their mortgage. The share of cash-outs among these "in-the-money" refis falls to below a third (see the second column of Table 1). Across both samples, we do find that the presence of other loans is associated with a mild increase in the propensity of borrowers to cash out.

Since borrowers with other debt are more likely to cash out, that suggests they may

[1] We define available (i.e., "tappable") equity as mortgages with a loan-to-value (LTV) ratio of less than 75 percent. Following the Great Financial Crisis of 2008-2009, lenders are very reluctant to allow a cash-out for refis that will make the LTV exceed 80 percent.

[2] Puzzlingly, the policy does appear to have a sizable differential effect on mortgagors whose refi-ed loans are securitized with Fannie Mae, but regardless of whether they had a student loan, i.e., whether they actually qualified for the surcharge waiver.

use their cash-out to pay down their debt. To assess if this is case, we compare the debt paydown of borrowers who cash out with borrowers who do not cash out. We find that borrowers who cash out pay substantially more towards their credit card debt compared with borrowers who do not cash out, but we do not find a similar pattern for auto loans.

Table 1: Cash-out share of all mortgage refinances

| Loan type in debt portfolio | Full sample share of cash-out refis | Rate decrease subsample share of cash-out refis |
|---|---|---|
| Overall | 40.75% | 27.13% |
| Student loan | 45.91% | 32.50% |
| Auto | 45.61% | 31.63% |
| Other* | 47.25% | 32.58% |
| Credit card | 40.69% | 27.40% |
| Large credit card debt | 44.69% | 37.68% |

Notes: Table reports the share of mortgage refis that are cash-out, conditional on whether or not a borrower has other types of debt in their debt portfolio. The sample is composed of all cash-out refis and rate-and-term refis with an LTV of 75% or less. Large credit card debt indicates that the outstanding card balance is greater than 2% of the pre-refi appraised value. Sources: Authors' calculations based on CRISM. * Other loans includes retail, consumer finance, and "other" loans as coded by Equifax.

Our paper contributes to three strands of the literature. First, we contribute to the household finance literature by showing that borrowers do not reduce their total debt burden by converting high-interest debt into low-interest debt. In particular, we show this in a setting where borrowers are already deciding to lower their interest rate on one part of their debt portfolio, but they do not extend that decision to the rest of their portfolio, namely, when borrowers have already made a mortgage refinancing decision. Previous research has extensively documented a variety of reasons why borrowers do not act optimally to reduce their total debt burden (See Agarwal et al. (2017), Amromin et al. (2020) for reviews of the literature). Commonly cited reasons for this suboptimal behavior include inertia, inattention, information frictions, and fixed costs (Agarwal et al., 2016, 2017, Keys et al., 2016, Andersen et al., 2020, Agarwal et al., 2021, Amromin et al., 2020, Berger et al., 2024).[3] We show that even in a situation where all of these frictions are removed (barring some small information frictions), many borrowers still do not convert high-interest debt into low-interest debt.

[3]Using Finnish data, Vihriälä (2022) points to intra-household frictions and anchoring as possible sources of the closely-related credit card (co-holding) puzzle.

Second, we contribute to the literature on mortgage refinancing by examining the cash-out decision *conditional* on the borrower already choosing to refinance their mortgage. By focusing on borrowers that are already refinancing, we avoid the need to model the decision of *when* or *whether* to refinance. Furthermore, we leverage the fact that frictions and costs associated with cashing out conditional on refinancing are dramatically smaller than those associated with the refinancing decision itself. Previous research has focused on the decision of *when* to refinance given its frictions and costs (see Hurst and Stafford (2004), Agarwal et al. (2013), Lambie-Hanson and Reid (2018), Chen et al. (2020), Gerardi et al. (2021) for analysis of the refinancing decision and its costs). Little work has focused on borrowers' decisions after they have already chosen to refinance.[4]

Finally, we contribute to the literature on student debt by examining the decision of student loan borrowers to pay off their loans through mortgage refinancing. Recent work on student loans has focused on how income-based repayment plans affect loan outcomes or the effects of student loan forgiveness (Bachas, 2018, Lochner and Monge-Naranjo, 2016, Lochner et al., 2021, Mueller and Yannelis, 2022, Catherine and Yannelis, 2020, Herbst, 2023).

Our paper is structured as follows. Section 2 provides background information on the refinancing process. Section 3 describes the data used in our analysis. Section 4 analyzes the cash-out decision. Section 5 presents the results of our difference-in-differences and triple-diff estimation that leverages Fannie Mae's policy change. Section 6 concludes.

## 2 Background

Homeowners can reduce their total cost of borrowing by refinancing their mortgage at a lower interest rate when interest rates decline. In the United States, most mortgages are fixed-rate mortgages, which means that the interest rate is fixed for the life of the loan (typically 30 years). Therefore, when mortgage interest rates fall below a borrower's current rate, they can refinance and lock in the new, lower rate for the duration of their mortgage. However, refinancing incurs substantial up-front costs because a borrower is taking out a new mortgage to pay off their old mortgage. Therefore, many of the same "closing costs"

[4]Pennington-Cross and Chomsisengphet (2007), LaCour-Little et al. (2010) primarily focus on the correlation between interest rates, macroeconomic variables, and borrower demographics and the decision to cash out. (Anenberg et al., 2025) provide an excellent analysis of how cash-out refis may substitute for other forms of borrowing.

still must be paid. These closing costs discourage borrowers from refinancing every time that interest rates fall.

If a borrower decides to refinance, they have two options. First, the borrower could choose a "rate-and-term" refinance in which they may change the rate and term (duration) of the new mortgage. For example, if a borrower refinances a 30-year mortgage that they have had for 5 years, they could choose to extend it by taking out a 30-year mortgage to pay off the remaining balance, keeping the current term, or shortening the mortgage term. Borrowers cannot choose the interest rate they pay, but by refinancing, they can lock in a lower rate than the rate on their old mortgage. Alternatively, a borrower could do a cash-out refinance, which has the same options as a rate-and-term refinance plus the option to extract equity from one's home. If a borrower chooses a cash-out refinance, the amount they can cash out is typically capped such that the new mortgage does not exceed 80 percent of the home's value.[5]

The refinancing decision can be summarized as follows: Given the prevailing interest rate and estimated closing costs, a borrower chooses whether or not to refinance. Conditional on refinancing, the borrower then chooses the term and equity extraction of their new mortgage.[6] A rate-and-term refinance is one where the borrower chooses no equity extraction and a cash-out refinance is one where the borrower chooses a positive amount of equity to extract from their home. In reality, due to Loan Level Price Adjustments, the interest rate on a cash-out refinance is about 0.125-0.625 percentage points higher than a rate-and-term refinance, depending on a borrower's credit score and loan-to-value ratio of the mortgage.[7] The slightly higher rate is almost surely less than the interest rate the borrower is paying on their other debt such as student loans or credit cards. However, the added interest surcharge applies on the entire balance of the mortgage, which is typically much larger than the debt amount being paid down. Consider a back-of-the-envelope cal-

[5]Appendix Figure A.2 shows that only about 15 percent of cash-out refis are for amounts greater than 80 percent LTV.

[6]Some borrowers may also consider the opportunity costs of other investments (e.g., entrepreneurship or stock ownership) as well as their expectations of future home price appreciation when deciding whether to extract equity from their home. However, these sophisticated financial motivations are not common (accounting for around 5% of reasons for cashing out) based on the nationally representative National Survey of Mortgage Originations. See Appendix Table B.3 for a tabulation of the most common reasons borrowers give for cashing out. CFPB (2025) provides an in-depth analysis of cash-out reasons and finds similar debt-driven reasons for cashing out.

[7]See Fannie Mae's Loan-Level Price Adjustment Matrix for an example. Available at https://singlefamily.fanniemae.com/media/9391/display. See Appendix Figure A.3 for a scatterplot of differences between cash-out and non-cash-out rates separated by credit score.

culation with a mortgage LTV of 80%, interest rate gap of 20pp between the mortgage and the credit card, and cash-out surcharge of 0.5pp. This exercise suggests that cashing out solely to repay the credit card debt pays only if the credit card debt balance exceeds 2% of the home value, and this threshold is larger for loans with smaller interest rates.

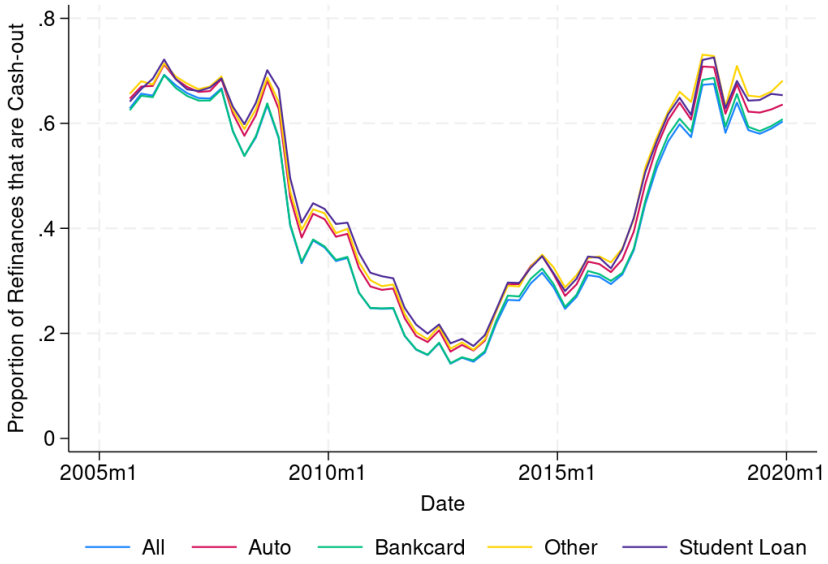
Trends in cash-out refinancing reflect changes in interest rates. When interest rates are high, there is less incentive to refinance and so only borrowers that need cash do a cash-out refi. Figure 1 shows that when interest rates are high and gains to refinancing are limited, then the share of rate-and-term refinances is small. This pattern is further supported by evidence from the National Survey of Mortgage Originations. Table B.2 shows stark increases in the share of borrowers refinancing to take out cash (23 percent to 39 percent) or to consolidate and pay down debt (30 percent to 51 percent) between 2016 and 2018 when interest rates were rising.

Some of these borrowers are refinancing due to liquidity shocks and need to extract equity from their home to pay for emergency expenses or other immediate needs. For these borrowers, cashing out is the primary motivation for refinancing, and hence they are much less sensitive to interest rates. Note that this explains why the cash-out share of refinances is much higher in periods of high interest rates (see Figure 1). To make sure our results below are not driven by these "involuntary" cash-outs, we provide robustness analysis by restricting the sample to "in-the-money" refinancers (i.e., borrowers who lower their interest rates).

# 3 Data

We use Equifax Credit Risk Insight Servicing and ICE, McDash data (CRISM). CRISM data contain monthly mortgage servicing information from the largest residential mortgage servicers in the United States. All data on servicers and borrowers is anonymized, only key characteristics are reported. The data contain multiple types of mortgage products, including rate-and-term and cash-out refinances. The data also contain various borrower, property, and loan characteristics. Additionally, CRISM contains Equifax credit bureau data and the match is performed by Equifax using balance, payment date, zip code, and payment history. The data cover June 2005 to January 2025. To remove possible effects of the Covid-19 pandemic, we end our sample in 2019. We limit our analysis to CRISM loans with a level of match confidence greater than .8234 (a standard confidence threshold during the period of our sample). We further restrict to all borrowers that did either a

Figure 1: Cash-out share of all refinances




Note: Figure plots the share of all refinancing activity for which borrowers cashed out some of their home equity. Sources: Authors' calculations based on CRISM.

cash-out refinance or a rate-and-term refinance with an LTV of 75 percent or less, as these are the borrowers who most likely had an option to cash out since most banks do not allow cash-out at LTVs of 80 percent or more.[8] We drop borrowers with more than two outstanding mortgages and a small number of borrowers who refinanced multiple times within a quarter.[9] These restrictions give us a sample of 11.9 million refinanced mortgages (either cash-out or rate-and-term refi with tappable equity), with 41 percent of those being cash-out refinances.

Table 2 reports the summary statistics for our sample. Note that borrowers who refinance without cashing out have FICO scores that are on average about 35 points higher (about one-half of a standard deviation) relative to borrowers who cash out.[10] This is consistent with the findings of Gerardi et al. (2021) and with the idea that a portion of cash-outs are "involuntary" (i.e., come from homeowners facing financial difficulties, which may already be reflected in their FICO scores).

We restrict our analysis to all borrowers that refinanced their mortgage. We are focused on understanding why borrowers may choose to not cash out *conditional on refinancing*. Since we are not analyzing the refinancing decision, we do not include borrowers that do not refinance their mortgage.

Our policy analysis focuses on borrowers with both student loans and mortgages.[11] First, Figure 2 shows that interest rates on federal student loans are almost always higher than the prevailing 30-year mortgage rate.[12] Furthermore, borrowers are likely to take out mortgages only after they finish school, so borrowers that originated mortgages in the 2010s likely had student loans back in the 2000s. For those borrowers, the 6 percent (or

[8] Mortgages where the refi type is "unknown" are included in the non-cash-out group.

[9] See Appendix Table B.1 for more details.

[10] All references to FICO and credit score herein refer to the credit score at origination from ICE, McDash.

[11] The CRISM data aggregates loan data by type. This means we do not observe individual student loan accounts; we observe only total outstanding student loans.

[12] According to the most recent data for 2024 Q1 from Enterval Analytics (2024), which is the only data cooperative of private student loan providers, there are about $29.26B of refinanced student loans outstanding. As a comparison, there were $1,187.9B in Federal student loans in some form of repayment status (out of a total of $1,620.1B). Therefore, as a share of total outstanding student loans being repaid, privately refinanced student loans accounted for about 2.4% of balances. Historically, the share of private student loans has been relatively constant at around 7% of student loan balances. Similar reports from 2015 and 2019 estimate private student loan balances at 7.2% and 7.8% of total balances, respectively (MeasureOne, 2015, 2019). These older reports do not provide estimates of what share of that is refinanced student loans compared with new originations, but given the similar overall share, these statistics support the fact that there is limited take-up of private student loan refinancing. While some borrowers may opt for a private student loan refi instead of cashing out, we suspect this can account for only a tiny portion of borrowers and do not explicitly account for private student loans in our analysis.

Table 2: Loan characteristics for cash-out and non cash-out refinances

| | All refinances mean/sd | Cash-out mean/sd | No cash-out*, Tappable mean/sd |
|---|---|---|---|
| FICO score at origination | 736.95 | 715.99 | 751.35 |
| | (63.46) | (67.66) | (56.02) |
| 30-year rate at origination | 4.84 | 5.24 | 4.56 |
| | (1.06) | (1.07) | (0.95) |
| Age (years) | 51.18 | 50.25 | 51.81 |
| | (12.35) | (12.41) | (12.27) |
| LTV | 59.47 | 66.55 | 54.61 |
| | (18.07) | (18.24) | (16.26) |
| Student loan balance | 3249.19 | 3556.74 | 3037.69 |
| | (15804.86) | (16116.92) | (15583.11) |
| Has a student loan | 0.11 | 0.13 | 0.10 |
| | (0.32) | (0.33) | (0.30) |
| Has an auto loan | 0.46 | 0.52 | 0.42 |
| | (0.50) | (0.50) | (0.49) |
| Has other debt | 0.48 | 0.56 | 0.43 |
| | (0.50) | (0.50) | (0.49) |
| Has a credit card | 0.85 | 0.85 | 0.85 |
| | (0.36) | (0.36) | (0.36) |
| Has large credit card debt | 0.16 | 0.18 | 0.15 |
| | (0.37) | (0.38) | (0.36) |
| Post-refi mortgage balance | 218355.46 | 221293.57 | 216339.31 |
| | (155440.04) | (145932.58) | (161610.02) |
| $N$ | 11879051 | 4840439 | 7038612 |

Notes: Table reports summary statistics for refinanced mortgages. The sample is composed of all cash-out refis and rate-and-term refis with an LTV of 75% or less. * Unknown cash-out types are classified as "no cash-out." The $N$ value applies to all variables except Post-refi mortgage balance, which is missing for about 0.4% of observations. Large credit card debt indicates that the outstanding card balance is greater than 2% of the pre-refi appraised value. Sources: Authors' calculations based on CRISM.

Figure 2: Average 30-year fixed mortgage rate and federal student loan rates

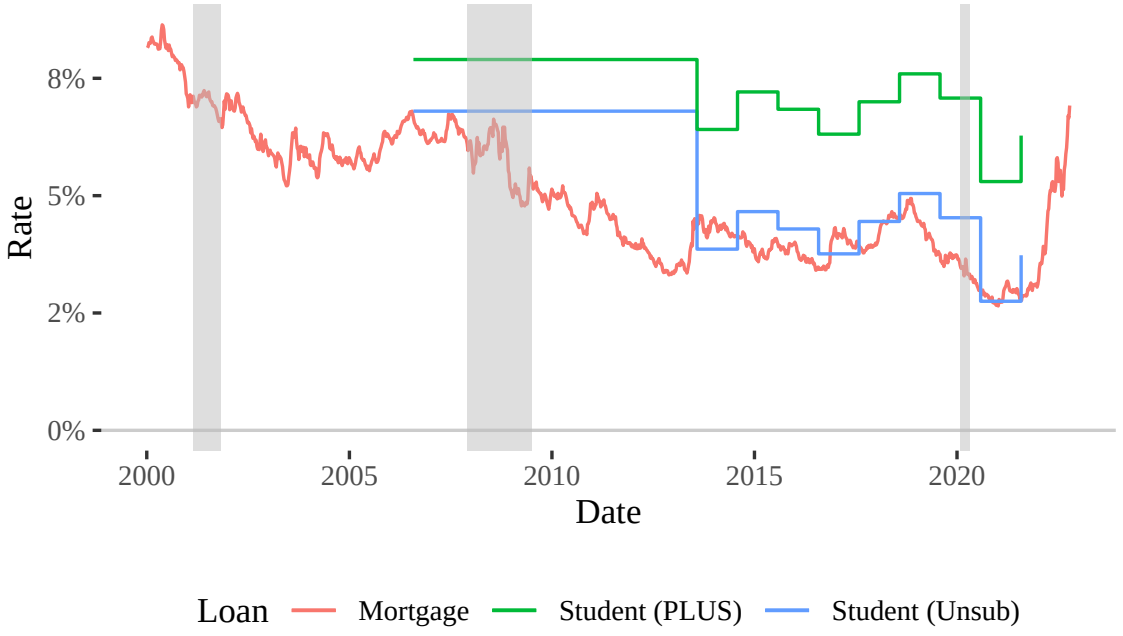



Figure plots average 30-year fixed rate mortgage interest rate as well as interest rates on two main categories of federal student loans. Student loan rate series are fixed rates and start in 2006, as these rates were variable prior to 2006. Shading denotes recessions as determined by the National Bureau of Economic Research (NBER). Sources: Freddie Mac, 30-Year Fixed Rate Mortgage Average in the United States [MORTGAGE30US], retrieved from FRED, Federal Reserve Bank of St. Louis, July 11, 2022; https://fred.stlouisfed.org/series/MORTGAGE30US; SavingForCollege.com; US Department of Education.

higher) interest rate on student loans is almost twice as large as the average mortgage rate.

Student loans are particularly well-suited for our analysis. First, interest rates are set annually by Congress and are the same for all borrowers (i.e., no differences by credit score). Furthermore, student loan debt is difficult to discharge in bankruptcy, so borrowers have little incentive to keep student loans since they will be responsible for paying down the debt even if they declare bankruptcy (i.e., no strategic default motive). Student loans are thus a better setting than other high-interest loans, such as credit card loans. Credit card loans are dischargeable in bankruptcy and not all credit card balances are actual debt (i.e., the borrower pays off their statement each month). Furthermore, there are a range of promotional and balance transfer programs through which borrowers can obtain 0 percent

APR on their credit cards (and auto loans), which is a better rate than they could obtain on their mortgage.

Admittedly, there are several possible (rational) reasons for not using mortgage refinancing to repay student loans. One example is the unsuccessful attempt by the Biden administration to forgive up to $20,000 of student loans. Figure A.1 shows that this policy proposal gained serious clout only during the 2020 primary season, which is outside of our analysis period.[13] We believe that the expectations of outright student loan forgiveness were very low in the years that our analysis focuses on. A somewhat related reason for not shifting from student loans to mortgages is the flexibility of repayment afforded by student loans via various income-based repayment schemes (some of these schemes permit some debt forgiveness at the end, but that outcome is exceedingly infrequent, as documented in National Consumer Law Center (2021)). Based on the eligibility guidelines for income-based repayment programs, given the median student debt balance and a two-person household, only borrowers making less than about $49,000 would benefit from keeping their federal loans.[14] In our data, about 10 percent of mortgage borrowers that refinanced have income low enough to benefit. Unfortunately, we lack data that would enable us to evaluate the importance of this potential explanation. Lastly, there may be a tax benefit to student loans (relative to mortgages) for a subset of borrowers — those who do not itemize deductions and thus do not benefit from mortgage interest tax deductability (claiming interest on student loans does not require itemizing).

[13] There was a spike in search interest around June 2014, but this was likely related to President Obama's announcement of a cap on loan payments at ten percent of income and any remaining balance would be forgiven after 20 years of payments. In our view, that kind of forgiveness is substantially different than the broad forgiveness that has been discussed since 2020.

[14] We calculate this using a conservative framework. The only borrowers that would benefit from keeping the income-based repayment are those that would have a lower monthly payment based on their income than if they reduced their interest rate from 6 percent to 3 percent. The median student loan of a borrower that refinances their mortgage is $16,500, which implies a monthly payment of $183 per month or $2,196 per year. The most generous repayment plans cap monthly payments at 10 percent of "discretionary income" (any income above 150 percent of the federal poverty line. For a two-person household, they would benefit only if their income was less than $49,425. The 10th percentile of joint mortgage applicants who refinance is $49,000, so the benefit of income-based repayment does not apply to the vast majority of our sample (i.e., those with both a mortgage and student loans).

# 4 Analysis of Cashing-Out Behavior

First, we establish that there are differences in debt paydown between borrowers that cash-out compared with those that do not. We compare the change in debt balances for non-mortgage debt between borrowers that opted to cash-out compared with those that did not.[15] Among borrowers that refinanced, we restrict our sample to those that have a particular type of debt (e.g., credit card debt) and examine how their balances change from one month before their refinance to three months after their refinance. We find that borrowers who cash out do pay down a portion of their debt, but the degree of paydown varies by the debt type. While we find practically no difference in auto loan repayment patterns between cash-outs and rate-and-term refis (see Figure 3a), when it comes to credit card debt, we do find a dramatically higher propensity to pay down the debt among cash-out refinancers (see Figure 3b).

To better quantify the relationship between borrowers' debt portfolios and their refinancing choices, we examine cash-out propensity across different types of borrowers using the following regression. We restrict our sample to only borrowers with tappable equity in their home, so a cash-out refinance is a feasible choice:[16]

$$Cashout_{it} = \alpha + \beta_1 LoanPortfolio_{i,t-1} + \beta_2 X_{it} + \lambda_{c(i),t} + \epsilon_{it}, \tag{1}$$

where $Cashout$ indicates whether borrower $i$, who refinanced in quarter $t$, chose to cash out. $LoanPortfolio$ is either just a vector of indicators of the loan types held by borrower $i$ in the previous quarter $t-1$ or also includes the magnitudes of these debts relative to the pre-refi appraised value of the house.[17] $X$ is a vector of other covariates including credit score, age (based on birth year), and age squared. $\lambda$ controls for county-quarter fixed effects. Table 3 shows that borrowers that hold student loans, auto loans, or other consumer finance loans are 2 to 5 percentage points more likely to do a cash-out refinance compared with borrowers without these additional loans. This is compared with a mean

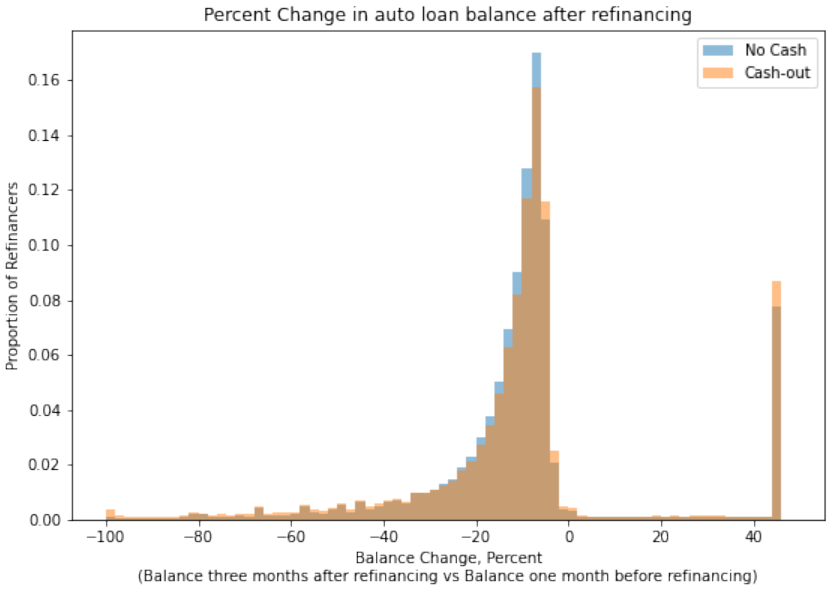
[15] Bhutta and Keys (2016) and Anenberg et al. (2025) also document that equity extraction leads to paydown of non-mortgage debt. Our analysis differs in that we use rate-and-term refinancers as the comparison group and we look at the share of balances paid down, rather than dollar amounts.

[16] We define tappable equity as mortgages with a loan-to-value ratio of less than 75 percent. Following the Great Financial Crisis of 2007-2009, lenders are very reluctant to allow a cash-out for refis that will make the LTV exceed 80 percent.

[17] We use the pre-refi estimates of the house value, since some rate-and-term refis are "streamlined" and proceed without a new appraisal, while that is much less widespread among cash-out refis. The findings are robust to using the latest appraised values (see Table B.4 in the Appendix).

Figure 3: Debt Paydown by Portfolio and Debt Type

(a) Auto Balances




(b) Credit Cards

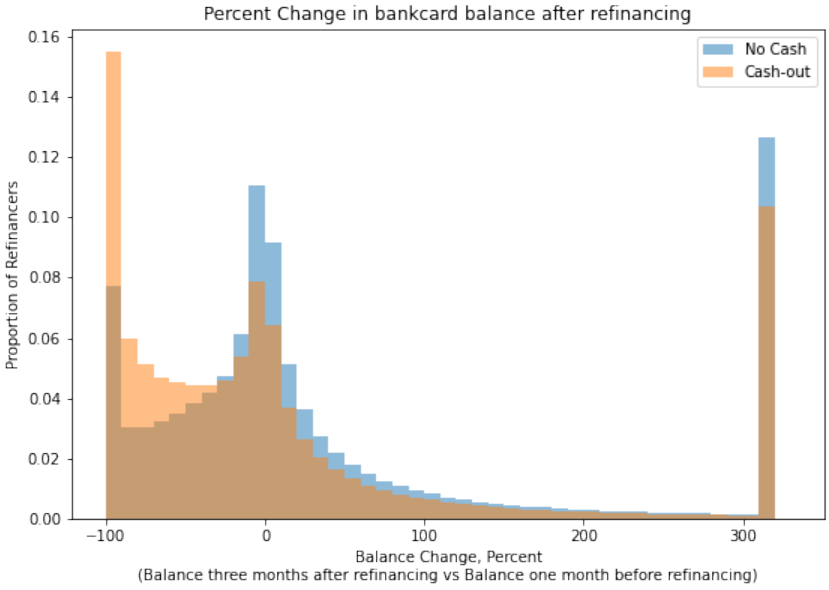



Figure plots the change in respective debt balances from one month prior to a mortgage refinance to three months after a mortgage refinance. Sources: Authors' calculations based on CRISM.

of 41 percent for the overall sample, so this is a statistically and economically significant increase in a borrower's cash-out propensity. The likelihood of cashing out falls with credit score. Overall, borrowers that hold other higher-interest debt are more likely to cash out than borrowers without other high-interest debt, but a large portion of them are still not cashing out though it would potentially be financially advantageous to do so.

As we discussed above, a portion of borrowers that cash out do so because of urgent liquidity needs. This category of borrowers do not even consider a rate-and-term refinance and are insensitive to both the interest rates and the composition of their debt portfolio. As a result, such liquidity-desperate borrowers are over-represented among refinancers during high-interest periods. In order to account for this group of borrowers, we further restrict our sample to borrowers that we identify as being "in-the-money" in that their new interest rate is lower than the interest rate on their old mortgage. The results for this in-the-money subsample are reported in column (3) of Table 3. The coefficients are slightly larger than those for the overall sample, even as the sample average rate of cash-out is (unsurprisingly) lower.[18] However, the difference in the size of the coefficients is due mostly to the sample selection (of borrowers for whom we observe both the pre- and the post-refi mortgages) and not to the in-the-money criterion, as can be seen from column (2) in Table 3.

We then examine whether the size of the higher-interest debts is important for the probability of cash-out decision, in addition to the indicators for simply having these debts. In Columns (4) and (5) of Table 3, we include the sizes of other debts relative to the pre-refi appraised value of the house. The basic idea is that larger high-interest debts encourage more cashing out because the interest savings would loom larger. Generally, we see evidence that the propensity to cash out is increasing along the intensive margin of high-interest debt as well (with the exception of "other" debts, which encompass a range of less common debt types).[19]

[18]The sample in column (3) is distinct from the one in column (1) not just in restricting to in-the-money refis but also in that we are able to "match" the refinanced mortgage to the previous mortgage for the same house (meaning that both mortgages are reported to ICE, McDash) and observe the interest rate for the previous mortgage. Column (2) in Table 3 reports the results of repeating the regression in column (1) on this "matched" sample. The same sample selection procedure applies to column (4).

[19]Since credit cards function as both means of payment and means of borrowing and our measure of credit card debt includes both transactional and revolving balances, we have replicated our analysis with an alternative definition of credit card debt meant to focus on borrowers with revolving balances. Since we cannot separate revolving balances from transactional ones in our data, we focus on borrowers whose card balances are so large that they are unlikely to be purely transactional. Specifically, we redefine credit card borrowing as having reported bankcard balances greater than 2% of the appraised value of the house, and replicate our analysis. The results reported in Table B.5 in the Appendix confirm the robustness of

Table 3: Regression of cash-out indicator on lagged debt indicators and debt measures

| | (1) cash-out | (2) cash-out | (3) cash-out | (4) cash-out | (5) cash-out |
|---|---|---|---|---|---|
| Lag student loan=1 | 0.0246*** | 0.0292*** | 0.0301*** | 0.0241*** | 0.0241*** |
| | (0.0004) | (0.0006) | (0.0007) | (0.0009) | (0.0010) |
| Lag auto loan=1 | 0.0324*** | 0.0404*** | 0.0395*** | 0.0284*** | 0.0271*** |
| | (0.0003) | (0.0004) | (0.0004) | (0.0017) | (0.0019) |
| Lag other loan=1 | 0.0448*** | 0.0503*** | 0.0503*** | 0.0524*** | 0.0523*** |
| | (0.0003) | (0.0004) | (0.0004) | (0.0008) | (0.0007) |
| Lag credit card=1 | 0.0180*** | 0.0255*** | 0.0229*** | 0.0207*** | 0.0182*** |
| | (0.0004) | (0.0005) | (0.0006) | (0.0013) | (0.0011) |
| Student loan debt / appr. val. | | | | 0.0379*** | 0.0453*** |
| | | | | (0.0065) | (0.0072) |
| Auto debt / appr. val. | | | | 0.1549*** | 0.1670*** |
| | | | | (0.0228) | (0.0258) |
| Other debt / appr. val. | | | | -0.1723*** | -0.1866*** |
| | | | | (0.0257) | (0.0290) |
| Card debt / appr. val. | | | | 0.1391*** | 0.1411*** |
| | | | | (0.0318) | (0.0284) |
| Age | -0.0003*** | -0.0003** | 0.0014*** | -0.0003** | 0.0013*** |
| | (0.0001) | (0.0001) | (0.0001) | (0.0001) | (0.0001) |
| Age squared | 0.0000*** | 0.0000*** | -0.0000*** | 0.0000*** | -0.0000*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Credit score | -0.0010*** | -0.0007*** | -0.0007*** | -0.0007*** | -0.0006*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| County x Quarter FEs | Yes | Yes | Yes | Yes | Yes |
| Observations | 11859722 | 5425221 | 4599040 | 5375044 | 4557612 |
| $R^2$ | 0.203 | 0.211 | 0.161 | 0.212 | 0.162 |
| Dependent variable mean | 0.41 | 0.33 | 0.27 | 0.33 | 0.27 |
| Dependent variable SD | 0.49 | 0.47 | 0.44 | 0.47 | 0.44 |
| Sample | Full | Matched | Rate Decrease | Matched | Rate Decrease |

Standard errors are heteroskedasticity robust.
Appraised value is measured before refinancing. Credit score is measured at refi origination.
"Matched" means that the pre-refi mortgage can be matched to the refinanced mortgage.
Source: Authors' calculations based on Equifax Credit Risk Insight Servicing McDash (CRISM)
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Turning to the intensive margin of the cash-out decision, we restrict the sample to only those who cash out and modify the dependent variable in regression equation (1) to be the magnitude of the cash-out relative to the pre-refi appraised value of the home (winsorized at 99th percentile level). Columns (1) and (2) of Table 4 show that there is no economically significant relationship between the amount of cash-out and an indicator for whether or not a borrower has a particular kind of debt. However, columns (3) and (4) show that when we include the debt as a share of the home's appraised value, the magnitude of cash-out is higher for borrowers with larger student loans and credit card balances, but not so for auto or other debt types. This is true for both the overall sample and the "in-the-money" borrowers.[20]

To summarize, while we find substantial differences in debt paydowns between cash-out and rate-and-term refinancers, these differences are largely accounted for by a range of observable covariates. We find that both the propensity to cash out and the intensity of cash-out are significantly affected by the presence and amount of higher-interest loans, especially revolving credit card debt.

# 5 The Effect of Eliminating the Cash-Out Surcharge

In November 2, 2016, Fannie Mae entered into a pilot program with SoFi to roll out their new "Student Loan Payoff ReFi" product, which allowed borrowers who refinanced their mortgage to also extract equity ("cash out") and pay off their student loans. Typically, a cash-out refi generates additional fees, but Fannie Mae waived those fees if the cash-out was used to pay down student loans.[21] In order to qualify, the cash-out funds have to be used to repay a student loan.[22] This program was then made available to all mortgage lenders that securitize with Fannie Mae on April 25, 2017, with the goal of providing borrowers a "cost-effective alternative to use existing home equity to pay off student loan debt..., potentially

our findings. Notably, the loading on the coefficients on bankcard debt is shifted from the intensive to the extensive margin.

[20] The results are almost identical if we use the alternative definition of credit card debt discussed above — see Table B.6 in the Appendix.

[21] See "SoFi and Fannie Mae give homeowners a smart way to reduce student debt" press release available at https://www.sofi.com/press/sofi-fannie-mae-give-homeowners-smart-way-reduce-student-debt/

[22] In addition to repaying the student loan, "the borrower may receive cash back in the amount that is not more than the lesser of 2% of the new refinance loan amount or $2,000" (see Fannie Mae's Selling Guide section B2-1.3-03).

Table 4: Regression of cash-out amount on lagged debt indicators and debt measures

| | (1) cash-out % value | (2) cash-out % value | (3) cash-out % value | (4) cash-out % value |
|---|---|---|---|---|
| Lag student loan=1 | 0.0039*** | 0.0053*** | -0.0208*** | -0.0194*** |
| | (0.0005) | (0.0006) | (0.0037) | (0.0047) |
| Lag auto loan=1 | -0.0007** | -0.0009** | -0.0029 | -0.0022 |
| | (0.0004) | (0.0004) | (0.0037) | (0.0049) |
| Lag other loan=1 | 0.0000 | 0.0021*** | -0.0058*** | -0.0035*** |
| | (0.0004) | (0.0004) | (0.0012) | (0.0013) |
| Lag credit card=1 | 0.0078*** | 0.0081*** | -0.0293*** | -0.0278*** |
| | (0.0005) | (0.0006) | (0.0025) | (0.0033) |
| Student loan debt / appr. val. | | | 0.1685*** | 0.1703*** |
| | | | (0.0300) | (0.0382) |
| Auto debt / appr. val. | | | 0.0250 | 0.0187 |
| | | | (0.0403) | (0.0560) |
| Other debt / appr. val. | | | -0.0355 | -0.0414 |
| | | | (0.0510) | (0.0673) |
| Card debt / appr. val. | | | 0.7063*** | 0.7130*** |
| | | | (0.0474) | (0.0669) |
| Age | 0.0067*** | 0.0072*** | 0.0055*** | 0.0061*** |
| | (0.0001) | (0.0001) | (0.0001) | (0.0001) |
| Age squared | -0.0001*** | -0.0001*** | -0.0000*** | -0.0001*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Credit score | -0.0001*** | -0.0002*** | 0.0000 | -0.0000 |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| County x Quarter FEs | Yes | Yes | Yes | Yes |
| Observations | 1676568 | 1168570 | 1676568 | 1168570 |
| $R^2$ | 0.145 | 0.150 | 0.198 | 0.205 |
| Dependent variable mean | 0.26 | 0.24 | 0.26 | 0.24 |
| Dependent variable SD | 0.22 | 0.22 | 0.22 | 0.22 |
| Sample | Matched | Rate Decrease | Matched | Rate Decrease |

Standard errors are heteroskedasticity robust.
Appraised value is measured before refinancing. Credit score is measured at refi origination.
"Matched" means that the pre-refi mortgage can be matched to the refinanced mortgage.
Source: Authors' calculations based on Equifax Credit Risk Insight Servicing McDash (CRISM)
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

reducing their monthly debt payments."[23] Based on our review of all announcements, letters, and notices published by Fannie Mae and Freddie Mac between 2016-2018, there were no other significant programs that directly affected refinancing. We use a difference-in-difference specification to assess whether eliminating the cash-out surcharge increased the likelihood that borrowers would cash out.

$$\begin{aligned} Cashout_{it} = \alpha + \beta_1 PostFannie_{it} + \beta_2 StudentLoan_{i,t-1} + \\ \beta_3 PostFannie_{it} \times StudentLoan_{i,t-1} + \\ \beta_4 LoanPortfolio_{i,t-1} + \beta_5 X_{it} + \lambda_{c(i),t} + \epsilon_{it}, \end{aligned} \tag{2}$$

where $PostFannie$ indicates a time period after the introduction of Fannie's student loan cash-out refi program (after Nov. 2, 2016).[24] $StudentLoan$ indicates whether borrower $i$ had a student loan in the previous quarter $t-1$. $LoanPortfolio$ is a vector of indicators for whether borrower $i$ held other kinds of debt in the previous quarter. $X$ is a vector of other covariates including credit score, age (based on birth year), and age squared. $\lambda_{c(i),t}$ is a county-quarter fixed effect to control for time and geography. We focus on a four-year time window around the policy change, so our data spans 2015:Q1 to 2018:Q4. The coefficient of interest is $\beta_3$. If the cash-out surcharge is a major obstacle to debt rebalancing, then we would expect that the program encouraged cash-outs and $\beta_3$ to be positive.

The results are reported in Table 5. The regression on the full sample, reported in Column 1, shows a statistically significant but economically rather small differential effect of policy — the increase in the cash-out rate of borrowers with student loans was only 1.5 percentage points higher than that of borrowers without student loans after the policy went into effect. This initial regression specification assumes that all borrowers were eligible for or had access to the surcharge-free cash-out following the Fannie Mae refi program reform. The regression reported in Column 2 restricts the sample to only those borrowers who we know were eligible — those whose refinanced mortgages were securitized with Fannie Mae. The slightly larger point estimate of the differential policy effect is still small relative to the average cash-out rate of 31-32%. Columns 3 and 4 report the same analysis, but only on the "in-the-money" refis (where the new interest rate is lower than the old interest

[23] See Announcement SEL-2017-04 from Fannie Mae available at https://singlefamily.fanniemae.com/media/20191/display. The messaging associated with this new program was added to Fannie Mae's Desktop Underwriter software on July 29, 2017. See SEL-2017-06 from Fannie Mae available at https://singlefamily.fanniemae.com/media/4741/display.

[24] Results are robust to using April 2017 as the policy date.

Table 5: DD-style regressions of cash-out indicator on post Fannie Mae-Cash-out program indicator:

| | (1) cash-out | (2) cash-out | (3) cash-out | (4) cash-out |
|---|---|---|---|---|
| Lag student loan=1 | 0.0271*** | 0.0200*** | 0.0305*** | 0.0184*** |
| | (0.0020) | (0.0025) | (0.0026) | (0.0033) |
| Post Fannie program=1 × Lag student loan=1 | 0.0150*** | 0.0203*** | 0.0093* | 0.0140* |
| | (0.0033) | (0.0042) | (0.0056) | (0.0074) |
| Credit score | -0.0001*** | -0.0002*** | 0.0001*** | -0.0001*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Age | -0.0015*** | -0.0027*** | 0.0044*** | 0.0022*** |
| | (0.0003) | (0.0004) | (0.0004) | (0.0006) |
| Age squared | 0.0000*** | 0.0000*** | -0.0000*** | -0.0000*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Lag auto loan=1 | 0.0447*** | 0.0417*** | 0.0406*** | 0.0329*** |
| | (0.0011) | (0.0015) | (0.0016) | (0.0021) |
| Lag credit card=1 | 0.0452*** | 0.0413*** | 0.0385*** | 0.0312*** |
| | (0.0015) | (0.0020) | (0.0021) | (0.0028) |
| Lag other loan=1 | 0.0524*** | 0.0474*** | 0.0472*** | 0.0345*** |
| | (0.0011) | (0.0015) | (0.0016) | (0.0021) |
| Quarter x County FEs | Yes | Yes | Yes | Yes |
| Observations | 673099 | 361146 | 283522 | 142923 |
| $R^2$ | 0.173 | 0.239 | 0.145 | 0.217 |
| Dependent variable mean | 0.32 | 0.31 | 0.23 | 0.20 |
| Sample | Full | Fannie Full | Rate Decrease | Fannie Rate Decrease |

Standard errors are clustered at the borrower level. Inclusion in the sample is conditional on having tappable equity.
Source: Authors' calculations based on Equifax Credit Risk Insight Servicing McDash (CRISM).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

rate).[25] Notably, the policy's differential effect becomes even smaller (and only marginally significant) for this restricted sample. As we show in Table B.7 in the Appendix, controlling for differential effects of other debt types entirely eliminates the significance of student debt in predicting the change in the cash-out propensity as a result of the policy. Using the alternative definition of credit card debt does not alter any of these results (see Tables B.8 and B.9 in the Appendix). These findings are consistent with the analysis of the paydown of student loans before and after the policy implementation. Comparing Figures A.4a and A.4b in the Appendix shows only a small increase in the propensity to pay off student loans post-policy.

One alternative way to address the variation in eligibility of borrowers for the surcharge waiver is to introduce an indicator for Fannie Mae securitized refinances, rather than restricting the sample as in Columns 2 and 4 of Table 5. To better identify the effect of the policy change, we construct a triple-difference specification that also controls for whether or not the refinanced mortgage was actually securitized by Fannie Mae. Equation (3) shows the triple-difference specification.

$$\begin{aligned} Cashout_{it} = \alpha + & \beta_1 PostFannie_{it} + \beta_2 StudentLoan_{i,t-1} + \beta_3 Fannie_{i,t} + \\ & \beta_4 PostFannie_{it} \times StudentLoan_{i,t-1} + \\ & \beta_5 PostFannie_{it} \times Fannie_{i,t-1} + \\ & \beta_6 Fannie_{it} \times StudentLoan_{i,t-1} + \\ & \beta_7 PostFannie_{it} \times StudentLoan_{i,t-1} \times Fannie_{i,t} + \\ & \beta_8 LoanPortfolio_{i,t-1} + \beta_9 X_{it} + \lambda_{c(i),t} + \epsilon_{it}, \end{aligned} \tag{3}$$

where $Fannie$ indicates whether the refinanced mortgage is securitized by Fannie Mae. All other covariates are the same as in Equation (2). $\beta_7$ is our coefficient of interest and estimates the effect of the reform on its target group (i.e., borrowers with student loans and who refinance into a mortgage securitized by Fannie Mae). Table 6 shows that even after controlling for the mortgage securitizer, there is no significant differential effect of the Fannie Mae policy on the cash-out propensity of its target group (refinancers with student loans) after the policy goes into effect. On the other hand, there appears to be a significant increase in cash-out propensity (by 7.5-9 percentage points) of mortgages securitized by Fannie Mae after the policy is implemented, regardless of whether the mortgage holder

[25] Appendix Table B.10 runs the same analysis on the intensive margin of cash-out and finds no significant differences in the amount of equity cashed out for borrowers that chose to cash out.

had a student loan. For borrowers that did not cash out to pay down student loans, the surcharge was still in effect, so these borrowers may have ended up paying slightly higher interest rates on their mortgage than if they had opted for a rate-and-term refinance.[26]

Table 6: Triple-diff regressions of cash-out indicator on post Fannie Mae-Cash-out program-Fannie Mae indicator

| | (1) cash-out | | (2) cash-out | |
|---|---|---|---|---|
| Lag student loan=1 | 0.0281*** | (0.0029) | 0.0346*** | (0.0040) |
| Post Fannie program=1 × Lag student loan=1 | 0.0111** | (0.0051) | 0.0098 | (0.0087) |
| Lag auto loan=1 | 0.0443*** | (0.0011) | 0.0400*** | (0.0016) |
| Lag other loan=1 | 0.0518*** | (0.0011) | 0.0463*** | (0.0016) |
| Lag credit card=1 | 0.0443*** | (0.0015) | 0.0378*** | (0.0021) |
| Fannie flag=1 | -0.0993*** | (0.0013) | -0.1047*** | (0.0018) |
| Credit score | -0.0001*** | (0.0000) | 0.0000*** | (0.0000) |
| Age | -0.0015*** | (0.0003) | 0.0043*** | (0.0004) |
| Age squared | 0.0000*** | (0.0000) | -0.0000*** | (0.0000) |
| Lag student loan=1 × Fannie flag=1 | -0.0026 | (0.0038) | -0.0100** | (0.0051) |
| Post Fannie program=1 × Fannie flag=1 | 0.0927*** | (0.0026) | 0.0745*** | (0.0043) |
| Post Fannie program=1 × Lag student loan=1 × Fannie flag=1 | 0.0071 | (0.0066) | 0.0015 | (0.0112) |
| Quarter x County FEs | Yes | | Yes | |
| Observations | 673099 | | 283522 | |
| $R^2$ | 0.179 | | 0.157 | |
| Dependent variable mean | 0.32 | | 0.23 | |
| Sample | Full | | Rate Decrease | |

Source: Authors' calculations based on Equifax Credit Risk Insight Servicing McDash (CRISM).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

# 6 Conclusion

We find that most borrowers do not convert high-interest debt into low-interest debt even when inertia, most information frictions, and fixed costs are eliminated. We focus on borrowers that have already overcome the inertia and information frictions by considering mortgage borrowers that have already chosen to refinance. Furthermore, we show that lowering (or eliminating) the cost of cashing out does not significantly increase the cash-out propensity of borrowers who would benefit from converting high-interest debts into lower-interest mortgages.

[26] As we show in Tables B.11 through B.13 in the appendix, this finding is robust to using the alternative definition of credit card debt, as well as to controlling for differential effects of other debt types. Additionally, Table B.14 repeats the analysis on the intensive margin of cash-out and finds no significant differences in the amount of equity cashed out for borrowers that chose to cash out.

Future research could examine what other factors may prevent borrowers from optimizing their debt portfolio (whether through the refinancing channel or other avenues). For example, there may be some remaining information frictions, in that borrowers who refinance may not be aware of cash-out options. Additionally, there may still be remaining behavioral biases, such as mental accounting where borrowers may prefer to keep separate debt accounts even though they would be better off treating them in the same way, that prevent borrowers from taking advantage of these opportunities. On the other hand, given that we do find a substantial increase in cashing-out that may be associated with the launch of Fannie Mae's Student Loan Cash-Out Refinance program, it may be the case that a "nudge" encouraging borrowers to take advantage of a cash-out opportunity may be quite effective at increasing cash-out rates. Our research shows that borrowers may not be taking full advantage of opportunities to lower their debt burdens, so finding ways of encouraging take-up of existing options may be an effective way of reducing financial stress for borrowers.

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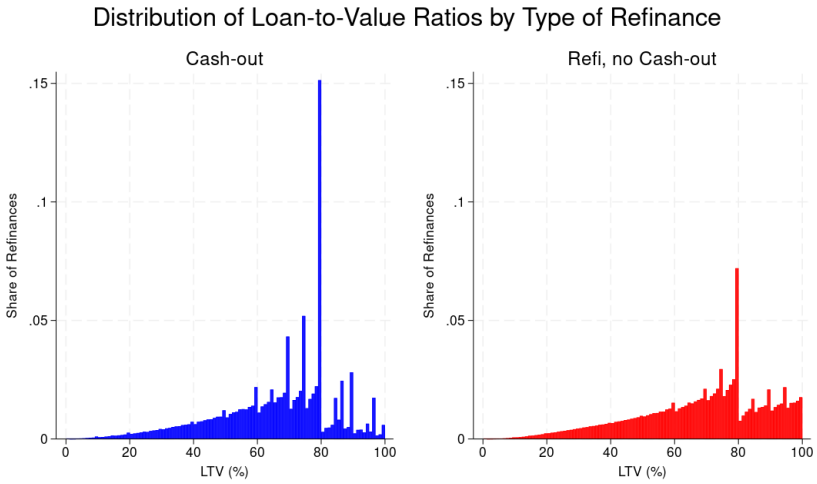
# A Appendix Figures

Figure A.1: Google Searches for "Student Loan Forgiveness"

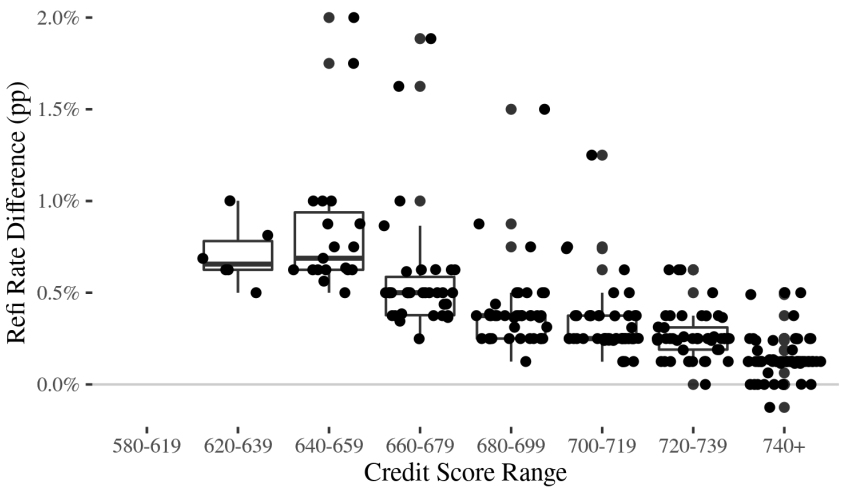

Source: Google Trends. Accessed August 29, 2022.

Figure A.2: Distribution of Loan-to-Value Ratios by Type of Refinance




Sources: Authors' calculations based on CRISM.

Figure A.3: Distribution of Differences Between Cash-out and Non-Cash-out Rates




Source: Data collected by the authors from publicly available quote tools available from Bankrate.com. Accessed September 15, 2021.

# B Appendix Tables

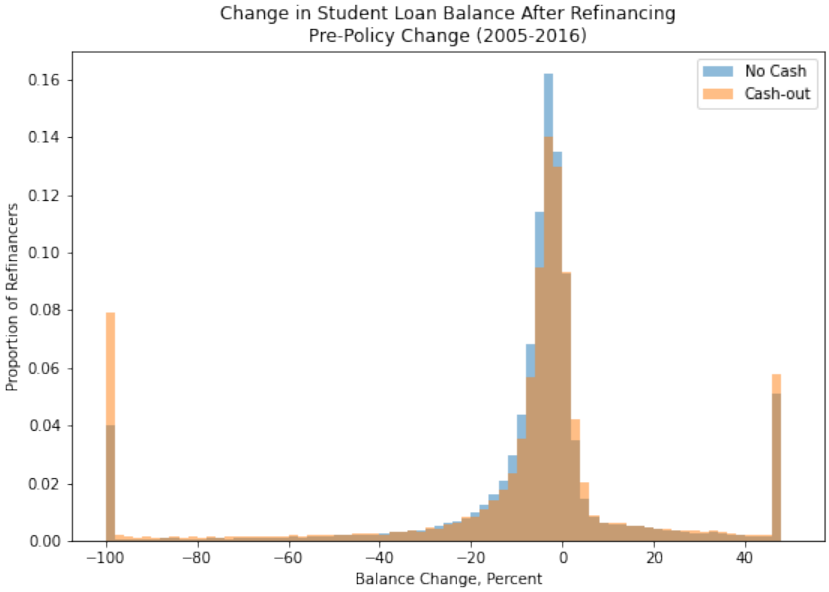
Table B.1: Sample Cleaning Table

| Action | Remaining $N$ |
|---|---|
| Starting refis | 25,534,504 |
| Drop if missing LTV ratio | 24,015,902 |
| Drop if missing FICO score | 21,874,006 |
| Drop if more than one refi | 20,911,164 |
| Drop if more than one mortgage | 17,775,009 |
| Drop if missing age | 17,723,200 |
| Drop if missing student loan balance | 17,500,638 |
| Drop if no tappable equity (LTV-based) | 11,904,177 |
| Drop if missing/invalid zip code | 11,879,051 |
| Drop if not able to match to previous mortgage | 5,347,484 |

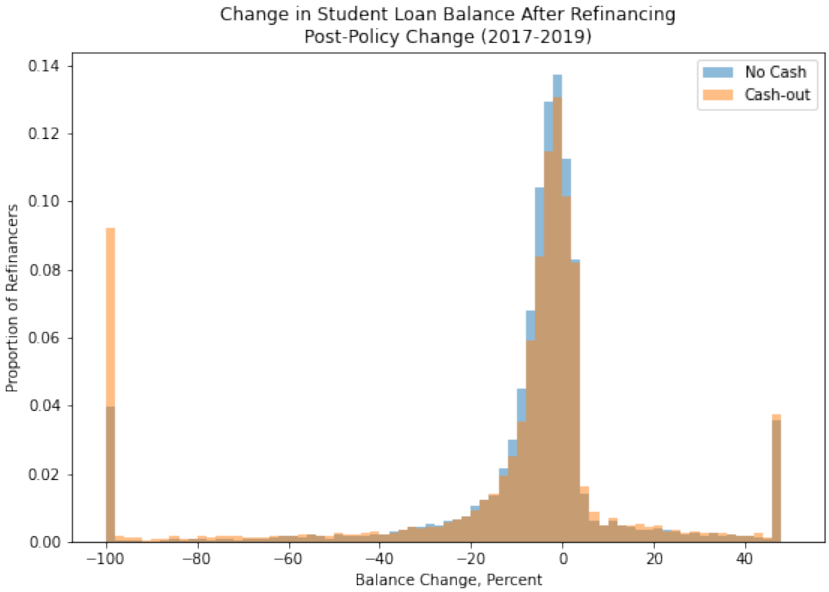
The 11.88 million observations shown above the horizontal line are used in some regressions that do not depend on the amount of tappable equity. The 5.35 million observations in the last row are used in regressions that depend on knowing the amount of tappable equity, change in mortgage balance, or change in interest rate. Source: Authors' calculations based on CRISM.

Figure A.4: Student Loan Paydown by Cash-Out and Pre/Post Policy Change

(a) Pre-Policy




(b) Post-Policy




Note: Figure plots the change in relative student loan balances from one month prior to a mortgage refinance to three months after a mortgage refinance. Sources: Authors' calculations based on CRISM.

Table B.2: How important were the following in your decision to refinance, modify, or obtain a new mortgage?

| Reason | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|
| Change to a fixed-rate loan | 48% | 47% | 46% | 54% | 40% |
| Get a lower interest rate | 91% | 91% | 80% | 74% | 86% |
| Get a lower monthly payment | 74% | 71% | 66% | 63% | 66% |
| Consolidate or pay down other debt | 32% | 30% | 41% | 51% | 41% |
| Repay the loan more quickly | 43% | 42% | 37% | 40% | 34% |
| Take out cash | 22% | 23% | 34% | 39% | 32% |
| Remove private mortgage | NA | NA | NA | NA | 76% |

Source: National Survey of Mortgage Originations Public Use File.

Table B.3: Did you use the money you got from this new mortgage for any of the following?

| Use | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|---|
| College expenses | 6% | 5% | 7% | 7% | 8% | 6% | 4% |
| Auto or other major purchase | 6% | 9% | 8% | 11% | 13% | 10% | 6% |
| Buy out co-borrower | NA | NA | NA | 3% | 3% | 4% | 2% |
| Pay off other bills or debts | 29% | 38% | 43% | 44% | 54% | 45% | 36% |
| Home repairs or new construction | 21% | 27% | 36% | 39% | 45% | 37% | 27% |
| Savings | 10% | 13% | 15% | 16% | 17% | 14% | 13% |
| Closing costs of new mortgage | 48% | 33% | 32% | 35% | 28% | 23% | 20% |
| Business or investment | 5% | 7% | 6% | 6% | 5% | 4% | 4% |
| Did not get money from refinancing | NA | NA | NA | NA | NA | 24% | 39% |

Source: National Survey of Mortgage Originations Public Use File.

Table B.4: OLS regressions of cash-out indicator on lagged debt indicators and debt to equity ratios conditional on tappable equity

| | (1) cash-out | (2) cash-out | (3) cash-out | (4) cash-out | (5) cash-out |
|---|---|---|---|---|---|
| Lag student loan=1 | 0.0246*** | 0.0292*** | 0.0301*** | 0.0281*** | 0.0297*** |
| | (0.0004) | (0.0006) | (0.0007) | (0.0008) | (0.0008) |
| Lag auto loan=1 | 0.0324*** | 0.0404*** | 0.0395*** | 0.0251*** | 0.0256*** |
| | (0.0003) | (0.0004) | (0.0004) | (0.0005) | (0.0005) |
| Lag other loan=1 | 0.0448*** | 0.0503*** | 0.0503*** | 0.0365*** | 0.0368*** |
| | (0.0003) | (0.0004) | (0.0004) | (0.0004) | (0.0004) |
| Lag Bankcard balance=1 | 0.0180*** | 0.0255*** | 0.0229*** | 0.0026*** | 0.0011* |
| | (0.0004) | (0.0005) | (0.0006) | (0.0005) | (0.0006) |
| Student Loan Debt / Post-Refi Appraisal Value | | | | -0.0212*** | -0.0288*** |
| | | | | (0.0049) | (0.0053) |
| Auto Debt / Post-Refi Appraisal Value | | | | 0.2097*** | 0.1908*** |
| | | | | (0.0044) | (0.0048) |
| Other Debt / Post-Refi Appraisal Value | | | | 0.3576*** | 0.3672*** |
| | | | | (0.0065) | (0.0073) |
| Card Debt / Post-Refi Appraisal Value | | | | 0.7447*** | 0.7371*** |
| | | | | (0.0049) | (0.0054) |
| Age | -0.0003*** | -0.0003** | 0.0014*** | -0.0011*** | 0.0006*** |
| | (0.0001) | (0.0001) | (0.0001) | (0.0001) | (0.0001) |
| Age squared | 0.0000*** | 0.0000*** | -0.0000*** | 0.0000*** | -0.0000*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Credit score | -0.0010*** | -0.0007*** | -0.0007*** | -0.0006*** | -0.0005*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| County x Quarter FEs | Yes | Yes | Yes | Yes | Yes |
| Observations | 11859724 | 5425223 | 4599040 | 5425178 | 4599010 |
| $R^2$ | 0.203 | 0.211 | 0.161 | 0.217 | 0.167 |
| Dependent variable mean | 0.41 | 0.33 | 0.27 | 0.33 | 0.27 |
| Dependent variable SD | 0.49 | 0.47 | 0.44 | 0.47 | 0.44 |
| Sample | Full | Pre-Post Matched | Rate Decrease | Pre-Post Matched | Rate Decrease |

Standard errors are heteroskedasticity robust. Source: Authors' calculations based on Equifax Credit Risk Insight Servicing McDash (CRISM).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.5: Regression of cash-out indicator on lagged debt indicators and debt measures

| | (1) cash-out | (2) cash-out | (3) cash-out | (4) cash-out | (5) cash-out |
|---|---|---|---|---|---|
| Lag student loan=1 | 0.0236*** | 0.0237*** | 0.0243*** | 0.0199*** | 0.0199*** |
| | (0.0004) | (0.0006) | (0.0007) | (0.0009) | (0.0009) |
| Lag auto loan=1 | 0.0318*** | 0.0361*** | 0.0351*** | 0.0301*** | 0.0291*** |
| | (0.0003) | (0.0004) | (0.0004) | (0.0011) | (0.0011) |
| Lag other loan=1 | 0.0435*** | 0.0411*** | 0.0408*** | 0.0417*** | 0.0415*** |
| | (0.0003) | (0.0004) | (0.0004) | (0.0006) | (0.0006) |
| Lag large card debt=1 | 0.0398*** | 0.0902*** | 0.0924*** | 0.0888*** | 0.0911*** |
| | (0.0004) | (0.0004) | (0.0005) | (0.0009) | (0.0008) |
| Student loan debt / appr. val. | | | | 0.0309*** | 0.0370*** |
| | | | | (0.0056) | (0.0057) |
| Auto debt / appr. val. | | | | 0.0791*** | 0.0815*** |
| | | | | (0.0137) | (0.0141) |
| Other debt / appr. val. | | | | -0.0619*** | -0.0678*** |
| | | | | (0.0184) | (0.0182) |
| Excess card debt / appr. val. | | | | 0.0496*** | 0.0503*** |
| | | | | (0.0151) | (0.0135) |
| Age | -0.0006*** | -0.0014*** | 0.0002 | -0.0014*** | 0.0001 |
| | (0.0001) | (0.0001) | (0.0001) | (0.0001) | (0.0001) |
| Age squared | 0.0000*** | 0.0000*** | -0.0000 | 0.0000*** | -0.0000 |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Credit score | -0.0010*** | -0.0005*** | -0.0005*** | -0.0005*** | -0.0004*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| County x Quarter FEs | Yes | Yes | Yes | Yes | Yes |
| Observations | 11859722 | 5425221 | 4599040 | 5375044 | 4557612 |
| $R^2$ | 0.203 | 0.218 | 0.169 | 0.218 | 0.169 |
| Dependent variable mean | 0.41 | 0.33 | 0.27 | 0.33 | 0.27 |
| Dependent variable SD | 0.49 | 0.47 | 0.44 | 0.47 | 0.44 |
| Sample | Full | Matched | Rate Decrease | Matched | Rate Decrease |

Standard errors are heteroskedasticity robust.
Appraised value is measured before refinancing. Credit score is measured at refi origination.
Excess card debt is defined as credit card balances in excess of 2% of the home's pre-refi appraised value.
Source: Authors' calculations based on Equifax Credit Risk Insight Servicing McDash (CRISM).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.6: Regression of cash-out amount on lagged debt indicators and debt measures

| | (1) cash-out % value | (2) cash-out % value | (3) cash-out % value | (4) cash-out % value |
|---|---|---|---|---|
| Lag student loan=1 | 0.0011** | 0.0024*** | -0.0214*** | -0.0202*** |
| | (0.0005) | (0.0006) | (0.0037) | (0.0047) |
| Lag auto loan=1 | -0.0028*** | -0.0029*** | -0.0037 | -0.0034 |
| | (0.0003) | (0.0004) | (0.0033) | (0.0043) |
| Lag other loan=1 | -0.0061*** | -0.0043*** | -0.0071*** | -0.0050*** |
| | (0.0004) | (0.0004) | (0.0014) | (0.0015) |
| Lag large card debt=1 | 0.0522*** | 0.0559*** | 0.0095*** | 0.0147*** |
| | (0.0004) | (0.0004) | (0.0036) | (0.0049) |
| Student loan debt / appr. val. | | | 0.1695*** | 0.1713*** |
| | | | (0.0299) | (0.0380) |
| Auto debt / appr. val. | | | 0.0291 | 0.0252 |
| | | | (0.0379) | (0.0512) |
| Other debt / appr. val. | | | -0.0378 | -0.0455 |
| | | | (0.0493) | (0.0630) |
| Excess card debt / appr. val. | | | 0.6778*** | 0.6687*** |
| | | | (0.0580) | (0.0798) |
| Age | 0.0060*** | 0.0065*** | 0.0054*** | 0.0060*** |
| | (0.0001) | (0.0001) | (0.0001) | (0.0001) |
| Age squared | -0.0001*** | -0.0001*** | -0.0000*** | -0.0001*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Credit score | -0.0001*** | -0.0001*** | -0.0000 | -0.0000*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| County x Quarter FEs | Yes | Yes | Yes | Yes |
| Observations | 1676568 | 1168570 | 1676568 | 1168570 |
| $R^2$ | 0.157 | 0.163 | 0.197 | 0.203 |
| Dependent variable mean | 0.26 | 0.24 | 0.26 | 0.24 |
| Dependent variable SD | 0.22 | 0.22 | 0.22 | 0.22 |
| Sample | Matched | Rate Decrease | Matched | Rate Decrease |

Standard errors are heteroskedasticity robust.
Appraised value is measured before refinancing. Credit score is measured at refi origination.
Excess card debt is defined as credit card balances in excess of 2% of the home's pre-refi appraised value.
Source: Authors' calculations based on Equifax Credit Risk Insight Servicing McDash (CRISM).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.7: DD-style regressions of cash-out indicator on post Fannie Mae-Cash-out program indicator:

| | (1) cash-out | (2) cash-out | (3) cash-out | (4) cash-out |
|---|---|---|---|---|
| Lag student loan=1 | 0.0298*** | 0.0239*** | 0.0323*** | 0.0211*** |
| | (0.0020) | (0.0025) | (0.0026) | (0.0033) |
| Post Fannie program=1 × Lag student loan=1 | 0.0080** | 0.0114*** | 0.0027 | 0.0058 |
| | (0.0033) | (0.0042) | (0.0056) | (0.0074) |
| Post Fannie program=1 × Lag auto loan=1 | 0.0304*** | 0.0391*** | 0.0280*** | 0.0391*** |
| | (0.0024) | (0.0031) | (0.0040) | (0.0052) |
| Lag auto loan=1 | 0.0328*** | 0.0244*** | 0.0330*** | 0.0207*** |
| | (0.0013) | (0.0017) | (0.0017) | (0.0021) |
| Post Fannie program=1 × Lag other loan=1 | 0.0381*** | 0.0487*** | 0.0322*** | 0.0405*** |
| | (0.0024) | (0.0031) | (0.0040) | (0.0053) |
| Lag other loan=1 | 0.0372*** | 0.0257*** | 0.0383*** | 0.0216*** |
| | (0.0013) | (0.0017) | (0.0018) | (0.0022) |
| Post Fannie program=1 × Lag credit card=1 | 0.0404*** | 0.0484*** | 0.0448*** | 0.0518*** |
| | (0.0033) | (0.0042) | (0.0054) | (0.0070) |
| Lag credit card=1 | 0.0294*** | 0.0204*** | 0.0260*** | 0.0145*** |
| | (0.0017) | (0.0022) | (0.0023) | (0.0028) |
| Credit score | -0.0001*** | -0.0002*** | 0.0001*** | -0.0001*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Age | -0.0016*** | -0.0028*** | 0.0044*** | 0.0022*** |
| | (0.0003) | (0.0004) | (0.0004) | (0.0006) |
| Age squared | 0.0000*** | 0.0000*** | -0.0000*** | -0.0000*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Quarter x County FEs | Yes | Yes | Yes | Yes |
| Observations | 673099 | 361146 | 283522 | 142923 |
| $R^2$ | 0.174 | 0.241 | 0.146 | 0.218 |
| Dependent variable mean | 0.32 | 0.31 | 0.23 | 0.20 |
| Sample | Full | Fannie Full | Rate Decrease | Fannie Rate Decrease |

Standard errors are clustered at the borrower level. Inclusion in the sample is conditional on having tappable equity.
Source: Authors' calculations based on Equifax Credit Risk Insight Servicing McDash (CRISM).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.8: DD-style regressions of cash-out indicator on post Fannie Mae-Cash-out program indicator:

| | (1) cash-out | (2) cash-out | (3) cash-out | (4) cash-out |
|---|---|---|---|---|
| Lag student loan=1 | 0.0257*** | 0.0194*** | 0.0250*** | 0.0141*** |
| | (0.0020) | (0.0025) | (0.0026) | (0.0033) |
| Post Fannie program=1 × Lag student loan=1 | 0.0154*** | 0.0205*** | 0.0105* | 0.0148** |
| | (0.0033) | (0.0042) | (0.0056) | (0.0073) |
| Credit score | -0.0000 | -0.0001*** | 0.0003*** | 0.0001*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Age | -0.0020*** | -0.0030*** | 0.0032*** | 0.0013** |
| | (0.0003) | (0.0004) | (0.0004) | (0.0006) |
| Age squared | 0.0000*** | 0.0000*** | -0.0000*** | -0.0000*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Lag auto loan=1 | 0.0444*** | 0.0418*** | 0.0368*** | 0.0300*** |
| | (0.0011) | (0.0015) | (0.0016) | (0.0021) |
| Lag revolving card=1 | 0.0570*** | 0.0410*** | 0.0943*** | 0.0723*** |
| | (0.0014) | (0.0018) | (0.0018) | (0.0023) |
| Lag other loan=1 | 0.0513*** | 0.0475*** | 0.0374*** | 0.0272*** |
| | (0.0011) | (0.0015) | (0.0016) | (0.0022) |
| Quarter x County FEs | Yes | Yes | Yes | Yes |
| Observations | 673099 | 361146 | 283522 | 142923 |
| $R^2$ | 0.174 | 0.240 | 0.154 | 0.222 |
| Dependent variable mean | 0.32 | 0.31 | 0.23 | 0.20 |
| Sample | Full | Fannie Full | Rate Decrease | Fannie Rate Decrease |

Standard errors are clustered at the borrower level. Inclusion in the sample is conditional on having tappable equity.
Source: Authors' calculations based on Equifax Credit Risk Insight Servicing McDash (CRISM).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.9: DD-style regressions of cash-out indicator on post Fannie Mae-Cash-out program indicator:

| | (1) cash-out | (2) cash-out | (3) cash-out | (4) cash-out |
|---|---|---|---|---|
| Lag student loan=1 | 0.0296*** | 0.0249*** | 0.0284*** | 0.0194*** |
| | (0.0020) | (0.0025) | (0.0026) | (0.0033) |
| Post Fannie program=1 × Lag student loan=1 | 0.0059* | 0.0081* | -0.0011 | -0.0010 |
| | (0.0033) | (0.0042) | (0.0056) | (0.0073) |
| Post Fannie program=1 × Lag auto loan=1 | 0.0292*** | 0.0373*** | 0.0249*** | 0.0345*** |
| | (0.0024) | (0.0031) | (0.0040) | (0.0052) |
| Lag auto loan=1 | 0.0330*** | 0.0253*** | 0.0301*** | 0.0193*** |
| | (0.0013) | (0.0017) | (0.0017) | (0.0021) |
| Post Fannie program=1 × Lag other loan=1 | 0.0343*** | 0.0430*** | 0.0225*** | 0.0263*** |
| | (0.0024) | (0.0031) | (0.0040) | (0.0053) |
| Lag other loan=1 | 0.0376*** | 0.0282*** | 0.0312*** | 0.0187*** |
| | (0.0013) | (0.0017) | (0.0018) | (0.0022) |
| Post Fannie program=1 × Lag revolving card=1 | 0.0662*** | 0.0899*** | 0.0694*** | 0.0981*** |
| | (0.0028) | (0.0037) | (0.0042) | (0.0055) |
| Lag revolving card=1 | 0.0301*** | -0.0007 | 0.0745*** | 0.0401*** |
| | (0.0017) | (0.0021) | (0.0019) | (0.0024) |
| Credit score | -0.0000** | -0.0001*** | 0.0002*** | 0.0001*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Age | -0.0020*** | -0.0030*** | 0.0033*** | 0.0015** |
| | (0.0003) | (0.0004) | (0.0004) | (0.0006) |
| Age squared | 0.0000*** | 0.0000*** | -0.0000*** | -0.0000*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Quarter x County FEs | Yes | Yes | Yes | Yes |
| Observations | 673099 | 361146 | 283522 | 142923 |
| $R^2$ | 0.176 | 0.242 | 0.156 | 0.226 |
| Dependent variable mean | 0.32 | 0.31 | 0.23 | 0.20 |

Standard errors are clustered at the borrower level. Inclusion in the sample is conditional on having tappable equity.
Source: Authors' calculations based on Equifax Credit Risk Insight Servicing McDash (CRISM).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.10: DD-style regressions of cash-out as a percent of pre-refinance appraisal value on post Fannie Mae-Cash-out program indicator, conditional on cashing out

| | (1) cash-out % value | (2) cash-out % value | (3) cash-out % value | (4) cash-out % value |
|---|---|---|---|---|
| Lag student loan=1 | 0.0034 | 0.0037 | 0.0027 | 0.0002 |
| | (0.0029) | (0.0057) | (0.0034) | (0.0068) |
| Post Fannie program=1 × Lag student loan=1 | -0.0062* | -0.0060 | 0.0004 | 0.0061 |
| | (0.0037) | (0.0064) | (0.0049) | (0.0085) |
| Credit score | -0.0002*** | -0.0002*** | -0.0003*** | -0.0003*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Age | 0.0066*** | 0.0061*** | 0.0090*** | 0.0102*** |
| | (0.0004) | (0.0006) | (0.0006) | (0.0010) |
| Age squared | -0.0000*** | -0.0000*** | -0.0001*** | -0.0001*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Lag auto loan=1 | -0.0076*** | -0.0054** | -0.0074*** | -0.0049 |
| | (0.0015) | (0.0022) | (0.0020) | (0.0033) |
| Lag credit card=1 | -0.0009 | 0.0003 | -0.0026 | -0.0009 |
| | (0.0022) | (0.0034) | (0.0030) | (0.0050) |
| Lag other loan=1 | -0.0020 | 0.0012 | 0.0005 | 0.0060* |
| | (0.0014) | (0.0022) | (0.0019) | (0.0033) |
| Quarter x County FEs | Yes | Yes | Yes | Yes |
| Observations | 102162 | 48877 | 60957 | 25195 |
| $R^2$ | 0.129 | 0.163 | 0.163 | 0.215 |
| Dependent variable mean | 0.23 | 0.23 | 0.23 | 0.23 |
| Sample | Full | Fannie Full | Rate Decrease | Fannie Rate Decrease |

Standard errors are clustered at the borrower level. Inclusion in the sample is conditional on having done a cash-out refinance. The outcome variable is winsorized at the 1st and 99th percentiles. Source: Authors' calculations based on Equifax Credit Risk Insight Servicing McDash (CRISM).

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.11: Triple-diff regressions of cash-out indicator on post Fannie Mae-Cash-out program-Fannie Mae indicator

| | (1) cash-out | | (2) cash-out | |
|---|---|---|---|---|
| Lag student loan=1 | 0.0294*** | (0.0029) | 0.0341*** | (0.0040) |
| Lag student loan=1 × Fannie flag=1 | 0.0005 | (0.0038) | -0.0052 | (0.0051) |
| Post Fannie program=1 × Lag student loan=1 | 0.0062 | (0.0051) | 0.0045 | (0.0087) |
| Post Fannie program=1 × Lag student loan=1 × Fannie flag=1 | 0.0030 | (0.0066) | -0.0016 | (0.0113) |
| Lag auto loan=1 | 0.0381*** | (0.0020) | 0.0413*** | (0.0026) |
| Lag auto loan=1 × Fannie flag=1 | -0.0119*** | (0.0025) | -0.0186*** | (0.0034) |
| Post Fannie program=1 × Lag auto loan=1 | 0.0206*** | (0.0037) | 0.0193*** | (0.0063) |
| Post Fannie program=1 × Lag auto loan=1 × Fannie flag=1 | 0.0191*** | (0.0048) | 0.0189** | (0.0081) |
| Lag other loan=1 | 0.0466*** | (0.0020) | 0.0511*** | (0.0027) |
| Lag other loan=1 × Fannie flag=1 | -0.0202*** | (0.0026) | -0.0288*** | (0.0034) |
| Post Fannie program=1 × Lag other loan=1 | 0.0273*** | (0.0037) | 0.0278*** | (0.0063) |
| Post Fannie program=1 × Lag other loan=1 × Fannie flag=1 | 0.0220*** | (0.0048) | 0.0141* | (0.0081) |
| Lag credit card=1 | 0.0365*** | (0.0027) | 0.0351*** | (0.0035) |
| Lag credit card=1 × Fannie flag=1 | -0.0169*** | (0.0034) | -0.0206*** | (0.0044) |
| Post Fannie program=1 × Lag credit card=1 | 0.0340*** | (0.0052) | 0.0437*** | (0.0085) |
| Post Fannie program=1 × Lag credit card=1 × Fannie flag=1 | 0.0159** | (0.0066) | 0.0072 | (0.0108) |
| Fannie flag=1 | -0.0706*** | (0.0033) | -0.0660*** | (0.0043) |
| Credit score | -0.0001*** | (0.0000) | 0.0000*** | (0.0000) |
| Age | -0.0015*** | (0.0003) | 0.0044*** | (0.0004) |
| Age squared | 0.0000*** | (0.0000) | -0.0000*** | (0.0000) |
| Post Fannie program=1 × Fannie flag=1 | 0.0601*** | (0.0065) | 0.0542*** | (0.0107) |
| Quarter x County FEs | Yes | | Yes | |
| Observations | 673099 | | 283522 | |
| $R^2$ | 0.181 | | 0.158 | |
| Dependent variable mean | 0.32 | | 0.23 | |
| Sample | Full | | Rate Decrease | |

Standard errors are clustered at the borrower level. Inclusion in the sample is conditional on having tappable equity.
Source: Authors' calculations based on Equifax Credit Risk Insight Servicing McDash (CRISM).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.12: Triple-diff regressions of cash-out indicator on post Fannie Mae-Cash-out program-Fannie Mae indicator

| | (1) cash-out | | (2) cash-out | |
|---|---|---|---|---|
| Lag student loan=1 | 0.0265*** | (0.0029) | 0.0293*** | (0.0039) |
| Post Fannie program=1 × Lag student loan=1 | 0.0118** | (0.0051) | 0.0110 | (0.0086) |
| Lag auto loan=1 | 0.0441*** | (0.0011) | 0.0363*** | (0.0016) |
| Lag other loan=1 | 0.0508*** | (0.0011) | 0.0367*** | (0.0016) |
| Lag revolving card=1 | 0.0548*** | (0.0014) | 0.0930*** | (0.0017) |
| Fannie flag=1 | -0.0985*** | (0.0013) | -0.1037*** | (0.0018) |
| Credit score | -0.0000*** | (0.0000) | 0.0002*** | (0.0000) |
| Age | -0.0020*** | (0.0003) | 0.0032*** | (0.0004) |
| Age squared | 0.0000*** | (0.0000) | -0.0000*** | (0.0000) |
| Lag student loan=1 × Fannie flag=1 | -0.0020 | (0.0038) | -0.0103** | (0.0051) |
| Post Fannie program=1 × Fannie flag=1 | 0.0923*** | (0.0026) | 0.0750*** | (0.0043) |
| Post Fannie program=1 × Lag student loan=1 × Fannie flag=1 | 0.0066 | (0.0066) | 0.0017 | (0.0112) |
| Quarter x County FEs | Yes | | Yes | |
| Observations | 673099 | | 283522 | |
| $R^2$ | 0.181 | | 0.165 | |
| Dependent variable mean | 0.32 | | 0.23 | |
| Sample | Full | | Rate Decrease | |

Source: Authors' calculations based on Equifax Credit Risk Insight Servicing McDash (CRISM).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.13: Triple-diff regressions of cash-out indicator on post Fannie Mae-Cash-out program-Fannie Mae indicator

| | (1) cash-out | | (2) cash-out | |
|---|---|---|---|---|
| Lag student loan=1 | 0.0277*** | (0.0029) | 0.0280*** | (0.0039) |
| Lag student loan=1 × Fannie flag=1 | 0.0036 | (0.0038) | -0.0004 | (0.0051) |
| Post Fannie program=1 × Lag student loan=1 | 0.0049 | (0.0051) | 0.0027 | (0.0087) |
| Post Fannie program=1 × Lag student loan=1 × Fannie flag=1 | 0.0008 | (0.0066) | -0.0060 | (0.0112) |
| Lag auto loan=1 | 0.0374*** | (0.0020) | 0.0369*** | (0.0026) |
| Lag auto loan=1 × Fannie flag=1 | -0.0100*** | (0.0025) | -0.0152*** | (0.0033) |
| Post Fannie program=1 × Lag auto loan=1 | 0.0198*** | (0.0037) | 0.0173*** | (0.0063) |
| Post Fannie program=1 × Lag auto loan=1 × Fannie flag=1 | 0.0179*** | (0.0048) | 0.0164** | (0.0080) |
| Lag other loan=1 | 0.0446*** | (0.0020) | 0.0399*** | (0.0027) |
| Lag other loan=1 × Fannie flag=1 | -0.0151*** | (0.0026) | -0.0199*** | (0.0034) |
| Post Fannie program=1 × Lag other loan=1 | 0.0249*** | (0.0037) | 0.0222*** | (0.0064) |
| Post Fannie program=1 × Lag other loan=1 × Fannie flag=1 | 0.0185*** | (0.0048) | 0.0057 | (0.0082) |
| Lag revolving card=1 | 0.0521*** | (0.0025) | 0.0992*** | (0.0029) |
| Lag revolving card=1 × Fannie flag=1 | -0.0528*** | (0.0032) | -0.0545*** | (0.0037) |
| Post Fannie program=1 × Lag revolving card=1 | 0.0526*** | (0.0045) | 0.0489*** | (0.0065) |
| Post Fannie program=1 × Lag revolving card=1 × Fannie flag=1 | 0.0383*** | (0.0057) | 0.0461*** | (0.0084) |
| Fannie flag=1 | -0.0770*** | (0.0020) | -0.0691*** | (0.0026) |
| Credit score | -0.0000*** | (0.0000) | 0.0002*** | (0.0000) |
| Age | -0.0019*** | (0.0003) | 0.0033*** | (0.0004) |
| Age squared | 0.0000*** | (0.0000) | -0.0000*** | (0.0000) |
| Post Fannie program=1 × Fannie flag=1 | 0.0681*** | (0.0041) | 0.0509*** | (0.0069) |
| County x Quarter FEs | Yes | | Yes | |
| Observations | 673099 | | 283522 | |
| $R^2$ | 0.183 | | 0.168 | |
| Dependent variable mean | 0.32 | | 0.23 | |
| Sample | Full | | Rate Decrease | |

Standard errors are clustered at the borrower level. Inclusion in the sample is conditional on having tappable equity.
Source: Authors' calculations based on Equifax Credit Risk Insight Servicing McDash (CRISM).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.14: Triple-diff regressions of cash-out as a percent of pre-refinance appraisal value on post Fannie Mae-Cash-out program-Fannie Mae indicator, conditional on cashing out

| | (1) cash-out % value | | (2) cash-out % value | |
|---|---|---|---|---|
| Lag student loan=1 | 0.0058* | (0.0035) | 0.0061 | (0.0040) |
| Post Fannie program=1 × Lag student loan=1 | -0.0067 | (0.0049) | -0.0038 | (0.0067) |
| Lag auto loan=1 | -0.0077*** | (0.0015) | -0.0076*** | (0.0020) |
| Lag other loan=1 | -0.0021 | (0.0014) | 0.0003 | (0.0019) |
| Lag credit card=1 | -0.0010 | (0.0022) | -0.0028 | (0.0030) |
| Fannie flag=1 | -0.0192*** | (0.0027) | -0.0198*** | (0.0030) |
| Credit score | -0.0002*** | (0.0000) | -0.0003*** | (0.0000) |
| Age | 0.0065*** | (0.0004) | 0.0089*** | (0.0006) |
| Age squared | -0.0000*** | (0.0000) | -0.0001*** | (0.0000) |
| Lag student loan=1 × Fannie flag=1 | -0.0068 | (0.0062) | -0.0107 | (0.0072) |
| Post Fannie program=1 × Fannie flag=1 | 0.0033 | (0.0034) | 0.0058 | (0.0044) |
| Post Fannie program=1 × Lag student loan=1 × Fannie flag=1 | 0.0034 | (0.0077) | 0.0117 | (0.0102) |
| Quarter x County FEs | Yes | | Yes | |
| Observations | 102162 | | 60957 | |
| $R^2$ | 0.130 | | 0.164 | |
| Dependent variable mean | 0.23 | | 0.23 | |
| Sample | Full | | Rate Decrease | |

Standard errors are clustered at the borrower level. Inclusion in the sample is conditional on having done a cash-out refinance. The outcome variable is winsorized at the 1st and 99th percentiles. Source: Authors' calculations based on Equifax Credit Risk Insight Servicing McDash (CRISM).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.