

Cash-Out Refinances and Paydown Behavior of Non- mortgage Debt Balances

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1. Introduction

Home equity (the home’s value minus all home-secured debt) is the third-most common asset class¹ and a significant source of savings: two-thirds of US households owned a home in 2022, with a median home equity value over \$200,000.² A cash-out refinance is one way homeowners can tap into their home equity. Paying off non-mortgage debts with home equity can make financial sense if the cost of extracting cash with the refinance (the interest on the new mortgage amount, plus any origination fees) is less than the cost of continuing to pay down other higher-interest debt (e.g., the interest on an existing car loan) and any existing mortgage.³ However, converting non-mortgage debts into mortgage debt secured by the home can put the home at risk of foreclosure if payments become unsustainable, while defaulting on a non-mortgage debt is unlikely to result in loss of the home. Cash-out refinancing also draws down current wealth that could be used for future consumption.

In a previous analysis, the Consumer Financial Protection Bureau’s (CFPB) Office of Research looked at cash-out refinance mortgages and their borrowers over the past decade.⁴ We found that cash-out refinances were a larger share of all refinances during periods of rising interest rates; that cash-out refinances were more likely to only have female borrowers and borrowers aged 62 and older; and that borrowers of cash-out refinances had lower credit scores and lower incomes compared to non-cash-out refinance borrowers. But how did cash-out refinance borrowers use their extracted cash? Cash-out borrowers surveyed in 1999 and 2002 reported using funds from cash-out refinances to pay down credit card balances and other debts, as well

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¹ See Briana Sullivan, Donald Hays, and Neil Bennett, “The Wealth of Households: 2021,” Current Population Reports P70BR-183, U.S. Census Bureau (June 2023), available at <https://www.census.gov/content/dam/Census/library/publications/2023/demo/p70br-183.pdf>.

² See Aditya Aladangady, Jesse Bricker, Andrew C. Chang, Sarena Goodman, Jacob Krimmel, Kevin B. Moore, Sarah Reber, Alice Henriques Volz, and Richard A. Windle, “Changes in U.S. Family Finances from 2019 to 2022: Evidence from the Survey of Consumer Finances” (October 2023), Board of Governors of the Federal Reserve System, available at <https://doi.org/10.17016/8799>.

³ This assumes that homeowners have equal access to extract their home equity. Recent research has documented application denial rate disparities for Black, Hispanic, and Asian homeowners (compared to non-Hispanic white homeowners) applying for cash-out refinances and other home equity loan products, even after controlling for loan and borrower characteristics. See James Conklin, Kristopher Gerardi, and Lauren Lambie-Hanson, “Can Everyone Tap into the Housing Piggy Bank? Racial Disparities in Access to Home Equity” (November 2023), Federal Reserve Bank of Philadelphia Working Paper No. 23-25, available at <https://doi.org/10.21799/frbp.wp.2023.25>.

⁴ See Alexei Alexandrov, Noah Cohen-Harding, and Patrick Lapid, “Office of Research blog: A look at cash-out refinance mortgages and their borrowers between 2013 to 2023” (December 18, 2023), Consumer Financial Protection Bureau, available at <https://www.consumerfinance.gov/about-us/blog/office-of-research-blog-a-look-at-cash-out-refinance-mortgages-and-their-borrowers-between-2013-to-2023/>.

as to pay for home improvements.⁵ However, these surveys did not provide further detail about which types of debts were paid down nor information on paydown amounts by debt type.

In this report, we look at how cash-out borrowers between 2014 and 2021 used their funds from a refinance, focusing on how they paid down balances of credit cards and other debts. We also look at how other credit outcomes, such as credit card utilization and credit scores, changed before and after the refinance event. We first analyze recent data from the National Survey of Mortgage Originations (NSMO) and show that cash-out refinance borrowers continue to report “pay off other bills or debts” and “home repairs or new construction” as the most frequent responses when asked about how they used their extracted cash. Focusing our attention on borrowers paying down non-mortgage debts, we examine whether borrowers’ self-reporting of paydown behavior are reflected in their credit records and, if so, what types of non-mortgage debt cash-out borrowers are now paying down.

To shed light on these questions, we then look at refinance borrowers in the National Mortgage Database (NMDB®) to compare the non-mortgage debt obligations of cash-out versus non-cash-out refinance borrowers. Even though we know there are differences in the loan and borrower characteristics between cash-out and non-cash-out refinance borrowers, the structure of the NMDB allows us to observe how credit card and other non-mortgage debt balances evolve during a refinance event for both groups of borrowers. In the case of cash-out borrowers, we know that they have funds available to potentially pay down such balances. Specifically, we look for evidence of the paydown behavior stated in cash-out borrowers’ responses to the NSMO by analyzing three types of non-mortgage debt clearly defined in the NMDB: credit cards, auto loans, and student loans—products which are of specific interest to the CFPB.

Key findings of this report include:

- **“Pay off other bills or debts” was the most common reason for using money from a cash-out refinance, according to cash-out refinance borrowers surveyed between 2014 and 2021.** From 2014 to 2019, a majority of cash-out refinance respondents (between 53.1 and 66.5 percent each year) selected “paying off other bills or debts,” while for 2020 and 2021, a plurality of respondents (between 43.5

⁵ See Peter J. Brady, Glenn B. Canner, and Dean M. Maki, “The Effects of Recent Mortgage Refinancing,” *Federal Reserve Bulletin* (July 2000), available at <https://doi.org/10.17016/bulletin.2000.86-7>; Glenn Canner, Karen Dynan, and Wayne Passmore, “Mortgage Refinancing in 2001 and Early 2002.,” *Federal Reserve Bulletin* (December 2002), available at <https://doi.org/10.17016/bulletin.2002.88-12>; and Alan Greenspan and James Kennedy, “Sources and Uses of Equity Extracted from Homes”, Finance and Economics Discussion Series 2007-20, Board of Governors of the Federal Reserve System (March 2007), available at <http://www.federalreserve.gov/pubs/feds/2007/200720/200720pap.pdf>.

and 45.2 percent) selected that reason. “Home repairs or new construction” was the second-most common reason cited every year.

- **Before refinance, mean balances for some debt types differed between cash-out refinance borrowers and non-cash-out borrowers.** Mean credit card balances were approximately \$4,000 higher among cash-out borrowers, while mean student loan balances were approximately \$4,000 lower among cash-out borrowers. Mean auto loan balances were similar in magnitude for both groups of borrowers.
- **Cash-out refinance borrowers were likely to have large credit card balance decreases around the time of refinance and a sharp decrease in average credit card balances during the quarter of the refinance and in the quarter following the refinance.** 57.2 percent of cash-out refinance borrowers with credit card balances had a balance decrease of 10 percent or more after the refinance. Cash-out borrowers’ average credit card balances decreased by over \$4,500 from the quarter before the refinance to the quarter after the refinance. Cash-out borrowers’ average credit card utilization rates also decreased by approximately nine percentage points during the immediate pre-to-post refinance period.
- **Cash-out refinance borrowers’ average credit card balances and average credit card utilization rates increased in the year following the refinance.** However, average balances and utilization rates stayed below their pre-refinance levels up to five quarters post-refinance.
- **Cash-out refinance borrowers were also likely to have large auto loan balance decreases around the time of refinance and a sharp decrease in average auto loan balances during the quarter of the refinance and in the quarter following the refinance.** 68.5 percent of cash-out refinance borrowers with auto loan balances had a balance decrease of 10 percent or more after the refinance. Cash-out borrowers’ average auto loan balances decreased by almost \$3,000 from the quarter before the refinance to the quarter after the refinance. However, we also show that between 10 and 25 percent of cash-out borrowers with auto loans took on additional debt in the two quarters before refinance. Average auto loan balances continued to decline during the year following the refinance, suggesting resumption of regular paydown behavior.
- **By contrast, cash-out refinance borrowers were less likely to have large student loan balance decreases around the time of refinance.** 27.2 percent of cash-out refinance borrowers with student loan balances had a balance decrease of 10 percent or more after the refinance. Cash-out borrowers’ average student loan balances declined gradually during the year following the refinance, also suggesting regular

paydown behavior—but unlike credit card and auto loan balances, average student loan balances did not show sharp declines.

- **Cash-out refinance borrowers’ average credit scores sharply increased at the quarter of refinance, while non-cash-out borrowers’ average credit scores decreased slightly.** Even though average credit scores moved back towards the pre-refinance average for both groups of borrowers, the average credit score for cash-out borrowers remained elevated in the year following the refinance.

2. Data

2.1 National Mortgage Database (NMDB)

The NMDB is a representative 1-in-20 sample of all closed-end first-lien mortgages in the United States. A joint program of the CFPB and the Federal Housing Finance Agency (FHFA), the NMDB is used to conduct research on mortgage products and the mortgage market.⁶ The database includes mortgage terms and performance as well as credit-related information on all mortgage cosigners, particularly non-mortgage debt balances. How these other debt balances evolve during a refinance event will be the focus of this report.

In the NMDB, we identified cash-out refinance mortgages as those where the total value of sampled refinance loans and their associated junior liens was more than 5 percent larger than the total value of the preceding loans and associated junior liens. Non-mortgage debt balances are drawn on the same date for all mortgages each quarter. In the NMDB, non-mortgage debt balances are reported as the total dollar balances of a specific debt type for all borrowers listed on the mortgage. Therefore, in this report we use the term “borrowers” to represent individual as well as multiple borrowers for a particular mortgage and their associated non-mortgage debts.

2.2 National Survey of Mortgage Originations (NSMO)

The NSMO is a nationally representative survey of borrowers with newly originated residential mortgages in the United States.⁷ Conducted quarterly, the NSMO provides information about borrowers’ experiences getting a mortgage, including reasons for seeking a refinance and the

⁶ For more information about the NMDB, see <https://www.fhfa.gov/PolicyProgramsResearch/Programs/Pages/National-Mortgage-Database.aspx#NMDB>.

⁷ For more information about the NSMO, see <https://www.fhfa.gov/PolicyProgramsResearch/Programs/Pages/National-Mortgage-Database.aspx#NSMO>.

uses of funds from a refinance.⁸ The NSMO is a component of the NMDB program, since the NSMO is sampled from new mortgage originations added to the NMDB.⁹

As with the NMDB, we defined cash-out refinance mortgages in the NSMO when the total value of sampled refinance loans and their associated junior liens was more than 5 percent larger than the total value of the preceding loans and associated junior liens.

2.3 Sample Restrictions

The NMDB does not store zero-value balances for non-mortgage debt, instead storing these values as missing. This is a key distinction for our analysis because there is an important difference between a borrower who has paid their balance down to zero and a borrower who does not have an account of the specific debt type. To fill in this gap, we made several adjustments to the data and our sample.

To construct a balanced panel for our event studies of cash-out and non-cash-out refinances, we first converted missing balances to zeroes for all debt types. Second, to avoid treating true missing values (such as when a borrower does not have one of the debt types which we analyze) as zero, we excluded borrowers whose non-mortgage debt balances across all debt types sum to zero two quarters before refinance and repeat for the third quarter before refinance. This is due to the way that non-mortgage debt balances are loaded into the NMDB as a look-back: if a borrower had zero non-mortgage debt balances for all types of debt, it is likely that the balances have not been filled in and that the missing balances which we originally converted to zeroes were true missing values. Lastly, when analyzing each non-mortgage debt type, we restricted our sample to borrowers with a positive balance for the respective debt type at the quarter before refinance. This is to ensure that the borrowers included in our analysis have the relevant debt type, and that their zero balances (which we have inferred from missing values in the original dataset) are true zeroes.

Table 2 in the following section looks only at the quarter before refinance, and as such provides an overview of the debt characteristics for borrowers in our sample before the refinance event. For all tables and figures after Table 2, the restrictions detailed above apply. Unrelated to

⁸ Refinance mortgages in the NSMO and NMDB are determined from matching with Home Mortgage Disclosure Act data, which report the loan purpose. For more details, see <https://www.fhfa.gov/sites/default/files/documents/NMDB-Technical-Documentation-20221228.pdf>.

⁹ Approximately 6,000 of the closed-end first-lien mortgage loans newly added to the NMDB each quarter are selected for NSMO. The survey's useable response rate is about 25% across all survey waves, which is approximately 5,000 to 6,000 useable survey responses per origination year. See <https://www.fhfa.gov/sites/default/files/2024-06/NSMO-Technical-Report-v50.pdf>.

missing values, we also excluded all records with three or more borrowers on file, as well as records with missing credit scores.¹⁰ These restrictions apply to all analyses in this report using the NMDB; the resulting sample consists of 485,159 cash-out refinances and 713,807 non-cash-out refinances.

These restrictions to our sample come with impacts to the interpretation of our analysis. Since we are only investigating cases where borrowers had debt before refinance, we cannot make conclusions about the likelihood that borrowers took on new debt after a refinance event. For example, a borrower may have used extracted equity from a cash-out refinance as a down payment on a new auto loan. This would not be captured by our analysis because that borrower did not have a positive balance of auto loan debt in the quarter before refinance. On the other hand, our analysis would capture a borrower who took out a new auto loan before a cash-out refinance event and subsequently used the extracted equity to pay down that auto loan.

¹⁰ NMDB contains a variable for credit score at origination, which is filled in for all records. However, a separate variable tracks credit scores quarter-to-quarter, which we use in this analysis. This is because the quarter-to-quarter variable comes from credit reports and therefore we can ensure that the source is consistent. We fill in missing values for this variable using the most recent non-missing value. After applying this methodology, we drop any records that have a missing credit score in the quarter of refinance (<1% of observations).

3. Results

3.1 Reported cash-out reasons

We first analyzed responses from cash-out refinance borrowers in the NSMO to understand why they extracted equity, and how these reasons may have changed between 2014 and 2021. Table 1 shows the distribution of borrowers' responses to the question "Did you use the money you got from this new mortgage for any of the following?" among cash-out refinance borrowers, for which respondents could say "Yes" to multiple options.

TABLE 1: SURVEY RESPONSES TO "DID YOU USE THE MONEY YOU GOT FROM THIS NEW MORTGAGE FOR ANY OF THE FOLLOWING?" AMONG CASH-OUT REFINANCE BORROWERS IN THE NATIONAL SURVEY OF MORTGAGE ORIGINATIONS, BY MORTGAGE ORIGINATION YEAR.

Cash-out refinance money used for: (% responding Yes)	2014	2015	2016	2017	2018	2019	2020	2021
Pay off other bills or debts	53.1	60.5	57.4	66.5	63.8	62.4	43.5	45.2
Home repairs or new construction	38.1	45.6	50.9	55.0	48.1	47.1	36.8	44.8
Closing costs of new mortgage	27.7	29.2	31.3	26.8	27.3	24.2	24.2	21.7
Savings	15.7	18.2	20.6	20.3	20.3	19.6	19.7	23.8
Auto or other major purchase	9.8	10.4	15.0	14.9	13.7	10.9	9.6	10.2
College Expenses	6.2	9.1	9.7	9.7	7.1	5.3	4.7	5.2
Business or investment	5.8	6.7	6.1	6.0	5.2	4.3	5.2	4.1
Observations (N)	490	654	739	760	664	942	1,157	1,346

Note: Sample respondents took out a cash-out refinance between 2014 and 2021. A cash-out refinance is identified when the total value of the sampled refinance loan and their associated junior liens was more than five percent larger than its preceding loan and associated junior liens. Respondents can say "Yes" to multiple uses. Source: National Survey of Mortgage Originations.

"Pay off other bills or debts" was the most common response, accounting for between 44 and 67 percent of answers across all survey years; in each examined year other than 2020 and 2021,

this option was selected by a majority of respondents. “Home repairs or new construction” was the second-most common response, accounting for between 37 and 55 percent of answers. Using cash-out refinance money toward mortgage closing costs and savings were also frequent responses. Approximately 10 percent of respondents used their cash-out refinance money for an automobile or other major purchase in 2014; this increased to 15 percent in 2016 and 2017, then fell back to 10 percent in 2020 and 2021. Using cash-out funds for college expenses was reported by only five to ten percent of respondents in any given year. The responses in Table 1 are in line with results from the 1999 and 2002 Surveys of Consumers that asked refinance borrowers how they used their extracted home equity.¹¹ We also see that the relative ranking of responses in Table 1 is (with minor exceptions) relatively stable across survey years.

3.2 Non-mortgage debt for cash-out and non-cash-out borrowers

We now turn to the NMDB to compare the non-mortgage debt balances of cash-out refinance borrowers to non-cash-out refinance borrowers. Table 2 shows the prevalence and mean amounts of six non-mortgage debt categories that are measured in the NMDB, split between cash-out and non-cash-out refinance borrowers. The debt types we analyzed include auto loans, student loans, credit cards, home equity lines of credit (or HELOCs, also referred to as open-end second liens), other open-end credit, and other closed-end credit; the first three of these are analyzed for delinquency. Prevalence is measured as the percentage of borrowers with a positive balance for that debt type at the quarter before their refinance. Mean balances are (conditionally) calculated among borrowers with a positive value for the respective debt type, also at the quarter before refinance. Delinquency rates are calculated as the fraction of borrowers with a positive balance for the debt type at the quarter before refinance who were at least 60 days delinquent. This analysis looks specifically at refinances which were closed between the first quarter of 2014 and the fourth quarter of 2021.

¹¹ See Peter J. Brady, Glenn B. Canner, and Dean M. Maki, “The Effects of Recent Mortgage Refinancing,” *Federal Reserve Bulletin* (July 2000), available at <https://doi.org/10.17016/bulletin.2000.86-7>; and Glenn Canner, Karen Dynan, and Wayne Passmore, “Mortgage Refinancing in 2001 and Early 2002.,” *Federal Reserve Bulletin* (December 2002), available at <https://doi.org/10.17016/bulletin.2002.88-12>.

TABLE 2: SUMMARY STATISTICS FOR NON-MORTGAGE DEBT TYPES AMONG CASH-OUT AND NON-CASH-OUT REFINANCE BORROWERS IN QUARTER BEFORE REFINANCE.

Debt Type	Cash-out borrowers			Non-cash-out borrowers		
	Share with positive balance (%)	Mean balance (\$)	Share 60+ days delinquent (%)	Share with positive balance (%)	Mean balance (\$)	Share 60+ days delinquent (%)
Credit Cards	92.1	\$12,948	1.8	92.8	\$9,082	1.6
Auto Loans	64.6	\$22,679	0.8	60.9	\$23,553	0.7
Student Loans	22.3	\$41,733	1.2	22.8	\$45,829	1.1
HELOCs	16.5	\$61,365	N/A	9.8	\$80,595	N/A
Other Closed-end	41.0	\$16,610	N/A	31.8	\$16,130	N/A
Other Open-end	57.9	\$4,517	N/A	47.0	\$3,790	N/A
All Non-mortgage Debts	99.2	\$55,928	N/A	98.7	\$48,735	N/A

Note: Sample borrowers took out a cash-out or non-cash-out refinance between 2014Q1 and 2021Q4. A cash-out refinance is identified when the total value of the sampled refinance loan and their associated junior liens was more than 5 % larger than its preceding loan and associated junior liens. Balances are checked the quarter before refinance. Borrowers without data for the quarter before refinance are not included, nor are borrowers with no non-mortgage debt in either the second or third quarter before refinance, nor are loans with three or more borrowers on file. Means are calculated only among borrowers with a positive balance. “All Non-mortgage Debts” represents the sum of all debt categories, and therefore columns will not add up due to borrowers with multiple debt types. All differences between cash-out and non-cash-out are statistically significant at the 99% level. Sample of 485,159 cash-out refinances and 713,807 non-cash-out refinances. Source: National Mortgage Database.

Credit cards were the most prevalent non-mortgage debt type among refinance borrowers, with 92 percent of cash-out refinance borrowers and 93 percent of non-cash-out refinance borrowers having a positive credit card balance the quarter before their refinance. Among those with positive balances, cash-out borrowers had higher mean credit card balances (\$12,948) compared to non-cash-out refinance borrowers (\$9,082).¹² Auto loan prevalence and mean

¹² For comparison, TransUnion reported that the average credit card balance per consumer was \$5,127 in 2021Q4. Since our unit of analysis contains balances across one or two borrowers on the mortgage, the higher

balances were similar between the two groups (65 percent and \$22,679 for cash-out versus 61 percent and \$23,553 for non-cash-out)¹³ as were student loans (22 percent and \$41,733 for cash-out versus 23 percent and \$45,829 for non-cash-out).¹⁴ Cash-out refinance borrowers were more likely to have HELOCs (17 percent versus 10 percent for non-cash-out refinance borrowers), but conditional on having one, their HELOCs had lower mean balances (\$61,365 vs. \$80,595). Cash-out refinance borrowers were also more likely to have other types of open- and close-end debts and overall had higher mean (total) balances across all their non-mortgage debts. Delinquency rates were low for the three products where we track them, with auto loans having the lowest percentage of borrowers 60+ days delinquent (1% for both cash-out borrowers and non-cash-out borrowers). For all these products, cash-out borrowers had higher delinquency rates in the quarter before refinance.

3.3 Evidence of paydown behavior

Using the non-mortgage debt variables in the NMDB, we looked for signs of the paydown behavior cited in the NSMO as the most common use for extracted home equity among cash-out borrowers. In this section, we plot graphs tracking average balances, residualized balances, and five percentiles of quarter-to-quarter change in balances from three quarters before refinance to five quarters after refinance. We do this for three types of non-mortgage balances: credit cards, auto loans, and student loans.

The graphs tracking average balances are calculated for both cash-out as well as non-cash-out refinance borrowers, allowing us to compare between the two groups in this event study around their refinance. Next to these graphs of average balances, we present residualized graphs for cash-out refinance borrowers only. These graphs display 95% confidence intervals for the predicted balance each quarter from a model controlling for the number of borrowers on file (one or two), the races of those borrowers, the average credit scores of borrowers on file at origination, the borrower income reported for the refinance origination, the average age of borrowers on file at origination, and the quarter and year when the non-mortgage balance

(approximately twice as much) averages observed in our data are consistent in magnitude. See <https://newsroom.transunion.com/recent-vintage-loans-perform-well-even-as-more-non-prime-consumers--secured-credit-in-second-half-of-2021/>.

¹³ These averages are comparable to those reported in other sources. For example, Experian reported that average auto loan balance held by consumers in the US increased from \$19,703 in 2019Q3 to \$23,792 in 2023Q3. See <https://www.experian.com/blogs/ask-experian/research/auto-loan-debt-study/>.

¹⁴ For comparison, using Federal Student Aid data on student loan portfolio dollars outstanding and the total number of borrowers, we calculated that the average federal student loan balance in 2021Q4 was approximately \$43,000 among borrowers aged 35 to 49 and approximately \$44,000 among borrowers aged 50 to 61. See <https://studentaid.gov/sites/default/files/fsawg/datacenter/library/Portfolio-by-Age.xls>.

amount was observed in the data. Regression tables corresponding to each residualized graph are presented in the Appendix.¹⁵

Following each average balance graph will be a graph comparing quarter-to-quarter balance changes by percentile for each non-mortgage debt type. These percentiles graphs are based on the ranking of changes in balances (which can be positive or negative) from one quarter to the next and are (re)constructed for every quarter; thus, the X-th percentile consumer going from one quarter to the next need not be the same consumer. We plot these percentiles for cash-out refinance borrowers only, allowing us to investigate the distribution of balance changes surrounding the refinance event for this particular group.

In addition to the graphs discussed above, we also graph pre- and post-refinance average credit card utilization rates by quarter for both cash-out and non-cash-out refinance borrowers, and residualized utilization rates by quarter for cash-out refinance borrowers only. Lastly, we graph average credit scores each quarter for cash-out and non-cash-out refinance borrowers.

3.3.1 Credit card balances and utilization

Figure 1 shows credit card balances by quarter relative to refinance.¹⁶ The first panel (left) shows average balances for cash-out and non-cash-out refinance borrowers. Cash-out borrowers had between \$3,014 and \$3,866 higher balances on average before refinance than non-cash-out borrowers. We observe a gradual decline in the average balance for non-cash-out borrowers in the quarters preceding refinance, while the average balance for cash-out borrowers gradually increased. Immediately following refinance ($t = 0$ and 1), we observe a significant decline in the average credit card balance for cash-out borrowers, but not for non-cash-out borrowers, whose balances remained at a similar level. After refinance, credit card balances increased for both groups, though this increase was steeper for cash-out borrowers such that their mean balance once again exceeded that of non-cash-out borrowers by the second quarter after refinance. Unlike non-cash-out borrowers, however, cash-out borrowers did not reach their pre-refinance level of mean credit card balances in the post-refinance period.

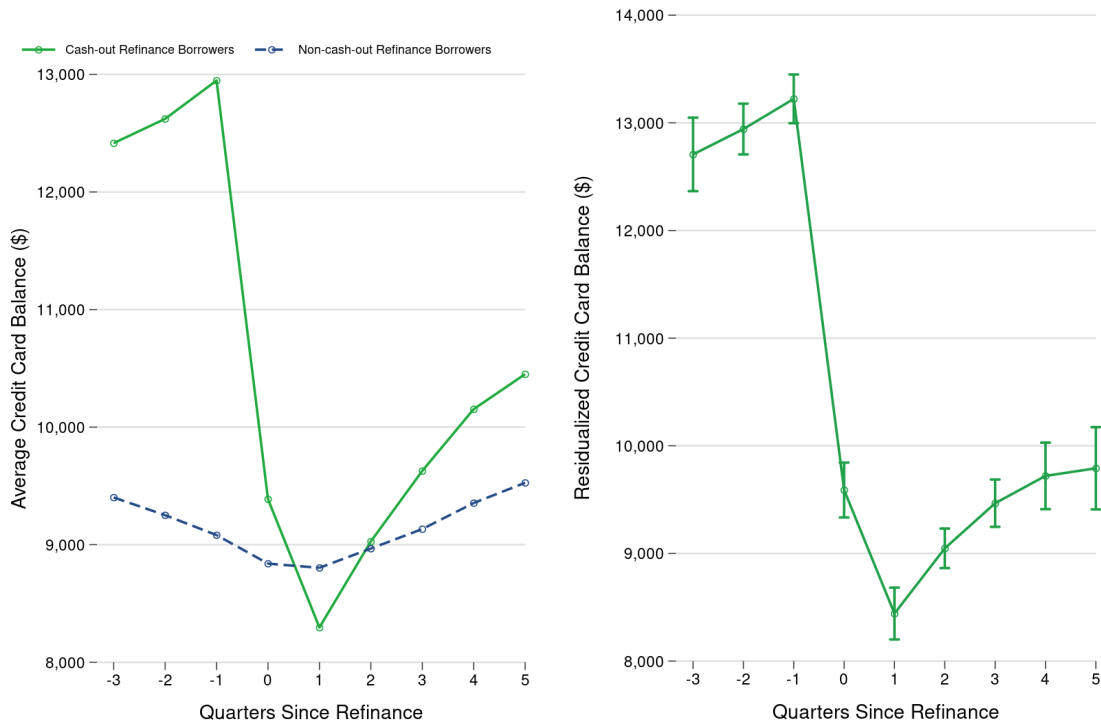
The second panel (right) shows predicted values for credit card balances each quarter for cash-out refinance borrowers after applying our controls for credit scores and other borrower characteristics (described above). The graph also displays 95% confidence intervals for each

¹⁵ We also present regression results for delinquency in the Appendix. These regressions were run but are not discussed in this section due to the low delinquency rates shown in Table 2. It is likely that those who were 60+ days delinquent were unable to refinance their mortgages.

¹⁶ Credit card balances in credit report data can include both recent purchases as well as revolving debt balances carried across payment periods.

predicted value. The predicted values are overall similar to the raw averages, with a few differences. The predicted values for one and two quarters before refinance are higher after including the controls, while the predicted values for four and five quarters after refinance are lower. Overall, credit card balances decreased at the quarter of refinance and continued to decrease through quarter two before rebounding slightly. However, the predicted balance never reaches the level predicted in the pre-refinance period.

FIGURE 1: AVERAGE CREDIT CARD BALANCES FOR CASH-OUT AND NON-CASH-OUT REFINANCE BORROWERS AND RESIDUALIZED CREDIT CARD BALANCES FOR CASH-OUT REFINANCE BORROWERS

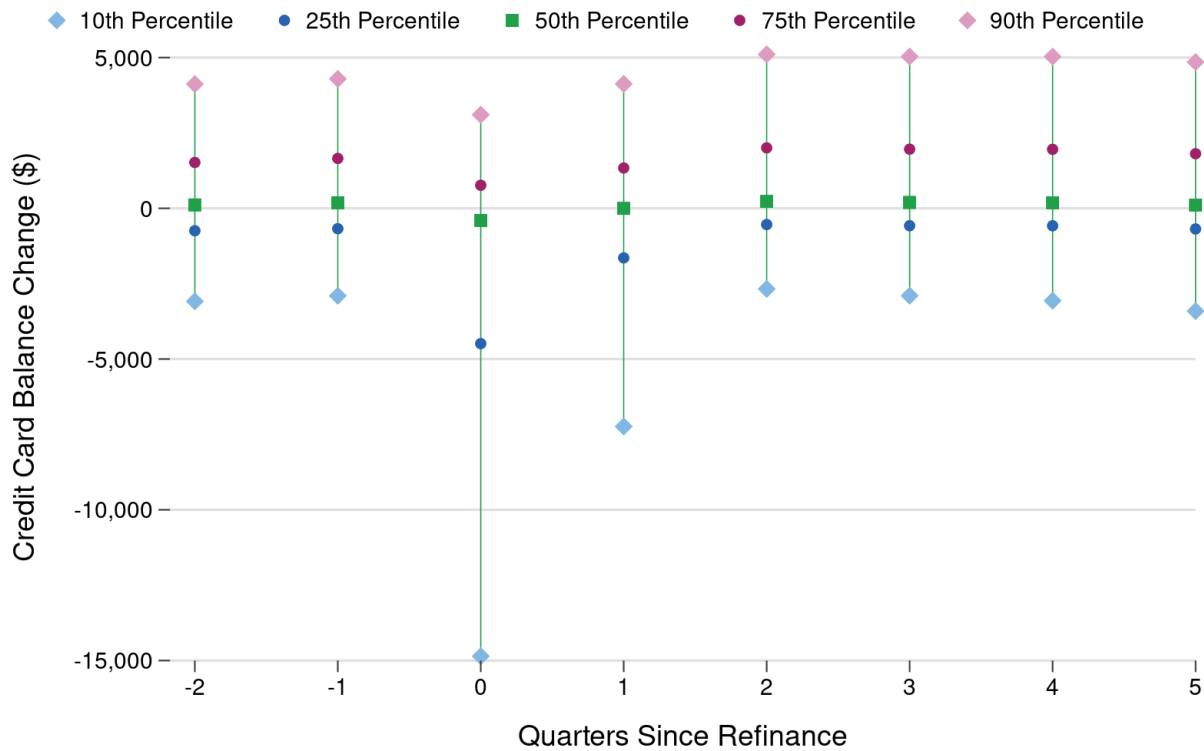


Note: Sample borrowers took out a refinance between 2014Q1 and 2021Q4. A cash-out refinance is identified when the total value of the sampled refinance loan and their associated junior liens was more than 5% larger than its preceding loan and associated junior liens. Borrowers with zero balances or missing data for the quarter before refinance are not included, nor are loans with three or more borrowers on file. Missing credit score values are filled in using the most recent non-missing score, and remaining borrowers missing values for the quarter of refinance are dropped. Source: National Mortgage Database

Figure 2 shows different percentiles of quarter-to-quarter changes in credit card balances for cash-out refinance borrowers. During the quarter of refinance ($t = 0$), the distribution of balance changes skews negative relative to prior quarters. Borrower(s) at the median saw a slight negative change in their credit card balance (-\$404), while the borrower(s) at the 25th

percentile of the balance change distribution saw a balance decrease of \$4,487. The distribution of credit card balance changes once again skews positive in quarters two through five since refinance.

FIGURE 2: QUARTER-TO-QUARTER CHANGE IN CREDIT CARD BALANCES FOR CASH-OUT REFINANCE BORROWERS, BY PERCENTILE



Note: Sample borrowers took out a cash-out refinance between 2014Q1 and 2021Q4. A cash-out refinance is identified when the total value of the sampled refinance loan and their associated junior liens was more than 5% larger than its preceding loan and associated junior liens. Borrowers with zero balances or missing data for the quarter before refinance are not included, nor are loans with three or more borrowers on file. Missing credit score values are filled in using the most recent non-missing score, and remaining borrowers with missing values for the quarter of refinance are dropped. Source: National Mortgage Database

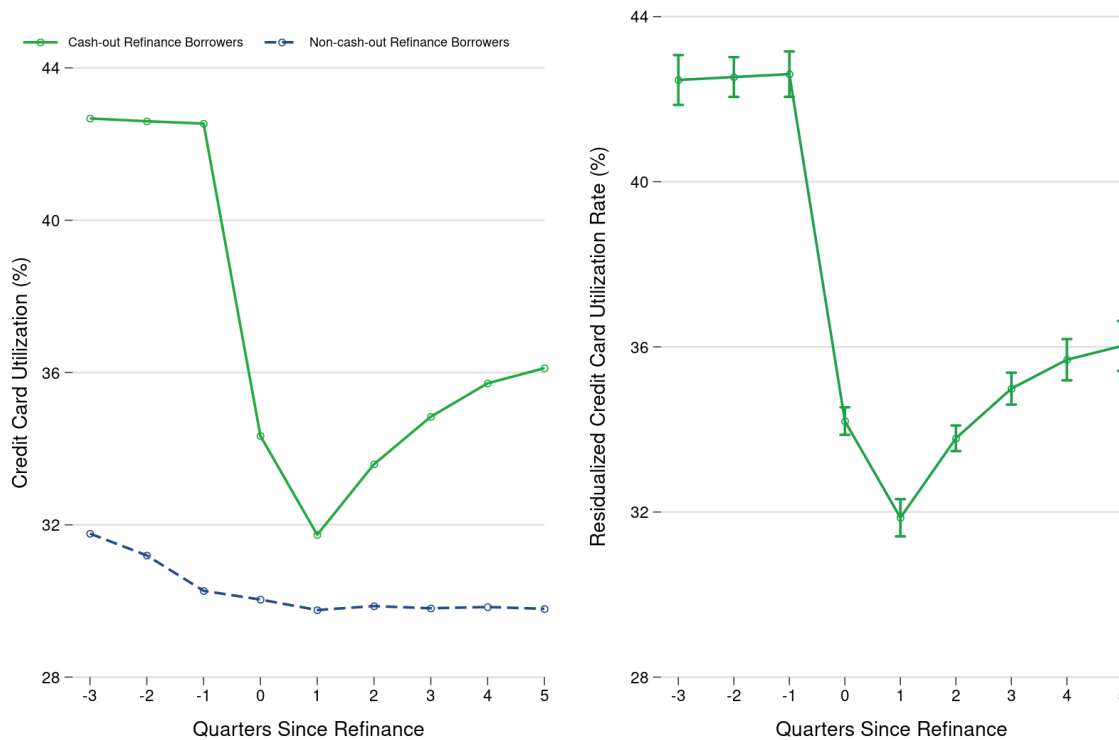
Figure 3 shows average credit card utilization for cash-out and non-cash-out refinance borrowers on the left panel, and residualized credit card utilization for cash-out refinance borrowers on the right panel. We define utilization as credit card balance divided by credit card limit for the respective quarter. In the first panel, we see that utilization was noticeably higher for cash-out borrowers than it was for non-cash-out borrowers. Non-cash-out borrowers had utilization rates between 29.8% and 31.8% for the duration of the analysis period. For cash-out borrowers, utilization was highest in the period before refinance (42.7% in quarter -3) before

declining significantly at the quarter of refinance, reaching as low as 31.7% in quarter one.¹⁷ From two quarters to five quarters post-refinance, utilization increased.

Looking at the residualized graph in the second panel, we see that the declines from $t = -1$ to $t = 0$ and from $t = 0$ to $t = 1$ were still present after including 95% confidence intervals, as were the increases from $t = 1$ to $t = 2$ and from $t = 2$ to the rest of the quarters post-refinance. After controlling for credit scores and other borrower characteristics which may have affected the level of a borrower's utilization in each quarter, the utilization rates remained similar throughout the entire period. Overall, utilization decreased sharply at the quarter of refinance. Though it rebounded such that it is higher in quarters three through five, it remained lower than in the pre-refinance period.

¹⁷ These credit card utilization rates are higher than typical, but not overly so. As a benchmark, consider large bank consumer credit card utilization rates reported by the Federal Reserve Bank of Philadelphia between 2014Q1 and 2021Q4. Our sample's utilization rates are above the 50th percentile (which varies between 5% and 10% over time) but below the 75th percentile (between 41% and 59% over time) reported there. See <https://fredblog.stlouisfed.org/2022/12/credit-card-balances-utilization-rates/>.

FIGURE 3: AVERAGE CREDIT CARD UTILIZATION FOR CASH-OUT AND NON-CASH-OUT REFINANCE BORROWERS AND RESIDUALIZED CREDIT CARD UTILIZATION FOR CASH-OUT REFINANCE BORROWERS



Note: Sample borrowers took out a refinance between 2014Q1 and 2021Q4. A cash-out refinance is identified when the total value of the sampled refinance loan and their associated junior liens was more than 5% larger than its preceding loan and associated junior liens. Borrowers with zero balances or missing data for the quarter before refinance are not included, nor are loans with three or more borrowers on file. Missing credit score values are filled in using the most recent non-missing score, and remaining borrowers with missing values for the quarter of refinance are dropped. Source: National Mortgage Database

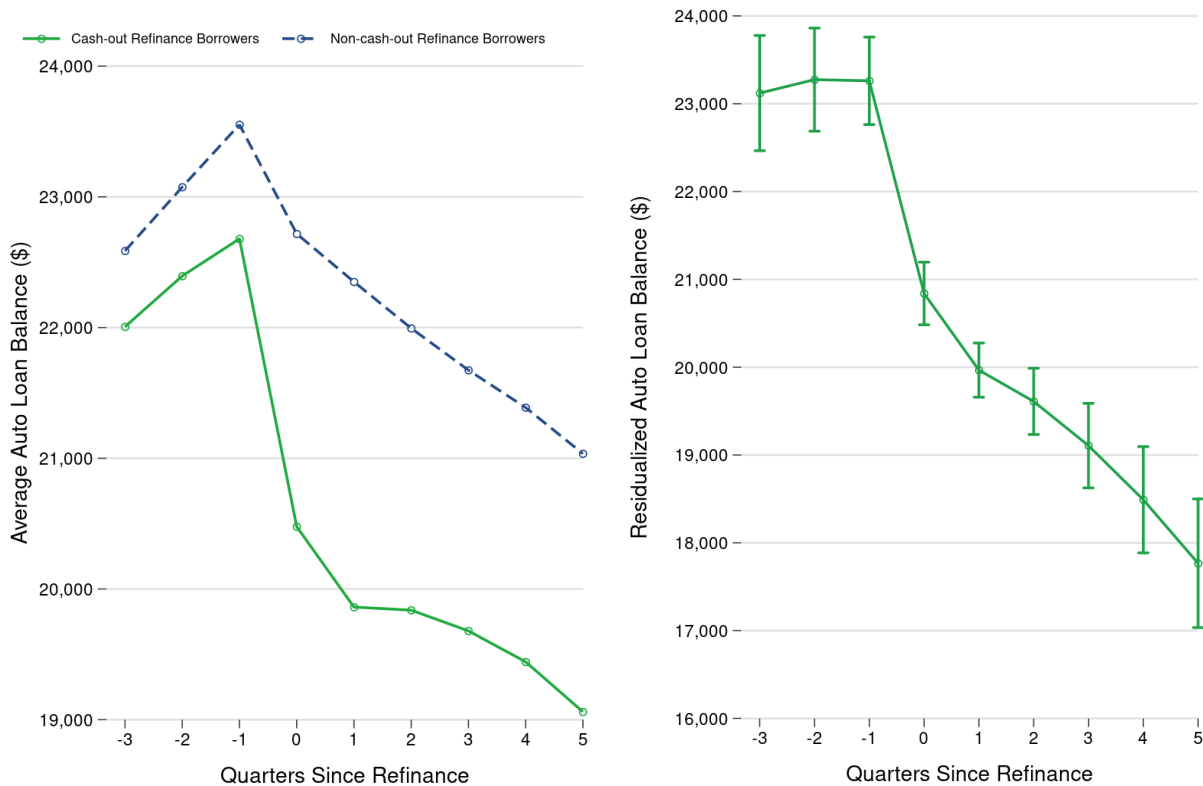
3.3.2 Auto loan balances

Figure 4 shows average auto loan balances for cash-out and non-cash-out refinance borrowers on the left panel and residualized auto loan balances for cash-out refinance borrowers on the right panel. The left panel shows that average auto balances increased slightly for both groups of refinance borrowers from three quarters to one quarter prior to refinance. We then see a steep decline in average auto loan balances during the quarter of refinance for cash-out borrowers and a shallower decline for non-cash-out borrowers. Subsequently, average balances gradually declined for both groups, though the absolute level of balances for cash-out borrowers is significantly below that of non-cash-out borrowers five quarters after refinance. Although the

auto loan balance gap is present before refinance, it widens at the time of refinance and stays wider throughout the rest of the post-refinance period.

Turning to the residualized graph on the right, we see that auto loan balances for cash-out borrowers are noticeably higher after applying our set of controls for credit scores and other borrower characteristics, particularly in the quarters before refinance. The increase during the pre-refinance period is no longer present, and the decline in the post-refinance period is steeper compared to the raw averages. Overall, auto loan balances decrease at the quarter of refinance and remain lower than in the pre-refinance period for the rest of the observed timeframe.

FIGURE 4: AVERAGE AUTO LOAN BALANCES FOR CASH-OUT AND NON-CASH-OUT REFINANCE BORROWERS

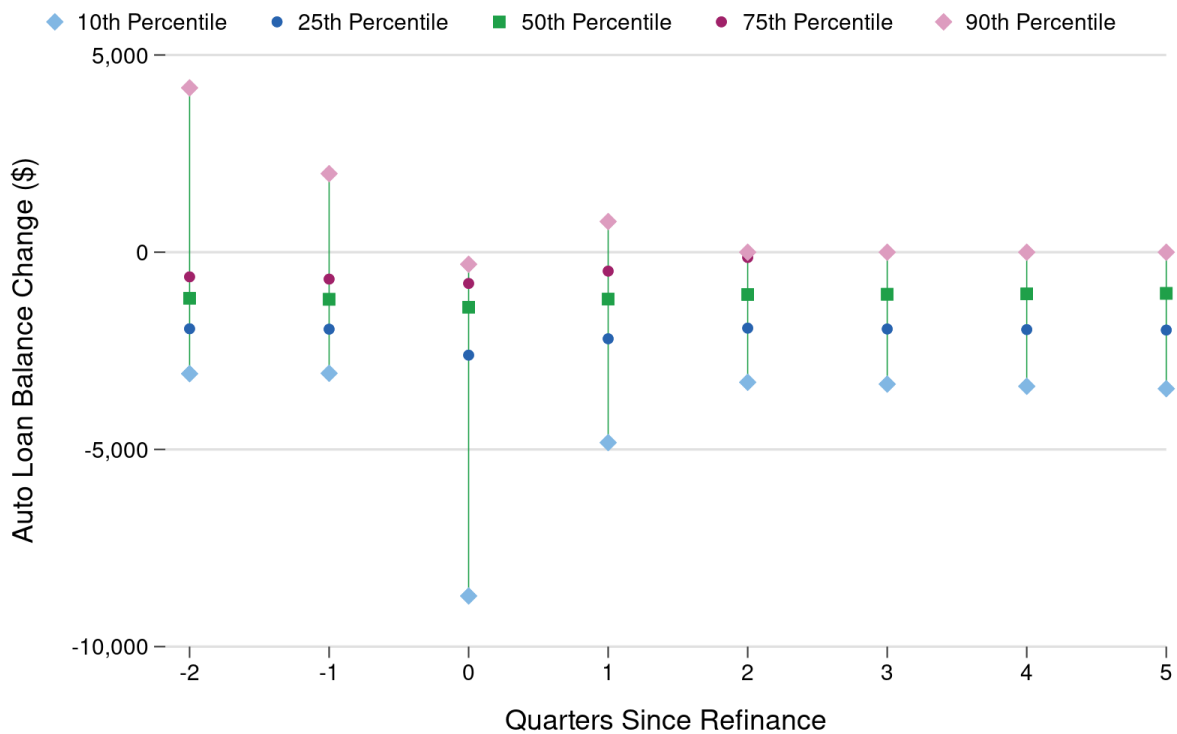


Note: Sample borrowers took out a refinance between 2014Q1 and 2021Q4. A cash-out refinance is identified when the total value of the sampled refinance loan and their associated junior liens was more than 5% larger than its preceding loan and associated junior liens. Borrowers with zero balances or missing data for the quarter before refinance are not included, nor are loans with three or more borrowers on file. Missing credit score values are filled in using the most recent non-missing score, and remaining borrowers with missing values for the quarter of refinance are dropped. Source: National Mortgage Database

Figure 5 shows different percentiles of quarter-to-quarter changes in auto loan balances for cash-out refinance borrowers. For auto loans, we see much less variation in balance changes than for credit cards. The 25th, 50th and 75th percentiles are all close together, with most borrowers' auto loan balances decreasing at a relatively constant rate from quarter to quarter, consistent with typical auto loan repayment behavior.

At the extremes of the distribution, we see behavior beyond typical auto loan repayment. Immediately prior to refinance, between 10 and 25 percent of cash-out borrowers took on significant balances of auto loans (as indicated by the 90th and 75th percentiles). For instance, two quarters before refinance, the borrower(s) at the 90th percentile (in terms of change in auto loan balances) took on \$4,167 in new auto loan debt. Then, during the quarter of refinance, the distribution of balance changes skews negative relative to prior quarters. A sizable minority of cash-out borrowers significantly paid down auto loan balances, with at least a quarter of them seeing their auto loan balance decrease by \$2,609 or more (as indicated by the 25th percentile) and 10 percent seeing a decline of at least \$8,715 (as indicated by the 10th percentile).

FIGURE 5: QUARTER-TO-QUARTER CHANGE IN AUTO LOAN BALANCES FOR CASH-OUT REFINANCE BORROWERS, BY PERCENTILE



Note: Sample borrowers took out a cash-out refinance between 2014Q1 and 2021Q4. A cash-out refinance is identified when the total value of the sampled refinance loan and their associated junior liens was more than 5% larger than its preceding loan and associated junior liens. Borrowers with zero balances or missing data for the quarter before refinance are not included, nor are loans with three or more borrowers on file. Missing credit score values are filled in using the most recent non-missing score, and remaining borrowers with missing values for the quarter of refinance are dropped. Missing 75th percentile markers in quarters 3, 4, and 5 are due to overlap with the 90th percentile markers (both have values of 0 in all three quarters). Source: National Mortgage Database

3.3.3 Student loan balances

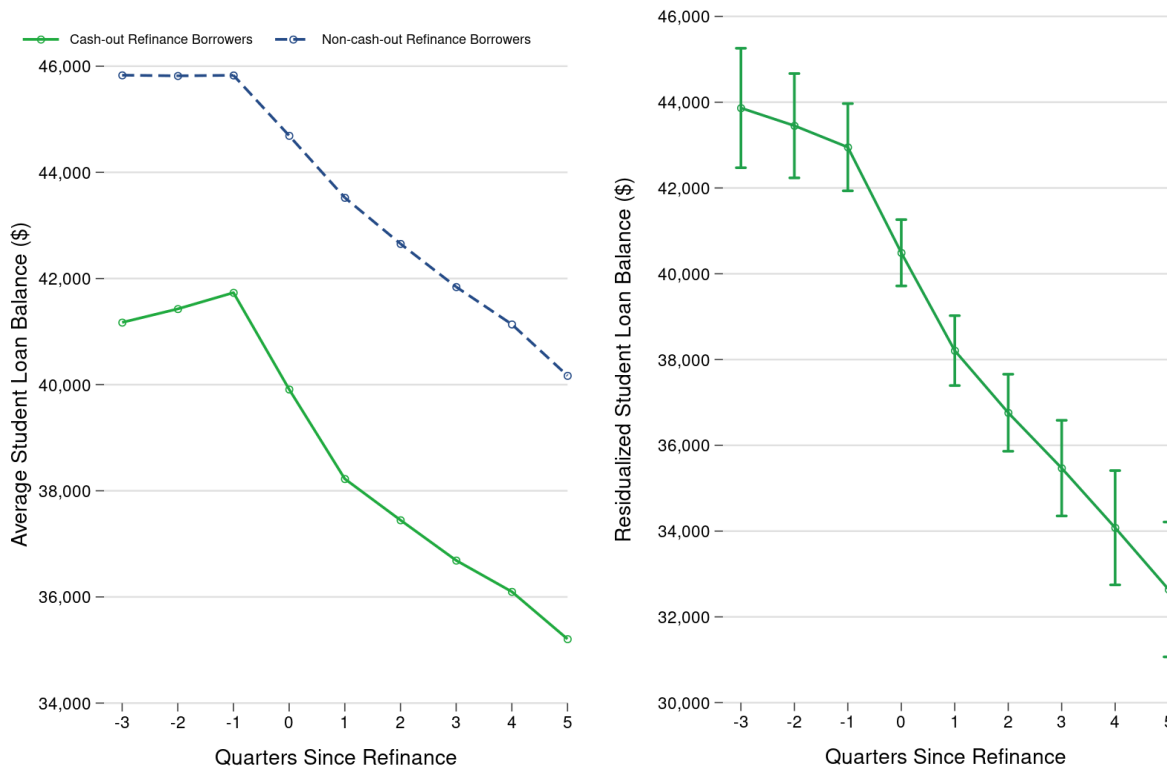
Figures 6 and 7 display the same plots for student loan balances. The left panel in Figure 6 shows average student loan balances gradually declining after refinance for both cash-out and non-cash-out borrowers. This decline is at a similar rate for both groups, though non-cash-out borrowers had higher student loan balances than cash-out borrowers before refinance: in the quarter before refinance, non-cash-out borrowers had an average balance of \$45,829 compared to \$41,733 for cash-out borrowers. During the quarters of and immediately after the refinance, cash-out borrowers' student loan balances declined more steeply than non-cash-out borrowers, suggesting that some cash-out borrowers used their funds towards student loan repayment. As a

result, the difference in average balance between non-cash-out borrowers and cash-out borrowers is higher five quarters after refinance than in the quarter before refinance (\$4,961 vs. \$4,096).

The residualized graph on the right panel in Figure 6 shows the same gradual decline in student loan balances as the graph of raw averages. Additionally, after applying our set of controls for credit scores and other borrower characteristics, student loan balances in the period before refinance appear higher, while for the rest of the observed period the confidence intervals include the raw averages measured in the first panel – with the exception of $t = 5$, where the predicted confidence interval is lower than the raw average. Overall, student loan balances decrease at the quarter of refinance and remain lower than in the pre-refinance period for the rest of the observed timeframe. Balances one quarter after refinance are lower than in the quarter of refinance, and balances in quarter five are lower than in quarters 1 and 2.¹⁸

¹⁸ Due to repayment and interest pauses during the pandemic, there may be concern that choices to pay down debt differ when comparing the periods before and after the pandemic. Dropping all refinances originated in 2019 or later (such that our new sample consists only of loans with a post-refinance period entirely pre-pandemic), we see that the shape of the residualized quarter-to-quarter balance graph remains the same, with a sharp decline after refinance followed by a slower decline suggestive of regular repayment. The levels are lower, which is not unexpected.

FIGURE 6: AVERAGE STUDENT LOAN BALANCES FOR CASH-OUT AND NON-CASH-OUT REFINANCE BORROWERS

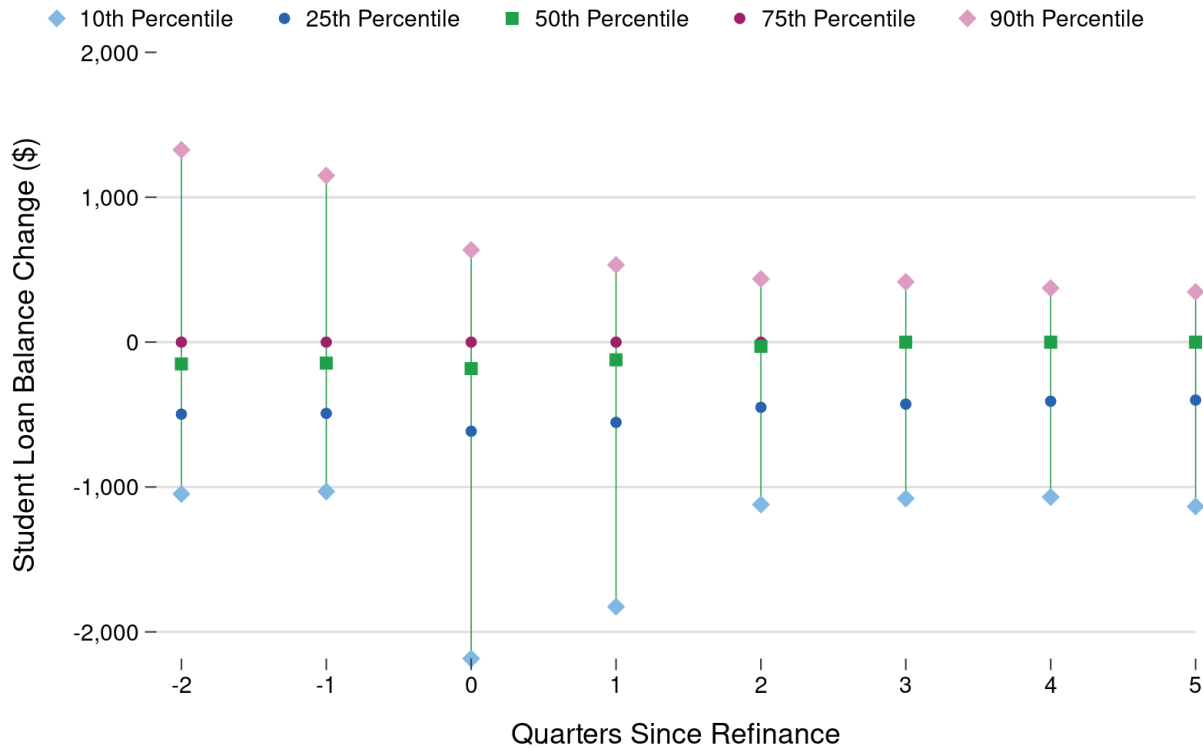


Note: Sample borrowers took out a refinance between 2014Q1 and 2021Q4. A cash-out refinance is identified when the total value of the sampled refinance loan and their associated junior liens was more than 5% larger than its preceding loan and associated junior liens. Borrowers with zero balances or missing data for the quarter before refinance are not included, nor are loans with three or more borrowers on file. Missing credit score values are filled in using the most recent non-missing score, and remaining borrowers with missing values for the quarter of refinance are dropped. Source: National Mortgage Database

The pattern in Figure 7 appears very similar to that of Figure 5. We observe that most cash-out borrowers reduced their student loan balances over time, with the median borrower’s student loan balance decreasing between \$122 and \$183 each quarter until the second quarter after the refinance, when the median payment becomes \$30, before staying at \$0 for all quarters thereafter. This is consistent with borrowers making regular payments on their loans. In the two quarters before the refinance event, slightly less than 25 percent of borrowers are increasing their student loan balances (as seen by the 75th percentiles). Indeed, the borrower(s) at the 90th percentile (in terms of change to student loan balances) two quarters before refinance saw an increase of \$1,327 to their student loan debt. In the quarter of refinance, the distribution of balance changes skews negative as many cash-out borrowers significantly reduce their student loan balances, more so than the typical amounts consistent with regular repayments. For

example, the borrower(s) at the 10th percentile saw a reduction of \$2,184 to their student loan balance.

FIGURE 7: QUARTER-TO-QUARTER CHANGE IN STUDENT LOAN BALANCES FOR CASH-OUT REFINANCE BORROWERS, BY PERCENTILE



Note: Sample borrowers took out a cash-out refinance between 2014Q1 and 2021Q4. A cash-out refinance is identified when the total value of the sampled refinance loan and their associated junior liens was more than 5% larger than its preceding loan and associated junior liens. Borrowers with zero balances or missing data for the quarter before refinance are not included, nor are loans with three or more borrowers on file. Missing credit score values are filled in using the most recent non-missing score, and remaining borrowers with missing values for the quarter of refinance are dropped. Missing 75th percentile markers in quarters 3, 4, and 5 are due to overlap with the 50th percentile markers (both have values of 0 in all three quarters). Source: National Mortgage Database

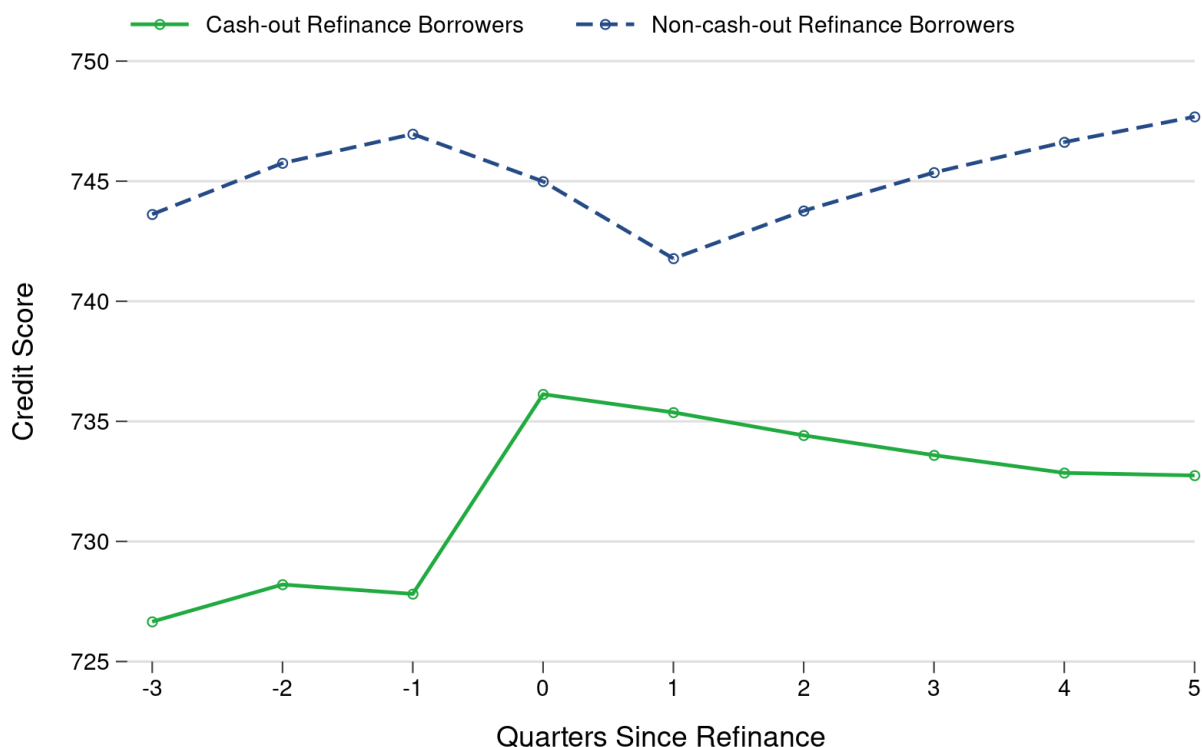
3.3.4 Credit scores

Figure 8 shows average credit scores for cash-out and non-cash-out refinance borrowers. Similar to what we found in our first blog post comparing median credit scores of cash-out and non-cash-out borrowers, non-cash-out borrowers had higher average credit scores than cash-

out borrowers throughout the analyzed period.¹⁹ This is heightened by the increase in credit score just before refinance, with the peak at $t = -1$, which may be consistent with borrowers taking steps to improve their credit score in advance of taking out a mortgage. Cash-out borrowers' credit scores spiked upward at the quarter of refinance; thereafter, their scores gradually declined. However, non-cash-out borrowers' credit scores decreased at the time of refinance and the following quarter, followed by an increase during quarters two through five post-refinance, with their average credit score in quarter five higher than it was in the three quarters before refinance. The behavior of average credit scores for non-cash-out borrowers is expected: applying for the refinance involves a "hard pull" of their credit reports and a resulting temporary reduction to their credit scores. That cash-out borrowers saw a sharp increase to their credit scores despite the "hard pull" of credit reports may be further evidence that they used extracted equity to pay down non-mortgage debt.

¹⁹ See Alexei Alexandrov, Noah Cohen-Harding, and Patrick Lapid, "Office of Research blog: A look at cash-out refinance mortgages and their borrowers between 2013 to 2023" (December 18, 2023), Consumer Financial Protection Bureau, available at <https://www.consumerfinance.gov/about-us/blog/office-of-research-blog-a-look-at-cash-out-refinance-mortgages-and-their-borrowers-between-2013-to-2023/>.

FIGURE 8: AVERAGE CREDIT SCORES FOR CASH-OUT AND NON-CASH-OUT REFINANCE BORROWERS



Note: Sample borrowers took out a cash-out refinance between 2014Q1 and 2021Q4. A cash-out refinance is identified when the total value of the sampled refinance loan and their associated junior liens was more than 5% larger than its preceding loan and associated junior liens. Borrowers with zero balances or missing data for the quarter before refinance are not included, nor are loans with three or more borrowers on file. Missing credit score values are filled in using the most recent non-missing score, and remaining borrowers with missing values for the quarter of refinance are dropped. Source: National Mortgage Database

3.4 Changes to non-mortgage debt among cash-out borrowers

How did non-mortgage debt balances change in percentage terms for cash-out refinance borrowers with non-mortgage debt? Table 3 shows the proportion of borrowers for each of the above debt types (credit cards, auto loans, and student loans) who saw their balance either increase or decrease between the quarter before and the quarter after refinance. Both are split into large (10 percent or greater) and small (between 0 and 10 percent) balance changes. The samples of cash-out borrowers in Table 3 are the same as for Table 2.

TABLE 3: CHANGES TO NON-MORTGAGE DEBT BALANCES AMONG CASH-OUT REFINANCE BORROWERS AROUND THE TIME OF REFINANCE, CLASSIFIED BY DIRECTION AND MAGNITUDE

Debt Type	% with large balance decrease (>10%)	% with small balance decrease (0-10%)	% with small balance increase (0-10%)	% with large balance increase (>10%)
Credit Card	57.2%	7.4%	6.3%	28.8%
Auto Loan	68.5%	16.4%	0.9%	14.0%
Student Loan	27.2%	37.0%	12.7%	7.6%
Total Non-Mortgage Debt	61.4%	12.0%	5.9%	19.9%

Note: Sample borrowers took out a cash-out refinance between 2014Q1 and 2021Q4. A cash-out refinance is identified when the total value of the sampled refinance loan and their associated junior liens was more than 5% larger than its preceding loan and associated junior liens. Borrowers with zero balances or missing data for the quarter before refinance are not included, nor are borrowers with no non-mortgage debt in either the second or third quarter before refinance, nor are loans with three or more borrowers on file. Increases and decreases are measured between the quarter before and the quarter after refinance. Source: National Mortgage Database

We observe that cash-out refinance borrowers with credit balances or auto debt were likely to have large percentage decreases in their credit card and auto loan balances after refinancing. For credit cards, 57.2 percent of cash-out refinance borrowers with credit card balances had a decrease of 10 percent or more, while for auto loans 68.5 percent of cash-out borrowers experienced such a decrease. For student loans, a much smaller portion of cash-out borrowers (only 27.2 percent) saw large percentage decreases in their balances. The proportion of borrowers who saw large percentage increases to their non-mortgage debt is markedly lower: 28.8 percent of borrowers increased their credit card balances by more than 10 percent, and only 14.0 percent and 7.6 percent saw similar large increases to their auto and student loan debt, respectively. In combination with Figures 1-8, our findings show that cash-out borrowers were likely to pay down their credit card and auto loan debt, with a small share increasing their balances around refinance.

Do borrowers who say they use the cash-out funds to pay off other bills or debts actually end up doing so? Because the National Survey of Mortgage Originations is sampled from the National Mortgage Database, we observed that 84.1 percent of surveyed cash-out refinance borrowers who reported “paying off other bills or debts” as a reason for refinance have an observed decrease in their non-mortgage debt between the quarter before refinance and the quarter after refinance. 75.1 percent have an observed large decrease (10 percent or more). It is possible that

many of the cash-out borrowers in the remaining 15.9 percent who reported “paying off other bills or debts” without an observed decrease in credit or debt balances in the NMDB used their funds to pay off bills and debts that are not reported in credit records.

4. Conclusion

“Paying down other bills or debts” is consistently the most reported use of funds from a cash-out refinance. In this report, we have shown how non-mortgage debt balances for cash-out refinance borrowers evolve before, during, and after their refinance origination. Using credit record data, we showed that cash-out borrowers with credit card and auto loan balances prior to the refinance had substantial decreases in their credit card and auto loan balances and their credit card utilization around the time of the refinance, with the majority of cash-out borrowers with either credit card or auto loan debt paying down 10 percent or more of their pre-refinance balances. However, student loans were less likely to be paid down after a cash-out refinance. We also showed that cash-out borrowers’ average credit scores increased at the time of refinance while the scores of non-cash-out borrowers decreased.

In the quarters after the refinance, the average credit card balance and utilization increased for cash-out borrowers but stayed relatively stable for non-cash-out borrowers. Average credit scores for cash-out borrowers declined slightly while remaining elevated compared to the period prior to refinance; for non-cash-out borrowers, credit scores increased such that the decrease at the time of refinance was fully recovered from by the fifth quarter after refinance. By contrast, average auto loan and student loan balances decreased at similar rates for both cash-out and non-cash-out borrowers in the periods following refinance. For cash-out borrowers specifically, we also showed how the distribution of balance changes varies over time for these three debt types, skewing negative during the quarter of refinance, suggesting that many are paying off balances using the extracted equity.

Even though we cannot observe non-mortgage interest rates in the NMDB, since interest rates for credit cards are generally higher than for mortgages, the larger frequency and amount of paydowns we observe for credit cards is consistent with borrowers substituting away from higher-interest debt. Yet we see cash-out borrowers’ credit card balances rising in the year after their refinance, suggesting that cash-out borrowers’ expenses and use of credit persisted after the refinance event. A high frequency of paydowns for auto loan balances could be from auto loans with higher interest rates than borrowers’ mortgages, but also from the possibility of owning one’s vehicle and no longer making auto loan payments.²⁰ The lower likelihood of paying down student loans among cash-out borrowers may be due to smaller interest rate differences

²⁰ As shown in Figure 4 of this report, average auto loan balances were approximately \$22,500 for cash-out borrowers with auto loans before their refinance. We show in our previous blog post on cash-out refinances that the median cash-out amount is approximately \$37,000, so fully paying off auto loan balances is possible for some borrowers. See <https://www.consumerfinance.gov/about-us/blog/office-of-research-blog-a-look-at-cash-out-refinance-mortgages-and-their-borrowers-between-2013-to-2023/>.

between student loans and mortgages, as well as loan repayment plan and loan forgiveness options for federal student loans.

We note that consumers may face substantial costs and other barriers to accessing their home equity for paying down debts or for other uses. Referring back to Table 1, we see that the third most frequent response to uses of cash-out funds were to pay the closing costs of the new mortgage. These costs can be substantial: they can include origination fees, appraisal fees, title insurance, and other taxes and fees to complete the mortgage transaction. In addition, the rise in interest rates starting in 2022 can result in additional costs to consumers, since the cash-out refinance may result in a higher-interest-rate mortgage replacing one with a lower interest rate.²¹ Thus, even with the observed paying down of outstanding debt among the borrowers in our sample, the financial benefits of extracting equity via cash-out refinancing will vary on individual circumstances and market conditions.

²¹ See Consumer Financial Protection Bureau, “CFPB Mortgage Report Finds Jumps in Closing Costs and Denials for Insufficient Income, Growing Proportion of Cash-Out Refinances” (September 27, 2023), available at <https://www.consumerfinance.gov/about-us/newsroom/cfpb-mortgage-report-finds-jumps-in-closing-costs-and-denials-for-insufficient-income-growing-proportion-of-cash-out-refinances/>.

5. Appendix

APPENDIX TABLE A1: REGRESSION RESULTS FOR NON-MORTGAGE DEBT BALANCES AND UTILIZATION

Dep. Var.:	(1) Auto Loan Balance (\$)	(2) Student Loan Balance (\$)	(3) Credit Card Balance (\$)	(4) Credit Card Utilization (%)
Indicator for t = -3	2281.9*** (305.4)	3375.6*** (644.6)	3117.6*** (125.1)	8.262*** (0.316)
Indicator for t = -2	2435.2*** (286.1)	2962.6*** (636.4)	3353.0*** (133.3)	8.334*** (0.310)
Indicator for t = -1	2421.6*** (219.2)	2461.4*** (501.1)	3633.5*** (176.0)	8.404*** (0.404)
Indicator for t = 1	-872.8*** (197.6)	-2280.8*** (536.0)	-1147.2*** (122.6)	-2.342*** (0.173)
Indicator for t = 2	-1229.0*** (299.8)	-3729.6*** (754.6)	-541.3*** (177.3)	-0.417 (0.237)
Indicator for t = 3	-1732.3*** (388.1)	-5020.8*** (858.1)	-122.5 (224.6)	0.786 (0.296)
Indicator for t = 4	-2348.4*** (446.7)	-6410.7*** (914.9)	131.2 (266.3)	1.486*** (0.339)
Indicator for t = 5	-3072.0*** (502.3)	-7849.8*** (1013.1)	202.1 (307.0)	1.822*** (0.388)
Income relied upon in underwriting (\$)	0.0426*** (0.000658)	0.104*** (0.00487)	0.0238*** (0.000786)	-0.00000887*** (0.00000772)
Credit score at origination	-37.49*** (1.791)	-83.26*** (2.777)	-63.05*** (0.735)	-0.281*** (0.00152)
Number of borrowers on the mortgage	5453.6*** (116.5)	3062.1*** (278.8)	4062.6*** (77.97)	0.448*** (0.0359)
Age	-158.4*** (6.629)	-151.5*** (16.09)	61.19*** (4.605)	-0.0578*** (0.00765)
Indicator for Asian on File with One Borrower	-1162.9*** (114.8)	2350.8*** (808.1)	1218.9*** (88.36)	-6.577*** (0.200)
Indicator for American Indian on File with One Borrower	1250.8*** (181.7)	-1229.0 (833.5)	-1047.7*** (62.49)	-0.700*** (0.160)
Indicator for Black on File with One Borrower	279.2*** (99.18)	14311.0*** (573.4)	-2183.4*** (91.64)	0.0285 (0.0980)
Indicator for Hispanic on File with One Borrower	1029.9*** (73.40)	-2522.5*** (186.4)	-1140.1*** (40.83)	-2.358*** (0.0854)
Indicator for Multiracial on File with One Borrower	1464.9*** (107.7)	1329.3*** (429.2)	-291.2*** (62.35)	0.353 (0.156)
Indicator for Pacific Islander on File with One Borrower	-318.2 (222.0)	1203.9 (612.2)	25.88 (159.8)	-0.111 (0.222)
Number of Asians on File with Two Borrowers	-1618.0*** (94.31)	-72.76 (146.6)	164.0 (56.10)	-3.131*** (0.0618)
Number of American Indians on File with Two Borrowers	1428.1*** (126.5)	-121.3 (471.8)	-338.7*** (64.71)	1.158*** (0.150)
Number of Blacks on File with Two Borrowers	832.6*** (80.84)	8032.5*** (318.5)	-344.4*** (44.03)	0.415*** (0.0869)
Number of Hispanics on File with Two Borrowers	892.1*** (41.34)	-911.0*** (85.01)	-733.7*** (40.22)	-0.853*** (0.0457)
Number of Multiracial on File with Two Borrowers	1100.3*** (134.7)	5960.0*** (295.9)	640.1*** (73.19)	0.169 (0.113)
Number of Pacific Islanders on File with Two Borrowers	252.5 (142.9)	5817.0*** (376.9)	629.6*** (88.92)	0.644*** (0.138)
Constant	43098.9*** (1342.3)	89777.7*** (1279.4)	44502.9*** (796.7)	245.2*** (0.997)
Observations	2822058	974781	4021389	3818834
Adjusted R ²	0.090	0.048	0.139	0.400

Note: Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Sample is cash-out borrowers who took out a refinance between 2014Q1 and 2021Q4. Excluded event study quarter t = 0 is quarter of refinance. Borrowers with zero balances or missing data for the quarter before refinance are not included, nor are borrowers with no non-mortgage debt in either the second or third quarter before refinance, nor are loans with three or more borrowers on file.

Source: National Mortgage Database

APPENDIX TABLE A2: REGRESSION RESULTS FOR NON-MORTGAGE DEBT DELINQUENCY (60+ DAYS)

Dep. Var.:	(1)	(2)	(3)
	Auto Loan 60+ Days Delinquent	Student Loan 60+ Days Delinquent	Credit Card 60+ Days Delinquent
Indicator for t = -3	0.00136*** (0.000375)	0.00123*** (0.000111)	0.00629*** (0.000701)
Indicator for t = -2	0.00110** (0.000349)	0.000647*** (0.000118)	0.00416*** (0.000600)
Indicator for t = -1	0.000640* (0.000266)	0.0000521 (0.000135)	0.00169*** (0.000462)
Indicator for t = 1	-0.000317 (0.000292)	0.000112 (0.000131)	-0.000114 (0.000432)
Indicator for t = 2	-0.000464 (0.000385)	0.000245 (0.000159)	0.00131* (0.000614)
Indicator for t = 3	-0.000295 (0.000455)	0.000208 (0.000160)	0.00277*** (0.000904)
Indicator for t = 4	-0.000287 (0.000525)	0.000200 (0.000214)	0.00467*** (0.00117)
Indicator for t = 5	-0.000325 (0.000623)	0.000198 (0.000247)	0.00599*** (0.00134)
Income relied upon in underwriting (\$)	-1.66e-08*** (7.28e-10)	-3.98e-09*** (5.66e-10)	-2.45e-08*** (8.41e-10)
Credit score at origination	-0.000207*** (0.00000448)	-0.0000594*** (0.00000431)	-0.000432*** (0.00000870)
Number of borrowers on the mortgage	-0.000542*** (0.0000703)	0.00176*** (0.000158)	0.00380*** (0.000165)
Age	0.000211*** (0.00000523)	-0.0000328*** (0.00000767)	0.000276*** (0.00000773)
Indicator for Asian on File with One Borrower	0.000608 (0.000348)	0.000788*** (0.000166)	0.000414 (0.000408)
Indicator for American Indian on File with One Borrower	0.00185 (0.00111)	-0.000230 (0.000798)	-0.0121*** (0.00131)
Indicator for Black on File with One Borrower	0.0137*** (0.000430)	0.00377*** (0.000363)	0.00896*** (0.000564)
Indicator for Hispanic on File with One Borrower	0.00159*** (0.000223)	-0.000479*** (0.000118)	-0.00279*** (0.000424)
Indicator for Multiracial on File with One Borrower	0.00714*** (0.000885)	-0.000249 (0.000412)	0.0105*** (0.00114)
Indicator for Pacific Islander on File with One Borrower	-0.000810 (0.00168)	0.000950 (0.000657)	-0.00164 (0.00125)
Number of Asians on File with Two Borrowers	0.000379** (0.000108)	-0.000222 (0.000115)	0.00223*** (0.000239)
Number of American Indians on File with Two Borrowers	-0.00108* (0.000533)	0.00186*** (0.000464)	-0.00107 (0.00135)
Number of Blacks on File with Two Borrowers	0.00503*** (0.000314)	0.00305*** (0.000371)	0.00748*** (0.000411)
Number of Hispanics on File with Two Borrowers	0.000513* (0.000206)	0.0000419 (0.0000818)	0.0000698 (0.000206)
Number of Multiracial on File with Two Borrowers	-0.00204*** (0.000404)	-0.000176 (0.000289)	0.000151 (0.000596)
Number of Pacific Islanders on File with Two Borrowers	0.000693 (0.000493)	0.000276 (0.000379)	0.000614 (0.000793)
Constant	0.151*** (0.00308)	0.0451*** (0.00327)	0.314*** (0.00625)
Observations	2822058	2822058	2822058
Adjusted R ²	0.027	0.007	0.046

Note: Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Sample is cash-out borrowers who took out a refinance between 2014Q1 and 2021Q4. Excluded event study quarter $t = 0$ is quarter of refinance. Borrowers with zero balances or missing data for the quarter before refinance are not included, nor are borrowers with no non-mortgage debt in either the second or third quarter before refinance, nor are loans with three or more borrowers on file.

Source: National Mortgage Database