Personal Bankruptcy, Moral Hazard, and Shadow Debt*

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December 2020

Abstract

Using newly collected data on the balance sheets of personal bankruptcy filers, we develop an identification strategy to test for moral hazard in debt accumulation by bankruptcy filers. We find that debtors who are incentivized by policy changes to delay filing for bankruptcy incur significantly more unsecured debt before filing. A large share of the additional debt incurred by later filers is "shadow debt" — debt not reported to credit bureaus, comprising an average of 16% of total liabilities on personal bankruptcy filings. Finally, these results are not present among borrowers with employment, medical, or marriage shocks, reinforcing our interpretation of strategic behavior.

Keywords: personal bankruptcy, moral hazard, shadow debt

*We thank workshop participants at the Boston Federal Reserve, BYU, Dartmouth, the FDIC consumer symposium, MIT, Michigan State University, the University of Rochester, and WEAI, and Carter Davis, Anthony DeFusco, Paul Goldsmith-Pinkham, Kyle Herkenhoff, Sasha Indarte, Ben Keys, Raymond Kluender, Sam Kruger, Ryan Lewis (discussant), Brigitte Madrian, Gregor Matvos, Antoinette Schoar, Amit Seru, Felipe Severino, Adrien Verdelhan, Jialan Wang, and Michelle White (discussant) for helpful comments. We appreciate the research assistance of Tammy Lee, Joseph Leung, and Richard Maxwell. We benefited tremendously from helpful conversations with David Sime, Clerk of the Utah Bankruptcy Court, and thank the Utah, Minnesota, Florida North and Florida South Bankruptcy Courts for data access. Palmer acknowledges funding from NSF CAREER Grant 1944138. This project received exempt status from MIT's IRB.

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1 Introduction

U.S. households discharged $2.03 trillion in debt from 2009-2018 (US Courts, 2019), and over 10% of U.S. households have filed for bankruptcy at least once (Stavins, 2000 and Keys, 2018). 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.[1] However, the bankruptcy option also creates incentives for distressed borrowers to increase their indebtedness without bearing the full cost of debt repayment. For example, if borrowers anticipate eventually discharging debt through bankruptcy, they may accumulate additional debt to finance higher consumption. Despite the incentives for distressed borrowers to behave strategically, owing to data constraints, the prior literature offers little evidence evaluating how distressed borrowers accumulate debt as they near filing for bankruptcy.[2]

This paper studies how borrowers accumulate debt following a shock to their incentive to delay filing for bankruptcy. Moral hazard is potentially manifest by borrowers who delay entering bankruptcy when possible and use this time to increase indebtedness. Two aspects of personal bankruptcy make moral hazard a possibility among distressed households. First, a borrower facing bankruptcy has strong incentives to incur additional debt before filing, especially unsecured debt that is likely to be discharged with little marginal cost to filers. Second, incumbent lenders, especially unsecured lenders, have only weak instruments to prevent additional debt origination by defaulting borrowers. These two criteria lead to a classic principal-agent problem where the agent (bankruptcy filer) is able to take a hidden action (incur additional debt which they will not repay) that principals (creditors) do not prefer.

It is also possible, however, that borrowers do not increase debt levels when given extra time to file. Given the sizable direct and indirect costs of bankruptcy, borrowers that take longer to file could use the additional time to reduce indebtedness in an attempt to stave off bankruptcy. For example, waiting to file affords borrowers the opportunity to pursue asset sales, to identify new opportunities for income, to negotiate with creditors, or to use newly available resources to pay down debt.

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

[2] As we discuss below, the most closely related work is Gropp, Scholz, and White (1997) and Severino and Brown (2017), who study how state bankruptcy law generosity affects interest rates and the demand for debt.

Our first empirical finding uses variation in the amount of allowable wage garnishing to show that when bankruptcy filers have their incentives to file quasi-randomly tilted towards delaying, they take an average of an additional 30 days to file. We then use an instrumental-variables (IV) approach to document that bankruptcy declarations from delayed filers exhibit significantly more unsecured debt than early filers. Unsecured debt is the category of debt bankruptcy filers have the strongest incentive to incur given the debt is not secured by seizable collateral. A large share of this additional unsecured debt is what we term "shadow debt" — debt not observable on credit reports that usually results from the non-payment of goods or services. This shadow debt is composed of both debt from formal sources (e.g., credit cards, retail loans, or personal loans) as well as informal debt (e.g., medical loans, unpaid rent, fees, or past-due utility bills). We find that the increase in shadow debt due to a filing delay is concentrated in informal credit categories.

Observing that distressed borrowers increase their debt amounts when they delay filing may not be prima facie evidence of strategic moral hazard behavior. Insolvent debtors who are randomly allowed to delay filing could also increase their debt levels by relying on unsecured debt to pay for goods and services that they would demand even if facing market prices. Broadly speaking, delaying filing and incurring more debt to pay for such consumption could still be undesirable relative to scenarios in which individuals enter bankruptcy sooner, discharge old debts, and pay for efficiently demanded consumption through newly available post-bankruptcy cash flows rather than by debt financing.

We provide several pieces of additional analysis to help separate strategic moral hazard debt accumulation from debt accumulation due to consumption needed for basic subsistence. First, we isolate a sample of filers that are more likely to be filing for non-strategic reasons—individuals who are likely to be entering bankruptcy due to a large economic shock. These reasons include substantial medical debt, recent job loss, or the recent dissolution of a marriage. We compare this sample (the "non-strategic sample") against a sample of filers that are still employed, married, and have no material medical debt at the time of filing (the "strategic sample"). We posit that individuals in the non-strategic sample are less likely to engage in moral hazard since they are entering bankruptcy mostly due to bad luck, such that the strategic sample should contain a higher portion of individuals who are willing to incur strategic moral hazard debt. The corresponding null hypothesis is that both samples have similar amounts of strategic moral hazard debt and debt used

to finance consumption even when bankruptcy is not looming.

Interestingly, both samples delay entering bankruptcy in response to the experiment; however, the samples display substantial differences in debt accumulation behavior as a consequence of this delay. Filers in the strategic sample display large increases in unsecured debt, while non-strategic filers do not significantly increase unsecured debt as a result of the delay. Further, increases in unsecured debt by strategic filers are concentrated most heavily in informal shadow debt. where lenders are least informed about the borrowers and, hence, strategic action is easiest. Finally, the magnitudes of our results also argue against an efficient consumption explanation. Despite having comparable incomes, we find that an average 30-day delay in filing is associated with almost an order of magnitude larger accumulated debt amount for the strategic vs. non-strategic subsample, and the delay leads to an increase of unsecured debt of $7,500 in the strategic sample, much larger than their average monthly expenses of $4,000.

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) website. The Minnesota, Utah, Florida Northern, and Florida Southern Bankruptcy Courts granted us fee waivers, and our data consists 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.

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. Our calculations imply that 16% of the total debt disclosed at the time of bankruptcy is not captured on credit reports.[3] Consumers have full incentive to disclose all of their debts at the time of filing for bankruptcy in order to receive the maximum relief possible

[3]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).

from discharge. Accordingly, a comparison of borrower liabilities listed on bankruptcy schedules to those reported to credit registries gives an accurate measure of the debt that is missed by estimates of consumer leverage that are based solely on data from credit reports.[4]

Estimating the causal effect of time-to-file on debt amounts at bankruptcy is not straightforward because the amount of time a borrower remains in distress prior to filing for bankruptcy is not random.[5] Many factors could jointly influence the time to file since the onset of distress 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 enter bankruptcy.[6] Title III of the Consumer Credit Protection Act caps the amount of allowable wage garnishing by most types of creditors to 25% of wages. However, for earners with lower incomes, a lower wage garnishing limit applies that is a function of the prevailing federal minimum wage (varying by state but always at least 30 hours of minimum wage earnings a week for subsistence—for details, see Carter, 2020). Accordingly, federal minimum wage changes induce quasi-random changes in wage garnishing. Prior research has shown a tight connection between wage garnishing and bankruptcy filling (Shuchman and Jantscher, 1972, and Lefgren and McIntyre, 2009), and we show that when a lower fraction of income can be garnished by creditors, as is the case after increases in the federal minimum wage, distressed debtors take longer to file for bankruptcy than they would have otherwise. If there is moral hazard in debt accumulation by bankruptcy filers, decreases in wage garnishing could nudge distressed debtors to delay filing for bankruptcy and thereby provide opportunities for debtors to incur additional unsecured debt in anticipation of bankruptcy.

During our sample period the federal minimum wage increased three times, on July 24 of 2007, 2008, and 2009. For each bankruptcy filer in our sample, we calculate how much her wages could be garnished at the time she files as a function of her income and the prevailing federal minimum wage—see Figure 1 for an illustration. Given the timing of the law changes and borrower incomes, minimum wage changes impact garnishment for about 5%-10% of borrowers depending on the

[4] As credit bureaus are not designed to capture such debts, we interpret these results as evidence that the debt captured by credit bureaus is an incomplete picture of household liabilities rather than as commentary on the accuracy of credit-bureau data.

[5] Our preferred measure of bankruptcy filing delay is the length of time between a borrower's first 90-day delinquency on any debt and their eventual bankruptcy filing date, although we find our conclusions robust to other measures.

[6] 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).

sample. Changes to the federal minimum wage allow for a comparison 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. There is a strong negative correlation between garnishable wages and months to file in the income region where changes in minimum wage impact garnishment amounts—a region we refer to as the treated region. Meanwhile, we find no change in months to file for filers whose incomes are outside of the treated region conditional on our controls. Controlling for borrower income, as well as a host of borrower demographics, geography and time fixed effects, we estimate that an additional $100 in monthly wage garnishing reduces the time between the first 90-day delinquency and the bankruptcy filing date by approximately one month.

To estimate the causal relationship between bankruptcy filing delay and debt accumulation, we use wage garnishment changes to instrument for months to file and find that an additional delay of one month in filing leads to an average 1 percentage-point increase in the share of unsecured debt relative to total debt. For the average first-stage delay of one month, our results imply an average increase of approximately $4,000 in unsecured debt. As discussed above, we focus on unsecured debt because borrowers who are highly distressed are unlikely to be able to accumulate much, if any, secured debt, nor would accumulating such debt be advantageous in the long run as secured assets could be seized before or during bankruptcy proceedings. Similarly, we expect that borrowers who delay filing will run up shadow debt in particular, given that formal unsecured lenders will likely screen out such borrowers. Consistent with this hypothesis, we find that an additional month in time to filing results in an average 1.8 percentage-point increase in the share of shadow debt relative to total debt or an average of $7,200 in shadow debt per month of filing delay. 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 no bigger than the estimated increase in unsecured debt.

What types of shadow debt do consumers incur when delaying bankruptcy? We use a Latent Dirichlet Analysis to classify debt based on the loan description text in each petition filing into broad categories such as medical, credit-card, etc. In all, we are able to categorize 85% of all claims (94%

of the value of all debt), with the remaining liabilities having uninformative or vague descriptions (e.g., "loan"). We then decompose a filer's shadow debt into four broad categories corresponding to categories of debt contained in a credit report: credit card and retail debt, student loan debt, personal loans, and informal debt (defined as the remaining unsecured debt). For each category, we define the category shadow debt as the differences between that category's total debt levels as recorded by the credit registry and as reported in the bankruptcy filing. Credit cards, student loans, and personal loans are all usually originated by formal lenders, and so we think of unreported debt in these combined categories as "formal" shadow debt. These three categories make up essentially all of the unsecured debt reported to the credit registry. Meanwhile, "informal" shadow debt includes such things as medical bills, bounced checks, unpaid rent or utilities, and uncategorizeable debt. Using our instrumental-variables strategy, we find that when borrowers are exogenously nudged to delay filing, essentially all of the increase in shadow debt is informal shadow debt. Under the assumption that informal creditors—who do not typically pull credit reports—are the least informed about borrowers, the sharp rise of informal shadow debt is consistent with the notion that borrowers on the brink of bankruptcy turn to these markets to be able to increase debt.

To further support this interpretation, we confront the possibility that changes to wage garnishment for treated borrowers might directly influence debt levels 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. Importantly, we do not find that changes to wage garnishing have any distinguishable effect on the propensity to enter bankruptcy, nor do we find that the observable attributes of filers are different before or after garnishment changes. Credit bureau data further show that the debt amounts of *non-filers* are not different before and after garnishment changes, indicating that garnishment changes themselves did not appear to induce an observably different type of borrower to file. We discuss this and other threats to the exclusion restriction in detail in sections 5.2 and 5.3.

A garnishment instrument could also be problematic if reduced garnishment creates an income effect that impacts debt amounts through a channel other than filing delays. For example, reduced garnishment could prompt borrowers to originate more debt on the back of higher take-home pay. Reductions in garnishment could also potentially increase debt levels mechanically by reducing the amount of wages that would have been applied towards an outstanding debt. Income and

mechanical effects are not likely to be explanations of our results, given the magnitudes. Moreover, an income-effect alternative explanation would predict similarly sized effects on debt levels for both the strategic and non-strategic filer subsamples, yet we observe substantial differences in debt accumulation across the two groups.

Finally, we note an important caveat regarding our empirical strategy. To uncover positive evidence of moral hazard in the level of debt accumulation, our instrumental-variables results are identified local to households that are sensitive to the interaction of wage garnishing statutes and changes to the federal minimum wage. While this treated sample may not seem especially representative of the average borrower, we note that the incentives to accumulate additional debt before filing for bankruptcy are likely to affect indebtedness for bankrupt and proto-bankrupt households more broadly.

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. 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. While our paper does not examine the determinants of the filing decision and instead takes the decision to file as given, we provide evidence that many borrowers are strategic in their use of debt *leading up to* filing. Regardless of whether the filing itself was caused by a cash-flow shock or a strategic decision, our findings on indebtedness conditional on filing are an unexplored margin of first-order importance to the functioning of consumer credit markets.

Another 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. Consistent with and complementary to this literature, we find informal shadow debt to be the category whose share increases the most when filing is delayed.

Notably, the only extant 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. 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 prior to bankruptcy nudges some debtors to delay filing and in the meantime accumulate more debt to be discharged. Severino and Brown (2017) interpret their findings as an efficient increase in credit demand among borrowers 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 likely to enter bankruptcy, allowing us to conclude that a nontrivial share of debt discharged at bankruptcy is the result of borrower moral hazard.

Although our work is primarily concerned with borrowers' debt decisions prior to filing, recent work studies the effects of bankruptcy on subsequent outcomes. Fisher and Lyons (2010) provide evidence that a bankruptcy flag on credit reports reduces borrower's 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. 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. To be able to weigh the real benefits of a more lenient bankruptcy system documented by these papers against potential moral-hazard costs, our work establishes whether such moral hazard costs are likely to be important and identifies filing delays and shadow

debt as key channels through which they operate.

Finally, the subsidy implicit in bankruptcy protection has generated a number of papers investigating general equilibrium effects of a bankruptcy system. For example, Dick and Lehnert (2010) document a link between aggregate credit supply and bankruptcy filings. Increased bankruptcies have an effect on the level of interest rates (Gross et al., 2019), thus impacting life-cycle income smoothing (Livshits, MacGee and Tertilt, 2007). Although general-equilibrium models emphasize the incentive effects of a bankruptcy system, their focus has not been on indebtedness. Li and Sarte (2006) evaluate how a bankruptcy provision alters incentives around investment and labor markets, and Cerqueiro and Penas (2017) study the impact of bankruptcy on incentives for entrepreneurs. In contrast, our work establishes the existence of incentive effects created by bankruptcy provisions for already-distressed borrowers.

3 Conceptual Framework

Purchasing goods or services by invoice—referred to as trade credit in the corporate sector—is not uncommon in the household sector. For example, transactions involving healthcare, utilities, and household repairs rarely require immediate payment and usually involve the buyer being invoiced for payment after receipt of the good or service. Similarly, any time a seller accepts a personal check for payment, the seller bears some uncertainty that the purchase price will be paid.[7] Importantly, in these transactions whether the buyer is going to pay as promised is unknown to the seller at the time of sale. There are costs to the buyer associated with nonpayment—the hassle of collections agencies, potential wage garnishing, and reputational costs both with the seller and potentially with credit-rating agencies. However, when a buyer has private information that the buyer is already highly likely to file for bankruptcy, these costs become negligible because the debt will likely soon be discharged and the buyer's non-exempt assets all seized regardless. An impending bankruptcy thus acts as a subsidy to buyers, potentially leading to overconsumption by soon-to-file-for-bankruptcy debtors who value a good less than its marginal cost of production but will not need to pay its price after discharging their liabilities in bankruptcy court. In turn, this turn raises prices for everyone and lowers consumption by those who do value it more than its cost but face the full market price

[7] Credit-card creditors also bear the risk of nonpayment.

of the good.

We present these economics formally in a model in the Appendix. The model is designed to illustrate the consequences of bankruptcy-filer moral hazard on demand, prices, quantities, the welfare of non-defaulting buyers (buyers who know they will not declare bankruptcy and will pay full price), and overall economic efficiency. Potential buyers who know they are going to default have weakly higher demand—an incentive to "run up the tab." This behavior has aggregate welfare consequences resulting from adverse selection, where the composition of buyers is disproportionately skewed towards defaulters. Because of the haircut sellers take from defaulting buyers, prices are higher than they would be absent moral hazard, decreasing welfare for non-defaulting buyers—see Figure 3 for an illustration. In aggregate, given elastic demand, these higher prices act as a tax and lead to lower equilibrium consumption and a deadweight loss. Without asymmetric information, there would be no moral hazard, the planner's solution and the competitive equilibrium would coincide and maximize consumer surplus, and goods would only be allocated to consumers who value them more than their marginal cost of production.

This conceptual framework demonstrates the classic incentives for moral hazard in the bankruptcy context. One unique feature of our setting is that borrowers can take two actions that both lead to higher amounts of discharged debt: increase consumption leading up to bankruptcy or delay filing and use debt to fund normal consumption. In the model, either action has similar consequences of raising equilibrium prices and reducing overall welfare. In Section 5.6 we provide some empirical evidence separating these two types of moral hazard behavior.

4 Data and Institutional Details

This section overviews our data sources, data processing procedures, and summary statistics.[8]

Our main dataset consists of data processed from filings obtained from the U.S. Court's Public Access to Court Electronic Records (PACER) website. Each individual bankruptcy district maintains its own dataset within the PACER system, and 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.[9] We selected

[8] See Appendix B for more information concerning the bankruptcy code and procedures in the U.S.

[9] Our fee waiver petition to the Florida Middle District was denied.

these districts to give geographical diversity across the United States. To obtain these data, we first download and process a list of all personal bankruptcy filings in Utah, Minnesota, and Florida using Lexis Nexis public-records searches. This provides a comprehensive database of individual names, addresses, and case numbers for the universe of household bankruptcies in these states from 1980–2018. From this list, we use the individual case numbers to query PACER for the four bankruptcy districts that constitute our sample. For each bankruptcy case, 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. Then, 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.

While we search for bankruptcy cases beginning in 2001, PACER contains very few electronic PDF documents before 2004. Accordingly, we begin our sample in January 2004 and end in September 2018. Though we have downloaded schedules for all electronic filings, in some cases the PDF documents are saved as relatively low-resolution images and we are unable to reliably process them, giving us somewhat less than 100% coverage in our final sample.[10] In addition, coverage varies somewhat by bankruptcy district in the early part of the sample. Both Minnesota and Florida Northern fully adopted electronic filings in January 2004 and tend to have few image files thereafter, giving us over 90% coverage for both of these districts for the full sample period. In Utah, adoption of electronic filings gradually increased from about 40% of all filings in early 2004 to over

[10]Standard Optical Character Recognition (OCR) techniques struggle in an environment where small differences are important, such as the difference between a comma and a period in a reported debt amount or asset value.

80% of all cases by 2006. However, a higher percentage of Utah filings were image files even after 2006 resulting in around 85% coverage for the remainder of the sample. Finally, the Southern District of Florida did not adopt electronic filing until 2006, with coverage increasing over the course of this first year to around 85% from 2007 onward.

The resulting dataset contains 606,120 individual bankruptcy filings. Of these, we drop 55,517 cases that are missing portions of either the Schedules of Assets and Liabilities or the Statement of Financial Affairs which make it impossible to calculate control variables such as employment status or whether the individual owns a business. Because all of our specifications include 3-digit ZIP-by-year fixed effects, we drop an additional 6,032 observations in which there is only one bankruptcy in this cell. 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 reported 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 (25% of income for most income levels), the average petitioner has $727 in monthly wages potentially subject to wage garnishing by creditors. Average total assets are $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%, where 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) to assign hard-to-categorize loans. 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." Using this technique, we are ultimately able to classify about 85% of all loans (94% of all debt) into a specific category. 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. 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 auto has been repossessed but also contains loans taken out for auto maintenance (e.g., tire purchases). Unsecured Priority claims are reported separately in the 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.

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 making 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 of filers in our sample. Over half of the borrowers in our data have some form of unsecured debt in our unknown category, which is unlikely

to be reported to credit bureaus. Student loans, which are not dischargeable in bankruptcy, are held by almost 25% of the sample, and make up 8% of unsecured liabilities on average. Medical debt—another category not usually reported to credit bureaus—is held by over half of our sample as well, although it accounts for less than 5% of the average filer's total debt. Arrears to utility providers—not reported to credit bureaus—are a particularly common category with 41% of filers reporting having unpaid utility bills, although this totals less than 2% of total unsecured debt. Consistent with the low share of business owners in our data, only 5% of filers report any business debt. Finally, despite being under acute financial distress, only 9% of filers in our data report outstanding 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 presumably routinely reported to credit bureaus and observable on credit reports, to total debt amounts reported on the bankruptcy filing.[11] 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. Bankruptcy thus presents perhaps the only opportunity to observe the size and scope of such informal credit markets since such debt is not administratively reported anywhere else.

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. Further, delinquent borrowers have little incentive to incur secured debt just prior to bankruptcy because it is rarely discharged without the individual also giving up the asset that serves as collateral. While

[11] See Appendix C for more information concerning the credit-bureau data merge.

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, this secured shadow debt likely does not reflect moral hazard, and instead is simply a reporting issue in the credit registry.[12] 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. In terms of total liabilities, 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 focusing on the set of observations for which there is only a single bankruptcy filing in a 5-digit zip-by-month cell. In these cases, we have a one-to-one merge between the two datasets and are confident that nearly 100% of these matches are correct.[13] For these 6,046 observations, we find that shadow debt levels are $11,100, $28,400, and $60,800 at the 25th, 50th, and 75th percentiles, 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.

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

[12] A handful of these cases have very large second mortgages that do not show up in the credit registry, which skews the numbers reported in Table 3, making it appear that secured shadow debt is large for many borrowers. While the average amount of secured shadow debt is $94,189, the median is only $13,900.

[13] To test 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 appear in the bankruptcy schedules that are not in credit reports because our credit-bureau data does 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. 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 will return to shadow debt in our analysis below, estimating that when debtors delay filing for bankruptcy, the majority of the increase in overall liabilities is in informal shadow debt.

5 Estimation

To identify the existence of moral hazard in debt accumulation before bankruptcy filing, the ideal experiment would randomly vary the *opportunity* to increase spending before bankruptcy and measure the extent to which individuals avail themselves of this opportunity (corresponding to varying γ in the model presented in Appendix A). Approximating this, our empirical strategy isolates the effect on indebtedness of quasi-random variation in the amount of time an individual can wait until filing for bankruptcy. If individuals were forced to enter bankruptcy immediately upon defaulting, they would not have the opportunity to strategically increase the size of their liabilities because there would never be a period when they would possess private information on their future bankruptcy

status. In reality, there is considerable scope for adjusting debt levels before filing for bankruptcy—in our data the average (median) bankruptcy petitioner files for bankruptcy 22.3 (15.3) months after first being 90 days past due on a debt.[14] 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.[15] Our primary regression specification tests whether borrowers i filing in court district s in year t who take longer to file have higher unsecured debt shares

$$\frac{Unsecured\,Debt_{ist}}{Total\,Debt_{ist}} = \beta \cdot Months\,to\,File_{ist} + X_i'\delta + \varphi_s + \varphi_t + \varepsilon_{ist}, \tag{1}$$

where X_i is a vector of bankruptcy filer controls explained below, and φ_s and φ_t are court-district and year fixed effects, respectively.[16] A key challenge to interpreting $\beta > 0$ as evidence of moral hazard is that even conditional on these controls, those who wait longer to file for bankruptcy may have systematically different debt amounts for many potential reasons besides moral hazard. Moreover, as we assess and address in section 5.2, our estimation sample conditions on a debtor having filed for bankruptcy, further raising sample-selection concerns.

To isolate quasi-exogenous variation in the speed with which a given petitioner files for bankruptcy, we exploit federal minimum-wage changes that affect the amount of wage garnishing a delinquent borrower could experience. 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

$$Garnishable\,Wages_{it} = \begin{cases} 0 & \text{if } Inc_i \leq 4.33 \cdot \omega_s \cdot MinWage_t \\ Inc_i - 4.33\omega_s MinWage_t & \text{if } 4.33 \cdot \omega_s \cdot MinWage_t < Inc_i < 5.8 \cdot \omega_s \cdot MinWage_t \\ 0.25 \cdot Inc_i & \text{if } Inc_i \geq 5.8 \cdot \omega_s \cdot MinWage_t \end{cases}, \tag{2}$$

for borrower i filing in bankruptcy district court s on date t. Monthly income Inc comes directly

[14] Though the first 90-day delinquency is not a perfect proxy for the beginning of bankruptcy filers' path towards bankruptcy, the first 90-day delinquency is a convenient and measurable marker of the beginning of financial distress. Our results are robust to alternative proxies.

[15] 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.

[16] While our results are robust to specifying the dependent variable as log unsecured debt, we examine effects on debt shares for consistency with later results that look at debt-category shares, for which zeroes would be problematic in logs.

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.[17] We multiply $\omega_s \cdot MinWage_t$ by 4.33 to convert it to a monthly figure. The $MinWage_t$ is the prevailing federal minimum wage on the date when the individual enters bankruptcy.

This statutory structure results in three possible income regions, plotted in Figure 1. For higher-income individuals whose $Inc_i > 5.8 \cdot \omega_s \cdot MinWage_t$, maximum garnishable wages are simply 25% of income. For low-income individuals whose $Inc_i < 4.35 \cdot \omega_s \cdot MinWage_t$, there is no wage garnishing. In the middle region, when $4.35 \cdot \omega_s \cdot MinWage_t < Inc_i < 5.8 \cdot \omega_s \cdot MinWage_t$, every marginal dollar of income above $4.35 \cdot \omega_s \cdot MinWage_t$ 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 1, prior to July 24, 2007 when $MinWage_t = \$5.15$, an individual in Utah with a monthly income of \$750 has garnishable wages of $\$750 - 4.35 \cdot 30 \cdot \$5.15 = \$77.93$, or 10.3% 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.

[17] 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).

5.1 First-Stage Estimates

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) in a cross-sectional regression as

$$\begin{aligned} Months\,to\,File_{ist} = \pi_1 \cdot Treatment_i \times Garnishable\,Wages_{ist} + \pi_2 \cdot Treatment_i \\ + \pi_3 \cdot G\,Wages_i + \pi_4 \cdot Treat_i \times Income_i + X_i'\pi_5 + \psi_s + \varphi_t + v_{ist}. \end{aligned} \tag{3}$$

Our objective is to isolate within-year variation in garnishable wages for borrowers with identical incomes. This objective is complicated by the fact that income and garnishable wages are perfectly collinear for anyone with income exceeding $5.8 \cdot \omega_s \cdot MinWage_t$ (where $\omega_s = 30$ in Utah and Florida and $\omega_s = 40$ in Minnesota). In contrast, in the income region defined by $4.35 \cdot \omega_s \cdot MinWage_t < Inc_i < 5.8 \cdot \omega_s \cdot MinWage_t$, 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.[18] 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 (3) 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. Our filer controls X_i include other plausible shifters of filing timing: the number of dependents and indicators for bankruptcy chapter choice, marital status, homeownership, business ownership, retired status, and

[18] We expand the treatment region outside the sharp kinks shown in Figure 1 and implied by the expression in equation (2) ($4.35 \cdot \omega_s \cdot MinWage_t < Inc_i < 5.8 \cdot \omega_s \cdot MinWage_t$) to allow for income volatility and measurement error (if unobserved garnishing from alimony or taxes affected income, for example).

disability status. 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 φ_t. Subsequent robustness checks control for unobservable geographic variation through time by including court-district $\times$ year fixed effects. Additional robustness exercises further 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 2 plots a binned scatterplot of equation 3 to visualize the treatment effect of garnishable wages given 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 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 (3) 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 dollar 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 33 days. To better gauge the magnitude of this coefficient, note that \$100 is roughly the average decrease around a minimum wage increase for a treated debtor in our sample.[19] 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.[20]

[19] 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 (2) and plotted in Figure 1, this decreases maximum garnishable wages by \$91.35/month for Florida and Utah filers and \$121.80/month for Minnesota filers.

[20] As described above, months to file is the number of months between when a consumer first becomes 90 days past due on any debt and when they file for bankruptcy. Some individuals transition in and out of being 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

The instrument delivers statistical power that varies with the precision 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. We reestimate our below 2SLS results using the Fuller (1977) estimator and find very similar results, suggesting weak instruments are not an issue here.

The first-stage results estimated in Table 4 and visible in Figure 2 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 garnishable wages influence debt amounts only through the timing of bankruptcy filing. However, conditioning on an endogenous outcome is not standard econometric practice because of the possibility that those who file may have different unobservables from the average distressed borrower. For example, a notable 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 when they do file. We evaluate selection concerns empirically along four dimensions. 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 precise 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

instead of the first month.

filers around minimum wage changes. Finally, we look for changes in filer characteristics as a function of the instrument.

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. The figure plots data from 25 weeks prior to the minimum wage change to 26 weeks after the change, covering one year in total. If minimum-wage induced changes in wage garnishing had large effects on the propensity to enter bankruptcy one would expect to see differences in the post period relative to the pre period. However, we do not see any statistically significant jump in filings around the law changes or any discernible trends that could confound our inference.

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 experience their first 90-day delinquency and then track whether they enter bankruptcy at any time in the next three years. If wage garnishment has a significant impact on the likelihood of entering bankruptcy conditional on being 90 days past due, we should see these filing probabilities change around minimum wage shocks. In Figure 5 we plot these bankruptcy probabilities in event time, where the event is any of the three changes in the federal minimum wage, similar to Figure 4. Each month is populated with borrowers that experienced their first 90-day delinquency in the indicated month. For example, a borrower would be assigned to the month -5 cohort if they experienced their first 90-day delinquency in February 2007, five months before the July 2007 change in minimum wage. Similarly, a borrower would be assigned the $+5$ cohort if they were first 90-days delinquent in December 2007, five months after a July 2007 minimum wage change. We then calculate and plot the fraction of borrowers in each cohort that declared bankruptcy within 3 years of their first 90-day delinquency. To account for seasonality in bankruptcy filings, we remove calendar month fixed effects. With the caveat that the standard errors are large, we find little difference in the point estimates of the bankruptcy probability across event time, and none of the differences are statistically different.[21] Both Figures 4 and 5 indicate that there is very little change in the extensive-margin decision to enter bankruptcy around the

[21] Results for bankruptcy probabilities over the next 4 or 5 years are similar.

three minimum wage change events.

Selection effects remain a concern, however, if the changes in garnishable wages influence the composition of filers without also changing the total number of filers. Our hypothesized mechanism is that decreases in garnishable wages will cause borrowers to file later, thereby affording themselves more time to incur debt prior to filing. While less plausible than a selection story where aggregate bankruptcy counts are 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 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 borrowers are assigned to a credit-default cohort based on the date of their first 90-day delinquency using the credit-bureau data. Figure 6 plots average log total debt at the time of delinquency, after removing calendar month fixed effects to account for seasonality. The plot indicates that point estimates of debt levels for non-filers are very stable across the 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 do not appear present in the data.[22]

We also test directly whether the distribution of filer incomes changed around the three minimum wage changes. Figure 7 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 1, borrowers whose wage garnishing was affected by minimum wage changes have incomes in the \$600 - \$1,300 range. The income percentiles falling 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 4-7 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.

Finally, 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

[22]Tests that use debt levels of non-filers one year after default (rather than concurrent with default) show similar results. Delinquent non-filing borrowers do not appear to accumulate debt differently over a one-year horizon after minimum wage 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 incomes across minimum wage changes in Figure 7 suggests that it is unlikely that such an event occurred as it would have likely affected the income distribution of bankruptcy filers. Table IA.I 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.

A final 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 (i.e. a mechanical effect). For example, lower wage garnishing could mechanically increase debt outstanding at bankruptcy because each dollar of lost wage garnishing would have been applied to reduce an outstanding debt. 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 effect, we find significant differences in debt accumulation between the samples. In addition, one must consider the net effect of reductions in garnishment on principal repayment. As low-garnishment consumers delay filing they are garnished for a longer period of time, resulting in a smaller mechanical net effect of wage garnishment reductions. In section 5.3, after discussing the magnitudes of our estimates, we will revisit the extent to which minimum wage changes affect debt outcomes independent of the moral hazard channel.

5.3 Effects of Filing Delays on Unsecured Debt

Building on first-stage estimates indicating the relevance of garnishable wages to the timing of bankruptcy filings, our second-stage specification estimates the extent to which filers use this marginal delay to increase debt. We estimate the specification in (1) with the first stage for months to file given by (3). Filer controls X_i are identical to those in the first stage. The battery of fixed effects capture court-district effects ψ_s, time effects ψ_t, or combinations of time, income, and

court-district 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 (1). 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 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 the relevance of these magnitudes, recall that the average minimum wage-induced change in garnishable 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 is an order of magnitude larger than the credit-bureau-merged sample. This reduced-form specification regresses debt shares on

garnishable wages

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

Borrower controls and fixed effects are identical to equation (1). We plot a binned scatterplot of this reduced-form regression to examine the relationship visually. Figure 8 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. As shown in Table 6, estimates 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 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-only credit-bureau sample. We also note that even using the conservative reduced-form estimates suggests an increase in unsecured debt an order of magnitude larger than could be driven by the forced debt repayment resulting from wage garnishing. While the average treated borrower had $100 fewer monthly wages garnished after one of the federal minimum wage increases we study, our reduced-form estimates imply an average of $1,200 increase in unsecured debt.

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 reliance of nearly bankrupt borrowers on various sources of unsecured credit. First, 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 check for increases in shadow debt as a result of an exogenous increase in months to file, and in section 5.5, we explore the types of shadow debt that borrowers are most likely to accumulate because of the delay in filing time.

The summary statistics in section 4.1—which require processing the detailed liability data in bankruptcy filing schedules and merging with credit-bureau records—show that shadow debt represents a large and meaningful segment of the consumer credit complex, at least for distressed borrowers. We argue above that distressed borrowers necessarily depend on unsecured debt when staving off bankruptcy. Similarly, 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. Figure 9 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 Figure 9 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. We also note that the reduced-form relationship between shadow debt and garnishable wages for treated borrowers in Figure 9 is stronger than the relationship between overall unsecured debt and garnishable wages in Figure 8, as we discuss below.

To formally test whether shadow debt responds to bankruptcy filing delays, we reestimate the same 2SLS specification of (1), 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.

Interestingly, 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.[23] In the context of the theoretical model in Appendix A, an increase in shadow debt is predicted as a consequence of borrowers with private information of their bankruptcy type having more scope to purchase goods and services without ever paying for them. While all borrowers on the brink of bankruptcy are likely to be unable to access formal credit markets and may turn to shadow debt out of necessity, the strong relationship between shadow debt and exogenous opportunities to delay filing underscores the empirical importance of shadow debt for strategic borrowers.

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 Schedule F forms filed in each bankruptcy case that list in detail each individual unsecured debt owed by a filer. 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. See Table 2 for summary statistics on debt shares for a finer set of debt categories. 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 from 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 most interested in the type of shadow debt origination that responds

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

the most to bankruptcy filing delays. We rely on our 2SLS specification, reestimating equation (1) 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 a specific debt category 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 debt estimated in column 2 of Table 7.[24]

Table 8 reports results with filing-year and court-district fixed effects. We find insignificant effects in all of the 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. In contrast, in column 4, we find an economically and statistically significant 171 basis point increase in informal shadow debt due to exogenous changes in months to file. A lack of loan-level detail in credit-bureau data limits our ability to directly identify particular debts as shadow debt, but the increases in informal shadow debt are particularly consistent with borrowers turning to informal lenders who are likely uninformed that the borrower is on the brink of bankruptcy. Debts in this category are by definition likely to originate from merchants that are not routinely pulling from or reporting to a credit bureau (e.g., landlords, plumbers, dentists, mechanics, utility providers, etc.). Thus, increases in informal shadow debt are particularly consistent with moral hazard behavior in which delaying borrowers increase debt via their informational advantage over informal lenders.

5.6 Interpretation

Results presented thus far have shown that an exogenous nudge towards filing delays results in larger debt amounts when borrowers eventually file. While the results resolve the question of whether borrowers increase or decrease debt when they delay filing, the results are not dispositive with respect to borrower's intentions when inflating debt levels prior to filing. The patterns in the data - increases in unsecured, informal, and unreported debt categories - are potentially consistent

[24]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.

with strategic and intentional debt accumulation just prior to bankruptcy. Yet we cannot reject the possibility that borrowers run up debt prior to bankruptcy because they are unintentionally or intentionally scouring for credit wherever possible in an effort to provide for the necessities of life.[25]

Differentiating intentional, strategic debt accumulation from passive, necessities-of-life accumulation is difficult because borrower intentions when originating debt are hidden from lenders as well as econometricians. In an effort to provide distinction between unobserved motives we turn to the cross-section of borrowers. We attempt to identify borrowers who are more likely to be filing for what could reasonably be determined to be non-strategic motives. These include borrowers with large medical debt, recent job loss, or the dissolution of a marriage. Though such circumstances are not exogenous, the existence of these life events could push borrowers to file for bankruptcy for reasons that do not include exploiting the ability to discharge debt in bankruptcy.

We extend our baseline specification to include a "strategic" indicator equal to one for filers with less than $500 in medical debt, are employed, and are not separated or divorced from their spouse.[26] This sample split results in roughly 40% of filers in our sample being classified as "strategic." We interact the strategic indicator with the interaction between the treatment dummy and garnishable wages from the previous analysis (and include 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 adverse life events (e.g. medical event, job loss, or divorce) relative to the sample of borrowers that have little medical debt, are employed, and married.

We report two sets of results across the sample splits. Table IA.III in the appendix reports estimates that test for differences in the timing of filing (the first stage) across the two groups. Both strategic and non-strategic filers respond equally to the garnishment nudge pushing borrowers to delay filing. Although both sets of borrowers avail themselves of a longer time to file, the two samples accumulate debt very differently. Results for the accumulation of unsecured debt are shown in Table 9 while the results for the accumulation of shadow debt are shown in Table 10. Both sets of tables indicate that the treatment effect for both the unsecured debt share and shadow debt is concentrated in the "strategic" filer sample. Triple difference versions of these analyses are reported

[25]We discuss in the conclusion the possibility that a broad definition of moral hazard could include either of the motives described. Delaying bankruptcy, for whatever reason, could be considered moral hazard if the borrower is eventually unable to repay.

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

in the appendix in Tables IA.IV, IA.V, and IA.VI. Finally, in Table 11 we evaluate the informal shadow debt result from column 4 of Table 8 across the two sub-samples. The results show that the run up in informal shadow debt is concentrated in the strategic filers.

The sub-sample results are insightful for three reasons. First, a concern about our experiment is the possibility that changes in wage garnishment could create an income effect that influences debt levels through a channel other than delayed filings. An income effect should operate equally on each of the strategic and non-strategic sub-samples. However, the estimates show that substantial debt accumulation only occurs within the strategic sub-sample. 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 push against this possibility because mechanical garnishment effects should operate equally on each sub-sample. Finally, the results make headway towards differentiating strategic moral hazard debt accumulation from necessities-of-life accumulation. Though the strategic sample split is admittedly imperfect (e.g. medical debt, job loss, and divorce are not always exogenous, and some in the "strategic" sample likely had similar unobserved shocks that pushed them into bankruptcy), the magnitudes of the estimates exceed debt amounts that would be accumulated by simply meeting the necessities of life during an average 30-day delay in filing. Estimates from Table 9 suggest that a 30-day filing delay is associated with an additional $7,500 in debt for the strategic sample, compared to $1,000 for the non-strategic sample. Though it is possible to imagine idiosyncratic life events impacting the strategic sample (e.g., car trouble), the dollar magnitude of such events would have to be an order of magnitude larger, on average, to explain the difference in the estimates.

6 Conclusion

A bankruptcy system provides consumers with many benefits, including insurance against bad luck and a corresponding willingness to take on risk. These benefits have been explored in the literature, both in theory and in the data (see, for example, Livshits, MacGee, and Tertilt, 2016; Mahoney, 2015; Dobbie and Song, 2015; Dobbie, Goldsmith-Pinkham, and Yang, 2017; Severino and Brown, 2017). One aspect of bankruptcy that has received little attention, however, is how borrowers behave in the run-up to bankruptcy. When borrowers have private information about their near-

term bankruptcy status, bankruptcy creates incentives for consumers to strategically accumulate debt in anticipation of the debt being discharged fully in a Chapter 7 filing or at least partially discharged in a Chapter 13 filing. Our analysis utilizes 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 consumers file for bankruptcy an average of 22 months after their first 90-day delinquency. 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 on average of one month later than otherwise similar borrowers, accumulating an incremental $4,000 of unsecured debt in the interim. A series of robustness checks provide evidence that our results are unlikely to be driven by direct effects of the minimum wage increases, time-varying shocks specific to debtors in the treated income range, 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; instead, "shadow debt" appears to be originated by psuedo-creditors, many of which are likely sellers of goods and services who do not consider themselves to be intentionally extending credit. Informal shadow debt appears to be the primary source of strategic debt originated by distressed borrowers anticipating bankruptcy who likely turn to informal lenders when facing acute credit constraints in formal credit markets.

While we cannot discern borrower motives conclusively, the pattern and magnitudes of debt originated prior to bankruptcy appear to be consistent with strategic moral hazard debt accumulation. That said, whether a borrower intentionally increases debt-fueled consumption prior to bankruptcy or simply fails to pay back necessities-of-life debt while staving off bankruptcy, from the creditors' perspective, delaying bankruptcy by increasing debt, for any reason, is costly if the borrower ends up in bankruptcy. The model presented in the appendix illustrates that either motivation constitutes moral hazard and has aggregate welfare consequences. Given this, in response to moral hazard the social planner might optimally choose to encourage potential defaulters to enter bankruptcy sooner so as to free up cash flows for continued consumption, as opposed to reducing bankruptcy benefits.

Overall, the consumer bankruptcy system provides large benefits to households who experience

extreme negative financial shocks. However, the system also comes with costs by incentivizing individuals to strategically increase debt when the probability of bankruptcy is high. The resulting discharge of billions of dollars of debt each year is a cost likely borne by other borrowers in the form of higher interest rates, fees, and prices. While our paper does not quantify the benefits of bankruptcy, it provides novel evidence of an under-appreciated moral-hazard cost of the bankruptcy system, and better understanding this cost is an important component of constructing and implementing optimal bankruptcy policy.

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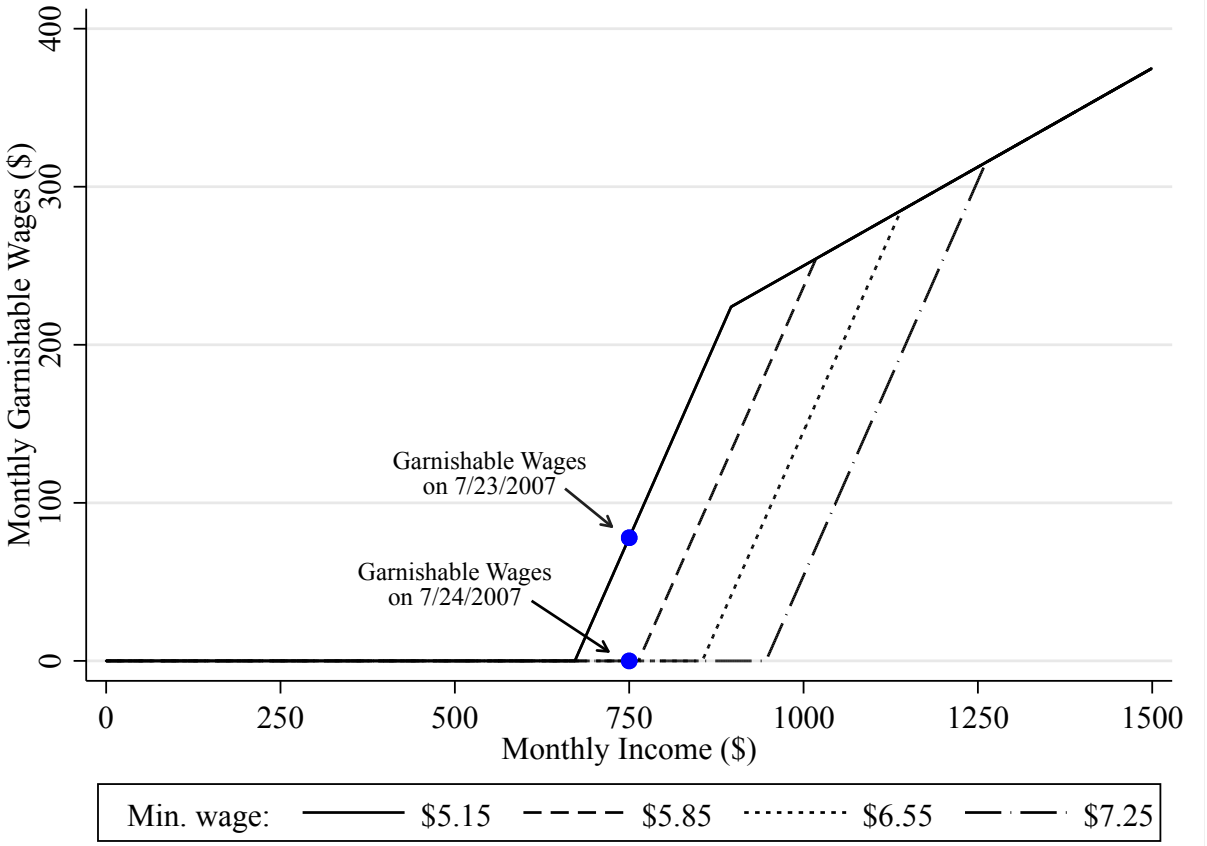
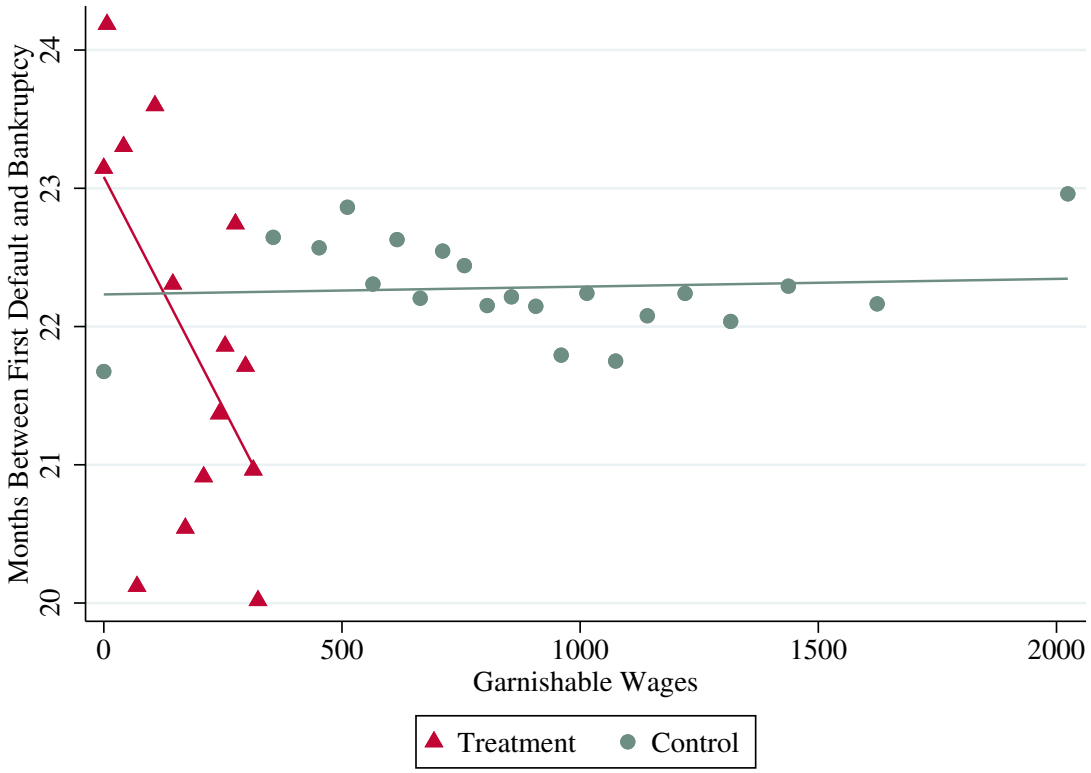
Figure 1: Monthly Garnishable Wages by Federal Minimum Wage Level



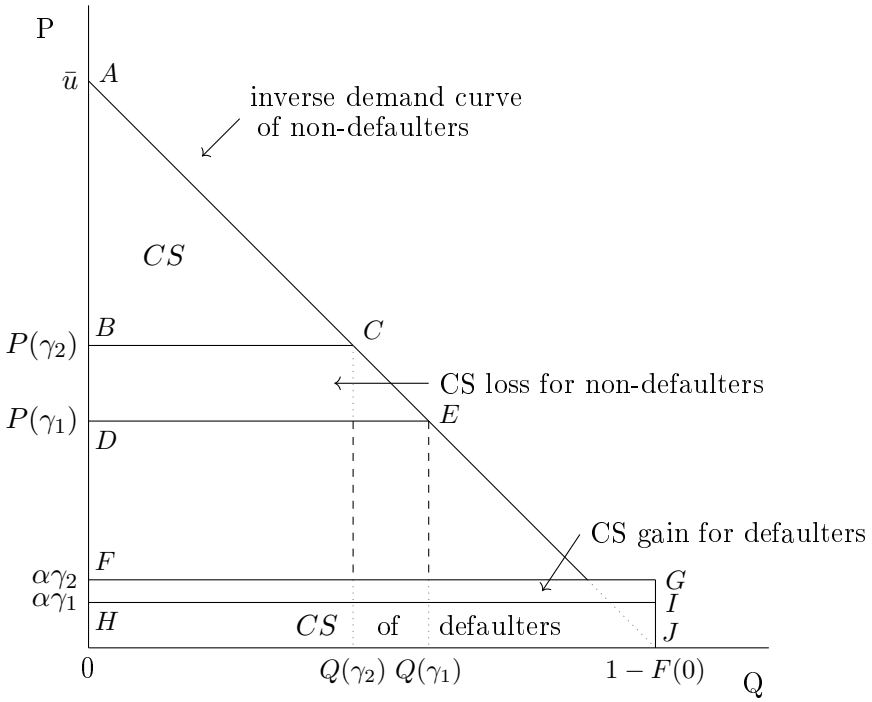
Notes: Figure plots the maximum level of monthly wages that are eligible for wage garnishing as a function of a household's monthly income for each of four federal minimum wage regimes according to equation (2) with $\omega_s = 30$, corresponding to the Florida and Utah statutes.

Figure 2: Garnishable Wages and Days to File



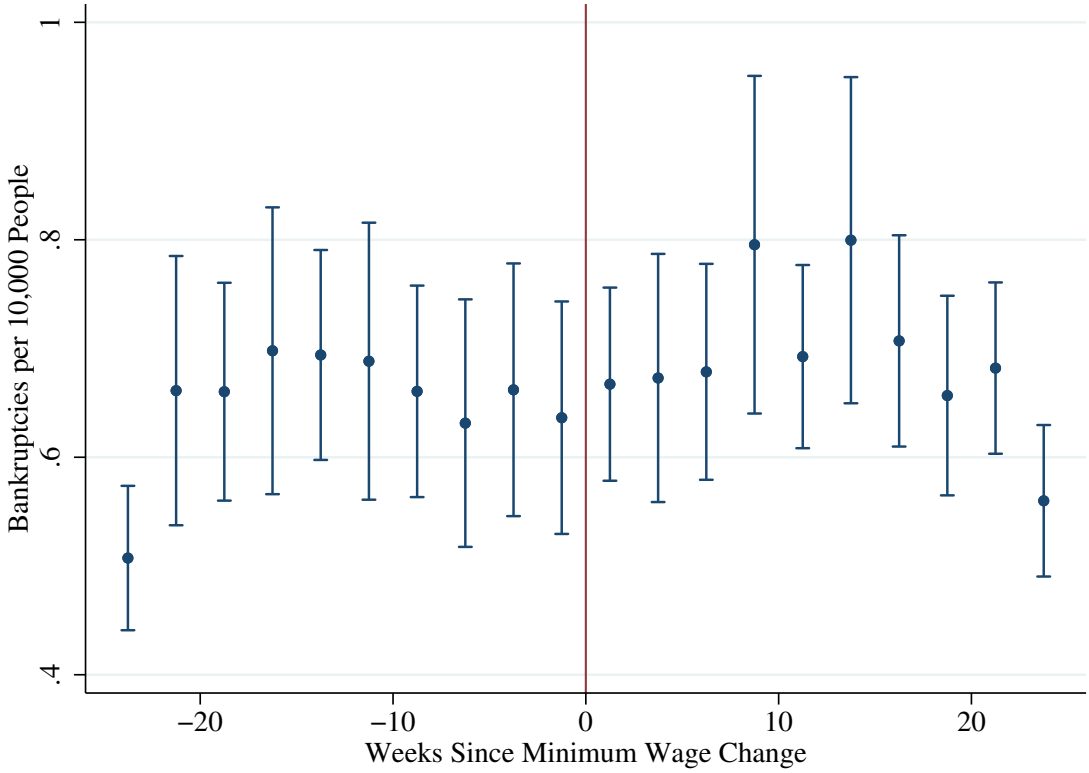
Notes: Figure plots a binned scatter plot of the number of months between the first 90-day delinquency and the bankruptcy filing date as a function of garnishable wages. The number of months to file is defined as the number of days to file divided by 30 after residualizing for court-district and year 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 3: Welfare Consequences of Increased Moral Hazard



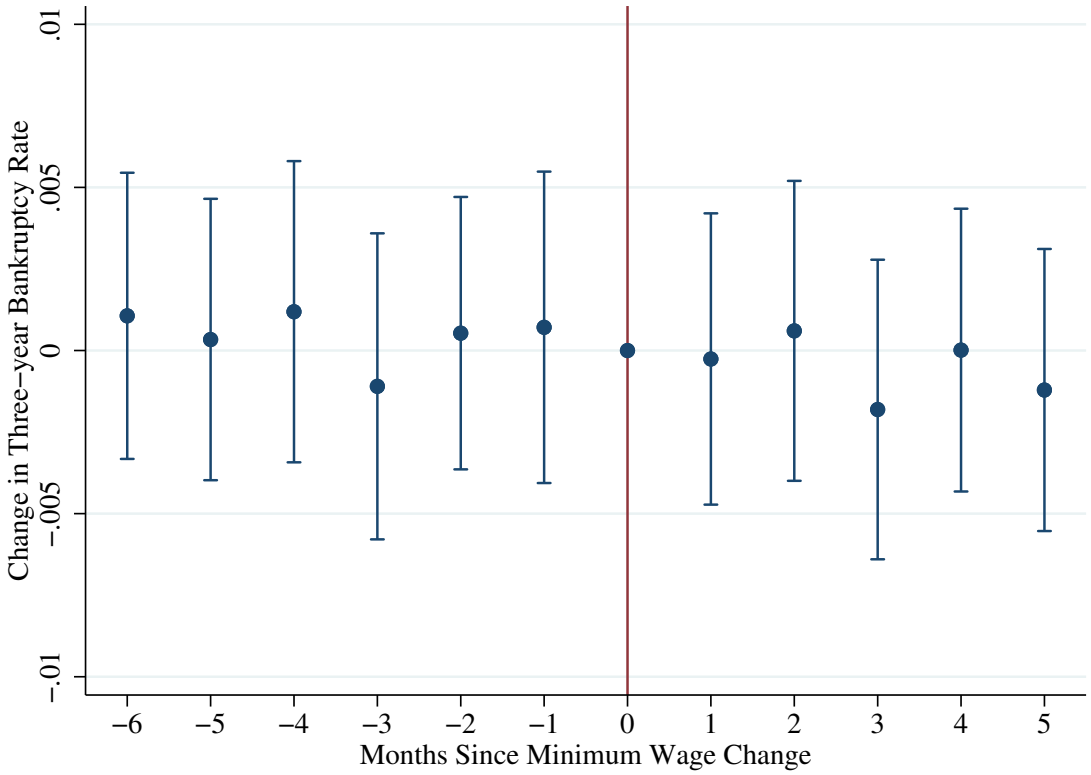
Notes: Diagram illustrates the change in equilibrium outcomes associated with an increase in moral hazard from γ_1 to γ_2 in price-quantity space. The zero-profit condition pins down price for a given γ, and the inverse demand curve plotted as AJ determines the fraction of consumers who would purchase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

Figure 4: Testing for Selection: Bankruptcy Counts around Minimum Wage Changes



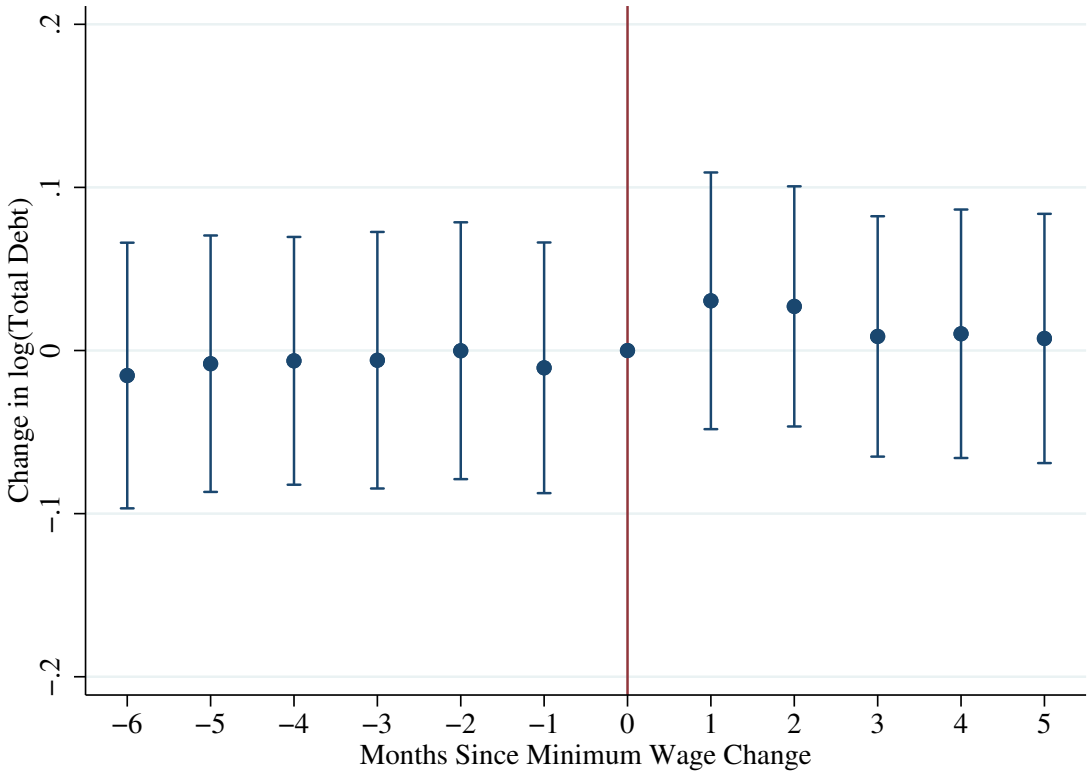
Notes: Figure plots the weekly average number of bankruptcies per 10,000 people across Florida, Minnesota, Utah for the six months before and the six months after the changes in minimum wage laws along with 95% confidence intervals.

Figure 5: Testing for Selection: Bankruptcy Rate Changes and Minimum Wage Changes



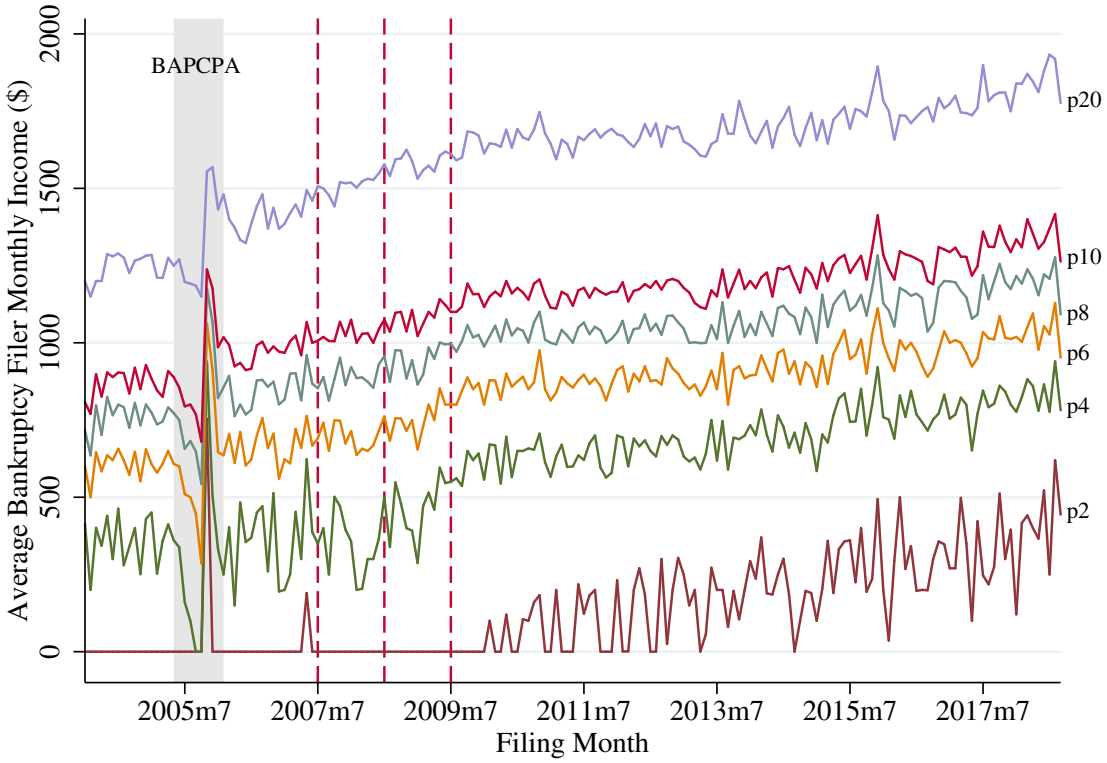
Notes: Figure plots the likelihood of filing for bankruptcy in the next 3 years from the first time an individual is 90 days delinquent on a credit-bureau account for the six months before and the six months after the changes in minimum wage laws along with 95% confidence intervals. The underlying regression removes calendar month fixed effects to remove seasonality with the bankruptcy rate normalized to zero in the month of the minimum wage change such that changes in the three-year bankruptcy rate relative to $t = 0$ are plotted. Confidence intervals are clustered by Zip3 $\times$ default-cohort month.

Figure 6: Testing for Selection: Non-filers' Total Debt Changes Around Delinquency



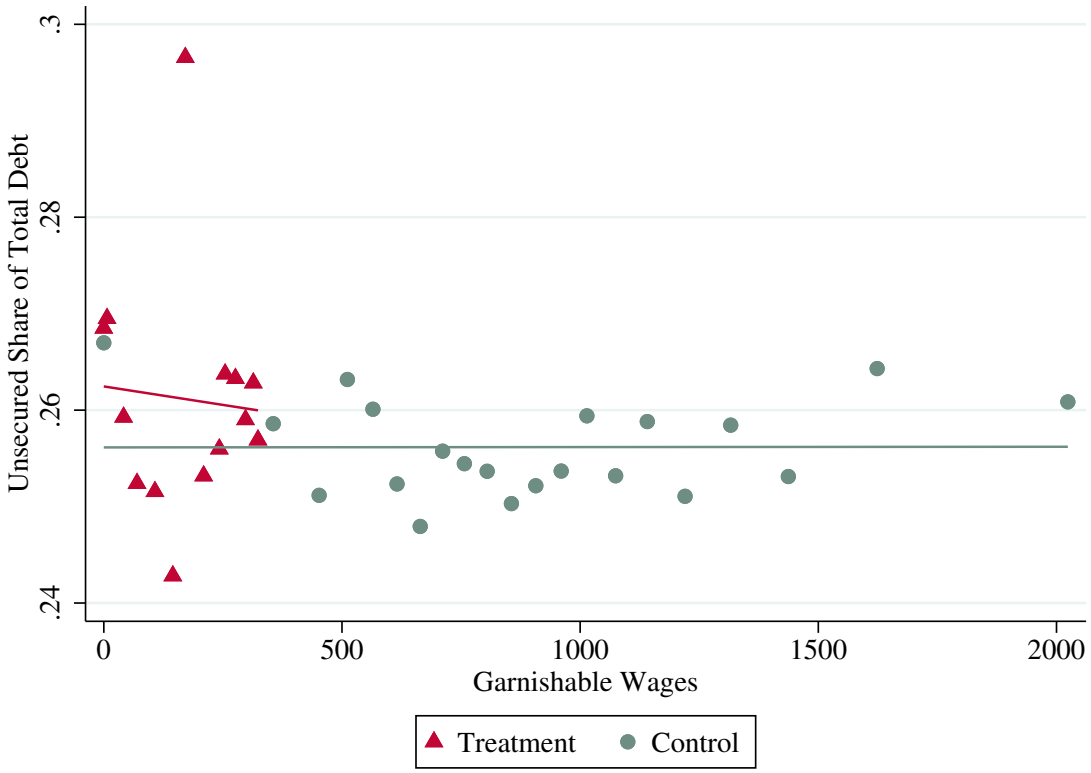
Notes: Figure plots log total debt at the time of delinquency for individuals that are 90 days delinquent on a credit line but do not file for bankruptcy in the next 5 years for the six months before and the six months after the changes in minimum wage laws along with 95% confidence intervals. The underlying regression removes calendar month fixed effects to remove seasonality with the bankruptcy rate normalized to zero in the month of the minimum wage change such that changes in the log total debt relative to $t = 0$ are plotted. Confidence intervals are clustered by Zip3 $\times$ default-cohort month.

Figure 7: 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. (2019) show had a large effect on personal bankruptcy filing.

Figure 8: Unsecured Debt Share and Garnishable Wages



Notes: Figure plots a binned scatter plot of the fraction of total debt disclosed in bankruptcy that is unsecured 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. Garnishable wages are the dollar amount of monthly income that is exposed to garnishing according to federal statute at the time of bankruptcy filing.

Figure 9: Shadow Debt Share and Garnishable Wages

Notes: Figure plots a binned scatter plot of the shadow debt share (the share of unsecured debt discharged in bankruptcy not reported in credit-bureau data) 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. Garnishable wages are the dollar amount of monthly income 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.	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. Miscellaneous categories include small categories such as unpaid insurance premia, 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. N = 554,942.

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

Variable	Mean	Std. Dev.	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: Decomposition of Effect of Bankruptcy Filing Timing on Shadow Debt Share of Total Debt

	(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 Unsecured Debt Share of Total Debt by Possible Filing Motive

Sample	Non-strategic	Strategic	Pooled
Treatment × Garnishable Wages	-0.0024	-0.0191***	-0.0016
	(0.0052)	(0.0060)	(0.0049)
Strategic Indicator			-0.0277***
			(0.0039)
Treatment × Garnishable Wages × Strategic			-0.0189**
			(0.0087)
Garnishable Wages	0.0016***	0.0014***	0.0012***
	(0.0003)	(0.0004)	(0.0003)
Garnishable Wages × Strategic			0.0007***
			(0.0003)
Treatment × Income	-0.0000	0.0001**	-0.0000
	(0.0000)	(0.0001)	(0.0000)
Treatment × Income × Strategic			0.0001**
			(0.0001)
Treatment	0.0198	-0.0980	0.0235
	(0.0313)	(0.0588)	(0.0303)
Treatment × Strategic			-0.1269*
			(0.0659)
Filer Controls	✓	✓	✓
Year Fixed Effects	✓	✓	✓
District Fixed Effects	✓	✓	✓
R^2	0.61	0.58	0.60
Observations	28,267	19,693	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 0.53. 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). Strategic 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 10: Effect of Wage Garnishing on Shadow Debt Share of Total Debt by Possible Filing Motive

Sample	Non-strategic	Strategic	Pooled
Treatment × Garnishable Wages	-0.0052	-0.0461***	-0.0022
	(0.0109)	(0.0161)	(0.0100)
Strategic Indicator			-0.0404***
			(0.0128)
Treatment × Garnishable Wages × Strategic			-0.0482***
			(0.0173)
Garnishable Wages	0.0026***	0.0024***	0.0024***
	(0.0007)	(0.0004)	(0.0007)
Garnishable Wages × Strategic			0.0003
			(0.0010)
Treatment × Income	0.0001	0.0003***	0.0001
	(0.0001)	(0.0001)	(0.0001)
Treatment × Income × Strategic			0.0003**
			(0.0001)
Treatment	-0.0468	-0.2852***	-0.0331
	(0.0741)	(0.1029)	(0.0728)
Treatment × Strategic			-0.2720**
			(0.1089)
Filer Controls	✓	✓	✓
Year Fixed Effects	✓	✓	✓
District Fixed Effects	✓	✓	✓
R^2	0.51	0.51	0.50
Observations	28,267	19,693	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). Strategic 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 11: Effect of Wage Garnishing on Informal Shadow Debt Share of Total Debt by Possible Filing Motive

Sample	Non-strategic	Strategic	Pooled
Treatment × Garnishable Wages	-0.0111	-0.0328*	-0.0077
	(0.0087)	(0.0176)	(0.0082)
Strategic Indicator			-0.0629***
			(0.0112)
Treatment × Garnishable Wages × Strategic			-0.0301*
			(0.0168)
Garnishable Wages	0.0008	0.0013***	0.0002
	(0.0006)	(0.0004)	(0.0006)
Garnishable Wages × Strategic			0.0018*
			(0.0009)
Treatment × Income	0.0001*	0.0003***	0.0001*
	(0.0001)	(0.0001)	(0.0001)
Treatment × Income × Strategic			0.0002*
			(0.0001)
Treatment	-0.0789	-0.2343***	-0.0671
	(0.0591)	(0.0832)	(0.0595)
Treatment × Strategic			-0.1788*
			(0.0917)
Filer Controls	✓	✓	✓
Year Fixed Effects	✓	✓	✓
District Fixed Effects	✓	✓	✓
R^2	0.51	0.51	0.51
Observations	28,267	19,693	47,960

Notes: Table reports reduced-form regressions using the credit-bureau-matched sample. Dependent variable is informal shadow debt, defined as the remainder of unsecured debt not in the categories of 1) credit card and retail shadow debt, 2) student loan shadow debt, and 3) 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). Strategic 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 Model

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.[27] 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 constitute moral hazard and 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 from purchasing a widget at price P given by

$$U_i = u_i - (1 - D_i)P \tag{4}$$

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 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

$$Q(P) = (1 - \alpha) \int_P^{\bar{u}} dF(u) + \alpha\gamma \int_0^{\bar{u}} dF(u) = (1 - \alpha)(1 - F(P)) + \alpha\gamma(1 - F(0)). \tag{5}$$

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 defaulters (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. 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 (5) 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

$$\pi = \beta(P)Q(P)(P - C) + (1 - \beta(P))Q(P)(-C) \tag{6}$$

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

[27] 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.

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

$$\beta(P) = \frac{(1-\alpha)\int_P^{\bar{u}} dF(u)}{(1-\alpha)\int_P^{\bar{u}} dF(u) + \alpha\gamma\int_0^{\bar{u}} dF(u)}. \tag{7}$$

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

$$P = \frac{C}{\beta(P)}. \tag{8}$$

Referencing (7), 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.

Figure 3 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 (7). 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 (5), 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

$$CS = (1-\alpha)\int_P^{\bar{u}} (u - P)dF(u) + \alpha\gamma\int_0^{\bar{u}} udF(u) \tag{9}$$

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 Figure 3 to write consumer surplus at a given price level P is given by

$$CS = \frac{(1-\alpha)(\bar{u} - P)^2 + \alpha\gamma\bar{u}^2}{2(\bar{u} - \underline{u})}. \tag{10}$$

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

$$\frac{\partial CS}{\partial \gamma} = \frac{1-\alpha}{\bar{u} - \underline{u}}\left[-\bar{u}\frac{\partial P}{\partial \gamma} + P\frac{\partial P}{\partial \gamma}\right] + \frac{\alpha\bar{u}^2}{2(\bar{u} - \underline{u})} \tag{11}$$

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 (9) is depicted as the triangle ADE in Figure 3 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 (11) 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 representing the amount of time defaulters have to purchase goods, the model provides a convenient vehicle to analyze the consequences of the increase in moral hazard. In addition, the framework allows us to highlight different types of moral hazard. In the basic model outlined above, buyers know their type exactly, 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 the same 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 be interpreted as moral hazard. 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 moral hazard 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.

B 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.[28] 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, an important aspect of bankruptcy law is whether debt incurred immediately prior to the bankruptcy is still dischargeable. If this debt cannot be discharged, then individuals would obviously have no incentive to strategically increase debt levels prior to entering bankruptcy. The 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

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

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.[29]

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.[30] 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.[31] 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 below. During our sample period, the federal minimum wage changed three times, on the 24th of July on 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 1. 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 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.

C 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 servicer 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

[29] 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.

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

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

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 below. 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 and 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.

Table IA.I: 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	-0.0044 (0.0041)	-0.0070 (0.0117)	0.0069 (0.0078)	-0.0187 (0.0299)	-0.0014 (0.0056)	-0.8828 (1.4448)
Filer Controls	✓	✓	✓	✓	✓	✓
Year Fixed Effects	✓	✓	✓	✓	✓	✓
District Fixed Effects	✓	✓	✓	✓	✓	✓
R^2	0.667	0.516	0.52	0.548	0.5	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. *Disabed* is a dummy for disabled status. *Credit Score* is the vantage score at time of fiming. 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 IA.II: 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 first-stage 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 IA.III: Effect of Wage Garnishing on Bankruptcy Filing Timing in Months 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)
Strategic Indicator	-1.24***	-1.02**	-1.24***	-1.15***
	(0.36)	(0.43)	(0.36)	(0.36)
Treatment × Garnishable Wages × Strategic	0.002	0.82	0.002	0.006
	(0.74)	(0.73)	(0.74)	(0.74)
Garnishable Wages	-0.11***	-0.11***	-0.11***	-0.025
	(0.02)	(0.03)	(0.02)	(0.06)
Garnishable Wages × Strategic	-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 × Strategic	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 × Strategic	-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 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). Strategic 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 IA.IV: Effect of Wage Garnishing on Unsecured Debt Share of Total Debt by Possible Filing Motive

	(1)	(2)	(3)	(4)
Treatment × Garnishable Wages	-0.0016	-0.0010	-0.0016	-0.0016
	(0.0049)	(0.0050)	(0.0049)	(0.0049)
Strategic Indicator	-0.0277***	-0.0278***	-0.0277***	-0.0271***
	(0.0039)	(0.0039)	(0.0039)	(0.0042)
Treatment × Garnishable Wages × Strategic	-0.0189**	-0.0197**	-0.0189**	-0.0189**
	(0.0087)	(0.0088)	(0.0087)	(0.0087)
Garnishable Wages	0.0012***	0.0012***	0.0012***	0.0013***
	(0.0003)	(0.0003)	(0.0003)	(0.0005)
Garnishable Wages × Strategic	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 × Strategic	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 × Strategic	-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	0.6	0.603	0.6	0.599
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 0.53. 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). Strategic 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 IA.V: Effect of Wage Garnishing on Shadow Debt Share of Total Debt by Possible Filing Motive

	(1)	(2)	(3)	(4)
Treatment × Garnishable Wages	-0.0022	-0.0011	-0.0022	-0.0002
	(0.0100)	(0.0099)	(0.0100)	(0.0098)
Strategic Indicator	-0.0404***	-0.0402***	-0.0404***	-0.0431***
	(0.0128)	(0.0126)	(0.0128)	(0.0129)
Treatment × Garnishable Wages × Strategic	-0.0482***	-0.0462***	-0.0482***	-0.0484***
	(0.0173)	(0.0169)	(0.0173)	(0.0172)
Garnishable Wages	0.0024***	0.0024***	0.0024***	-0.0000
	(0.0007)	(0.0007)	(0.0007)	(0.0010)
Garnishable Wages × Strategic	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 × Strategic	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 × Strategic	-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	0.508	0.503	0.506	0.506
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). Strategic 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 IA.VI: Effect of Wage Garnishing on Unsecured Debt Share by Possible Filing Motive Using Full Bankruptcy Sample

Sample	Non-strategic	Strategic	Pooled
Treatment × Garnishable Wages	-0.0008	-0.0081**	-0.0013
	(0.0012)	(0.0033)	(0.0012)
Strategic Indicator			-0.0122***
			(0.0025)
Treatment × Garnishable Wages × Strategic			-0.0054*
			(0.0029)
Garnishable Wages	-0.0005***	0.0003	-0.0002
	(0.0002)	(0.0003)	(0.0002)
Garnishable Wages × Strategic			-0.0001
			(0.0002)
Treatment × Income	-0.0000	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)
Treatment × Income × Strategic			-0.0000
			(0.0000)
Treatment	0.0223**	0.0252	0.0195**
	(0.0097)	(0.0178)	(0.0094)
Treatment × Strategic			0.0127
			(0.0169)
Filer Controls	✓	✓	✓
Year Fixed Effects	✓	✓	✓
District Fixed Effects	✓	✓	✓
R^2	0.745	0.745	0.747
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). Strategic 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