Can I Borrow [for] Your Car? Income, Race, and Automobile Debt in California

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Abstract The COVID-19 crisis elevated the importance of private vehicles. The pandemic drove riders off public transit and spawned additional car-based activities such as drive-through testing and vaccinations and curbside pick-ups. Yet millions of low-income and non-white households do not own vehicles. This chapter draws on a unique credit panel dataset to examine automobile debt and delinquency in California. In particular, we examine whether automobile debt patterns during the pandemic differed from those during and coming out of the Great Recession (December 2007–June 2009). We also analyze the response to the COVID-19 recession across neighborhoods by income and race. Similar to the situation during the Great Recession, we find that the number of automobile loans per borrower declined. While the automobile debt burden (the ratio between total automobile debt and aggregate income) also declined, it fell far less during the pandemic than during the Great Recession. Moreover, automobile loan delinquencies spiked during the Great Recession but instead continued to drop during the pandemic. Finally, the COVID-19 crisis affected consumers differently by both race and income. Automobile debt burden rose in low-income, Latino/a, and Black neighborhoods, a pattern that preceded but continued unabated during the pandemic. The findings suggest that COVID-19 relief may have

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A. Loukaitou-Sideris et al. (eds.), *Pandemic in the Metropolis*, Springer Tracts on Transportation and Traffic 20, https://doi.org/10.1007/978-3-031-00148-2_2

helped some families manage their automobile-related expenditures. However, other factors, such as increasing automobile prices, likely contributed to growing debt burdens, a potential source of financial distress.

1 Introduction

Most U.S. metropolitan areas grew alongside the automobile. As a result, most have come to consist of relatively low-density development best suited to vehicle travel. In the United States, about 82% of all trips and 91% of all miles are made in a private vehicle [20]. However, despite the many advantages of driving, more than 18.5 million households did not own a vehicle prior to the pandemic, of which almost 60% were households of color [38]. While some of these households were voluntarily car-free, more than 70% were car-less largely due to income constraints that prevented them from purchasing and operating a vehicle [8].

The crisis caused by the Coronavirus Disease 2019 (COVID-19) elevated the importance of private vehicles. Despite the lack of empirical evidence of transit's role in the transmission of the virus (see Chap. 15 on this topic), many former transit riders avoided buses and trains [28, 32]. Transit ridership plummeted during the pandemic, particularly in higher income, white neighborhoods, where many workers could work from home and most owned automobiles [28, 32]. Vehicle miles of travel (VMT) also dropped, falling 42% from February to April 2020 [24]. While transit ridership remains depressed [10], VMT rebounded quickly and, as of March 2021, was at about 90% of the pre-pandemic levels [24]. Despite stay-at-home orders during the pandemic, some of this vehicle travel was for essential work purposes. The COVID-19 crisis also spawned additional car-based activities, such as drive-through testing and vaccinations, curbside pick-ups, and drive-in church services and entertainment, to name a few [27].

A number of researchers have examined changes in travel behavior during this health crisis with an eye toward predicting future travel and mode use [7, 40]. Far fewer have analyzed the effect of the pandemic on automobile ownership, which is the focus of this chapter. We use a unique dataset—credit panel data—to track changes in automobile debt in California from 2004 to the first quarter of 2021. We track three measures: the ratio of automobile loans to borrowers (automobile borrowing), the ratio of automobile debt to aggregate income (automobile debt burden), and the share of delinquent borrowers (delinquency rate).

We examine whether consumer response during the pandemic differed from that during and coming out of the Great Recession. The federal response to the COVID-19 crisis differed substantially from that during the Great Recession [54]. As of March 2021, 44% of all adults experienced a loss of household employment income; however, almost 40% of this group relied on stimulus payments to cover their expenses [45]. Additionally, some consumers benefited from loan forbearance and other financial relief provided by select financial institutions [13].

Our data show that similar to the Great Recession, automobile borrowing slowed. However, while the automobile debt burden declined, it fell far less during the COVID-19 recession. And while automobile loan delinquencies spiked during the Great Recession, they instead continued to drop during the pandemic. Analyzing the response to the COVID-19 recession across neighborhoods by income and race, we find that the crisis affected different groups of consumers differently. The most apparent trend was the growing automobile debt burden in low income, Latino/a, and Black neighborhoods, a pattern that preceded but continued unabated during the pandemic.

2 COVID-19, Consumers, and the Car

In most metropolitan areas, automobiles provide greater access to opportunities within a reasonable travel time than other modes [41]. This access advantage not only explains why so many households own cars but also why studies find positive relationships between automobile ownership and economic outcomes, particularly among low-income and non-white households [33, 36, 42]. Conversely, households without cars can be isolated from opportunities, a disadvantage that has grown in parallel with the continued dispersion of metropolitan areas [30].

As of 2019, almost all U.S. households (94%) had at least one automobile [38]. Automobile ownership rates are high even among low-income households: 80% of households in the bottom income quintile owned at least one vehicle. However, low-income households own fewer vehicles than higher-income households, and Black and Asian households are the least likely to own cars [34, 38].[1]

On average, low-income and non-white households have less automobile debt than higher-income households [51]. Due to a lack of savings, lower-income households might be expected to be more likely than higher-income households to finance their automobile purchases. However, this is not the case. In 2019, low-income households spent an average of $10,000 on a vehicle—45% less than high-income households—and were more likely than higher-income households to purchase their vehicles with cash [34]. In addition to drawing from their savings, low-income households buy automobiles using lump-sum payments such as those from the earned income tax credit [26], as well as targeted revenue generation such as from crowdfunding campaigns [29].

While some consumers prefer to pay cash, others may do so after being denied financing. For example, an analysis of credit bureau records shows that Black and Latino/a applicants had loan approval rates 1.5 percentage points lower than white consumers, even accounting for creditworthiness [11]. Finally, lower-income

[1] Sixty-nine percent of low-income Black households and 74% of low-income Asian households have at least one automobile. Automobile ownership among Latino/a households (81%) is only slightly lower than among non-Latino/a white households (85%) [38].

households own fewer and less expensive vehicles than higher-income households [34, 38].

About a third of all low-income households fully or partially finance the costs of their vehicle purchases; this group spent significantly more on their vehicles than those who paid cash [34]. While this group tends to have less automobile debt than higher-income households, on average they have higher automobile debt *burdens*—automobile debt as a percentage of household income [34, 51]. Indeed, more broadly, among households with cars, low-income households have slightly higher total transportation expenditure burdens than higher-income households [52].

Studies show significant racial discrimination in automobile lending. In a matched pair test of purchases at car dealerships, researchers found that non-white testers received a higher quote for the financing of the exact same vehicle; non-white testers who experienced discrimination would have paid an average of $2,663 more over the life of the loan [37]. Studies drawing on other sources of data find similar results [11, 12].

Lower-income and non-white buyers who finance their vehicles are subject to an array of predatory loan practices including excessive interest rates, false or misleading information about vehicle costs, lending without verification of borrower income, and inflated fees and add-ons [15, 48, 49]. These practices can drive up the costs of vehicle loans and elevate default risks [48, 49]. Emmons and Ricketts [19] find that younger, less-educated, and non-white families are more likely than other families to miss loan payments. Indeed, unanticipated economic shocks, credit constraints, and lack of financial education are the leading causes of higher delinquency risks, each a factor inextricably linked to structural racism and enduring discrimination in credit markets based on racial and ethnic identities [2, 11].

These disparities also map onto neighborhoods by income and race. Residents of majority-non-white and low-income neighborhoods are less likely than residents of other neighborhoods to have automobile loans [6, 31].[2] However, automobile loans comprise a larger share of total debt in lower-income than higher-income neighborhoods, since residents in these neighborhoods are less likely to have mortgages [31]. Moreover, the ratio of automobile debt to income is higher in ZIP codes in the lowest income quintile compared to those in the highest income quintile [1].

Since the Great Recession, total outstanding U.S. automobile debt adjusted for inflation increased significantly, growing by 40% from 2010 to 2019 [21]. Much of this growth was due to a substantial increase (22%) in the percentage of consumers with automobile debt [22]. Increasing median automobile debt played a smaller role, growing by 8% over this period to just under $15,000. Vehicle credit tended to follow the economic cycle, increasing during periods of expansion and contracting during recessions. These trends were magnified among consumers living in low-income neighborhoods [1].

[2] However, this pattern is not consistent across states and counties in the United States. For example, the percentage of the population with automobile loans is the same (28%) in majority-white and majority-non-white neighborhoods in California [6].

As we note above, the COVID-19 pandemic has elevated the importance of driving, largely due to concerns about the health effects of other modes (e.g., transit, etc.) [4]. As evidence of this, one survey found that a high percentage of individuals in zero-vehicle households were contemplating purchasing a vehicle in the near future [3]. Increased demand also contributed to the significant rise in vehicle prices in 2021, particularly for used vehicles [18].[3] Overall, after dipping to nine million vehicles per month in April 2020, vehicle sales rebounded, increasing by 94% by May 2021 [46]. Preliminary analysis also shows that total automobile debt has increased across the United States [44]. Automobile debt trends among low-income and non-white consumers during the pandemic have not yet been studied.

3 Data and Methods

For this analysis, we used a 1% random sample of the University of California Consumer Credit Panel (UC-CCP), a dataset from Experian of every loan and every borrower in California, for every quarter from 2004 through the first quarter of 2021. For every loan, the dataset has information on loan type, current balance, whether or not the loan is delinquent on payment, and beginning in 2010, the census tract of the borrower's residential address. The data also include all of the borrowers associated with the loan, some of whom have shared ownership of the asset; to minimize double-counting, we restrict our analysis to only the primary borrower on each loan.

The credit data do not provide income, race, or ethnic identifiers. Therefore, we analyze the debt and delinquency characteristics of consumers across neighborhoods, defined for the purposes of this chapter by the income and racial/ethnic characteristics of the census tract in which they live. We matched UC-CCP data to socio-economic characteristics of census tracts from the U.S. Census Bureau's American Community Survey (ACS) 2015–2019 5-year estimates. We first present statewide trends from 2004 to the first quarter of 2021. These data allow us to compare automobile loan trends between the Great Recession (December 2007 to June 2009) and the COVID-19 recession (February to April 2020), plus their aftermath [35]. Drawing on geographic data from 2010 onward (with more detail available in 2014 and after), we then analyze neighborhoods by quintiles of median household income and race/ethnicity, selecting tracts where at least half of the residents were non-Latino/a white, Black, Asian, or Latino/a.[4]

Our analysis centers on the three metrics included and defined in Table 1: the rate of automobile borrowing, automobile debt burden, and automobile loan delinquencies.

[3] Production slowdowns due to the shortage of semiconductor chips, along with increased competition from car-hire firms, also contributed to the surge in automobile prices [18].

[4] All but seven tracts in California had records for median household income, and roughly three-quarters of tracts had a race majority; tracts that had no income data or did not have a majority race/ethnicity are excluded from the corresponding analyses but are included in the statewide data. Statewide data also include loans without census tract identifiers (20% of all loans).

Table 1 Automobile debt measures

Topic	Questions	Measures
Automobile borrowing	Did more consumers finance their automobile purchases during the COVID-19 pandemic?	Ratio of automobile loans to number of all borrowers with an active primary credit record
Automobile debt burden	Did the automobile debt burden increase during the COVID-19 pandemic?	Relationship between total automobile debt and aggregate income
Automobile loan delinquencies	Did the COVID-19 recession affect consumers' ability to retain vehicles they have financed?	Share of automobile borrowers with loans 30+ days in arrears

4 Findings

4.1 Automobile Borrowing

Just how common is automobile borrowing? From 2004 to 2021, California averaged 0.38 automobile loans per individual with a credit record as a primary borrower—in other words, California has one automobile loan for every 2.6 borrowers. As the first graph in Fig. 1 shows, this ratio remained relatively steady from 2004 until the Great Recession. In the recession's wake, automobile loans per borrower declined by 17% from the third quarter of 2007 to the third quarter of 2011, bottoming out at 0.32. The ratio then increased, in all but one quarter, until mid-2018, when it peaked at 0.45—a 40% increase over seven years—after which it remained relatively unchanged until the beginning of the COVID-19 pandemic. While the first quarter of 2020 saw a slight decline, the second quarter of 2020 saw the steepest change of any quarter in the past 17 years, with neighborhoods of all incomes and racial/ethnic majorities experiencing a drop in automobile borrowing.

Few neighborhoods were immune to the effects of the pandemic shock by this measure; however, the lead-up and aftermath to the pandemic nonetheless contoured differently across neighborhoods. We found small but significant differences in the number of automobile loans among neighborhoods by income, particularly beginning in 2018. As the middle panel of Fig. 1 shows, the number of automobile loans among all borrowers leveled off in neighborhoods in the three highest-income quintiles after years of growth and then slightly declined in 2018 and 2019, whereas the number of automobile loans in neighborhoods in the two lower-income quintiles continued to slightly increase during those years. When the pandemic struck, the number of borrowers in all neighborhoods dipped in the second quarter of 2020, as households net shed automobile loans in the period immediately after the first lockdowns.[5] Subsequently, while loans per borrower generally rebounded—the bottom

[5] All neighborhood household income quintiles were significantly different from each other within and between the second quarter of 2019 and the second quarter of 2020.

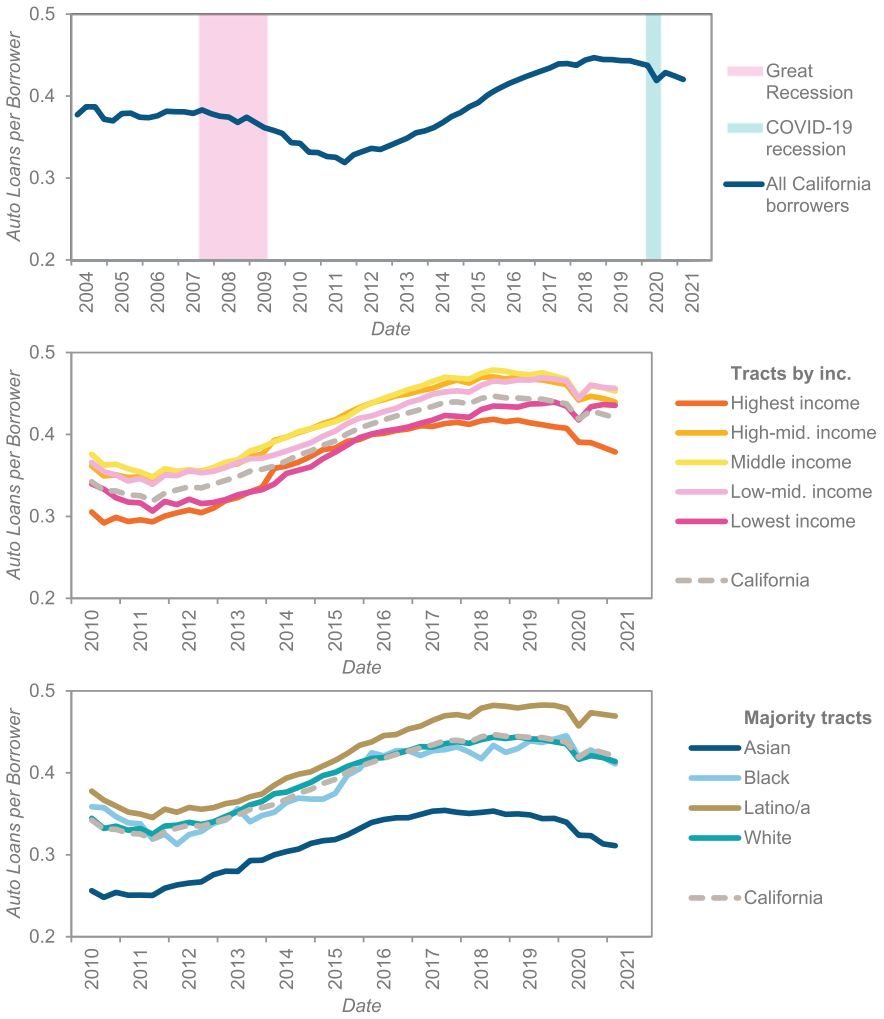

Fig. 1 Ratio of automobile loans to all borrowers in California. *Supplementary data sources* [35, 47]

four income quintiles averaged a 3% increase—the ratio in the highest-income neighborhoods instead slightly declined. These well-off areas continued to lose automobile loans into the start of 2021, as did middle-income areas; meanwhile, the lowest-income neighborhoods leveled off. All told, while the pandemic caused an initial drop in automobile borrowing, only lower-income neighborhoods shifted back toward pre-pandemic loan patterns thereafter.

In the decade prior to the pandemic and since, trends in loans per borrower were similar across majority-race/ethnicity neighborhoods, but the ratios themselves were more dispersed. Asian-majority neighborhoods averaged 0.31 automobile loans per

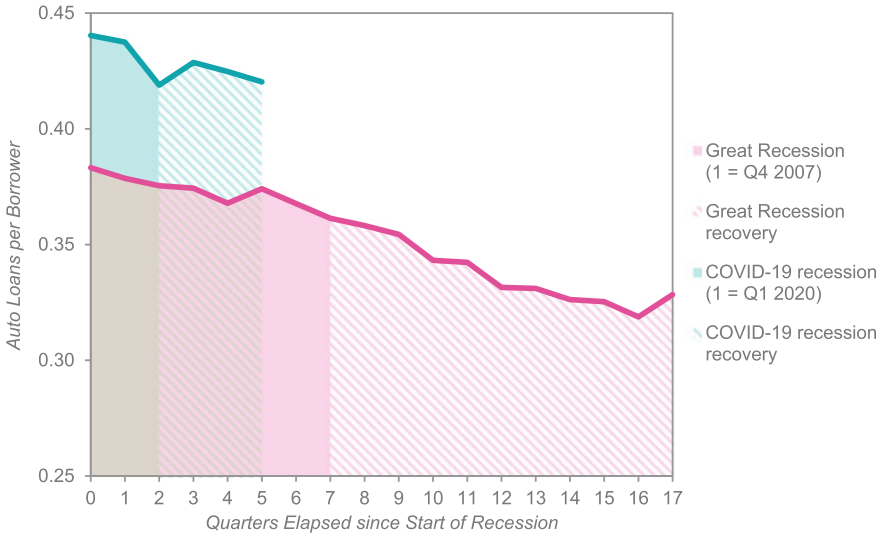

Fig. 2 Ratio of automobile loans to all borrowers in California during recessions and recoveries. *Supplementary data source* [35]

borrower from 2010 to 2021, a ratio consistently far below that of other groups and the state average. In contrast, Latino/a-majority areas consistently had the most automobile loans per borrower, an average of 0.42 over the same time period. All majority-race/ethnicity neighborhoods experienced a decrease in automobile loans in the second quarter of 2020, but the drop continued thereafter in majority-Asian neighborhoods.[6] In contrast, vehicle lending in Black- and white-majority neighborhoods rebounded in the third quarter of 2020 and since declined, while automobile lending in Latino/a neighborhoods experienced a larger, longer-lasting rebound. These trends represent a continuation of patterns from both prior to and during the pandemic; automobile borrowing in Latino/a neighborhoods was consistently high, while it was consistently low in Asian neighborhoods.

The sudden and substantial decline in automobile borrowing at the start of the COVID-19 recession and the subsequent rebound differs from patterns during the Great Recession. As shown in Fig. 2, automobile borrowing declined gradually for over a year during the Great Recession before beginning to rebound. However, automobile loans per borrower fell a precipitous 4.2% in just the second quarter of 2020, which contained the COVID-19 recession. This was the largest single-quarter change in the dataset. The immediate dip may have been due to the combined effects of initial economic uncertainty, as well as shelter-in-place orders that were associated with an 80% drop in vehicle sales [5]. As we describe below, automobile loan delinquencies

[6] All majority-race/ethnicity neighborhoods were significantly different from each other within and between the second quarter of 2019 and the second quarter of 2020 with one exception: Black-majority neighborhoods.

declined over this same period, suggesting that the decline in borrowing was not due to an increase in automobile loan defaults.

Nonetheless, over the five quarters after the beginning of each recession, the percentage decline was roughly comparable (4.0% drop in loans per borrower in the Great Recession versus 4.6% drop in the pandemic recession). What remains unknown about the COVID-19 recession is how its recovery will proceed. According to economists with the National Bureau of Economic Research, the Great Recession ended after seven quarters; however, the ratio of automobile loans to all borrowers continued to decline for nearly four more years. By the same definition, the COVID-19 recession lasted only 2 months, making it the shortest recession in U.S. history [35]. This is likely because the COVID-19 recession was caused by an external shock, and thus the recovery from this recession may be far faster than from the Great Recession. Other indicators suggest that this might be the case [53].

4.2 Automobile Debt Burden

While trends in the number of automobile loans are telling, not all loans are the same size, nor do they have the same effect on the finances of different households. Thus, we turn next to the burden of automobile debt across California: the ratio of automobile debt to the median neighborhood income.[7]

During the Great Recession, the automobile debt burden declined steeply. This downward trend continued to 2011 and then began to rise, peaking in 2016.[8] The top panel of Fig. 3 shows the average automobile debt burden from 2014 to 2021, which ranged from 0.08 and 0.11. Automobile expenditures are cyclical. Historically, the automobile debt burden is lowest in the first quarter of each year, a seasonal pattern similar to vehicle sales [23]. Typically, consumer spending—including consumer spending on automobiles—falls after the December holidays and then accelerates in the spring, aided by tax refunds and improved weather [26, 43]. The COVID-19 pandemic disrupted this pattern; in 2020, the lowest automobile debt burden occurred during the second quarter, the same quarter as the steep decline in the ratio of automobile loans to borrowers described previously. Overall, the automobile debt burden waned during the pandemic but far less than during the Great Recession.

The second and third panels in Fig. 3 show the automobile debt burden across neighborhoods by income and race. Households in the lowest-income neighborhoods have a higher debt burden compared to households in other neighborhoods, a finding consistent with Amromin and McGranahan's ZIP-code level analysis of data from

[7] We draw neighborhood income data from the middle year of the 5-year ACS estimates and assign that income to all quarters in the year. For instance, we draw the aggregate income in all quarters of 2016 from the 2014–2018 5-year estimates. From 2017 on, we assign the income from the 2015–2019 estimates—the most recent year available—to all quarters, adjusting for inflation.

[8] We begin our analysis in all graphs of Fig. 3 with 2014 due to data limitations inherent in combining UC-CCP data and ACS estimates; the percentage of loans with census tract identifiers in the UC-CCP data increased substantially during 2013.

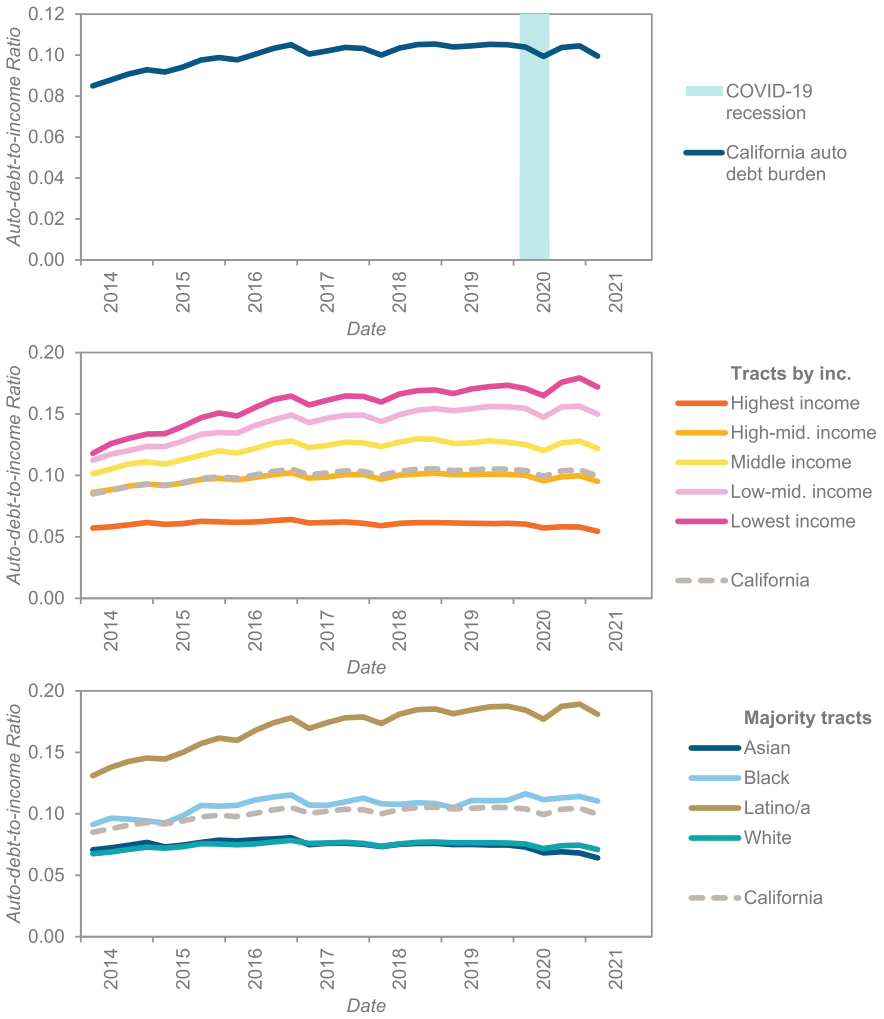

Fig. 3 Automobile debt burden in California. *Supplementary data sources* [35, 47]

2004 and 2012 [1]. This debt gap widened over time. In 2014, the automobile debt burden in the lowest-income neighborhoods was twice that in the highest-income neighborhoods. By the third quarter of 2020, the differential was more than three to one. The debt burden in higher-income neighborhoods remained relatively stable. Therefore, this trend can be largely explained by the increasing automobile debt burden among households in low-income neighborhoods.

During the COVID-19 pandemic, this diverging trend of debt burden between the lowest-income and the highest-income neighborhoods continued. Between the first quarters of 2019 and 2021, the debt burden in the lowest-income neighborhoods

increased by 3%, while it declined by about 11% in the highest-income neighborhoods.[9] Expanded federal benefits may have contributed to the uptick in vehicle sales and the automobile debt burden among households in lower-income neighborhoods.

The bottom panel in Fig. 3 highlights the substantial differences in the automobile debt burden across majority-race/ethnicity neighborhoods. Automobile borrowers in Latino/a-majority neighborhoods had a substantially higher automobile debt burden than the residents of any other majority-race/ethnicity neighborhood, followed by borrowers in Black-majority neighborhoods. Latino/a neighborhoods also experienced the largest increase in automobile debt burden, a 38% increase from 2014 to 2021. The debt burden in Black neighborhoods also increased by 21%, while it remained largely constant in Asian- and white-majority areas. During the pandemic, only Asian neighborhoods experienced a decline in their automobile debt burden, and a slight one at that. In other majority-race/ethnicity neighborhoods, the auto-debt-to-income ratio remained largely unchanged.[10]

4.3 Automobile Loan Delinquencies

Having the financial means to purchase a vehicle is important, but so too is the ability to hold on to a vehicle once it has been purchased. Vehicles that have been financed require regular payments, which can be difficult to manage for individuals with low credit scores, high-risk borrowers who are highly vulnerable to financial shocks [16]. Data from past recessions show that delinquency rates typically follow the unemployment rate and other macroeconomic indicators [17, 50]. However, bucking the trend, automobile loan delinquencies in the United States fell during the COVID-19 economic downturn, even as unemployment rates rose [17].

As the top panel in Fig. 4 shows, vehicle delinquencies rose steeply during the Great Recession, as expected, and then fell over the last decade. Before the Great Recession, between 3% and 4% of California automobile borrowers were delinquent on at least one loan. As economic conditions worsened during the Great Recession, the delinquency rate nearly doubled, peaking at 6% in the last quarter of 2008. The delinquency rate declined coming out of the recession, dropping to below 4% in 2012. Despite seasonal fluctuations, delinquencies remained roughly constant (between 3% and 4%) through 2019, as the economy recovered and grew. However, during the COVID-19 recession, history did not repeat itself. Unlike during the previous recession, the percentage of delinquent borrowers continued to decline. Other studies

[9] Automobile debt burdens were significantly different from each other in neighborhoods by household income quintile in the second quarter of 2019 and in the second quarter of 2020. Between these two time periods, neighborhoods of all income quintiles had significant differences in debt burden.

[10] All majority-race/ethnicity neighborhoods were significantly different from each other within and between the second quarter of 2019 and the second quarter of 2020 with one exception: Black-majority neighborhoods did not have significant differences in their automobile debt burden between second quarter of 2019 and second quarter of 2020.

Fig. 4 Automobile borrower delinquency rates. *Supplementary data sources* [35, 47]

have found declining delinquency rates for automobile loans as well as other loan types (e.g., student loans, mortgages, and credit cards) during the pandemic [17, 39].

As the middle panel in Fig. 4 shows, there is a negative relationship between neighborhood income and delinquency rates. As median income falls, automobile delinquency rates rise. In the highest-income neighborhoods, about 2% of automobile borrowers had delinquent loans a year after the Great Recession, whereas the share in the lowest-income neighborhoods was about 7%. Starting in 2012, the share of delinquent automobile borrowers in the highest-income neighborhoods fell below 2%, where it has remained. Delinquency rates also declined in the lowest-income

neighborhoods, but have remained between 3% and 5%. During the pandemic, delinquency rates dropped across all neighborhoods by income, with consumers in the three lowest-income quintile neighborhoods experiencing the steepest decline.[11]

As with the automobile debt burden, there are stark disparities in delinquency rates across majority-race/ethnic neighborhoods. Black-majority neighborhoods had the highest delinquency rate in most quarters, followed by Latino/a neighborhoods. The share of delinquent automobile borrowers in white- and Asian-majority neighborhoods, meanwhile, remained largely between 2.0% and 2.5% during the post-Great-Recession period. During the pandemic, automobile loan delinquency rates again declined across all neighborhoods. The rate of decline was greatest in Asian-majority neighborhoods, followed by white-majority neighborhoods.[12]

5 Discussion and Conclusion

Our analysis of automobile debt highlights how consumer response varied between the two most recent recessions. In general, recessions are associated with a decline in automobile loans and debt and an increase in automobile loan delinquencies. Aside from an initial shock, in 2020 and 2021, California experienced a decline in automobile borrowers similar to the Great Recession, though for different reasons. In the early days of the pandemic, many car dealerships were closed [25]. Moreover, increased economic insecurity combined with shifts to remote work likely prevented or delayed automobile purchases among many households. Consequently, both automobile sales as well as purchase intent plummeted during the pandemic [25].

In other respects, the automobile debt patterns during the pandemic differed more noticeably from those during the Great Recession. Although the burden of automobile debt compared to neighborhood income fell during the pandemic, the decline was far less substantial than during the Great Recession, as falling rates of automobile borrowing were potentially offset by rising automobile prices and average amount financed [14, 18]. From February 2020 to February 2021, the price of new automobiles increased by 1.2%. Over this same time period, the price of used vehicles increased by 9.3% and then by another 19.5% from February to May of 2021 [9]. Used car prices spiked, not just because of rising demand (particularly with the lifting of stay-at-home orders), but also because of heightened competition for used vehicles from car rental agencies that sold off their stock during the pandemic, as well

[11] Neighborhoods in all income quintiles were significantly different from each other in terms of share of delinquent borrowers within and between the second quarter of 2019 and the second quarter of 2020.

[12] The share of delinquent borrowers was significantly different across all of the majority-race/ethnicity neighborhoods in both the second quarter of 2019 and the second quarter of 2020. Between these two quarters, the share of delinquent borrowers was significantly different in Latino/a-majority and white-majority neighborhoods.

as a slowdown in the production of new vehicles due to a semiconductor shortage [14, 18].

Despite initial job losses and rising car prices, automobile loan delinquency rates fell during the pandemic. This decline continued pre-pandemic trends since the last quarter of 2009 but differed from patterns during the Great Recession, when delinquencies skyrocketed. We suspect that federal, state, and local policy interventions played a key role in this trend. For instance, payment assistance, income support, and loan forbearances may have helped avert the rise of delinquencies. Income replacement from various policy interventions (e.g., stimulus payments, unemployment insurance expansions, and forgivable loans to small businesses) resulted in a greater rate of support for unemployed workers during the pandemic compared to previous recessions [17]. While temporary economic support may not have motivated households to purchase vehicles, it may have reduced the rate of missed automobile debt payments. Per the U.S. Census Bureau's Household Pulse Survey, 22.5% of California respondents who received a stimulus payment in the previous week used or planned to use at least some of the funds to make vehicle payments [45].

The credit panel data do not allow us to track automobile debt by neighborhood income or race/ethnicity prior to 2010. However, they do highlight income and racial disparities leading up to and during the pandemic. Perhaps most glaring is the increase in automobile debt among consumers in the lowest-income neighborhoods and, even more apparent, in majority-Latino/a neighborhoods. Even prior to the pandemic, automobile ownership among low-income and Latino/a households in California had increased substantially. Consumers in lower-income neighborhoods were also the only group that shifted back to pre-pandemic loan borrowing patterns.

From 2004 to 2019, the average number of household vehicles in Latino/a households increased by more than 15% (from 1.85 to 2.13) [38]. Over this same time period, mean household vehicles among households in the bottom income quintile increased by about 8%. Automobiles may have been particularly important to these two population groups during the pandemic since they were the groups least likely to be able to work from home [45]. They likely saw a greater need for cars during the pandemic (though they needed to borrow to finance them), while consumers in higher-income areas, with higher rates of working from home [25, 38], did not. The trends underscore the importance of subsidies to help low-income households purchase vehicles as well as manage their automobile debt.

Consumer response during the COVID-19 pandemic, while similar across some dimensions, varied from that during the Great Recession, suggesting that federal support may have helped some families purchase vehicles and manage their automobile-related expenditures. However, the growing automobile debt burden in low-income and, particularly, in Latino/a neighborhoods is cause for concern, as it may indicate significant financial distress. The data suggest the ongoing need for financial assistance to support automobile ownership among lower-income households, whose quality of life depends on access to a reliable vehicle. The observed trends—both over time and across neighborhoods by race/ethnicity and income—may be due to other confounding factors, too (e.g., household composition, access to high-quality transit, etc.). Therefore, as the country continues to recover from the

pandemic, additional analysis of the underlying causes of these trends is needed to better target policy interventions.

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