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Who Provides Credit in Times of Crisis? Evidence from the Auto Loan Market*

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Abstract

We examine the contribution of different lending channels to the auto loan market in times of crisis. Specifically, we explore lending from traditional banks, credit unions, and finance companies (nonbanks) over the past two decades, with an emphasis on the Great Recession and the COVID-19 pandemic. We find that banks provided weak support during the pandemic, thus losing market share and continuing the trend that emerged following the Great Recession. Nonbank market share during this period grew most significantly for subprime borrowers and in counties with stronger bank dependence. Survey evidence suggests that a tightening in banks' lending standards may have contributed to this trend. These findings contrast with the experience during the Great Recession, when banks contributed the most resilient credit to the auto loan market. Our paper highlights nonbanks' increasing role in the auto loan market in times of crisis, particularly for the subprime segment.

Keywords: nonbanks, auto loans, financial crisis, consumer credit

JEL Classification: G01, G21, G23, L62

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1 Introduction

The growth in fintech and nonbanks has disrupted how households interact with financial markets, spanning from various types of borrowing (e.g., mortgages, auto loans, credit cards, student loans, small businesses) to insurance, investing, and financial management. Despite the expansion of credit access that accompanied this entry of nonbanks, the economics literature and banking regulators cite the fragility of nonbanks in crisis periods as a cause for concern.¹ These views are, however, primarily informed by research over the period of the Great Recession, with particular attention to the mortgage market due to its importance to this period of distress.

Our work contributes to research on nonbanks and crisis periods by offering a new focal domain in auto loans. The auto loan market, with \$1.55 trillion in outstanding balances, represents an important segment of consumer finance. For comparison, credit cards represent close to \$1 trillion, student loans represent about \$1.60 trillion, and mortgages represent about \$12.26 trillion in outstanding balances.² Furthermore, 60 percent of U.S. adults with a credit report have an auto loan. The total number of active auto loans is about forty percent larger than the number of active mortgages. Given its significant size in the economy, it is important to understand how different lending channels contribute to the auto loan market during crisis periods.

We begin by analyzing long term trends in auto loan originations. First, we revisit the performance of the auto loan market during the Great Recession. We examine loan originations separately for banks, credit unions, and nonbanks to better understand the relative importance of these lending channels. We expand on existing research by examining the evolution of the auto loan market in the aftermath of the Great Recession. We then analyze the performance of the auto loan market throughout 2020. We analyze the initial months of the pandemic, when the auto market was severely impaired by the di-

¹<https://www.federalreserve.gov/newsevents/speech/quarles20201015a.htm>

²2022Q4 FRBNY Consumer Credit Panel/Equifax.

rect effects of the pandemic as well as lockdown policies. We then quantify the strength of recovery in auto lending as the economy began to adapt to the pandemic. We also explore the heterogeneity in the COVID-19 impact across lending channels and Equifax Risk Score (hereafter Risk Score) segments. We use credit bureau data from the FRB NY Consumer Credit Panel/Equifax (CCP) and leverage two empirical facts: (1) auto loan originations mimicked approximately the same within-year patterns in recent years, and (2) January and February of 2020 appeared to be on track to repeat the prior years' trajectory. We find a significant divergence in the rebound trajectory across lender groups starting in March 2020. Specifically, while the recovery in auto loan originations proved substantial for finance companies and credit unions, bank-financed originations did not return to the pre-2020 level. We observe the largest divergence among the non-prime Risk Score segments.

We subsequently examine how county-level bank dependence related to auto loan originations during the pandemic. We follow an empirical strategy similar to [Benmelech, Meisenzahl & Ramcharan \(2017\)](#), who document that regions more dependent on non-bank auto lending experienced a larger drop in auto sales after the collapse of the asset-backed commercial paper market during the Great Recession. We show that there was a significant substitution away from banks during 2020. Specifically, counties with higher pre-pandemic bank dependence experienced a more significant drop in bank-financed originations, while finance companies and credit unions both absorbed substantial market share. The pandemic accelerated the shift away from bank auto lending, with finance companies gaining significant market share, especially with the subprime segment, and credit unions gaining market share, especially with the prime segment.

Finally, we analyze the potential drivers of the observed bank market share loss. We discuss a collection of direct empirical evidence, qualitative descriptions of the auto loan market, and survey evidence. We first show that nonbanks and credit unions captured market share away from banks primarily among their traditional customer base. We also

observe a sharp change in market share loss across neighboring narrow Risk Score bands for banks but not for nonbanks. We interpret this result as evidence of a decrease in risk appetite on the part of banks. More broadly, we discuss how our findings are unlikely to be explained by regulation or illiquidity, which were significant factors around the time of the Great Recession. The factors discussed in the paper are not an exhaustive list of potentially important drivers of bank market share loss, and we acknowledge that other supply and demand forces may also be at play.

Overall, our work complements and expands on prior studies that discuss the fragility in nonbanks as a significant contributor to the collapse of the auto loan market in the Great Recession. We offer empirical evidence that nonbank lending rebounded in the years following the Great Recession. Nonbanks also provided stronger lending support than banks during the COVID-19 pandemic, suggesting a need for an updated view in this policy debate. By connecting the findings from the two crisis periods, we highlight the important discussion on the changing landscape in auto lending.

Our paper relates to several strands of literature. First, we naturally add to the literature studying the growth in nonbanks in financial markets. Notably, the rise of shadow banks in the mortgage market has been documented by [Buchak, Matvos, Piskorski & Seru \(2018\)](#). Similarly, [Gopal & Schnabl \(2022\)](#) document the rise of finance companies and fintech lenders in small business financing. The existing literature points to strict regulations following the Great Recession as the key driver for the growth in nonbanks ([Irani, Iyer, Meisenzahl & Peydro 2021](#), [Chernenko, Erel & Prilmeier 2022](#)). [Beck & Keil \(2022\)](#) show that the increase in uncertainty during the pandemic significantly affected banks' risk appetite and the subsequent contraction of credit supply. We contribute to this discussion by documenting the growing role of nonbanks during a new crisis period in auto financing, with a further focus on the cross-sectional differences between prime and subprime borrowers.³

³In an inquiry with a cross-sectional spirit similar to our paper, [Degerli & Wang \(2022\)](#) show that nonbanks in the mortgage market develop a focus on lower-income borrowers as they grow.

Second, our paper joins the literature studying the impact of the COVID-19 pandemic on consumer finance ([Baker, Farrokhnia, Meyer, Pagel & Yannelis 2020](#), [Horvath, Kay & Wix 2021](#), [Cox, Ganong, Noel, Vavra, Wong, Farrell, Greig & Deadman 2020](#), [Han, Meyer & Sullivan 2020](#), [Baker, Farrokhnia, Meyer, Pagel & Yannelis 2022](#), [Dong, Gozgor, Lu & Yan 2021](#), [Cherry, Jiang, Matvos, Piskorski & Seru 2021](#), [Wang, Yang, Iverson & Jiang 2021](#), [Lee, Park & Shin 2021](#), [Akana, Lambie-Hanson & Vickery 2021](#), [Ben-David, Johnson & Stulz 2021](#), [An, Cordell, Geng & Lee 2022](#), [Pence 2022](#)). In particular, our paper relates to studies focusing on the heterogeneous impact of the pandemic across consumer segments. [Chetty, Friedman, Hendren & Stepner \(2020\)](#) report the heterogeneous impact of the COVID-19 pandemic on consumption, with high-income individuals reducing consumption spending most sharply. We add to this literature by providing a detailed analysis of the auto loan market during 2020, as households adapted to the new realities of the pandemic.

Finally, our paper contributes to the literature on auto financing ([Mian & Sufi 2012](#), [Attanasio, Koujianou Goldberg & Kyriazidou 2008](#), [Benmelech et al. 2017](#), [Brevoort, Clarkberg, Kambara & Kelly 2017](#), [Argyle, Nadauld & Palmer 2020](#), [An et al. 2022](#)). Our paper adds to this literature by emphasizing the auto credit market and examining the relative lender resilience in a new period of distress.

The rest of the paper is organized as follows. [Section 2](#) describes the institutional context of the auto loan market, our data, and historical auto loan origination trends. [Section 3](#) describes the aggregate impact of COVID-19 on auto loan originations and reports our main results on differential origination activities across financing sources. [Section 4](#) estimates the effect of pre-pandemic bank dependence on post-pandemic market share across lending channels and examines the potential factors that contributed to the contraction in the bank share of the auto loan market. [Section 5](#) concludes.

2 Auto Loan Market Institutional Background and Data

In this section, we describe the institutional differences across auto lending channels, introduce our data, and summarize the historical origination patterns in the auto loan market in 2000-2020. Next, we describe additional data sources and explain how the relevant variables are constructed. We also provide a description of the long-term trends in auto loan originations across financing sources and Risk Score segments. Finally, we document the consistency of seasonal patterns in auto loan originations in recent years, which we exploit in our econometric framework.

2.1 Lenders in the Auto Loan Market

Auto loans, mortgages, and credit cards are the most important consumer finance segments. The structure of these lending markets is markedly different, with mortgages significantly influenced by government sponsored enterprises (GSEs), credit cards primarily the domain of large banks, and auto credit reliant on its own structure of lending channels described in the next paragraphs.

The three main providers of auto loans in the US are banks, credit unions, and finance companies. These lender types differ in their corporate structure, financing sources, and regulatory oversight; they also differ with regards to their client relations. These features may lead to differences in risk appetite and lending behavior. Unlike banks, credit unions are nonprofit institutions that originate loans primarily among their members. Finance companies in the auto loan space are generally referred to as monoline lenders because they generate most of their business from the origination of auto loans. Among finance companies, the largest segment by loan originations is composed of captive finance companies, i.e., subsidiaries of a parent car manufacturer. Captive finance companies originate loans primarily for the financing of new vehicle sales of the parent company. Another important segment is composed of finance companies affiliated with large bank holding

companies. In addition, a small proportion of auto loans are originated by independent finance companies or auto dealers.

The primary source of funding for banks and credit unions is from deposits, generally perceived as a stable source of funding; these institutions are also more likely to retain originated loans in their books. Finance companies rely primarily on alternative sources of funding, including securitization, commercial paper, corporate bonds, and bank financing.

Auto lenders must comply with a variety of laws and regulations; however, there are significant differences in the level of regulatory oversight across lender types. Deposit taking institutions are subject to direct supervision by a designated primary regulator and can be subject to several layers of regulatory oversight by other agencies, depending on their complexity. The National Credit Union Administration (NCUA) is the primary regulator, supervisor and insurer of credit unions. Banks are regulated by state banking regulators and federal regulators, including the Office of the Comptroller of the Currency (OCC), Federal Reserve Banks (FRB), and the Federal Deposit Insurance Corporation (FDIC). The Federal Reserve Board is responsible for supervising the financial condition and activities of financial holding companies, including bank-affiliated finance companies. Thus, banks, credit unions and bank-affiliated finance companies are subject to the direct safety and soundness supervision of their banking regulators. Finance companies without any bank affiliation face less regulatory oversight, although they are governed by a variety of consumer protection laws and regulations, and by the enforcement authority of the Consumer Finance Protection Bureau (CFPB).

Conditional on financial terms, an auto loan is a homogeneous product in principle ([Grunewald, Lanning, Low & Salz 2020](#)). However, there is a significant variation in the financial terms offered by lenders, and thus the customer base can vary across lender types. In recent years, banks originated loans primarily in the prime and super-prime segments, while bank affiliated finance companies originated about a third of their loans

in the subprime segment and around 50% of their loans in the subprime and near-prime segments.⁴ Credit unions originate about seventy five percent of their loans in the prime and super-prime segments but also have a significant presence in the subprime and near prime segments. Captive finance companies serve primarily the prime and super-prime customer of the affiliated car manufacturer; other finance companies serve primarily the subprime and near prime segments. Overall, the prime and super-prime segments are primarily served by banks, credit unions and captive finance companies, while the subprime and near prime segments are primarily served by finance companies and credit unions.

2.2 Data Description

Our main data source is the FRBNY Consumer Credit Panel/Equifax (CCP) and the associated Auto Tradeline panel data. The CCP is a panel data set comprising information from anonymized individual credit bureau reports starting with the first quarter of 1999. The panel data comprise a nationally representative 5 percent random sample of individuals who have a credit history.⁵ The Auto Tradeline panel data associated with the CCP was constructed to provide additional tradeline-level (or loan-specific) information on auto loans associated with the individuals in the CCP data.

For each auto loan, the CCP reports loan-specific information such as origination date, initial balance, and term. Using the origination date, we construct a historical series of monthly origination vintages. We observe consumer-specific information such as Risk Score⁶ and geographic area of residency. Importantly, the data further identify the financ-

⁴Authors' calculations based on the CCP data.

⁵In addition, for each primary individual in the sample, the CCP includes credit files for all additional individuals residing in the same households, but our focus is on the primary sample. [Lee & Van der Klaauw \(2010\)](#) describes the data in more detail.

⁶The Equifax Risk Score is a proprietary credit score that estimates the likelihood that an individual will pay his or her debts without defaulting. A variety of factors that relate to loan performance contribute to the Risk Score, including payment history, outstanding debts, length of credit history, new account openings, and types of credit used ([Board of Governors of the Federal Reserve System 2007](#), [Fair Isaac Corporation 2015](#)). Delinquency, large increases in one's debt, and events of public record (e.g., bankruptcy or foreclosure) often lead to low scores ([Anderson 2007](#)). The scores range from 280 to 850, with higher scores representing greater financial health and advantage.

ing source of each loan. We aggregate these lender categories into three broad groups: (1) banks, which also include savings and loan institutions; (2) nonbanks, which include car dealerships, auto company financing, and sales financing; and (3) credit unions. Auto loans originated by car dealerships or sales financing are rare in our data. We henceforth interchangeably refer to finance companies as nonbanks, given the auto loan market context in this paper.

We collapse our consumer-level data at the county-month-Risk Score segment-financing source level. Following the Consumer Financial Protection Bureau (CFPB) convention, we consider four Risk Score segments:⁷ (1) subprime: <620, (2) near-prime: 620–660, (3) prime: 660–720, and (4) super-prime: >720. With three financing sources, we have 12 resulting partitions of the data. Relevant variables and classification schemes are described in Table 1.

We also complement our data with U.S. Census demographic information at the county-level. Finally, to examine the drivers of our main results, we conduct additional analyses based on the following data sources: (1) net percentage of banks reporting tightening standards from the Federal Reserve Senior Loan Officer Opinion Survey, (2) captive finance companies' balance sheet data from Compustat,⁸ (3) usage level of the Term Asset-Backed Securities Loan Facility (TALF) program from the Board of Governors of the Federal Reserve System, and (4) aggregated data on auto securitization origination, the primary source of liquidity for finance companies, from Intex Solutions (a leading provider of information and valuation software on structured finance securities).

⁷<https://www.consumerfinance.gov/data-research/consumer-credit-trends/credit-cards/borrower-risk-profiles/>

⁸References to Compustat herein refer to Compustat data from S&P Global Market Intelligence (2024) via Wharton Research Data Services (WRDS).

2.3 Long-term Trends in Auto Loan Originations

Prior work by [Benmelech et al. \(2017\)](#) documents that lending from finance companies (which relied heavily on the securitization channel) were significantly impaired during the Great Recession, likely due to funding disruptions in short-term credit markets. This naturally corresponded to a substitution away from nonbank to bank financing in the auto loan market. They additionally show that counties more reliant on nonbank lending experienced a more dramatic contraction in aggregate car sales. While their data spans the period 2002-2013, their analysis primarily focuses on 2008 and 2009. In [Figure 1](#), we extend their analysis by offering insights on the relative importance of financing sources for the auto loan market in the years following the Great Recession. Furthermore, [Figure 2](#) reports auto loan originations across financing sources and Risk Score segments. The time span covered in [Figures 1 and 2](#) encompasses several years of economic expansion (2004–2006), the Great Recession (2007–2009), subsequent recovery and growth years (2010–2019), and the period of the COVID-19 crisis.

Finance companies originated the largest share of all loans leading up to the Great Recession, with an oversized concentration in subprime. Thus, the subprime segment was particularly impacted by the collapse of nonbank financing. Banks and credit unions experienced smaller contractions, particularly in the prime and super-prime segments. When compared with finance companies, banks and credit unions played a substantial role in sustaining the auto loan market during the Great Recession.

Expanding on the works of [Benmelech et al. \(2017\)](#), we find that auto loan originations by finance companies grew vigorously following the Great Recession, while banks grew only moderately or mostly stalled. The observed differences in lending growth precipitated a steady decrease in the bank market share of auto loan originations. In 2009, finance companies originated roughly 40 percent of auto loans, while banks and credit unions originated the other 60 percent. By 2019, the respective shares had flipped, with finance companies originating 60 percent of auto loans.

Figure 3 provides a more granular depiction of auto loan originations, with a continuous spectrum of Risk Scores for different snapshots throughout the sample period. Specifically, it shows the substantial reduction in originations by finance companies (particularly for subprime borrowers) during the Great Recession. Finance companies lost significant market share in 2009 during the height of the Great Recession. Figure 3 furthermore shows the contrasting result for the COVID-19 crisis, where there is no visible contraction in finance company originations.

Figure 4 graphically previews the basis for the empirical specification in our subsequent econometric analyses, where we formally test for the COVID-19 effect on auto loan originations. Specifically, it reports monthly auto loan originations for the years 2017-2020. Two key observations are relevant for our econometric specifications. First, it shows that within-year trends are consistent for 2017-2019. Specifically, originations start slowly in January and February, then jump significantly in March followed by small fluctuations for the rest of the year. The *level* of originations is also similar across the three years. Second, the figure also shows originations for the first two months of 2020 are broadly in line with 2017–2019, before the COVID-19 pandemic began to halt economic activities in March. Based on January and February, the 2020 origination trend appears to be on track to repeat the previous years' trend.

3 COVID-19 and the Auto Loan Market

Section 2 documented how the auto loan market evolved in the last twenty years across financing sources. In this section, we measure the impact of COVID-19 on aggregate loan originations and formally analyze the importance of financing sources in the auto loan market during COVID-19, across Risk Score segments. Also, in the final subsection, we analyze changes in market share across financing sources.

3.1 Aggregate Originations

In this subsection, we formally estimate the COVID-19 impact on auto loan originations. Our main econometric specification is motivated by the observation from Figure 4. Specifically, we hypothesize that loan originations in 2019 can serve as an appropriate counterfactual for 2020.⁹ Thus the 2019 observations serve as our *de facto* control group, and the 2020 observations give us our treated group.¹⁰ Our resulting baseline specification can be written as

$$\log(\text{Orig}_{irft} + 1) = \delta(X_{irft}) Y_{2020t} + \beta(X_{irft}) \text{COVID}_t + \text{County } FE + \text{State-Month } FE + \varepsilon_{irft}, \quad (1)$$

with the dependent variable representing the log of auto loan originations for borrowers in Risk Score segment r using financing source f in county i in month t . Y_{2020} is an indicator variable that is equal to 1 for all months in 2020, and COVID is an additional indicator variable that takes the value of 1 for the months of March–December 2020.

Intuitively, Y_{2020} estimates the average 2020 effect on auto loan originations for the pre-COVID-19 months of January and February, and COVID estimates the additional 2020 effect starting in March. Naturally, our main coefficient of interest is β . Our estimate COVID captures the comprehensive pandemic effect (e.g., lockdown effects, health shocks, preference shocks, monetary or fiscal policy). Another important feature of our analysis relates to potential sources of the heterogeneous impact of the pandemic (e.g., financing sources and Risk Score segments), represented as X_{it} . We cluster standard errors at the state level and weight each observation by county population.

Column 1 in Table 2 presents the initial results from the baseline specification in equation (1).¹¹ The results indicate that the COVID-19 period is associated with an average drop in auto loan originations of roughly 15.2 percent per month relative to the same

⁹Wang et al. (2021) and Horvath et al. (2021) follow a similar approach of using 2019 as the counterfactual to estimate the COVID-19 effect.

¹⁰We focus on 2019 as our control group, as opposed to 2017 or 2018, because the economic environment of 2019 is naturally closest to 2020.

¹¹The coefficient for the main COVID impact reports consistent estimates across incrementally fuller fixed effects structures.

period in 2019, which is statistically and economically significant. The Y_{2020} coefficient shows that the months of January and February 2020 are associated with slightly higher originations (1.7 percent) compared to 2019.

In columns 2–5, we estimate equation (1) separately for the four Risk Score segments. We find a substantial variation in the COVID-19 coefficient across Risk Score segments. For the subprime borrower group (column 2), we find that the average monthly drop in auto loan originations associated with the COVID-19 period is roughly -21.7 percent. The estimated effect of the pandemic is notably different for other borrower groups. Specifically, for the near-prime borrowers with Risk Scores between 620 and 660, the COVID-19 effect is -0.099 and the COVID-19 effect is -0.127 for the prime borrowers in the 660-720 range. For the super-prime borrowers, the COVID-19 effect is -0.164. This seemingly significant estimate for the super-prime borrowers can be partially explained by a large increase in their January–February 2020 average monthly effect with respect to 2019. In summary, while we find a significant drop in auto loan origination activity during COVID-19 for all borrowers, subprime borrowers report the most severe drop. In column 6, which pools the sample together, we find that the difference between subprime and other segments during the COVID-19 months (i.e., the coefficient for $COVID \times \text{Subprime}$) is statistically significant.

In Figure 5, we interact the indicator variable $COVID$ with month dummies to examine the heterogeneity of the *dynamic* COVID-19 impact across Risk Score segments. In Panel A, we find that the aggregate drop associated with the months of March and April 2020 is roughly 28.2 percent and 48 percent, respectively. This drop is followed by a quick and substantial recovery. The associated coefficient in May 2020 is a much smaller -0.150 and the associated coefficient in June 2020 of -0.024 is statistically indistinguishable from zero. The subsequent months from July to October 2020 are again associated with statistically significant drops, but much smaller compared with the early months of the pandemic. In

November and December, which coincides with a new wave of COVID-19 cases,¹² we find evidence for some contraction.

In Panel B, we repeat the estimation separately for the four Risk Score segments. While the initial drop in auto loan originations does not differ dramatically across the Risk Score groups, the recovery paths prove notably different. Specifically, the subprime borrower group continues to report a persistent negative effect of COVID-19, while the three higher Risk Score groups report a strong recovery starting in May. We even find a positive coefficient estimate for June, which ranges between 0.011 and 0.023 across the three higher Risk Score groups.

3.2 Originations across Financing Sources and Risk Segments

To examine the heterogeneity in the COVID-19 impact across financing sources, Table 3 reports the estimates from equation (1) separately for each financing source. First, it shows that originations by finance companies started 2020 with the strongest growth. The coefficients of Y_{2020} indicate that finance companies originated roughly 5.4 percent more loans in January and February 2020 relative to 2019, while banks and credit unions experienced statistically insignificant growth. Column 1's coefficient estimate of $COVID$, -0.241, indicates that bank-financed originated auto loans experienced the most significant percentage drop in originations associated with COVID-19. Columns 2–3 show a less severe COVID-19 impact for finance companies and credit unions. The estimates of $COVID$ show that the effect of the pandemic on the average monthly drop in auto loans for finance companies and credit unions was around 12.6 percent and 8.9 percent, respectively. In column 4, which pools the sample together, we show that these differences between banks and nonbanks during the COVID months (i.e., the coefficients for $COVID \times Finance$) are statistically significant.

Table 4 decomposes the COVID-19 impact by separating $COVID$ into two periods:

¹²This period is also notably affected by the semiconductor chip shortage in the auto industry.

(1) March-December of 2020, denoting the pandemic period, and (2) May-December of 2020, representing the recovery period. In columns 1–3, we again break down the sample by financing source. Bank-financed originations experienced the most dramatic drop in auto loan originations during both the initial and recovery months of the pandemic. The initial contraction corresponds to the coefficient estimate of -0.467 , followed by a relatively smaller recovery (estimate of 0.281) throughout the following months. On the other hand, finance companies and credit unions experience an initial contraction of -0.396 and -0.281 , respectively, followed by a much stronger recovery between May and December that almost offset these drops. During this period of recovery, the average monthly effect of COVID-19 on auto loan originations financed by finance companies is 0.338 , and for loans financed by credit unions, it is 0.240 . Overall, Tables 3 and 4 show the importance of nonbanks in originating auto loans during the COVID-19 crisis period.

In Figure 6, we examine the impact of COVID-19 auto loan originations across financing sources *and* Risk Score segments. Specifically, we split our sample by financing source and interact both Y_{2020} and $COVID$ with the Risk Score segment indicator variable to estimate each group-specific coefficient. We furthermore decompose the $COVID$ indicator variable into two sub-variables to separately denote the period of the initial shock (March and April) and the recovery period (May–December). Two features stand out from this figure. First, across all financing sources, all borrower groups experience a significant drop in auto loan originations during the initial months of the pandemic. Second, originations in the recovery period contract most significantly for banks across all Risk Score groups. The differences are stark. For the subprime borrower group, we estimate that bank-originated loans initially fell by roughly 44.7 percent per month due to COVID-19, whereas the corresponding drop was 41.1 percent for finance companies and 24.3 percent for credit unions. The recovery period reveals similarly divergent strengths, during which the subprime borrower group reports a loss of around 31.8 percent per month for bank loans, while the corresponding estimate is 22.9 percent for finance companies and 8.2 per-

cent for credit unions. For the near-prime borrower group's recovery period, the figure reports a loss of around 21 percent per month for bank loans, and 2.7 percent and zero percent for finance companies and credit unions, respectively. For the super-prime borrower group, bank-financed originations recover with strength much closer to those of the finance company and credit union counterparts. It is worthwhile to point out that banks contribute little to subprime lending. Credit unions, while significantly more active than banks, still contribute about one-third as much as finance companies in subprime lending. Therefore the recovery of subprime lending among finance companies resulted in the largest absolute impact on this segment.

3.3 Bank Market Share

In addition to documenting the relative COVID-19 impact across lenders, we examine how the market share of each lender changed during the pandemic. Table 5 formally addresses this question by estimating a version of equation (1) with the log of bank share as the dependent variable. In Panel A, we estimate the baseline regression with four subsamples (one for each Risk Score segment). First, we find that banks were generally already losing market share in 2020 prior to the COVID-19 pandemic. The coefficients for Y_{2020} show magnitudes ranging from -0.107 to -0.055 for the three non-super-prime borrower groups, indicating economically and statistically significant percent drops relative to the 2019 bank share. For the super-prime borrower group, 2020 reported a significant increase in the bank share in the beginning (coefficient for Y_{2020} of 0.075). The COVID-19 period is associated with a further significant drop in bank market share of about ten percent across the board; we estimate a larger relative drop in bank share associated with *COVID* for the two lower Risk Score segments.

Panel B of Table 5 further decomposes the *COVID* effect separately for the initial versus recovery months. This decomposition conveys a similar message, in which the bank share fell more dramatically *and* recovered less for the subprime and near-prime borrower

groups. These results offer a precise quantification of bank market share loss during COVID-19. This represents a continuation and acceleration of a 10-year secular trend of declining bank market share, especially for the subprime and near-prime segments.

4 Contraction of Bank Market Share

The previous section documents a significant reduction of bank market share in the months of the pandemic. This could be driven by (1) a reduction in the *supply* of bank credit, perhaps due to the tightening of lending standards, or (2) a reduction in the *demand* for bank-originated auto loans, perhaps due to a shift in borrowers' preference towards nonbank loans. In this section, we discuss the potential drivers of the observed bank market share loss. We begin with survey evidence suggesting a significant tightening in banks' lending standards and discuss empirical evidence supportive of this view, although we do not rule out other contributing supply and demand forces.

To start, the Federal Reserve Senior Loan Officer Opinion Survey (SLOOS) reports significant tightening of auto lending standards by banks after the onset of COVID and for the remainder of 2020, as illustrated in Figure 7. Moreover, the figure shows that tightening lending standards during COVID-19 coincides with a significant loss in banks' market share in auto loan originations.¹³ For quantitative context, both of (1) reported tightening of lending standards and (2) bank market share decline during this period are economically significant. For instance, the peak value of the net percentage of tightening banks is a 4-standard deviation event going back to the beginning of its series in 2011. This evidence of tighter lending standards by banks is furthermore consistent with the observed stronger decline in bank lending to less creditworthy borrowers.

The following subsections provide additional analysis for establishing the link between bank market share loss and a tightening in banks' lending standards. In subsection 4.1, we

¹³A one quarter delay in loan officers' reporting of tightening standards is expected, given the backward-looking nature of the survey.

consider the impact of county bank lending dependence on loan originations across lending channels. Subject to certain conditions, this approach has been applied in the literature to analyze the impact of sharp changes in credit supply from a specific lending channel. In subsection 4.2, we explore further disaggregated classifications for lender types and Risk Score segments. In subsection 4.3, we provide a broader interpretation of our findings and a qualitative analysis of the driving factors behind the observed lending dynamics.

4.1 Bank Dependence and Auto Loan Growth

After documenting banks' significant loss in auto loan origination share during the pandemic, we turn to investigate the effect of pre-pandemic bank market share across counties on auto loan originations during the pandemic. If banks experience a tightening at the *aggregate* level, the impact of a credit supply shock will resonate more severely in regions more dependent on bank lending prior to the shock. Using pre-pandemic regional variation in bank market share, we can identify to what extent nonbank lending expands more in areas more impacted by shocks to bank lending. The underlying identification assumption of the analysis requires that regional bank dependence prior to the shock is exogenous with respect to auto loan demand changes across lending channels during the pandemic.¹⁴ In this subsection, we focus on the impact of pre-pandemic bank dependence on loan originations across lending channels.

Our approach closely follows [Benmelech et al. \(2017\)](#), who use the pre-crisis *Nonbank Share* as the relevant right hand side variable to estimate the real effects of financing disruption to the nonbanks on the auto loan market during the Great Recession. Because the relative roles of banks and nonbanks during COVID-19 are reversed from their roles during the Great Recession, we use *Bank Share* as the main explanatory variable resulting

¹⁴[Gopal & Schnabl \(2022\)](#) discuss this identification strategy in more detail.

in the following specification,

$$\begin{aligned} \Delta \log(\text{Orig}_{i,2020m3:m12}) &= \gamma \Delta \log(\text{Orig}_{i,2020m1:m2}) + \alpha \text{Bank share}_{i,2019} \\ &+ X_i \beta + \text{State } FE + \varepsilon_i, \end{aligned} \quad (2)$$

where the dependent variable is the log difference between 2019m3-m12 originations and 2020m3-m12 originations in county i . Our main explanatory variable is Bank Share $_{i,2019}$, which is defined as the market share of banks in all 2019 auto loan originations in the county. We also control for the log difference between 2019m1-m2 and 2020m1-m2 originations to account for the “counterfactual 2020 effect”. The full specification includes county-level economic variables¹⁵ and state fixed effects. We weight each county by its population and cluster standard errors at the state level.

We examine how within-county substitution between lenders is related to bank dependence. In Table 6, we estimate equation (2) with the outcome variable decomposed by financing source and risk segment – i.e., the log difference in auto loans of risk segment originated by *each* financing source between 2019 and 2020. The results show a significant substitution away from banks to finance companies and credit unions. Specifically, higher bank dependence in 2019 is associated with a substantial drop in auto loans originated by banks in all segments. Furthermore, this drop is accompanied by a rise in market share for finance companies and credit unions.

Across the risk spectrum, we find the largest substitution from banks to finance companies in the subprime segment. Specifically, in Panel A, we find that for an additional 10 percentage points increase in bank dependence, the implied decline in bank-financed originations (-14.9 percent) is partially offset by an approximate increase of 5.2 percent in finance company originations. The subprime segment also reports a large substitution of bank financing towards credit unions, as reflected in the coefficient of 0.46, or a 4.6 per-

¹⁵These control variables are selected based on the baseline specification in [Benmelech et al. \(2017\)](#).

cent increase in credit union originations. For the non-subprime segments, the decline in bank-financed originations associated with higher bank dependence is essentially offset by both finance companies and credit unions. Credit unions provide significant lending support across all risk segments, ranging from 4.6 percent to 6.8 percent.

Taken together, these findings suggest that counties with higher exposure to traditional banks fared worse in terms of auto loan originations during the pandemic. Higher bank share in 2019 accelerated the shift away from bank auto lending during the pandemic, with finance companies gaining significant market share, especially with the subprime segment, and credit unions gaining market share, especially with the prime segment. Since it would be unlikely for a broad demand shock to result in significant changes in market share across lenders, this exercise offers some support to the supply-side interpretation of loss in bank market share.

4.2 Risk Appetite across Lender Types

In this subsection, we further disaggregate lender types and Risk Score segments to examine the drivers of bank market share loss. First, we consider the lending behavior of bank-affiliated finance companies separately from other finance lending channels to illuminate the role of supervisory oversight. Second, we estimate changes in auto loan growth across narrower Risk Score segments. This analysis allows us to identify potential sharp changes in lending across neighboring Risk Score segments, which would be consistent with changes in lenders' risk appetite as a driver of changes in lenders' market share.

4.2.1 Bank-affiliated finance companies versus other finance companies

As we described in Section 2, finance companies can differ in terms of corporate structure and regulatory oversight. Bank-affiliated finance companies are subject to safety and soundness supervision from the Federal Reserve as the designated Federal Bank Holding Company regulator, while other finance companies usually face less regulatory oversight.

Fortunately, our data allow us to differentiate between bank affiliated finance companies and other finance companies in recent years. Leveraging this information, in Panel B of Table 6 we report originations of bank affiliated finance companies and other finance companies separately. The results indicate that each lender type plays to its strength when capturing market share from banks. Specifically, bank-affiliated finance companies primarily grow in the near-prime and prime segments. For an additional 10 percentage points increase in pre-COVID bank dependence, the implied increase in originations by bank-affiliated finance companies is 40.8 percent in near-prime and 31.8 percent in prime. Finance companies with no bank affiliation, which are mostly composed of captive finance companies, grow strongest in the super-prime segment, consistent with their main objective of providing financing for the customers of their parent company. Nevertheless, finance companies without bank affiliation also grow in the other risk segments. Credit unions capture market share across the board. In summary, these lenders play to their strength when auto loan originations substitute away from banks.

4.2.2 Differences across lenders over narrow Risk Score bands

We also examine loan originations and market share across lender types and more disaggregated Risk Score segments. Intuitively, a shift in borrowers' preferences towards nonbank lenders should similarly impact borrowers in narrow neighboring Risk Score bands. By contrast, changes in loan originations resulting from tightening of lending standards can vary significantly across narrow Risk Score bands because of loan policies generating discontinuities at fixed Risk Score thresholds ([Argyle, Nadauld & Palmer 2023](#)). Thus, observing sharp changes around narrow Risk Score bands offers additional support to interpreting risk appetite as a contributor to the decline in bank market share.

Table 7 reports the change in loan originations (Panel A) and market share (Panel B) for the months of May to December (i.e., the recovery period following the initial onset of the pandemic) across lending channels and narrow Risk Score segments. For finance

companies and credit unions, the differences in originations are immaterial across these intervals (i.e., *not* statistically significantly different using an F -test), which does not support a tightening of lending standards. By contrast, we observe significant differences in the impact of the COVID months for loan originations and market share changes for banks between the 620-640 segment and the 640-660 segment, suggesting the relevance of the potential policy rule by lenders at the Risk Score of 640. Specifically, originations by banks fell by 15.9 percent relative to 2019 levels for consumers in the 620-640 segment, but the corresponding drop was 9.2 percent and 9.9 percent for 640-660 and 660-690, respectively. The coefficient for 620-640 is more than 70 percent larger than the coefficient for 640-660, and statistically significantly different from the coefficients for 640-660 and 660-690 according to F -tests. In Figure 8, we provide a visual illustration of bank market share loss around this Risk Score region with even narrower bands (i.e., 10-point intervals).

In summary, we observe sharp changes in loan originations for banks across narrow Risk Score segments. This provides additional evidence consistent with a tightening of banks' lending standards that we do not observe for other lender types. We also do not observe market share shifting primarily towards a specific type of specialized lender channel, as would be predicted by a taste-based demand-side interpretation.

4.3 Drivers of Bank Market Share Loss

This subsection offers qualitative discussions related to the drivers of bank market share loss. We analyze to what extent specific features across lender types may have been contributing factors. We focus on four key features: regulatory oversight, funding source, corporate structure, and client relationships.

Prior research on the Great Recession identified new banking regulations ([Gopal & Schnabl 2022](#)) and illiquidity in credit markets ([Benmelech et al. 2017](#)) as the primary drivers of changes in lending patterns around the Great Recession. We argue that regulatory framework and funding sources across lender types did not play a significant role

during the recent COVID-19 crisis. We point instead to specific features of corporate structure and client relationships that may have contributed to the sluggish recovery in risk appetite on the part of banks relative to finance companies and credit unions.

Bank-affiliated finance companies are subject to safety and soundness oversight from the Federal Reserve Board as the bank holding company regulator. Finance companies without any bank affiliation are not subject to the same level of safety and soundness supervision on the part of designated banking regulators, but are subject to the supervisory authority of the Consumer Financial Protection Bureau (CFPB). In subsection 4.2, we reported bank-affiliated finance companies grew in market share similarly to other nonbank lenders. Credit unions, which are governed by the National Credit Union Administration, also experienced an increase in market share. These results suggest that differences in regulatory oversight across auto lenders are unlikely to be primarily responsible for the observed differences in lending behavior.

Another important difference between banks and finance companies is their sources of financing. Banks and credit unions rely primarily on deposits, which are more stable than the alternative sources of funding available to finance companies – mostly asset-backed securitization (ABS) markets. For banks in the early months of the pandemic, they had access to the Federal Reserve’s liquidity injection programs and were generally well capitalized (Li, Strahan & Zhang 2020). For finance companies, in stark contrast to the Great Recession (during which the ABS market collapsed), programs such as the Term Asset-Backed Securities Loan Facility (TALF) supported the securitization markets during the pandemic, and the ABS market remained open. Thus, the pandemic likely did not disrupt banks and finance companies differentially through the channel of funding sources.

For quantitative context on finance companies’ financing sources, specifically to compare the degree of their financing source disruptions between the Great Recession and the COVID-19 period, we present several results.

Using the publicly available balance sheet information for the captive financing arms of

major auto manufacturers (e.g., Ford Motor Credit, Toyota Motor Credit, GM Financial), we show that finance companies' leverage level has declined since the Great Recession.¹⁶ Figure 9 shows that, on average,¹⁷ these finance companies had a liabilities to assets ratio over 0.92 before the Great Recession, but their leverage had fallen below 0.90 by early 2020. We interpret these firms' lower leverage level as offering more financial flexibility to manage the early period of the crisis.

To augment the analysis of large captive financing companies' balance sheet information, we also show in Panel A of Figure 10 that the TALF program was relatively unused during 2020 compared to the Great Recession period. Shortly after the introduction of the TALF program in 2008, when the liquidity needs of finance companies were significant, the level of TALF had reached almost \$50 billion. During 2020, however, there was comparatively insignificant use of the TALF program, potentially indicating that finance companies faced no constraints with respect to emergency liquidity needs. Panel B of Figure 10, which reports the annual ABS issuance volume throughout the period spanning the two recessions, conveys a similar message. Specifically, ABS fell by more than 50 percent during the Great Recession and subsequently did not fully recover to the pre-crisis level until 2015. In contrast, ABS issuance remained relatively open during the pandemic period, during which it fell with respect to the peak in 2019 (by less than 15 percent) but was in line with 2017-2018. In summary, we interpret this collection of quantitative information as evidence for finance companies' liquidity environment being significantly more favorable during the COVID period compared to the Great Recession.

Other factors may also be at play, although our analyses cannot provide any direct insights to these dimensions. Specifically, features of corporate structure and client relations may relate to differences in risk appetites. Captive companies' primary mission is to serve the clients of the parent company. In addition, finance companies are generally monoline lenders with their exclusive focus being the auto loan market. Credit unions'

¹⁶We note a caveat that these firms may not be representative of the entire captive financing industry.

¹⁷This average is weighted by each firm's total assets.

primary focus concerns their members. Prior research suggest they are more likely to rely on qualitative information in lending decisions compared to banks (Holmes, Isham, Petersen & Sommers 2007). Additionally, loans originated by credit unions perform better on average (Shahidinejad 2022). Related, Beck & Keil (2022) find a more significant reduction in syndicated loans for banks more affected by the heightened uncertainty during the pandemic, and suggest that the supply contraction may have been related to lower risk appetite. Banks are more exposed to other forms of risky consumer debt such as unsecured credit cards, which may affect their risk appetite across consumer finance portfolios during crisis periods. Banks also hold more non-consumer loans that could have been perceived as particularly risky during the pandemic (e.g., commercial real estate loans). Thus, a relative decrease in banks' risk appetite could have been a contributing factor to the bank market share loss.

5 Conclusion

We analyze the evolution of the auto loan origination market over a time span encompassing two significant crisis periods, the Great Recession and the COVID-19 pandemic, with an emphasis on the contribution of different lending channels. We revisit findings from prior studies on the auto loan market during the Great Recession. We expand on existing work by examining the evolution of the auto loan market in the years after the Great Recession. We pay particular attention to the originations across lending channels during the recent COVID-19 pandemic. Our analysis highlights significant differences in performance across lending channels over the two stress periods. In particular, we document a significant loss in bank market share. We analyze potential drivers behind this loss and find empirical evidence suggesting a tightening in banks' lending may have contributed to this trend, along with structural differences across lender types.

The Great Recession revealed the importance of nonbanks for the health of the auto

loan market, especially for the subprime segment. Specifically, [Benmelech et al. \(2017\)](#) suggests that illiquidity of nonbanks largely explained the contraction in nonbank automotive credit during the Great Recession, which in turn explained about one-third of the collapse in car sales. Our analysis shows that nonbank lending gained significant market share in the years after the financial crisis. Furthermore, nonbank lending played a significant role in sustaining the auto loan origination market during COVID-19. Specifically, we show that auto loan originations contracted significantly across lending channels in the initial months of the pandemic. However, bank lending contracted more than lending by finance companies and credit unions. Banks also lagged other origination channels in the recovery after the initial two months of the pandemic. This resulted in a further decline in the market share of banks, which began its downward trajectory following the Great Recession. Differences in the recovery across lending channels proved particularly pronounced for the subprime segment.

By estimating the impact of pre-pandemic bank dependence on county-level loan originations, we find significant substitution from banks to finance companies and credit unions. We observe the largest substitution in the subprime segment. For the non-subprime segments, the decline in bank-financed originations is essentially offset by both finance companies and credit unions. We present empirical evidence consistent with banks' tightening of lending standards contributing to this finding. We also argue that other prevalent factors during the Great Recession, including differences in regulatory oversight and illiquidity constraints, did not play a significant role during the recent crisis. Our paper complements prior work by studying the evolution of lending channels after the Great Recession and during the COVID-19 crisis and documents the reversed roles for banks and nonbanks in this recent crisis episode.

Overall, our analysis of the auto loan market over the past two decades highlights the increasing importance of nonbank lending. The experience in this market during the Great Recession revealed important weaknesses in nonbanks, while the COVID-19 expe-

rience highlighted potential strengths. These dissimilar experiences over two very different episodes highlight the inherent uncertainty of outcomes during crisis periods. The evolving relevance of different lending channels may have significant implications for the stability of the auto loan market in future crises.

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Figure 1: Historical Auto Loan Originations by Financing Source

This figure reports the annual auto loan originations (in millions) for 2004-2020. The origination series is divided across the three financing sources: banks (blue), finance companies (red), and credit unions (teal).

Data Sources: FRBNY Consumer Credit Panel/Equifax (CCP)

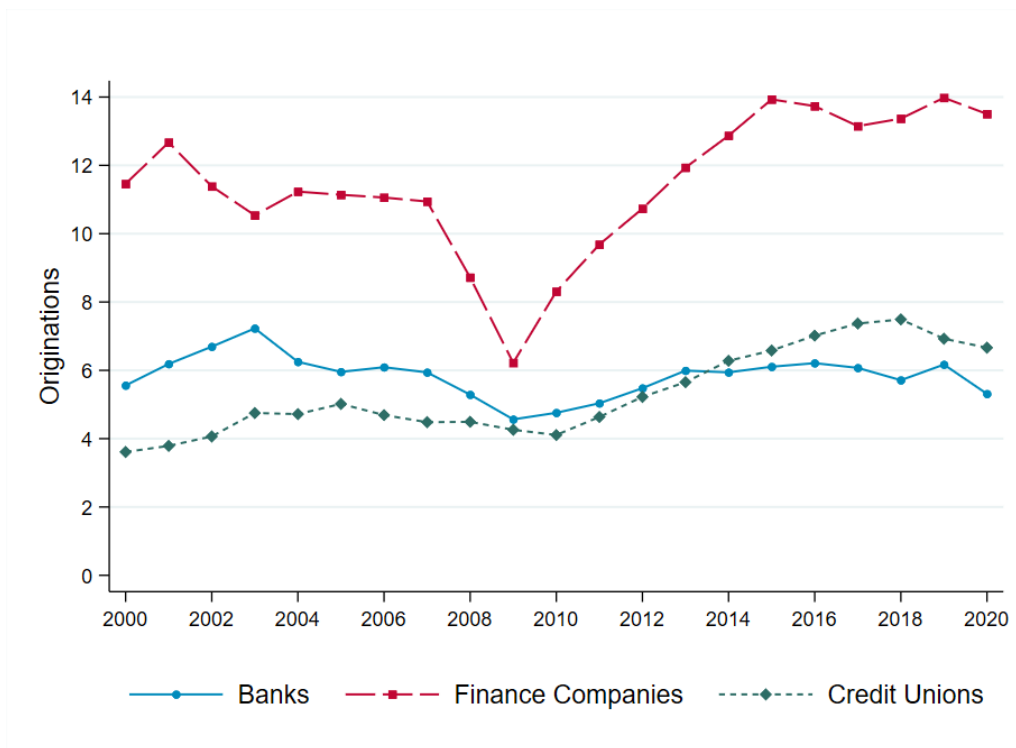


Figure 2: Historical Auto Loan Originations by Risk Segment

This figure reports the annual auto loan originations (in millions) for 2004-2020. Each subfigure includes the Risk Score segment corresponding to its title: subprime (<620), near-prime (620-660), prime (660-720), super-prime (>720). In each subfigure, the origination series is furthermore divided across the three financing sources: banks (blue), finance companies (red), and credit unions (teal).

Data Sources: FRBNY Consumer Credit Panel/Equifax (CCP)

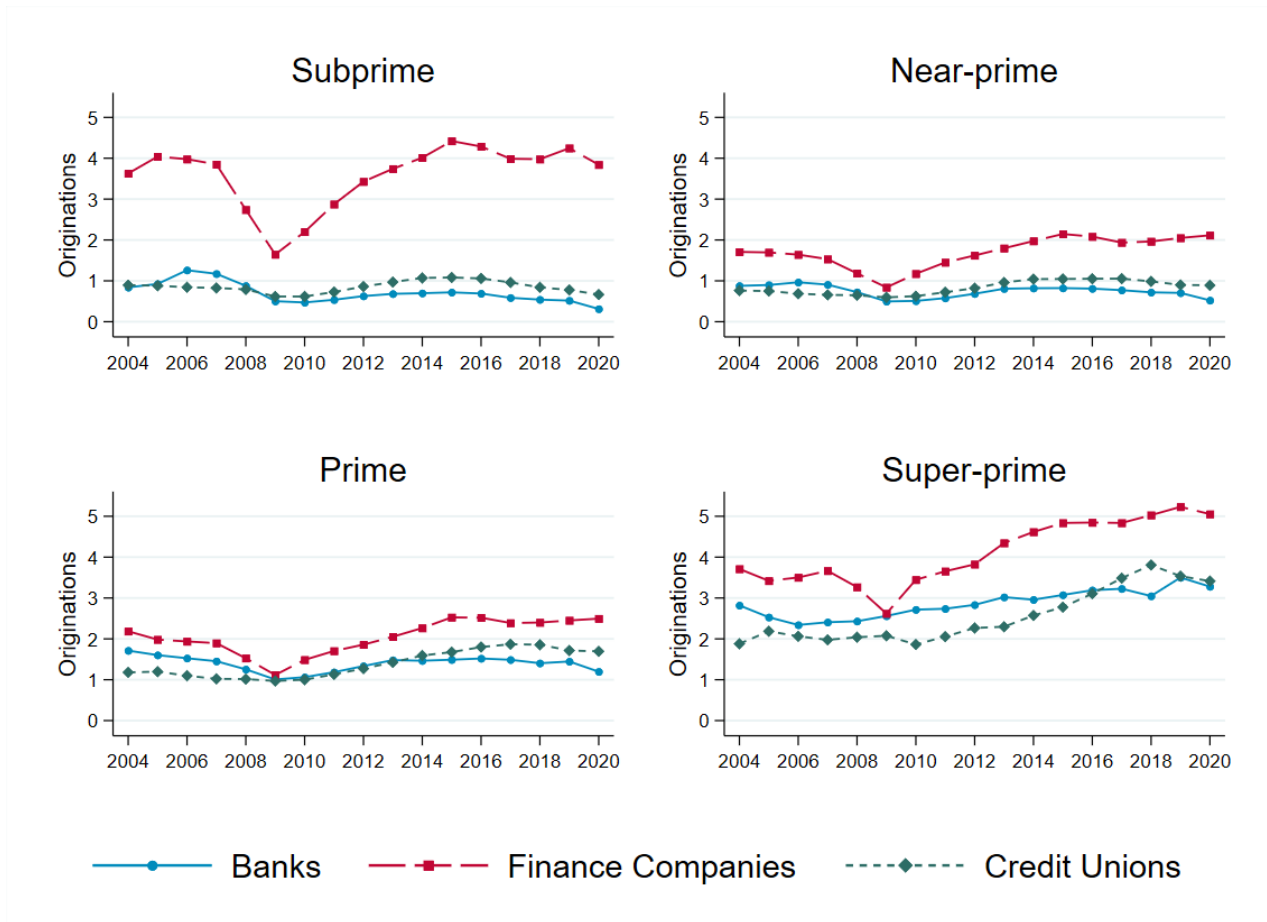


Figure 3: Auto Loan Originations across Risk Scores during Crisis Periods

This figure reports the annual auto loan originations (in thousands) over five-unit Risk Score intervals for the years 2006, 2009, 2017, and 2020. In each subfigure, the origination series is divided across the three financing sources: banks (blue), finance companies (red), and credit unions (teal).

Data Sources: FRBNY Consumer Credit Panel/Equifax (CCP)

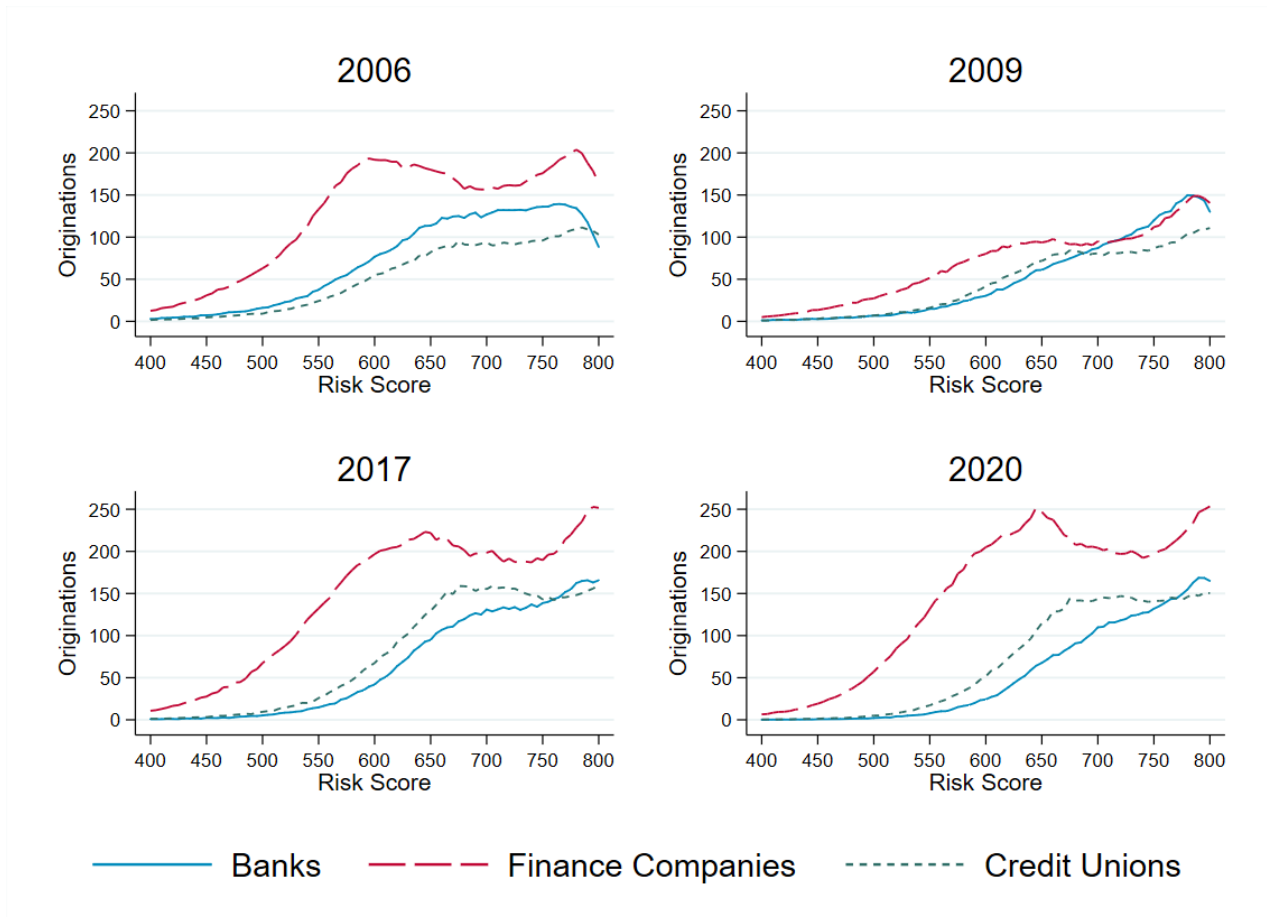


Figure 4: Monthly Auto Loan Originations 2017–2020

This figure shows monthly auto loan originations (in thousands) across Risk Score segments for banks, finance companies, and credit unions for 2017-2020. The title of each subfigure describes the Risk Score segment and financing source in the sample. In each subfigure, the color of the series denotes the corresponding year: 2020 (red line), 2019 (gold), 2018 (blue) and 2017 (black).

Data Sources: FRBNY Consumer Credit Panel/Equifax (CCP)

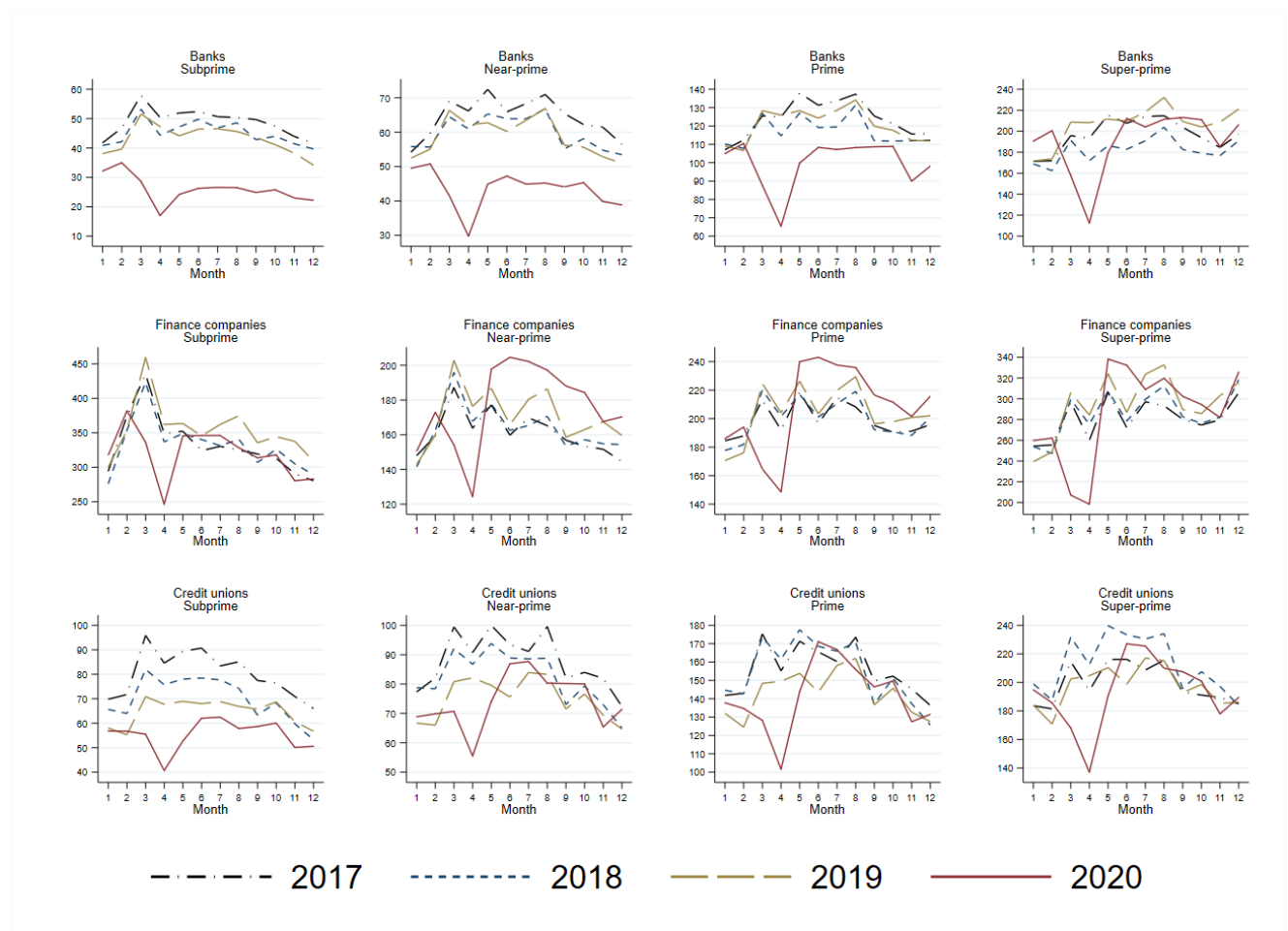


Figure 5: Monthly Dynamics of the COVID-19 Effect

This figure reports the coefficient estimates for a modified equation (1), which includes interaction terms between month indicator variables and *COVID*. Panel A includes originations for the entire sample, and Panel B estimates the regression separately for each Risk Score segment. The bar around the point estimate represents the 95% confidence interval. **Data Sources:** FRBNY Consumer Credit Panel/Equifax (CCP) and U.S. Census

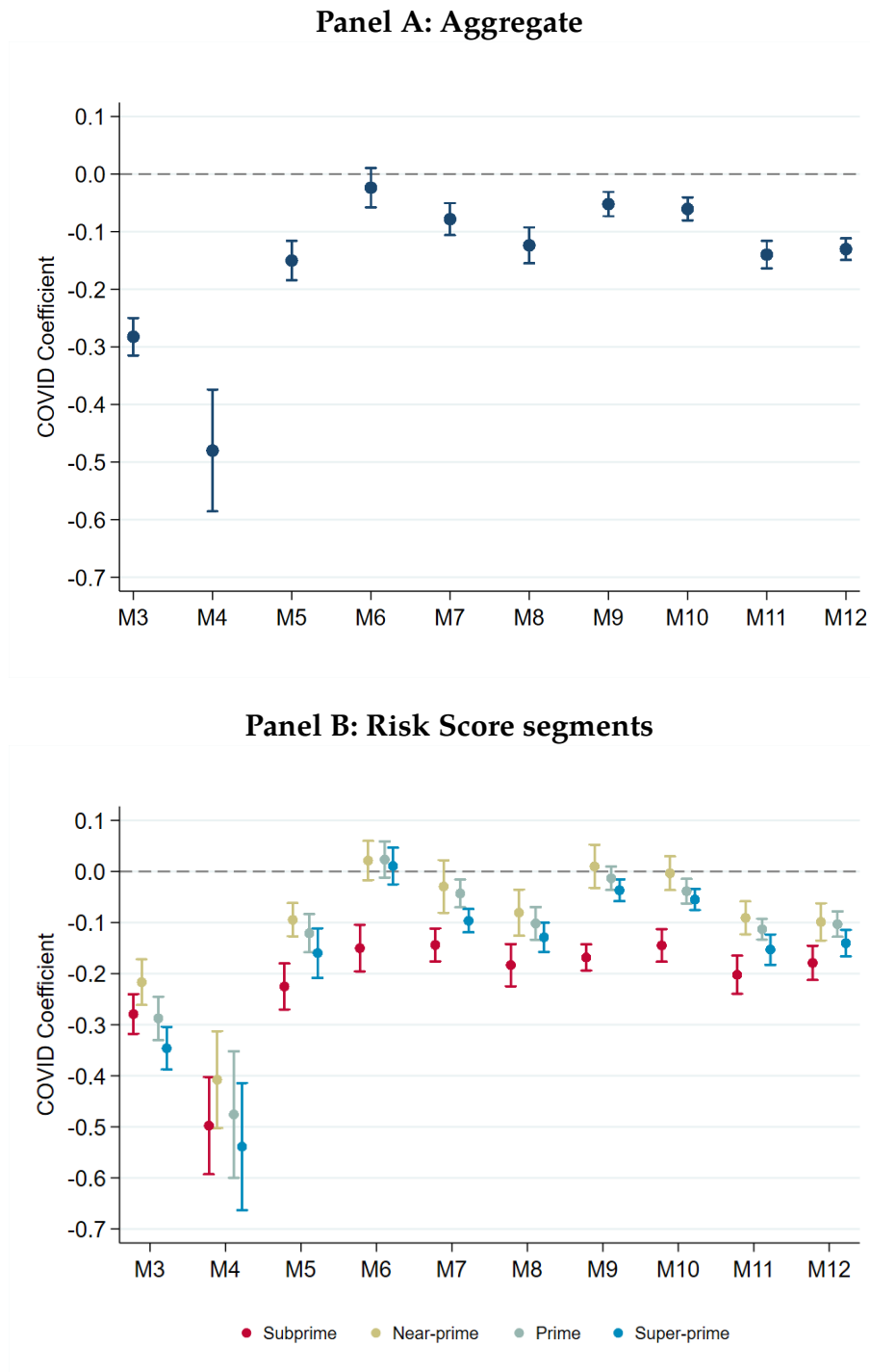


Figure 6: COVID-19 and Auto Loan Growth by Risk Score and Financing Source

This figure reports the coefficient estimates for a modified equation (1), includes interaction terms between *COVID* and the Risk Score segment indicator variable. The sample is furthermore split by financing source and separately estimated in each panel. *COVID* is divided into two indicator variables denoting two distinct subperiods: (1) March–April (left) and (2) May–December (right). The former period reflects the initial COVID impact, while the latter period captures the recovery strength. The bar around the point estimate represents the 95% confidence interval.

Data Sources: FRBNY Consumer Credit Panel/Equifax (CCP) and U.S. Census

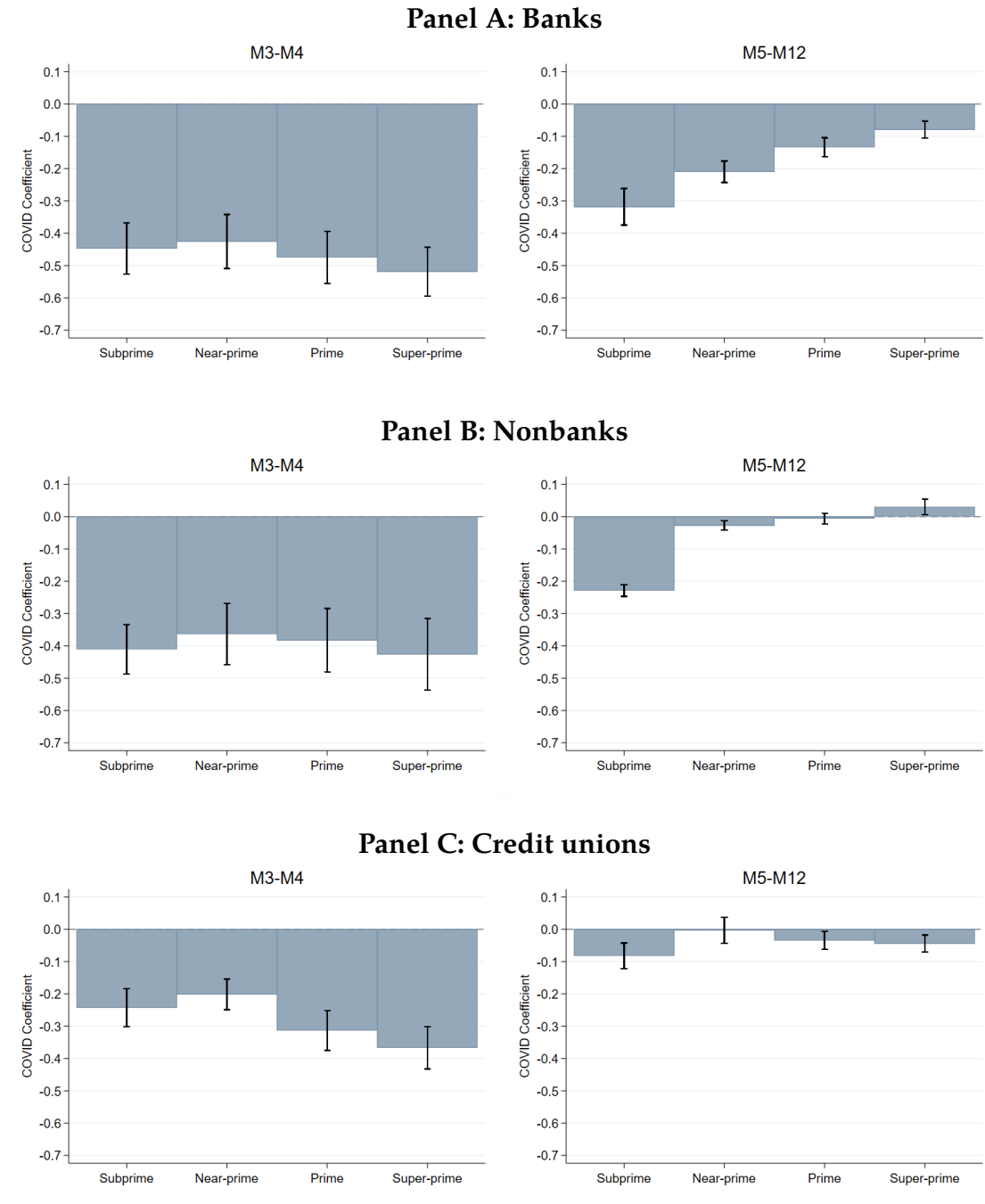


Figure 7: Banks' Tightening of Loan Standards and Bank Share

This figure shows the bank market share in auto loan originations for prime consumers (solid blue) and subprime consumers (solid red), with the net percentage of banks reporting tightening credit standards in the auto loan market (dashed black).

Data Sources: FRBNY Consumer Credit Panel/Equifax (CCP) and Federal Reserve Senior Loan Officer Opinion Survey (SLOOS)

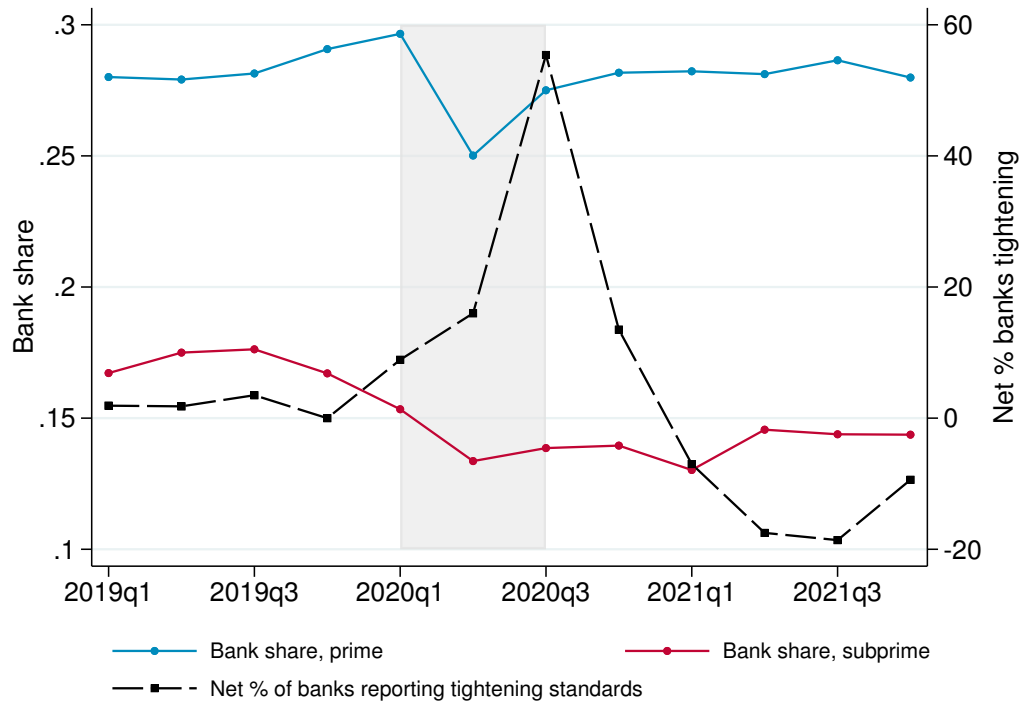


Figure 8: Bank Market Share Loss across Narrow Risk Score Bands

This figure reports the coefficients estimating the effect of COVID-19 months on bank market share loss across narrow Risk Score bands (i.e., 10-point intervals). The regression specifications follow Panel B in Table 7. The gray dashed line corresponds to the Risk Score of 640, and the red dashed lines correspond to the OLS fitted line for the estimates of 620-630 and 640-670.

Data Sources: FRBNY Consumer Credit Panel/Equifax (CCP) and U.S. Census

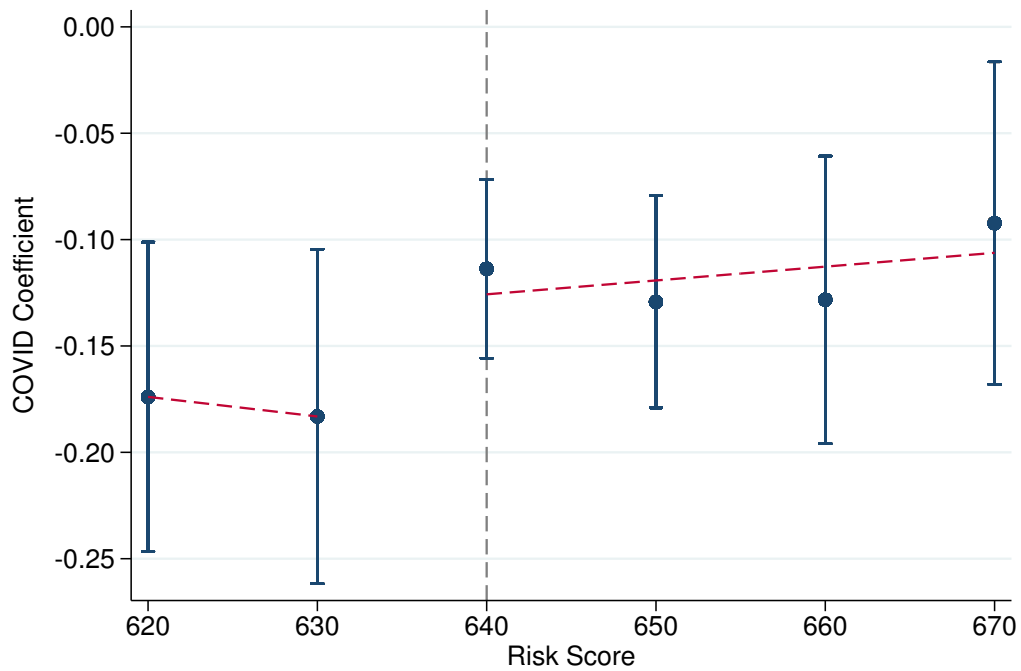


Figure 9: Captive Finance Companies Leverage

This figure shows the average (weighted by total assets) of Liabilities to Assets ratio for the captive finance companies of major auto manufacturers over time. The gray shaded areas denote recession periods.

Data Sources: Compustat

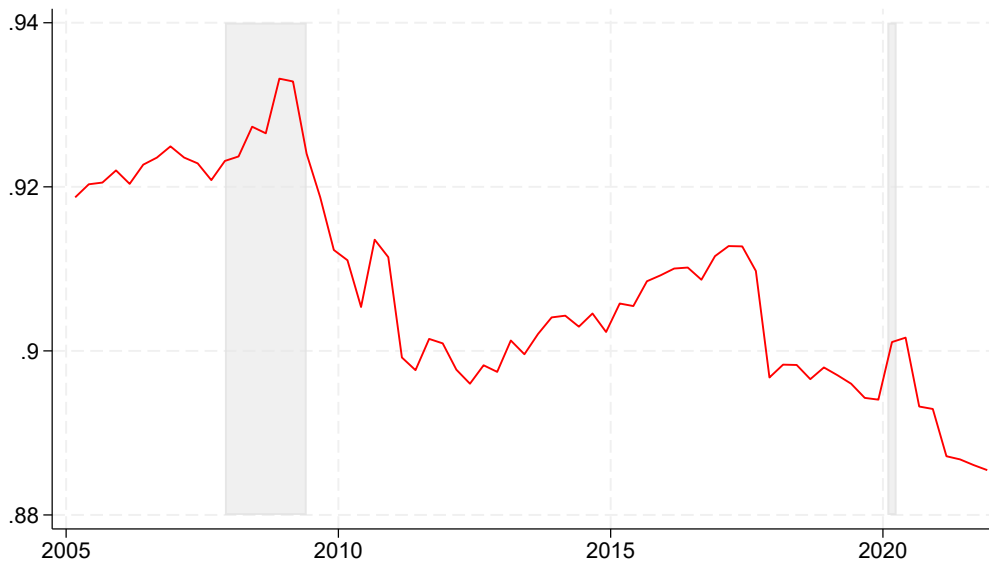
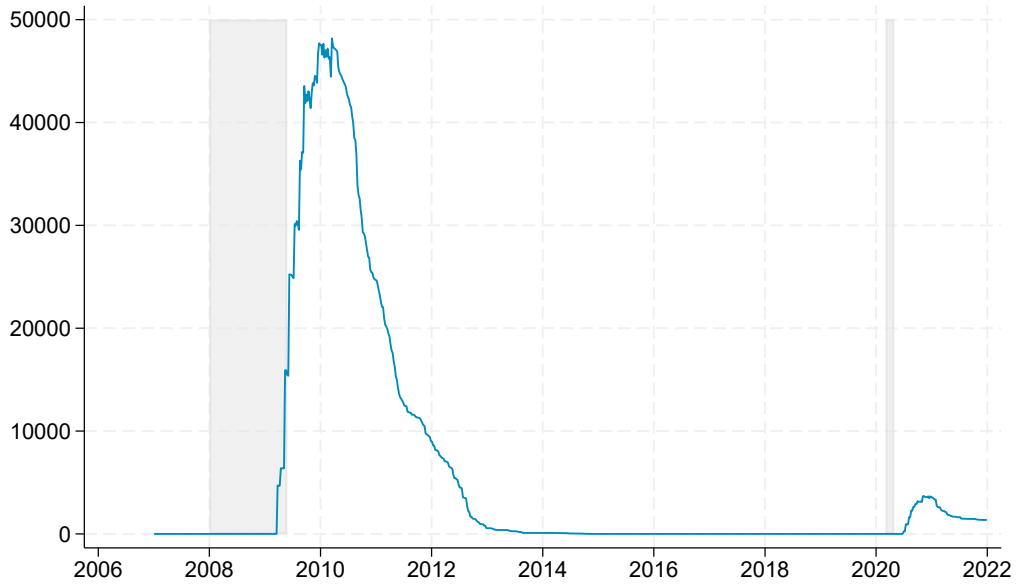


Figure 10: Liquidity and Credit Facilities

In Panel A, this figure shows the weekly level of Term Asset-Backed Securities Loan Facility (TALF) in millions. The gray shaded areas denote recession periods. Panel B shows the annual auto ABS issuance amounts in billions of USD.

Data Sources: Board of Governors of the Federal Reserve System and Intex Solutions

Panel A: TALF



Panel B: Auto ABS Issuance

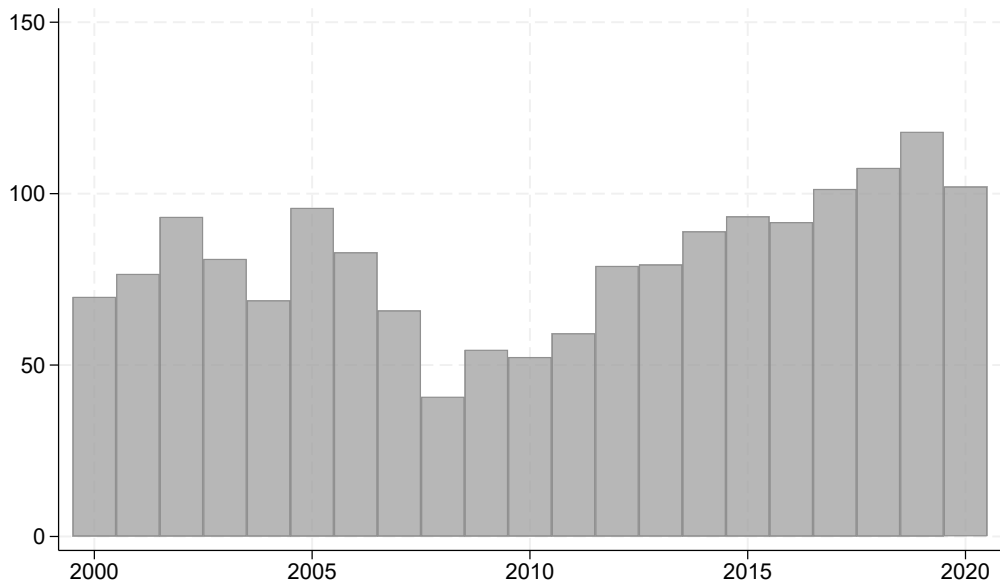


Table 1: Variable and Definitions

	Definition
CCP Variables	
Risk Score	Borrower Equifax Risk Score at observation time
Origination Date	The month that the reported loan is originated
Segmentation	
Risk Segment 1	Borrowers with Risk Score < 620 (subprime)
Risk Segment 2	Borrowers with Risk Score between 620 and 660 (near-prime)
Risk Segment 3	Borrowers with Risk Score between 660 and 720 (prime)
Risk Segment 4	Borrowers with Risk Score > 720 (super-prime)
Banks	Banks, Savings & Loans
Finance/Nonbanks	Dealers (used and new), auto and sales financing
Credit Union	Credit Unions (Equifax classification)

Table 2: COVID-19 and Auto Loan Origination Growth

This table reports the estimates of equation (1). The dependent variable in all columns is $\log(\text{Originations} + 1)$. The indicator variable Y_{2020} is equal to 1 for the calendar year 2020 and 0 otherwise, and $COVID$ is equal to 1 for the months March–December 2020. In column 6, $Subprime$ is equal to 1 for subprime segments and 0 for the other three Risk Score segments. Observations are weighted by county population. Standard errors, which are clustered by state, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Data Sources: FRBNY Consumer Credit Panel/Equifax (CCP) and U.S. Census

	(1) All	(2) Subprime	(3) Near-prime	(4) Prime	(5) Super-prime	(6) Subprime vs. others
Year 2020	0.017*** (0.005)	-0.022** (0.010)	-0.012 (0.010)	0.032*** (0.006)	0.071*** (0.006)	0.024*** (0.004)
<i>COVID</i>	-0.152*** (0.009)	-0.217*** (0.013)	-0.099*** (0.014)	-0.127*** (0.010)	-0.164*** (0.011)	-0.122*** (0.009)
Subprime						-0.410*** (0.058)
Year 2020 \times Subprime						-0.026*** (0.008)
<i>COVID</i> \times Subprime						-0.119*** (0.009)
Observations	884,640	217,848	218,880	222,984	224,928	884,640
R^2	0.660	0.562	0.723	0.839	0.891	0.677
County FE	Yes	Yes	Yes	Yes	Yes	Yes
State-Month FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 3: Auto Loan Origination Growth and Financing Sources

This table reports the estimates of equation (1) separately across financing sources. The dependent variable is $\log(\text{Originations} + 1)$. The indicator variable Y_{2020} is equal to 1 for the calendar year 2020 and 0 otherwise. $COVID$ is equal to 1 for the months March–December 2020. In column 4, the base group is banks. Observations are weighted by county population. Standard errors, which are clustered by state, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Data Sources: FRBNY Consumer Credit Panel/Equifax (CCP) and U.S. Census

	(1)	(2)	(3)	(4)
	Banks	Finance	Credit Unions	All
Year 2020	-0.014*	0.054***	0.012	-0.010
	(0.008)	(0.006)	(0.011)	(0.007)
<i>COVID</i>	-0.241***	-0.126***	-0.089***	-0.246***
	(0.014)	(0.009)	(0.011)	(0.011)
Finance				0.903***
				(0.073)
Credit Union				0.042
				(0.076)
Year 2020 \times Finance				0.043***
				(0.010)
Year 2020 \times Credit Union				0.040***
				(0.011)
<i>COVID</i> \times Finance				0.147***
				(0.012)
<i>COVID</i> \times Credit Union				0.136***
				(0.012)
Observations	294,168	298,008	292,464	884,640
R^2	0.653	0.902	0.730	0.738
County FE	Yes	Yes	Yes	Yes
State-Month FE	Yes	Yes	Yes	Yes

Table 4: Auto Loan Origination Growth and Financing Sources: Recovery Period

This table reports the estimates of equation (1) separately across financing sources. The dependent variable is $\log(\text{Originations} + 1)$. For column (1), the indicator variable Y_{2020} is equal to 1 for the calendar year 2020 and 0 otherwise. *COVID* is further divided into two indicator variables denoting two distinct subperiods: (1) March–December and (2) May–December. The former period all months of 2020 impacted by COVID, while the latter period captures the recovery period after the initial period. Observations are weighted by the county population. Standard errors, which are clustered by state, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. **Data Sources:** FRBNY Consumer Credit Panel/Equifax (CCP) and U.S. Census

	(1)	(2)	(3)
	Banks	Finance	Credit Unions
Year 2020	-0.014* (0.008)	0.054*** (0.006)	0.012 (0.011)
<i>COVID</i>	-0.467*** (0.037)	-0.396*** (0.048)	-0.281*** (0.024)
<i>COVID</i> 2020m5-m12	0.281*** (0.039)	0.338*** (0.050)	0.240*** (0.022)
Observations	294,168	298,008	292,464
R^2	0.654	0.903	0.731
County FE	Yes	Yes	Yes
State-Month FE	Yes	Yes	Yes

Table 5: COVID-19 Effect on Bank Market Share

This table reports the effect of the COVID-19 period on the bank share of auto loan originations. In each panel, the dependent variable is the log of the bank share for the *entire* county in column (1). In columns (2)-(5), the dependent variable is the county's bank share *only* for borrower segment corresponding to the column title. The indicator variable *Y2020* is equal to 1 for the calendar year 2020 and 0 otherwise. In Panel A, *COVID* is equal to 1 for the months March–December of 2020. For Panel B, *COVID* is further divided into two indicator variables denoting two distinct subperiods: (1) March–April and (2) May–December. The former period reflects the initial COVID impact, while the latter period captures the recovery strength. Observations are weighted by county population. Standard errors, which are clustered by state, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Data Sources: FRBNY Consumer Credit Panel/Equifax (CCP) and U.S. Census

Panel A: Average COVID-19 effect					
	(1)	(2)	(3)	(4)	(5)
	All	Subprime	Near-prime	Prime	Super-prime
Year 2020	0.014 (0.009)	-0.107*** (0.017)	-0.097*** (0.016)	-0.055*** (0.011)	0.075*** (0.009)
<i>COVID</i>	-0.102*** (0.008)	-0.137*** (0.015)	-0.161*** (0.014)	-0.101*** (0.014)	-0.114*** (0.012)
Observations	71,923	57,609	52,290	59,292	66,384
R^2	0.453	0.262	0.235	0.284	0.331
County FE	Yes	Yes	Yes	Yes	Yes
State-Month FE	Yes	Yes	Yes	Yes	Yes

Panel B: Dynamic COVID effect					
	(1)	(2)	(3)	(4)	(5)
	All	Subprime	Near-prime	Prime	Super-prime
Year 2020	0.014 (0.009)	-0.107*** (0.017)	-0.097*** (0.016)	-0.055*** (0.011)	0.075*** (0.009)
<i>COVID</i> 2020m3-m4	-0.131*** (0.012)	-0.169*** (0.021)	-0.184*** (0.033)	-0.142*** (0.016)	-0.148*** (0.019)
<i>COVID</i> 2020m5-m12	-0.095*** (0.008)	-0.129*** (0.015)	-0.155*** (0.014)	-0.091*** (0.015)	-0.106*** (0.012)
Observations	71,923	57,609	52,290	59,292	66,384
R^2	0.454	0.262	0.235	0.284	0.331
County FE	Yes	Yes	Yes	Yes	Yes
State-Month FE	Yes	Yes	Yes	Yes	Yes

Table 6: Bank Dependence and Origination Growth by Risk Segment

This table reports the results from estimating equation (2) separately for the three financing sources *and* risk segments. The dependent variable is the log change in originations from 2019m3-m12 to 2020m3-m12 at the county level. The main independent variable *Bank share* is defined as the market share of banks in all 2019 auto loan originations in the county. Each column corresponds to a risk segment and the reported coefficient refers to the effect of bank share (in the corresponding risk segment) on the log change in originations financed by each lender group. Control variables include unemployment change, population, median income, urbanization rate, and HPI change. All regressions include state fixed effects and observations are weighted by county population. Panel B estimates equation (2) additionally decomposing finance companies to bank-affiliated finance companies versus finance companies with no bank affiliation. Standard errors, which are clustered at the state level, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Data Sources: FRBNY Consumer Credit Panel/Equifax (CCP) and U.S. Census

Panel A: Banks, finance companies, and credit unions				
	(1)	(2)	(3)	(4)
	Subprime	Near-prime	Prime	Super-prime
Bank originations	-1.491*** (0.189)	-1.256*** (0.146)	-1.070*** (0.117)	-0.975*** (0.128)
Finance company originations	0.517*** (0.066)	0.578*** (0.090)	0.427*** (0.069)	0.337*** (0.110)
Credit union originations	0.462*** (0.099)	0.629*** (0.071)	0.681*** (0.116)	0.580*** (0.123)

Panel B: Finance companies with vs. without bank affiliation				
	(1)	(2)	(3)	(4)
	Subprime	Near-prime	Prime	Super-prime
Finance companies with bank-affiliation	0.225 (0.157)	0.408** (0.202)	0.318** (0.130)	0.089 (0.193)
Finance companies without bank-affiliation	0.217** (0.089)	0.197* (0.116)	0.192** (0.078)	0.345*** (0.117)

Table 7: Differences across Lenders over Narrow Risk Score Bands

This table reports the estimated change in originations (Panel A) and market share (Panel B) during 2020m5-m12 separately for the three financing sources, banks, finance companies, and credit unions. Columns (1)-(3) each correspond to smaller intervals of Risk Scores. The rest of the regression specifications follow Panel B in Table 5.

Data Sources: FRBNY Consumer Credit Panel/Equifax (CCP) and U.S. Census

Panel A: Originations			
	(1)	(2)	(3)
	620–640	640–660	660–690
Banks	-0.159*** (0.020)	-0.092*** (0.020)	-0.099*** (0.023)
Finance companies	0.008 (0.016)	0.021* (0.011)	-0.006 (0.012)
Credit unions	0.013 (0.037)	0.039* (0.020)	-0.033* (0.019)

Panel B: Market share			
	(1)	(2)	(3)
	620–640	640–660	660–690
Banks	-0.178*** (0.019)	-0.115*** (0.021)	-0.085*** (0.020)
Finance companies	0.049*** (0.016)	0.017 (0.015)	0.038*** (0.013)
Credit unions	0.026 (0.037)	0.048** (0.018)	-0.008 (0.016)