The Intended and Unintended Consequences of Consumer Protection Laws: An Analysis of Wage Garnishment and Usury Limits in Auto Lending

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January 2024

ABSTRACT

We use novel auto financing data to examine the relation between consumer protection laws and vehicle prices, loan terms, and outcomes for subprime borrowers. After accounting for borrower creditworthiness, purchase timing, and vehicle quality, we find that state laws prohibiting post-default wage garnishment are associated with higher prices, higher initial principal balances, and higher default rates. We find that default rates are lower among borrowers who cannot discharge their debts due to a recent Chapter 7 bankruptcy, suggesting moral hazard as a plausible explanation for the higher default rates in states that prohibit wage garnishment. We find no evidence that usury laws, which cap interest rates for high-risk borrowers, are associated with higher prices or default rates. We summarize our findings in terms of the distributional consequences of consumer protection laws.

JEL Classification: D14, D82, G28, H31, L14

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ABSTRACT

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Auto loans are a prevalent and substantial liability on households' balance sheets. As of 2019, more than 91% of U.S. households had a vehicle, and more than one-third of households held vehicle-related debt (Bhutta et al., 2020). Moreover, the size of this debt has been increasing: total vehicle loan balances in the U.S. rose from $717 billion in 2008 to over $1.2 trillion in 2019 (Zabritski, 2019). In the used vehicle market, roughly 50% of buyers are classified as nonprime, subprime, or deep subprime (Zabritski, 2019), and delinquency and repossession rates among these higher-risk borrowers have grown substantially in recent years (Andriotis, 2022). Credit problems are also widespread among U.S. households in general: between 2003 and 2022, approximately 12% of U.S. consumers had a third-party collection account in their credit report.[1] Each year, the third-party collection industry garners approximately $79 billion from borrowers after default (ACA International, 2017). Therefore, policy makers must grapple not only with the long-term consequences of increased indebtedness (Yilmazer and DeVaney, 2005), but also with how to protect vulnerable consumers.

Common forms of consumer protection—and the two most prominent in auto financing—are wage garnishment prohibitions, which limit lenders' ability to recover loan deficiencies after borrowers default; and usury laws, which set the maximum interest rate that can be charged to borrowers. Usury laws have long been a subject of debate (Blitz and Long, 1965; Glaeser and Scheinkman, 1998; Drysdale and Keest, 1999). In contrast, debt collection regulation (including wage garnishment prohibitions) is a relatively new priority for both the U.S. Department of Justice and the Consumer Financial Protection Bureau (CFPB) (Cioffi and Serratore, 2021*b*,*a*; CFPB, 2022, 2023). Like interest rate limits, wage garnishment prohibitions create trade-offs: reducing lenders' ability to collect outstanding loan balances may lead to more defaults, increase the price of credit for all borrowers, reduce low-income borrowers' access to consumer credit (Fedaseyeu, 2020; Fonseca, 2022; Garmaise, Jansen and Winegar, 2022), and affect debtors' bankruptcy decisions (Dawsey, Hynes and Ausubel, 2013), but it may also make it easier for borrowers to recover from financial hardship (Livshits, MacGee and Tertilt, 2007; Hynes, 2008; Chatterjee and Gordon, 2012). Both usury laws and wage garnishment laws have the potential to affect the availability and cost of credit, as well as eventual loan outcomes.

[1] Authors' calculation using data from the Federal Reserve of New York, Center for Microeconomic Data, available online at `www.newyorkfed.org/medialibrary/interactives/householdcredit/data/xls/HHD_C_Report_2022Q4` as of February 2023.

Despite their economic importance, debt collection and the policies related to it have been relatively understudied (Cheng, Severino and Townsend, 2021), in part due to the lack of data on repossession and collection (Kelly et al., 2022; CFPB, 2023). Using unique loan-level data, we examine vehicle sales, loan terms, and borrower outcomes in auto financing. Our analysis suggests that usury laws are not associated with substantially different vehicle prices or loan outcomes—a question that has also not been previously studied. However, wage garnishment laws are associated with higher vehicle prices, higher principal balances, and higher default rates. We summarize these findings in terms of the distributional consequences of wage garnishment laws.

Usury limits set an upper bound on the interest rate that lenders can charge on consumer loans and vary according to state law. If usury laws simply acted as price ceilings (as is often assumed), then credit rationing would reduce the availability of credit to the riskiest borrowers (Peterson, 1983).[2] However, creative lenders can adjust other dimensions of the loan in order to continue serving these borrowers (Schwartz, 1977; Hynes and Posner, 2002). Even if a usury law caps the interest rate, a dealership can offer a loan with the same monthly payments and maturity simply by increasing the vehicle price and principal amount. For example, a borrower would face the same \$294 payment for 60 months with either a loan of \$10,000 at 25% or a loan of \$11,078 at 20%.[3]

Whereas usury laws directly affect loan terms by capping interest rates, wage garnishment laws may indirectly affect loan terms through their impact on loan outcomes. For example, if a borrower defaults on a car loan, the lender will repossess the vehicle to recover its losses. Auto loans are full recourse, so lenders can pursue the borrower for any outstanding loan amount after the sale of the repossessed vehicle. In states without wage garnishment prohibitions, a lender that wins a judgment against a borrower can attempt to collect additional funds directly off the borrower's paychecks. In states *with* such prohibitions, the lender can still repossess the vehicle and pursue the borrower but cannot win a judgment for repayment through the borrower's paychecks. In states that prohibit wage garnishment, lenders must therefore account *ex ante* for the expected absence of post-default payments from borrowers. As a result, possible loan outcomes can affect *ex ante* origination terms, potentially making loans more costly for *all* borrowers. Thus, laws that are

[2]If frictions in the credit market were zero, a consumer could substitute retail-originated credit for other financing, and an auto loan-specific interest rate limit would have little impact on the consumer's total indebtedness (Peterson, 1983). In practice, though, non-trivial frictions prevent consumers from substituting perfectly across credit markets.

[3]Dealers could also adjust the term length in response to an interest rate cap. Of course, loan term lengths beyond the mechanical life of the vehicle may create moral hazard problems.

intended to protect defaulting borrowers can impose additional costs on all borrowers.[4]

Using a rich panel of individual auto loan data spanning from the mid-1990s to 2019, we document vehicle prices and loan characteristics in the presence (or absence) of wage garnishment and usury laws. Although Melzer and Schroeder (2017) explored the relation between usury laws and loan origination terms in aggregate loan data from 2011 to 2013, we know of no other studies that examine the relation between usury laws and auto loan outcomes, nor any studies of the impact of wage garnishment laws (in any setting). Our analysis relies on cross-sectional variation in interest rate caps and wage garnishment prohibitions. Thirty-three U.S. states have laws that specify a maximum interest rate that can be charged on an auto loan.[5] Seven U.S. states with interest rate caps also explicitly prohibit or severely restrict the use of post-judgment wage garnishment.[6]

We also use data on defaults and collections to explore the relation between consumer protection laws and loan outcomes, and we consider the distributional consequences of wage garnishment and usury laws across borrower types. To our knowledge, we are the first to examine borrower and lender outcomes in this market. Importantly, consumer protection laws do not appear to vary systematically across states; for example, there is little correlation between debt collection regulations and states' economic conditions or political climates.

To compare borrowers with similar risk profiles across different regulatory regimes, we use the richness of our microdata to construct a composite measure of an individual vehicle buyer's riskiness. After accounting for borrowers' riskiness, the timing of the purchase, and vehicle quality, we find that laws that prohibit wage garnishment are associated with substantially higher vehicle prices as well as higher initial principal balances. In contrast, we do not find that laws limiting interest rates are associated with higher prices.

Next, we examine how wage garnishment restrictions and usury limits affect loan default. We find that usury limits are not associated with changes in default rates, but wage garnishment restrictions are associated with higher default rates for both higher- and lower-risk borrowers.

[4]Using consumer bankruptcy, credit score, credit card and hospital discharge data, Gross et al. (2021) highlight, among other things, a similar phenomenon: a generous bankruptcies system benefits some borrowers, but these benefits come at the cost of higher interest rates for other consumers.

[5]With one exception, states have not adjusted their interest rate limits in recent history, making within-state, across-time analyses infeasible. Arkansas (the exception) permanently raised its interest rate cap in 2011; unfortunately, our data include very few observations in that state prior to the law change.

[6]Similarly, nine U.S. states prohibit a lender from pursuing a homeowner's other assets if he or she defaults on a mortgage and a foreclosure sale does not cover the outstanding debt (Ghent and Kudlyak, 2011). Thus, our study may provide insight into outcomes in other credit markets with nonrecourse loans.

Differences in default rates and collection rates have significant implications for both lenders and individual borrowers.

One of the unique features of our data is that we observe not only loan terms and borrower characteristics but also the loan and collections payments from the borrower. Using these data, we can examine how usury and wage garnishment laws affect the cost of auto loans for subprime borrowers. We find that wage garnishment restrictions are associated with higher costs for lenders, but have more complex costs for borrowers. For loans paid in full, borrowers in states that prohibit wage garnishment pay over $1,000 more over the life of the loan than borrowers in other states. However, for loans ending in default, borrowers in states that prohibit wage garnishment pay roughly $3,000 less than their peers in other states. Because the lenders have little recourse after repossessing the vehicle, we argue that the differences in default rates and loan costs may be, in part, due to moral hazard.

When wage garnishment is restricted, moral hazard could prompt individuals to take on more financial risk if they believed they could discharge their debts without recourse to the lender, potentially leading to higher default rates. Similarly, when consumers can discharge their auto loan debt through Chapter 7 bankruptcy, weaker incentives to avoid delinquencies may result in more frequent defaults on auto loans. Although we cannot observe individuals' incentives directly, we find evidence suggesting that moral hazard is a plausible and empirically relevant explanation—we find that consumers who can discharge their auto debt through Chapter 7 bankruptcy, and therefore face weaker incentives to avoid delinquencies, default more frequently.

Our work contributes several new insights to academic and policy discussions of financial regulations. First, using loan-level data, we find no evidence that usury laws result in strict credit rationing or higher default rates. The welfare implication of this finding is particularly notable in the U.S., where access to auto financing—and vehicle ownership—is often critical to employment opportunities and mobility (Gurley and Bruce, 2005; Baum, 2009; Gautier and Zenou, 2010; Moody et al., 2021). Even in Brazil, where public transportation is more prevalent than in the U.S. (Golub, 2004), access to a private vehicle leads to higher formal employment rates and salaries, especially among low-income individuals and in areas with less developed public transportation systems or more sparse labor markets (Doornik et al., 2021). Second, we identify important distributional consequences of wage garnishment laws. Specifically, when wage garnishment laws limit lenders'

ex post ability to collect from delinquent borrowers, lenders appear to *ex ante* adjust prices for all borrowers. Together, these results highlight the heterogeneous welfare implications of common financial regulations. Furthermore, to our knowledge, our study is the first to include data on repossession and collection (CFPB, 2023; Kelly et al., 2022).

Although we focus on just one liability on households' balance sheets, household debt in aggregate has been shown to drive broad macroeconomic phenomena. During the Great Recession, record-high levels of household debt contributed to a decrease in aggregate consumption (Mian, Rao and Sufi, 2013), leading to a decrease in the production and demand for labor (Mian and Sufi, 2011, 2014; Eggertsson and Krugman, 2012; Guerrieri and Lorenzoni, 2017). Even without a global financial crisis, greater access to consumer credit and increased burdens of household debt can lead to losses in aggregate welfare (Campbell and Hercowitz, 2009). Although our research approach is micro in nature, our results on how regulation affects households' access to credit, monthly debt burden, and debt-related outcomes may inform broad economic debate.

1 Auto sales, financing and regulations

1.1 Indirect financing

The U.S. market for personal vehicle financing is highly fragmented with 65,000 lenders. Lenders vary in size; in 2013, the largest lender had approximately 5.8% market share by volume and the ten largest had 37.7% of the market (Baines and Courchane, 2014). The novel data that we examine come from one of the large indirect-financing firms that purchases loan contracts originating at dealerships. Our data include all loans that were purchased by the firm between the mid-1990s and 2019.[7]

Our analysis focuses on autos purchased through indirect financing, which accounts for approximately 80% of auto loans by volume (Cohen, 2012; Grunewald et al., 2020). In contrast to the direct channel in which buyers secure financing through their own bank or an automaker's financing division, indirect financing is negotiated between the auto dealer and the buyer, and then sold at auction to financial companies that service the loan over time.

Lenders in the auto market use credit scores, as well as other applicant and loan characteristics,

[7]To avoid inadvertently identifying our data provider, we do not state the start date.

to assess borrowers' creditworthiness. Regardless of the riskiness of the potential borrower, the indirect auto financing and sales process involves several steps. In this market, dealers initially assess vehicle preferences. If a car buyer expresses interest in financing, she fills out a credit application, which helps the dealer gauge the buyers' creditworthiness—this ensures that the buyer is offered vehicles that are suitable for her budget. The consumer and the dealer then agree on the vehicle, the price, and the financing terms, as well as any additional services. When relevant, they also negotiate the value of a vehicle trade-in.

With indirect financing, the dealer sells the auto loan to a third-party lender immediately after completing the sales transaction.[8] To facilitate this process, the dealer submits the borrower's credit application to multiple financial institutions at the time of purchase, typically through the online portal used throughout the industry. After a preliminary review of the financing terms, potential lenders submit their bids for the loan. The bid indicates not just the payment that the lender would require to acquire the loan but also limits on the loan-to-value ratio. The dealer accepts the best bid from the competing lenders, completes the transaction with the customer, and the buyer drives the vehicle off the lot.

Over the next several days, the lender completes the due diligence process on the loan to verify, for example, the borrower's employment. If the borrower passes this final screening, the loan is acquired by the lender. Lenders typically have a schedule that prescribes the interest rate given a borrower's credit score, down payment, and the loan-to-value ratio of the auto loan (cf. Jansen, Nguyen and Shams, 2020). In addition to a fixed processing fee, the lender's schedule stipulates a minimum acquisition fee or "discount" that the lender requires to buy the loan contract—that is, the dealer pays several hundred to several thousand dollars to get the loan off of its own books. The discount is strictly increasing with the risk of the loan. Lenders may also reward dealers who sell loans that are expected to yield significant profit; for example, if the dealer is able to get a low-risk buyer to agree to a loan with a relatively high interest rate, the lender will transfer some of its expected surplus to the dealer when the loan is funded (Grunewald et al., 2020; Jansen, Kruger and Maturana, 2023). In this paper, we consider these payments (called "reserves," in industry jargon) to be negative discounts.

[8]Our data provider purchases loans in the indirect financing market. As such, we cannot examine the outcomes of loans obtained through direct financing at buyers' own banks or the automakers' financing arms.

If the verification process does not confirm the details in the loan application during the lender's due diligence period, the loan is renegotiated and acquired by the lender at a higher discount to reflects its higher risk.[9] As such, the discount required by the lender may reflect both formal information available on the loan application and additional information acquired during the due diligence period.

1.2 Default and vehicle recovery process

Lenders retain the property rights to vehicles purchased on credit until the loan has been paid in full. The specific rights and obligations of lenders and borrowers, including what happens in the event of default, are governed by state law.[10] Some states allow a borrower who misses a payment to remedy the default by partial payment. In other states, when the borrower defaults, the lender can require immediate repayment in full.

When a borrower defaults, the lender attempts to recover the lost value of the loan in a process governed by state law. In some states, the lender may repossess the vehicle at any time after default without prior notice; other states require the lender to formally notify the borrower.[11] Once the vehicle has been recovered, the lender must sell the vehicle at a commercially reasonable price, usually at a public auction. If the vehicle sells for more than the outstanding loan amount net the recovery cost, then the borrower receives the balance. If there is an outstanding loan amount even after the sale of the repossessed vehicle, the lender can sue the borrower for the remaining balance. If the lender wins a judgment against the borrower, it can attempt to collect additional funds from the borrower. The collection process is governed by the law in the state in which the borrower resides; for example, in forty-three states, lenders can get a court order to garnish borrowers' wages to cover the outstanding loan balance.

1.3 Wage garnishment laws

As discussed in Section 1.2, if a borrower defaults on a car loan, the lender will repossess the vehicle and try to recoup its losses. If there is an outstanding loan amount even after the sale of

[9]The dealer may seek recourse directly from consumers who submit fraudulent applications; however, in practice, this happens only rarely.
[10]The 1978 Federal Fair Debt Collection Practices Act does not apply to auto loans.
[11]On average, the repossession process takes 37 days (Zabritski, 2013).

the repossessed vehicle, then the lender can sue the borrower for the remaining balance. If the lender wins a judgment against the borrower, it can attempt to collect additional funds. Federal law established the maximum amount that can be garnished from delinquent borrowers—the lesser of 25% of the individual's disposable weekly earnings or the amount by which those earnings exceed thirty times the federal minimum wage (Consumer Credit Protection Act[12]). Although federal law sets the minimum amount of protection for borrowers, states may enact more stringent protections. Indeed, seven U.S. states explicitly prohibit post-judgment wage garnishment or otherwise severely restrict its use. Figure 1 represents the states with wage garnishment restrictions as shaded areas on a map of the U.S., and we provide a summary of wage garnishment restrictions in Appendix Table A1. All states with laws restricting wage garnishment also have laws that limit the interest rate; as such, there is no variation to consider the impact of prohibiting wage garnishment in the presence of unrestricted interest rates. Many state-level legal restrictions to wage garnishment were established in the 1950s and 1960s, and there has been little change in the laws since they were enacted. There is little correlation between restrictions on wage garnishment and states' political climate.[13] Moreover, wage garnishment laws appear to be uncorrelated with states' economic conditions over time.[14]

Whereas usury laws affect loan terms directly by capping interest rate, wage garnishment restrictions may be priced into the loan (Hynes and Posner, 2002). To assess the potential impact of wage garnishment, consider two borrowers of the same creditworthiness who live, respectively, in states that permit and prohibit wage garnishment. The wage garnishment restriction reduces the funds that can be collected from the borrower after default.[15] Now consider a lender who transacts in both states.[16] This lender would be indifferent between the two loans only if it could

[12]Public Law 90321, §303, 82 Stat. 163 (1968), codified as amended at 15 U.S. Code §1673(a)(1)(2018).

[13]We regressed a state-level indicator for the presence of wage garnishment laws on measures of political ideology from Pew Research Center, available online at `www.pewforum.org/religious-landscape-study/compare/political-ideology/by/state/`, and found no evidence that laws are systematically related to state politics. These results are reported in the first two columns of Appendix Table A2.

[14]We regressed a state-level indicator for the presence of wage garnishment laws on measures of states' median household income and income growth; changes in states' poverty rates; consumers' tax burdens and historical marginal tax rates; growth in state GDP per capita and home prices; whether the state has recourse or non-recourse mortgages; and an indicator for a state-level ban on payday lending. Coefficient estimates, none of which were statistically significant at conventional levels, are reported in Appendix Table A3.

[15]If the restriction on wage garnishment is effective, collections on deficiency payments should be lower in states that prohibit direct garnishment. Appendix Figure A1 plots the amount that is recovered through collections separately for states with and without wage garnishment restrictions and shows that deficiency payments are indeed substantially lower in states that prohibit wage garnishment for borrowers of a broad spectrum of credit risk.

[16]Many subprime lenders, including our data provider, operate in multiple states.

collect more in (pre-default) payments in the state that prohibits wage garnishment. That is, after accounting for borrowers' credit risk and vehicle value, monthly payments in states that prohibit wage garnishment should be systematically higher than payments in states that allow collection after default (Livshits, MacGee and Tertilt, 2007).

In practice, a lender's calculus is further complicated by the trade-offs between payment size, probability of default, and the value of the asset. Specifically, lenders must balance the direct benefits of higher payments with the fact that borrowers who face higher monthly payments are more likely to default. Moreover, when the lender has little recourse after default, borrowers may differentially degrade the vehicle and make it less valuable after repossession. The loan terms and outcomes that we observe reflect the net effect of these competing concerns.

1.4 Usury laws

Figure 1 maps U.S. states by their maximum allowable interest rate for auto loans. Usury laws show no obvious geographic pattern.[17] Moreover, usury laws appear to be uncorrelated with states' economic conditions over time.[18] Where they exist, usury laws affect interest rates for the highest risk borrowers—individuals whose weak credit history would otherwise result in even higher rates. One possibility is that the price ceiling leads to credit rationing, with especially risky borrowers unable to secure a loan at the capped rate. Figure 2 presents two histograms that suggest that the market still serves high-risk borrowers, despite the usury laws that limit the price of credit. Figure 2.a presents two distributions for Arizona, which does not have a usury limit; Figure 2.b presents two distributions for Colorado, where the usury limit is 21% on auto loans. In both cases, the shaded histogram represents the distribution of borrowers' predicted interest rates, a measure

[17]Both legal scholars and economists have studied the evolution of U.S. usury laws. In their study of nineteenth century financial regulations, Benmelech and Moskowitz (2010) conclude that usury laws were motivated by private interests, acting as anticompetitive policies to restrict entry to benefit incumbent firms. That is, variation in historical usury limits did not reflect differences in the financial or political strength of a state's population of underserved borrowers. Glaeser and Scheinkman (1998) propose a model in which usury laws act as a means of social insurance and, examining regional variation in usury limits in 1950, find empirical support for the hypothesis that usury laws are more likely when income inequality is high and growth rates are low. Usury laws changed considerably with innovations in the finance sector in the 1960s. In a regression of current usury limits on 1950 usury limits, we find no statistically significant relation between historical and current rates as reported in columns 4 and 6 of Appendix Table A2.

[18]We regressed a state-level indicator for the presence of a usury law on measures of states' median household income and income growth; changes in states' poverty rates; consumers' tax burdens and historical marginal tax rates; growth in state GDP per capita and home prices; whether the state has recourse or non-recourse mortgages; and an indicator for a state-level ban on payday lending. Coefficient estimates, none of which were statistically significant at conventional levels, are reported in Appendix Table A4.

of creditworthiness described in detail in Section 3.1, and the unshaded histogram represents the distribution of actual interest rates in the data.

The distributions of predicted interest rates in Colorado and Arizona are similar: in both states, the market serves borrowers with a range of credit profiles. However, the distributions of actual interest rates are very different across states. In Arizona, the distributions of predicted and actual interest rates have a similar range and shape; in Colorado, actual interest rates are capped at the usury limit. Notably, there is a substantial mass at the usury limit in Colorado, suggesting that at least some high-risk borrowers in the state are able to secure loans at a lower rate. In our data, more than 38% of the loans in Colorado have an interest rate of exactly 21%, the state interest rate limit; in contrast, in Arizona, only 15% of loans have interest rates around 21% and another 20% of loans have interest rates above 21%.

The substantial mass at the state interest rate limit is not unique to Colorado. For example, 66% and 63% of loans in Arkansas and Nebraska have an APR of 16.99% and 17.99%, respectively, one basis point below the states' limits. The modal interest rate in states with relatively high limits falls below the maximum; for example, in our data, the modal interest rate in South Carolina is 18.95%, well below the maximum allowable rate of 29.99%. Among states without usury restrictions, the modal interest rates fall between 19.5 and 21%, representing an (unweighted) average of 19% of the loans in each state. Although we do not have formal measures of access and rationing, the rate ceiling in Colorado does not appear to push all high-risk borrowers out of the market.[19]

Instead of rationing credit, dealers and lenders may serve higher-risk borrowers by adjusting other loan terms to compensate for the lower interest rate (Schwartz, 1977; Hynes and Posner, 2002; Melzer and Schroeder, 2017). More specifically, in the presence of a binding interest rate limit, a dealer may offer a loan for the same vehicle with the same down payment, monthly payment, and maturity by increasing the price and principal amount.[20] One consequence is that at any given point during the life of the loan, high-risk borrowers with capped interest rates have higher loan balances than their otherwise similar counterparts with unrestricted interest rates.

[19] Although state-level differences in the maximum interest rate make a national version of Figure 2 less stark, the national patterns are consistent with the claim that usury laws limit price without dramatically reducing borrowers' access to credit.

[20] Dealers cannot skirt usury laws by offering lease agreements instead of loans because lease contracts include an implied interest rate which is also subject to usury laws.

2 Data

To explore the role of consumer protection laws in auto financing, we examine loan terms and outcomes. The loan data come from a large automotive indirect-finance company and include all loans that were purchased by the firm in thirty-eight states between the mid-1990s and 2019.[21] In total, we observe key features of 260,286 loans that were originated at 4,284 dealerships located in 2,043 U.S. ZIP codes (Table 1, Panel A). The variables are defined in Appendix Table A5.

We expect that our data provider is similar to other large indirect lenders.[22] The actual data, however, are uniquely rich. Specifically, the breadth, detail, and completeness of our data distinguish our study from previous work using aggregate Experian Autocount data, including Melzer and Schroeder (2017).

Our data are at the individual loan level and track the full life of the loan. Moreover, by observing the amount financed, down payments, and vehicle trade-ins, including those with negative equity, we can construct the total price paid by the buyer, as well as measures of collateral that cannot be imputed from Experian data (Melzer and Schroeder, 2017). We also observe the price at which each loan is sold by the dealer to the lender, a value that may capture some otherwise unobservable loan or borrower attributes. The representativeness of our data is also remarkable: Experian data include only loans reported to its credit bureau; yet, many dealers in the indirect financing market do not report loans to credit bureaus (Melzer and Schroeder, 2017). Because they were acquired directly from a lender, our data are not contingent on reporting to formal credit agencies. In the following section, we discuss other advantages of studying a nearly 30-year panel of individual loans.

2.1 Buyers, vehicles and loans

Panel B of Table 1 presents the mean and standard deviation of the buyer, loan and vehicle characteristics that were observable to the dealer at the time of origination. The first set of columns

[21] The raw data include approximately 320,000 loans from 43 states. We exclude loans with very incomplete origination data, as well as loans from five states with fewer than 100 observations each.

[22] A comprehensive comparison of lenders is limited by the availability of firm-level data in the industry. One dimension on which we can compare firms is their exposure to risk. Using data in a publicly available report (`finsight.com/sector/Auto/Subprime%20Loan?products=ABS&regions=USOA`), we compare our data provider's ABS structure to other subprime auto lenders and find that large players in the market are acquiring and securitizing similar loans. Summary measures of our data provider's ABS structure, along with other details in the text, would allow a careful reader to identify the firm. Therefore, we describe the lender's risk profile only in sweeping terms.

describe 151,853 loans in states with neither usury nor wage garnishment limits; the middle set of columns describe 69,328 loans originated in states with usury laws that allow wage garnishment; and the final set of columns describe 39,105 loans originated in states with both usury and wage garnishment limits. These three categories are exhaustive; all states that prohibit wage garnishment also limit interest rates.

Borrower characteristics, measured at loan origination, are generally similar in magnitude across consumer protection regimes.[23] An average borrower in our sample has a weak credit profile with a credit score of approximately 530.[24] Depending on the state, between one-quarter and one-third of borrowers have declared bankruptcy (either Chapter 7 or Chapter 13) in the seven years prior to loan origination, and only a small fraction of borrowers are homeowners. Across the three types of states, an average borrower earns a monthly gross income between $4,323 and $4,673.

Vehicles in states that allow wage garnishment have a wholesale value at origination of approximately $13,800, and the wholesale value is approximately $1,300 higher in states that restrict wage garnishment. Vehicles purchased are similar across states in terms of age and mileage; in our sample, an average vehicle is approximately two and a half years old with approximately 40,000 miles on its odometer. On average, vehicles sell for approximately $17,400 in states that permit wage garnishment and $18,800 in states that prohibit wage garnishment.

Initial principal balances are approximately $17,700 for borrowers in states that allow wage garnishment, regardless of the presence (or absence) of usury limits; however, principal amounts average $1,400 higher in states that prohibit wage garnishment. Borrowers may bring assets—either cash, a trade-in or both—to the dealership to secure financing for their vehicle purchase.[25] For approximately 6% of the loans in our sample, borrowers traded in a vehicle with negative equity. Approximately 81% of these underwater borrowers also made a cash down payment. In most cases, the cash only partially offset the negative equity; on average, these borrowers were approximately $3,000 underwater on their trade-ins, brought in approximately $1,200 in cash, and the remaining negative equity was rolled into a new loan.

[23] Although t-tests for the three pair-wise comparisons largely reject the null hypotheses of equality, the differences are small in magnitude. We account of these borrower characteristics in our regression framework.

[24] High-risk borrowers can be non-prime (FICO 601–660), subprime (FICO 501–600), or deep subprime (FICO $\leq$ 500) (Zabritski, 2019). In this study, we describe all of these higher-risk borrower types as simply "subprime".

[25] Because they cannot observe trade-ins or cash payments, Melzer and Schroeder (2017) note that they cannot address the possibility that differences in net down payment explain the differences that they observe in principal amounts. We avoid this problem by observing sale prices, down payments, and principal balances directly.

Although average interest rates are similar in states with and without usury limits, the difference in the standard deviations is consistent with the different skewness of the statistics. As shown in Figure 2, the distribution of interest rates in states with usury laws is necessarily limited.

In principle, dealers could adjust the term length in response to state-level laws. Studying prime borrowers who secure financing through credit unions, Argyle, Nadauld and Palmer (2019) use variation in auto loan maturity to show evidence of payment targeting. In our sample, however, 77% of the subprime loans are exactly four, five, or six years in length.[26] Moreover, the life of the loan is constrained by the mechanical life of the vehicle and, as such, loan length varies little across the industry. The duration of the modal loan in our sample, six years, is in line with the industry average (Zabritski, 2019). Average borrowers in our data pay $400 to $430 per month for their auto loans.

Other features of the loan are described in Panel B of Table 1, including the discount from the face value on the sale of the loan and the purchase of insurance and service contracts, and we account for these variables where appropriate in our analysis.

2.2 Loan outcomes

Panel C of Table 1 presents the mean and standard deviation of several measures of loan outcomes. As in Panel B, summary statistics are reported separately by state consumer protection regimes.

Approximately 30% of all loans end in default after an average of 32 payments. Default rates appear to be significantly higher in states that prohibit wage garnishment. An average borrower owes roughly $13,000 at default, and the lender recovers $3,300 to $3,800 through the repossession and resale of the vehicle. In our data, 92% of vehicles designated for repossession are successfully recovered and sold at auction; the reminder cannot be recovered and resold due to accidents or theft. As expected, proceeds from collections are substantially (approximately 67%) lower in states that prohibit wage garnishment.

While the summary statistics in Panel C suggest that default rates vary with wage garnishment laws, this simple comparison does not account for differences in vehicle characteristics, the timing

[26] Approximately 22% of the loans are 54 or 66 months in length. The conclusions of our study remain unchanged if we restrict our analysis to only 48-, 60- or 72-month loans.

of origination, and other complicating factors. In Section 3, we control for detailed characteristics of transactions and examine differences in loan terms and outcomes in states with and without wage garnishment limits.

3 Empirical analysis

The consumers in our sample purchase a bundle of products from the dealer, including financing, maintenance packages, insurance, and, of course, the vehicle itself. In light of evidence that auto dealers increase their profit margins by pricing over a bundle of goods (Busse and Silva-Risso, 2010), we ask whether dealers adjust vehicle price and loan terms in the face of different state-level consumer protection laws.

3.1 Interest rates and a measure of creditworthiness

To consider how vehicle prices, loan terms, and outcomes vary across borrowers and consumer protection regimes, we generate a measure of borrowers' creditworthiness using the data available to dealers and lenders at the time of the transaction. The APR offered to a borrower is the most obvious market-based proxy of the riskiness of the loan. An empirical challenge is to distinguish loans whose interest rates are affected by a usury law from loans that are unaffected by the law. State-level indicators for usury limits are insufficient, since the caps do not bind for loans to relatively low-risk buyers who are offered low interest rates. Ideally, we would observe the interest rate that would have been offered to each high-risk borrower in the absence of the usury limit. In practice, however, we observe only the *actual* interest rate on each loan. As such, our analysis requires that we estimate borrowers' counterfactual interest rate—i.e., what they would have paid in the absence of a rate cap. For a borrower with a strong credit history for whom a usury limit is of little relevance, the actual and counterfactual interest rates should be equal. In contrast, when the interest limit binds—because the borrower is a particularly risky one—the actual rate should be lower than the counterfactual rate.

To construct the counterfactual interest rate, $\widehat{APR}_{ist}$, we generate a predicted interest rate for each loan in the data. Specifically, we regress the interest rate of loans in states without usury laws against borrower characteristics, the loan's discount value, the loan's term length, as well

as month-year fixed effects to account for differences in common economic conditions over time. Borrower characteristics include only measures available at the time of the loan application—credit score, current income, indicators for homeownership and recent Chapter 7 and 13 bankruptcies, the borrower's down payment, and any negative equity on a trade-in vehicle. As discussed in Section 1.1, the loan's discount value is the acquisition fee charged by the lender. The discount reflects both the borrower's formal credit score and additional information acquired during the transaction or due diligence process. Our data provider uses the same acquisition fee schedule in all states, and discounts are increasing with the *ex ante* riskiness of the loan.[27]

We then use the coefficient estimates to predict an interest rate for all loans in the data and interpret this predicted value as a composite measure of the riskiness of a borrower.[28] The coefficient estimates that generate the predicted values are reported in Appendix Table A6.[29]

As would be the case for underwriters predicting loan performance, our measure reflects only the information available at the time of loan application (Thomas, Oliver and Hand, 2005). The specification presented in Appendix Table A6 does not uncover any causal relation and has purely predictive objectives; to that end, with an adjusted R^2 of 43%, its predictive power is strong. One assumption underlying our predicted interest rate measure is that lenders in states with and without usury laws consider similar factors in assessing buyers' riskiness—that is, we assume that the coefficient estimates in Appendix Table A6 are valid out-of-sample weights. Conversations with our data provider suggest that our empirical assumption is in line with the industry perspective.

We assess the quality of our predicted risk measure by noting that borrowers with strong credit—those for whom the usury limit does not bind—should face an actual interest rate equal to their predicted interest rate in all states, whereas borrowers with weak credit should be offered an actual interest rate that is lower than their predicted interest rate in states with a usury limit.[30]

[27]Our data provider shared an internal document with us that outlined the schedule of minimum discounts by credit score, as well as other guidelines for loan acquisition. We note that credit scores are, by design, unbiased across states. To that end, after accounting for regulatory regime, we find no evidence that borrowers with the same credit score in different states default at different rates.

[28]For loans in states with usury limits, the predicted interest rate may also be framed as a measure of treatment intensity which is correlated with the likelihood that a loan is subject to the interest rate cap.

[29]Our results are similar if we generate a predicted interest rate from additional loan and vehicle characteristics (e.g. the vehicle's wholesale value, mileage, and reliability rating). The robustness of the main results to different versions of the generated risk measure suggests that our findings are not driven, for example, by differences in vehicles purchased in states with and without usury laws.

[30]We use the terms "weaker credit", "stronger credit", "higher-risk" and "lower-risk" to describe borrowers in our data relative to each other. According to Experian (`www.experian.com/blogs/ask-experian/what-is-the-average-credit-score-in-the-u-s/`), the average FICO score in the U.S. ranged from 690 to 703

Specifically, in the sample of individual loans, we estimate:

$$\begin{aligned} APR_{ist} &= \beta_1\Big(\widehat{APR}_{ist}\Big) + \beta_2\Big(1[\widehat{APR}_{ist} > \text{Limit}_s]\Big) \\ &\quad + \beta_3\Big(\widehat{APR}_{ist} \times 1[\widehat{APR}_{ist} > \text{Limit}_s]\Big) + \mathbf{X}_t + \varepsilon_{ist}, \end{aligned} \tag{1}$$

where APR_{ist} is the actual interest rate for borrower i's loan originating in state s in month t; $\widehat{APR}_{ist}$ is the measure of creditworthiness generated using borrower characteristics (i.e., the predicted interest rate, described above) and $1[\widehat{APR}_{ist} > \text{Limit}_s]$ is an indicator for whether the predicted interest rate is above the state-specific interest rate limit. The specification includes month-year fixed effects, $\mathbf{X}_t$, to account for changes in aggregate economic conditions over time.

Least squares estimation with a generated regressor yields consistent coefficient estimates, but inconsistent standard errors that lead to over-rejection of the null hypothesis, even in large samples (Murphy and Topel, 2002). Without a correction, the covariance matrix of the second-stage regression includes the noise induced by the first-stage estimates. To account for the inclusion of generated regressors—in our case, variables based on borrowers' predicted creditworthiness, $\widehat{APR}_{ist}$—we employ an algorithm that includes both the regression generating the predicted variable and the regression of interest in every bootstrapped sample. The standard errors reported in the tables, clustered at the dealership level to account for correlation across loans originated in the same dealership over time, are obtained through 500 replications of the bootstrapping procedure. To ease interpretation, we report p-values in the text and tables that assume that the corrected errors are normally distributed.

Table 2 reports the regression results from estimating Eq. (1). The coefficient estimates on the predicted interest rate is nearly 1 ($p < 0.01$), consistent with the fact that data from states without usury laws were used to generate the prediction. The coefficient estimate on the interaction of the predicted APR and the indicator for exceeding the state's interest rate limit is negative, roughly half of the magnitude of the uninteracted coefficient on predicted APR, and significantly different from zero ($p < 0.01$). That is, where the usury limit binds—in cases where the predicted interest rate exceeds the maximum interest rate allowed by state law—the actual interest rate faced by a

between 2012 and 2019. More than 99% of borrowers in our data have credit scores below 690, making even some of our "lower risk" borrowers substantially riskier than the average U.S. borrower.

borrower is lower and less sensitive to changes in the borrower's creditworthiness, relative to the rates in states without an interest rate cap.

Together, the coefficient estimates in Table 2 strengthen the validity of our measure of creditworthiness and suggest that, where imposed by state law, usury limits effectively cap the interest rates faced by high-risk borrowers.

3.2 Vehicle prices

We exploit the richness of the borrower-level data to study the relation between consumer protection laws and the prices paid by subprime buyers. Whereas Melzer and Schroeder (2017) focus on the relation between monthly payments and usury laws—likely because they cannot observe prices or initial principal—we can examine the total price paid, as well as detailed loan terms and outcomes, in presence of usury and wage garnishment limits.

Figure 3 presents a binned scatterplot of vehicle price against the measure of borrower risk, separating buyers by their state's usury and wage garnishment laws. Under all regimes, vehicle prices decline with borrower riskiness—as expected, financial constraints affect buyers' access to both credit and cash. Holding fixed a borrower's risk, we can compare the prices paid: whereas vehicle prices in states that allow wage garnishment appear to be very similar for similar borrowers regardless of the presence or absence of a usury law, the prices are remarkably higher in states that limit post-default collections through wage garnishment. This suggestive figure motivates further empirical examination. In specifications reported in Table 3, we regress the vehicle sale price on measures of borrower creditworthiness and their interaction with indicators for state-level usury and wage garnishment laws, as well as a demanding set of controls.

To start, we account only for the presence or absence of state-level usury laws. Although our data are substantially different, by focusing only on interest rate limits, this approach addresses the research question in Melzer and Schroeder (2017). Specifically, we estimate:

$$\begin{aligned} \text{Vehicle Price}_{ist} &= \alpha_1 \text{QuintRisk}_1 + \cdots + \alpha_5 \text{QuintRisk}_5 \\ &+ \text{UsuryLaw}_s \times (\beta_1 + \beta_2 \text{QuintRisk}_2 + \cdots + \beta_5 \text{QuintRisk}_5) \\ &+ \mathbf{V}_i + \mathbf{X}_t + \varepsilon_{ist}, \end{aligned} \tag{2}$$

where QuintRisk_l is equal to 1 when the borrower's predicted APR falls in the l^{th} quintile of the overall distribution, UsuryLaw_s is an indicator for whether the borrower's state s has a usury law that limits the interest rate that can be charged on a vehicle loan, $\mathbf{V}_i$ is a set of transaction-level controls including an indicator for whether borrower i's vehicle is new (versus used) and the vehicle's wholesale value to proxy for vehicle-specific quality and characteristics at the time of purchase, and $\mathbf{X}_t$ are month-year fixed effects. Column 1 of Table 3 reports the coefficient estimates, as well as standard errors that are bootstrapped to account for the generated regressor.

As expected, vehicle prices decline with the buyers' creditworthiness—riskier buyers likely have less access to credit *and* cash.[31] The coefficient estimates on the uninteracted indicators for the quintiles are negative, and their magnitudes increase with borrower riskiness. In this specification, we find no evidence that interest rate limits are associated with significantly different vehicle prices. Of course, the regression reported in column 1 captures only one of the two primary consumer protection laws affecting the subprime auto lending market.

Departing even more from Melzer and Schroeder (2017)—and motivated by Figure 3—we also consider the impact of laws that limit lenders' ability to recoup losses after default. To assess the impact of wage garnishment, consider two borrowers of the same creditworthiness who live, respectively, in states that permit and prohibit wage garnishment. The wage garnishment restriction reduces the funds that can be collected from the borrower after default.[32] Now consider a lender who transacts in both states. This lender would be indifferent between the two loans only if it could collect more in (pre-default) payments in the state that prohibits wage garnishment. That is, after accounting for credit risk and vehicle value, prices in states that prohibit wage garnishment should be systematically higher than prices in states that allow collections after default (Livshits, MacGee and Tertilt, 2007).[33]

To examine the role of both usury and wage garnishment laws, we augment our earlier specifi-

[31] We discuss the relation between borrower risk and sale prices in Footnote 34 and report additional results in Appendix Table A7. We also discuss access to credit more directly when we examine loan terms in Table 4.

[32] The restriction on wage garnishment is effective. Appendix Figure A1 plots the amount that is recovered through collections separately for states with and without wage garnishment restrictions and shows that deficiency payments are substantially lower in states that prohibit wage garnishment.

[33] Lenders must also account for the relation between payment size and default, as well as moral hazard.

cation to estimate:

$$\begin{aligned}
\text{Vehicle Price}_{ist} &= \alpha_1 \text{QuintRisk}_1 + \cdots + \alpha_5 \text{QuintRisk}_5 \\
&+ \text{UsuryLaw}_s \times (\beta_1 + \beta_2 \text{QuintRisk}_2 + \cdots + \beta_5 \text{QuintRisk}_5) \\
&+ \text{WageGarnishmentLaw}_s \times (\gamma_1 + \gamma_2 \text{QuintRisk}_2 + \cdots + \gamma_5 \text{QuintRisk}_5) \\
&+ \mathbf{V}_i + \mathbf{X}_t + \varepsilon_{ist},
\end{aligned} \tag{3}$$

where $\text{WageGarnishmentLaw}_s$ is an indicator for a state s that prohibits post-default collections through wage garnishment. Coefficient estimates are reported in column 2 of Table 3.

Again, we find that the borrowers who are most likely to be financially constrained—in terms of both cash and credit—face lower sale prices; the coefficient estimates on the indicators for borrower quintiles categories are negative and increase in magnitude borrower riskiness ($p < 0.05$).[34] The specification in column 2 again suggests that prices do not vary systematically with the usury limits. That is, after accounting for the presence of laws limiting lenders' ability to collect on loan deficiencies after default, we again find no evidence of strategic pricing among the set of buyers for whom we would expect interest rate limits to bind.

The other new (and central) finding in column 2 is that buyers in states that prohibit wage garnishment pay significantly more for vehicles than similarly risky peers in states that allow post-default collections through wage garnishment. Borrowers in the lowest risk quintile pay on average \$372 more than their peers in other states ($p < 0.01$), which amounts to 2% of the average price of \$19,360 for buyers in this quintile. Average borrowers in other risk quintiles also pay substantially more—\$217 to \$294 or 1.2% to 1.7%—than similar borrowers in states without wage garnishment restrictions.[35]

The specification reported in columns 1 and 2 include month-year fixed effects to account for temporal variation, including changes in the auto market and broader economic environment, as well

[34]Supplemental regression results, reported in Appendix Table A7, include both the indicators for borrower risk quintiles and their interactions with the vehicle wholesale value at origination. Higher-risk borrowers appear to pay less on average—the coefficient estimates on the quintile indicators are negative and increasing in magnitude ($p < 0.01$ in all cases). But these high-risk borrowers pay a higher mark-up on each dollar of wholesale value, relative to their lower-risk peers. Coefficient estimates suggest that \$1 of wholesale value is associated with \$0.98 of sale price for most buyers ($p < 0.01$). However, the interaction term is positive for the highest risk borrowers for whom \$1 of wholesale value is associated with more than \$1.02 of sale price ($p < 0.01$).

[35]The sums of the uninteracted indicator and its interaction with the quintile dummy variables are statistically different from zero in the four cases (p-values between 0.04 and < 0.01).

as trends in buyer and lender preferences. In column 3, we use vehicle type-month-year fixed effects that allow the market for different types of vehicle to change differently over time; for example, these rich fixed effects allow the demand for large pick-up trucks to be different (and different over time) from the demand for sedans, beyond what would be captured by the changing wholesale value. Perhaps unsurprisingly, the coefficient estimates in column 3 are virtually unchanged from those in column 2.

In the remainder of the paper, we report coefficient estimates from specifications that include vehicle wholesale value as the control for vehicle-specific quality and characteristics at the time of purchase. Our conclusions throughout would be unchanged if we were to instead include vehicle type-month-year fixed effects, as in column 3 of Table 3. The wide variety of make and model years, as well as differences in vehicle condition and mileage, mean that more demanding fixed effects create data sparsity issues. For example, there are 6,502 loans for Hyundai Elantras in the data, model years 1999 to 2018; this represents the 75th percentile in terms of the number of transactions by vehicle make and model. There is substantial heterogeneity in mileage within the cell created by interacting the model and model year with the month and year of the loan—on average, in months when more than two Elantras of the same model-year were sold, the difference between the highest- and lowest-mileage cars was approximately 27,450 miles. Introducing finer mileage categories exacerbates data sparsity issues, without resolving concerns about other unobservable features of the vehicle. Ultimately, we conclude that the wholesale value of the vehicle, assigned at the time of purchase, best represents vehicle-specific quality and characteristics when the loan is established.

Buyers may choose to purchase additional products along with the vehicle, including gap insurance, service contracts, and life insurance. The prices paid for these add-ons may be included in the amount financed by the lender, and we examine that total in our next subsection. In column 4 of Table 3, we present the results of a specification similar to column 2 with the total price of add-on products as the dependent variable. As we observe for the vehicle itself, borrowers spend less on add-on products when they are more financially constrained; the coefficient estimates on the indicators of borrower riskiness are negative and decrease with riskiness ($p < 0.01$ in all cases). The lowest-risk borrowers in states with usury laws that allow wage garnishment make fewer add-on purchases than their peers in states without usury laws ($p < 0.05$); although the difference

disappears for borrowers outside of the first quintile (p-values range from 0.26 to 0.72). In states that prohibit wage garnishment, riskier buyers pay substantially more for add-on products. For example, average borrowers in the second to fifth quintiles of risk spend \$180 to \$360 more for add-ons than their peers in states without wage garnishment ($p < 0.01$).

The coefficient estimates in columns 2–4 foreshadow our findings around differences in the total loans offered to buyers across state regimes; we examine loan terms in Table 4. Because they pay higher prices for both their vehicles and additional services, buyers in states that prohibit wage garnishment face higher principal amounts and higher monthly payments.

One alternative explanation for higher prices is that limits on post-default recourse due to wage garnishment restrictions could lead to additional demand for financed vehicles. Simply put, borrowers could be more willing to take on debt when the consequences of default are less acute and, barring a commensurate supply response, higher demand could mean higher prices. This alternative mechanism requires that consumers in states without wage garnishment anticipate defaulting on their auto debt and that dealers do not respond competitively to the opportunity—both somewhat unlikely conditions. Consumers are known to be myopic with respect to credit contracts and their future finances (Agarwal et al., 2015; Agarwal, Ben-David and Yao, 2017). Moreover, dealers draw used vehicles from the national market, and these mobile assets can be relocated at relatively low cost.

3.3 Loan terms

In principle, both usury laws and wage garnishment prohibitions can affect loan terms: In the presence of a binding interest rate limit, a dealer can offer a similar schedule of monthly payments on a given vehicle purchase only by adjusting the loan's starting principal. When lenders cannot recoup their losses after default through wage garnishment, they may require more upfront from all borrowers. In the following section, we consider the relation between these consumer protection laws and the vehicle loans offered to subprime borrowers. Our loan-level data allow us to consider several dimensions of vehicle financing, including starting principal, down payment, monthly payments, and loan term length.

Initial principal

Figure 4 plots the initial amount financed against the predicted interest rate separately by usury and wage garnishment laws. As expected, across all states, the initial principal decreases with borrower riskiness. When wage garnishment is permitted, the average amount financed per loan appears similar in states with and without usury laws; however, loans' initial principal balances appear to be substantially higher in states that prohibit wage garnishment.

To examine loan terms in a regression analysis, we re-estimate Eq. (3) with the loan's initial principal as the dependent variable and report the results in column 1 of Table 4. Consistent with the patterns in Figure 4, higher-risk borrowers secure smaller loans in all states; the coefficient estimates of the borrower risk indicators are all negative and increase in magnitude with borrower risk—on average, in states without usury or wage garnishment limits, the highest risk buyers borrow \$1,650 less than the average lowest risk buyer in the data ($p < 0.01$).

We find little evidence that usury laws are associated with higher principal amounts. Although usury limits are most likely to bind for the highest risk borrowers—buyers who would otherwise face interest rates above the limit—these borrowers do not finance significantly more than their peers in states without interest rate caps. The sum of the coefficient estimates for the uninteracted usury law indicator and its interaction with the indicator for borrowers of the highest risk is not statistically significant at conventional levels ($p = 0.82$). This result runs counter to those in Melzer and Schroeder (2017); however, Melzer and Schroeder (2017) pool all states with interest rate limits and do not distinguish between states with and without wage garnishment. In our specification, the coefficient estimate for the uninteracted indicator for state-level wage garnishment prohibition is large and positive ($p < 0.01$); on average, these borrowers finance approximately \$630 more than their peers in states that allow wage garnishment after default. The interactions with borrower risk indicators suggest that this large difference is found across all levels of borrower risk ($p < 0.01$ in all cases). That is, on average, initial principal is higher for borrowers in states that limit wage garnishment. Because they purchase the least expensive vehicles, the riskiest borrowers face the largest wage garnishment-related burden, as measured as a percentage of vehicle value.

Down payment

One might wonder whether the difference (or similarity) in initial principal is driven by borrowers' down payments—after all, the higher differences in vehicle prices reported in Table 3 must be paid for either through down payments or financing. Column 2 of Table 4 reports coefficient estimates from the same specification as Eq. (3) with buyers' down payment as the dependent variable. On average, borrowers with the weakest credit make the largest down payments; the average down payment for borrowers in the top quintile of risk is $215 more than the down payment for those in the quintile with the best credit ($p < 0.05$). Garmaise, Jansen and Winegar (2022) provide intuition: down payments for less durable assets purchased by low-income borrowers are expected to be higher because low-income borrowers have limited future wages to pledge to support borrowing today. The presence of a usury limit appears to have little relation to down payments; however, wage garnishment limits are associated with lower down payments for the lowest and highest risk borrowers ($p = 0.03$ and $p = 0.04$, respectively). The magnitude of the differences are small compared to those observed for the initial principal—whereas down payments of the average lowest risk borrower in a state that prohibits wage garnishment is $160 lower, his initial principal is $630 higher. As such, differences in down payment cannot explain the observed differences in initial principal balances.

Monthly payment & term length

Consumers may use simple heuristics to evaluate complex or multidimensional financial products (Benartzi and Thaler, 2007). In the auto financing context, a buyer might simplify a loan into a linear function of down payment and monthly payment, without considering the overall obligation (Herrmann and Wricke, 1998). Indeed, the monthly payment amount is a prominent loan term that is often used to market auto financing, and monthly payment targeting is prevalent for borrowers of all levels of creditworthiness (Argyle, Nadauld and Palmer, 2019). Since household savings declines with income (Huggett and Ventura, 2000), low income borrowers may be particularly vulnerable to unanticipated liquidity shocks and, as a result, may be especially sensitive to their monthly debt burden (Attanasio, Koujianou Goldberg and Kyriazidou, 2008; Karlan and Zinman, 2008).

Column 3 and 4 of Table 4 reports coefficient estimates from our main specification with buyers' monthly payment and the loan term length (in months) as the dependent variables, respectively. Overall, borrowers in states with usury laws face similar monthly payments to their peers in states without limits. Even differences that are statistically significant are small in magnitude. On average, borrowers in states with usury laws pay only \$4 less per month than similar borrowers in states the interest rate limits ($p < 0.05$). Moreover, we find little evidence that usury laws are associated with different term lengths.

On average, the lowest and highest risk borrowers in states that prohibit wage garnishment face monthly payments that are \$6 higher and \$10 lower than their respective peers in states that allow wage garnishment ($p < 0.05$). Low risk borrowers loans are of average length, whereas the highest risk borrowers' loans are 2.3 months longer than the loans of peers in other states ($p < 0.01$).

Our results on monthly payments are different from Melzer and Schroeder (2017), who find that risky borrowers face higher payments in states with usury laws. Those authors postulate that differences in monthly payments across states may be driven by a lack of competition among sellers in certain regions.[36] We raise another possible explanation for the difference in payments in Melzer and Schroeder (2017): regulatory restrictions on the use of wage garnishment.

3.4 Loan outcomes

State-level heterogeneity in consumer protection laws—and the richness of our data—allows us to identify new facts about subprime auto lending. In the analysis described above, we examined detailed loan characteristics. We next investigate whether consumer protection laws are associated with different loan outcomes; our loan-level data include an indicator of default, as well as information on the timing of delinquencies, the value of the vehicle at default, and collections. While differences in default and collection rates have business implications for lenders, they also have a substantial economic impact on individual borrowers.

[36] Although competition in banking has been previously studied (*cf.* Gande, Puri and Saunders, 1999; Ho and Ishii, 2011; Crawford, Pavanini and Schivardi, 2018; Dick, 2007; Cohen and Mazzeo, 2007; Degryse and Ongena, 2008; Melzer and Morgan, 2015; Montes, 2014), we are not aware of studies documenting differences in the competitiveness of subprime auto lending across states. It is true, however, that approximately 65,000 financial institutions finance vehicle purchases in the U.S., and no single lender accounts for more than 6% of the market. The ten largest lenders hold 38% market share. This is substantially less than in the mortgage market, where the ten largest originators account for 52% of the transactions. The Herfindahl-Hirschman for used car origination is below 100—well below what government agencies consider even moderately concentrated (Baines and Courchane, 2014).

Approximately 85,000 loans in our data are still active at the end of the sample period. Because including loans that are still being paid off by borrowers would understate the default rate, we exclude these loans from our analysis of loan outcomes and restrict our sample to loans that could have been paid in full by the contracted monthly payments. Even with this restriction, we observe the outcomes of more than 155,000 loans.

Borrowers default on their loan when they fail to submit a timely monthly payment. Figure 5 plots the percent of loans that default and borrowers' predicted interest rate. Examining only states in which wages can be garnished, the relation between creditworthiness and default is similar for loans in states with and without usury laws: the lowest risk borrowers' default rate is less than 15%, whereas the highest risk borrowers' default rate is more than 35%. The difference between the default behavior of the borrowers in states with and without wage garnishment is also evident in Figure 5. At every level of creditworthiness, borrowers in states that prohibit wage garnishment default more frequently than similar borrowers in other states.

To examine the relation between default and consumer protection laws, we re-estimate Eq. (3) with an indicator for whether the loan ended in default as the dependent variable. Because gap insurance affects borrowers' incentive to default, we include an indicator for whether the borrower purchased gap insurance in all specifications. We examine three versions of the default indicator and report the results in Table 5: Did the borrower default within 24 months of origination (column 1), 36 months of origination (column 2), or over the full term of the loan (column 3)?

Unsurprisingly, across all specifications, higher-risk borrowers are more likely to default on their loans. The coefficient estimates are positive and increase monotonically with borrower riskiness ($p < 0.01$ in all cases).

We find no evidence that usury laws are associated with higher default rates. Coefficient estimates suggest that borrowers in states with usury laws, on average, have slightly lower default rates than their peers in other states ($p < 0.01$). Notably, we do not see differentially higher or lower default rates among the highest-risk borrowers for whom the usury limits should bind.

However, wage garnishment limits are associated with higher default rates for both higher- and lower-risk borrowers. Across all specifications, the coefficient estimate on the uninteracted indicator for states that prohibit wage garnishment is positive and large ($p < 0.01$). Using the coefficient estimates for defaults over the full term of the loan (column 3) and the mean default rate for states

without usury laws that allow wage garnishment, the wage garnishment law is associated with a 35% increase in the probability of default. The coefficient estimates increase in magnitude across the 24-month, 36-month, and full-term specifications. We would not have expected this coefficient estimate to decline—after all, a borrower who defaults within 24 months has mechanically defaulted within 36 months. However, the increasing magnitude across the specifications suggests that the increased propensity to default in the presence of wage garnishment laws is not a matter of timing alone.

4 Cost of default to lenders

Although default rates are uncorrelated with states' usury laws, borrowers in states that prohibit wage garnishment face higher prices and larger loans, and they are more likely to default. In this section, we examine the principal balance at default, collections activities, and the net cost of default to the lender.

Our analysis of collections activities requires us to restrict our sample to loans that terminated in default before 2018. Although deficiency payments can continue for many years after default, in practice, only 2.3% and 0.3% of borrowers in our sample make payments three years and five years after default, respectively. As a result, restricting the sample to loans that terminated in default before 2018 censors few post-default payments.

We start by focusing on the total amount of money owed by the borrower in the month that they default. The coefficient estimates reported in column 1 of Table 6 come from a specification with the principal balance at default as the dependent variable and, to account for the timing of default, include additional controls for the age of the loan at default. Because higher-risk borrowers tend to start with smaller loans, the principal balance owing at default decreases with borrowers' riskiness; the coefficient estimates on the uninteracted quintiles of borrower risk are negative, and their magnitudes increase across the quintiles of borrower risk ($p < 0.01$).

Because we found little difference in initial loan amounts and the timing of defaults for the highest risk borrowers in states with and without usury limits, we expect little variation in the principal at default. Consistent with our earlier finding that lowest risk borrowers in states with usury laws buy slightly lower priced vehicles and take out slightly smaller loans, we find here that

the lowest risk borrowers may owe slightly less than higher-risk borrowers at default ($p < 0.10$)—usury laws are unlikely the cause, however, since they should have little impact on these loans with interests far below the legal maximum. Again, we find no evidence that borrowers in states with usury limits owe more at default than their peers in other states.

Similarly, we find no statistical differences in the balances at default for borrowers in states that prohibit wage garnishment (p-values range from 0.12 to 0.85). Despite the fact that these borrowers start with higher principal amounts, after accounting for the age of the loan at default, they owe similar balances on their loans compared to their defaulting peers in other states.

Lenders can recover some of the loan deficiency in default through costly recovery efforts, such as repossession and sale of the vehicle. If repossession and sale of the vehicle do not cover the outstanding debt, lenders can attempt to recover the deficiency through direct communication with the borrower or, where permitted, through court-ordered wage garnishment.[37] Columns 2 and 3 of Table 6 report coefficient estimates from estimating Eq. (3) with the net proceeds from the repossession and re-sale of the vehicle and the funds recovered through collections as dependent variables, respectively.

The amount recovered by the lender through the repossession is decreasing with borrowers' riskiness ($p < 0.01$), consistent with our finding that riskier borrowers purchase less expensive vehicles. Comparing states with usury restrictions to those without, we find no significant differences in the amount recovered through the sale of the repossessed vehicle. We do, however, find that the recovery amount is $290 less for vehicles repossessed in states that prohibit wage garnishment ($p < 0.10$). This difference is consistent with moral hazard—wage garnishment restrictions shield borrowers from the full consequences of lost vehicle value arising from excessive wear and tear, neglect, or damage.

Collections from the borrower do not vary with the presence of a usury limit; however, collections are substantially lower where lenders cannot seek compensation through wage garnishment. Appendix Figure A1 plots collections against predicted interest rate separately for states with and without wage garnishment and shows the stark difference in total collections across wage garnishment regimes. Collections are substantially higher in states that allow post-default collections

[37] Federal and state level anti-harassment statutes limit debt collectors' communications with borrowers (Dawsey, Hynes and Ausubel, 2013).

through wage garnishment. Regression results are consistent with the figure: In Column 3 of Table 6, the coefficient estimate on the uninteracted indicator for states that prohibit wage garnishment is large and negative ($p < 0.01$). Across the five quintiles, lenders in states that prohibit wage garnishment collect an average of at least $1,500 less than they would on a similar loan in a state without restrictions ($p < 0.01$). We do not find evidence that the difference is driven by differences in legal costs associated with collections[38] or by differences in local economic conditions at the time of default.[39]

Finally, column 4 of Table 6 re-estimates Eq. (3) with the final balance owed by borrowers who default (i.e. the principal balance minus the amount recovered through repossession and collections). Usury laws are associated with only a small difference in the net balance faced by lenders after recovery—in states with usury limits, lenders write off, on average, $340 less they do on loans to similar borrowers in states without usury laws ($p < 0.05$).

In contrast, lenders face large balance deficits from defaults in states that prohibit wage garnishment. After repossession and collections, deficits average $2,300 higher in states that prohibit wage garnishment ($p < 0.01$).

5 Estimating borrowers' costs

Wage garnishment restrictions are associated with higher costs for lenders: compared to similar loans in states that permit wage garnishment, average loans in states that prohibit post-default collections have higher initial principal amounts (Section 3.3), are more likely to end in default (Section 3.4) and, conditional on default, leave lenders with higher unpaid balances (Section 4).

Now, we turn to the costs for the borrowers. Loan-level data allow us to account for many borrowing costs: we observe borrowers' down payments (including any vehicle trade-in), monthly payments, and other fees paid over the life of the loan. Of course, borrowers may incur additional

[38] Appendix Figure A2 plots collections against post-default legal fees for states with and without wage garnishment limits. At similarly low levels of fees, collections are higher in states that allow wage garnishment, and collections continue despite a very high fee in many states that permit wage garnishment.

[39] To assess whether collections are systematically lower in states with wage garnishment because of local economic conditions, we plot collections against GDP per capita at the time of default separately for states with and without wage garnishment limits in Appendix Figure A3. The figure illustrates that in states where wage garnishment is restricted, lenders experience notably lower collection amounts. At the same time, there is no apparent correlation between per capita GDP and collection amounts in these states, suggesting that the observed trends in collections are not influenced by the underlying economic conditions of the states.

costs that are not reported in the data, especially in the event of a default. For example, consumers who default may face especially high interest rates on future loans or may be unable to secure additional credit. The benefits of vehicle ownership are also difficult to assess. For example, individuals may rely on their vehicle to commute to current or prospective workplaces. Depreciation over the life of the loan provides one market-based measure of the value derived from vehicle ownership; however, unmeasured benefits of ownership, including preferences for flexibility, safety, and social status, complicate any formal cost-benefit analysis. As such, a comprehensive welfare analysis is beyond the scope of our current study. Instead, we consider the total non-discounted cost of the loan to borrowers under usury and wage garnishment laws.[40]

Table 7 reports coefficient estimates from a specification that is similar to those reported in previous tables but uses consumer costs as the dependent variable. We report results for the sample of all loans that were paid in full or terminated in default before 2018 (column 1), loans that were paid in full (column 2), and loans that terminated in default (column 3). We present the pooled sample for completeness but focus on columns 2 and 3, noting that the final status of loans is not randomly assigned. As such, the patterns that we describe across the columns is exactly about *which* and *when* borrowers default.

Examining borrowers in states without consumer protection laws who did not default, we find that borrowers in the second and third risk quintiles face higher loan costs than lowest risk borrowers, but highest risk borrowers face the lowest costs ($p < 0.01$).

When the loan was paid in full, the total cost varied little with the presence of usury laws. None of the coefficient estimates or the sums of the coefficients for the uninteracted indicator and the interactions with the risk quintiles is statistically significant at conventional levels—the magnitudes are small and the p-values range from 0.40 to 0.95 in column 2. In contrast, for borrowers who default, loan costs are slightly higher for defaulting borrowers in states without usury limits—on average, \$775 higher ($p < 0.10$).

[40]Borrowers' mobility may also affect total loan costs. Interest rates are determined by the dealership's location, whereas limits on collections depend on the borrowers' residence. Borrowers who reside outside of the state in which they purchased their vehicle—either because they shopped across a border or because they relocated permanently—may face (or avoid) different loan costs. In principle, the highest cost is faced by borrowers who purchase in a state that prohibits wage garnishment and reside in a state that permits it. They would pay upfront for the restriction on collections *and* would then be subject to wage garnishment in their home state. Although borrowers and their vehicles are mobile in principle, there appears to be little mobility across regimes. Our sample includes only 3,143 loans that were originated in a dealership in a state with a different wage garnishment law than in the borrower's home state.

By capping interest rates, usury laws are intended to protect the highest-risk borrowers. It is perhaps unsurprising, then, that higher-risk borrowers in states with usury laws face lower loan costs than their peers in other states. We note, however, that the least risky borrowers in states with usury laws face *higher* loan costs relative to their similar-risk peers in other states.

In contrast, the coefficient estimates related to wage garnishment laws are large and statistically significant. For loans that were paid in full, the average borrower in a state that prohibits wage garnishment paid approximately $1,020 *more* over the life of the loan than a peer borrower in a state without the restriction ($p < 0.01$). For loans that ended in default, the average borrower in a state that prohibits wage garnishment paid roughly $2,900 *less* than a peer borrower in a state without the restriction ($p < 0.01$).

Assuming that unobserved costs are similar across states, defaulting borrowers who are protected from collections through wage garnishment appear to be substantially better off than defaulting borrowers who face the possibility of wage garnishment. Notably, when they pay off the loan without defaulting, borrowers in states that prohibit wage garnishment are *worse* off than their counterparts in other states.

The contrasting results in columns 2 and 3 likely reflect, at least in part, asymmetric information in the market. In states that allow wage garnishment, lenders can recover deficiencies after the default—these collections are costly for borrowers who default and are irrelevant for borrowers who make payments on schedule. In contrast, in states that prohibit wage garnishment, lenders account for the *possibility* of future default by increasing monthly payments for *all* borrowers. In short, whereas lenders in states that allow wage garnishment can distinguish between good and bad borrowers *ex post*, lenders in states that prohibit wage garnishment increase principal and payments to account for the *ex ante* mix of borrower types.

5.1 Wage garnishment and moral hazard

Where wage garnishment is restricted, individuals might be inclined to take on more financial risk because they assume that their debts can be discharged without lender recourse, potentially leading to higher default rates. Similarly, the ability to discharge auto loan debt through Chapter 7 bankruptcy may weaken incentives to avoid delinquencies, resulting in more frequent auto loan defaults. Despite the challenge of directly observing incentives, our empirical evidence supports

the notion that moral hazard plays a significant and plausible role in these scenarios.

In Section 3.4, we present evidence that borrowers in states that permit wage garnishment default more frequently than their peers in other states. In this section, we consider one possible explanation: moral hazard. Moral hazard suggests that borrowers respond to the reduced incentives to make timely payments—in this context, by making default less costly, the prohibition on wage garnishment may induce more delinquencies.

Although we cannot observe directly *why* borrowers default more frequently in states that prohibit wage garnishment, an analysis of borrowers' behavior in a similar setting suggests that moral hazard may be at least partly responsible. To understand the relevance of moral hazard in our setting, we consider the relation between prior bankruptcies, which make default more costly by limiting borrowers' ability to discharge their debt, and borrowers' propensity to default. A borrower's prior bankruptcy is observable at the time of loan issuance and, as a consequence, should be "priced into" the original loan terms. Nevertheless, our results show that differential pricing is not sufficient to erase the relation between prior bankruptcy and default.

Our data include information about borrowers' creditworthiness at the time of purchase. Specifically, we can observe whether a borrower had previously declared bankruptcy and, if so, the bankruptcy type. Chapter 7 bankruptcy allows the borrower to discharge most unsecured debt but, importantly, prohibits the individual from filing another bankruptcy claim for eight years.[41] Since vehicle loans are recourse loans, borrowers' ability to discharge their debt in bankruptcy court protects the borrower and adversely impacts the lender. After a recent bankruptcy, the borrower's inability to discharge additional debt adversely affects the borrower, while leaving recourse for the lender.

To simplify the exposition, we limit our regression analysis to loans from states that have neither usury limits nor restrictions on wage garnishment.[42] We examine the role of borrowers' prior bankruptcy by regressing an indicator for whether a loan ended in default in 24 months, 36

[41] Chapter 13 establishes a repayment plan for the borrower and, compared to Chapter 7 bankruptcy, offers more flexibility in terms of the timing of a second filing.

[42] Whereas we have no *a priori* hypothesis about the interactive effect of a borrower's ability to declare bankruptcy and a state's usury limit, a law prohibiting wage garnishment restricts a lender's ability to recover funds owed by the borrower after default and may limit the additional impact of bankruptcy protection. Estimating a regression with the full set of predicted interest rate-, usury-, wage garnishment- and bankruptcy-related interactions yields results that are similar to those in the simplified framework that we report, but are considerably harder to interpret concisely.

months or over full term on an indicator for whether the borrower filed a Chapter 7 bankruptcy in the eight years prior to loan origination, as well as a rich set of borrower controls (similar to those included in Appendix Table 2, except bankruptcy indicators), the vehicle's wholesale value, indicators for new vehicles and the purchase of gap insurance, and month-year fixed effects. The main coefficient estimate of interest on the indicator for a Chapter 7 bankruptcy is reported in Table 8.

An average borrower who declared Chapter 7 bankruptcy in the eight years prior to loan origination is less likely to default on their auto loan. The coefficient estimate on the indicator for a prior bankruptcy is large and negative in all specifications ($p < 0.01$). A prior bankruptcy is associated with approximately 2 percentage points lower probability of default in the first two or three years and 9 percentage point lower probability of default over the full term of the loan.

Recent bankruptcy limits borrowers' ability to discharge their debt through a second bankruptcy filing. Conversely, borrower who have not recently declared bankruptcy have the *option* to file for Chapter 7 protection against the collection of outstanding debt in the event that they default on an underwater vehicle loan. Wage garnishment laws provide borrowers with similar protections from post-default collections. Evidence that borrowers who cannot discharge their debt due to a prior bankruptcy default less frequently lends credence to the claim that wage garnishment protection leads to more defaults by reducing the cost of delinquencies. Important caveats remain, however. First, we cannot observe moral hazard directly in the context of wage garnishment and can only infer its role indirectly through the relationship between prior bankruptcy and default. Second, in the current analysis, we cannot compare the importance of moral hazard with other possible explanations, including the role of short-term liquidity constraints. Instead, we present suggestive evidence that increased moral hazard is a plausible consequence of laws protecting borrowers from wage garnishment.

6 Conclusion

Using data on individual auto loans, we examine the relation between consumer protection laws—interest rate and wage garnishment restrictions—and loan terms and outcomes for both lenders and borrowers. In contrast to prior research, we find that state-level usury laws are not as-

sociated with substantially different vehicle prices, principal amounts, loan terms or loan outcomes. However, we find that borrowers in states that prohibit wage garnishment face significantly higher vehicle prices and initial loan balances. By reducing the funds that can be collected from borrowers after default, the restriction pushes lenders to collect more in (pre-default) payments. The shift in the timing of cash flow to the lender may have consequences for borrowers. Examining loan outcomes, we find that default rates do not vary with usury law when lenders can seek deficiency payments through wage garnishment. However, in line with borrowers not facing the full costs of their financial actions, wage garnishment laws are associated with higher default rates.

Consumer protection laws impact some dimensions of the indirect auto financing market, and their consequences are significant. Due to its long-lasting impact on individuals' formal credit scores, auto loan default and repossession can reduce borrowers' access to other forms of consumer credit. Moreover, there is an established link between auto ownership and employment (cf. Raphael et al., 2001), and the loss of a vehicle may reduce borrowers' employment prospects in both the short and long term. Consumer protections continue to evolve, with new regulations on "ability-to-pay" and debt collections now being considered by the CFPB and DOJ (Cioffi and Serratore, 2021*b*,*a*; CFPB, 2023, 2022). These changes present new opportunities for researchers.

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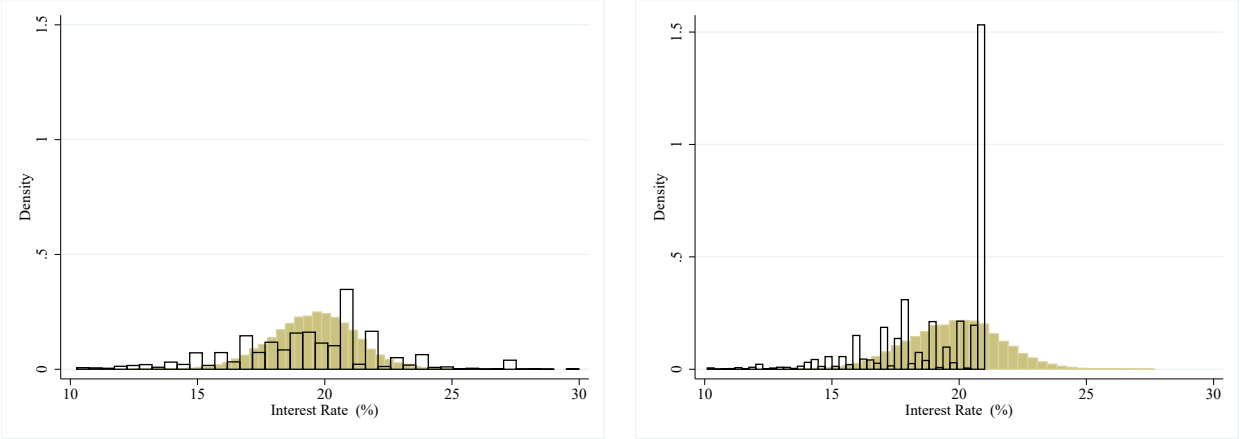
Figure 1. This map describes wage garnishment and usury laws by U.S. state. Each state is labeled with the maximum allowable interest rate on auto loans; where we report a range, the maximum rate varies by vehicle model year and value. The seven states shaded in grey have laws that prohibit or severely restrict post-default wage garnishment for auto loans; see Appendix Table A1 for more detail on these state laws.



(a) Arizona **(b)** Colorado

Figure 2. These figures present histograms of actual and predicted interest rates, denoted in %. Figure (a) depicts the distributions for Arizona, which does not have a usury limit; Figure (b) depicts the distributions for Colorado, where the usury limit is 21% on auto loans. The shaded histogram is the distribution of borrowers' predicted interest rate. Predicted interest rates for all loans are generated using coefficient estimates from a regression of the actual interest rate of loans in states without usury limits against the borrower- and loan-specific characteristics in Table 1 and month-year fixed effects; this measure of creditworthiness is described in Section 3.1. The unshaded histogram depicts the distribution of the interest rate that borrowers actually paid.

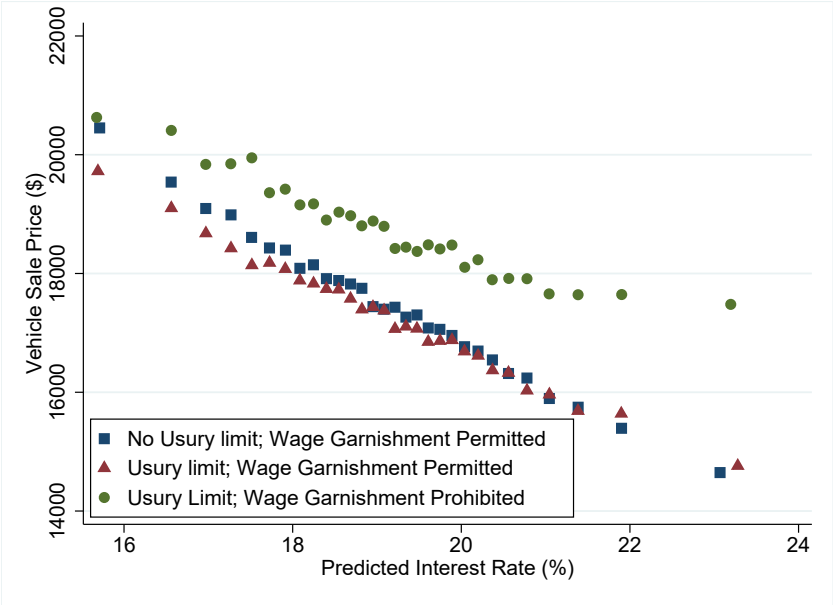


Figure 3. This figure presents a binned scatter plot of vehicle sale price ($) and predicted interest rate (%), separating states with and without usury limit that allow wage garnishment and states with usury limits that prohibit wage garnishment. The scatter plot accounts for month-year fixed effects. Predicted interest rates are described in Section 3.1. States without usury limits are plotted as blue squares; states with usury limits that allow wage garnishment are plotted as red triangles; states with usury limits that prohibit wage garnishment are plotted as green circles.

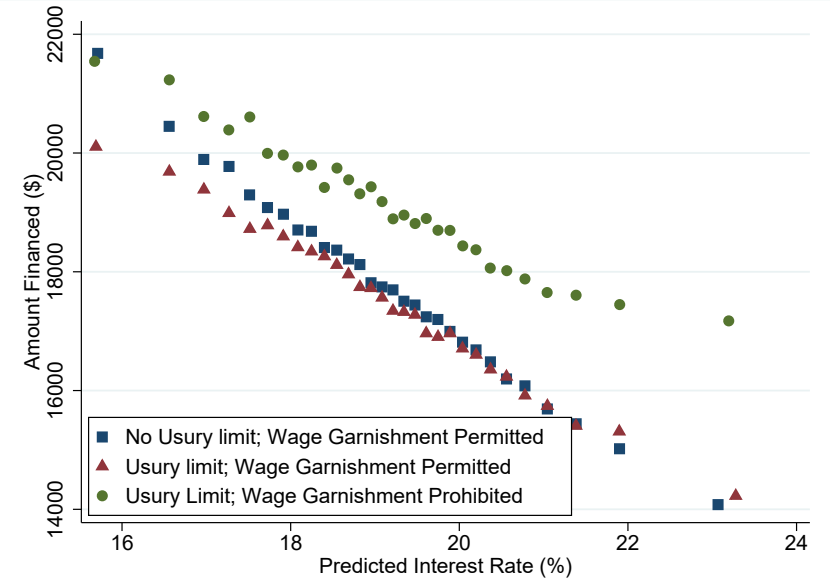


Figure 4. This figure presents a binned scatter plot of the total amount financed ($) and predicted interest rate (%), separating states with and without usury limits that allow wage garnishment and states with usury limits that prohibit wage garnishment. The scatter plot accounts for month-year fixed effects. Predicted interest rates are described in Section 3.1. States without usury limits are plotted as blue squares; states with usury limits that allow wage garnishment are plotted as red triangles; states with usury limits that prohibit wage garnishment are plotted as green circles.

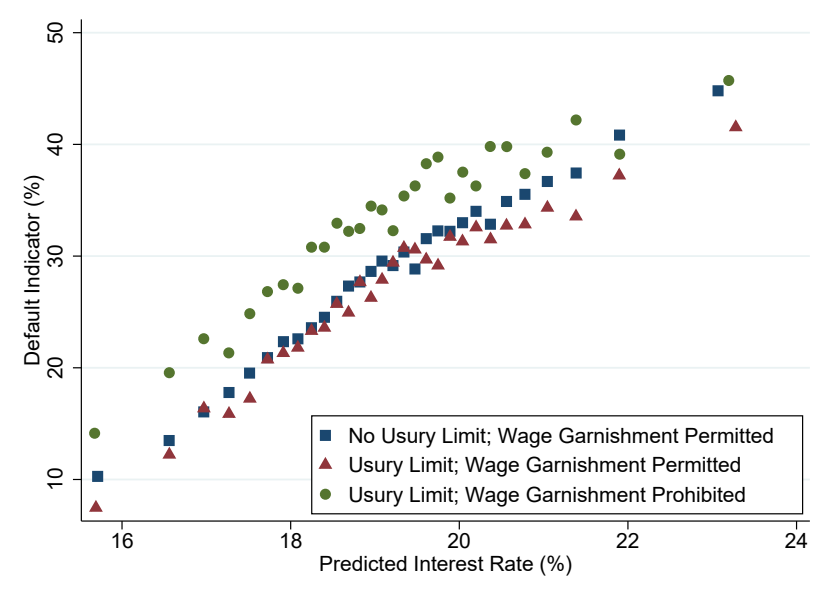


Figure 5. This figure presents a binned scatter plot of the percent of loans that default and predicted interest rate (%), separating states with and without usury limits that allow wage garnishment and states with usury limits that prohibit wage garnishment. The scatter plot accounts for month-year fixed effects. Predicted interest rates are described in Section 3.1. States without usury limits are plotted as blue squares; states with usury limits that allow wage garnishment are plotted as red triangles; states with usury limits that prohibit wage garnishment are plotted as green circles.

Table 1. Summary Statistics

Panel A. Auto loans

Number of auto loans	260,286
Number of dealerships	4,284
Number of ZIP codes	2,043

Panel B. Buyer, loan, and vehicle characteristics

	Loans from states without usury laws & allow wage garnishment		Loans from states with usury laws & allow wage garnishment		Loans from states with usury laws & prohibit wage garnishment	
	N = 151,853		N=69,328		N=39,105	
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.
Buyer						
Credit score	530.37	50.73	528.20	49.34	533.45	46.98
Prior Chapter 7 bankruptcy (%)	24.62	43.08	28.64	45.21	8.68	28.15
Prior Chapter 13 bankruptcy (%)	7.83	26.86	8.80	28.32	15.16	35.86
Homeownership (%)	4.97	21.74	4.93	21.65	11.74	32.19
Monthly income ($)	4,323.90	1,841.90	4,457.30	1,946.10	4,673.40	1,979.00
Vehicle						
Vehicle wholesale value ($)	13,827.00	4,281.90	13,653.00	4,066.60	15,069.00	4,237.80
Sale Price ($)	17,435.00	4,546.00	17,297.00	4,299.70	18,755.00	4,344.10
Loan						
Initial principal ($)	17,718.00	4,615.90	17,555.00	4,307.70	19,088.00	4,322.20
Down payment ($, cash and/or positive equity)	994.49	1,371.60	900.62	1,208.70	1,029.10	1,264.40
Negative equity on trade-in (%)	7.51	26.35	4.61	20.98	6.19	24.10
Negative equity on trade-in ($, cond.)	3,194.00	2,316.60	3,126.70	2,082.20	3,250.70	2,245.00
Down payment ($ cond. on neg equity)	1,327.10	1,522.90	1,108.30	1,352.90	1,117.10	1,460.90
APR (%)	19.11	2.69	19.12	2.14	18.04	1.71
Term (months)	68.78	5.67	68.74	5.66	69.69	4.71
Monthly payment ($)	411.92	112.49	407.88	112.42	427.47	114.58
Loan discount to lender ($)	630.05	373.56	649.57	386.27	807.98	449.04

Table 1. Summary Statistics – *continued*

	Loans from states without usury laws & allow wage garnishment		Loans from states with usury laws & allow wage garnishment		Loans from states with usury laws & prohibit wage garnishment	
Panel B: Buyer, loan, and vehicle characteristics – continued						
	N = 151,853		N=69,328		N=39,105	
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.
Gap insurance purchased (%)	50.09	50.00	50.44	50.00	51.76	49.97
Gap insurance ($)	591.84	154.83	508.28	184.19	505.95	179.61
Service contract purchased (%)	43.33	49.55	44.55	49.70	52.35	49.95
Service contract ($)	1,655.40	474.32	1,681.50	495.27	1,643.40	471.39
Life & disability insurance purchased (%)	2.29	14.95	0.95	9.72	3.89	19.34
Life & disability insurance purchased ($)	1,055.60	647.02	1,036.00	683.48	972.47	613.99
Panel C: Loan outcomes						
Default within full term (%)	27.84	44.82	25.72	43.71	35.57	47.87
Age of loan at default (conditional, months)	31.69	17.55	31.26	17.25	33.01	18.36
Loan balance at default (conditional, $)	13,079.00	5,974.60	12,729.00	5,921.40	13,471.00	6,290.50
Resale value net recovery cost (conditional, $)	3,493.00	3,680.00	3,314.00	3,614.70	3,792.00	3,737.80
Proceeds from collection (conditional, $)	1,653.80	3,500.40	1,540.30	3,351.60	597.27	2,062.00

This table reports summary statistics for the main sample of subprime auto loans from states without usury laws that allow wage garnishment, states with usury laws that allow wage garnishment, and states with usury laws that prohibit wage garnishment after default. Panel A describes the main sample, Panel B reports means and standard deviations for borrower, loan and vehicle characteristics, and Panel C reports means and standard deviations for loan outcomes. Data were provided by an indirect auto financing firm.

Table 2. Actual and Predicted Interest Rates

Dependent variable: Actual interest rate (%)	
Predicted APR	0.944***
	(0.011)
Predict APR above State Usury Limit	8.421***
	(0.884)
Predicted APR × Above State Usury Limit	-0.502***
	(0.044)
Adjusted R^2	0.42
No. of observations	260,256

This table summarizes results from the regression of the actual loan interest rate on the predicted interest rate measures, an indicator for whether the predicted APR is above the usury limit in the state in which the vehicle was purchased, and their interaction. Predicted interest rates for all loans are generated using coefficient estimates from a regression that is described in Section 3.1 and reported in Appendix Table A6. The regression includes fixed effects for the month-year of origination. Standard errors, clustered at the dealership level and reported in parentheses, are obtained through 500 replications of a bootstrapping procedure that accounts for the generated regressor. To report significance, we assume that the corrected errors are normally distributed. *** indicates statistical significance at the 1% level.

Table 3. Vehicle Sale Price & Add-ons

Dependent variable:	Vehicle sale price ($)			Total price of add-ons
	(1)	(2)	(3)	(4)
2nd quintile Predicted APR	-88.988**	-92.624**	-90.125**	-207.781***
	(44.290)	(45.600)	(44.821)	(13.185)
3rd quintile Predicted APR	-197.851***	-204.005***	-199.267***	-377.337***
	(52.545)	(53.325)	(51.560)	(18.222)
4th quintile Predicted APR	-294.822***	-307.801***	-301.519***	-561.737***
	(62.488)	(63.119)	(62.461)	(23.794)
Top quintile Predicted APR	-441.317***	-479.190***	-472.688***	-824.911***
	(57.077)	(57.937)	(57.293)	(37.384)
Usury law	-20.964	-149.167	-144.396	-117.633**
	(88.749)	(93.393)	(87.793)	(58.669)
Usury law × 2nd quintile Predicted APR	-1.049	37.076	27.777	57.250**
	(49.355)	(46.916)	(47.619)	(22.942)
Usury law × 3rd quintile Predicted APR	-10.879	47.298	38.846	69.952**
	(57.502)	(52.737)	(54.029)	(32.373)
Usury law × 4th quintile Predicted APR	27.574	58.305	49.844	99.844**
	(68.137)	(68.461)	(69.429)	(38.766)
Usury law × Top quintile Predicted APR	109.289	131.907	125.585	143.917***
	(74.318)	(82.871)	(80.974)	(45.953)
Wage Garnishment Prohibition		371.886***	370.123***	62.170
		(140.080)	(140.831)	(76.578)
Wage Garnishment law × 2nd quintile Predicted APR		-79.483	-79.545	116.029***
		(68.819)	(71.529)	(33.090)
Wage Garnishment law × 3rd quintile Predicted APR		-155.441*	-153.041*	240.913***
		(89.153)	(90.393)	(43.356)
Wage Garnishment law × 4th quintile Predicted APR		-118.190	-112.475	297.738***
		(107.608)	(110.853)	(54.534)
Wage Garnishment law × Top quintile Predicted APR		-110.643	-102.795	219.384***
		(123.097)	(119.432)	(59.020)
Fixed Effects:				
Month-Year	X	X		X
Vehicle Type-Month-Year			X	
New vs. Used Vehicle	X	X	X	X
Vehicle Wholesale Value ($)	X	X	X	X
Adjusted R^2	0.85	0.85	0.85	0.08
No. of observations	260,256	260,256	260,244	260,256

This table summarizes results from the regression of the vehicle sale price (columns 1–3) or the total value of add-ons (column 4) on the predicted interest rate measures, an indicator for states with usury laws, an indicator for states prohibiting wage garnishment, and their interactions. Predicted interest rates for all loans are generated using coefficient estimates from a regression that is described in Section 3.1 and reported in Appendix Table A6. Regressions include fixed effects for the month-year of origination or the vehicle type (SUV, sedan, truck,etc.) interacted with the month-year fixed effects, as well as an indicator for a new vehicle and the vehicle's wholesale value at origination. Standard errors, clustered at the dealership level level and reported in parentheses, are obtained through 500 replications of a bootstrapping procedure that accounts for the generated regressor. To report significance, we assume that the corrected errors are normally distributed. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 4. Loan Terms

Dependent variable:	Initial principal ($) (1)	Down payment ($) (2)	Monthly payment ($) (3)	Loan term (months) (4)
2nd quintile Predicted APR	-313.832***	-64.738*	9.580***	-0.308***
	(39.765)	(36.272)	(1.080)	(0.055)
3rd quintile Predicted APR	-693.196***	0.906	10.583***	-0.709***
	(49.775)	(46.790)	(1.123)	(0.126)
4th quintile Predicted APR	-1057.913***	56.272	11.104***	-1.413***
	(51.360)	(64.212)	(1.155)	(0.155)
Top quintile Predicted APR	-1651.015***	215.493**	11.299***	-3.932***
	(74.502)	(83.664)	(1.179)	(0.397)
Usury law	-301.359***	-32.314	-3.924**	-0.001
	(100.093)	(49.702)	(1.764)	(0.111)
Usury law × 2nd quintile Predicted APR	151.461***	-9.278	0.080	0.027
	(56.977)	(33.293)	(1.639)	(0.076)
Usury law × 3rd quintile Predicted APR	182.400***	0.461	-0.390	0.015
	(66.880)	(37.142)	(1.596)	(0.132)
Usury law × 4th quintile Predicted APR	192.215***	38.379	-0.554	-0.222
	(71.607)	(47.281)	(1.708)	(0.156)
Usury law × Top quintile Predicted APR	317.139***	39.359	0.922	-0.380
	(86.126)	(55.465)	(1.893)	(0.246)
Wage Garnishment Prohibition	630.624***	-160.071**	6.368**	-0.010
	(141.586)	(72.959)	(2.603)	(0.168)
Wage Garnishment law × 2nd quintile Predicted APR	-131.835*	117.064***	-6.129***	0.195**
	(73.934)	(45.046)	(2.233)	(0.090)
Wage Garnishment law × 3rd quintile Predicted APR	-78.427	121.627**	-4.459	0.339**
	(90.584)	(52.436)	(2.917)	(0.133)
Wage Garnishment law × 4th quintile Predicted APR	33.006	76.589	-9.151***	1.024***
	(104.097)	(56.354)	(2.705)	(0.197)
Wage Garnishment law × Top quintile Predicted APR	-21.573	37.085	-16.213***	2.297***
	(124.198)	(61.981)	(2.612)	(0.254)
Fixed Effects:				
Month-Year	X	X	X	X
New vs. Used Vehicle	X	X	X	X
Vehicle Wholesale Value ($)	X	X	X	X
Adjusted R^2	0.78	0.08	0.48	0.21
No. of observations	243,233	243,233	243,233	243,233

This table summarizes results from regressions of initial principal (column 1), down payment (column 2), monthly payment (column 3) and loan term (column 4) on the predicted interest rate measures, an indicator for states with usury laws, an indicator for states prohibiting wage garnishment, and their interactions. Predicted interest rates for all loans are generated using coefficient estimates from a regression that is described in Section 3.1 and reported in Appendix Table A6. The sample excludes loans where the borrower traded in a vehicle with negative equity. All specifications include fixed effects for the month-year of origination, an indicator for whether the vehicle is new (vs. used), and the vehicle's wholesale value at origination. Standard errors, clustered at the dealership level and reported in parentheses, are obtained through 500 replications of a bootstrapping procedure that accounts for the generated regressor. To report significance, we assume that the corrected errors are normally distributed. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 5. Default Within 2 Years, 3 Years, and the Life of the Loan

Dependent variable:	Default within		
	24 months	36 months	full term
	(1)	(2)	(3)
2nd quintile Predicted APR	0.034***	0.058***	0.093***
	(0.002)	(0.004)	(0.005)
3rd quintile Predicted APR	0.056***	0.091***	0.147***
	(0.003)	(0.005)	(0.006)
4th quintile Predicted APR	0.080***	0.128***	0.187***
	(0.003)	(0.004)	(0.007)
Top quintile Predicted APR	0.103***	0.155***	0.192***
	(0.004)	(0.007)	(0.011)
Usury law	-0.008**	-0.016***	-0.032***
	(0.003)	(0.004)	(0.008)
Usury law × 2nd quintile Predicted APR	-0.006	-0.009	0.003
	(0.004)	(0.005)	(0.011)
Usury law × 3rd quintile Predicted APR	-0.001	0.008	0.034***
	(0.005)	(0.007)	(0.011)
Usury law × 4th quintile Predicted APR	-0.007	-0.003	0.004
	(0.005)	(0.006)	(0.011)
Usury law × Top quintile Predicted APR	-0.002	0.006	0.023
	(0.006)	(0.009)	(0.016)
Wage Garnishment Prohibition	0.029***	0.049***	0.096***
	(0.005)	(0.009)	(0.013)
Wage Garnishment law × 2nd quintile Predicted APR	0.001	0.005	0.004
	(0.006)	(0.008)	(0.012)
Wage Garnishment law × 3rd quintile Predicted APR	-0.004	-0.017*	-0.043***
	(0.007)	(0.009)	(0.012)
Wage Garnishment law × 4th quintile Predicted APR	-0.01	-0.017	-0.011
	(0.007)	(0.010)	(0.014)
Wage Garnishment law × Top quintile Predicted APR	-0.004	-0.015	-0.015
	(0.008)	(0.011)	(0.017)
Fixed Effects:			
Month-Year	X	X	X
New vs. Used Vehicle	X	X	X
Gap Insurance	X	X	X
Vehicle Wholesale Value ($)	X	X	X
Adjusted R^2	0.02	0.03	0.05
No. of observations	244,438	223,565	156,938

This table summarizes results from regressions of an indicator for default in the first 24 months (column 1), first 36 months (column 2) or over the original loan term (column 3) on predicted interest rate measures, an indicator for states with usury laws, an indicator for states prohibiting wage garnishment, and their interactions, and an indicator for whether gap insurance was purchased for the vehicle financing. All specifications also include fixed effects for the month-year of origination, an indicator for whether the vehicle is new (vs. used), and the vehicle's wholesale value at origination. Predicted interest rates for all loans are generated using coefficient estimates from a regression that is described in Section 3.1 and reported in Appendix Table A6. Standard errors, clustered at the dealership level and reported in parentheses, are obtained through 500 replications of a bootstrapping procedure that accounts for the generated regressor. To report significance, we assume that the corrected errors are normally distributed. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 6. Outstanding Debt at Default

Dependent variable:	Principal balance at default ($) (1)	Net proceeds from repossession ($) (2)	Collections ($) (3)	Balance net recovery and collections ($) (4)
2nd quintile Predicted APR	-37.168	-285.461***	154.053*	-171.175
	(101.693)	(82.020)	(78.995)	(109.924)
3rd quintile Predicted APR	-260.423***	-415.058***	187.015**	-125.869
	(99.296)	(81.191)	(87.065)	(117.043)
4th quintile Predicted APR	-494.127***	-505.924***	108.975	-172.704
	(105.961)	(73.229)	(79.697)	(127.620)
Top quintile Predicted APR	-976.566***	-709.528***	-36.948	-144.419
	(141.302)	(76.714)	(80.367)	(158.651)
Usury law	-371.419*	-76.242	95.275	-341.559**
	(192.814)	(149.138)	(125.188)	(166.689)
Usury law × 2nd quintile Predicted APR	63.387	43.646	137.832	261.827
	(247.968)	(153.569)	(163.808)	(237.612)
Usury law × 3rd quintile Predicted APR	397.372	81.211	90.827	406.625*
	(250.201)	(158.502)	(168.049)	(235.659)
Usury law × 4th quintile Predicted APR	141.394	-55.602	28.388	306.371
	(237.096)	(165.908)	(172.360)	(219.293)
Usury law × Top quintile Predicted APR	224.727	98.152	-15.017	242.982
	(246.932)	(164.946)	(163.278)	(211.846)
Wage Garnishment Prohibition	51.680	-290.780*	-1558.351***	2308.441***
	(233.385)	(163.346)	(124.914)	(204.901)
Wage Garnishment law × 2nd quintile Predicted APR	-150.546	24.391	-413.497***	110.465
	(286.209)	(162.947)	(155.460)	(243.196)
Wage Garnishment law × 3rd quintile Predicted APR	-134.594	231.282	-443.241***	-16.116
	(288.165)	(177.542)	(154.618)	(240.043)
Wage Garnishment law × 4th quintile Predicted APR	188.433	204.253	-295.112*	312.160
	(276.188)	(182.554)	(172.431)	(234.560)
Wage Garnishment law × Top quintile Predicted APR	183.856	177.970	-161.526	122.400
	(288.197)	(183.140)	(162.360)	(236.510)
Fixed Effects:				
Month-Year	X	X	X	X
New vs. Used Vehicle	X	X	X	X
Vehicle Wholesale Value ($)	X	X	X	X
Age of Loan at Default (months)	X	X	X	X
Adjusted R^2	0.49	0.36	0.05	0.16
No. of observations	45,168	42,887	44,966	42,877

This table summarizes results from regressions of the loan balance at default (column 1), the funds recovered through vehicle repossession (column 2), funds recovered through collections (column 3) and the net balance outstanding after repossession and collections (column 4) on predicted interest rate measures, indicators for states with usury laws and wage garnishment prohibitions, and their interactions. All specifications also include fixed effects for the month-year of origination, an indicator for whether the vehicle is new (vs. used), the age of the loan at the time of default, and the vehicle's wholesale value at origination. The sample is restricted to only loans that terminated in default. Predicted interest rates for all loans are generated using coefficient estimates from a regression that is described in Section 3.1 and reported in Appendix Table A6. Standard errors, clustered at the dealership level and reported in parentheses, are obtained through 500 replications of a bootstrapping procedure that accounts for the generated regressor. To report significance, we assume that the corrected errors are normally distributed. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 7. Consumer Costs

Dependent variable:	Consumer costs ($)		
	All loans	Did not default	Defaulted
	(1)	(2)	(3)
2nd quintile Predicted APR	324.712***	424.049***	451.285**
	(87.648)	(105.778)	(228.727)
3rd quintile Predicted APR	99.304	307.013***	288.163
	(92.341)	(105.428)	(235.744)
4th quintile Predicted APR	-359.037***	-28.305	-195.544
	(108.381)	(130.442)	(255.834)
Top quintile Predicted APR	-1283.790***	-985.352***	-869.114***
	(125.012)	(137.100)	(242.348)
Usury law	436.259**	160.154	775.641*
	(180.232)	(193.098)	(417.381)
Usury law × 2nd quintile Predicted APR	-331.502**	-263.474	-205.784
	(160.208)	(182.584)	(456.458)
Usury law × 3rd quintile Predicted APR	-425.929***	-268.794	-689.883
	(161.730)	(171.205)	(508.712)
Usury law × 4th quintile Predicted APR	-250.609	-172.057	-269.872
	(186.057)	(189.689)	(545.473)
Usury law × Top quintile Predicted APR	-308.037	-147.352	-820.332
	(267.022)	(201.022)	(550.026)
Wage Garnishment Prohibition	-62.388	1019.035***	-2944.596***
	(340.043)	(325.335)	(450.884)
Wage Garnishment law × 2nd quintile Predicted APR	-298.840	-2.168	-204.428
	(264.024)	(251.093)	(500.565)
Wage Garnishment law × 3rd quintile Predicted APR	-276.186	-13.357	340.776
	(323.687)	(294.619)	(580.582)
Wage Garnishment law × 4th quintile Predicted APR	-664.410*	-310.032	-185.367
	(348.412)	(324.448)	(644.733)
Wage Garnishment law × Top quintile Predicted APR	-645.846	-234.147	6.199
	(393.933)	(366.084)	(669.877)
Fixed Effects:			
Month-Year	X	X	X
New vs. Used Vehicle	X	X	X
Vehicle Wholesale Value ($)	X	X	X
Adjusted R^2	0.41	0.58	0.19
No. of observations	146,691	107,020	39,671

This table summarizes results from regressions of consumer costs for all loans (column 1), loans that were paid in full (column 2) or loans that terminated in default (column 3) on predicted interest rate measures, indicators for states with usury laws and wage garnishment prohibitions, and their interactions. All specifications include fixed effects for the month-year of origination, an indicator for whether the vehicle is new (vs. used), and the vehicle's wholesale value at origination. Predicted interest rates for all loans are generated using coefficient estimates from a regression that is described in Section 3.1 and reported in Appendix Table A6. Standard errors, clustered at the dealership level and reported in parentheses, are obtained through 500 replications of a bootstrapping procedure that accounts for the generated regressor. To report significance, we assume that the corrected errors are normally distributed. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 8. Bankruptcy and Default

Dependent variable:	Default within		
	24 months	36 months	full term
	(1)	(2)	(3)
Ch. 7 Bankruptcy Prior to Origination	-0.023***	-0.022***	-0.089***
	(0.002)	(0.003)	(0.004)
Fixed Effects:			
Month-Year	X	X	X
New vs. Used Vehicle	X	X	X
Gap Insurance	X	X	X
Vehicle Wholesale Value ($)	X	X	X
Borrower Controls	X	X	X
Adjusted R^2	0.02	0.04	0.06
No. of observations	126,507	116,722	81,059

This table summarizes results from regressions of an indicator for default in the first 24 months (column 1), first 36 months (column 2), and over the full loan term (column 3) on an indicator for whether the borrower declared Chapter 7 bankruptcy in the previous seven years, examining only loans from states without usury or wage garnishment prohibition laws. All specifications also include fixed effects for the month-year of origination, an indicator for whether the vehicle is new (vs. used), and the vehicle's wholesale value at origination, as well the borrower controls described in Section 3.1. Standard errors, clustered at the dealership level, are reported in parentheses. *** indicates statistical significance at 1% level.

Appendix

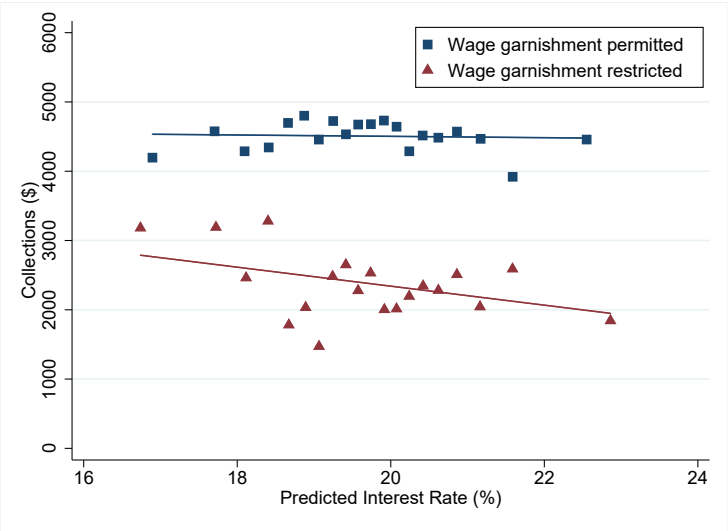


Figure A1. This figure presents a binned scatter plot of amount recovered through collections ($) relative to predicted interest rate (%), separating states that allow (blue squares) or restrict (red triangles) wage garnishment. The scatter plot accounts for month-year fixed effects and vehicle wholesale value at origination. Predicted interest rates are described in Section 3.1.

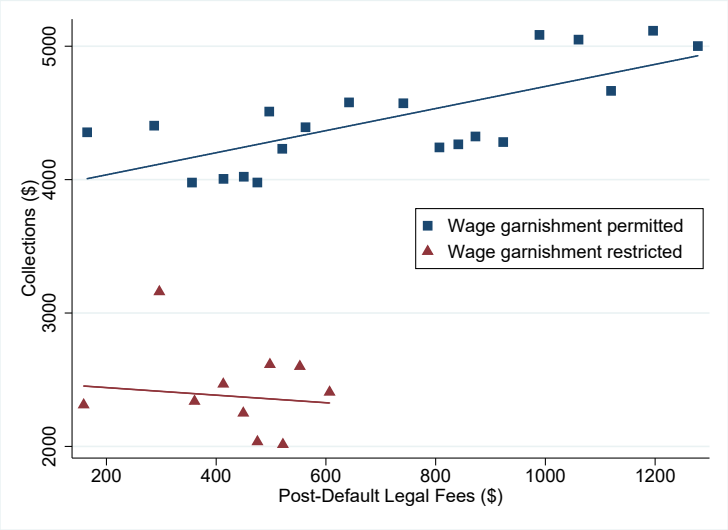


Figure A2. This figure presents a binned scatter plot of amount recovered through collections ($) relative to post-default legal fees ($), separating states that allow (blue squares) or restrict (red triangles) wage garnishment. The scatter plot accounts for month-year fixed effects and vehicle wholesale value at origination.

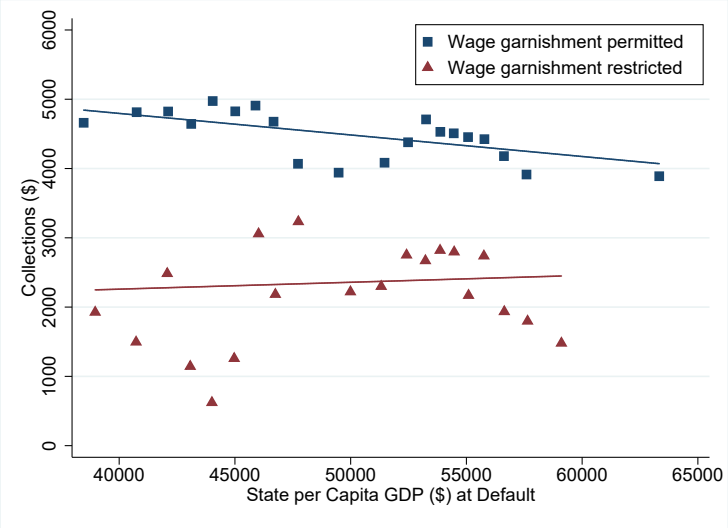


Figure A3. This figure presents a binned scatter plot of amount recovered through collections ($) relative to State GDP per capita ($) at the time of default, separating states that allow (blue squares) or restrict (red triangles) wage garnishment. The scatter plot accounts for month-year fixed effects and vehicle wholesale value at origination.

Table A1. States with Legal Restrictions on Wage Garnishment

U.S. State	Wage garnishment	Notes
Florida	Severely restricted	Florida Statute (Title VI, Chapter 77) outlines very strict procedures for garnishment. For example, the head of the family is exempt from wage garnishment.
Massachusetts	Severely restricted	Massachusetts law (Part III, Title IV, Chapter 246, Section 28 and 28A) restrict wage garnishment on the first $2,500 of disposable income and first $2,5000 in a borrower's bank account, and restricts vehicle repossession in some cases.
New Hampshire	Severely restricted	New Hampshire law (Title XXIII, Chapter 282-A, Section 152-A) has no provision for ongoing garnishment.
North Carolina	Not permitted	North Carolina (General Statute, Article 31) is interpreted to permit wage garnishment only for unpaid taxes, student loans, child support, alimony, and some ambulance service.
Pennsylvania	Not permitted	Pennsylvania law (Title 42, Section 8127) permits wage garnishment only for unpaid taxes and child support.
South Carolina	Not permitted	South Carolina law (Title 37, Chapter 5, Section 37-5-104) prohibits wage garnishment for unpaid consumer credit sale, a consumer lease, a consumer loan, or a consumer rental-purchase agreement, regardless of where it was made.
Texas	Not permitted	Texas law (Title 3, Chapter 63) prohibits wage garnishment except for unpaid child support.

Table A2. Historical and political patterns of wage garnishment and usury laws

Dependent Variable:	Wage Garnishment Prohibition (Ind)		Usury law (Ind)			Usury rate (%, current)
	(1)	(2)	(3)	(4)	(5)	(6)
Usury law in 1950 (Ind)	-0.169		-0.299			
	(0.142)		(0.199)			
Political ideology score		-0.002		-0.001		
		(0.004)		(0.006)		
Usury rate (%, 1950)					0.007	-0.152
					(0.008)	(0.187)
R^2	0.03	0.01	0.05	0.01	0.01	0.03
No. of observations	50	50	50	50	48	22

This table summarizes the results of regressions in which the dependent variables are, respectively, an indicator of whether a state prohibits or severely restricts wage garnishment (columns 1–2), has a usury law (columns 3–5), and the usury rate (current) as described in Table A5 (column 6). The "political ideology score" is from Pew Research Center and measures the alignment of individuals' liberal or conservative views across various political dimensions dating back to 1994, each coded with -1 for liberal, +1 for conservative, and 0 for other responses. "Usury law in 1950 (Ind)" is an indicator for whether a state had usury laws in 1950, and "Usury rate in 1950" is the maximum legal interest rate for auto loans in 1950. Column 6 includes only states with that currently have a usury limit.

Table A3. Economics Conditions and Patterns in Wage Garnishment Laws

Dependent Variable:	Wage Garnishment Prohibition (Ind)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Median Household Income (1985)	0.001									
	(0.005)									
Growth in Median Income		-0.001								
1985 to 2000 (%)		(0.004)								
Change in Poverty Rate			0.027							
1985 to 2000 (%)			(0.032)							
Consumer Tax Burden (2012)				-0.036						
				(0.038)						
Marginal Tax Rate (% in 1980, for					-0.018					
income of $10,000)					(0.022)					
Growth in GDP per Capita						-0.003				
2000 to 2010 (%)						(0.005)				
Growth in Home Prices							0.001			
1991 to 2023 (%)							(0.001)			
Non-Recourse Mortgage (Ind)								-0.063		
								(0.121)		
Legal Ban on Payday Lending (Ind)									0.123	
									(0.113)	
Effective Ban on Payday Lending (Ind)										0.029
										(0.100)
R^2	0.01	0.01	0.02	0.02	0.01	0.07	0.01	0.01	0.02	0.01
No. of observations	50	50	50	50	50	50	50	50	50	50

This table summarizes results from regressions where the dependent variable is an indicator for whether a state has a law prohibiting wage garnishment. Median household income and poverty rate data are from the Current Population Survey of U.S. Census Bureau; the consumer tax burden is from the Tax Foundation (available online at `https://taxfoundation.org/data/all/state/state-local-tax-burden-rankings-fy-2012/` as of November 2023); the marginal tax rate is from Feenberg and Rosen (1986); state GDP is from the U.S. Bureau of Economic Analysis and the population values used to calculate per capita GDP are midyear estimates from the U.S. Census Bureau; the indicator from non-recourse mortgage is based on data from Ghent and Kudlyak (2011); and the indicators for bans on payday lending as based on data from Justia (`regulations.justia.com`) and NCSL (`ncsl.org/financial-services/payday-lending-state-statutes`).

Table A4. Economics Conditions and Patterns in Usury Laws

Dependent Variable:	Usury Laws (Ind)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Median Household Income (1985)	0.003									
	(0.007)									
Growth in Median Income		-0.010								
1985 to 2000 (%)		(0.006)								
Change in Poverty Rate			-0.020							
1985 to 2000 (%)			(0.045)							
Consumer Tax Burden (2012)				-0.011						
				(0.053)						
Marginal Tax Rate (% in 1980, for					0.006					
income of $10,000)					(0.032)					
Growth in GDP per Capita						0.009				
2000 to 2010 (%)						(0.007)				
Growth in Home Prices							-0.001			
1991 to 2023 (%)							(0.001)			
Non-Recourse Mortgage (Ind)								-0.186		
								(0.169)		
Legal Ban on Payday Lending (Ind)									0.125	
									(0.160)	
Effective Ban on Payday Lending (Ind)										0.112
										(0.141)
R^2	0.01	0.05	0.01	0.01	0.01	0.03	0.03	0.02	0.01	0.01
No. of observations	50	50	50	50	50	50	50	50	50	50

This table summarizes results from regressions where the dependent variable is an indicator for whether a state has a usury law. Median household income and poverty rate data are from the Current Population Survey of U.S. Census Bureau; the consumer tax burden is from the Tax Foundation (available online at `taxfoundation.org/data/all/state/state-local-tax-burden-rankings-fy-2012/` as of November 2023); the marginal tax rate is from Feenberg and Rosen (1986); state GDP is from the U.S. Bureau of Economic Analysis and the population values used to calculate per capita GDP are midyear estimates from the U.S. Census Bureau; the indicator from non-recourse mortgage is based on data from Ghent and Kudlyak (2011); and the indicators for bans on payday lending as based on data from Justia (`regulations.justia.com`) and NCSL (`ncsl.org/financial-services/payday-lending-state-statutes`).

Table A5. Variable Definitions

Variable names	Definition
Buyer	
Credit score	Mean of borrower's credit scores from all queried credit-reporting agencies. For joint applications, this includes scores for both borrowers. Assigned a value of 0 if no credit score is available.
Prior Chapter 7 bankruptcy	Indicator for a Chapter 7 bankruptcy in the seven years prior to the loan application.
Prior Chapter 13 bankruptcy	Indicator for a Chapter 13 bankruptcy in the seven years prior to the loan application.
Homeownership	Indicator for borrower's homeownership status at origination.
Monthly income	Borrower's gross monthly income as calculated during loan underwriting, measured in $.
Loan	
Down payment	Total down payment (cash + equity), measured in $.
Negative equity on trade-in (Ind)	Indicator for negative equity on the trade-in vehicle.
Negative equity on trade-in	Negative equity on trade-in vehicle, measured in $.
Initial principal	Original amount financed, measured in $.
APR (actual interest rate)	Original interest rate, measured in %.
Term	Original term of the contract, measured in months.
Monthly payment	Monthly payment, measured in $.
Gap insurance (Ind)	Indicator for the purchase of guaranteed auto protection (GAP) insurance policy.
Gap insurance	Amount financed for GAP insurance policy, measured in $.
Life & disability insurance (Ind)	Indicator for the purchase of credit, life and disability insurance policy.
Life & disability insurance	Amount financed for credit, life and disability insurance policy, measured in $.
Service contract (Ind)	Indicator for the purchase of service contract.
Service contract	Amount financed for the purchase of service contract, measured in $.
Loan discount to lender	Total of discount and fees charged to the dealer by the lender during the loan purchase, measured in $.
Vehicle	
Vehicle wholesale value	Vehicle value at origination, measured in $.
Default	Indicator for termination of the loan due to default (i.e., failure to make payments).
Default 24	Indicator for termination of the loan due to default within 24 months (i.e., failure to make payments).
Default 36	Indicator for termination of the loan due to default within 36 months (i.e., failure to make payments).
Age of loan at default	Months between origination and loan termination due to default (i.e., number of payments made).
Loan balance at default	Outstanding loan balance at default calculated as the initial amount financed minus payments made against the loan, measured in $.
Resale value net recovery costs	Proceeds from vehicle liquidation minus the costs of recovery and resale, measured in $.
Proceeds from collection	Funds recovered through collections (e.g., wage garnishment), measured in $.

This table reports definitions for the variables used in the analysis. Data were obtained from an indirect auto financing firm.

Table A6. Predicting Borrowers' Interest Rate

Dependent variable: Actual interest rate (%)	
Loan discount to lender ($)	0.00244***
	(0.00002)
Loan term length	-0.07158***
	(0.00094)
Chapter 7 bankruptcy (Ind)	-1.18976***
	(0.01396)
Chapter 13 bankruptcy (Ind)	-1.07229***
	(0.02062)
Credit score	-0.01810***
	(0.00011)
Monthly Income ($)	-0.00015***
	(0.00000)
Homeownership (Ind)	-0.34061***
	(0.02430)
Down payment ($)	0.00002***
	(0.00000)
Negative equity ($)	0.00014***
	(0.00001)
Negative equity Missing (Ind)	0.06657**
	(0.03316)
Fixed Effects: Month-Year.	X
Adjusted R^2	0.43
No. of observations	151,853

This table summarizes results from the regression of the actual loan interest rate on borrower characteristics, described in Table 1 and defined in Table A5, using only loans from states without usury limits or wage garnishment restrictions. The regression includes fixed effects for the month-year of loan origination. Robust Standard errors are reported in parentheses.

Table A7. Vehicle Sale Price with Vehicle Wholesale Value Interactions

Dependent variable: Vehicle sale price ($)	
2nd quintile Predicted APR	-233.112***
	(70.663)
3rd quintile Predicted APR	-446.905***
	(69.963)
4th quintile Predicted APR	-609.683***
	(75.545)
Top quintile Predicted APR	-1075.331***
	(82.669)
Vehicle Wholesale Value	0.977***
	(0.007)
2nd quintile Predicted APR × Vehicle Wholesale Value	0.010
	(0.006)
3rd quintile Predicted APR × Vehicle Wholesale Value	0.016**
	(0.007)
4th quintile Predicted APR × Vehicle Wholesale Value	0.021***
	(0.006)
Top quintile Predicted APR × Vehicle Wholesale Value	0.041***
	(0.008)
Usury law indicator	-147.089
	(91.646)
Usury law × 2nd quintile Predicted APR	25.948
	(48.446)
Usury law × 3rd quintile Predicted APR	60.969
	(55.242)
Usury law × 4th quintile Predicted APR	42.082
	(66.875)
Usury law × Top quintile Predicted APR	131.315
	(86.131)
Wage Garnishment Prohibition	371.985***
	(136.710)
Wage Garnishment law × 2nd quintile Predicted APR	-98.479
	(72.062)
Wage Garnishment law × 3rd quintile Predicted APR	-163.844*
	(90.637)
Wage Garnishment law × 4th quintile Predicted APR	-146.422
	(105.999)
Wage Garnishment law × Top quintile Predicted APR	-150.226
	(122.789)
Fixed Effects:	
Month-Year	X
New vs. Used Vehicle	X
Adjusted R^2	0.85
No. of observations	260,256

This table summarizes results from the regression of the vehicle sale price on the predicted interest rate measures, an indicator for states with usury laws, an indicator for states prohibiting wage garnishment, and their interactions, the vehicle's wholesale value at origination and its interaction with the predicted interest rate measures. Predicted interest rates for all loans are generated using coefficient estimates from a regression that is described in Section 3.1 and reported in Appendix Table A6. Regressions include fixed effects for the month-year of origination and an indicator for a new vehicle. Standard errors, clustered at the dealership level level and reported in parentheses, are obtained through 500 replications of a bootstrapping procedure that accounts for the generated regressor. To report significance, we assume that the corrected errors are normally distributed. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.