



The Influence of the COVID-19 Pandemic on Recent Homebuyers



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Foreword

The COVID-19 pandemic provided an unexpected opportunity to see how a sample of recent homebuyers fared during an unprecedented, negative event that had rippling effects on housing stability and financial security nationwide. The question posed by this analysis was to describe the overall financial outcomes before and after the onset of the COVID-19 pandemic for a sample of low- to middle-income first-time homebuyers who purchased a home by December 2019. The sample of recent homebuyers analyzed in this report participated in HUD’s First Time Homebuyer Education and Counseling Demonstration, but the report does not speak to the impact of housing counseling. This report only analyzes how the sample of homebuyers fared during COVID-19, based on their status as recent homebuyers, regardless of whether they were randomly assigned to the treatment or control group in the FTHB Demonstration.

To conduct this analysis, the study team used credit bureau data from July 2017 through December 2021 to examine (1) how the levels in the financial circumstances of the homebuyers changed in July 2020 relative to prepandemic trends in these financial measures. This analysis does not try and separate the influence of the COVID-19 pandemic from any national or local pandemic responses or to look at the impact of the intervention tested in the demonstration, but rather interprets the findings as capturing the influence of the pandemic in its totality on this study sample of first-time homebuyers up to December 2021.

The analysis found that the homebuyer sample experienced improvements in several financial indicators between 2017 and 2021, including an increase in credit scores, a decrease in nonhousing debt, and a decrease in student loan and mortgage delinquencies. Most improvements in financial indicators and mortgage performance were experienced by a range of different subgroups of recent homebuyers, including by age, gender, and race and ethnicity. These positive findings are consistent with other research and probably because of the combination of decreased consumer spending and aggressive government interventions to mitigate the impact of the pandemic on homeowners.



Solomon Greene
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Actions Taken by HUD's Office of Housing Counseling and HUD-Certified Housing Counselors During the COVID-19 Pandemic

Throughout the COVID-19 pandemic, HUD-certified housing counselors provided essential support to families facing housing instability. The Office of Housing Counseling sent letters to almost 800,000 FHA borrowers who had fallen behind on their mortgage payments, informing them about COVID-19 forbearance options and offering housing counseling services to guide them through the process.

During the height of the COVID-19 pandemic (FY2020-FY2022), the Office of Housing Counseling approved agencies conducted over 15,000 workshops focused on resolving mortgage delinquencies. Housing counselors provided more than 325,000 housing counseling sessions to help resolve or prevent mortgage defaults, ultimately saving nearly 100,000 homeowners from losing their homes. They also guided borrowers through the forbearance process, working closely with mortgage providers to ensure homeowners received the necessary assistance.

Housing counselors also assisted families with applications for the Emergency Rental Assistance Program (ERAP) and the Homeowner Assistance Fund (HAF) providing specific guidance to over 100,000 individuals, securing the financial support needed to stay in their homes. Counselors addressed critical needs such as credit management, financial analysis and emergency budgeting, which were crucial in maintaining housing stability and avoiding foreclosure during the pandemic.

HUD-certified housing counselors were instrumental in helping homeowners navigate financial hardships and remain securely housed during one of the most challenging times in recent history.

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Executive Summary

In early 2020, the COVID-19 pandemic hit the United States, causing short-term devastation to the U.S. economy. In response, the government implemented a set of aggressive policy interventions to ameliorate financial hardships. These policy interventions included direct stimulus payments, enhanced unemployment benefits, student loan relief, and credit score protections (specifically, prohibitions on servicers advancing the delinquency status of loans that receive accommodations in their reporting to credit bureaus). It also implemented a host of housing supports—among them, policies developed to protect homeowners from losing their homes. Homeowner support included a foreclosure moratorium and mandatory forbearance for any mortgage borrower who requested one. Other housing policies included an eviction moratorium and funding for state and local governments to address housing instability.

Recent research has shown that individuals' financial well-being actually improved on average, at least during the first year of the pandemic, likely as a result of these policy interventions and individual behavioral changes such as less discretionary spending. However, research has also shown that such improvements were not experienced by some groups—for example, African-American individuals and individuals with lower levels of education (Fulford and Shupe, 2021).

This report supplements these findings about the influence of the COVID-19 pandemic on financial well-being by exploring the influence of the pandemic on the financial situations of low- to middle-income recent first-time homebuyers. This analysis is a selective followup analysis of data from the evaluation of HUD's First-Time Homebuyer Education and Counseling Demonstration, a 2012–22 study that used an experimental design to evaluate the *impacts* of providing access to free homebuyer education and counseling to a large, diverse sample of low- to middle-income prospective first-time homebuyers. This report capitalizes on the availability of that sample to conduct an analysis that focuses on a subset of study participants—those who purchased a home. This report describes the financial outcomes for that subgroup before and after the onset of the COVID-19 pandemic. A separate document, titled *The Impact of Homebuyer Education and Counseling: 6- to 7-Year Followup From the HUD First-Time Homebuyer Education and Counseling Demonstration* (Peck et al., forthcoming), reports the *impacts* of the intervention (that is, the impact of the offer of free homebuyer education and counseling) on the whole sample 6 to 7 years after study enrollment.

The analysis in this report is limited to the 3,746 study participants who purchased a home by December 2019, based on credit bureau data from July 2017 through December 2021. Using national credit bureau data, the research team considered (1) how the *levels* in the financial circumstances of low- to middle-income first-time homebuyers changed in July 2020 (about 4 months after the onset of COVID-19) relative to projections based on the prepandemic trend in these measures and (2) differences in *time trends* for each measure of interest before and after the onset of COVID. The team did not try to disentangle the influence of the COVID pandemic from various policy changes that the government implemented in response to COVID at either the local or national levels. Rather, the team interpreted the findings as capturing the influence of the pandemic as a whole, including both the economic influences of the pandemic (for example, on earned income and spending) and policy interventions put in place, including homeowner supports.

Overall, the team found that several financial indicators for this analysis sample improved after the onset of the pandemic—that is, in July 2020—and the trends for most financial indicators

either persisted or improved further relative to trends in each respective outcome during the period before the pandemic. The team found that—

- **Credit scores improved.** Both the average credit score and the share of the analysis sample with a credit score greater than or equal to 620 improved in July 2020 relative to the projected means for these outcomes based on the prepandemic trend.
- **Nonhousing debt decreased.** Total nonhousing debt decreased in July 2020 relative to the projection based on the prepandemic trend. The team also found that total consumer debt (credit card, auto, and medical), student loan debt, and credit card debt decreased in July 2020 relative to the projection based on the prepandemic trend.
- **Student loan delinquencies decreased.** The share of the analysis sample with student loans 30 or more days past due decreased in July 2020 relative to the projection based on the prepandemic trend.
- **Nonmortgage derogatory events remained stable.** The share of the analysis sample with a nonmortgage derogatory event was not detectably different in July 2020 relative to the projection based on the prepandemic trend.
- **Trends for most financial indicators improved after the onset of the pandemic.** The trends for five out of eight financial indicators improved relative to the trends in these measures in the period before the pandemic. Financial indicators with improved trends after the onset of the pandemic include the share of the analysis sample with credit scores greater than or equal to 620, total nonhousing debt, share of the analysis sample with student loans 30 or more days past due in the past 6 months, total consumer debt, and share of the analysis sample with a major nonmortgage derogatory event.

Mortgage performance—both levels and trends—for the analysis sample also improved after the onset of the pandemic.

- **Mortgage delinquencies decreased.** The share of the analysis sample who had ever been 30 or 60 days delinquent was lower in July 2020 relative to the projection based on the prepandemic trend.
- **Trends in mortgage delinquencies improved after the onset of the pandemic.** The trends through December 2021 in the 30-, 60-, and 90-day delinquency rates improved (that is, increased at a slower rate) relative to the trends in these measures in the period before the pandemic.

Furthermore, the team found that most improvements in financial indicators and mortgage performance were experienced across a range of the subpopulations of recent homebuyers, including by age, gender, and race and ethnicity.

Improving financial conditions during the pandemic might seem counterintuitive, but these findings are consistent with other research and are likely attributable to decreased consumer spending and the aggressive government interventions enacted in response to the pandemic. These findings are dependent on the end point of our analysis. A different end point, during a period after the expiration of all government policy interventions, likely would have revealed different results.

Chapter 1. Introduction

In 2011, HUD launched The First-Time Homebuyer Education and Counseling Demonstration, a large-scale, multisite experimental study intended to generate strong evidence on the effectiveness of homebuyer education and counseling. From September 2013 through February 2016, the study recruited and enrolled 5,854 low-, moderate-, and middle-income prospective first-time homebuyers across 28 large metropolitan areas.^{1,2} The demonstration used a randomized experimental design to assess the effects of homebuyer education, homebuyer preparedness and search counseling, financial capability, and homeownership sustainability. The analysis is limited to 3,746 study participants who purchased their first homes between the time they enrolled in the study and December 2019 and had credit bureau data from July 2017 through December 2021.³

In early 2020, the COVID-19 pandemic hit the United States, killing millions and devastating the U.S. economy. The onset of the pandemic caused the largest 1-month increase in unemployment since the U.S. Bureau of Labor Statistics began publishing data in January 1948, with unemployment rates rising from 4.4 percent in March 2020 to 14.7 percent in April 2020 (BLS, 2020). In response, the federal government enacted several policies to provide financial relief to individuals and families. Collectively, these policies provided a wide range of support to address unemployment, housing instability, and other adverse consequences of the pandemic (exhibit 1).

¹ Low-, moderate-, and middle-income homebuyers are those who have incomes at or below 120 percent of their local area median income (AMI). Specifically, those with incomes less than 50 percent of AMI are classified as “low” income, those with incomes between 50 and 80 percent of AMI are “moderate” income, and those with incomes between 80 and 120 percent of AMI are “middle” income. Those with incomes more than 120 percent of AMI are considered “upper” income and are not targets of this study.

² The 28 metropolitan areas in this study include Atlanta-Sandy Springs-Marietta, GA; Boston-Cambridge-Quincy, MA-NH; Chicago-Naperville-Joliet, IL-IN-WI; Dallas-Fort Worth-Arlington, TX; Detroit-Warren-Livonia, MI; Houston-Sugar Land-Baytown, TX; Las Vegas, NV; Los Angeles-Long-Beach-Santa Ana, CA; Miami-Fort Lauderdale-Miami Beach, FL; Minneapolis-St. Paul-Bloomington, MN-WI; New York-Northern New Jersey-Long Island, NY-NJ-PA; Orlando-Kissimmee, FL; Philadelphia-Camden-Wilmington, PA-NJ-DE-MD; Phoenix-Mesa-Scottsdale, AZ; Portland-Vancouver-Hillsboro, OR-WA; Raleigh-Cary, NC; Riverside-San Bernardino-Ontario, CA; Sacramento-Arden-Arcade-Roseville, CA; San Antonio-New Braunfels, TX; San Diego-Carlsbad-San Marcos, CA; San Francisco-Oakland-Fremont, CA; San Jose-Sunnyvale-Santa Clara, CA; Seattle-Tacoma-Bellevue, WA; St. Louis, MO-IL; Stockton, CA; Tampa-St. Petersburg-Clearwater, FL; Virginia Beach-Norfolk-Newport News, VA-NC; and Washington, D.C.

³ Exhibit A.1 summarizes the baseline characteristics for this analytic sample of first-time homebuyers. Although all study participants included in the sample purchased their first homes between study enrollment (which spanned September 2013 through February 2016) and December 2019 (the most recent period capturing home purchases prior to the pandemic), these first-time homebuyers could have followed varied paths after this initial purchase, including paying off their mortgages, selling their homes, buying second homes, or moving into rental units—as Peck et al., (2021) discusses in more detail. This report ignores these varying post-purchase trajectories and considers how this collective set of first-time homebuyers influenced key financial indicators and mortgage performance measures.

Exhibit 1. Overview of Provisions of Key COVID-19 Relief Legislation

Congress passed several pieces of legislation to help protect individuals and families from the economic impact of the COVID-19 pandemic. This legislation included—

- **The Coronavirus Aid, Relief, and Economic Security (CARES) Act:** On March 27, 2020, Congress passed the CARES Act. The CARES Act's provisions included—
 - **Enhanced and Expanded Unemployment Benefits.** The CARES Act addressed the widespread unemployment resulting from the pandemic by increasing the amount of weekly benefits, providing additional weeks of unemployment benefits for individuals who had reached their benefit limits, and expanding benefits to previously excluded groups.
 - **Housing Support.** The CARES Act included several provisions to protect homeowners and renters from housing insecurity, including (1) an eviction moratorium for rental units in properties that were part of federal assistance programs or had federally backed mortgages or multifamily mortgages, (2) a moratorium on foreclosures on federally backed owner-occupied mortgages, and (3) a requirement that mortgage servicers provide forbearance to any homeowner who requested one.
 - **Relief for Students.** The CARES Act automatically suspended payments and interest accrual on federal student loans.
 - **Direct Stimulus Payments.** The CARES Act provided support to individuals and families in the form of direct cash payments equal to \$1,200 per adult and up to \$500 per child.
 - **Credit Reporting.** The CARES Act prohibited servicers from including the delinquency status of any loan that had received an accommodation in its reporting to credit bureaus. This exclusion included mortgages that received forbearance and federal student loans suspended under the CARES Act.
- **The Consolidated Appropriations Act (CAA):** On December 21, 2020, Congress passed CAA, which built on several of the provisions of the CARES Act, including—
 - **Enhanced Unemployment Benefits.** CAA continued the basic unemployment-related provisions of the CARES Act.
 - **Direct Stimulus Payments.** CAA provided an additional round of stimulus payments (\$600 per adult and dependent child).
 - **Housing Support.** CAA included funding to state and local governments for rental assistance programs.
- **The American Rescue Plan (ARP):** Congress passed ARP on March 11, 2021, providing further relief to individuals and families. Among the supports were—
 - **Enhanced Unemployment Benefits.** ARP extended unemployment benefits for several additional months and made the first \$10,200 in benefits tax free.
 - **Housing Support.** ARP established the Homeowner Assistance Fund, which provided nearly \$10 billion to states, territories, and tribal nations to prevent housing hardships. Funds may be used for such purposes as assisting homeowners with mortgage payments, homeowner's insurance, utility payments, and counseling services.
 - **Direct Stimulus Payments.** ARP provided one-time direct payments of up to \$1,400 per individual for eligible individuals and families.

This report examines the influence that the COVID-19 pandemic had on financial indicators and mortgage performance for the portion of the study's sample of low- to middle-income first-time homebuyers who had purchased homes.⁴ Using national credit bureau data, the team considered (1) how the financial circumstances of low- to middle-income first-time homebuyers changed in July 2020 (about 4 months after the onset of COVID-19) relative to projections based on the

⁴ A separate report presents findings related to the extent to which the offer of homebuyer education and counseling provided an additional buffer to program participants (the treatment group) when they faced that major economic downturn about 6 to 7 years after enrolling in the study (Peck et al., forthcoming). That is, the team estimates the effects of homebuyer education and counseling on financial indicators and mortgage performance in the context of COVID-19.

prepandemic trend in these measures and (2) differences in *time trends* for each measure of interest before and after the onset of COVID.

The motivation for this work stems from the desire to examine how a large, diverse sample of low- to middle-income first-time homebuyers fared during the economic turmoil the COVID-19 pandemic brought on. The team did not try to disentangle the influence of the COVID pandemic from various policy changes that the government implemented in response to it. Rather, the team interprets the findings as capturing the influence of the pandemic as a whole, including both the economic influences of the virus (for example, on earned income and spending) and policy interventions put in place, including the homeowner supports.

Chapter 2. Approach and Findings

The research team conducted an interrupted time series analysis using credit bureau data from July 2017 to December 2021 to examine the influence of the COVID pandemic on the financial conditions and mortgage performance of the portion of the study sample who had purchased homes. The team also examined the influence of the COVID pandemic on selected subsamples of recent homebuyers defined by age at study enrollment, race and ethnicity, gender, borrower income at study enrollment, credit score at study enrollment, and whether the study participant had a Federal Housing Administration (FHA) loan as of December 2019. For context, exhibit 2 summarizes the provisions of key federal legislation that provided financial relief to individuals and families in response to the pandemic.

Exhibit 2. Summary of Key COVID-Related Financial Supports by Federal Legislation

	Enhanced Unemployment Benefits	Housing Protections and Support	Student Loan Protections	Direct Stimulus	Modifications to Credit Reporting Requirements for Loans With Accommodations	Other (e.g., Childcare, Health Insurance Subsidies)
Coronavirus Aid, Relief, and Economic Security Act (March 2020)	X	X	X	X	X	
Consolidated Appropriations Act (December 2020)	X			X		
American Rescue Plan (March 2021)	X	X		X		X

Using the interrupted time series analysis, the team estimated—

- **The influence of the pandemic on the *levels* of outcomes.** The team calculated the differences between the mean levels of outcomes in July 2020 (the first time point for which outcomes were observed during the pandemic) and the *projected* July 2020 mean outcome levels based on the pre-pandemic trend. This calculation addresses how the pandemic and its responses influenced outcomes in the form of a one-time “shock” early in the pandemic.
- **The influence of the pandemic on *trends* in outcomes.** The team calculated differences for each outcome between pre-COVID time trends (using credit bureau data from July 2017 through December 2019) and during-COVID time trends (using credit bureau data from July 2020 through December 2021). This calculation shows how the pandemic and the response to it influenced the trend of outcomes over time.

This section describes findings from the analysis, both for the full sample of recent homebuyers (section 2.1) and for subpopulations of homebuyers (section 2.2). Chapter 3 provides a discussion of these findings.

Exhibit 3 explains how to read the regression estimates from the interrupted time series analysis and the graphical representations of these same estimates. Appendix A details the methodology. Appendix B provides additional detail on the construction of measures. Appendix C provides

interrupted time series regression estimates for subpopulations of purchasers defined by age at study enrollment, race and ethnicity, gender, borrower income at study enrollment, credit score at study enrollment, and whether the study participant had a FHA loan as of December 2019.⁵ Appendix C also includes a comparison of results for purchasers and nonpurchasers for those interested.

Exhibit 3. How to Read the Exhibits That Report the Influence of the COVID-19 Pandemic

This exhibit explains how to read the exhibits and interpret the estimates from the interrupted time series analysis. To help with the explanation, an example is included based on the credit score outcome (presented in the first row of exhibit 4 and depicted in the following graphic).

- **Mean Level of the Outcome in July 2017 (column 1)** reports the mean outcome at the first prepandemic time point for which the outcome is observed.
- **Monthly Slope of the Outcome Prior to the Pandemic (column 2)** reports that prior to the pandemic, the average credit score increased by about 0.37 points every month. This prepandemic positive trend in credit scores is statistically different from 0 at the 1-percent significance level indicated by three asterisks.
- **Change in the Mean Level of the Outcome as of July 2020 (column 3)** reports the change in the mean level of the outcome in July 2020 (the first time point for which the outcome is observed in the pandemic) relative to the projected mean outcome in July 2020 based on the prepandemic trend. The estimates in this column generally indicate how the pandemic and the response to it influenced outcomes in the form of a one-time “shock” early in the pandemic. In this specific case, the average credit score increased by 4.4 points in July 2020 relative to the projected mean outcome in July 2020 based on the prepandemic trend. This increase in credit scores in July 2020 is statistically different from 0 at the 1-percent significance level indicated by three asterisks.
- **Change in the Monthly Slope of the Outcome After the Onset of the Pandemic (column 4)** reports the difference between prepandemic slope (column 2) versus the slope of the outcome after the onset of the pandemic. The estimates in this column generally indicate how the pandemic and the response to it influenced the trend of outcomes over time. Prior to the pandemic, the average credit score increased by about 0.37 points every month. The estimate in this column reports that the slope decreased by 0.12 points after the onset of the pandemic, implying that the monthly change in credit scores after the onset of the pandemic is 0.25. This 0.12-point decrease in the monthly slope is statistically significant at the 10-percent significance level indicated by one asterisk.
- **Mean Level of the Outcome in December 2021 (column 5)** reports the mean outcome for the latest time point for which the outcome is observed.

⁵ Although not the focus of this report, appendix C also provides interrupted time series regression estimates for the demonstration’s full sample of both purchasers and nonpurchasers (presumably renters), whereas the findings in the main text focus on the subsample of purchasers. Appendix C also provides estimates for the subpopulation of study participants who did not purchase a home by December 2019.

Exhibit 3 Continued

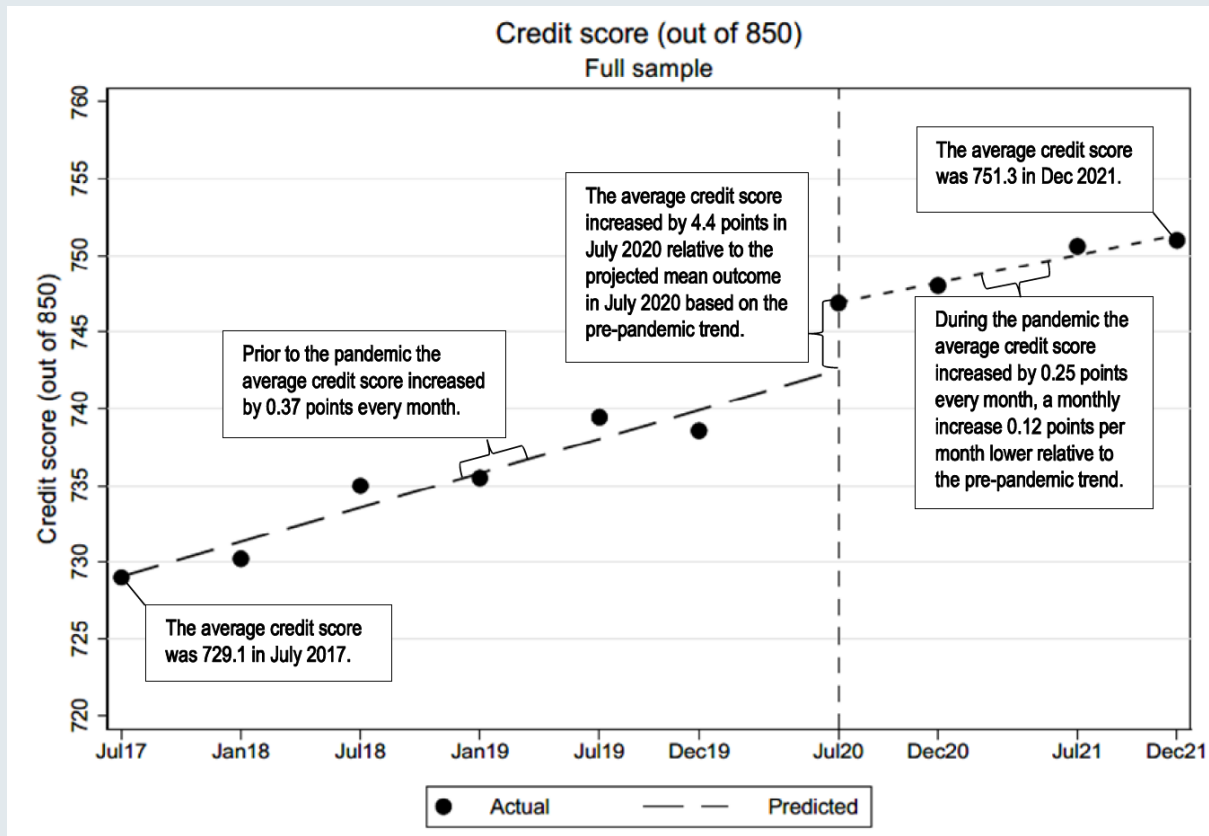


Exhibit 2.1: How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, Full Sample

Outcomes	Mean Level of the Outcome in July 2017	Monthly Slope of the Outcome Prior to the Pandemic	Change in the Mean Level of the Outcome as of July 2020	Change in the Monthly Slope of the Outcome After the Onset of the Pandemic	Mean Level of the Outcome in December 2021
<i>Panel A: Financial Indicators Domain</i>					
Credit score (out of 850)	729.1	0.37*** (0.03)	4.4*** (0.7)	-0.12* (0.05)	751.3

When describing findings, the text sometimes reports the July 2020 mean for a given outcome, although it does not report the July 2020 mean in the exhibits. However, the July 2020 mean is computed from the first three columns in the exhibits. For example, the July 2020 mean credit score is computed as the mean level of the outcome in July 2017 (729.1) + [the monthly slope of the outcome prior to the pandemic (0.37) times the number of months between July 2017 and July 2020 (36)] + the change in the mean level of the outcome as of July 2020 (4.4). This computation implies that the mean credit score in July 2020 was 746.8.

2.1. The Influence of the COVID-19 Pandemic for Recent Homebuyers

Exhibit 4 reports the estimates of the influence of the COVID-19 pandemic based on interrupted time series regressions for the prospective homebuyers who had purchased a home. Exhibits 5 through 7 present graphical illustrations of the regression estimates for select outcomes.

Exhibit 4. How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, Full Sample

Outcomes	Mean Level of Outcome in July 2017	Monthly Slope of Outcome Prior to Pandemic	Change in Mean Level of Outcome as of July 2020	Change in Monthly Slope of Outcome After Onset of Pandemic	Mean Level of Outcome in December 2021
Panel A. Financial Indicators Domain					
Credit score (out of 850)	729.1	0.37*** (0.03)	4.4*** (0.7)	- 0.12* (0.05)	751.3
Study participant has a credit score greater than or equal to 620 (%)	91.0	- 0.09*** (0.02)	2.2*** (0.4)	0.23*** (0.03)	92.4
Total nonhousing debt (\$)	25,820	105*** (12)	- 2,813*** (269)	- 64** (24)	27,467
Student loan balance (\$)	8,570	3 (5)	- 268** (103)	10 (9)	8,614
Student loan account 30 or more days past due in the past 6 months (%)	2.6	0.03 (0.02)	- 1.5*** (0.3)	- 0.08** (0.02)	1.3
Total consumer debt (\$)	16,117	84*** (9)	- 2,404*** (214)	- 64*** (19)	17,091
Credit card debt (\$)	4,664	34*** (3)	- 1,311*** (83)	- 10 (6)	4,986
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	6.7	0.26*** (0.02)	0.4 (0.3)	- 0.17*** (0.02)	18.0
Panel B. Mortgage Performance Domain					
Every 30 days delinquent on any mortgage loan (%)	4.1	0.20*** (0.01)	- 0.7*** (0.2)	- 0.12*** (0.02)	11.9
Every 60 days delinquent on any mortgage loan (%)	2.0	0.10*** (0.01)	- 0.3* (0.2)	- 0.07*** (0.01)	5.8
Every 90 days delinquent on any mortgage loan (%)	1.3	0.07*** (0.01)	- 0.1 (0.1)	- 0.05*** (0.01)	4.1

Notes: The interrupted time series analysis used the Stata command xtitsa. The sample includes 3,746 study participants who had purchased a home by December 2019 and had nonmissing credit bureau data. Standard errors are in parentheses. Appendix A details the analytic methods, and appendix B provides additional detail on the construction of measures. Statistical significance levels for two-sided tests: *** = 1 percent; ** = 5 percent; * = 10 percent.

Source: Credit bureau

Exhibit 5. How the COVID-19 Pandemic Influenced Credit Scores

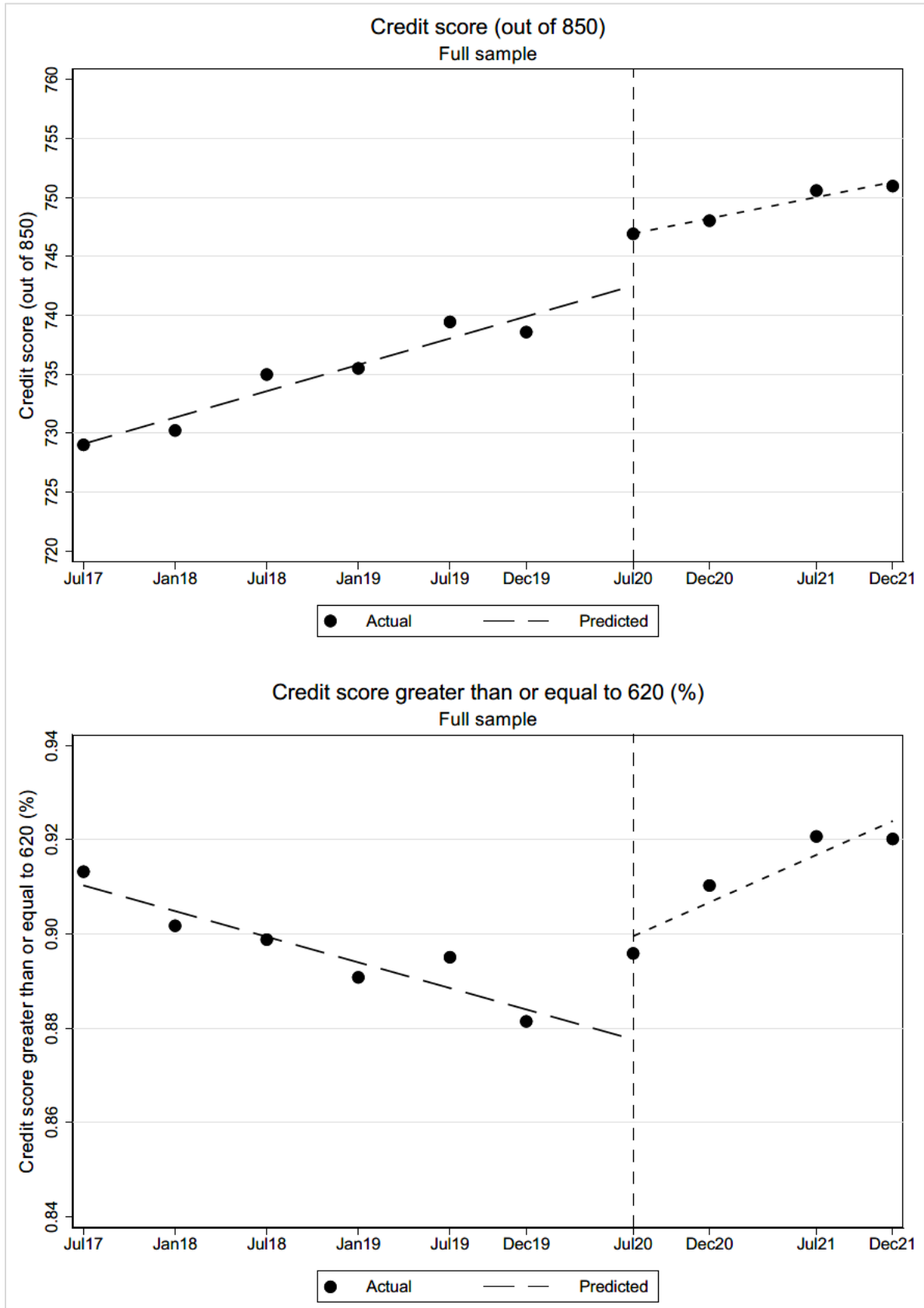


Exhibit 6. How the COVID-19 Pandemic Influenced Nonhousing Debt

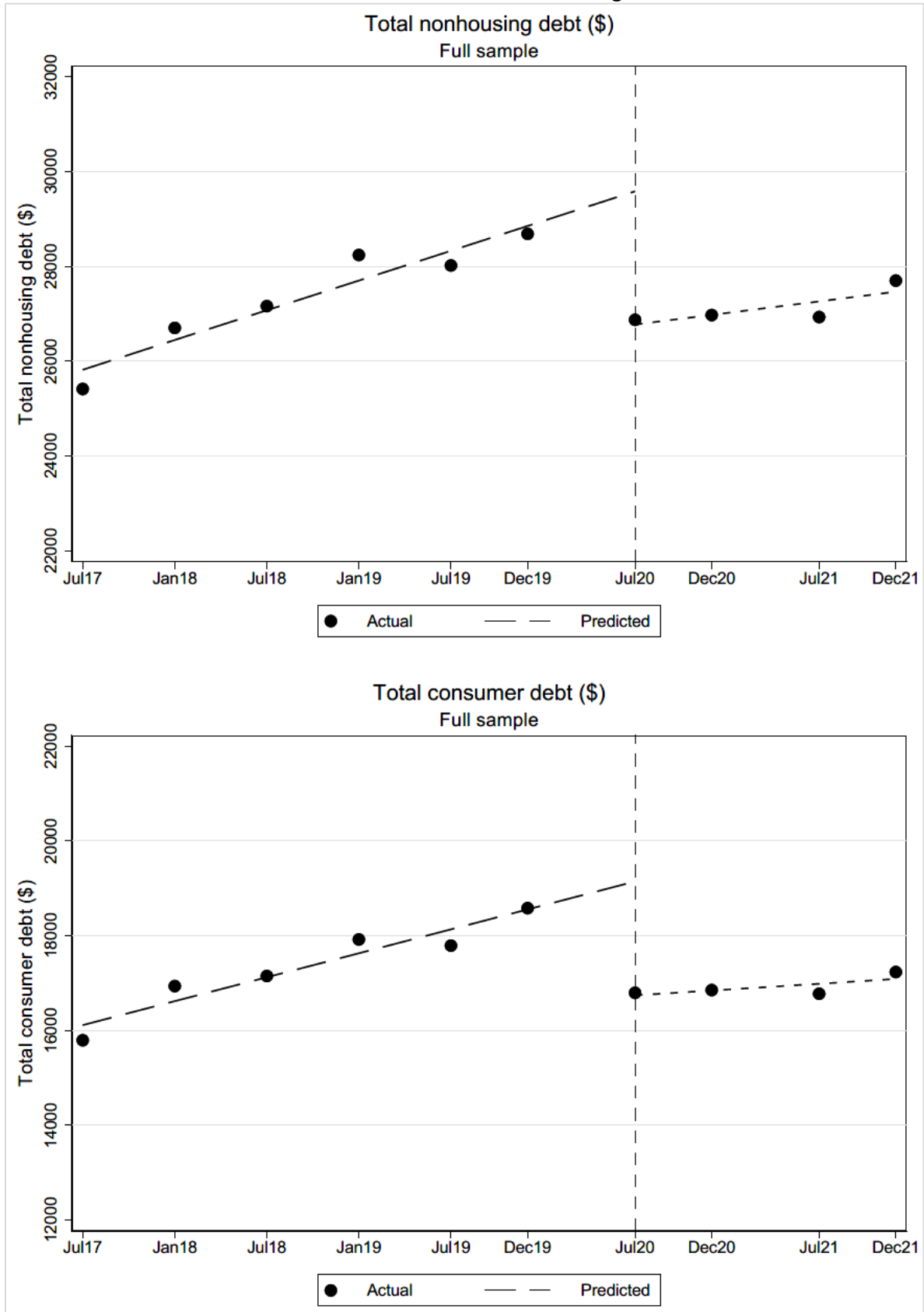
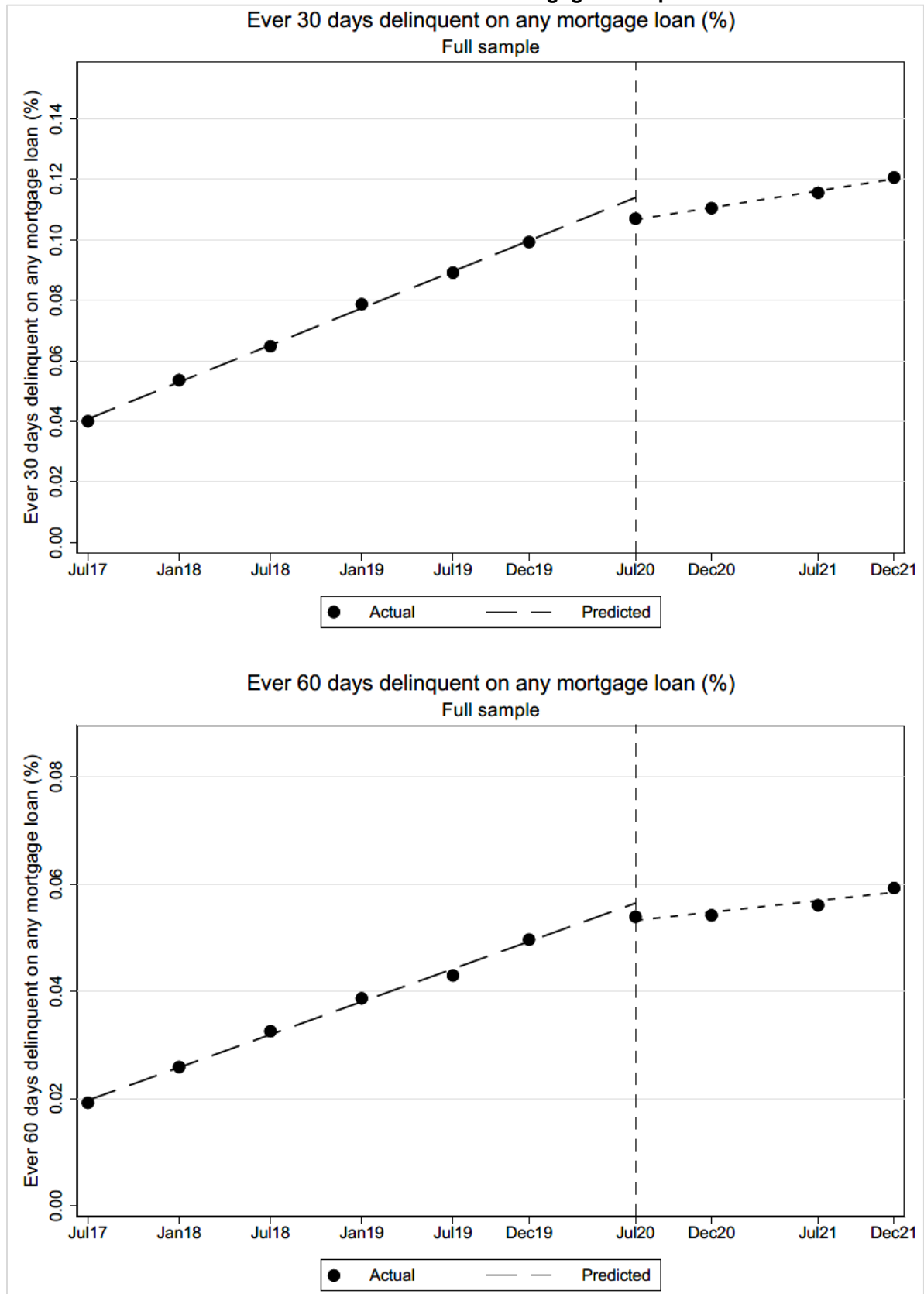


Exhibit 7. How the COVID-19 Pandemic Influenced Mortgage Delinquencies



Overall, the team found that financial indicators for the study’s sample of home purchasers improved after the onset of the pandemic.⁶ The regression estimates in panel A of exhibit 4 indicate the following.

- **Credit scores improved.**⁷ The average credit score (out of 850) increased to 746.8 in July 2020. This increase is 4.4 points higher than the projected mean outcome in July 2020 based on the prepandemic trend.⁸ The share of the analysis sample with a credit score greater than or equal to 620 increased to 90.0 percent in July 2020, 2.2 percentage points higher than the projected share based on the prepandemic trend.
- **Nonhousing debt decreased.** Total nonhousing debt was \$26,787 in July 2020. This number was \$2,813 less than the projected mean outcome based on the prepandemic trend.⁹ The team also found a decrease in the components of nonhousing debt. Consumer debt—including credit card, automobile, and medical debt—decreased by \$2,404 in July 2020, student loan debt decreased by \$268 in July 2020, and credit card debt decreased by \$1,311 relative to the projected means for these outcomes based on the prepandemic trend.
- **Student loan delinquencies decreased.** The share of the analysis sample with student loans 30 or more days past due decreased to 2.2 percent in July 2020. This decrease was 1.5 percentage points less than the projected mean outcome based on the prepandemic trend.
- **Nonmortgage derogatory events remained stable.** The share of the analysis sample with a nonmortgage derogatory event was not detectably different in July 2020 relative to the projection based on the prepandemic trend.

The trends in these financial indicators either persisted or improved after the onset of the pandemic. The favorable changes in financial indicators observed as of July 2020 compared with the prepandemic trend either persisted or improved further through December 2021.¹⁰ The one exception is a slightly less favorable trend in mean credit scores during the pandemic. Prior to the pandemic, the average credit score increased by about 0.37 points every month. The slope

⁶ See chapter 3 for a discussion of possible explanations for and limitations of these findings.

⁷ Credit scores after the enactment of the CARES Act may not reflect or predict risk in the same way as prior to its enactment as a result of its provisions around credit reporting. That is because the CARES Act stipulated that servicers could not include the delinquency status of any loans that had received an accommodation in their reporting to the credit bureaus, and many missed payments of loans were not reflected in credit scores.

⁸ Changes in the average credit score for individuals with credit scores under 680 drove this increase. For these individuals, average credit scores increased by 9.6 points in July 2020 relative to the projected mean outcome based on the prepandemic trend, whereas the average increase was not statistically significant for individuals with credit scores at or above 680. See section 2.2.

⁹ Total nonhousing debt equals the total balance on open installment accounts plus open revolving accounts minus the balance on open mortgage accounts.

¹⁰ Furthermore, two outcomes had an unfavorable trend prior to the pandemic and switched to having a favorable trend after the onset of the pandemic. These outcomes include the share of purchasers with a credit score greater than or equal to 620 and the share with student loans 30 or more days past due in the past 6 months. For example, prior to the pandemic, the share of purchasers who had a credit score greater than or equal to 620 was decreasing by -0.09 percentage points per month from a high of about 91 percent in July 2017 to a low of about 88 percent in December 2019. After the onset of the pandemic, the trend in the share of purchasers who had a credit score greater than or equal to 620 changed to a favorable trend, and the share of purchasers with a credit score greater than or equal to 620 increased by 0.14 percentage points each month after the pandemic.

decreased by 0.12 points after the onset of the pandemic, implying that the monthly change in credit scores after the onset of the pandemic is 0.25.

Mortgage performance also improved after the onset of the pandemic. The share of the sample of first-time homebuyers who had ever been 30 days delinquent was 0.7 percentage points lower in July 2020 than the projected rate for this time point based on the prepandemic trend (exhibit 4, panel B). Similarly, the share of the analysis sample of recent homebuyers who had ever been 60 days delinquent was 0.3 percentage points lower in July 2020 than the projected rate for this time point based on the prepandemic trend. The trends in the 30-, 60-, and 90-day delinquency rates from July 2020 through December 2021 improved (that is, increased at a slower rate) relative to the trend in these measures in the period before the pandemic.

2.2. The Influence of the COVID-19 Pandemic on Subpopulations of Recent Homebuyers

This section reports findings from analyses on the influence of the COVID-19 pandemic on subpopulations of study participants who had purchased a home by December 2019. Appendix C includes interrupted time series regression estimates for subpopulations of purchasers defined by age at study enrollment, race and ethnicity, gender, borrower income at study enrollment, credit score at study enrollment, and whether the participant had an FHA loan as of December 2019. Although not the focus of this report, appendix C also provides interrupted time series regression estimates for the demonstration's full sample of both purchasers and nonpurchasers (presumably renters) and for the subpopulation of study participants who did not purchase a home by December 2019.

The team found that, for the full analysis sample, a range of purchaser subpopulations experienced improvements in financial indicators and mortgage performance.

- **Credit scores improved for a wide range of subpopulations.**¹¹ Mean credit scores increased more than projections as of July 2020 for nearly all subpopulations considered, including those aged 30 or older, 29 or younger, Whites, African-Americans, Hispanics, men, women, those with higher incomes, those with lower incomes, those with baseline credit scores less than 680, and FHA loan recipients. Asians and those with baseline credit scores of 680 or more did not experience an improvement over projections in mean credit scores as of July 2020. However, these two subpopulations of purchasers had the highest prepandemic credit scores of any subpopulation considered, which could explain why the average score for this group did not improve further.
- **Nonhousing debt decreased for all subpopulations.** *All* the examined subpopulations experienced a decrease over projections in nonhousing, total consumer, and credit card debt as of July 2020. Some subpopulations—those age 30 or older, Hispanics, women, and those with a baseline credit score of 680 or more—also experienced a decrease in student loan debt as of July 2020.

¹¹ In the text, for parsimony and to be consistent with prior reports, the labels for subgroups are abbreviated and defined by race and ethnicity. Exhibit titles include the complete labels for the subgroups. The White non-Hispanic, African-American non-Hispanic, Asian non-Hispanic or Hispanic subgroups in the exhibit titles are referred to in the text as simply White, African-American, Asian, or Hispanic, respectively. Each of these four groups—White, African-American, Asian, and Hispanic—are mutually exclusive.

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- **Student loan delinquencies decreased for a wide range of subpopulations.** Subpopulations of home purchasers defined by age, gender, income, those with a baseline credit score less than 680, and those who received a Federal Housing Administration loan experienced a decrease over projections in their student loan delinquency rate as of July 2020. The influence of the pandemic on student loan delinquencies for subpopulations defined by race and ethnicity was mixed. White and African-American first-time homebuyers experienced a decrease in their student loan delinquency rate, whereas Hispanic and Asian first-time homebuyers did not.

The trends in these financial indicators generally persisted or improved after the onset of the pandemic. The trends from July 2020 through December 2021 (the latest data available for this analysis) for these financial indicators generally persisted or improved relative to the trend in the period before the pandemic. That is, improvements in financial indicators these subpopulations experienced that were observed as of July 2020 either persisted or improved further through December 2021.

Mortgage performance improved after the onset of the pandemic for a wide range of subpopulations. The share of first-time homebuyers that experienced mortgage delinquencies declined in the following ways.

- The share of the analysis sample who had ever been 30 days delinquent was smaller in July 2020 than the projected rate for this time point (based on the prepandemic trend) for the following subpopulations of first-time homebuyers: those age 30 and older, the African-American subgroup, the Hispanic subgroup, men, women, those with higher income, those with lower income, those with baseline credit scores less than 680, and FHA loan recipients.
- The share of the analysis sample who had ever been 60 days delinquent was smaller in July 2020 than the projected rate for this time point (based on the prepandemic trend) for women, those with higher income, and those with baseline credit scores less than 680.

Trends in mortgage delinquencies improved after the onset of the pandemic for nearly every subpopulation examined. Of all the subpopulations examined, only Asians did not experience an improvement in their mortgage performance trend after the onset of the pandemic.¹² However, Asians had comparatively very low delinquency rates both before and during the pandemic. For example, less than 2 percent of Asians had ever been 60 days delinquent on a mortgage loan from the time they enrolled in the study through December 2021.

¹² Even White non-Hispanic study members—who did not experience an improvement in delinquencies over projections as of July 2020—did experience an improvement in the *trend* of delinquencies during the pandemic.

Chapter 3. Discussion

Chapter 2 reports results from an interrupted time series analysis that assesses the relationship between the COVID-19 pandemic and the financial circumstances of U.S. adults. The research team found that, on average, *financial indicators* and *mortgage performance* for the study's sample of low-, moderate-, and middle-income first-time homebuyers improved after the onset of the pandemic. Credit scores improved, nonhousing debt decreased, student loan delinquencies decreased, and mortgage delinquencies decreased compared with projections for July 2020 based on prepandemic trends. The trends for these measures from July 2021 through December 2021 (the latest data available for this study) generally either persisted or improved relative to the trend in the period before the pandemic, indicating that improvements in financial indicators observed in July 2020 either were sustained or improved further through December 2021. A wide range of subpopulations—defined by age, race and ethnicity, gender, income, credit score, and receipt of a Federal Housing Administration loan—experienced these improvements in financial indicators and mortgage performance.

Although improvements in the study participants' financial conditions during the pandemic might seem counterintuitive, several factors likely contributed to these improvements. First, behavioral changes such as decreases in discretionary household spending—the result of pandemic-related closures and social distancing—likely boosted the financial health of many Americans.¹³ Second, the government enacted several policies specifically designed to blunt the financial impact of the pandemic on individuals and families. These policies included—

- **Direct Stimulus.** During the pandemic, the federal government sent three waves of stimulus checks (Economic Impact Payments) directly to individuals to help ward off financial hardships. Around 165 million Americans received these payments, which totaled more than \$931 billion.¹⁴
- **Housing Supports.** The federal government enacted several policies to prevent housing insecurity during the pandemic, including several specifically aimed at helping homeowners. These policies included foreclosure moratoria and required that mortgage servicers provide forbearance to any borrower with a federally backed mortgage who attested to financial hardship.¹⁵ The government also established the Homeowner Assistance Fund, which provided nearly \$10 billion to states, territories, and tribal nations to help homeowners facing hardships. Assistance with mortgage payments, homeowner's insurance, utility payments, and counseling services were among the allowable uses of funds.

¹³ Although personal spending on goods and services fell sharply after the onset of the pandemic, spending on services did not rebound as quickly as spending on goods (Bishop, Boulter, and Rosewall, 2022).

¹⁴ The first wave of stimulus payments authorized in March 2020 as part of the CARES Act provided up to \$1,200 per tax filer plus \$500 per child. The second wave, authorized in December 2020 as part of the Consolidated Appropriations Act, provided up to \$600 per tax filer plus \$600 per child. The third round, authorized in March 2020 as part of the American Rescue Plan, provided up to \$1,400 per tax filer plus \$1,400 per child (GAO, 2022).

¹⁵ A separate report includes an analysis of interviews with some of the analysis sample who had experienced a forbearance to understand qualitatively that experience and its implications for them (Peck et al., forthcoming).

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- **Student Relief.** In response to the pandemic, all payments and interest accrual on federal student loans were suspended.¹⁶ Although students could still pay down student loan debt after the enactment of this policy, any nonpayment would not change the total amount owed.
 - **Revisions to Credit Reporting.** A key provision of the Coronavirus Aid, Relief, and Economic Security, or CARES, Act prohibited loan servicers from reporting on the delinquency status of loans that had received an accommodation, including but not limited to mortgages that were in forbearance and all federal student loans.¹⁷ While we find that credit scores improved during the pandemic, it is not entirely clear how to interpret these improvements, given that the CARES Act provisions masked nonpayment of loans that received accommodations.^{18,19}
 - **Other Supports.** The federal government provided several other forms of support to consumers during the pandemic, including enhanced unemployment insurance, enhancements to the Child Tax Credit, and increases in health insurance subsidies.²⁰

Although not all Americans were eligible for or able to access these government supports, the magnitude of this financial relief likely contributed to the improved financial conditions for millions of individuals and families.

The analysis sample of first-time homebuyers, although diverse along many dimensions, differs from the total U.S. population of adults or homeowners. The study includes low- to middle-income U.S. adults who inquired about purchasing their first homes from one of three major national lenders from 2014 through 2016 and had purchased homes by December 2019.²¹ This study's findings will be most relevant to populations similar to the analysis sample—low- to middle-income households with above-average educational attainment, homeownership rates, and credit scores.²² The findings might not carry over for groups that differ in meaningful ways from this analysis sample—such as those with higher incomes or those not interested in homeownership. That said, members of the analysis sample varied quite a bit in their sociodemographic composition and were recruited across 28 large metropolitan areas. Furthermore, the findings are generally consistent with other research on financial well-being during the pandemic. For example, Consumer Financial Protection Bureau research found that

¹⁶ After a 3-year pause, the U.S. Department of Education's student relief ended in the fall of 2023. Interest rates reverted to their prepandemic terms on September 1, 2023, with payments resuming in October.

¹⁷ Of the study participants who purchased homes in the sample, 12.9 percent received a mortgage forbearance, loan modification, or other accommodation during the pandemic.

¹⁸ It is not clear how faithfully servicers implemented this policy, especially in the early months after enactment. For example, lawsuits have been brought against servicers and at least one credit agency for harming borrowers by reporting nonpayments on loans that had received accommodations, including mortgages and student loans in forbearance (CFPB, 2022b; Edwards, 2023; Weiss, 2022).

¹⁹ For more on this topic, see CFPB (2022a).

²⁰ The American Rescue Plan (ARP) temporarily increased the Child Tax Credit from \$2,000 to \$3,600 for each child under age six and to \$3,000 for each child ages 6 through 17, with the credits phasing out for couples making more than \$150,000 a year and individuals making more than \$112,500 a year. ARP also made the credit fully refundable. Efforts to extend these changes beyond the 2021 tax year were unsuccessful.

²¹ Study participants who enrolled in the study during the 2013 pilot period were excluded from this analysis, because collecting their December 2021 credit bureau data was not possible due to informed consent timeout.

²² Some 59 percent of the analysis sample of first-time homebuyers had bachelor's degrees or higher when they enrolled in the study, and the average credit score of the analysis sample was 751 in December 2021, or about 37 points higher than the national average of 714 (Horymski, 2023).

financial conditions improved on average for individuals during the pandemic,²³ and Federal Reserve Bank of Boston research showed that policies in response to COVID, such as mandatory forbearance, helped to relieve financial stress for homeowners (Gerardi, Lambie-Hanson, and Willen, 2021).

The timing of collecting data poses some limitations to the interpretation and potential generalization of results. For example, the incidence of mortgage default tends to decrease after the first few years following loan origination. Because many of the homebuyers in the sample purchased their homes more than 5 years prior to the onset of the pandemic, the improved mortgage delinquency outcomes could be—at least in part—the result of the natural improvement in mortgage performance associated with loan age.²⁴

This study uses credit bureau data at approximately 6-month intervals to capture outcomes. The first measure of outcomes after the onset of the pandemic was in July 2020, about 4 months after the pandemic emerged in the United States. Although unemployment was still extremely high (10.2 percent) that month, it fell notably from the April 2020 high of 14.7 percent. In addition, the most recent data for this analysis was collected in December 2021. Therefore, the post-onset data in this analysis generally overlaps with the timing of the COVID-related government relief efforts described previously and predates the high inflation experienced in 2022. A less favorable influence of the pandemic on financial indicators and mortgage performance may be found if the post-onset outcomes were from April 2020 (that is, prior to the full implementation of the extensive policy interventions) or from late summer of 2022 (that is, after such interventions had expired and inflation had taken off).²⁵ Future research could consider alternative timeframes to explore further the pandemic’s influence on the financial circumstances of adult Americans and how government efforts affected them.

²³ The Consumer Financial Protection Bureau’s study found improvements on average in financial well-being scores, a decrease in the share of consumers with difficulty paying bills, and a decline in credit card debt (Fulford and Shupe, 2021).

²⁴ Research shows a “seasoning effect” for prime mortgages, whereby default rates start low on average in the first year and then increase, peaking around the fifth year after origination (Stein et al., 2010). However, although the overall improvement in the mortgage performance may be partially attributed to the loan’s age, the one-time drop in delinquency in July 2020 is not typical of the seasoning effect.

²⁵ For example, analysis of data collected from the Survey of Household Economic Decisionmaking in October 2022 revealed a sharp decline in many financial indicators from the prior year (Board of Governors of the Federal Reserve System, 2023).

Appendix A. Methodology

This section describes the methods and data used to produce this report's findings.

A.1. Study Participant Recruitment and Characteristics

From September 2013 through February 2016, the First-Time Homebuyer Education and Counseling Demonstration recruited participants into the study via three major national mortgage lenders. As the study's baseline report fully details (DeMarco et al., 2017), those lenders identified potential participants by screening their home loan databases of prospective homebuyers for low-, moderate-, and middle-income first-time homebuyers living in one of the study's 28 metropolitan areas. The demonstration's sample consisted of 5,854 individuals who were eligible based on these and other criteria and who ultimately consented to be in the study.

This analysis is limited to 3,746 study participants who purchased a home by December 2019 and had nonmissing credit bureau data from July 2017 through December 2021.²⁶ All analyses used the pooled sample of treatment and control group members. Exhibit A.1 summarizes the baseline characteristics for this analytic sample. The sample was racially and ethnically diverse, with more men than women. The sample reflects a wide range of educational attainment, with most participants holding at least a bachelor's degree (59 percent). Most participants in the sample (92 percent) were working full-time (at least 30 hours per week) as of the study's baseline survey. The median income for study participants and their co-borrowers was \$60,000 in the 12 months prior to study enrollment, with 13 percent making more than \$100,000 and 6 percent making less than \$25,000. The participants' mean credit scores was 716 at the time of study enrollment.

²⁶ About 77 percent of the study sample purchased a home by December 2019, and about 85 percent of the study sample had nonmissing credit bureau data from July 2017 through December 2021.

Exhibit A.1. Baseline Characteristics of the Analysis Sample of Low-, Moderate-, and Middle-Income First-Time Homebuyers at Enrollment

Baseline Variable	Analysis Sample
Race and Ethnicity of Study Participant (%)	
Hispanic	21.8
White, non-Hispanic	43.5
African-American, non-Hispanic	17.1
Asian, non-Hispanic	13.6
Other	4.0
<hr/>	
Men (%)	60.7
<hr/>	
Age greater than or equal to 30 (%)	65.8
<hr/>	
Marital Status of Study Participant (%)	
Married	40.3
Divorced, widowed, or separated	12.7
Single and never married	47.0
<hr/>	
Plans to purchase the home with a co-borrower (%)	26.2
<hr/>	
Household Size (%)	
One	23.1
Two	34.1
Three	19.1
Four or more	23.7
<hr/>	
Education of Study Participant (%)	
Bachelor's degree or higher	59.3
Associate's degree	11.8
Some college, but no degree	14.6
High school diploma or less	14.3
<hr/>	
Employment (%)	
Full-time employment (30 or more hours per week)	92.0
Part-time employment (1–29 hours per week)	3.3
Unemployed and looking for work	0.3
Not working, homemaker, retired, student, or other	4.4
<hr/>	
Income Received by Study Participant and Any Co-Borrowers in Past 12 Months	
\$24,999 or less (%)	5.6
\$25,000 to \$49,999 (%)	30.3
\$50,000 to \$74,999 (%)	34.6
\$75,000 to \$99,999 (%)	16.9
\$100,000 or more (%)	12.5
Mean income (\$)	63,624
Median income (\$)	60,000

Baseline Variable	Analysis Sample
Credit Score (range is 300–850)	
Mean	716
Median	722
Stage in the Homebuying Process (%)	
Not yet started home search	6.7
Started home search, but no offer	30.0
Made an offer on a home or signed a purchase agreement, but no purchase	44.9
Purchased a home	18.4

Notes: All characteristics reported in this exhibit were measured 0 to 2 months prior to study participants enrolling. The sample includes 3,746 participants who purchased homes by December 2019 and had nonmissing credit bureau data from July 2017 through December 2021. Measure-specific sample sizes might vary due to item nonresponse. Due to rounding, not all reported percentages precisely equal 100 percent.

Sources: Baseline survey of study participants; credit bureau data

DeMarco et al. (2017) compared how study participants who at enrollment had recently purchased homes with recent homebuyers in the American Housing Survey and with credit scores of recent homebuyers from Li and Goodman (2016).²⁷ The study’s early home purchasers and the comparison group consisted of roughly the same proportions of Hispanic and African-American homebuyers, but participants who had purchased homes by enrollment had a higher share of Asian homebuyers. The study’s sample of early homebuyers had a higher share of households with annual income ranging from \$60,000 to \$80,000, with a correspondingly lower share of households with annual income below \$40,000. This variance is likely because the study sample was drawn exclusively from metropolitan areas, opposed to including some rural areas. Credit scores for study participants who recently purchased homes were similar to those of recent homebuyers, except that a higher share of recent homebuyers nationally had low scores.

A.2. Interrupted Time Series Analysis

Interrupted time-series analysis is a quasi-experimental research design that can assess the influence of an intervention or event when the outcome variable is observed during multiple time points before and after the introduction of the intervention or event of interest. In this application, the research team used single-group interrupted time series analysis to explore the influence of the COVID-19 pandemic on study participant outcomes. Using data from pre-COVID and during-COVID periods, the team estimated (1) differences in the levels of outcomes of interest in the period immediately following the onset of COVID versus projected levels for that period based on pre-COVID trends and (2) changes in trends for outcomes of interest between pre-COVID and during-COVID time periods.

²⁷ The study’s sample recruitment and enrollment design did not allow for strictly representative sampling from a well-defined population of prospective low-, moderate-, and middle-income first-time homebuyers. Instead, three major lenders permitted recruitment of their customers, so the study sample is distinctive to those lenders and the 28 large metropolitan areas in which recruiting took place. This detail means the sample is not designed to produce a statistically representative sample of the general population of low-, moderate-, and middle-income prospective first-time homebuyers. Two additional factors also may have resulted in its idiosyncrasy. First, the sample is self-selected, both because study participants contacted the partner lenders about a mortgage and participation in the study was voluntary. Second, a number of eligibility screens were necessary to facilitate successful data collection.

Following Linden (2021), the team estimated a model of the following general form:

$$Y_{it} = \beta_0 + \beta_1 T_t + \beta_2 C_t + \beta_3 C_t T_t + \varepsilon_{it} \quad (\text{equation 1})$$

Where Y_{it} is the outcome of interest measured at time t for individual i , T_t is the number of months since starting the study, and C_t is a dummy variable that indicates the onset of the COVID pandemic. The pre-COVID period is 0, and during the COVID period is 1.²⁸ The coefficient β_0 represents the outcome variable at the earliest time point of data used for the analysis. The coefficient β_1 indicates the slope of the outcome variable before COVID. The coefficient β_2 indicates the change in the level of the outcome that occurred in the period immediately following the onset of COVID compared with the counterfactual.²⁹ The coefficient β_3 indicates the difference between the pre-COVID and during-COVID slopes of the outcome.

Testing whether β_2 is statistically different from zero finds whether the influence of COVID is immediate on the outcomes measured as of July 2020. Testing whether β_3 is statistically different from zero finds whether the slope of the outcome over time is different after the onset of COVID (Linden and Adams, 2011).

In addition to conducting this analysis for the full analysis sample, the team estimated equation 1 separately for subgroups defined by age, race and ethnicity, gender, income, credit score, and receiving a Federal Housing Administration (FHA) loan.

As Linden (2015) described, a single-group interrupted time series analysis has no comparable control group. Instead, the pre-COVID trend in the outcome projected into the during-COVID period serves as the counterfactual. With multiple pre-interruption observations and a stable baseline slope, the projection of that outcome serves as the counterfactual, permitting the influence of the pandemic to be interpreted as causal in some circumstances. Although the influence of the COVID pandemic could not be fully disentangled from various policy changes resulting from COVID at either the local or national levels, the findings can be interpreted as capturing the influence of the pandemic as a whole, including the influence of the virus, economic consequences such as job loss, and policy (for example, stimulus checks and unemployment benefits). The team must assume that any time-varying unmeasured confounder changes relatively slowly so that its effects would be different from the abrupt changes occurring after the onset of COVID (Linden, 2015).

A.3. Data Sources

The analysis examines outcomes in two domains: *financial indicators* and *mortgage performance*. The team constructed **pre-COVID outcomes** at six time points within the 3-year window prior to the March 2020 onset of COVID in the United States: July 2017, January 2018, July 2018, January 2019, July 2019, and December 2019.³⁰ The team constructed **outcomes**

²⁸ The team estimated this model using Stata's *xtitsa* command, developed by Linden (2021).

²⁹ For this analysis, outcomes measured in July 2020 are the earliest observed outcomes in the COVID period.

³⁰ By July 2017, all participants were enrolled in the study and no longer participating in homebuyer education and counseling services. Therefore, using July 2017 as the first pre-COVID time point for the interrupted time series analysis ensured that the full sample of first-time homebuyers was available for the analysis and that the homebuyer education and counseling intervention did not abruptly influence the pre-COVID time trend.

during COVID at four time points: July 2020, December 2020, July 2021, and December 2021. The team constructed all outcomes using credit bureau data.³¹

In addition to conducting the analysis for the full sample of purchasers with nonmissing credit bureau data for each time point ($N = 3,746$), the team conducted analyses separately for **subpopulations** defined by age at study enrollment, race and ethnicity, gender, borrower income at study enrollment, credit score at study enrollment, and whether the participant held a FHA loan as of December 2019 (the most recent time point observed prior to the pandemic). The team used multiple primary and administrative data sources—including a baseline survey of study participants, credit bureau data, FHA data, and the 2013 Federal Financial Institutions Examination Council Median Family Income Report—to identify subpopulations.³²

³¹ Exhibit B.1 in appendix B describes that construction.

³² Exhibit B.2 lists the subpopulations used for this analysis.

Appendix B. Measure Construction

This appendix details constructing outcome measures and subpopulation identifiers for the analyses.

B.1. Construction of Outcomes

Exhibit B.1 describes how each analysis outcome was constructed. The outcomes are divided into two domains: (1) *financial indicators* and (2) *mortgage performance*.³³ For the interrupted time series analysis, the team constructed outcomes using credit bureau data that capture study participant outcomes before and after the onset of COVID-19.^{34,35}

Exhibit B.1. Construction of Outcomes for COVID-19 Analysis

Outcome Definition	Operationalization
Panel A. Financial Indicators Domain	
Credit score (out of 850)	Credit score (continuous variable)
Study participant has a credit score greater than or equal to 620 ^a (%)	Binary variable that takes on value: 1 if credit score is greater than or equal to 620 0 if credit score is less than 620
Total nonhousing debt (\$)	Total nonhousing debt equals the total debt balance minus the balance on open mortgage accounts (top coded at its 99th percentile)
Student loan balance (\$)	Student loan balance (top coded at 99th percentile)
Student loan 30-day delinquency indicator (%)	Binary variable that takes on value: 1 if 30 or more days past due on student loans in past 6 months 0 otherwise
Total consumer debt (\$)	Total consumer debt balance, including credit card, auto, and medical debt (top coded at 99th percentile)

³³ Prior study reports, including Peck et al. (2019; 2021), considered outcomes constructed using both survey and administrative data in three domains. In contrast, the outcomes for this longer term analysis are constructed using only administrative data in two domains. The team used different domain names for this longer term analysis to align with the types of outcomes available solely from the administrative data sources available for this analysis.

³⁴ Because an archive of Federal Housing Administration data for December 2020 is not available, the team constructed the loan performance measures in each time point using only credit bureau data so that the loan performance measures were constructed using a consistent set of data sources for each pre-COVID and during-COVID time points.

³⁵ Although the CARES Act and subsequent executive orders provided that all borrowers with government-backed mortgages experiencing a hardship as a result of the pandemic be given the option of a forbearance, the forbearance was not automatic. That is, borrowers had to contact their mortgage servicers to request a forbearance. For borrowers current on their mortgages at the time a forbearance was granted, servicers were required to report accounts as current during the forbearance period. For borrowers delinquent when a forbearance was requested, servicers were required to maintain the same delinquency status during the forbearance period that the borrower had when they requested a forbearance (unless the borrower makes payments to improve the status).

Outcome Definition	Operationalization
Credit card balance (\$)	Credit card balance (top coded at 99th percentile)
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	Binary variable that takes on value: 1 if major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) 0 otherwise
Panel B. Mortgage Performance Domain	
Every 30 days delinquent on any mortgage (%)	Binary variable that takes on value: 1 if ever 30 days delinquent on any mortgage, home equity loan, or home equity line of credit 0 otherwise
Every 60 days delinquent on any mortgage (%)	Binary variable that takes on value: 1 if ever 60 days delinquent on any mortgage, home equity loan, or home equity line of credit 0 otherwise
Every 90 days delinquent on any mortgage (%)	Binary variable that takes on value: 1 if ever 90 days delinquent on any mortgage, home equity loan, or home equity line of credit 0 otherwise

^a An outcome of above or below a credit score of 620 was chosen, because in general, it is the minimum credit score to qualify for conventional loans. Although no agreed-on, formal definition exists for a “good” credit score, scores such as 680 are often important thresholds in assessing mortgage risk and used in both mortgage underwriting and mortgage pricing. For example, in 2014, the Federal Housing Administration’s (FHA) Office of Single Family Housing developed a “supplemental performance metric” to provide FHA with more insight into the mortgage performance for three credit bands: below 640, 640–680, and above 680 (FHA, n.d.).

Notes: Outcomes were constructed using credit bureau data that capture study participant outcomes pre-COVID (in July 2017, January 2018, July 2018, January 2019, July 2019, and December 2019) and after the onset of COVID (in July 2020, December 2020, July 2021, and December 2021).

B.2. Construction of Subpopulation Identifiers

In addition to conducting the interrupted time series analysis for the full sample with nonmissing credit bureau data for each time point, the team conducted the interrupted time series analysis separately for subpopulations defined by age at study enrollment, race and ethnicity, gender, borrower income at study enrollment, and whether the study participant held a Federal Housing Administration (FHA) loan as of December 2019 (the most recent time point observed prior to the pandemic).

Exhibit B.2 lists the subpopulations for this analysis. As exhibit B.2 specifies, subpopulation identifiers were constructed from multiple primary and administrative data sources, including a baseline survey of study participants, credit bureau data, FHA data, and the 2013 Federal Financial Institutions Examination Council’s Median Family Income Report.

Exhibit B.2. Construction of Subpopulation Identifiers

Subpopulations	Data Sources
White non-Hispanic African-American non-Hispanic Asian non-Hispanic Hispanic	Baseline survey
Men Women	Baseline survey
Age 30 or older at study enrollment Age 29 or younger at study enrollment	Credit bureau data

Subpopulations	Data Sources
Borrower income higher than 80 percent of area median at study enrollment Borrower income less than 80 percent of area median at study enrollment	Baseline survey and Federal Financial Institutions Examination Council (FFIEC) ^a
Credit score 680 or more at study enrollment ^b Credit score less than 680 at study enrollment	Credit bureau data
Federal Housing Administration (FHA) loan recipient by December 2019	FHA data

^a The area median family incomes are from the 2013 FFIEC Median Family Income Report (FFIEC, 2023). The addresses used to determine which area median income is matched to each study participant are from the baseline survey.

^b An outcome of above or below a credit score of 620 was chosen, because in general, it is the minimum credit score to qualify for conventional loans. Although no agreed-on, formal definition exists for a “good” credit score, scores such as 680 are often important thresholds in assessing mortgage risk and used in both mortgage underwriting and mortgage pricing. For example, in 2014, FHA’s Office of Single Family Housing developed a “supplemental performance metric” to provide FHA with more insight into the mortgage performance for three credit bands: below 640, 640–680, and above 680 (FHA, n.d.).

Appendix C. The Influence of the COVID-19 Pandemic by Subpopulation: Regression Estimates

This appendix provides interrupted time series regression estimates for subpopulations defined by age at study enrollment, race and ethnicity, gender, borrower income at study enrollment, credit score at study enrollment, and whether the study participant held Federal Housing Administration loans as of December 2019 (exhibits C.1 through C.15). The findings are in section 2.2 of this report.

Exhibit C.1. How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, Age 30 or Older

Outcomes	Mean Level of Outcome in July 2017	Monthly Slope of Outcome Prior to Pandemic	Change in Mean Level of Outcome as of July 2020	Change in Monthly Slope of Outcome After Onset of Pandemic	Mean Level of Outcome in December 2021
Panel A. Financial Indicators Domain					
Credit score (out of 850)	724.2	0.34*** (0.04)	5.0*** (0.9)	- 0.03 (0.07)	746.7
Study participant has a credit score greater than or equal to 620 (%)	89.7	- 0.10*** (0.02)	2.3*** (0.5)	0.29*** (0.04)	91.7
Total nonhousing debt (\$)	26,514	91*** (15)	- 2,708*** (334)	- 71* (29)	27,452
Student loan balance (\$)	8,252	6 (6)	- 261* (133)	9 (12)	8,452
Student loan account 30 or more days past due in the past 6 months (%)	2.9	0.04 (0.02)	- 1.6*** (0.5)	- 0.10** (0.03)	1.7
Total consumer debt (\$)	17,123	68*** (12)	- 2,288*** (266)	- 65** (23)	17,341
Credit card debt (\$)	5,069	31*** (4)	- 1,269*** (105)	- 18* (8)	5,133
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	8.0	0.31*** (0.02)	0.2 (0.4)	- 0.20*** (0.03)	21.2
Panel B. Mortgage Performance Domain					
Every 30 days delinquent on any mortgage loan (%)	4.8	0.22*** (0.02)	- 0.9** (0.3)	- 0.13*** (0.02)	13.4
Every 60 days delinquent on any mortgage loan (%)	2.6	0.12*** (0.01)	- 0.3 (0.2)	- 0.08*** (0.02)	7.3
Every 90 days delinquent on any mortgage loan (%)	1.7	0.09*** (0.01)	- 0.2 (0.2)	- 0.06*** (0.01)	5.3

Notes: The interrupted time series analysis was conducted using the Stata command xtitsa. The sample includes 2,441 study participants who had purchased homes by December 2019 and had nonmissing credit bureau data. Standard errors are in parentheses. Appendix A details the analytic methods, and appendix B provides additional detail on the construction of measures. Statistical significance levels for two-sided tests are *** = 1 percent; ** = 5 percent; * = 10 percent.

Source: Credit bureau

Exhibit C.2. How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, Age 29 or Younger

Outcomes	Mean Level of Outcome in July 2017	Monthly Slope of Outcome Prior to Pandemic	Change in Mean Level of Outcome as of July 2020	Change in Monthly Slope of Outcome After Onset of Pandemic	Mean Level of Outcome in December 2021
Panel A. Financial Indicators Domain					
Credit score (out of 850)	738.5	0.44*** (0.05)	3.1** (1.1)	- 0.30*** (0.09)	760.0
Study participant has a credit score greater than or equal to 620 (%)	93.5	- 0.06* (0.02)	1.7** (0.5)	0.13** (0.05)	94.3
Total nonhousing debt (\$)	24,708	125*** (20)	- 2,864*** (459)	- 51 (42)	27,611
Student loan balance (\$)	9,277	- 5 (9)	- 260 (162)	17 (16)	9,016
Student loan account 30 or more days past due in the past 6 months (%)	2.0	0.03 (0.03)	- 1.3* (0.5)	- 0.05 (0.04)	1.5
Total consumer debt (\$)	14,330	112*** (16)	- 2,545*** (366)	- 63 (32)	16,638
Credit card debt (\$)	3,926	39*** (5)	- 1,348*** (134)	6 (10)	4,748
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	4.4	0.17*** (0.02)	0.8 (0.5)	- 0.11*** (0.03)	12.3
Panel B. Mortgage Performance Domain					
Every 30 days delinquent on any mortgage loan (%)	2.9	0.16*** (0.02)	- 0.6 (0.3)	- 0.12*** (0.03)	8.8
Every 60 days delinquent on any mortgage loan (%)	0.8	0.07*** (0.01)	- 0.3 (0.2)	- 0.06*** (0.02)	3.2
Every 90 days delinquent on any mortgage loan (%)	0.6	0.04*** (0.01)	0.0 (0.2)	- 0.03* (0.01)	2.2

Notes: The interrupted time series analysis was conducted using the Stata command xtitsa. The sample includes 1,270 study participants who had purchased homes by December 2019 and had nonmissing credit bureau data. Standard errors are in parentheses. Appendix A details the analytic methods, and appendix B provides additional detail on the construction of measures. Statistical significance levels for two-sided tests are *** = 1 percent; ** = 5 percent; * = 10 percent.

Source: Credit bureau

Exhibit C.3. How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, White Non-Hispanic

Outcomes	Mean Level of Outcome in July 2017	Monthly Slope of Outcome Prior to Pandemic	Change in Mean Level of Outcome as of July 2020	Change in Monthly Slope of Outcome After Onset of Pandemic	Mean Level of Outcome in December 2021
Panel A. Financial Indicators Domain					
Credit score (out of 850)	744.1	0.43*** (0.04)	3.1*** (0.9)	- 0.22** (0.08)	766.1
Study participant has a credit score greater than or equal to 620 (%)	94.8	- 0.08*** (0.02)	1.8*** (0.5)	0.15*** (0.04)	94.9
Total nonhousing debt (\$)	25,428	87*** (18)	- 2,825*** (414)	- 68* (34)	26,045
Student loan balance (\$)	8,615	- 18* (7)	- 147 (150)	11 (12)	7,715
Student loan account 30 or more days past due in the past 6 months (%)	1.8	0.04 (0.03)	- 0.9* (0.4)	- 0.09* (0.03)	1.4
Total consumer debt (\$)	15,527	90*** (14)	- 2,575*** (325)	- 76** (27)	16,443
Credit card debt (\$)	4,933	29*** (5)	- 1,213*** (125)	- 7 (10)	5,116
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	4.1	0.20*** (0.02)	0.4 (0.4)	- 0.14*** (0.03)	12.8
Panel B. Mortgage Performance Domain					
Every 30 days delinquent on any mortgage loan (%)	3.0	0.14*** (0.02)	- 0.4 (0.3)	- 0.09*** (0.02)	8.4
Every 60 days delinquent on any mortgage loan (%)	1.1	0.08*** (0.01)	- 0.4 (0.2)	- 0.07*** (0.01)	3.8
Every 90 days delinquent on any mortgage loan (%)	0.6	0.06*** (0.01)	- 0.1 (0.2)	- 0.05*** (0.01)	2.8

Notes: The interrupted time series analysis was conducted using the Stata command xtitsa. The sample includes 1,610 study participants who had purchased homes by December 2019 and had nonmissing credit bureau data. Standard errors are in parentheses. Appendix A details the analytic methods, and appendix B provides additional detail on the construction of measures. Statistical significance levels for two-sided tests are *** = 1 percent; ** = 5 percent; * = 10 percent.

Source: Credit bureau

Exhibit C.4. How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, African-American Non-Hispanic

Outcomes	Mean Level of Outcome in July 2017	Monthly Slope of Outcome Prior to Pandemic	Change in Mean Level of Outcome as of July 2020	Change in Monthly Slope of Outcome After Onset of Pandemic	Mean Level of Outcome in December 2021
Panel A. Financial Indicators Domain					
Credit score (out of 850)	685.9	0.19* (0.09)	7.3*** (2.0)	0.48** (0.15)	711.5
Study participant has a credit score greater than or equal to 620 (%)	80.4	- 0.15** (0.05)	2.3 (1.4)	0.63*** (0.10)	85.4
Total nonhousing debt (\$)	35,846	135*** (34)	- 3,215*** (645)	- 37 (66)	39,162
Student loan balance (\$)	16,752	24 (17)	- 494 (327)	43 (32)	18,241
Student loan account 30 or more days past due in the past 6 months (%)	5.5	0.09 (0.06)	- 4.0** (1.3)	- 0.23** (0.08)	2.3
Total consumer debt (\$)	18,256	73** (25)	- 2,673*** (521)	- 30 (50)	18,952
Credit card debt (\$)	5,069	52*** (10)	- 1,861*** (222)	- 53** (17)	5,041
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	14.3	0.54*** (0.05)	- 0.6 (1.0)	- 0.36*** (0.07)	36.2
Panel B. Mortgage Performance Domain					
Every 30 days delinquent on any mortgage loan (%)	7.8	0.38*** (0.04)	- 1.7** (0.7)	- 0.27*** (0.06)	21.6
Every 60 days delinquent on any mortgage loan (%)	5.0	0.20*** (0.03)	- 0.4 (0.5)	- 0.15*** (0.04)	12.7
Every 90 days delinquent on any mortgage loan (%)	3.3	0.14*** (0.03)	- 0.0 (0.5)	- 0.09** (0.03)	9.2

Notes: The interrupted time series analysis was conducted using the Stata command xtitsa. The sample includes 633 study participants who had purchased a home by December 2019 and had nonmissing credit bureau data. Standard errors are in parentheses. Appendix A details the analytic methods, and appendix B provides additional detail on the construction of measures. Statistical significance levels for two-sided tests are *** = 1 percent; ** = 5 percent; * = 10 percent.

Source: Credit bureau

Exhibit C.5. How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, Asian Non-Hispanic

Outcomes	Mean Level of Outcome in July 2017	Monthly Slope of Outcome Prior to Pandemic	Change in Mean Level of Outcome as of July 2020	Change in Monthly Slope of Outcome After Onset of Pandemic	Mean Level of Outcome in December 2021
Panel A. Financial Indicators Domain					
Credit score (out of 850)	770.8	0.50*** (0.06)	- 0.1 (1.5)	- 0.54*** (0.11)	787.7
Study participant has a credit score greater than or equal to 620 (%)	97.6	- 0.01 (0.02)	0.5 (0.7)	0.04 (0.05)	98.3
Total nonhousing debt (\$)	16,895	85** (31)	- 2,882*** (793)	- 48 (64)	17,681
Student loan balance (\$)	3,221	- 4 (10)	155 (257)	10 (21)	3,336
Student loan account 30 or more days past due in the past 6 months (%)	0.5	- 0.02 (0.02)	0.1 (0.3)	0.01 (0.03)	- 0.3
Total consumer debt (\$)	12,311	68** (25)	- 2,630*** (595)	- 19 (49)	12,959
Credit card debt (\$)	3,814	23** (8)	- 1,216*** (205)	44** (14)	4,580
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	1.6	0.07** (0.02)	0.4 (0.5)	- 0.04 (0.03)	5.0
Panel B. Mortgage Performance Domain					
Every 30 days delinquent on any mortgage loan (%)	1.7	0.06** (0.02)	0.5 (0.4)	0.01 (0.03)	5.6
Every 60 days delinquent on any mortgage loan (%)	0.6	0.01 (0.01)	0.0 (0.2)	0.03 (0.02)	1.7
Every 90 days delinquent on any mortgage loan (%)	0.5	0.01 (0.01)	0.0 (0.2)	0.00 (0.02)	1.0

Notes: The interrupted time series analysis was conducted using the Stata command xtitsa. The sample includes 505 study participants who had purchased a home by December 2019 and had nonmissing credit bureau data. Standard errors are in parentheses. Appendix A details the analytic methods, and appendix B provides additional detail on the construction of measures. Statistical significance levels for two-sided tests: *** = 1 percent; ** = 5 percent; * = 10 percent.

Source: Credit bureau

Exhibit C.6. How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, Hispanics

Outcomes	Mean Level of Outcome in July 2017	Monthly Slope of Outcome Prior to Pandemic	Change in Mean Level of Outcome as of July 2020	Change in Monthly Slope of Outcome After Onset of Pandemic	Mean Level of Outcome in December 2021
Panel A. Financial Indicators Domain					
Credit score (out of 850)	707.9	0.39*** (0.08)	6.9*** (1.6)	- 0.13 (0.13)	733.2
Study participant has a credit score greater than or equal to 620 (%)	88.0	- 0.09* (0.04)	3.7*** (0.9)	0.18* (0.07)	90.0
Total nonhousing debt (\$)	24,029	122*** (26)	- 2,510*** (553)	- 68 (52)	26,816
Student loan balance (\$)	5,126	26* (10)	- 509** (190)	- 12 (20)	5,792
Student loan account 30 or more days past due in the past 6 months (%)	3.1	- 0.02 (0.04)	- 0.8 (0.8)	0.02 (0.06)	1.5
Total consumer debt (\$)	17,982	83*** (21)	- 1,806*** (473)	- 70 (41)	19,372
Credit card debt (\$)	4,357	37*** (7)	- 1,136*** (174)	- 13 (12)	4,934
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	9.1	0.32*** (0.04)	0.0 (0.7)	- 0.22*** (0.05)	22.3
Panel B. Mortgage Performance Domain					
Every 30 days delinquent on any mortgage loan (%)	4.9	0.27*** (0.03)	- 1.2* (0.5)	- 0.14** (0.05)	15.6
Every 60 days delinquent on any mortgage loan (%)	2.2	0.12*** (0.02)	- 0.3 (0.4)	- 0.07* (0.03)	7.1
Every 90 days delinquent on any mortgage loan (%)	1.5	0.08*** (0.02)	- 0.3 (0.3)	- 0.04 (0.02)	4.8

Notes: The interrupted time series analysis was conducted using the Stata command xtitsa. The sample includes 808 study participants who had purchased a home by December 2019 and had nonmissing credit bureau data. Standard errors in parentheses. Appendix A details the analytic methods, and appendix B provides additional detail on the construction of measures. Statistical significance levels for two-sided tests are *** = 1 percent; ** = 5 percent; * = 10 percent.

Source: Credit bureau

Exhibit C.7. How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, Males

Outcomes	Mean Level of Outcome in July 2017	Monthly Slope of Outcome Prior to Pandemic	Change in Mean Level of Outcome as of July 2020	Change in Monthly Slope of Outcome After Onset of Pandemic	Mean Level of Outcome in December 2021
Panel A. Financial Indicators Domain					
Credit score (out of 850)	733.7	0.41*** (0.04)	3.6*** (0.9)	- 0.20** (0.07)	755.4
Study participant has a credit score greater than or equal to 620 (%)	92.1	- 0.08*** (0.02)	1.6*** (0.5)	0.18*** (0.04)	92.6
Total nonhousing debt (\$)	24,467	105*** (16)	- 2,826*** (358)	- 75* (31)	25,912
Student loan balance (\$)	6,856	0 (6)	- 157 (125)	7 (11)	6,829
Student loan account 30 or more days past due in the past 6 months (%)	1.9	0.02 (0.02)	- 0.9* (0.4)	- 0.05 (0.03)	1.2
Total consumer debt (\$)	16,349	90*** (13)	- 2,515*** (287)	- 76** (24)	17,293
Credit card debt (\$)	4,455	35*** (4)	- 1,290*** (109)	- 10 (8)	4,830
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	6.0	0.24*** (0.02)	0.6 (0.4)	- 0.14*** (0.03)	16.9
Panel B. Mortgage Performance Domain					
Every 30 days delinquent on any mortgage loan (%)	3.2	0.18*** (0.02)	- 0.5* (0.3)	- 0.08*** (0.02)	10.8
Every 60 days delinquent on any mortgage loan (%)	1.2	0.08*** (0.01)	- 0.1 (0.2)	- 0.04** (0.02)	4.7
Every 90 days delinquent on any mortgage loan (%)	1.0	0.05*** (0.01)	0.0 (0.2)	- 0.03* (0.01)	3.1

Notes: The interrupted time series analysis was conducted using the Stata command xtitsa. The sample includes 2,269 study participants who had purchased homes by December 2019 and had nonmissing credit bureau data. Standard errors are in parentheses. Appendix A details the analytic methods, and appendix B provides additional detail on the construction of measures. Statistical significance levels for two-sided tests are *** = 1 percent; ** = 5 percent; * = 10 percent.

Source: Credit bureau

Exhibit C.8. How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, Females

Outcomes	Mean Level of Outcome in July 2017	Monthly Slope of Outcome Prior to Pandemic	Change in Mean Level of Outcome as of July 2020	Change in Monthly Slope of Outcome After Onset of Pandemic	Mean Level of Outcome in December 2021
Panel A. Financial Indicators Domain					
Credit score (out of 850)	722.1	0.33*** (0.05)	5.6*** (1.1)	0.01 (0.09)	745.4
Study participant has a credit score greater than or equal to 620 (%)	89.4	- 0.11*** (0.03)	3.0*** (0.7)	0.32*** (0.05)	92.1
Total nonhousing debt (\$)	27,940	104*** (18)	- 2,795*** (407)	- 43 (37)	29,934
Student loan balance (\$)	11,254	6 (9)	- 447* (180)	17 (16)	11,411
Student loan account 30 or more days past due in the past 6 months (%)	3.7	0.04 (0.03)	- 2.2*** (0.6)	- 0.11** (0.04)	1.7
Total consumer debt (\$)	15,748	76*** (14)	- 2,236*** (319)	- 44 (29)	16,792
Credit card debt (\$)	4,991	33*** (5)	- 1,347*** (127)	- 11 (10)	5,241
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	7.8	0.30*** (0.03)	0.1 (0.5)	- 0.21*** (0.03)	20.2
Panel B. Mortgage Performance Domain					
Every 30 days delinquent on any mortgage loan (%)	5.4	0.24*** (0.02)	- 1.0** (0.4)	- 0.19*** (0.03)	13.8
Every 60 days delinquent on any mortgage loan (%)	3.0	0.13*** (0.02)	- 0.7* (0.3)	- 0.12*** (0.02)	7.1
Every 90 days delinquent on any mortgage loan (%)	1.7	0.10*** (0.02)	- 0.2 (0.3)	- 0.08*** (0.02)	5.4

Notes: The interrupted time series analysis was conducted using the Stata command xtitsa. The sample includes 1,467 study participants who had purchased a home by December 2019 and had nonmissing credit bureau data. Standard errors are in parentheses. Appendix A details the analytic methods, and appendix B provides additional detail on the construction of measures. Statistical significance levels for two-sided tests are *** = 1 percent; ** = 5 percent; * = 10 percent.

Source: Credit bureau

Exhibit C.9. How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, Income Higher Than 80 Percent of Area Median

Outcomes	Mean Level of Outcome in July 2017	Monthly Slope of Outcome Prior to Pandemic	Change in Mean Level of Outcome as of July 2020	Change in Monthly Slope of Outcome After Onset of Pandemic	Mean Level of Outcome in December 2021
Panel A. Financial Indicators Domain					
Credit score (out of 850)	739.9	0.36*** (0.04)	4.1*** (1.0)	- 0.18* (0.07)	760.1
Study participant has a credit score greater than or equal to 620 (%)	93.0	- 0.10*** (0.02)	2.1*** (0.5)	0.20*** (0.04)	93.2
Total nonhousing debt (\$)	27,394	97*** (18)	- 3,064*** (402)	- 64 (35)	28,392
Student loan balance (\$)	8,874	- 7 (7)	- 298 (156)	16 (13)	8,454
Student loan account 30 or more days past due in the past 6 months (%)	2.5	0.03 (0.03)	- 1.5** (0.5)	- 0.07* (0.03)	1.4
Total consumer debt (\$)	17,272	80*** (14)	- 2,637*** (319)	- 49 (28)	18,015
Credit card debt (\$)	5,073	28*** (5)	- 1,371*** (121)	8 (9)	5,336
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	5.6	0.24*** (0.02)	0.6 (0.4)	- 0.17*** (0.03)	16.0
Panel B. Mortgage Performance Domain					
Every 30 days delinquent on any mortgage loan (%)	4.1	0.19*** (0.02)	- 0.9** (0.3)	- 0.13*** (0.02)	11.1
Every 60 days delinquent on any mortgage loan (%)	1.9	0.10*** (0.01)	- 0.4* (0.2)	- 0.07*** (0.02)	5.6
Every 90 days delinquent on any mortgage loan (%)	1.3	0.08*** (0.01)	- 0.2 (0.2)	- 0.06*** (0.01)	4.4

Notes: The interrupted time series analysis was conducted using the Stata command xtitsa. The sample includes 1,861 study participants who had purchased a home by December 2019 and had nonmissing credit bureau data. Standard errors are in parentheses. Appendix A details the analytic methods, and appendix B provides additional detail on the construction of measures. Statistical significance levels for two-sided tests are *** = 1 percent; ** = 5 percent; * = 10 percent.

Source: Credit bureau

Exhibit C.10. How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, Income Less Than 80 Percent of Area Median

Outcomes	Mean Level of Outcome in July 2017	Monthly Slope of Outcome Prior to Pandemic	Change in Mean Level of Outcome as of July 2020	Change in Monthly Slope of Outcome After Onset of Pandemic	Mean Level of Outcome in December 2021
Panel A. Financial Indicators Domain					
Credit score (out of 850)	718.7	0.39*** (0.05)	4.6*** (1.0)	- 0.06 (0.08)	743.1
Study participant has a credit score greater than or equal to 620 (%)	89.2	- 0.08** (0.03)	2.2*** (0.6)	0.27*** (0.05)	91.7
Total nonhousing debt (\$)	24,251	114*** (16)	- 2,602*** (362)	- 62 (32)	26,635
Student loan balance (\$)	8,248	13 (7)	- 248 (137)	6 (13)	8,780
Student loan account 30 or more days past due in the past 6 months (%)	2.6	0.04 (0.03)	- 1.4** (0.5)	- 0.08* (0.04)	1.9
Total consumer debt (\$)	14,997	89*** (13)	- 2,203*** (288)	- 76** (25)	16,245
Credit card debt (\$)	4,270	39*** (5)	- 1,237*** (114)	- 27*** (8)	4,647
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	7.8	0.28*** (0.02)	0.3 (0.5)	- 0.17*** (0.03)	20.0
Panel B. Mortgage Performance Domain					
Every 30 days delinquent on any mortgage loan (%)	4.1	0.22*** (0.02)	- 0.6* (0.3)	- 0.12*** (0.03)	13.1
Every 60 days delinquent on any mortgage loan (%)	2.0	0.11*** (0.01)	- 0.3 (0.2)	- 0.07*** (0.02)	6.4
Every 90 days delinquent on any mortgage loan (%)	1.3	0.06*** (0.01)	- 0.1 (0.2)	- 0.03* (0.01)	3.8

Notes: The interrupted time series analysis was conducted using the Stata command xtitsa. The sample includes 1,858 study participants who had purchased a home by December 2019 and had nonmissing credit bureau data. Standard errors are in parentheses. Appendix A details the analytic methods, and appendix B provides additional detail on the construction of measures. Statistical significance levels for two-sided tests are *** = 1 percent; ** = 5 percent; * = 10 percent.

Source: Credit bureau

Exhibit C.11. How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, Baseline Credit Score of 680 or more

Outcomes	Mean Level of Outcome in July 2017	Monthly Slope of Outcome Prior to Pandemic	Change in Mean Level of Outcome as of July 2020	Change in Monthly Slope of Outcome After Onset of Pandemic	Mean Level of Outcome in December 2021
Panel A. Financial Indicators Domain					
Credit score (out of 850)	757.2	0.38*** (0.04)	1.2 (0.7)	- 0.26*** (0.06)	774.1
Study participant has a credit score greater than or equal to 620 (%)	96.9	- 0.07*** (0.01)	1.0** (0.4)	0.16*** (0.03)	96.9
Total nonhousing debt (\$)	23,028	85*** (14)	- 2,570*** (339)	- 68* (29)	23,808
Student loan balance (\$)	7,300	- 2 (6)	- 285* (122)	3 (10)	6,949
Student loan account 30 or more days past due in the past 6 months (%)	1.1	0.02 (0.02)	- 0.5 (0.3)	- 0.03 (0.02)	1.1
Total consumer debt (\$)	14,670	71*** (11)	- 2,206*** (267)	- 54* (23)	15,310
Credit card debt (\$)	4,616	28*** (4)	- 1,312*** (102)	- 4 (8)	4,738
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	2.6	0.16*** (0.02)	0.3 (0.3)	- 0.12*** (0.02)	9.3
Panel B. Mortgage Performance Domain					
Every 30 days delinquent on any mortgage loan (%)	2.0	0.11*** (0.01)	- 0.2 (0.2)	- 0.05** (0.02)	6.8
Every 60 days delinquent on any mortgage loan (%)	0.8	0.05*** (0.01)	- 0.1 (0.1)	- 0.03* (0.01)	2.9
Every 90 days delinquent on any mortgage loan (%)	0.6	0.03*** (0.01)	0.1 (0.1)	- 0.01 (0.01)	2.1

Notes: The interrupted time series analysis was conducted using the Stata command xtitsa. The sample includes 2,442 study participants who had purchased a home by December 2019 and had nonmissing credit bureau data. Standard errors are in parentheses. Appendix A details the analytic methods, and appendix B provides additional detail on the construction of measures. Statistical significance levels for two-sided tests are *** = 1 percent; ** = 5 percent; * = 10 percent.

Source: Credit bureau

Exhibit C.12. How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, Baseline Credit Score Less than 680

Outcomes	Mean Level of Outcome in July 2017	Monthly Slope of Outcome Prior to Pandemic	Change in Mean Level of Outcome as of July 2020	Change in Monthly Slope of Outcome After Onset of Pandemic	Mean Level of Outcome in December 2021
Panel A. Financial Indicators Domain					
Credit score (out of 850)	662.3	0.36*** (0.07)	9.6*** (1.6)	0.32** (0.12)	696.6
Study participant has a credit score greater than or equal to 620 (%)	77.4	- 0.13** (0.05)	4.0*** (1.1)	0.42*** (0.08)	81.7
Total nonhousing debt (\$)	33,303	155*** (26)	- 3,404*** (518)	- 51 (48)	37,239
Student loan balance (\$)	11,819	20 (12)	- 390 (227)	34 (22)	13,077
Student loan account 30 or more days past due in the past 6 months (%)	6.2	0.05 (0.05)	- 3.1** (1.0)	- 0.17** (0.07)	2.8
Total consumer debt (\$)	20,092	108*** (20)	- 2,716*** (415)	- 85* (36)	21,626
Credit card debt (\$)	5,025	49*** (7)	- 1,349*** (164)	- 34** (12)	5,692
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	16.5	0.52*** (0.04)	0.4 (0.9)	- 0.31*** (0.06)	39.2
Panel B. Mortgage Performance Domain					
Every 30 days delinquent on any mortgage loan (%)	9.1	0.43*** (0.04)	- 1.8** (0.6)	- 0.29*** (0.05)	25.2
Every 60 days delinquent on any mortgage loan (%)	4.7	0.25*** (0.03)	- 1.0* (0.5)	- 0.20*** (0.03)	13.6
Every 90 days delinquent on any mortgage loan (%)	2.9	0.18*** (0.02)	- 0.4 (0.4)	- 0.13*** (0.03)	9.8

Notes: The interrupted time series analysis was conducted using the Stata command xtitsa. The sample includes 1,023 study participants who had purchased a home by December 2019 and had nonmissing credit bureau data. Standard errors are in parentheses. Appendix A details the analytic methods, and appendix B provides additional detail on the construction of measures. Statistical significance levels for two-sided tests are *** = 1 percent; ** = 5 percent; * = 10 percent.

Source: Credit bureau

Exhibit C.13. How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, Federal Housing Administration Loan Holders

Outcomes	Mean Level of Outcome in July 2017	Monthly Slope of Outcome Prior to Pandemic	Change in Mean Level of Outcome as of July 2020	Change in Monthly Slope of Outcome After Onset of Pandemic	Mean Level of Outcome in December 2021
Panel A. Financial Indicators Domain					
Credit score (out of 850)	686.2	0.36*** (0.07)	7.6*** (1.5)	0.11 (0.13)	714.7
Study participant has a credit score greater than or equal to 620 (%)	81.4	- 0.12** (0.04)	3.6*** (1.0)	0.40*** (0.08)	85.4
Total nonhousing debt (\$)	32,199	115*** (26)	- 3,644*** (548)	- 10 (47)	34,497
Student loan balance (\$)	11,687	10 (12)	- 316 (258)	38 (20)	12,517
Student loan account 30 or more days past due in the past 6 months (%)	5.1	0.06 (0.05)	- 2.4** (0.9)	- 0.16* (0.06)	3.2
Total consumer debt (\$)	19,461	78*** (20)	- 2,928*** (436)	- 41 (37)	19,959
Credit card debt (\$)	5,509	30*** (7)	- 1,373*** (176)	- 13 (13)	5,483
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	12.3	0.48*** (0.04)	0.1 (0.8)	- 0.30*** (0.05)	32.7
Panel B. Mortgage Performance Domain					
Every 30 days delinquent on any mortgage loan (%)	8.1	0.39*** (0.04)	- 1.8*** (0.5)	- 0.26*** (0.05)	22.5
Every 60 days delinquent on any mortgage loan (%)	4.2	0.23*** (0.03)	- 0.7 (0.5)	- 0.16*** (0.03)	13.0
Every 90 days delinquent on any mortgage loan (%)	2.9	0.16*** (0.02)	- 0.3 (0.4)	- 0.11*** (0.03)	9.3

Notes: The interrupted time series analysis was conducted using the Stata command xtitsa. The sample includes 972 study participants who had purchased a home by December 2019 and had nonmissing credit bureau data. Standard errors are in parentheses. Appendix A details the analytic methods, and appendix B provides additional detail on the construction of measures. Statistical significance levels for two-sided tests are *** = 1 percent; ** = 5 percent; * = 10 percent.

Source: Credit bureau

Exhibit C.14. How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, The Demonstration’s Full Sample, Including Purchasers and Nonpurchasers

Outcomes	Mean Outcome in July 2017	Monthly Change (Slope) in Outcome Prior to Pandemic	Change in Level of Outcome From December 2019 to July 2020	Change in Level of Outcome in July 2020	Mean Outcome in December 2021
Panel A. Financial Indicators Domain					
Credit score (out of 850)	715.9	0.31*** (0.03)	5.3*** (0.6)	0.01 (0.05)	737.6
Study participant has a credit score greater than or equal to 620 (%)	86.2	- 0.08*** (0.02)	2.6*** (0.4)	0.23*** (0.03)	88.4
Total nonhousing debt (\$)	25,519	84*** (11)	- 2,547*** (232)	- 33 (20)	26,864
Student loan balance (\$)	8,713	2 (5)	- 260** (95)	16 (8)	8,841
Student loan account 30 or more days past due in the past 6 months (%)	3.4	0.03 (0.02)	- 1.4*** (0.3)	- 0.09*** (0.02)	2.0
Total consumer debt (\$)	15,714	64*** (8)	- 2,126*** (183)	- 41** (16)	16,300
Credit card debt (\$)	4,559	29*** (3)	- 1,223*** (70)	- 7 (5)	4,730
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	9.8	0.33*** (0.01)	- 0.2 (0.3)	- 0.22*** (0.02)	23.4
Panel B. Mortgage Performance Domain					
Every 30 days delinquent on any mortgage loan (%)	3.2	0.16*** (0.01)	- 0.6*** (0.2)	- 0.09*** (0.01)	9.6
Every 60 days delinquent on any mortgage loan (%)	1.6	0.08*** (0.01)	- 0.3* (0.1)	- 0.05*** (0.01)	4.7
Every 90 days delinquent on any mortgage loan (%)	1.1	0.06*** (0.01)	- 0.1 (0.1)	- 0.03*** (0.01)	3.6

Notes: The interrupted time series analysis was conducted using the Stata command xtitsa. The sample includes 4,901 study participants who had purchased a home by December 2019 and had nonmissing credit bureau data. Standard errors in parentheses. Appendix A details the analytic methods, and appendix B provides additional detail on the construction of measures. Statistical significance levels for two-sided tests are *** = 1 percent; ** = 5 percent; * = 10 percent.

Source: Credit bureau

Exhibit C.15. How the COVID-19 Pandemic Affected Study Participant Outcomes, Interrupted Time Series Estimates, Subsample of Study Participants Who Did Not Purchase a Home by December 2019

Outcomes	Mean Outcome in July 2017	Monthly Change (Slope) in Outcome Prior to Pandemic	Change in Level of Outcome From December 2019 to July 2020	Change in Level of Outcome in July 2020	Mean Outcome in December 2021
Panel A. Financial Indicators Domain					
Credit score (out of 850)	673.0	0.10 (0.07)	8.3*** (1.4)	0.40*** (0.11)	693.2
Study participant has a credit score greater than or equal to 620 (%)	70.5	-0.06 (0.04)	3.8*** (0.9)	0.22** (0.07)	74.8
Total nonhousing debt (\$)	24,543	17 (22)	-1,685*** (459)	68 (37)	24,908
Student loan balance (\$)	9,177	1 (12)	-233 (225)	33 (17)	9,579
Student loan account 30 or more days past due in the past 6 months (%)	6.0	0.01 (0.04)	-1.3* (0.6)	-0.12 (0.06)	3.2
Total consumer debt (\$)	14,407	-1 (16)	-1,222*** (344)	34 (29)	13,736
Credit card debt (\$)	4,216	11 (6)	-937*** (131)	2 (11)	3,902
Major nonmortgage derogatory event (charge-offs, repossessions, bankruptcies) (%)	20.0	0.54*** (0.04)	-2.0** (0.7)	-0.39*** (0.05)	40.0

Notes: The interrupted time series analysis was conducted using the Stata command xtitsa. The sample includes 1,155 study participants who did not purchase a home by December 2019 and had nonmissing credit bureau data. Standard errors are in parentheses. Appendix A details the analytic methods, and appendix B provides additional detail on the construction of measures. Statistical significance levels for two-sided tests are *** = 1 percent; ** = 5 percent; * = 10 percent.

Source: Credit bureau

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