Personal Bankruptcy and the Accumulation of Shadow Debt

Bronson Argyle
BYU

Ben Iverson
BYU

Taylor Nadauld
BYU

Christopher Palmer
MIT and NBER

CFPB, May 2021

Bankruptcy and Debt Accumulation Behavior

- Bankruptcy is a form of insurance
- Downside protection but also potential for moral hazard
- Classic trade-off: UI, health insurance, flood insurance, etc.
- Widespread policy concern: B**AP**CPA
- ~10% of U.S. households have filed for bankruptcy (Keys, 2018)
- Important to bankruptcy system design, understand credit market functioning

---

→ Does monthly liquidity influence the timing of bankruptcy filing (Gross, Notowidigdo, & Wang, 2014 and Indarte, 2020)?

→ Conditional upon ultimately filing, what is the debt origination behavior of delaying filers?

- Option to delay filing 1 month ⇒ +$4k in unsecured debt, +$6k in "shadow debt"

Outline

- Data
- Identification Strategy
- Empirical Results
- Conclusion

Our data source

- Scrape completed bankruptcy filing schedules from PACER for BK districts of Utah, Minnesota, Florida North, and Florida South between 2004-2018
  - Detailed information about assets, liabilities Example, employment status, historic and current income, projected expenses, family situation
- ~15% of cases unable to process PDF (the form is handwritten or PDF is an unreadable image or schedules are missing).
- Final sample ~545,000 bankruptcy filings with 15+ million individual debt claims
- Merged by hand (using unique "cells" and first mortgage amounts) to credit-bureau data CB Merge

Measuring Shadow Debt

- Shadow debt $\equiv$ Total unsecured debt on bankruptcy filing - total unsecured debt on credit report.

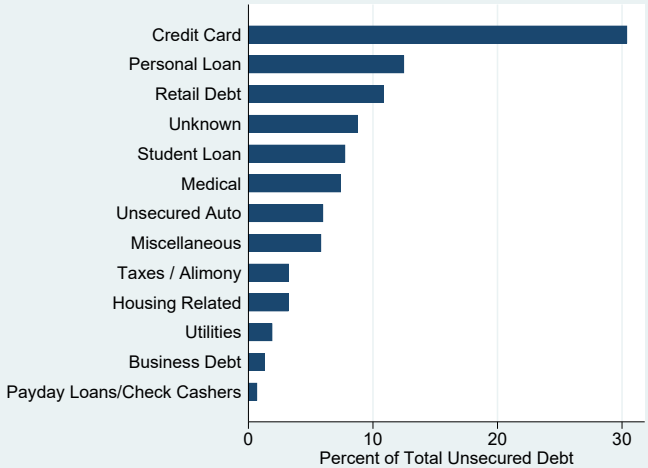
?! Isn't that the whole point of a credit registry?

- Many creditors and collection agencies do not report to credit bureau (e.g., dental offices).

- Key component: **non-payment of goods and services**

- Shadow debt is large: **$41,680** ($27,750) for mean (median) filer
  - 7% of total debt
- Shadow debt in **formal** settings like credit cards, student loans, and personal loans is surprisingly large (about $30k, on average)

Categories of Unsecured Debt



- Using an augmented LDA (Latent Dirchlet Analysis), we categorize 92% of all loans based on keywords in the loan descriptions.
- We map these categories into the debt categories supplied by a credit report:
  1. Credit card/retail debt
  2. Student loans
  3. Personal loans
  4. Uncategorized (informal shadow debt)

Summary Statistics

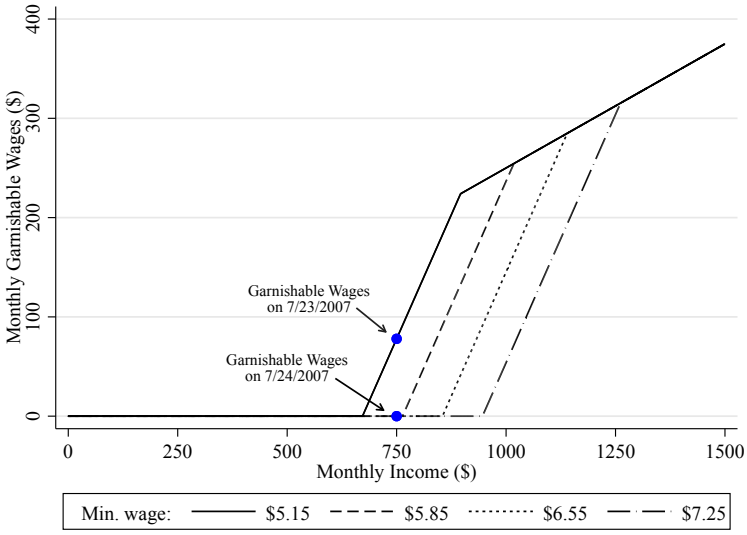
Variable	Mean	Std. Dev.	25th	50th	75th
Monthly Income ($)	2,973.3	1,682.3	1,786.8	2,700	3,902.2
Monthly Garnishable Wages ($)	727.03	442.81	446.7	675	975.55
Total Assets ($)	133,738.0	207,304.2	10,380.9	84,265.3	197,556.9
Total Debt ($)	238,809.2	673,127.3	52,545.6	148,959.6	282,618.1
Unsecured Debt ($)	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

Identification Strategy

- Identification strategy: exogenous changes to wage garnishment affect how fast people file for bankruptcy.
  - Wage garnishment: creditors taking money directly from delinquent borrower's wages
- Idea: Higher garnishment $\Rightarrow$ Less take-home pay $\Rightarrow$ File for bankruptcy sooner
- Exogenous variation in garnishment: Federal changes to minimum wage
  - These minimum wage changes do not appear to change the composition of filers, and
  - the magnitudes of the response are very difficult to ascribe to either
    - an increase in income qualifying filers for more debt, or
    - a mechanical reduction in the amount of wage garnishment being used to pay down debt.

How Min. Wage Affects Garnishment

Details and Equations



Details and Equations

Empirical Strategy

- Treated group: filers in middle income range whose wage garnishment is affected by minimum wage changes
- Control groups:
  - Filers with income below lowest threshold, and
  - Filers with income above highest threshold

- First stage: effect of minimum wage changes on delay in entering bankruptcy
- Second stage: effect of instrumented bankruptcy delay on debt discharged in bankruptcy

Measuring Delay to Bankruptcy

- Use credit bureau data to identify first transition into 90 days past due
- Define time to bankruptcy as months from first 90-day delinquency to bankruptcy filing
  - Robustness: 120-day delinquency, or last transition to 90-day delinquency

- Filers delay a long time before entering bankruptcy:
  - Average time to file: 22.3 months
  - Median time to file: 15.3 months

First-Stage Specification

$$\begin{aligned} \textit{Months to File}_{ist} &= \pi_1 \cdot \textit{Treatment}_i \times \textit{Garnishable Wages}_{ist} + \pi_2 \cdot \textit{Treatment}_i \\ &\quad + \pi_3 \cdot \textit{Garnishable Wages}_i + \pi_4 \cdot \textit{Treat}_i \times \textit{Income}_i + X_i' \pi_5 + \psi_s + \varphi_t + v_{ist} \end{aligned}$$

- π_1 identifies effect of change in wage garnishment on treated individuals
  - Holding income constant (π_4)
- Outside of treated region, garnishable wage and income are collinear
- Filer controls X_i include marital status, number of dependents, home ownership, business ownership, retired status, disabled status, employed status
- Fixed effects: Banrkuptcy district, year, income quartiles, and income by year
- S.E. double clustered by month and 3-digit zipcode

First-Stage Effect of Wage Changes on Filing

	(1)	(2)	(3)	(4)
Treatment ×	-1.12***	-0.78**	-1.03**	-1.19***
Garnishable Wages	(0.37)	(0.38)	(0.45)	(0.38)
Filer Controls	✓	✓	✓	✓
Year FEs	✓		✓	✓
District FEs	✓		✓	✓
District × Year FEs		✓		
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

- Economic magnitude: \$100 increase in garnishable wages $\Rightarrow$ 1 month reduction in time to bankruptcy

Selection & Mechanical Effect Concerns

- Exclusion restriction: conditional on income, changes to the minimum wage do not effect filer debt levels directly, but only the timing of filing.
- One possible threat: Selection into bankruptcy
  - E.g. When wage garnishment falls, only high-debt people continue to file for bankruptcy
- Tests (in paper): Wage garnishment changes not associated with
  - % of people who file for bankruptcy
  - Debt levels of people who are 90 days delinquent but don't file for bankruptcy
  - Income distribution of bankruptcy filers
- Second stage results are more than twice the size of the direct change in garnished wages

Reduced-Form Effects on Unsecured Debt Share

	(1)	(2)	(3)	(4)
Treatment ×	-0.0027*	-0.0033**	-0.0067***	-0.0046***
Garnishable Wages	(0.0014)	(0.0013)	(0.0018)	(0.0014)
Filer Controls	✓	✓	✓	✓
Year FEs	✓		✓	✓
District FEs	✓		✓	✓
District × Year FEs		✓		
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

→ policy induces 0.5% increase in unsecured debt share, an increase of $1,200

2SLS Effect of Delayed Filing on Unsecured Debt Share

	(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 FEs	✓	✓		✓	✓
District FEs	✓	✓		✓	✓
District × Year FEs			✓		
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

→ delaying filing one month ⇒ +1% in unsecured debt share, an increase of $4,000

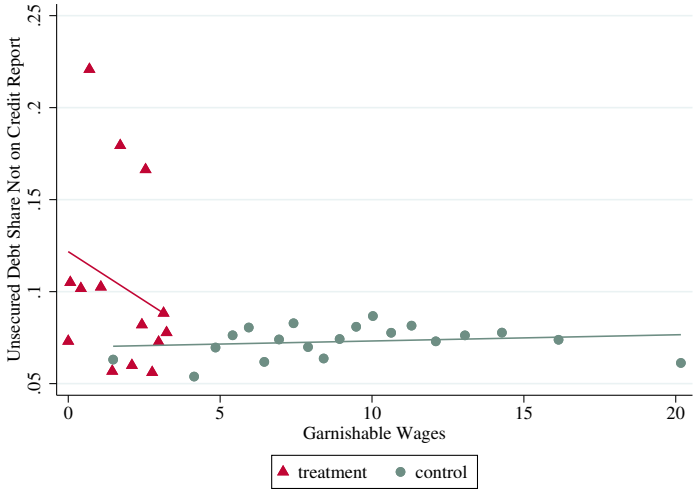
What Kind of Debt do Delaying Filers Incur? Shadow Debt

	(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 FEs	✓	✓		✓	✓
District FEs	✓	✓		✓	✓
District × Year FEs			✓		
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

→ delaying filing one month ⇒ +1.7% in shadow debt share, an increase of $6,300

- We cannot reject the hypothesis that the increase in shadow debt is no more than the increase in unsecured debt.

Only Treated Group Shadow Debt Affected by Δ Garnishable Wages



Increase Concentrated in Informal Shadow Debt

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

- No significant increase in the formal categories reported by the credit bureau (credit card/retail, student loans, personal loans)
  - these formal categories are also those most likely to have increased if we were picking up a mechanical income effect.
- Significant increase in "missing" informal shadow debt.

Running up the tab on purpose?

- Is this classic moral hazard or passive/"non-strategic" accumulation of debt?

Running up the tab on purpose?

- Is this classic moral hazard or passive/"non-strategic" accumulation of debt?
- Incidence of strategic filers seems low (Indarte, 2020): everyone needs to file for some unobserved reason, but can we identify borrowers who are less likely to be filing for exogenous bad shocks?
  - Among filers, "non-shocked debtors" $\equiv$ have relatively discretionary debt:
    1. Medical debt $<$ \$500
    2. Employed
    3. Not separated or divorced from spouse
- Test whether shocked" and "non-shocked" debtors have different reactions to filing delays and also test whether the timing of when debt is originated changes with our experiment.

$\rightarrow$ Results strongest for non-shocked debtors, mostly insignificant for shocked

Non/Shocked Debtors Delay the Same

	(1)	(2)	(3)	(4)
Treatment × Garnishable Wages (100s)	-1.13**	-1.11**	-1.14**	-1.21**
	(0.53)	(0.53)	(0.53)	(0.55)
Non-shocked Indicator	-1.24***	-1.02**	-1.24***	-1.15***
	(0.36)	(0.43)	(0.36)	(0.36)
Treatment × Garnishable Wages × Non-shocked	0.002	0.82	0.002	0.006
	(0.74)	(0.73)	(0.74)	(0.74)
Filer Controls	✓	✓	✓	✓
Year FEs	✓		✓	✓
District FEs	✓		✓	✓
District × Year FEs		✓		
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

Non-Shocked Debtors Increase Unsecured Debt Share

Sample	Shocked	Non-Shocked	Pooled
Treatment × Garnishable Wages	-0.0024	-0.0191***	-0.0016
	(0.0052)	(0.0060)	(0.0049)
Non-shocked Indicator			-0.0277***
			(0.0039)
Treatment × Garnishable Wages × Non-shocked			-0.0189**
			(0.0087)
Filer Controls	✓	✓	✓
Year FEs	✓	✓	✓
District FEs	✓	✓	✓
R^2	0.61	0.58	0.60
Observations	28,267	19,693	47,960

Non-Shocked Debtors Increase Shadow Debt Share

Sample	Shocked	Non-Shocked	Pooled
Treatment × Garnishable Wages	-0.0052	-0.0461***	-0.0022
	(0.0109)	(0.0161)	(0.0100)
Non-shocked Indicator			-0.0404***
			(0.0128)
Treatment × Garnishable Wages × Non-shocked			-0.0482***
			(0.0173)
Filer Controls	✓	✓	✓
Year FEs	✓	✓	✓
District FEs	✓	✓	✓
R^2	0.51	0.51	0.50
Observations	28,267	19,693	47,960

Non-Shocked Debtors Increase *Informal* Shadow Debt Share

Sample	Shocked	Non-Shocked	Pooled
Treatment × Garnishable Wages	-0.0111	-0.0328*	-0.0077
	(0.0087)	(0.0176)	(0.0082)
Non-shocked Indicator			-0.0629***
			(0.0112)
Treatment × Garnishable Wages × Non-shocked			-0.0301*
			(0.0168)
Filer Controls	✓	✓	✓
Year FEs	✓	✓	✓
District FEs	✓	✓	✓
R^2	0.51	0.51	0.51
Observations	28,267	19,693	47,960

The Timing of Debt Origination Relative to Filing

LHS	Fraction of Total Debt Originated in the 6 months before Filing				
Sample	Pooled	Pooled	Shocked	Non-Shocked	Pooled
Treatment × Garnishable Wages		-0.0028**	-0.0006	-0.0087**	-0.0002
		(0.0013)	(0.0018)	(0.0042)	(0.0019)
Non-shocked Indicator	0.0182***				0.0268***
	(0.0034)				(0.0061)
Treatment × Garnishable Wages × Non-shocked					-0.0102*
					(0.0060)
Filer Controls	✓	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓	✓
District FEs	✓	✓	✓	✓	✓
R^2	0.523	0.521	0.516	0.531	0.521
Observations	76,909	76,909	60,819	16,090	76,909

Conclusion

- Bankruptcy filers that can file more slowly incur more unsecured debt before filing
- Shadow debt (from non-payment of goods/services largest effect) is large balance sheet component for bankruptcy filers, and
  - Delaying filing is associated with an increase in informal shadow debt, the shadow debt that does not fall into a traditional credit category.
- Debt accumulation behavior is concentrated in filers without obvious shocks, and
- debt ramps up for filers without obvious shocks in the 6 months before filing, consistent with classical MH and inconsistent with alternative stories (e.g., mechanical wage increase, mechanical garnishable wage decrease, accumulation of fees).
- Policies that offer better monitoring of distressed borrowers (since many liabilities may be not be readily observable), and nudge distressed borrowers to file sooner, may improve welfare

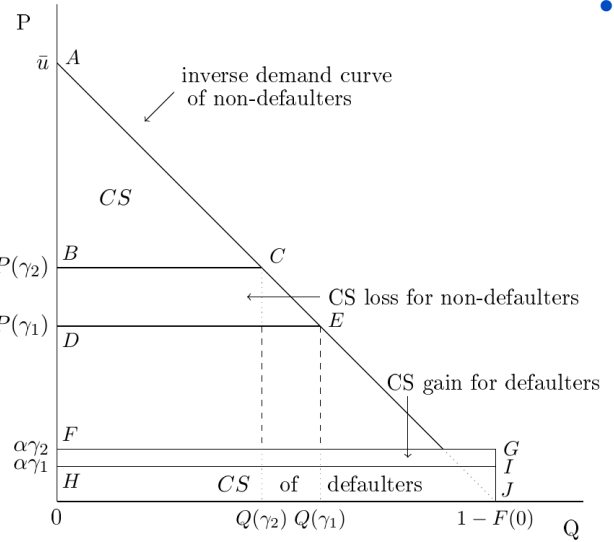
Setup

- Buyers know their type (defaulter $D \in \{0,1\}$), but sellers only know $\alpha = Pr(D)$.
- Non-defaulters pay a price P for the good; defaulters pay 0.
- Buyer's utility U_i from purchasing the widget at price P is given by

$$U_i = u_i - (1 - D_i)P$$

  where $u_i \in [\underline{u}, \overline{u}]$ is the idiosyncratic flow utility from consuming the good (distributed $F(\cdot)$).
- Assume that defaulters are time constrained so that only a portion γ are able to purchase the good.

Welfare Implications

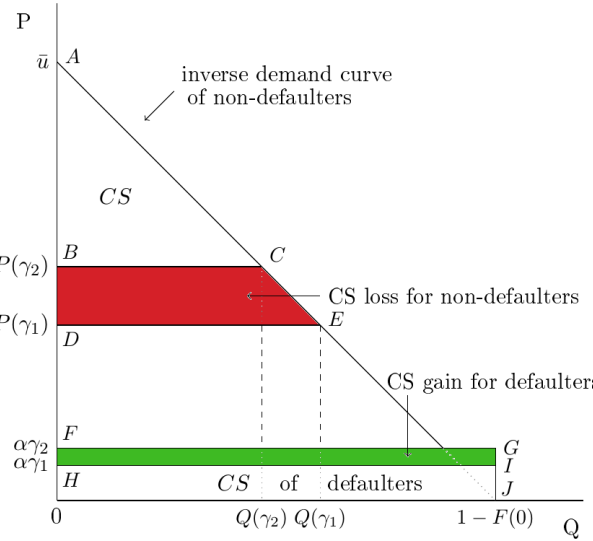


- Assume competitive, profit-maximizing behavior. Then, equilibrium prices are given by

$$P = \frac{C}{\beta(P)}$$

where $\beta(P)$ is the share of total demand $Q(P)$ from non-defaulter buyers who know they will pay full price P.

Welfare Implications



- Assume competitive, profit-maximizing behavior. Then, equilibrium prices are given by

$$P = \frac{C}{\beta(P)}$$

where $\beta(P)$ is the share of total demand $Q(P)$ from non-defaulter buyers who know they will pay full price P.

- An **increase** in γ leads to a **decrease** in consumer surplus if:

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

- that is, if the fraction of defaulting buyers is low enough.

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

Wage Garnishment back

- Wage garnishment limits:

$$Garnishable\ Wages_{it} = \begin{cases} 0.25 \cdot Income_i, & \text{if } Income_i > 5.8 \cdot 30 \cdot MinWage_t \\ Income_i - 4.35 \cdot 30 \cdot MinWage_t & \text{if } 5.8 \cdot 30 \cdot MinWage_t > Income_i > 4.35 \cdot 30 \cdot MinWage_t \\ 0 & \text{if } 4.35 \cdot 30 \cdot MinWage_t > Income_i \end{cases}$$

- Federal minimum wage changes:
  - 7/24/2007: \$5.15 $\rightarrow$ \$5.85
  - 7/24/2008: \$5.85 $\rightarrow$ \$6.55
  - 7/24/2009: \$6.55 $\rightarrow$ \$7.25

Credit-bureau data back

- Measure public information on liabilities and timing of distress
- Cannot use personal information for the merge
- Instead: zip code + bankruptcy filing month + bankruptcy chapter (7 or 13)
- When doesn't uniquely identify a match, use other characteristics:
  - Mortgage origination month
  - First mortgage balance
  -
- Of 188,975 bankruptcy filings in the CB data, we can uniquely match 55,357
  - 2 of 3 FL districts, imaged PDFs, non-unique matches

☐ Yes

■ Other. Specify Medical bill

4.9 **Lifewatch, Inc**
Nonpriority Creditor's Name
2731 Paysphere Cir
Chicago, IL 60674-0027
Number Street City State Zip Code

Who incurred the debt? Check one.

■ Debtor 1 only
☐ Debtor 2 only
☐ Debtor 1 and Debtor 2 only
☐ At least one of the debtors and another
☐ **Check if this claim is for a community debt**

Is the claim subject to offset?

■ No
☐ Yes

Last 4 digits of account number 6934 — $40.00

When was the debt incurred? 2016

As of the date you file, the claim is: Check all that apply

☐ Contingent
☐ Unliquidated
☐ Disputed

Type of NONPRIORITY unsecured claim:

☐ Student loans
☐ Obligations arising out of a separation agreement or divorce that you did not report as priority claims
☐ Debts to pension or profit-sharing plans, and other similar debts
■ Other. Specify Medical bill

4.10 **Mercy Hospital**
Nonpriority Creditor's Name
P.O. Box 504682
St. Louis, MO 63150-4682
Number Street City State Zip Code

Who incurred the debt? Check one.

☐ Debtor 1 only
☐ Debtor 2 only
■ Debtor 1 and Debtor 2 only
☐ At least one of the debtors and another

Last 4 digits of account number — $500.00

When was the debt incurred? 2016

As of the date you file, the claim is: Check all that apply

☐ Contingent
☐ Unliquidated
☐ Disputed

Type of NONPRIORITY unsecured claim: