Personal Bankruptcy and the Accumulation of Shadow Debt*

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Abstract

Compiling new liability-level data from the balance sheets of personal bankruptcy filers, we document that a sizable share of reported liabilities are "shadow debt," debt not reported to credit bureaus that often arises from the non-payment of goods and services. We use this new data to evaluate how debtor cash flows affect when consumers file for bankruptcy and how much debt they have at bankruptcy. We find that filers respond to a quasi-exogenous $100 increase in monthly cash flows by delaying filing by an average of one month and by increasing unsecured indebtedness by $4,000 in the months preceding filing. A large share of the additional debt incurred by delaying filers is shadow debt, and our effects are concentrated among filers without employment, health, or marriage shocks.

Keywords: personal bankruptcy, unsecured debt, shadow debt

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1 Introduction

Both the rate of personal bankruptcy filing and the corresponding amount of debt discharged are substantial in the United States. Over 10% of U.S. households have filed for bankruptcy at least once (Stavins, 2000 and Keys, 2018), and an equivalent of $832 per U.S. adult is discharged through personal bankruptcy each year.[1] For borrowers experiencing financial distress, the option to discharge or reschedule debt in bankruptcy offers substantial benefits, including higher future earnings, lower mortality rates, and the ability to escape potentially ruinous financial shocks.[2] However, the prevalence of bankruptcy also increases the cost of credit for consumers (Gross et al., 2021). While corporations only pay an extra 23 basis points for unsecured credit relative to secured loans (Luck and Santos, 2021), the secured-unsecured spread in consumer credit is at least an order of magnitude larger.[3] The large secured-unsecured spread in consumer credit likely stems at least in part from high default costs to unsecured lenders, with bankruptcy playing a fundamental role.

In this paper, we study key factors that affect the amount of debt discharged in bankruptcy. Conditional on the decision to file, we first evaluate how monthly cash flow affects when a debtor chooses to file by isolating exogenous reductions in severely distressed borrowers' wage garnishment. Second, we evaluate how filing delays affect the accumulation of liabilities prior to bankruptcy. Despite the magnitude of debt that is discharged through personal bankruptcy, little is known about the drivers and dynamics of nearly bankrupt borrowers' balance sheets, including how borrower indebtedness responds to a shock to the urgency with which borrowers file for bankruptcy.

Exogenous increases to consumer cash flows could accelerate bankruptcy if liquidity constraints prevent some individuals from filing (Gross et al., 2014). At the same time, increased liquidity could provide financial flexibility that allows some filers to delay entering bankruptcy for a period of time. Similarly, it is theoretically ambiguous whether delaying filers will increase or decrease debt. On one hand, borrowers facing bankruptcy could incur additional debt before filing, especially unsecured debt that is likely to be discharged. Incurring more debt while delaying bankruptcy is possible both because many "accidental creditors," such as health-care providers and utility companies, do not

[1] US Courts (2019) estimates that U.S. households discharged $2.03 trillion in debt from 2009-2018 (2.03 trillion/10 years/242.8 million adults in 2015 = $832 per adult).

[2] See, for example, Dobbie and Song (2015), Mahoney (2015), and Dobbie, Goldsmith-Pinkham, and Yang (2017).

[3] For example, holding fixed borrower credit score, loan maturity and loan amount, the current spread on Bankrate.com between the interest rates on an unsecured personal loan and a secured auto loan is about 300 basis points.

observe a borrowers' likelihood of filing for bankruptcy and also because incumbent lenders have only weak instruments to prevent additional debt origination by distressed borrowers. Distressed debtors could accumulate additional debt somewhat passively—through the nonpayment of debt that finances their usual monthly consumption or by accruing interest or fees—or more intentionally to finance higher consumption. Alternatively, delaying filers may attempt to pay down their existing debt—possibly by pursuing asset sales, identifying new opportunities for income, negotiating with creditors, or using newly available resources to pay down debt.[4] Finally, some borrowers may not adjust their debt levels when given extra time to file; indeed, we show in section 5.6 that a portion of borrowers in our sample do not seem to increase or decrease their indebtedness in response to filing delays.

Our results show that monthly cash-flow increases from persistent wage garnishment shocks spur filing delays and that, on average, delaying filers report significantly more debt in bankruptcy. Our empirical tests focus on the elasticity of indebtedness with respect to filing delays, regardless of whether defaulters are intentionally or unintentionally accumulating additional debt just prior to entering bankruptcy. The richness of our liability-level data allows us to highlight the types of liabilities that respond most sensitively to bankruptcy delays. Finally, a concluding section offers a set of cross-sectional tests that provide suggestive evidence of intentional debt accumulation by a subsample of bankruptcy filers. Combining our findings with Gross et al. (2021), we conclude that, by increasing the amount of debt discharged, filing delays likely increase the cost of credit.

To understand how borrowers manage debt levels prior to bankruptcy, we require detailed microdata on filer balance sheets. Our principal dataset is obtained by downloading the Schedules of Assets and Liabilities and the Statement of Financial Affairs for individual bankruptcy filers from the U.S. Court's Public Access to Court Electronic Records (PACER) websites for the Minnesota, Utah, Florida Northern, and Florida Southern Bankruptcy Courts. Our data consist of borrower-level data from 606,120 personal bankruptcy filings with over 15 million individual debts across these bankruptcy districts between the years 2001-2018. These schedules provide line-by-line descriptions of a filer's itemized real estate assets, personal assets, secured debts, unsecured priority debts, unsecured non-priority debts, monthly income, and monthly expenses.

[4]For example, Calem et al. (2017) find that delaying foreclosures during the great recession resulted in higher cure rates on delinquent credit cards.

After anonymizing, we supplement the bankruptcy data with credit-bureau data for a subset of the bankruptcy filings in an effort to paint the broadest possible picture of the filer's credit profile. Insights from this merged dataset offer an important contribution to our understanding of distressed household balance sheets. Comparing liabilities listed on the credit registry with debt disclosed on bankruptcy filings yields a measure of consumer "shadow debt"—debt held by a borrower that is not observable through credit registries, such as unpaid medical or utility bills, missed rent, or any other debts that do not get reported to credit bureaus.[5] Disclosed debts are verified by a court-appointed trustee, and consumers have every incentive to accurately disclose all of their debts at the time of filing for bankruptcy in order to receive the maximum possible relief from discharge. Accordingly, a comparison of borrower liabilities listed on bankruptcy schedules to those reported to credit bureaus gives an accurate measure of the debt that is missed by estimates of consumer leverage that depend solely on data from credit reports. We find that 7.4% of the total debt disclosed at the time of bankruptcy is not captured on credit reports.[6]

Armed with these data, we develop an empirical strategy to estimate how take home pay influences filing delays and how filing delays impact borrower indebtedness. The amount of time a borrower remains in distress prior to filing for bankruptcy is not random, and several factors could jointly influence time-to-file and debt amounts. To address these endogeneity issues, our identification strategy focuses on the role played by wage garnishing in influencing how long an individual waits to file for bankruptcy.[7] We hypothesize that high levels of wage garnishment nudge borrowers to file for bankruptcy more quickly. To identify exogenous shocks to wage garnishment, we use pre-scheduled federal minimum wage increases. Garnished individuals are allowed to keep at least 30 hours of minimum wage earnings a week for subsistence, although this amount can vary by state (see Carter, 2020 for details). Accordingly, federal minimum wage changes induce quasi-random changes in wage garnishing for lower-wage debtors who earn close to this subsistence threshold. Meanwhile, borrowers who are far above and below the threshold are unaffected by changes to the

[5]Shadow debt is similar to the concept of overdue trade credit in the corporate sector. Trade credit makes up 22.5% of total liabilities for large corporations that enter bankruptcy (Ivashina, Iverson, and Smith, 2016).

[6]As credit bureaus are designed to tabulate the debts that are reported to them, we interpret these results as evidence that the debt of distressed borrowers captured by credit bureaus is an incomplete picture of household liabilities rather than as commentary on the accuracy of credit-bureau data.

[7]Wage garnishing is relatively common for financially distressed workers. In 2013, 7.2% of U.S. workers had their wages garnished (ADP Research Institute, 2014). Prior research has shown a tight connection between wage garnishing and bankruptcy filling (Shuchman & Jantscher, 1972; Lefgren and McIntyre, 2009; Keys et al., 2020).

minimum wage. During our sample period, the federal minimum wage increased three times, on July 24 of 2007, 2008, and 2009, resulting in lower garnishment for particular subsets of borrowers in our sample. Given the timing of the law changes and borrower incomes, minimum wage changes impact garnishment for about 5%-10% of borrowers depending on the sample. Changes to the federal minimum wage allow for within-year comparisons of outcomes between otherwise similar borrowers with identical incomes but different levels of wage garnishing.

First-stage regressions show a strong relationship between changes in wage garnishment and bankruptcy filing delays. To measure filing delays, we construct a *months to file* measure for each borrower, defined as the number of days between a borrower's first 90 day delinquency and the bankruptcy filing date, divided by 30. As garnishable wages decline, months to file increases, but only in the treated income region where changes in minimum wage impact garnishment amounts. Controlling for borrower income, as well as geography and time fixed effects and a host of borrower characteristics, we estimate that $100 lower monthly wage garnishing increases *months to file* by approximately one month, and we find no change in filing timing for filers whose incomes are outside of the treated region.

We then estimate the causal effect of filing delays on debt accumulation prior to bankruptcy using wage garnishment changes as an instrument for *months to file*. We find that an additional delay of one month in filing leads to an average 1 percentage-point increase in the share of total debt that is unsecured. In dollar amounts, our results imply an average increase of approximately $4,000 in unsecured debt for each one-month delay in bankruptcy. We also find that borrowers who delay filing increase their shadow debt in particular. An additional month delay results in an average 1.8 percentage-point increase in the share of total debt that is shadow debt—an average of $7,200 in shadow debt per month of filing delay.[8] This result is consistent with formal unsecured lenders screening out distressed borrowers and shadow-debt lenders (e.g., heath-care providers) not inspecting a credit report as a condition of providing service. Indeed, delaying filers do not increase shadow debt in "formal" credit categories like credit cards, personal loans, and student loans; instead, we find that the increase in shadow debt is concentrated exclusively in the leftover "informal" component of shadow debt.

[8]Though the point estimates suggest that borrowers may increase shadow debt in an attempt to repay some formal unsecured debts, we cannot reject the null hypothesis that the estimated increase in shadow debt is the same as the estimated increase in unsecured debt.

There are several possible threats to the exclusion restriction of our empirical strategy. We discuss these in detail in sections 5.2 and 5.3. In particular, we confront the possibility that changes to the minimum wage or to wage garnishment for treated borrowers might influence debt levels directly or the bankruptcy decision itself rather than only affecting the timing of filing. For example, our estimates of debt accumulation could be biased if higher-debt borrowers' propensity to file is correlated with changes in wage garnishment, especially given our sample's selection conditioning on having filed. Importantly, we find that our wage garnishing shocks do not have any distinguishable effect on the propensity to enter bankruptcy, the level of secured debt at the time of filing, or the observable attributes of filers. Credit bureau data further show that the debt amounts of *non-filers* are not different before and after garnishment changes, indicating that changes to garnishment do not appear to induce an observably different type of borrower to file. The exclusion restriction could also be violated if wage garnishment directly affects debt amounts, for example through an income effect that increases the debt capacity of borrowers or a mechanical effect in which reduced garnishment leads to less debt repayment prior to bankruptcy. Larger debt levels could also be the result of the accumulation of late fees and fines from existing delinquencies (Di Maggio et al., 2020) or from avoiding debt payments that could be classified as preferential transfers and reversed in court.[9]

To explore borrower behavior in the cross section and test for these potential alternative mechanisms, we proxy for filers that are more likely to be filing due to an observable shock in their lives, including substantial medical debt, job loss, or the dissolution of a marriage. Filers in this sample arguably have had life events that could have created financial distress and thus these filers may be less intentional in how they accumulate debt prior to bankruptcy. We compare this sample (the "shocked" sample hereafter) against a sample of filers that are still employed, not divorced, and have no material medical debt at the time of filing (the "non-shocked" sample hereafter). The null hypothesis of the test is that both samples should respond similarly to changes in wage garnishment. We find that both samples do delay entering bankruptcy in response to the experiment; liquidity does not have differential effects on filing delays across shocked and non-shocked filers. However, the two samples display substantial differences in debt accumulation as a consequence of this delay.

[9]Preferential transfers are payments to creditors near the time of bankruptcy filing that a bankruptcy trustee disallows as not "in the ordinary course of business or financial affairs of the debtor." See Appendix A for more details.

Filers in the non-shocked sample display large increases in unsecured debt, shadow debt, and in debt origination in the six months prior to filing. By contrast, we find that shocked filers do not significantly increase unsecured or shadow debt as a result of the delay, nor does the rate of their debt accumulation accelerate in the six months preceding filing.

Aside from illustrating the types of filers that accumulate debt during a filing delay, these subsample results help rule out several of the alternative explanations mentioned above. Any mechanical effects of garnishment, a direct income effect, increased fees and fines, or debt nonpayment to prevent a preferential transfer ruling are less likely to operate differently on debt accumulation within the shocked and non-shocked sample of borrowers given that both samples delay filing in response to decreased garnishment. Moreover, given the differences in results across the sample splits, any unobserved variable driving our results must be jointly correlated with wage garnishment only in the treated income region and with debt accumulation only in the sample of non-shocked borrowers.

Finally, the fact that only non-shocked borrowers increase debt levels prior to bankruptcy, including an acceleration of debt accumulation in the six months preceding filing, raises the possibility that increases in debt are due to moral hazard behavior by borrowers. Because we cannot observe borrower intentions, our results do not conclusively show that debt accumulation by delaying filers is purposeful. However, we note that from a creditor's perspective, any additional debt that is discharged in bankruptcy is costly, and these costs are likely passed on to other borrowers in the form of higher borrowing costs and prices (Gross et al., 2021), as we illustrate in the model of Appendix B. We conclude that even if filing delays and the associated additional debt accumulation are unintentional, such effects have significant scope to impose negative externalities on non-defaulting borrowers.

2 Related Literature

Much of the prior work on personal bankruptcy decision-making focuses on the determinants of bankruptcy filing at the extensive margin. For example, Fay, Hurst, and White (2002) investigate whether borrowers file for bankruptcy for strategic reasons or because of negative financial shocks; they largely conclude that strategic motives play an important role. Similarly, Gross and Souleles (2002) show that some filers with similar risk composition to non-filers appear to be more willing to

enter bankruptcy, suggesting some role for strategic default.[10] Along those lines, Guiso, Sapienza, and Zingales (2013) demonstrate that views about fairness and morality affect strategic default in mortgages, and Gerardi et al. (2018) find that strategic motives are important in explaining mortgage defaults. However, Indarte (2020) finds only a small incidence of strategic bankruptcy filings, instead attributing most bankruptcies to liquidity shocks.[11] In contrast to these papers, we take the decision to ultimately file as given, and provide evidence that monthly cash-flow shocks impact the timing of the filing decision and the amount of debt discharged. Further, regardless of the underlying bankruptcy motive, our findings on indebtedness are an unexplored margin important to our understanding of consumer credit markets.

A related strand of the bankruptcy literature explores the types of debt most associated with triggering a bankruptcy filing. For example, Domowitz and Sartain (1999) conclude that credit card and medical debt play a pivotal role. Dobkin et al. (2018) estimate that medical debt plays a statistically significant role in causing bankruptcy but that only 4% of personal bankruptcies are caused by hospitalizations.[12] Consistent with and complementary to this literature, we find that informal shadow debt—of which medical debt is one component—is the category that responds the most when filing is delayed.

Notably, the only other papers that study how the *level* of household debt changes in response to the bankruptcy system are Gropp, Scholz, and White (1997) and Severino and Brown (2017), who examine how credit demand increases with the generosity of the bankruptcy system.[13] Using state-level changes in homestead and personal exemption limits (the amount of assets exempt from seizure by bankruptcy creditors) to study the intensive margin of bankruptcy protection, Severino and Brown (2017) find that more generous bankruptcy protection increases both unsecured debt levels and interest rates, especially in low-income areas. Complementing these studies of the consequences of increasing the level of bankruptcy protection, we study whether less aggressive wage garnishing nudges debtors to delay filing and how filing delays influence the accumulation of debt. Severino and Brown (2017) interpret their findings as an efficient increase in credit demand among borrowers

[10] Livshits et al. (2010) argue that a non-strategic framework with a decreasing cost of bankruptcy filing helps explain the rise in U.S. personal bankruptcies over time.

[11] Similarly, Ganong and Noel (2020) conclude moral hazard in mortgage default is scarce. On the other hand, Mayer et al. (2014) find evidence of mortgagors strategically missing payments to qualify for loan modifications.

[12] See also Gupta et al. (2017), who find that cancer diagnoses increase bankruptcy incidence.

[13] Recent theoretical work by Exler et al. (2020) finds that over-optimistic consumers inefficiently borrow too much and file too late.

responding to a financial insurance policy with more favorable terms, but they do not find any increase in default rates. In this paper, we focus on policy experiments that directly affect individuals who are already likely to enter bankruptcy, allowing us to conclude that filing delays result in increased debt levels for a subsample of distressed borrowers.

Although our work is primarily concerned with borrowers' debt decisions prior to filing, it is also relevant for recent work that studies the effects of bankruptcy on subsequent outcomes. Fisher and Lyons (2010) provide evidence that a bankruptcy flag on credit reports reduces borrowers' subsequent access to credit. Dobbie, Mahoney, Goldsmith-Pinkham, and Song (2020) document improved access to credit and credit utilization following the removal of a bankruptcy flag. Dobbie and Song (2015) report higher subsequent incomes, lower mortality, and lower foreclosure rates for borrowers randomly afforded more lenient access to Chapter 13 bankruptcy. Parra (2018) uses a regression-discontinuity design to show positive effects of Chapter 7 on entrepreneurship, home-ownership, and financial distress. Similarly, Dobbie, Goldsmith-Pinkham, and Yang (2017) use quasi-random variation in chapter choice to show that filing under Chapter 13 leads to better future financial outcomes. More structural work also quantifies the optimality and welfare benefits of the current bankruptcy system (Livshits, MacGee, and Tertilt, 2007; Auclert et al., 2019; Davila, 2019). To be able to weigh the real benefits of a more lenient bankruptcy system documented by these papers against the potential costs of increased debt at the time of discharge, our work establishes that such costs are likely to be important and identifies filing delays and shadow debt as key channels through which they operate.

3 Conceptual Framework

The average (median) bankruptcy petitioner files for bankruptcy 22.3 (15.3) months after first being 90 days past due on a debt. Given the interest charges, fees, hassle of collections agencies, potential wage garnishing, and credit-bureau-related reputations costs, delinquent borrowers that are nudged to delay filing have strong incentives to decrease their indebtedness. Debt could be reduced through asset sales, proactive negotiations with creditors, or reduced consumption, for example. Indeed, many borrowers in our sample who choose to delay bankruptcy following a reduction in wage garnishment do not increase debt levels. By contrast, distressed borrowers that delay bankruptcy

could increase debt levels by increasing consumption (and nonpayment) leading up to bankruptcy or by funding their usual consumption with debt during the delay.

We present a model in Appendix B that illustrates the consequences of increases in bankruptcy-filer indebtedness on demand, prices, quantities, the welfare of non-defaulting buyers (buyers who know they will not declare bankruptcy and will thus pay full price), and overall economic efficiency. A key parameter in the model captures the degree to which defaulters can delay bankruptcy and incur more debt. As bankruptcy delays increase, equilibrium prices rise due to the haircut that sellers take from these defaulting buyers, consistent with empirical evidence in Gross et al. (2021). These higher prices are paid by non-defaulting consumers, resulting in lost welfare for non-defaulters and an aggregate deadweight loss as some consumers are priced out of the market by higher prices. See Appendix Figure A1 for an illustration of the welfare consequences of debt accumulation by nearly bankrupt debtors under asymmetric information. In the model, defaulting consumers know with certainty that they will default and intentionally increase debt through nonpayment as a result.

When borrowers do not have private information about their likelihood of default—or choose not to act on that information—they accumulate less debt and the effects on equilibrium prices and welfare are attenuated. However, regardless of whether debtors intentionally or unintentionally "run up the tab" before bankruptcy, we note that equilibrium prices will rise (and welfare of non-defaulters will fall) as long as defaulting borrowers increase debt levels prior to bankruptcy. Overall, the model demonstrates how the debt accumulation patterns we document here could affect equilibrium prices and create negative externalities on non-defaulting consumers.

4 Data and Institutional Details

This section overviews our data sources, data processing procedures, and summary statistics.[14]

Our main dataset consists of data processed from filings obtained from the U.S. Court's Public Access to Court Electronic Records (PACER) website. We obtained academic fee waivers that allow us to download data from four bankruptcy court districts: the Northern District of Florida, the Southern District of Florida, the District of Minnesota, and the District of Utah.[15] We selected these districts to give geographical diversity across the United States. For each bankruptcy case

[14]See Appendix A for background on the U.S. personal bankruptcy code and bankruptcy court procedures.
[15]Our fee waiver petition to the Florida Middle District was denied.

in these districts, we search the court docket for the Schedules of Assets and Liabilities and the Statement of Financial Affairs. These documents are required filings for all bankruptcy petitioners and are typically filed either jointly with the bankruptcy petition or within the first week of the bankruptcy filing.

The Schedules of Assets and Liabilities and the Statement of Financial Affairs that constitute the basis of our data contain a rich set of petitioner attributes. Each document contains a summary of the household's total real estate assets, personal assets, secured debt, unsecured priority debt, unsecured non-priority debt, monthly income, and monthly expenses. In subsequent schedules, petitioners list individually all assets and all liabilities, detailed monthly income and expense budgets, and information on the petitioner's employment, number of dependents, and marital status. Additionally, individuals list their income over the previous three years in the Statement of Financial Affairs, lawsuits they are a party to, and any businesses they own (among other items). We scrape these PDF documents for the relevant information and reformat it into a standardized dataset.

PACER contains very few electronic PDF documents before 2004. Accordingly, we begin our sample in January 2004 and end in September 2018. In the first two years of our sample, as courts were still adopting electronic filings, coverage ramps up from just over 50% of cases to close to 90% by the end of 2006. Following this time, a small percentage of schedules are handwritten documents that we are unable to process, leaving us with about 90% coverage of all bankruptcy cases through the remainder of the sample.

The resulting dataset contains 606,120 individual bankruptcy filings. Of these, we drop 50,712 cases that are missing portions of either the Schedules of Assets and Liabilities or the Statement of Financial Affairs, which prevent calculating control variables such as employment status or whether the individual owns a business. We also exclude extreme income observations outside the 1st and 99th percentile. Our final sample contains 554,942 observations. Florida Northern, Florida Southern, Minnesota, and Utah make up 7.7%, 34.9%, 32.6%, and 24.8% of the total sample, respectively.

Table 1 reports summary statistics. The average bankruptcy petitioner in our sample declares a current monthly income after required deductions of $2,973. Calculating the garnishable wages for each petitioner based on the applicable state statute and federal minimum wage, the average petitioner has $727 in monthly wages potentially subject to wage garnishing by creditors. Average

total assets are approximately $134,000, although this varies widely across the sample with a standard deviation of over $200,000 and the bottom of the distribution having essentially zero assets. Average total debt is approximately $240,000, which includes more than $95,000 in unsecured debt and nearly $110,000 in mortgage debt, the latter averaging across almost half of the sample with no mortgage. Total indebtedness also varies significantly in the cross section of filers with a long right tail, especially for unsecured debt, which has a standard deviation of $570,000. On average, bankruptcy filers reported 53% of their liabilities as unsecured debt. The Chapter 7 share of filers in our data is 74%, 56% of the sample are homeowners, and 24% are business owners. Looking at demographics, 33% of bankruptcy petitions were joint filings by a married couple, the average number of dependents is around one (although over half of the sample reports zero dependents), and very few filers are retired or disabled.

Debt Categories The average debtor has over 30 individual loans reported in their schedules, resulting in over 15 million individual liabilities in our data. To summarize the composition of liabilities at bankruptcy, we categorize these loans by processing the text in the loan description provided. We begin with simple keyword searches for easily-categorized loans with search terms such as "credit card," "mortgage," or "auto." We then use Latent Dirichlet Allocation (LDA) as a topic modeling technique to assign hard-to-categorize loans.[16] This combined process allows us to classify about 85% of all loans (94% of the total dollar amount of debt) into specific categories. The remaining 15% is placed in an "unknown" category; these unknown loans all have vague descriptions (e.g., "Collections" or "Loan") that do not allow us to clearly categorize them. Table 2 displays the distribution of debt across these loan categories. Looking across categories, mortgages (63%) and auto loans (29%) comprise the majority of secured debt reported by bankruptcy filers, and around half of bankruptcy filers have a mortgage and around half have an auto loan. Other forms of secured debt are less common among bankruptcy filers and make up less than 3% of total liabilities. Credit card debt is the most common type of unsecured debt—77% of filers report credit-card debt, which makes up 30% of their unsecured debt on average. Unsecured personal loans and retail debt are also common, making up 13% and 11% of unsecured debt, respectively, with each held by a majority

[16]LDA looks for common usage of words across loans and places those loans together in the same "topic." For example, if "hospital" and "medical" often appear together in a loan description, LDA would then group other loans with the word "hospital" into the medical category even if they do not contain the word "medical." See Appendix C for further details.

of filers in our sample. Student loans are held by almost 25% of the sample, and comprise 8% of unsecured liabilities on average. Several categories of debt are constituted by "unintentional lenders" who are unlikely to report these debts to credit bureaus. This includes medical debt, which is held by over half of our sample and is similar in size to student loans, and unpaid utility bills, which appear in 41% of filings. In addition, debts that are housing related (such as unpaid rent or HOA fees) are likely not reported to credit bureaus, as well as large portions of the unknown category. We discuss these unreported "shadow debts" in the next section. Finally, despite being under acute financial distress, only 9% of filers in our data report outstanding debts identifiable as payday loans or debts to check cashers, comprising less than 0.4% of total debt.

4.1 Shadow Debt

The set of bankruptcy filers that are merged with credit-bureau records provides a unique opportunity to compare debt amounts obtained in the formal credit market, which are routinely reported to credit bureaus and observable on credit reports, to total debt amounts reported on court filings.[17] Credit registries can only collect information on debts that are reported to them, typically by formal lending institutions, retail institutions with formal lending arms such as store brand credit cards and, in some cases, debt collectors. By contrast, bankruptcy filings reveal a wide array of liabilities that would not generally appear on a credit report, including bounced checks, unpaid medical, utility, or telecommunications bills, and fines and fees. In search of maximal relief from creditors, an individual filing for bankruptcy has strong incentives to list all of their debts, such that we view the liabilities listed in the Schedules of Assets and Liabilities to represent a complete view of their total indebtedness.[18] Since such debt is not administratively reported anywhere else, bankruptcy potentially offers the only opportunity to characterize the size and scope of such informal credit markets.

We define shadow debt as the total unsecured debt amount in the bankruptcy filing less the total unsecured debt amount in the credit report in the same month as the bankruptcy. We focus on unsecured debt because secured debt is nearly always originated by formal lenders that report to credit bureaus. Further, delinquent borrowers have little incentive to incur secured debt just

[17] See Appendix D for details on the credit-bureau data merge.

[18] There is very little incentive for a filer to inflate their filing with exaggerated debt, and debts are also verified, whenever possible, by the court-assigned trustee.

prior to bankruptcy because it is rarely discharged without the individual also giving up the asset that serves as collateral. A relatively small portion of our sample have second mortgages, home equity lines of credit, or auto loans that do not appear in the credit report. Such secured shadow debt likely reflects a reporting issue in the credit registry. Unsecured debt varies widely between the bankruptcy schedules and credit records. The average borrower has $41,680 in shadow debt, a substantial share of average unsecured debt. Shadow debt makes up 7% and 11% of the average and median bankrupt individual's total listed debt, respectively, underscoring that the informal credit market constitutes a material portion of total liabilities for individuals in acute financial distress.

The accuracy of our shadow debt estimates relies on the accuracy of each dataset and the fidelity of the merge between them. First, if the merge between the bankruptcy data and the credit-bureau data is low quality, we could miscalculate shadow debt. Because we do not have unique identifiers, the merge between the datasets will necessarily be imperfect. We examine whether incorrectly merged records are affecting our results by alternatively focusing on the set of observations for which there is only a single bankruptcy filing in a 5-digit zip $\times$ filing-month cell. In these cases, we have a one-to-one merge between the two datasets and are confident that close to 100% of these matches are correct.[19] For these 6,046 observations, we find that the 25th, 50th, and 75th percentiles of shadow debt levels are $11,100, $28,400, and $60,800, respectively—a distribution almost identical to the distribution estimated using the full sample of matches. Furthermore, in contrast to the mean-zero differences that would be expected under a low-quality-merge data generating process, we find that the total amount of unsecured debt on credit records only rarely exceeds the total amount of unsecured debt on bankruptcy filings for a given individual. The average and median unsecured debt on credit-bureau records are $57,800 and $14,700, respectively, while on the bankruptcy schedules, the comparable figures are much larger at $94,700 and $44,500. Finally, shadow debt summary statistics are similar for single and joint filers, suggesting that misattributing debt to one spouse instead of another is not driving our shadow-debt findings.

A second possibility is that debt amounts reported in the bankruptcy filings are fraudulently inflated, making it appear that there is a large amount of shadow debt. This is unlikely to be the case because the schedules are most often prepared by a bankruptcy lawyer and are always reviewed

[19]To verify this assumption of high match-quality for this subsample, we note that outstanding first mortgage amounts in the two datasets are within $2,000 of each other for the vast majority of these matches even though we are not using the mortgage amount for the match.

by a trustee, both of whom require documentation of loans so that creditors can be notified and an official record of debt discharge created. A final possibility is that debt amounts in the credit reports are lower simply due to a lag in reporting or differences between the timing of the bankruptcy filing and when the credit report is pulled in our data. However, we find essentially identical amounts of shadow debt regardless of whether we use the credit report from a month prior to or a month after the bankruptcy filing. Timing differences between bankruptcy filing and credit records cannot explain the preponderance of shadow debt that we detect.

Shadow debt constitutes a large proportion of total liabilities for bankrupt individuals. We cannot precisely determine which loans in the bankruptcy schedules are not in credit reports because our credit-bureau data do not contain loan-level detail. However, we note that loan categories that are likely to contain shadow debt are large. In particular, medical debt, unpaid rent or utility bills, deficiency balances on repossessed vehicles, legal costs, bounced checks, and other fees are, for the most part, not reported to credit bureaus. These categories alone amount to $45,400 for the average bankrupt borrower in our dataset.

To further unpack our shadow debt measure, we estimate the correlation between the unsecured shadow debt share of total debt and the unsecured debt categories in Table 2 at the individual level. Figure 1 plots the resulting correlation coefficients in descending order. The types of unsecured liabilities that are most correlated with shadow debt are housing-related (e.g., unpaid rent), unknown unsecured (e.g., debt in collections without other identifying information), miscellaneous unsecured (e.g., unpaid insurance premia), unsecured auto (e.g., the negative-equity portion of a car loan), medical, and business-related. Utilities, payday loans, and priority unsecured liabilities (e.g., unpaid taxes) are also positively correlated with shadow debt. Meanwhile, unsecured liabilities that are usually well captured by credit reports are not correlated with shadow debt (student loans) or are negatively correlated with shadow debt (personal loans, retail, and credit card debt). Combining these correlations with the overall debt share statistics in Table 2, we estimate that the largest components of informal shadow debt are medical debt and debt in the unknown category. Examining word frequencies in the unknown category, the most common words are related to debt that is in collections, with the original creditor or purpose unspecified.

We reiterate that credit bureaus are not designed to collect data on such liabilities (and in some cases are legally prohibited from doing so). Accordingly, rather than an indictment on the

accuracy of credit records, these descriptive statistics show that informal credit markets are large and important sources of credit for distressed borrowers. We return to shadow debt in our analysis below, estimating that when debtors delay filing for bankruptcy, the strongest increase in overall liabilities is in informal shadow debt.

5 Estimation

Our first-stage estimates are designed to isolate quasi-exogenous variation in the speed with which a given petitioner files for bankruptcy. Our second-stage estimates then isolate the effect on indebtedness of quasi-random variation in the amount of time an individual can wait until filing for bankruptcy. We exploit federal minimum-wage changes that affect the amount of wage garnishing a delinquent borrower could experience.[20] For each individual, we calculate *Garnishable Wages*, defined as the statutory maximum amount of income per month that could be garnished by a creditor, as

$$Garnishable\,Wages_{it} = \begin{cases} 0 & \text{if } Inc_i \leq 4.33\omega_s MinWage_t \\ Inc_i - 4.33\omega_s MinWage_t & \text{if } 4.33\omega_s MinWage_t < Inc_i < 5.8\omega_s MinWage_t \\ 0.25 \cdot Inc_i & \text{if } Inc_i \geq 5.8\omega_s MinWage_t \end{cases} \quad (1)$$

for borrower i filing in bankruptcy district court s on date t. Monthly income Inc comes directly from the bankruptcy schedules, where all filers report their current monthly income after required deductions. In Florida and Utah, the subsistence allowance ω_s is the federally mandated minimum of 30 hours of federal minimum wage earnings, while in Minnesota $\omega_s = 40$, as described above.[21] We multiply $\omega_s \cdot MinWage_t$ by 4.33 to convert it to a monthly figure. The prevailing federal minimum wage $MinWage_t$ is measured on the date when the individual enters bankruptcy.

This statutory structure results in three possible income regions, plotted in Figure 2. For higher-income individuals with $Inc_i > 5.8 \cdot \omega_s \cdot MinWage_t$, maximum garnishable wages are simply 25% of income. For low-income individuals whose $Inc_i < 4.33 \cdot \omega_s \cdot MinWage_t$, there is no allowable wage garnishing. In the middle region, when $4.33 \cdot \omega_s \cdot MinWage_t < Inc_i < 5.8 \cdot \omega_s \cdot MinWage_t$, every

[20] See Appendix E for more details on wage garnishment.

[21] Florida household heads earning less than \$750/week may file an affidavit for exemption from wage garnishing if they contribute more than half of the support for a dependent family member. Minnesotans eligible for public assistance in the last six months are exempt from wage garnishing. For a detailed overview of state-level wage garnishing statues, see Carter (2020).

marginal dollar of income above $4.33 \cdot \omega_s \cdot MinWage_t$ is garnishable. Importantly, the boundaries between these regions depend directly on $MinWage_t$. When the federal minimum wage increases, a) individuals just above the lower boundary are pushed into the no-garnishing region, b) all individuals in the middle region are garnished less, and c) individuals just above the upper boundary move to the middle region and are garnished less. For this reason we refer to the middle region of income as the treated region in our experiment.

For example, as illustrated in Figure 2, prior to July 24, 2007 when $MinWage_t = \$5.15$, an individual in Utah with a monthly income of \$750 has garnishable wages of $\$750 - 4.33 \cdot 30 \cdot \$5.15 = \$81.02$, or 10.8% of their income. On July 24, 2007, the federal minimum wage increased to \$5.85. Beginning with this date, a debtor with an income of \$750 will no longer face any wage garnishing. The foundation of our identification strategy is that such federal minimum wage increases alter the incentives for otherwise identical debtors who haven't filed before the minimum wage increase to delay bankruptcy because they have discontinuously lower garnishable wages and thus higher take-home pay. We address the possibility that federal minimum wage changes affect distressed-borrower indebtedness in other ways in section 5.2 below.

5.1 Bankruptcy Timing

We test the relevance of wage garnishing to filing timing using our measure of the time interval between when borrowers are at risk to file and when they actually file. Our first stage specification uses the credit-bureau-merged data and tests whether wage garnishing changes affect bankruptcy timing by regressing *months to file* on monthly garnishable wages (measured in \$100s)

$$\begin{aligned} Months\,to\,File_{ist} = \pi_1 \cdot Treatment_i \times Garnishable\,Wages_{ist} + \pi_2 \cdot Treatment_i \\ + \pi_3 \cdot Garnishable\,Wages_{ist} + \pi_4 \cdot Treat_i \times Income_i + X_i'\pi_5 + \psi_s + \theta_t + v_{ist}. \end{aligned} \tag{2}$$

Our objective is to isolate within-year variation in garnishable wages for borrowers with identical incomes.[22] This objective is complicated by the fact that income and garnishable wages are perfectly

[22] It is possible that wage garnishment changes only affect bankruptcy filings gradually, in which case including year fixed effects might force comparisons between treated and control samples before garnishment impacts the treated sample. Our results are essentially unchanged if we allow for broader comparisons by using two-year fixed effects instead of one-year.

collinear for anyone with income exceeding $5.8 \cdot \omega_s \cdot MinWage_t$. By contrast, in the middle income region defined by $4.33 \cdot \omega_s \cdot MinWage_t < Inc_i < 5.8 \cdot \omega_s \cdot MinWage_t$, income and garnishable wages are no longer collinear because of within-year changes in $MinWage_t$. To isolate this treated region of incomes from a control region of incomes where wage garnishment is not impacted by changes in the minimum wage, we define $Treatment_i = 1$ for monthly incomes between \$600 and \$1,300.[23] In our 2SLS specifications, 5% of bankruptcy filers have incomes in the treatment region. In the reduced-form specifications that do not require the credit-bureau merge, treated borrowers represent 10% of the sample.

Equation (2) estimates the impact of an additional \$100 of wage garnishment on *months to file* for borrowers of identical income with the $Treatment \times GarnishableWages$ interaction. Controlling for $Treatment \times Income$ allows the effect of income to differ in the treated region and means that the only residual variation in $Treatment \times Garnishable\,Wages$ will be due to within-year minimum-wage changes. Outside the treated region, income and garnishment are perfectly collinear such that the income main effect is absorbed by the garnishable wages main effect. Filer controls X_i improve our precision in subsample tests and include other plausible shifters of filing timing: the number of dependents and indicators for bankruptcy chapter choice, marital status, homeownership, business ownership, credit score, retired status, and disability status.[24] To allow for time shocks or fixed differences across courts in average filing timing, we control for court-district fixed effects ψ_s and year fixed effects θ_t. Subsequent robustness checks control for unobservable geographic variation over time by including court-district $\times$ year fixed effects and allow for time-varying income elasticities through income $\times$ year fixed effects and income quartile controls. Conditional on this rich set of controls, the coefficient π_1 will be identified from filers that have identical incomes and filed in the same year but faced different potential wage garnishing levels because they filed before or after a federal minimum wage change.

Figure 3 plots a binned scatterplot of equation (2) to visualize the treatment effect of garnishable wages conditional on our controls. The negative slope through the treated region reveals the impact of increased wage garnishment on months to file. This relationship between filing timing and

[23] We expand the treatment region outside the sharp kinks shown in Figure 2 and implied by the expression in equation (1) ($4.33 \cdot \omega_s \cdot MinWage_t < Inc_i < 5.8 \cdot \omega_s \cdot MinWage_t$) to allow for income volatility and measurement error (if unobserved garnishing from alimony or taxes affected income, for example).

[24] All of our results are also robust to not including additional controls and fixed effects.

garnishable wages in the treated region contrasts with the control region where there is essentially no relationship, indicating that our specification and controls isolate covariation between garnishable wages and filing timing coming from changes in garnishable wages in only the treated region.

Table 4 reports formal estimates of equation (2) with standard errors double clustered by month and 3-digit zip code. All specifications include main effects for treatment, garnishable wages, and treatment $\times$ income. The estimated coefficient in column 1 of -1.12 months indicates that a \$100 decrease in monthly garnishable wages induced by a federal minimum wage change increases the number of days between the first 90-day delinquency and bankruptcy filing date by an average of 1.03 months. For context, note that \$100 is roughly the average decrease around a minimum wage increase for a treated debtor in our sample.[25] Columns 2-4 repeat the estimation with different combinations of fixed effects. Column 2 reports a coefficient on garnishable wages of -0.78 months conditional on court-district $\times$ filing-year fixed effects. Column 3 reports a coefficient of -1.03 months when we allow for varying income elasticities with interactions between income and filing-year indicators. Column 4 reports an estimate of -1.19 months with income quartile fixed effects.[26]

The instrument delivers statistical power that varies with the level of the fixed effects, although the instrument is always significant at least at the 0.05 level. The partial F-statistics in columns 1 and 4 are 9.0 and 9.7, respectively. The aggressive geography $\times$ year and income $\times$ year controls weaken the power of the instrument somewhat, reducing the partial F-statistics to 4.3 and 5.2, respectively. While these F-statistics indicate a potential weak-instruments concern, Hahn et al. (2004) argue that the k-class estimator of Fuller (1977) with $\alpha = 1$ minimizes bias in weak instruments settings.[27] We reestimate our 2SLS results using the Fuller (1977) estimator and find very similar results, suggesting weak instruments are not an issue here. We also note that weak instruments bias 2SLS estimates *towards* OLS estimates, and our 2SLS and OLS estimates are quite different. Finally, we estimate the reduced form of our primary specification on our full sample of bankruptcy filings, where power is unlikely to be an issue, and find results consistent with the 2SLS

[25] Each minimum wage increase in our data was \$0.70/hour. For a debtor on the relevant part of the garnishing schedule defined by equation (1) and plotted in Figure 2, this decreases maximum garnishable wages by \$90.93/month for Florida and Utah filers and \$121.24/month for Minnesota filers.

[26] Some individuals transition in and out of being at least 90 days past due several times before entering bankruptcy. All of our results are robust to defining *months to file* using 120 days past due or using the last month before bankruptcy in which a consumer becomes 90 days past due on a debt.

[27] In our setting, weak instruments may arise from debtors who are not currently subject to wage garnishing (or who are but are not in the treated income region) being unaffected by the instrument.

results.

The first-stage results estimated in Table 4 and visible in Figure 3 establish the relevance of our instrument and confirm our hypothesis that decreases in wage garnishing, driven by minimum wage increases, nudge bankruptcy filers to delay filing.

5.2 Exclusion Restriction and Selection Concerns

Using minimum wage-induced variation in garnishable wages as an instrument relies on an exclusion restriction that minimum wage shocks to wage garnishment influence debt amounts only through the timing of bankruptcy filing. However, conditioning on an endogenous outcome like filing for bankruptcy raises the concern that changes to wage garnishment could change the sample of borrowers who enter bankruptcy. For example, one threat to our identification strategy is the possibility that varying the level of wage garnishing also affects average-filer indebtedness by changing the composition of who files for bankruptcy. In particular, our estimates could be biased by selection effects if a decrease in garnishable wages causes debtors with low unsecured debt to not file altogether or if borrowers with low garnishable wages have consistently larger unsecured debt shares regardless of when they do file. Similarly, minimum wage increases may directly affect debt levels through income effects or relaxing underwriting constraints.

We evaluate such selection concerns empirically along six dimensions; overall, we find no evidence that sample-selection concerns are biasing our results. First, we consider whether wage garnishment affects the overall number of individuals that enter bankruptcy. If selection is at play, we should see changes in the prevalence of bankruptcy filings after minimum wage changes. In the same spirit, we further test whether the likelihood of filing and the debt levels of *non*-filers are correlated with the timing of wage garnishing changes. Third, though our income controls account for many potential changes in borrower composition in the treatment sample coincident with minimum wage changes, we also test for selection by examining the income distribution of filers around minimum wage changes. Fourth, we look for changes in other filer characteristics as a function of the instrument. Fifth, we present placebo analyses showing that changes in the minimum wages do not directly affect secured debt levels. Finally, we show that debt accumulation effects are not present among filers with observable medical, marital, or employment shocks, further suggesting that our main results are not driven by any direct effect of the minimum wage on indebtedness. These results are

also consistent with Severino and Brown (2017), who argue that bankruptcy generosity does not effect the extensive margin of filing, and papers showing no relationship between foreclosure delays and mortgagors' ultimate default behavior (Gerardi et al., 2013; Cordell et al., 2016).

Using the counts in Figure 4, we evaluate whether aggregate bankruptcy filings change when the minimum wage increases. The figure plots total weekly personal bankruptcy filings in Florida, Minnesota, and Utah per 10,000 people in event time, where the event is any of the three changes in the federal minimum wage. We estimate these counts in event time after controlling for the state-level unemployment rate and state and week-of-year fixed effects from 25 weeks prior to the minimum wage change to 26 weeks after the change, covering one year in total. We do not see any change in the filing rate around minimum-wage induced changes in wage garnishing. For contrast, we note that bankruptcy filing rates can respond dramatically to filings incentives, as the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005 caused a dramatic increase and decline in filings at its passage. As is apparent in Figure 4, minimum wage changes have no such effect; all point estimates are statistically indistinguishable across the year of a minimum wage change. Further, the differences in point estimates are very small, with post-minimum wage change estimates being only three more filings per million people than pre-minimum wage changes.

At the individual level, we can use credit-bureau data combining bankruptcy filers and non-filers to test whether the likelihood of entering bankruptcy changes after the federal minimum wage increases. We first identify all individuals who have been at least 90-days delinquent for at least 12 months, which we take to be one definition of those in the risk set of filing for bankruptcy. We then calculate the fraction of these already-delinquent borrowers who file for bankruptcy in a given month, with months measured in event time. If wage garnishment has a significant impact on the type of delinquent borrowers entering bankruptcy—the selection of delinquent borrowers into bankruptcy—then a change in the composition of filers could be manifest as a change in filing probabilities after minimum wage increases. In panel I of Figure 5 we plot these bankruptcy probabilities in event time, similar to Figure 4. For example, a borrower first becoming 90 days or more delinquent on a debt in February 2006—17 months before a minimum wage change—would first appear in the sample of borrowers with event time month equal to -5. To account for seasonality in bankruptcy filings and focus on within-year selection issues, we remove calendar month-of-year fixed effects and year fixed effects. With the caveat that the confidence intervals are somewhat wide relative to the

mean monthly bankruptcy filing rate in this sample of 0.002, we find little difference in the point estimates of the filing probability across event time, and none of the differences are statistically different. Both Figures 4 and panel I of 5 indicate that there is little change in the extensive-margin decision to enter bankruptcy around the three minimum wage change events.

Selection effects remain a concern, however, if the changes in garnishable wages influence the composition of filers even without changing the total number of filers. While less plausible than a selection story where aggregate bankruptcy counts are also affected, the non-results discussed above could mask compositional selection effects if minimum wage increases induce relatively low-debt borrowers not to enter bankruptcy while simultaneously inducing roughly the same number of relatively high-debt borrowers to enter bankruptcy. We test for this possibility by examining the debt levels of those who *do not* file for bankruptcy. As before, we perform the analysis in event time where the sample used to estimate average log total debt for each event-time month is already-delinquent borrowers (who first transitioned to 90-days delinquent at least 12 months prior). Panel II of Figure 5 plots average log total debt for this sample each period normalized to zero at time 0 after removing calendar month fixed effects and year fixed effects to account for seasonality and focus on within-year selection. While the standard errors are large, the pattern of debt levels for non-filers is stable across minimum wage changes, and there are no statistically different changes after the event. The lower debt levels among non-filers predicted by a selection story whereby post-event filers are disproportionately drawn from more indebted borrowers do not appear present in the data.

We also test directly whether the distribution of filer incomes changed around the three minimum wage changes. Figure 6 plots several percentiles of the filer income distribution by month of filing. In most months, bankruptcy filers at the second percentile or below report zero income. As illustrated in Figure 2, borrowers whose wage garnishing was affected by minimum wage changes have incomes in the \$600–1,300 range. The income percentiles in this range evolve smoothly following each minimum wage change, exhibiting the typical time-series volatility evident in other months, and in parallel with incomes outside this range from unaffected borrowers. Taken together, Figures 4-6 are consistent with federal minimum wage changes affecting filing timing through wage garnishing but not significantly affecting the number of filers, the likelihood of filing, or changes in the composition of filers.

The exclusion restriction could also be violated by a shock that affects only the treated region of incomes. Problematic omitted variables would need to be jointly correlated with changes in garnishable wages and the unsecured debt levels of bankruptcy filers but only for filers within the treated income band around the months when minimum wage was raised. The time-varying nature of our experiment and battery of fixed effects help rule out many such alternative explanations. In addition, the smoothness of income percentiles across minimum wage changes in Figure 6 suggests that it is unlikely that such an event occurred as it would have likely affected the income distribution of bankruptcy filers. Appendix Table A1 further rules out compositional changes to filer observables as a function of the instrument as we see no response to the instrument in filer characteristics. Moreover, all three national minimum wage changes were decided in advance as part of the Fair Minimum Wage Act of 2007 such that the policy changes themselves were not endogenous to shocks to the indebtedness of debtors in the treated income band. Finally, if a material change in filer composition occurred, it would be reasonable to expect a change in both unsecured and secured debt amounts; we see no such response in secured debt amounts (Appendix Table A2).

A remaining possibility is that the minimum wage change itself directly affected the demand for debt (i.e. an income effect) or mechanically affected the payback of outstanding debts by reducing the amount of wages garnished to pay down debt (i.e., a mechanical effect). Section 5.6 presents results that cast doubt on the possibility that income or mechanical effects are driving our key results. In regressions where we split the sample into subsamples, where both samples should manifest an income and/or mechanical debt-paydown effect, we continue to find significant differences in debt accumulation between the samples. Also constraining the scope for a mechanical effect of lower wage garnishing on debt levels, we note that the net effect of reductions in garnishment on principal repayment includes both lower wage garnishing per month and an increase in the number of months (Table 4), if anything likely leading to *lower* debt at filing. Finally, in section 5.3 we show that a one-month delay in filing corresponds to an accumulation of about $4,000 of additional debt. The same one-month delay only reduces garnishment by $100 for the average treated borrower in our sample, further ruling out that minimum wage changes could directly explain the debt accumulation behavior that we document via a mechanical reduction in debt repayment.

5.3 Effects of Filing Delays on Unsecured Debt

Building on first-stage estimates that show the relevance of garnishable wages to the timing of bankruptcy filings, our second-stage specification estimates the elasticity of debt amounts with respect to a marginal delay in filing. While borrowers on the brink of bankruptcy are likely limited in their credit market access, when distressed borrowers *are* able to obtain credit, it most commonly comes in the form of unsecured debt.[28] Our specification tests whether borrower i filing in court district s in year t, who takes longer to file, has a higher unsecured debt share, specified as

$$\frac{Unsecured\,Debt_{ist}}{Total\,Debt_{ist}} = \beta \cdot Months\,to\,File_{ist} + X_i^{'}\delta + \varphi_s + \lambda_t + \varepsilon_{ist}. \tag{3}$$

We estimate the specification in (3) with the first stage for months to file given by (2).[29] Filer controls X_i are identical to those in the first stage. Also as in (2), the battery of fixed effects capture combinations of court-district, time, and income effects, depending on the specification.

Using our garnishable wages instrument to exploit exogenous variation in months to file, Table 5 reports 2SLS estimates of equation (3). Column 1 reports an OLS coefficient on months to file that is negative but economically insignificant. Months to file is likely correlated with many borrower attributes that could co-determine debt levels. For example, more sophisticated borrowers better able to forestall bankruptcy might also have more assets collateralized with tangible debt, like homes or cars, driving the share of unsecured debt down. In column 2, we report 2SLS estimates instrumenting for months to file and controlling for the standard set of filer controls and year and court-district fixed effects. The estimated coefficient of 0.0079 indicates that an additional month delay in filing is associated with a 79 basis point larger unsecured debt share. Columns 3-5 report estimates with different combinations of fixed effects. Column 3 isolates within district court $\times$ year variation and indicates that an additional month delay in filing increases the share of unsecured debt by 109 basis points. Income $\times$ year fixed effects and income-quartile fixed effects in columns 4 and 5, respectively, result in similarly sized estimates.

To interpret these magnitudes, recall that the average minimum wage-induced change in gar-

[28] Our bankruptcy filings data explicitly report unsecured debt separately from secured debt. A third category of debt, priority unsecured debt, contains mostly tax, alimony, and child-support claims. We exclude this amount from unsecured debt but include it in our measure of total debt.

[29] Though our results are robust to specifying the dependent variable as log unsecured debt (Appendix Table A2), we examine effects on debt shares for consistency with later results that look at debt-category shares, for which shares equal to zero would be problematic in logs.

nishable wages causes around a one month delay in filing. Using sample averages from the credit-bureau-merged sample, a one-month delay would have the effect of increasing the ratio of unsecured debt from an average of 26% to 27%. When evaluated against average unsecured debt amounts at filing, a one percentage-point increase corresponds to an approximately $4,000 increase in unsecured debt. Our 2SLS estimates capture the Local Average Treatment Effect of filing delays, i.e., the effect of delaying filing for compliers to our instrument who put off declaring bankruptcy because the minimum-wage-induced decrease in their garnishable wages nudged them toward a delayed filing.

One notable limitation of the 2SLS estimates in Table 5 is the sample size relative to the full sample. Calculating *months to file* requires 90-day delinquency dates from merged credit-bureau data. However, because garnishable wages can be calculated using income reported from the bankruptcy filings alone, reduced-form estimates of garnishable wages' effect on unsecured debt shares can be estimated with the full bankruptcy sample, which has an order of magnitude more observations than the credit-bureau-merged sample. This reduced-form specification regresses debt shares on garnishable wages

$$\frac{Unsecured\,Debt_{ist}}{Total\,Debt_{ist}} = \alpha_1 \cdot Treatment_i \times Garnishable\,Wages_{ist} + \alpha_2 \cdot Treatment_i + \alpha_3 \cdot Garnishable\,Wages_{ist} + \alpha_4 Treat_i \times Income_i + X_i'\mu + \psi_s + \theta_t + \xi_{ist}. \tag{4}$$

Borrower controls X_i and fixed effects are identical to equation (3). We first plot a binned scatterplot of this reduced-form regression to examine the relationship visually. Panel I of Figure 7 shows a negative relationship between maximum garnishable wages and the share of unsecured debt in the treated region compared to an essentially flat relationship throughout the control region, as would be expected if our specification's controls allow our treatment variable to isolate only the LATE of filing delays on unsecured debt accumulation. The garnishable wages instrument relies on the argument that an increase in garnishable wages will induce borrowers to file for bankruptcy sooner, a premise that is confirmed in first-stage results. Filing more quickly allows less time for the accumulation of debt, suggesting a negative relationship between garnishable wages and unsecured debt share.

Estimates in Table 6 of the coefficient on garnishable wages α_1 in the reduced-form specification vary between -27 and -67 basis points depending on the fixed effects, indicating that an increase in garnishing decreases debt amounts at the time of filing. On average, a 50 basis point increase in the

share of unsecured debt corresponds to a $1,200 increase in unsecured debt. This level estimate is smaller than the estimates in Table 5 because the average total debt is higher for the credit-bureau sample but also because the estimated effect on the unsecured debt share is smaller for the full sample, suggesting that wage garnishing effects are stronger for treated bankruptcy filers in our mortgagor-heavy credit-bureau sample.

5.4 The Accumulation of Shadow Debt

Having documented that borrowers increase their share of unsecured debt when their incentive to file quickly is blunted by minimum wage changes, we next evaluate the various types of unsecured credit that nearly bankrupt borrowers accumulate. In particular, we evaluate the fraction of unsecured debt that is not documented by formal credit registries, a type of debt we term "shadow debt," as detailed in section 4.1. We then further decompose increases in shadow debt as a result of filing delays in section 5.5.

The summary statistics in section 4.1 show that shadow debt represents a large and meaningful segment of the consumer credit complex, at least for distressed borrowers. Distressed borrowers may be most likely to accumulate shadow debt because shadow debt lenders (such as utility companies or hospitals) are unlikely to check credit reports before providing goods or services on credit. Panel II of Figure 7 plots the reduced-form relationship between shadow debt and garnishable wages, conditional on our controls, separately for the treatment and control samples. Shadow debt decreases with garnishable wages through the treatment region of garnishable wages, but conditional on our controls, there is no correlation between shadow debt and garnishable wages in the control region. The pattern in panel II of Figure 7 is consistent with the prediction that quasi-random decreases in wage garnishing push borrowers towards filing more slowly, providing more time to accumulate shadow debt.

To formally test whether shadow debt responds to bankruptcy filing delays, we reestimate the same 2SLS specification of (3) and (2) with shadow debt as a share of total debt as the dependent variable. As before, column 1 of Table 7 reports OLS estimates and columns 2-5 tabulate the 2SLS estimates following the same sequence of fixed effects in Table 5. Estimates of this specification indicate a 1.6 to 2.4 percentage-point increase in shadow debt as a fraction of total debt for an additional month delay in filing. Even conservatively taking the lowest estimate in Table 7, an

additional month of filing delay increases shadow debt for the average treated borrower by $6,300.[30] The point estimates in Tables 5 and 7 indicate that the filing delays induced by minimum wage increases have a larger effect on shadow debt than total unsecured debt. These coefficients are not statistically different from one another, and we cannot reject the hypothesis that the increase in unsecured debt is completely comprised of an increase in shadow debt.[31]

5.5 Filing Delay Effects by Shadow Debt Category

To estimate which debt categories are the most responsible for the increase in shadow debt, we exploit the detailed listing of each individual unsecured debt in the Schedules filed by the borrower. As described in section 4 above, we use the textual descriptions of individual debts to categorize unsecured liabilities and then compare debt amounts in each category to those available from a credit report. Specifically, we examine shadow debt in four categories: credit card or retail loans, student loans, personal loans, and informal credit, the latter consisting of the remaining unsecured debt categories in Table 2. By comparing actual debt amounts from the bankruptcy filing to those reported to the credit bureau, this categorization allows us to decompose shadow debt into formal and informal channels. Formal shadow debt is the gap between actual debt from the bankruptcy filing and debt visible on a credit report for formal lending products like credit cards, student loans, and personal loans. Informal shadow debt is the remainder of shadow debt after subtracting all formal shadow debt. As mentioned before, the average total shadow debt, including formal and informal varieties, is more than $40,000. Surprisingly, formal shadow debt comprises about $30,000 of that total. Though the potential breakdown in the reporting of formal debt is noteworthy, we are primarily interested in discovering the type of shadow debt origination that responds most strongly to bankruptcy filing delays. We rely on our 2SLS specification, reestimating equation (3) with the dependent variable being defined as $Shadow\,Debt^{j}_{ist}/Total\,Debt_{ist}$, where the numerator $Shadow\,Debt^{j}_{ist}$ is the total amount of shadow debt owed by borrower i in one of the four specific debt categories j filing in court s at time t. Because the dependent variable is the share of shadow debt in each category and the four categories are mutually exclusive and exhaustive of all shadow debt, the total effect for the four shadow debt categories sum to the coefficient for total shadow

[30] Appendix Table A3 estimates the reduced-form effect of treatment on the shadow debt share.

[31] While inconclusive, the point estimates are also consistent with some borrowers using shadow debt to pay back some formal unsecured debt.

debt estimated in column 2 of Table 7.[32]

Table 8 reports results with filing-year and court-district fixed effects. We find small and insignificant effects in each of the three formal shadow debt categories: credit cards/retail debt, student loans, and unsecured personal loans. Constrained borrowers who delay filing are unlikely to be able to increase borrowing through formal credit markets, even in the shadows, and we see no increase in this type of shadow debt. By contrast, in column 4, we find an economically and statistically significant 171 basis point increase in informal shadow debt due to exogenous changes in the time between delinquency and filing. This increase in informal shadow debt is consistent with borrowers turning to informal creditors who are likely uninformed that the borrower is on the brink of bankruptcy. The unsecured debt categories besides credit cards, student loans, and personal loans in Table 2 are types of liabilities that we do not expect to be reported to credit bureaus and would thus make up the informal shadow debt category in column 4. These same categories are also the types of liabilities most positively correlated with shadow debt (Figure 1).

5.6 Interpretation

The results above show that an exogenous nudge towards delayed bankruptcy filing results in higher debt levels listed on bankruptcy filings and that these debt increases are predominantly in informal shadow debt. Though we cannot observe borrower intentions directly, borrower-level heterogeneity allows us to partially differentiate among possible debt accumulation motives. Cross-sectional tests further address concerns about selection and debt accumulation variation being driven by any mechanical effects of wage garnishment, the accumulation of fines and fees, and direct income effects of minimum wage changes on debt levels.

We construct a proxy for borrowers who are more likely to be filing for relatively exogenous shocks: large medical debt, recent job loss, or divorce. Though such circumstances are not necessarily random, borrowers with such life events seem particularly likely to be filing for bankruptcy for reasons that do not include exploiting the ability to discharge extra debt in bankruptcy. We extend our baseline specification to include a "non-shocked" indicator for filers with less than $500

[32]Note that negative shadow debt-share coefficients do not necessarily indicate declines in the absolute levels of a given shadow debt category; shadow debt amounts could be increasing in all categories, though faster in some categories than others.

in medical debt, who are employed, and who are not separated or divorced from their spouse.[33] This sample split classifies roughly 40% of filers in our sample as "non-shocked."[34]

Our first test interacts the non-shocked indicator with the interaction between the treatment dummy and garnishable wages from the previous analysis (and includes interactions with the corresponding main effects). This specification is designed to estimate differences in debt accumulation patterns for the sample of borrowers that have experienced observable adverse life events relative to the sample of borrowers that have little medical debt, are employed, and are not divorced. Appendix Table A6 reports estimates that test for differences in the timing of filing (the first stage) across the two groups. Both shocked and non-shocked filers' timing respond equally to wage garnishment shocks—both subsamples delay filing for bankruptcy by about one month after wage garnishment declines. However, although both sets of borrowers on average avail themselves of a longer time to file, the two samples' debt responds very differently. The first two columns of Table 9 show that only debtors in the non-shocked sample significantly increase unsecured debt following a garnishable wage decrease, and columns 3-4 similarly reports that only individuals in the non-shocked sample accumulate shadow debt when treated. Finally, columns 5-6 of Table 9 show that the run up in informal shadow debt is also concentrated among non-shocked filers.[35]

These subsample results also help to rule out at least three possible alternative mechanisms that could explain our main results. First, a threat to validity mentioned in Section 5.2 is the possibility that changes in the minimum wage or wage garnishment could increase debt levels through an income effect that expands debt capacity. However, such effects should operate equally on each of the shocked and non-shocked subsamples. If our effects were driven by increases in the minimum wage, we would expect even borrowers whose distress was caused by medical, marital, or employment shocks to also show increases in debt because income effects should affect both groups. Instead, the estimates show that substantial debt accumulation occurs only within the subsample of borrowers that do not appear to experience an observable adverse life event. A second concern is that decreased wage garnishment mechanically increases borrower debt because it reduces the amount of debt being paid down through garnishment. Differences in debt accumulation estimates across the two samples

[33]The accompanying results are robust to defining the "non-shocked" dummy using various individual and combined measures of minimal medical debt, household employment, and a lack of divorce.

[34]We report summary statistics of the two subsamples in Appendix Tables A4 and A5.

[35]Additional specifications with triple difference-in-differences estimates on the pooled sample, alternative fixed effects, and using the full bankruptcy sample are reported in Appendix Tables A7-A10.

also push against this possibility because mechanical garnishment effects should operate equally on each subsample. The subsample results also rule out a third concern, which is that increases in debt amounts could be driven by increased fines and fees stemming from filing delays. Given that both samples respond to the nudge to delay filing, such fines and fees should accumulate equally across the two subsamples.[36]

Our conceptual framework suggests debt accumulation is increasing in the degree of information asymmetry (see section 3 and Appendix B). Although we cannot directly measure information asymmetry empirically, it is plausible that borrowers' private information with respect to their bankruptcy intentions increases as borrowers move closer to filing. Under this assumption, a testable implication of the model is that borrowers should increase debt levels as they approach filing.[37] We estimate this relationship using the timing of newly originated debt, measured in a limited sample of liabilities listing precise origination dates. Using these dates, we calculate the fraction of total debt at bankruptcy that was originated within six months of the filing date. Because of the limited sample size, we estimate reduced-form regressions of the fraction of debt originated six months prior to filing on garnishable wages. Table 10 reports the results of this exercise. Column 1 reports results for the full sample, and columns 2-3 report estimates for the shocked and non-shocked samples, respectively. For the pooled sample, a decrease in garnishable wages is associated with a statistically significant 28 bp increase in debt accumulated within the six months before filing. The significant 87 bp estimate in column 3 indicates that this result is concentrated in the non-shocked sample, with an implied magnitude of additional recent debt ($3,779 using the mean total debt in Appendix Table A5) consistent with the $4,000 debt effect estimated in Table 5. A pattern of increased debt accumulation just prior to filing is consistent with filing delays playing a causal role in debt accumulation, further ruling out alternative explanations such as sample selection.

The results in this section show that additional debt accumulation occurs only within the non-shocked sample of borrowers and that treated borrowers who accumulate more debt do so in the

[36] Our estimated debt effects (roughly $4,000) are also too large to plausibly be caused by fines, fees, and interest given the magnitudes in Di Maggio et al. (2020). Moreover, using the loan categorization to identify claims that are explicitly listed as fees, we find that fees and fines constitute 1.37% and 1.59% of total unsecured claims for the average filers in the non-shocked and shocked samples, respectively. Thus, fees appear to be, if anything, larger among the shocked sample.

[37] While the bankruptcy statute prohibition of preferential transfers would lead to debt increases from the nonpayment of debts in the months immediately prior to bankruptcy, this channel should also affect shocked and non-shocked borrowers equally. See Appendix A for more details.

six months before filings for bankruptcy. This increased debt is then subsequently discharged in bankruptcy, which likely increases equilibrium prices of goods and credit for non-defaulting borrowers, as argued previously. This is true regardless of whether defaulting borrowers intentionally run up debt prior to bankruptcy—knowing that they will have those debts forgiven—or unintentionally through a more passive process. However, we also note that the subsample and timing-of-debt-accumulation results helps differentiate between intentional and passive debt accumulation. Though our adverse-event proxy is imperfect (i.e., medical debt, job loss, and divorce are not necessarily exogenous), these major events occurring among the shocked sample would intuitively lead these filers to have more debt at bankruptcy and to incur this debt closer to filing. Instead, our results show the opposite. Further, the magnitudes of the estimates exceed debt amounts that would be accumulated by simply continuing habitual consumption during an average 30-day delay in filing. Estimates from Table 9 suggest that a 30-day filing delay is associated with an additional $8,000 in debt for the non-shocked sample, compared to $1,000 for the shocked sample. By contrast, the expected non-housing expenses per month at bankruptcy exit as declared on bankruptcy filings are approximately $2,000. Even if the non-shocked sample were somehow more likely to face idiosyncratic expense shocks, the average dollar amount of such events would have to be almost an order of magnitude larger to explain the difference in the estimates. Given this, our results appear consistent with a differential increase in nonpayment just prior to bankruptcy among the non-shocked sample.

6 Conclusion

A bankruptcy system provides consumers with many benefits, including insurance against bad luck and a corresponding willingness to take on risk. Many of these benefits have been explored theoretically and empirically by prior studies. This paper documents new costs of a bankruptcy system by documenting how borrowers accumulate debt in the run-up to bankruptcy and how they choose when to enter bankruptcy. Filers wait an average of 22 months after their first serious delinquency before filing for bankruptcy. While filing delays afford consumers an opportunity to alleviate distress, delaying also creates the potential for larger debt balances at the time of filing. Our analysis utilizes new and uniquely detailed bankruptcy filing data and an instrumental variables strategy that isolates quasi-exogenous variation in the incentive to delay filing for bankruptcy to

document how consumers accumulate debt leading up to filing for bankruptcy.

Conditional on filing, we find that the average borrower files with nearly $240,000 in total debt, $95,000 of which is unsecured. Borrowers facing decreased wage garnishing due to minimum wage increases file for bankruptcy an average of one month later than otherwise similar borrowers, while accumulating an incremental $4,000 of unsecured debt. A series of robustness checks provide evidence that our results cannot be explained by direct effects of the minimum wage increases, time-varying shocks specific to debtors in the treated income range, increased fines or fees, the avoidance of preferential transfers, or any other change in the composition of bankruptcy filers. We also document a large amount of debt reported at bankruptcy that does not appear on formal credit registries, usually informal debt that credit bureaus are not expected to detect or monitor. Such "shadow debt" appears to be originated by pseudo-creditors, including sellers of goods and services who become creditors only after buyer nonpayment. Informal shadow debt originated by pseudo-creditors appears to be the primary source of debt relied upon by distressed borrowers anticipating bankruptcy, possibly because such borrowers face acute credit constraints in formal credit markets.

While we cannot conclusively discern borrower motives, the amount of debt originated among filers without observable and plausibly exogenous negative economic shocks is substantially larger than otherwise similar borrowers. To the extent that borrowers with health, employment, or marital shocks are less likely to be strategic filers, their lack of debt accumulation notably contrasts with the large effects for filers without such observable shocks, suggesting that some borrowers may be intentional in their pre-bankruptcy debt accumulation. However, from a creditor's perspective, regardless of whether a borrower intentionally increases debt-financed consumption prior to bankruptcy or simply does not pay back debt while attempting to stave off bankruptcy, delaying bankruptcy by increasing debt for any reason is costly when the borrower ends up in bankruptcy. Instead of reducing bankruptcy benefits, a social planner might optimally encourage potential defaulters to enter bankruptcy more quickly to free up cash flows for future consumption. Given this, policymakers designing a bankruptcy system may want to consider how features of that system lead to the unintended consequences we document of increasing indebtedness from delayed filing.

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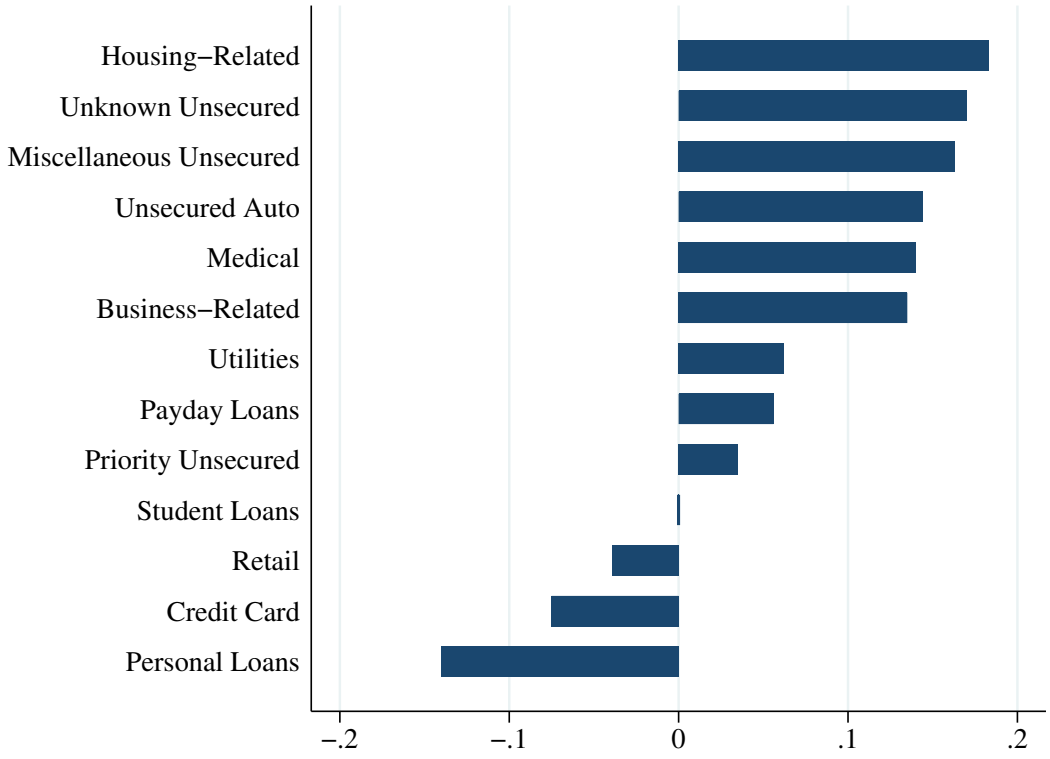
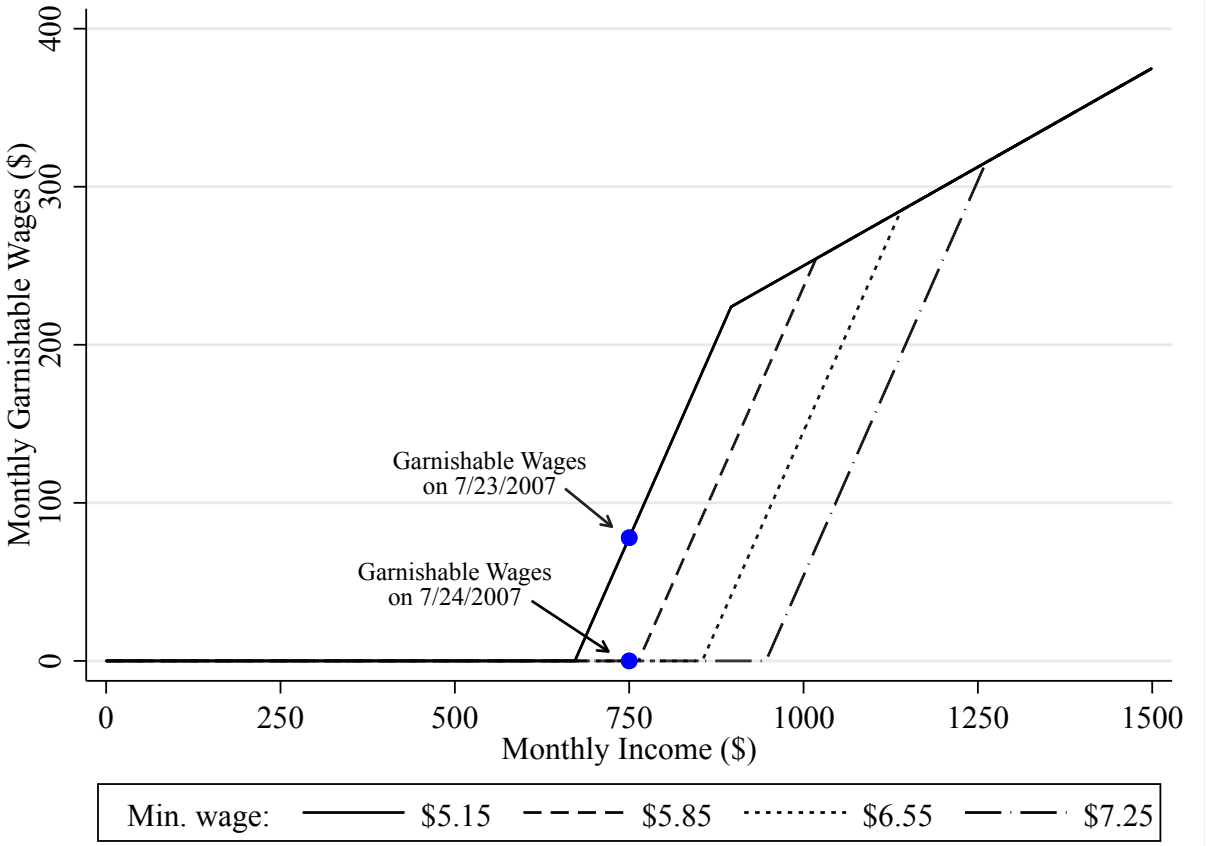
Figure 1: Correlations Between Shadow Debt Share and Unsecured Debt Category Shares



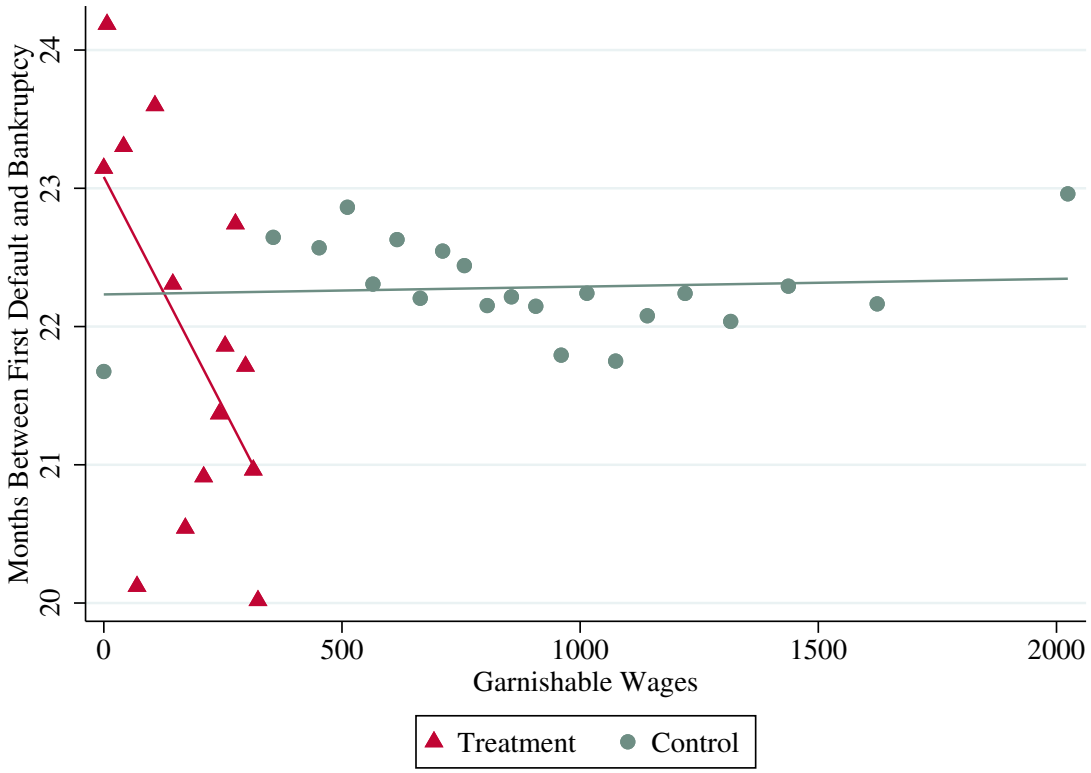
Notes: Figure plots the bivariate correlation coefficient between each listed unsecured debt category's share of total debt and the unsecured shadow debt share of total debt of at the individual level. The shadow debt share is the share of unsecured debt discharged in bankruptcy not reported in credit-bureau data. Unsecured liabilities are allocated to unsecured debt categories from textual descriptions using the LDA procedure described in Appendix C.

Figure 2: Monthly Garnishable Wages by Federal Minimum Wage Level



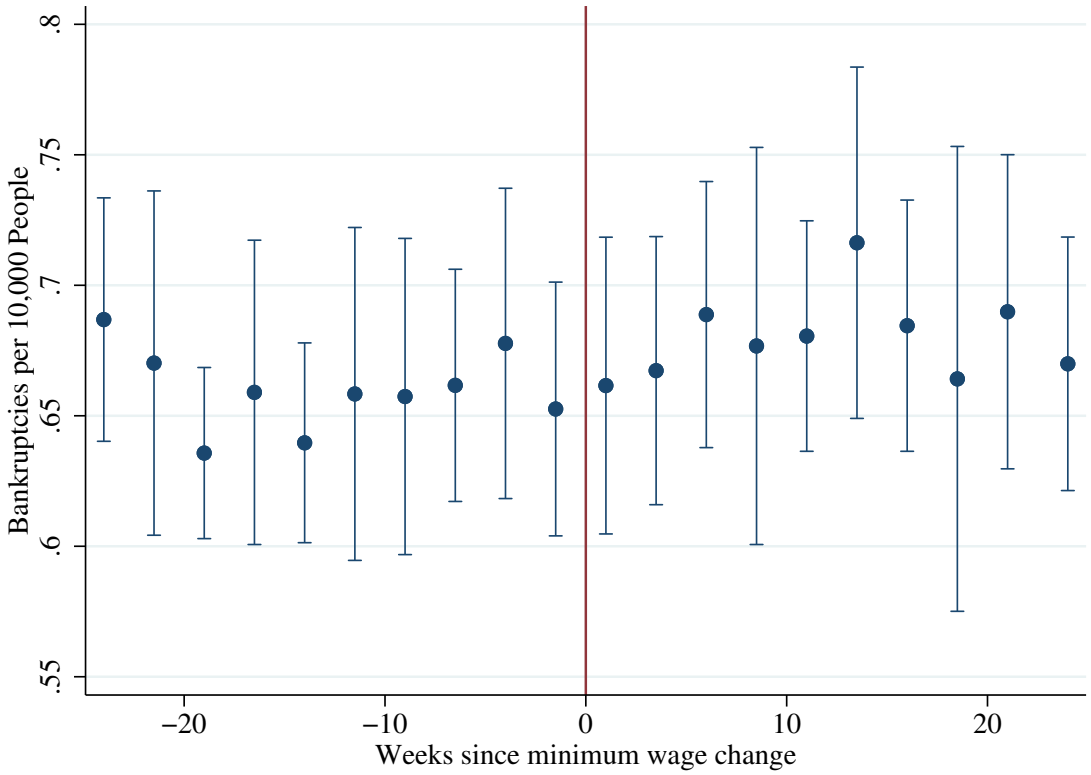
Notes: Figure plots the maximum level of monthly wages that are eligible for wage garnishing as a function of a household's monthly income for each of four federal minimum wage regimes according to equation (1) with $\omega_s = 30$, corresponding to the Florida and Utah statutes.

Figure 3: Garnishable Wages and Days to File



Notes: Figure plots a binned scatter plot of the number of months between the first 90-day delinquency and the bankruptcy filing date as a function of garnishable wages. The number of months to file is defined as the number of days to file divided by 30 after residualizing for court-district and year fixed effects and filer controls including income, number of dependents, Vantage credit score, log(total assets), and indicators for filing chapter, marital status, homeownership, business ownership, retirement status, employment status, and disability status. Garnishable wages are the monthly dollar amount of income that is exposed to garnishing according to federal statute at the time of bankruptcy filing.

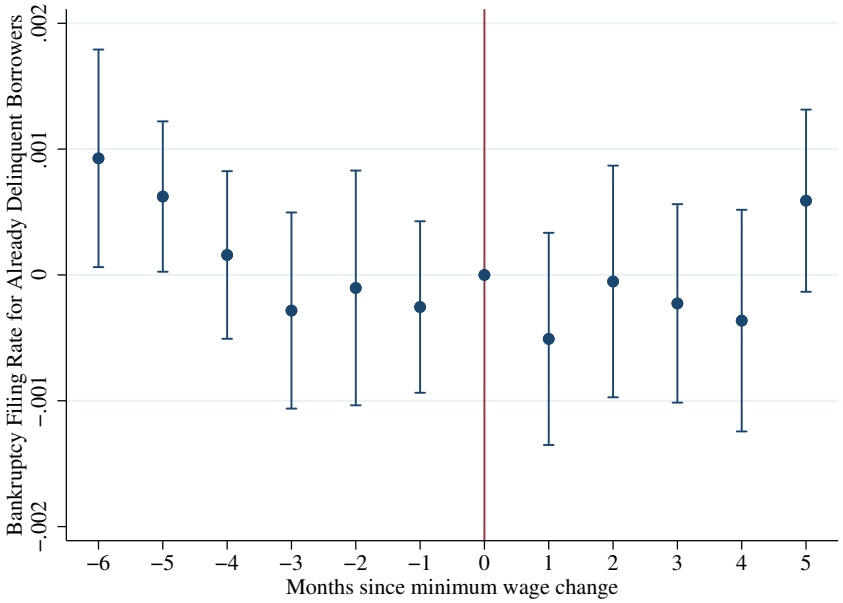
Figure 4: Bankruptcy Counts Around Minimum Wage Changes



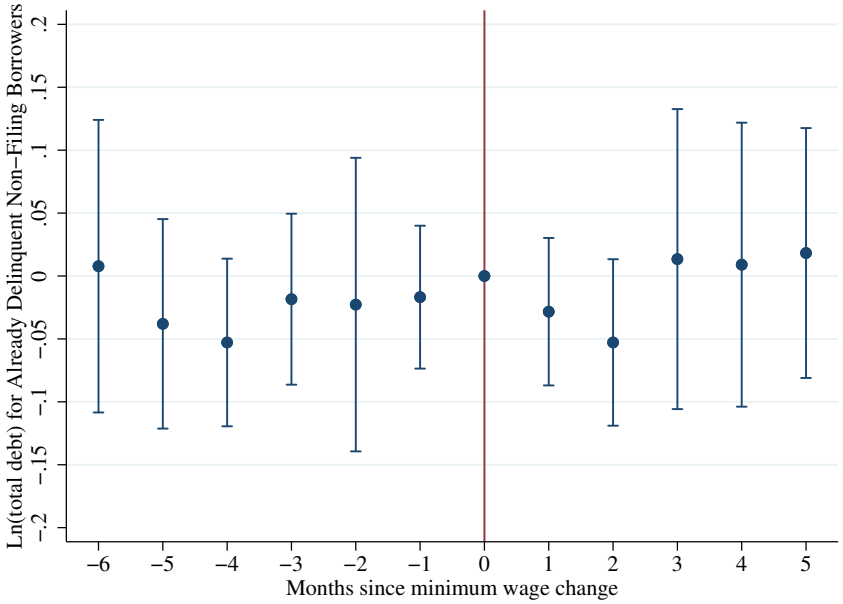
Notes: Figure plots the weekly average number of bankruptcies per 10,000 people across Florida, Minnesota, and Utah after controlling for the local unemployment rate and state and week-of-year fixed effects. Graph displays the six months before and the six months after the changes in minimum wage laws along with 95% confidence intervals.

Figure 5: Selection Tests Using Delinquent Borrower Outcomes Around Minimum Wage Changes

I. Delinquent Borrower Bankruptcy Rates Around Minimum Wage Changes

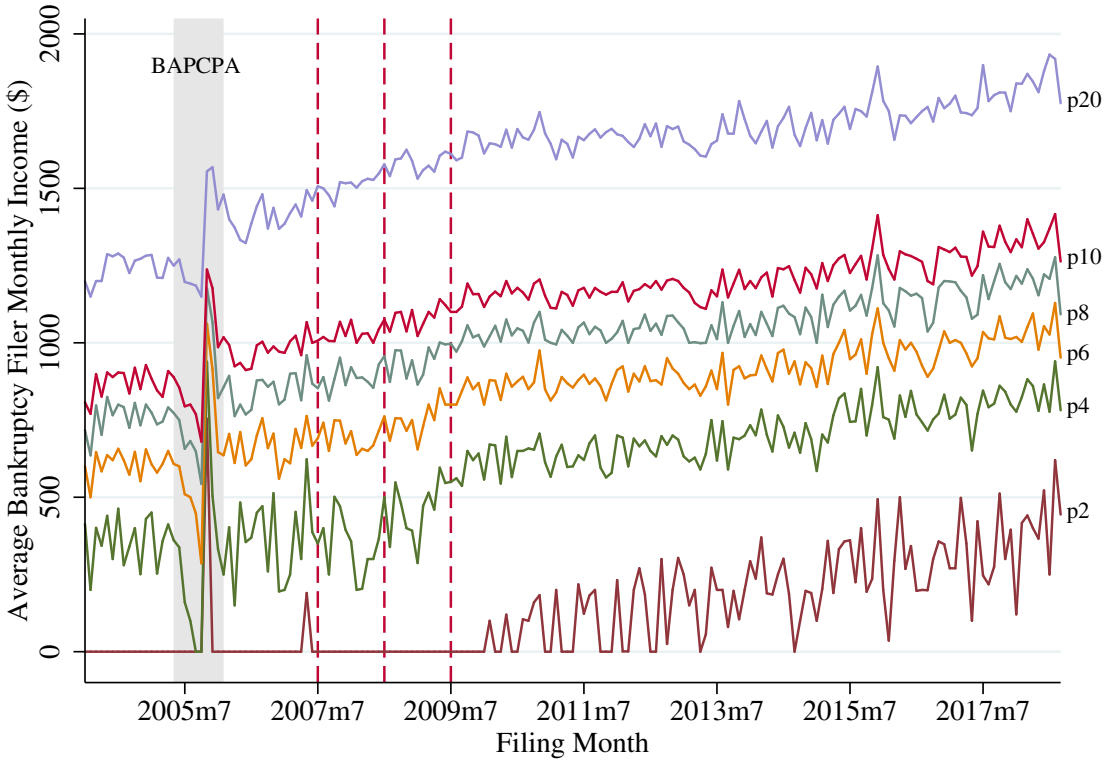


II. Delinquent Borrower Total Debt Around Minimum Wage Changes



Notes: Panel I plots the likelihood of filing for bankruptcy in event time for the six months before and after federal minimum wage increases. The sample in panel I consists of individuals that first became 90 days delinquent on at least one credit-bureau account at least 12 months prior to a given event-time month. Panel II plots log total debt in event time for the six months before and after federal minimum wage increases. The sample in panel II consists of borrowers in the credit-bureau data that do *not* eventually file for bankruptcy and first became 90 days delinquent on at least one credit-bureau account at least 12 months prior to a given event-time month. Estimates in both panels have been adjusted for month-of-year fixed effects and year fixed effects with the bankruptcy rate normalized to zero in the month of the minimum wage change. Plotted 95% confidence intervals are clustered by Zip3 × calendar month.

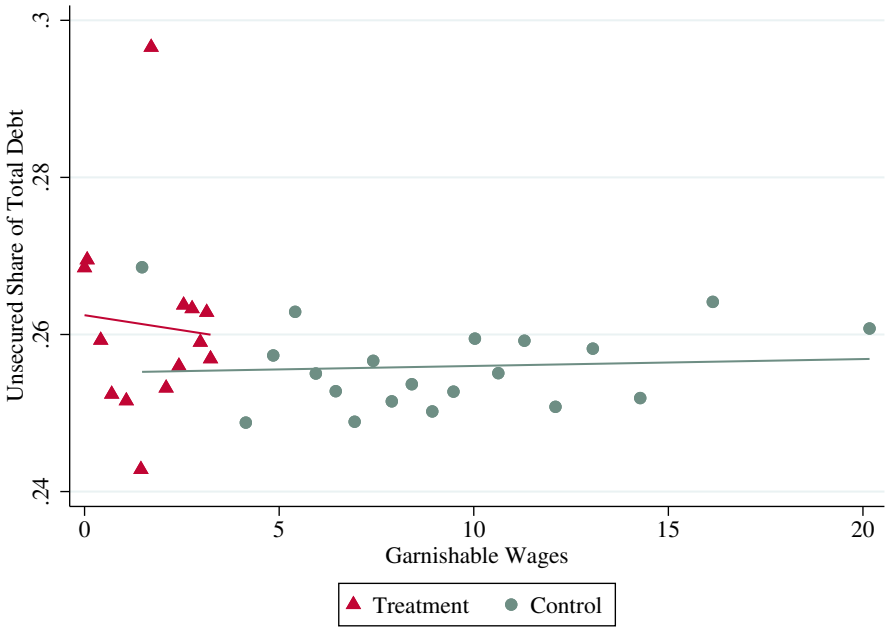
Figure 6: Distribution of Bankruptcy Filer Income



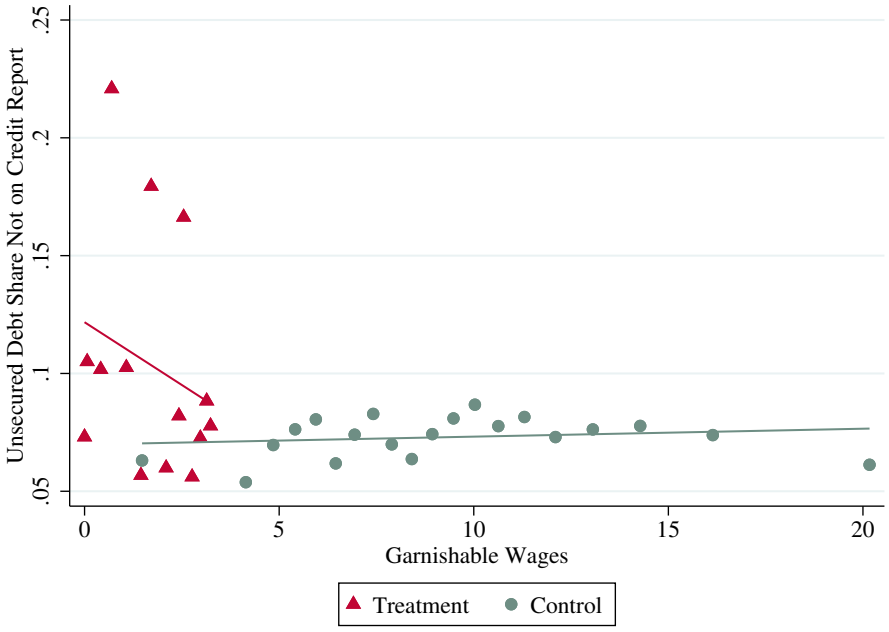
Notes: Figure plots percentiles of bankruptcy filer incomes by the month of filing. Dashed vertical lines indicate the timing of three federal minimum wage changes that affected wage garnishing for treated filers in our sample. Gray shaded area marks the announcement and passage of the Bankruptcy Abuse Prevention And Consumer Protection Act of 2005 that Gross et al. (2021) show had a large effect on personal bankruptcy filing.

Figure 7: Debt Shares and Garnishable Wages by Treatment Status

I. Unsecured Debt Share and Garnishable Wages



II. Shadow Debt Share and Garnishable Wages



Notes: Figure plots a binned scatter plot of the fraction of total debt disclosed in bankruptcy that is unsecured (panel I) or unsecured shadow debt (panel II) as a function of garnishable wages after controlling for court-district and year fixed effects and filer controls including income, number of dependents, Vantage credit score, log(total assets), and indicators for filing chapter, marital status, homeownership, business ownership, retired status, employment status, and disabled status. The shadow debt share in panel II is the share of unsecured debt discharged in bankruptcy not reported in credit-bureau data. Garnishable wages are the dollar amount of monthly income that is exposed to garnishing according to federal statute at the time of bankruptcy filing.

Table 1: Summary Statistics: Full Sample of Bankruptcy Filings

Variable	Mean	Std. Dev.	Percentile 25th	50th	75th
Monthly Income ($)	2,973.3	1,682.3	1,786.8	2,700	3,902.2
Monthly Garnishable Wages ($)	727.03	442.81	446.7	675	975.55
Total Assets ($)	133,738.0	207,304.2	10,380.9	84,265.3	197,556.9
Total Debt ($)	238,809.2	673,127.3	52,545.6	148,959.6	282,618.1
Mortgage Debt ($)	108,291.2	171,334.7	0	64,074	169,900
Unsecured Debt ($)	96,502.3	570,631.5	24,502	44,835.5	82,656.4
Unsecured Debt Share	0.53	0.36	0.19	0.46	0.94
Chapter 7 Indicator	0.74	0.44	0	1	1
Married Indicator	0.34	0.47	0	0	1
Divorced Indicator	0.11	0.32	0	0	0
Separated Indicator	0.04	0.19	0	0	0
Single Indicator	0.21	0.41	0	0	0
Widowed Indicator	0.02	0.13	0	0	0
Unknown Marital Status Indicator	0.28	0.45	0	0	1
Homeowner Indicator	0.56	0.50	0	1	1
Business Owner Indicator	0.24	0.43	0	0	0
Filing Jointly Indicator	0.33	0.47	0	0	1
Number of Dependents	0.98	1.27	0	0	2
Retired Indicator	0.02	0.15	0	0	0
Disabled Indicator	0.03	0.16	0	0	0

Notes: Table reports summary statistics for the universe of bankruptcy schedules. Monthly income is the self-reported current income from the filing schedules. Monthly garnishable wages is the dollar amount of monthly wage income that is exposed to garnishing according to the applicable state statute at the time of bankruptcy filing. N = 554,942.

Table 2: Share of Debt by Loan Category

Category	% of (Un)Secured	% of Total	% with Loan Type
	I. Secured Debt		
Mortgage	63.29%	35.59%	51.62%
Auto Loan	29.18%	6.73%	47.74%
Miscellaneous Secured	3.10%	1.36%	7.16%
Unknown Secured	2.43%	0.79%	5.58%
Household Goods	1.39%	0.18%	5.37%
Other Vehicle	0.61%	0.20%	2.22%
Secured Debt Total	100.00%	44.84%	
	II. Unsecured Debt		
Credit Card	30.41%	14.76%	76.60%
Personal Loan	12.50%	6.55%	52.55%
Retail Debt	10.87%	5.39%	71.00%
Unknown Unsecured	8.79%	5.18%	58.06%
Student Loan	7.77%	4.92%	24.72%
Medical	7.43%	4.46%	55.69%
Unsecured Auto	6.00%	3.91%	24.96%
Miscellaneous Unsecured	5.84%	3.42%	38.78%
Unsecured Priority Claims	3.25%	1.80%	22.91%
Housing Related	3.22%	2.50%	9.99%
Utilities	1.92%	1.00%	41.42%
Business Debt	1.31%	0.75%	4.80%
Payday Loans/Check Cashers	0.70%	0.39%	8.82%
Unsecured Debt Total	100.00%	55.03%	

Notes: Table reports the average share of secured debt that falls into each of 6 secured loan categories (panel I), the average share of unsecured debt that falls into each of 13 unsecured loan categories (panel II), and each category's share of total debt. The final column reports the share of bankruptcy filers that have at least one loan in each category. The miscellaneous category include smaller categories such as unpaid insurance premia, non-priority tax liabilities, bad checks, fees, legal fees, and loans against retirement accounts or certificates of deposit. Unknown categories include all loans that did not provide enough information to be categorized. Unsecured Priority Claims include tax, child support, and alimony claims reported in Schedule E for each bankruptcy filer. See Appendix C for a detailed description of our categorization algorithm. N = 554,942.

Table 3: Summary Statistics: Credit-Bureau-Matched Sample

Variable	Mean	Std. Dev.	Percentile 25th	50th	75th
		I. Bankruptcy Filing Variables			
Monthly Income ($)	3,577.5	1,785.1	2,320.9	3,360	4,586.4
Monthly Garnishable Wages ($)	886.12	459.83	580.24	840	1,146.61
Total Assets ($)	245,021.2	251,136.2	125,937.0	190,834.6	286,408.5
Total Debt ($)	394,914.6	499,685.4	194,233.9	283,777.9	442,075.2
Mortgage Debt ($)	212,206.9	220,722.8	106,900	164,600	249,000
Unsecured Debt ($)	97,317.1	222,097.8	29,602	54,137.5	97,809.2
Unsecured Debt Share	0.26	0.20	0.12	0.21	0.34
Chapter 7 Indicator	0.68	0.47	0	1	1
Married Indicator	0.51	0.5	0	1	1
Divorced Indicator	0.12	0.32	0	0	0
Separated Indicator	0.04	0.19	0	0	0
Single Indicator	0.19	0.39	0	0	0
Widowed Indicator	0.02	0.13	0	0	0
Unknown Marital Status Indicator	0.13	0.34	0	0	0
Homeowner Indicator	0.94	0.23	1	1	1
Business Owner Indicator	0.31	0.46	0	0	1
Filing Jointly Indicator	0.44	0.50	0	0	1
Number of Dependents	1.09	1.29	0	1	2
Retired Indicator	0.03	0.16	0	0	0
Disabled Indicator	0.02	0.14	0	0	0
		II. Credit-Record Derived Variables			
Total Debt ($)	259,044.9	227,790.7	133,086.5	211,034	317,250
Unsecured Debt ($)	55,636.9	139,892.6	5,527.5	19,013	47,623.5
Mortgage Debt ($)	195,899.9	152,242.2	103,000	172,000	255,000
Revolving Debt ($)	19,226.7	38,177.8	981	6,260.5	20,467
Shadow Debt ($)	41,680.2	247,231.9	3,553	27,750.5	66,775.4
Credit Card / Retail Shadow Debt ($)	20,502.5	46,420.7	0	11,655.5	33,383.5
Student Loans Shadow Debt ($)	1,190	23,039.7	0	0	0
Personal Loans Shadow Debt ($)	11,191.4	55,227.9	0	0	9,314.8
Informal Shadow Debt ($)	8,797.5	223,037.7	-36	4,422.5	21,924
Shadow Debt Share of Total Debt	0.07	0.38	0.01	0.11	0.23
Months to File	22.3	20.9	6.8	15.3	31.1
Credit Score	508.0	77.4	454	508	563

Notes: Table reports summary statistics for bankruptcy filings that merged with our credit-bureau sample. Panel I reports statistics on the same variables as Table 1 for comparison—see notes to Table 1 for further details. Panel II reports statistics on variables derived from credit records. Revolving debt is the total amount of debt listed on the filer's credit report at the time of bankruptcy that was revolving (i.e., as opposed to installment payments for a fixed loan size). Shadow debt is the amount of unsecured debt reported on bankruptcy filings but not on credit reports. Months to file is the number of days divided by 30 that elapsed between an individual's first 90-day delinquency on any debt in the credit report and the bankruptcy filing date. Credit score is a proprietary risk measure from our credit bureau for the bankruptcy petitioner as of the month of bankruptcy filing. N = 47,960.

Table 4: First-Stage: Effect of Wage Garnishing on Bankruptcy Filing Timing in Months

	(1)	(2)	(3)	(4)
Treatment × Garnishable Wages	-1.12***	-0.78**	-1.03**	-1.19***
	(0.37)	(0.38)	(0.45)	(0.38)
Filer Controls	✓	✓	✓	✓
Year Fixed Effects	✓		✓	✓
District Fixed Effects	✓		✓	✓
District × Year Fixed Effects		✓		
Income × Year Controls			✓	
Income Quartile Controls				✓
Partial F-Stat	9.00	4.31	5.20	9.68
R^2	0.60	0.61	0.60	0.60
Observations	47,960	47,960	47,960	47,960

Notes: Table reports first-stage regression results using the credit-bureau-matched sample. Dependent variable is the number of months between the first 90-day delinquency and the bankruptcy filing date, defined as the number of days to file divided by 30. Dependent variable mean is 22.3. Garnishable wages are the dollar amount (measured in $100s) of monthly income exposed to garnishing by creditors according to federal statute at the time of bankruptcy filing. Treatment is an indicator for the treated monthly income range ($600 to $1,300). All specifications control for main effects for treatment, garnishable wages, and treatment × income. Filer controls include income, number of dependents, Vantage credit score, log(total assets), and indicators for filing chapter, marital status, homeownership, business ownership, retired status, employment status, and disabled status. Robust standard errors in parentheses are double clustered by filing month and 3-digit zip code. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 5: Second Stage: Effect of Bankruptcy Filing Timing on Unsecured Debt Share of Total Debt

	(1)	(2)	(3)	(4)	(5)
Estimator	OLS	2SLS	2SLS	2SLS	2SLS
Months to File	-0.0002***	0.0079**	0.0109*	0.0119**	0.0074**
	(0.0001)	(0.0038)	(0.0064)	(0.0057)	(0.0036)
Filer Controls	✓	✓	✓	✓	✓
Year Fixed Effects	✓	✓		✓	✓
District Fixed Effects	✓	✓		✓	✓
District × Year Fixed Effects			✓		
Income × Year Controls				✓	
Income Quartile Controls					✓
R^2	0.60	0.48	0.40	0.38	0.48
Observations	47,960	47,960	47,960	47,960	47,960

Notes: Table reports OLS (column 1) and two-stage least-squares regressions (columns 2-5) using the credit-bureau-matched sample. Dependent variable is the fraction of total debt disclosed in bankruptcy that is unsecured. Dependent variable mean is 0.26. Months to File is the number of days between the first 90-day delinquency and the bankruptcy filing date divided by 30. Excluded instrument is Treatment × Garnishable Wages. All specifications include main effects for treatment and garnishable wages. Filer controls include income, number of dependents, Vantage credit score, log(total assets), and indicators for filing chapter, marital status, homeownership, business ownership, retired status, employment status, and disabled status. Robust standard errors in parentheses are double clustered by filing month and 3-digit zip code. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 6: Reduced Form: Effect of Wage Garnishing on Unsecured Debt Share of Total Debt

	(1)	(2)	(3)	(4)
Treatment × Garnishable Wages	-0.0027*	-0.0033**	-0.0067***	-0.0046***
	(0.0014)	(0.0013)	(0.0018)	(0.0014)
Filer Controls	✓	✓	✓	✓
Year Fixed Effects	✓		✓	✓
District Fixed Effects	✓		✓	✓
District × Year Fixed Effects		✓		
Income × Year Controls			✓	
Income Quartile Controls				✓
R^2	0.75	0.75	0.75	0.75
Observations	554,942	554,942	554,942	554,942

Notes: Table reports reduced-form regressions using the full sample of bankruptcy filings. Dependent variable is the fraction of total debt disclosed in bankruptcy that is unsecured. Dependent variable mean is 0.53. Garnishable wages are the dollar amount (measured in $100s) of monthly income exposed to garnishing by creditors according to federal statute at the time of bankruptcy filing. Treatment is an indicator for the treated monthly income range ($600 to $1,300). All specifications control for main effects for treatment, garnishable wages, and treatment × income. Filer controls include income, number of dependents, Vantage credit score, log(total assets), and indicators for filing chapter, marital status, homeownership, business ownership, retired status, employment status, and disabled status. Robust standard errors in parentheses are double clustered by filing month and 3-digit zip code. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 7: Second Stage: Effect of Bankruptcy Filing Timing on Shadow Debt Share of Total Debt

	(1)	(2)	(3)	(4)	(5)
Estimator	OLS	2SLS	2SLS	2SLS	2SLS
Months to File	0.0009***	0.018**	0.024*	0.017*	0.016**
	(0.0001)	(0.008)	(0.013)	(0.009)	(0.007)
Filer Controls	✓	✓	✓	✓	✓
Year Fixed Effects	✓	✓		✓	✓
District Fixed Effects	✓	✓		✓	✓
District × Year Fixed Effects			✓		
Income × Year Controls				✓	
Income Quartile Controls					✓
R^2	0.51	0.40	0.35	0.41	0.42
Observations	47,960	47,960	47,960	47,960	47,960

Notes: Table reports OLS (column 1) and two-stage least-squares regressions (columns 2-5) using the credit-bureau-matched sample. Dependent variable is shadow debt, defined as the dollar difference between total unsecured debt discharged in bankruptcy and the total unsecured debt reported in credit-bureau data as a share of total debt reported on bankruptcy filing. Dependent variable mean is 0.07. Months to File is the number of days between the first 90-day delinquency and the bankruptcy filing date divided by 30. Excluded instrument is Treatment × Garnishable Wages. All specifications include main effects for treatment, garnishable wages, and treatment × income. Filer controls include income, number of dependents, Vantage credit score, log(total assets), and indicators for filing chapter, marital status, homeownership, business ownership, retired status, employment status, and disabled status. Robust standard errors in parentheses are double clustered by filing month and 3-digit zip code. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 8: Effect of Bankruptcy Filing Timing on Shadow Debt Categories Share of Total Debt

Dependent Variable	(1) Credit Card/ Retail	(2) Student Loans	(3) Personal Loans	(4) Informal Debt
Months to File	0.0023	-0.0018	0.0007	0.0171**
	(0.0049)	(0.0032)	(0.0028)	(0.0081)
Filer Controls	✓	✓	✓	✓
Year Fixed Effects	✓	✓	✓	✓
District Fixed Effects	✓	✓	✓	✓
R^2	0.50	0.49	0.50	0.39
Observations	47,960	47,960	47,960	47,960

Notes: Table reports two-stage least-squares regressions using the credit-bureau-matched sample. Dependent variable is the shadow debt share of total debt decomposed across four categories in columns 1-4, respectively: 1) credit card and retail shadow debt, 2) student loan shadow debt, 3) personal loan shadow debt, 4) informal shadow debt (the remaining shadow debt that is not in the three previous categories). Months to File is the number of days between the first 90-day delinquency and the bankruptcy filing date divided by 30. Excluded instrument is Treatment × Garnishable Wages. All specifications include main effects for treatment, garnishable wages, and treatment × income. Filer controls include income, number of dependents, Vantage credit score, log(total assets), and indicators for filing chapter, marital status, homeownership, business ownership, retired status, employment status, and disabled status. Robust standard errors in parentheses are double clustered by filing month and 3-digit zip code. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 9: Effect of Wage Garnishing on Debt Shares by Possible Filing Motive

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	Unsecured Debt Share		Shadow Debt		Informal Shadow Debt	
Sample	Shocked	Non-shocked	Shocked	Non-shocked	Shocked	Non-shocked
Treatment × Garnishable Wages	-0.0024	-0.0191***	-0.0052	-0.0461***	-0.0111	-0.0328*
	(0.0052)	(0.0060)	(0.0109)	(0.0161)	(0.0087)	(0.0176)
Filer Controls	✓	✓	✓	✓	✓	✓
Year Fixed Effects	✓	✓	✓	✓	✓	✓
District FEs	✓	✓	✓	✓	✓	✓
R^2	0.61	0.58	0.51	0.51	0.51	0.51
Observations	28,267	19,693	28,267	19,693	28,267	19,693

Notes: Table reports reduced-form regressions using the credit-bureau-matched sample. Dependent variable in columns 1-2 is the fraction of total debt disclosed in bankruptcy that is unsecured. Dependent variable in columns 3-4 is the shadow debt share, defined as the dollar difference between total unsecured debt discharged in bankruptcy and the total unsecured debt reported in credit-bureau data as a share of total debt reported on bankruptcy filing. Dependent variable in columns 5-6 is the informal shadow debt share, defined as the remainder of unsecured debt not in the categories of credit card and retail shadow debt, student loan shadow debt, and personal loan shadow debt. Garnishable wages are the dollar amount (measured in $100s) of monthly income exposed to garnishing by creditors according to federal statute at the time of bankruptcy filing. Treatment is an indicator for the treated monthly income range ($600 to $1,300). Non-shocked is a dummy equal to one for individuals with less than $500 in medical debt, are employed, and are not separated or divorced from their spouse. Filer controls include income, number of dependents, Vantage credit score, log(total assets), and indicators for filing chapter, marital status, homeownership, business ownership, retired status, employment status, and disabled status. All regressions include the interactions of relevant covariates and the main effects. Robust standard errors in parentheses are double clustered by filing month and 3-digit zip code. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 10: Effect of Wage Garnishing on Debt Origination Timing

	(1)	(2)	(3)
Sample	Pooled	Shocked	Non-shocked
Treatment × Garnishable Wages	-0.0028**	-0.0006	-0.0087**
	(0.0013)	(0.0018)	(0.0042)
Filer Controls	✓	✓	✓
Year Fixed Effects	✓	✓	✓
District Fixed Effects	✓	✓	✓
R^2	0.521	0.516	0.531
Observations	76,909	60,819	16,090

Notes: Table reports reduced-form regressions using the sample of filings that have precise debt origination date information. Dependent variable is the fraction of total debt disclosed in bankruptcy that is originated in the 6 months directly before filing. Dependent variable mean is 0.0504. Garnishable wages are the dollar amount (measured in $100s) of monthly income exposed to garnishing by creditors according to federal statute at the time of bankruptcy filing. Treatment is an indicator for the treated monthly income range ($600 to $1,300). Non-shocked is a dummy equal to one for individuals with less than $500 in medical debt, are employed, and are not separated or divorced from their spouse. Filer controls include income, number of dependents, Vantage credit score, log(total assets), and indicators for filing chapter, marital status, homeownership, business ownership, retired status, employment status, and disabled status. Robust standard errors in parentheses are double clustered by filing month and 3-digit zip code. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendix

A Personal Bankruptcy Background

Individuals filing for bankruptcy in the U.S. can choose to file under Chapter 7 or Chapter 13 of the bankruptcy code. In Chapter 7, the debtor can protect certain exempt assets from creditors, including some home equity or a vehicle as well as personal property such as food, clothing, and furniture, but remaining assets must be turned over to a trustee to help pay creditors.[38] In our sample, 87% of all Chapter 7 filers do not have assets above the exemption limit and thus keep all of their personal property. Regardless, after turning over all non-exempt property, nearly all debt is discharged and the individual has no further obligation to repay these debts. Liabilities that are not discharged include secured claims in which the debtor retains the asset (e.g., a mortgage is not discharged if the debtor keeps the home), alimony and child support, some taxes, court fees, and student loans.

While this discharge can be highly beneficial for the debtor, bankruptcy comes with a variety of costs. The total cost of court filing fees, attorney fees, and mandatory debt counseling fees average about $1,400 (GAO, 2008). While this fee is small compared to the average amount of discharged debt, Gross, Notowidigdo, and Wang (2014) show that liquidity constraints prevent a large number of individuals from filing. In addition, an individual can only obtain a Chapter 7 discharge every eight years such that filing for bankruptcy comes at the cost of losing the option to discharge debt in the medium term. Other consequences include having a bankruptcy flag on one's credit report for ten years after filing, which limits access to credit (Dobbie, Goldsmith-Pinkham, Mahoney, and Song, 2020) and imposes possible negative stigma.

Individuals who file for Chapter 13 bankruptcy propose a three- to five-year plan to repay some of their unsecured debt. Dobbie, Goldsmith-Pinkham, and Yang (2017) estimate that Chapter 13 filers propose to repay an average of 36% of their unsecured debt with the rest discharged. In exchange, debtors are allowed to keep non-exempt assets. Due to additional legal filing requirements, Chapter 13 is considerably more expensive than Chapter 7, costing the average filer about $3,400 (GAO, 2008). Debtors who discharge debt in Chapter 13 cannot file for Chapter 7 for six years and cannot re-enter Chapter 13 for two years. Chapter 13 bankruptcy flags stay on the filer's credit report for seven years after the filing. While many prospective bankruptcy filers can choose either Chapter 7 or Chapter 13, individuals with relatively high income may not pass the required means test and would be deemed ineligible to file for Chapter 7.

For our purposes, important aspects of bankruptcy law are whether debtors can pay back debt immediately before bankruptcy and whether debt incurred immediately prior to the bankruptcy is still dischargeable. In order to ensure equal treatment of like creditors in a bankruptcy proceeding, the U.S. Bankruptcy Code instructs bankruptcy trustees to reverse any payment by already insolvent bankruptcy filers to creditors close to a bankruptcy filing that meets certain conditions so that (11 U.S. Code § 547(b)). In the case of personal bankruptcy filers, these conditions depend on whether the paid creditor was an insider or outsider. Trustees are to undo a payment exceeding $600 to an outside creditor made within 90 days of filing and to an inside creditor made up to one year before filing that resulted in the creditor receiving more than would have been received from the bankruptcy proceeding provided the payment was not part of the "ordinary financial affairs" of the debtor and (11 U.S. Code § 547(c)).

If debt incurred in the months prior to filing cannot be discharged, then individuals would obviously have no incentive to strategically increase debt levels prior to entering bankruptcy. The

[38] While bankruptcy law is set at the federal level, exemption limits are set by states individually.

U.S. Bankruptcy Code prevents discharge of debts incurred under "false pretenses, a false representation, or actual fraud" (11 U.S. Code § 523(a)(2)(A)). The Code specifically outlines that debts incurred for luxury goods or services within 90 days of bankruptcy or cash advances within 70 days of bankruptcy are presumed to be nondischargeable. However, the burden of proof is on the creditor to prove actual fraud by the debtor. Specifically, a creditor must prove to the court that the debtor made a representation which they knew at the time was false with the intention to deceive the creditor (*In re Apte,* 96 F.3d 1319, 1322 and *In re Kirsh*, 973 F.2d 1454, 1457). Debts arising from reckless negligence are still dischargeable because the debtor was not intentionally deceiving the creditor. Due to this high bar, very few nondischargeability actions are filed by creditors and debtors can likely discharge nearly all debts incurred in the run-up to a bankruptcy filing.[39]

B Model

In this appendix, we present a stylized model of the consequences of borrowers' ability to originate debt they know will be discharged in an impending bankruptcy that neither incumbent or new lenders would prefer they originate. The model demonstrates the case of full private information, in which borrowers' private information of their bankruptcy plans leads to adverse selection among the buyers of goods and services, which results in higher prices in equilibrium and a deadweight loss from the reduced consumption among non-defaulters that pay higher prices. However, as we discuss below, borrowers do not need to intentionally increase consumption for debt accumulation effects among bankrupt borrowers to cause an aggregate welfare loss. While the model assumes private information and that borrowers act on that private information by increasing consumption, even if borrowers consume at the same rate but delay filing for bankruptcy, this still results in nonpayment, increased debt at bankruptcy, higher equilibrium prices, and decreased consumer surplus for non-defaulters.

Consider a continuum of buyers indexed by i with measure 1 in the market for a single widget. Buyers have private information about their near-term bankruptcy state $D \in \{0, 1\}$, with $D = 1$ corresponding to defaulting buyers who will be declaring bankruptcy soon.[40] A continuum of identical sellers of measure 1 do not observe D_i but know $\alpha = \Pr(D = 1)$. When non-defaulting buyers ($D_i = 0$) purchase a good at price P, they pay P. When a defaulting buyer purchases a good, they declare bankruptcy and renege on their promise to pay so that the seller receives nothing. As the model makes clear, both strategic and passive motivations by defaulting buyers create a negative externality on non-defaulting buyers.

We assume elastic unit demand over widgets, with the utility of the outside option (not buying a widget) equal to zero. Buyers' utility U_i is quasi-linear in wealth with the utility buyer i receives

[39] There is no systematic evidence on the number of nondischargeability claims filed in bankruptcy cases. However, David Sime, the clerk of court for the Bankruptcy District of Utah, estimated in an interview that the total number of nondischargeability actions filed in a year in Utah is at most in the hundreds and that such actions are not generally contesting debt strategically incurred just before bankruptcy, but instead relate to other nondischargeable debt such as alimony and child support. For context, we estimate that in an average year, Utah has about 11,000 personal bankruptcy cases with an average of 30 unsecured debts per case. We conclude that only a tiny portion of all unsecured debts are contested—even if there are 1,000 nondischargeability claims filed in Utah in a year (an order of magnitude above Sime's estimate), they would only comprise 0.3% of all unsecured claims.

[40] While buyers' spending behavior in product markets could affect their likelihood of bankruptcy, the focus of both the model and this paper is on the behavior of people who have already determined their bankruptcy status before entering the market in question. For example, this would arise if bankruptcy were determined by large long-standing debts relative to which the purchase of a widget will be inframarginal for the bankruptcy decision.

from purchasing a widget at price P given by

$$U_i = u_i - (1 - D_i)P \tag{5}$$

where $D_i \in \{0, 1\}$ is the buyer's private information about her default state and $u_i \in [\underline{u}, \bar{u}]$ is idiosyncratic flow utility from consuming the widget and is distributed $F(\cdot)$. We assume that defaulters are time constrained so that only a portion γ are able to purchase the widget. A useful comparative static in our setting is to consider what happens when γ increases, which approximates our empirical setting in which defaulters are exogenously nudged to delay filing for bankruptcy.

Given that the set of buyers has measure one, market demand $Q(P)$ is decreasing in P and is given by

$$Q(P) = (1 - \alpha) \int_P^{\bar{u}} dF(u) + \alpha\gamma \int_0^{\bar{u}} dF(u) = (1 - \alpha)(1 - F(P)) + \alpha\gamma(1 - F(0)). \tag{6}$$

Market demand aggregates demand from two sources: non-defaulting buyers (measure $1 - \alpha$) who value the good more than its price ($u_i > P$) and defaulting buyers (measure $\alpha\gamma$) who buy the good only if they value it more than the outside option ($u_i > 0$). Notably, this means that demand is weakly higher for people with $D = 1$ who are afforded the opportunity to buy the widget; even consumers with a relatively low valuation of the widget have an incentive to buy because their liabilities already exceed their assets, and given the impending declaration of bankruptcy, they are ultimately unlikely to pay for the good. The defaulting buyers could be purchasing the widget explicitly knowing that they will default and not pay, which would constitute intentional moral hazard. However, the purchase could be made hoping to stave off bankruptcy a bit longer or in hopes that the buyer will be able to pay at some point, and as long as this does not appreciably affect the bankruptcy probability the effects in the model are the same. Meanwhile, a share $\alpha(1-\gamma)$ of buyers do not purchase the good because they do not have time before defaulting. As prices rise, the first term in (6) decreases because there are fewer consumers who value the good more than its price and the second term does not respond to a price increase because defaulters' demand is price insensitive.

Given constant marginal cost C, aggregate seller profits are given by

$$\pi = \beta(P)Q(P)(P - C) + (1 - \beta(P))Q(P)(-C) \tag{7}$$

where $\beta(P)$ is the share of total demand $Q(P)$ from $D = 0$ buyers who know they will pay full price P with the seller receiving $P - C$ in profits per widget sold. Conversely, $1 - \beta(P)$ is the share of widgets sold to defaulters, from whom sellers will not receive anything resulting in a loss of C per widget sold. The share of total demand coming from people paying full price is decreasing in price and decreasing in α and γ—higher prices or more defaulting buyers who are able to buy mean a higher share of demand is coming from defaulters—and is given by

$$\beta(P) = \frac{(1 - \alpha) \int_P^{\bar{u}} dF(u)}{(1 - \alpha) \int_P^{\bar{u}} dF(u) + \alpha\gamma \int_0^{\bar{u}} dF(u)}. \tag{8}$$

Assuming the continuum of sellers will lead to perfect competition, prices will adjust in equilibrium to ensure $\pi = 0$ with

$$P = \frac{C}{\beta(P)}. \tag{9}$$

Referencing (8), it is clear that when $\gamma = 0$, there is no demand from defaulters and hence there

is no moral hazard because they receive full price for every widget they sell. Thus, there are no costs from default to pass along to consumers such that marginal cost pricing prevails with $P = C$. However, as the prevalence of default increases because either α or γ increase, markups increase to cover these higher costs.

Appendix Figure A1 illustrates the effect of an increase in moral hazard on prices, quantities, and consumer surplus. For a given level of γ, the zero-profit condition pins down prices $P(\gamma)$ according to (8) and (9). The inverse demand curve is plotted as the diagonal line from A to H and is defined as inverse market demand if $D = 0$ for everyone with $P(Q) = F^{-1}(1 - Q)$, where $F^{-1}(\cdot)$ is the inverse CDF of preferences u_i. To simplify the illustration and ensure the linearity of the inverse demand curve, here we assume that preferences u_i are distributed uniformly $U[\underline{u}, \bar{u}]$ with $\underline{u} \leq 0 < 1 \leq \bar{u}$. At an initial (lower) level of moral hazard, $\gamma = \gamma_1$, price will be $P(\gamma_1)$ and the demand from non-defaulting buyers will be $(1 - \alpha)Q(\gamma_1)$. Total demand across defaulting and non-defaulting buyers will be given by (6), which will include the $\alpha\gamma$ share of buyers who purchase the good because they value it more than 0, know that $D = 1$, and have enough time to purchase widgets before declaring bankruptcy.

Consumer surplus is given by

$$CS = (1 - \alpha) \int_P^{\bar{u}} (u - P) dF(u) + \alpha\gamma \int_0^{\bar{u}} u dF(u) \tag{10}$$

where the first term is the aggregate utility of full-price buyers and the second term is the aggregate utility of defaulting buyers. As discussed above, we use the parameter γ to represent the degree of moral hazard in the market. To see analytically how consumer surplus changes with γ, we make use of the uniform distributional assumption on preferences used to plot Appendix Figure A1 to write consumer surplus at a given price level P is given by

$$CS = \frac{(1 - \alpha)(\bar{u} - P)^2 + \alpha\gamma\bar{u}^2}{2(\bar{u} - \underline{u})}. \tag{11}$$

When γ increases, the instantaneous change in consumer surplus is given by

$$\frac{\partial CS}{\partial \gamma} = \frac{1 - \alpha}{\bar{u} - \underline{u}} \left[-\bar{u} \frac{\partial P}{\partial \gamma} + P \frac{\partial P}{\partial \gamma} \right] + \frac{\alpha\bar{u}^2}{2(\bar{u} - \underline{u})} \tag{12}$$

where $\partial P / \partial \gamma > 0$ as discussed above. In this equation, the first term shows the reduction in consumer surplus for non-defaulters due to rising prices and lower demand, while the second term contains the increase in consumer surplus for defaulters who are now able to purchase the widget before defaulting. Aggregate consumer surplus will decrease in γ as long as the loss for non-defaulters is larger than the gain for defaulters. Formally,

$$\frac{\alpha\bar{u}^2}{2(\bar{u} - \underline{u})} < \frac{1 - \alpha}{\bar{u} - \underline{u}} \left[\bar{u} \frac{\partial P}{\partial \gamma} - P \frac{\partial P}{\partial \gamma} \right],$$

or

$$\alpha < \frac{2(\bar{u} - P)\frac{\partial P}{\partial \gamma}}{\bar{u}^2 + 2(\bar{u} - P)\frac{\partial P}{\partial \gamma}},$$

which will be satisfied for sufficiently small α. Intuitively, as long as only a small fraction of buyers end up defaulting then the deadweight costs borne by non-defaulters outweighs any benefit gained from defaulters.

Graphically, the integral in the first term of consumer surplus in (10) is depicted as the triangle ADE in Appendix Figure A1 and represents the consumer surplus from all of the non-defaulting buyers whose valuations of the good exceed price $P(\gamma_1)$. The second term of consumer surplus is the consumer surplus of defaulting buyers and is represented by rectangle $HIJ0$. When γ increases from γ_1 to γ_2, price increases to $P(\gamma_2)$ and fewer non-defaulting buyers value the good more than its price such that quantity demanded by non-defaulting buyers falls. This results in a loss of consumer surplus among non-defaulting buyers represented by the trapezoid $BCED$. Meanwhile, quantity demanded by defaulting buyers increases as a larger share of them are allowed time to purchase the good. Thus, there is an increase in consumer surplus for defaulters as shown by the rectangle $FGIH$. There is no producer surplus in this market because of perfect competition and constant marginal costs. Accordingly, aggregate welfare is equal to the net effect on consumer surplus, which will be negative as long as $BCED$ is larger than $FGIH$. As shown above, this will be true for sufficiently small α, in which case a small number of defaulters cause price increases that reduce consumer surplus for a larger number of non-defaulters. This graphical finding is consistent with the analytical results in (12) that moral hazard among bankruptcy filers creates a deadweight loss in the goods markets in which they participate.

Through comparative statics examining the parameter γ, the model provides a convenient vehicle to examine the consequences of giving defaulters more time to purchase goods before defaulting. In addition, the framework allows us to highlight that the intentions of the defaulters are of little consequence from a social planner's perspective. In the basic model outlined above, buyers know their type exactly and act on that information, such that all defaulting buyers purchase the widget if they can. This is explicit moral hazard in the sense that defaulters know they will not pay price P. An alternative assumption could allow buyers to have some uncertainty about their type D (though less uncertainty than the seller). In this case, some buyers of type $D = 1$ may purchase the widget without knowing they will not repay. Importantly, this unintentional moral hazard has similar economic effects as the intentional moral hazard laid out in the model. Specifically, unintentionally defaulting buyers cause sellers to raise prices, which generates deadweight losses. Thus, regardless of the intentions of defaulting buyers, purchases made just prior to defaulting reduce the consumer surplus of non-defaulters. Indeed, policies that inform buyers of their type D by forcing quicker default are optimal in this simple model. For example, if stricter wage garnishment helps to inform consumers that default is inescapable and forces them to default earlier, this helps to avoid deadweight costs borne by non-defaulters.

In a similar vein, the model also highlights two hidden actions that could both lead to aggregate welfare losses. Most directly, defaulting borrowers could purchase goods just before entering bankruptcy, knowing they will discharge their debt. Alternatively, defaulting borrowers could keep purchasing the same goods, or could even reduce their purchases, but delay their filing. Delaying bankruptcy is still harmful to non-defaulters if the goods are purchased on credit that is eventually discharged. For example, suppose that the defaulting borrower is paying for basic necessities on credit. The optimal response by the social planner is not to prevent the borrower from purchasing the goods, as they have high marginal utility for the defaulting borrower. Rather, the social planner would optimally encourage defaulting borrowers to default sooner so that other debts are discharged and cash flows are available to continue purchasing basic necessities. Of course, we cannot make full normative statements because the model and our empirical results only illustrate the moral hazard effects of running up the tab and ignore larger general equilibrium effects. Nevertheless, we emphasize that one possible policy response given our findings is to encourage quicker filings to take advantage of bankruptcy protection sooner rather than reducing bankruptcy protection.

C Loan Categorization Details

We use both keyword searches and Latent Dirichlet Allocation (LDA) to categorize loans into categories, and this breakdown is displayed in Table 2. While most category labels are self-explanatory, a few categories benefit from further explanation. Retail debt contains store-brand credit cards as well as unsecured debt used to purchase big-ticket items such as furniture or jewelry. Unsecured auto debt is mostly made up of loan deficiency claims after an automobile has been repossessed but also contains loans taken out for car maintenance (e.g., tire purchases). Unsecured priority claims are reported separately in Schedule E of the bankruptcy filings and contain unpaid taxes, child support, and alimony. Housing-related unsecured liabilities include unpaid rent and homeowners association fees. Finally, we combine some smaller categories into catch-all miscellaneous groups. Miscellaneous secured debts include secured tax liens, insurance claims, 401(k) loans, timeshare and association fees, loans against certificates of deposit, secured business debt, secured utilities, and secured credit cards. Miscellaneous unsecured debts include bad checks, fees, non-priority taxes, legal fees, and insurance dues.

D Credit-Bureau Merge

Our second data source is a sample of credit-bureau records. The credit-bureau data available to us contain only individuals who have had or currently have a mortgage serviced by one of the top twenty mortgage servicers by size during our time period. Acknowledging this restriction, 56% of the bankruptcy filers in our sample report owning real estate, and this number is only slightly lower (51%) for chapter 7 filers. In this credit-bureau data, there are 188,975 individuals with a bankruptcy filing in Florida, Minnesota, or Utah between 2004 and 2018. However, because the bankruptcy data does not contain the Middle District of Florida our maximum number of matches is strictly less than this. We anonymously match the two datasets using a series of merges that take advantage of common information in both datasets. In particular, we have the 3- or 5-digit ZIP code, the month of bankruptcy filing, and specific debt amounts in each dataset. We merge the datasets by looking for matches that are unique on sets of these characteristics. For example, if there is a single bankruptcy filing in a given month-3-digit zip cell in both the bankruptcy and credit-bureau datasets, we consider this a match. When there are multiple entries in the same month-zip, we use loan amounts to detect matches, such as matching mortgage amounts. In all cases, we require that first mortgage amounts between the two datasets are within 10% of each other to ensure that the matches are correct. In 53% of cases, loan amounts are within 1% of each other, suggesting very high match fidelity. This process results in a total of 55,357 bankruptcy filings that are matched to credit-bureau records. We require at least 30 days between the first 90 day delinquency and the bankruptcy filing and filter on income similar to the broader sample. This results in 47,960 merged observations.

The matched credit-bureau sample is somewhat different from the overall sample since all matched individuals must have or have had a mortgage in order to appear in our credit-bureau data. For comparison, Panel I of Table 3 reports summary statistics for this merged sample on the same set of bankruptcy filing characteristics described in Table 1. The share of unsecured debt is lower in this sample; total assets, debt, and income are higher; and the percentage that own a home at the time of filing is near 100%. Meanwhile, other characteristics are very similar, including the number of dependents, the percentage that filed a Chapter 7 bankruptcy, the share that are retired, and the share that are disabled. Panel II of Table 3 reports statistics on variables that we only observe by virtue of the match between bankruptcy filings and credit records. Total debt and

unsecured debt observed on the credit records is much less than total debt listed on bankruptcy filings, which we discuss at length in section 5.4. Mortgage debt is very similar between bankruptcy filings and credit-bureau records, consistent with our intuition above that secured debt is most likely to be formally registered with credit bureaus. Average revolving debt—mostly consisting of credit card debt—is approximately $19,000 for the matched sample. Total shadow debt—including formal and informal flavors as defined in section 5.4—averages $41,680 or 7% of total debt on average. Besides detecting shadow debt, one of our primary uses of the credit-bureau data is to calculate the days between when an individual first becomes 90 days past due on any debt and when they enter bankruptcy, a key measure to document the validity of our identification strategy. Our *months to file* variable averages 22.3 months, with significant variation between the 25th percentile (just over one month) and the 75th percentile (just over two years). Like other credit bureaus, the credit bureau that provided our data has a proprietary credit risk score comparable to a FICO score. For the merged sample, the average bankruptcy filer has a credit score of 508 in their month of filing—in line with their widespread delinquencies.

We note potential external-validity concerns for the empirical tests that rely on the merging of a sample of low-income bankruptcy filers with a sample of borrowers that had a mortgage in the last six months. Because the full bankruptcy sample differs from the matched credit-bureau sample, we present empirical results for both datasets wherever possible, reporting reduced-form estimates (which do not require the time to bankruptcy measure) for the full sample and 2SLS estimates for the credit-bureau-merged sample. The merged sample essentially trades off the benefits of providing positive evidence for the intervening mechanism of filing delays against the cost of potentially limited application to the broader population. However, homeownership among low-income bankruptcy filers is surprisingly common—roughly 35% of our treated sample own mortgaged real estate—suggesting our results are representative of a sizable share of bankruptcy filers.

E Wage Garnishment Background

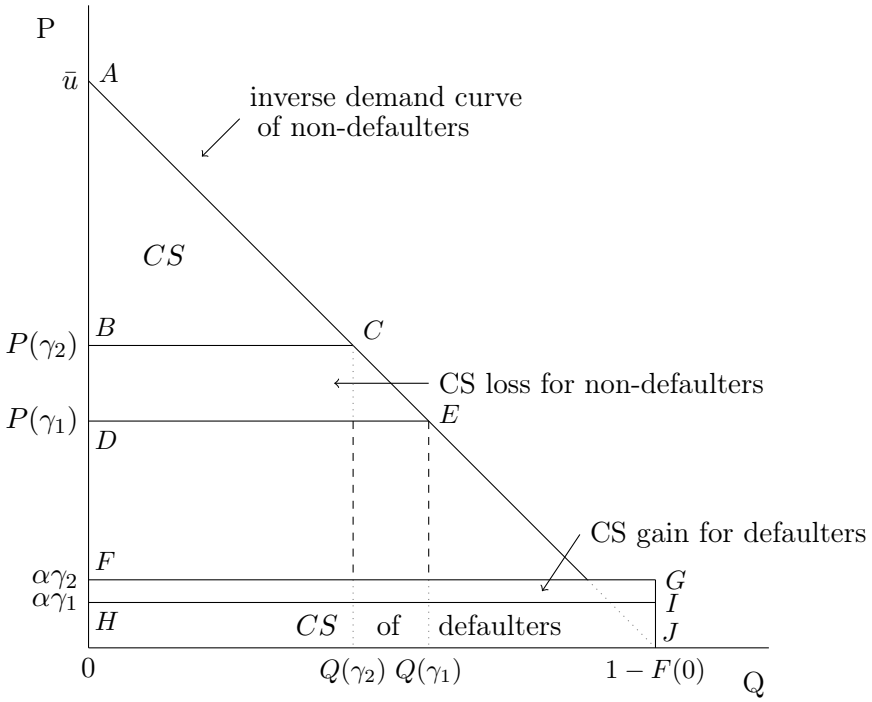
While many factors affect if and when an individual files for bankruptcy, our identification strategy focuses on the role of wage garnishing. Wages can be garnished by any creditor who secures a court order.[41] Federal law limits wage garnishing to 25% of disposable earnings or the amount by which weekly disposable earnings exceeds 30 times the federal minimum wage, whichever is lower.[42] For the states in our sample, these federal limits are effective in both Florida and Utah; in Minnesota, wage garnishing is limited to 25% of disposable earnings or the amount by which weekly disposable earnings exceeds 40 times the federal minimum wage, whichever is lower. Because of these limits, the amount of wage garnishing a low-income delinquent borrower faces will change discontinuously when the federal minimum wage changes. This is the basis of our identification strategy, as explained in the body of the paper. During our sample period, the federal minimum wage changed three times, on the 24th of July in 2007, 2008, and 2009. These three changes moved the minimum wage from $5.15 per hour to $5.85, then $6.55, and then $7.25 per hour. With each of these changes, the maximum amount of wage garnishing decreases for certain individuals, as illustrated by Figure 2. Importantly, wage garnishment ceases when an individual files for bankruptcy, such that higher wage garnishing presumably increases the incentive for an individual to file for bankruptcy earlier. We also note that even if a debtor is not currently being garnished, a creditor may use garnishing as a threat in their debt collection efforts, making it possible for wage garnishing to affect a large

[41] Garnishing actions by creditors for child support, back taxes, and student loans do not require a court order.

[42] Disposable income is total income less required deductions such as federal and state taxes, involuntary pension contributions, and health insurance premiums.

number of debtors. Intuitively, decreases in the amount of wage garnishment nudge debtors towards delaying filing by relieving some of the financial pressure caused by wage garnishment. Supporting this, Lefgren and McIntyre (2009) show that wage garnishing laws are important determinants of the bankruptcy decision.

Figure A1: Welfare Consequences of Increased Moral Hazard



Notes: Diagram illustrates the change in equilibrium outcomes associated with an increase in moral hazard from γ_1 to γ_2 in price-quantity space. The zero-profit condition pins down price for a given γ, and the inverse demand curve plotted as AJ determines the fraction of consumers who would purchase the good if required to pay $P(\gamma)$. Consumer surplus when $\gamma = \gamma_1$ is given by the triangle AED and decreases to ACB when increased moral hazard increases γ to γ_2, resulting in a consumer surplus loss given by the trapezoid $BCED$. Meanwhile, the rectangle $FGIH$ shows the consumer surplus gain when the share of defaulters who are able to purchase a good before defaulting increases from γ_1 to γ_2.

Table A1: Balance Tests of Filer Characteristics

	(1) Home Owner	(2) Business Owner	(3) Retired	(4) Number of Dependents	(5) Disabled	(6) Credit Score
Treatment × Garnishable Wages	-0.004 (0.004)	-0.007 (0.012)	0.007 (0.008)	-0.019 (0.030)	-0.001 (0.006)	-0.883 (1.445)
Filer Controls	✓	✓	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓	✓	✓
District FEs	✓	✓	✓	✓	✓	✓
R^2	0.67	0.52	0.52	0.55	0.50	0.53
Observations	47,960	47,960	47,960	47,960	47,960	47,960

Notes: Table reports reduced-form regressions of borrower characteristics. Home Owner is a dummy for home ownership. Business Owner is a dummy for business ownership. Retired is a dummy for retirement status. Number of Dependents is the number of dependents in the household at time of filing. Disabled is a dummy for disabled status. Credit Score is the Vantage score at time of filing. Garnishable wages are the dollar amount (measured in $100s) of monthly income exposed to garnishing by creditors according to federal statute at the time of bankruptcy filing. Treatment is an indicator for the treated monthly income range ($600 to $1,300). All specifications control for main effects for treatment, garnishable wages, and treatment × income. For each column, filer controls exclude the dependent variable from the list of controls reported in Table 4. Robust standard errors in parentheses are double clustered by filing month and 3-digit zip code. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A2: Effect of Wage Garnishing on Log Unsecured and Secured Debt

	(1)	(2)
Dependent Variable	log(1 + Unsecured Debt)	log(1 + Secured Debt)
Treatment × Garnishable Wages	-0.0353***	-0.0248
	(0.0100)	(0.0270)
Filer Controls	✓	✓
Year Fixed Effects	✓	✓
District Fixed Effects	✓	✓
R^2	0.53	0.68
Observations	554,942	554,942

Notes: Table reports reduced-form regressions using the full sample of bankruptcy filings. Dependent variable is the natural log of 1 + the level of unsecured debt (column 1) and the natural log of 1 + the level of secured debt (column 2). Garnishable wages are the dollar amount (measured in $100s) of monthly income exposed to garnishing by creditors according to federal statute at the time of bankruptcy filing. Treatment is an indicator for the treated monthly income range ($600 to $1,300). All specifications control for main effects for treatment, garnishable wages, and treatment × income. Filer controls include income, number of dependents, Vantage credit score, log(total assets), and indicators for filing chapter, marital status, homeownership, business ownership, retired status, employment status, and disabled status. Robust standard errors in parentheses are double clustered by filing month and 3-digit zip code. *** p<0.01, ** p<0.05, * p<0.1

Table A3: Reduced-form Effect of Wage Garnishing on Shadow Debt Share of Total Debt

	(1)	(2)	(3)	(4)
Treatment × Garnishable Wages	-0.0205**	-0.0185*	-0.0175*	-0.0186**
	(0.0094)	(0.0093)	(0.0096)	(0.0091)
Filer Controls	✓	✓	✓	✓
Year Fixed Effects	✓		✓	✓
District Fixed Effects	✓		✓	✓
District × Year Fixed Effects		✓		
Income × Year Controls			✓	
Income Quartile Controls				✓
R^2	0.51	0.51	0.50	0.51
Observations	47,960	47,960	47,960	47,960

Notes: Table reports reduced-form regression results using the credit-bureau-matched sample. Dependent variable is shadow debt, defined as the dollar difference between total unsecured debt discharged in bankruptcy and the total unsecured debt reported in credit-bureau data as a share of total debt reported on bankruptcy filing. Dependent variable mean is 0.07. Garnishable wages are the dollar amount (measured in $100s) of monthly income exposed to garnishing by creditors according to federal statute at the time of bankruptcy filing. Treatment is an indicator for the treated monthly income range ($600 to $1,300). All specifications control for main effects for treatment, garnishable wages, and treatment × income. Filer controls include income, number of dependents, Vantage credit score, log(total assets), and indicators for filing chapter, marital status, homeownership, business ownership, retired status, employment status, and disabled status. Robust standard errors in parentheses are double clustered by filing month and 3-digit zip code. *** p<0.01, ** p<0.05, * p<0.1

Table A4: Summary Statistics: Credit-Bureau-Matched, Shocked Sample

Variable	Mean	Std. Dev.	Median
	I. Bankruptcy Filing Variables		
Monthly Income ($)	3,440.48	1,721.28	3,236.61
Monthly Garnishable Wages ($)	851.14	444.87	809.15
Total Assets ($)	226,579.69	219,031.48	181,561.93
Total Debt ($)	367,405.20	450,694.63	266,541.00
Mortgage Debt ($)	196,048.05	194,190.48	157,200.00
Unsecured Debt ($)	95,293.92	224,321.20	52,179.00
Unsecured Debt Share	0.27	0.21	0.21
Chapter 7 Indicator	0.67	0.47	1
Homeowner Indicator	0.94	0.25	1
Business Owner Indicator	0.30	0.46	0
Filing Jointly Indicator	0.42	0.49	0
Number of Dependents	1.15	1.32	1
Retired Indicator	0.02	0.13	0
Disabled Indicator	0.02	0.15	0
	II. Credit-Record Derived Variables		
Total Debt ($)	244,016.46	217,516.19	200,161.00
Unsecured Debt ($)	50,495.24	130,249.05	17,300.00
Mortgage Debt ($)	186,141.98	146,713.27	164,585.00
Revolving Debt ($)	17,618.78	35,562.28	5,548.00
Shadow Debt ($)	44,798.68	244,788.67	27,690.06
Credit Card / Retail Shadow Debt ($)	18,190.37	45,808.62	9,758.00
Student Loans Shadow Debt ($)	1,420.36	24,161.98	0
Personal Loans Shadow Debt ($)	10,364.49	54,828.05	0
Informal Shadow Debt ($)	14,825.61	219,125.40	6,988.56
Shadow Debt Share of Total Debt	0.09	0.38	0.12
Months to File	25.23	23.33	17.17
Credit Score	512.81	51.91	506

Notes: Table reports summary statistics for bankruptcy filings that merged with our credit-bureau sample for individuals that are divorced, unemployed, or report more than $500 worth of medical debt at time of filing. Panel I reports statistics on the same variables as Table 1 for comparison—see Table 1 notes for details. Panel II reports statistics on variables derived from credit records—see Table 3 notes for details. N = 28,267.

Table A5: Summary Statistics: Credit-Bureau-Matched, Non-shocked Sample

Variable	Mean	Std. Dev.	Median
	I. Bankruptcy Filing Variables		
Monthly Income ($)	3,774.20	1,855.41	3,564.01
Monthly Garnishable Wages ($)	936.33	476.02	891.00
Total Assets ($)	271,491.93	289,051.16	205,378.72
Total Debt ($)	434,401.14	560,254.37	309,474.84
Mortgage Debt ($)	235,401.02	252,210.34	175,500.00
Unsecured Debt ($)	100,221.15	218,839.84	57,229.36
Unsecured Debt Share	0.24	0.19	0.20
Chapter 7 Indicator	0.69	0.46	1
Homeowner Indicator	0.96	0.20	1
Business Owner Indicator	0.33	0.47	0
Filing Jointly Indicator	0.46	0.50	0
Number of Dependents	1.00	1.24	1
Retired Indicator	0.04	0.19	0
Disabled Indicator	0.02	0.13	0
	II. Credit-Record Derived Variables		
Total Debt ($)	280,616.37	240,144.03	227,548.00
Unsecured Debt ($)	63,017.11	152,374.39	21,314.00
Mortgage Debt ($)	209,906.33	158,803.52	183,000.00
Revolving Debt ($)	21,534.58	41,538.28	7,389.00
Shadow Debt ($)	37,204.05	250,635.64	27,900.00
Credit Card / Retail Shadow Debt ($)	23,821.09	47,088.59	14,901.00
Student Loans Shadow Debt ($)	859.43	21,322.07	0
Personal Loans Shadow Debt ($)	12,378.16	55,776.80	0
Informal Shadow Debt ($)	145.36	228,263.49	1,118.00
Shadow Debt Share of Total Debt	0.06	0.39	0.10
Months to File	18.10	15.73	13.33
Credit Score	506.72	48.00	501

Notes: Table reports summary statistics for bankruptcy filings that merged with our credit-bureau sample for individuals that are not divorced, are employed, and report less than $500 worth of medical debt at time of filing. Panel I reports statistics on the same variables as Table 1 for comparison—see Table 1 notes for details. Panel II reports statistics on variables derived from credit records—see Table 3 notes for details. N = 19,693.

Table A6: Effect of Wage Garnishing on Bankruptcy Filing Timing by Possible Filing Motive

	(1)	(2)	(3)	(4)
Treatment × Garnishable Wages	-1.13**	-1.11**	-1.14**	-1.21**
	(0.53)	(0.53)	(0.53)	(0.55)
Treatment × Garnishable Wages × Non-shocked	0.002	0.82	0.002	0.006
	(0.74)	(0.73)	(0.74)	(0.74)
Non-shocked Indicator	-1.24***	-1.02**	-1.24***	-1.15***
	(0.36)	(0.43)	(0.36)	(0.36)
Garnishable Wages	-0.11***	-0.11***	-0.11***	-0.025
	(0.02)	(0.03)	(0.02)	(0.06)
Garnishable Wages × Non-shocked	-0.02	-0.007	-0.02	-0.02
	(0.02)	(0.03)	(0.02)	(0.02)
Treatment × Income	0.004	0.003	0.004	0.004
	(0.003)	(0.003)	(0.003)	(0.003)
Treatment × Income × Non-shocked	0.001	-0.002	0.001	0.001
	(0.005)	(0.005)	(0.005)	(0.005)
Treatment	-2.42	-1.93	-2.42	-2.17
	(2.31)	(2.35)	(2.31)	(2.38)
Treatment × Non-shocked	-1.44	1.41	-1.44	-1.54
	(4.62)	(4.28)	(4.62)	(4.63)
Filer Controls	✓	✓	✓	✓
Year Fixed Effects	✓		✓	✓
District Fixed Effects	✓		✓	✓
District × Year Fixed Effects		✓		
Income × Year Controls			✓	
Income Quartile Controls				✓
R^2	0.60	0.61	0.60	0.60
Observations	47,960	47,960	47,960	47,960

Notes: Table reports triple difference-in-differences regression results using the credit-bureau-matched sample. Dependent variable is the number of months between the first 90-day delinquency and the bankruptcy filing date, defined as the number of days to file divided by 30. Dependent variable mean is 22.3. Garnishable wages are the dollar amount (measured in $100s) of monthly income exposed to garnishing by creditors according to federal statute at the time of bankruptcy filing. Treatment is an indicator for the treated monthly income range ($600 to $1,300). Non-shocked is a dummy equal to one for individuals with less than $500 in medical debt, are employed, and are not separated or divorced from their spouse. Filer controls include income, number of dependents, Vantage credit score, log(total assets), and indicators for filing chapter, marital status, homeownership, business ownership, retired status, employment status, and disabled status. Robust standard errors in parentheses are double clustered by filing month and 3-digit zip code. *** p<0.01, ** p<0.05, * p<0.1

Table A7: Effect of Wage Garnishing on Debt Shares by Possible Filing Motive

Dependent Variable	(1) Unsecured Debt Share	(2) Shadow Debt Share	(3) Informal Shadow Debt Share	(4) Last 6-month Share
Treatment × Garnishable Wages	-0.0189**	-0.0482***	-0.0301*	-0.0102*
× Non-shocked	(0.0087)	(0.0173)	(0.0168)	(0.0060)
Treatment × Garnishable Wages	-0.0016	-0.0022	-0.0077	-0.0002
	(0.0049)	(0.0100)	(0.0082)	(0.0019)
Non-shocked Indicator	-0.0277***	-0.0404***	-0.0629***	0.0268***
	(0.0039)	(0.0128)	(0.0112)	(0.0061)
Garnishable Wages	0.0012***	0.0024***	0.0002	-0.0003
	(0.0003)	(0.0007)	(0.0006)	(0.0002)
Garnishable Wages × Non-shocked	0.0007***	0.0003	0.0018*	-0.0011***
	(0.0003)	(0.0010)	(0.0009)	(0.0004)
Treatment × Income	-0.0000	0.0001	0.0001*	-0.0000
	(0.0000)	(0.0001)	(0.0001)	(0.0000)
Treatment × Income	0.0001**	0.0003**	0.0002*	0.0001*
× Non-shocked	(0.0001)	(0.0001)	(0.0001)	(0.0000)
Treatment	0.0235	-0.0331	-0.0671	0.0173*
	(0.0303)	(0.0728)	(0.0595)	(0.0100)
Treatment × Non-shocked	-0.1269*	-0.2720**	-0.1788*	-0.0622*
	(0.0659)	(0.1089)	(0.0917)	(0.0319)
Filer Controls	✓	✓	✓	✓
Year Fixed Effects	✓	✓	✓	✓
District Fixed Effects	✓	✓	✓	✓
Dependent Variable Mean	0.26	0.07	0.21	0.05
R^2	0.60	0.50	0.51	0.521
Observations	47,960	47,960	47,960	76,909

Notes: Table reports triple difference-in-differences regressions using the credit-bureau-matched sample. Dependent variable in column 1 is the fraction of total debt disclosed in bankruptcy that is unsecured. Dependent variable in column 2 is the shadow debt share, defined as the dollar difference between total unsecured debt discharged in bankruptcy and the total unsecured debt reported in credit-bureau data as a share of total debt reported on bankruptcy filing. Dependent variable in column 3 is the informal shadow debt share, defined as the remainder of unsecured debt not in the categories of credit card and retail shadow debt, student loan shadow debt, and personal loan shadow debt. Dependent variable in column 4 is the share of total debt originated in the six months before filing for bankruptcy. Garnishable wages are the dollar amount (measured in $100s) of monthly income exposed to garnishing by creditors according to federal statute at the time of bankruptcy filing. Treatment is an indicator for the treated monthly income range ($600 to $1,300). Non-shocked is a dummy equal to one for individuals with less than $500 in medical debt, are employed, and are not separated or divorced from their spouse. Filer controls include income, number of dependents, Vantage credit score, log(total assets), and indicators for filing chapter, marital status, homeownership, business ownership, retired status, employment status, and disabled status. Robust standard errors in parentheses are double clustered by filing month and 3-digit zip code. *** p<0.01, ** p<0.05, * p<0.1

Table A8: Effect of Wage Garnishing on Unsecured Debt Share by Possible Filing Motive

	(1)	(2)	(3)	(4)
Treatment × Garnishable Wages	-0.0189**	-0.0197**	-0.0189**	-0.0189**
× Non-shocked	(0.0087)	(0.0088)	(0.0087)	(0.0087)
Treatment × Garnishable Wages	-0.0016	-0.0010	-0.0016	-0.0016
	(0.0049)	(0.0050)	(0.0049)	(0.0049)
Non-shocked Indicator	-0.0277***	-0.0278***	-0.0277***	-0.0271***
	(0.0039)	(0.0039)	(0.0039)	(0.0042)
Garnishable Wages	0.0012***	0.0012***	0.0012***	0.0013***
	(0.0003)	(0.0003)	(0.0003)	(0.0005)
Garnishable Wages × Non-shocked	0.0007***	0.0007***	0.0007***	0.0007**
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Treatment × Income	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Treatment × Income × Non-shocked	0.0001**	0.0002**	0.0001**	0.0001**
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Treatment	0.0235	0.0265	0.0235	0.0202
	(0.0303)	(0.0305)	(0.0303)	(0.0304)
Treatment × Non-shocked	-0.1269*	-0.1309*	-0.1269*	-0.1276*
	(0.0659)	(0.0664)	(0.0659)	(0.0659)
Filer Controls	✓	✓	✓	✓
Year Fixed Effects	✓		✓	✓
District Fixed Effects	✓		✓	✓
District × Year Fixed Effects		✓		
Income × Year Controls			✓	
Income Quartile Controls				✓
R^2	0.60	0.60	0.60	0.60
Observations	47,960	47,960	47,960	47,960

Notes: Table reports reduced-form regressions using the credit-bureau-matched sample. Dependent variable is the fraction of total debt disclosed in bankruptcy that is unsecured. Dependent variable mean is 0.26. Garnishable wages are the dollar amount (measured in $100s) of monthly income exposed to garnishing by creditors according to federal statute at the time of bankruptcy filing. Treatment is an indicator for the treated monthly income range ($600 to $1,300). Non-shocked is a dummy equal to one for individuals with less than $500 in medical debt, are employed, and are not separated or divorced from their spouse. Filer controls include income, number of dependents, Vantage credit score, log(total assets), and indicators for filing chapter, marital status, homeownership, business ownership, retired status, employment status, and disabled status. Robust standard errors in parentheses are double clustered by filing month and 3-digit zip code. *** p<0.01, ** p<0.05, * p<0.1

Table A9: Effect of Wage Garnishing on Shadow Debt Share by Possible Filing Motive

	(1)	(2)	(3)	(4)
Treatment × Garnishable Wages	-0.0482***	-0.0462***	-0.0482***	-0.0484***
× Non-shocked	(0.0173)	(0.0169)	(0.0173)	(0.0172)
Treatment × Garnishable Wages	-0.0022	-0.0011	-0.0022	-0.0002
	(0.0100)	(0.0099)	(0.0100)	(0.0098)
Non-shocked Indicator	-0.0404***	-0.0402***	-0.0404***	-0.0431***
	(0.0128)	(0.0126)	(0.0128)	(0.0129)
Garnishable Wages	0.0024***	0.0024***	0.0024***	-0.0000
	(0.0007)	(0.0007)	(0.0007)	(0.0010)
Garnishable Wages × Non-shocked	0.0003	0.0003	0.0003	0.0006
	(0.0010)	(0.0009)	(0.0010)	(0.0010)
Treatment × Income	0.0001	0.0001	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Treatment × Income × Non-shocked	0.0003**	0.0003**	0.0003**	0.0003**
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Treatment	-0.0331	-0.0276	-0.0331	-0.0292
	(0.0728)	(0.0717)	(0.0728)	(0.0737)
Treatment × Non-shocked	-0.2720**	-0.2655**	-0.2720**	-0.2688**
	(0.1089)	(0.1101)	(0.1089)	(0.1084)
Filer Controls	✓	✓	✓	✓
Year Fixed Effects	✓		✓	✓
District Fixed Effects	✓		✓	✓
District × Year Fixed Effects		✓		
Income × Year Controls			✓	
Income Quartile Controls				✓
R^2	0.51	0.50	0.51	0.51
Observations	47,960	47,960	47,960	47,960

Notes: Table reports reduced-form regressions using the credit-bureau-matched sample. Dependent variable is shadow debt, defined as the dollar difference between total unsecured debt discharged in bankruptcy and the total unsecured debt reported in credit-bureau data as a share of total debt reported on bankruptcy filing. Dependent variable mean is 0.07. Garnishable wages are the dollar amount (measured in $100s) of monthly income exposed to garnishing by creditors according to federal statute at the time of bankruptcy filing. Treatment is an indicator for the treated monthly income range ($600 to $1,300). Non-shocked is a dummy equal to one for individuals with less than $500 in medical debt, are employed, and are not separated or divorced from their spouse. Filer controls include income, number of dependents, Vantage credit score, log(total assets), and indicators for filing chapter, marital status, homeownership, business ownership, retired status, employment status, and disabled status. Robust standard errors in parentheses are double clustered by filing month and 3-digit zip code. *** p<0.01, ** p<0.05, * p<0.1

Table A10: Effect of Wage Garnishing on Unsecured Debt Share Using Full Bankruptcy Sample

	(1)	(2)	(3)
Sample	Shocked	Non-shocked	Pooled
Treatment × Garnishable Wages	-0.0008	-0.0081**	-0.0013
	(0.0012)	(0.0033)	(0.0012)
Treatment × Garnishable Wages × Non-shocked			-0.0054*
			(0.0029)
Non-shocked Indicator			-0.0122***
			(0.0025)
Garnishable Wages	-0.0005***	0.0003	-0.0002
	(0.0002)	(0.0003)	(0.0002)
Garnishable Wages × Non-shocked			-0.0001
			(0.0002)
Treatment × Income	-0.0000	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)
Treatment × Income × Non-shocked			-0.0000
			(0.0000)
Treatment	0.0223**	0.0252	0.0195**
	(0.0097)	(0.0178)	(0.0094)
Treatment × Non-shocked			0.0127
			(0.0169)
Filer Controls	✓	✓	✓
Year Fixed Effects	✓	✓	✓
District Fixed Effects	✓	✓	✓
R^2	0.75	0.75	0.75
Observations	384,163	170,779	554,942

Notes: Table reports reduced-form regressions using the full sample of bankruptcy filings. Dependent variable is the fraction of total debt disclosed in bankruptcy that is unsecured. Dependent variable mean is 0.53. Garnishable wages are the dollar amount (measured in $100s) of monthly income exposed to garnishing by creditors according to federal statute at the time of bankruptcy filing. Treatment is an indicator for the treated monthly income range ($600 to $1,300). Non-shocked is a dummy equal to one for individuals with less than $500 in medical debt, are employed, and are not separated or divorced from their spouse. Filer controls include income, number of dependents, Vantage credit score, log(total assets), and indicators for filing chapter, marital status, homeownership, business ownership, retired status, employment status, and disabled status. Robust standard errors in parentheses are double clustered by filing month and 3-digit zip code. *** p<0.01, ** p<0.05, * p<0.1