Firm Bankruptcy with Fire Sales

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UW-Madison

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Big Picture

- During some crises, government interventions aim to preserve distressed—and possibly insolvent—firms and reorganize their debt (e.g., PPP during COVID)
- In other crises, government policies encouraged firm liquidation (e.g., Takenaka Plan)
- What frictions distort private incentives of firms and banks to encourage policy intervention?
- *Pecuniary fire-sale externality* (Shleifer and Vishny, 1992)
  - Constrained agents sell their assets below discounted value of cashflows
  - More aggregate liquidations lower recoveries for all firms
  - Private agents do not internalize effect of their decisions on aggregates
- **Goal:** Add fire-sale externality into structural GE firm dynamics model w/ entry and exit

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- Antill and Clayton (2022) is pen-and-paper two-period model with fire-sale externality and collateral constraints for lenders and derive conditions when tax on liquidations is optimal
- *Relative Contributions*:
  - Add rich firm dynamics model as supply side of liquidated capital
  - Bring to data $\implies$ quantitative statements about optimal policy
- Corbae and D'Erasmo (2021) is GE firm dynamics model with endogenous entry and exit where firm choose Ch. 7 liquidation and Ch. 11 reorganization bankruptcy instead of repaying debt More
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  - *Key new ingredient*: What is elasticity of demand for liquidated capital?

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Two-Period Model: Environment and Default Decision

- Trade-off theory (Myers, 1984): interest is tax deductible but debt raises probability of bankruptcy
- Investment period ($t = 1$) and production/default/repayment period ($t = 2$) (no discounting)
- Three agents: Firms, lenders, and liquidators (all risk neutral)
- Firm has project w/ initial cost small κ and stochastic return $v \sim U(0, 1)$ realized at $t = 2$
- κ is small enough so project is NPV positive and project is irreversible for firm
- Firm borrows w/ noncontingent defaultable discount bonds w/ face value b, pays proportional corporate income tax τ, and enjoys tax rebate on interest
- If firm defaults, firm walks away and gets zero and lender pay deadweight cost of bankruptcy c_7 and sell project to liquidators at price s_7

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Firm Problem

- In period 2, firm defaults iff

$$\underbrace{(1-\tau)(v-b)}_{\text{no default pay-off}} < \underbrace{0}_{\text{default pay-off}} \implies v < b$$

- In period 1, firm continuation value is

$$E_v[V(v,b)] = E_v[(1-\tau)(v-b)^+] = (1-\tau)\left[\underbrace{\frac{1}{2}}_{\text{expected project return}} - \underbrace{b}_{\text{repayment}} + \underbrace{\frac{b^2}{2}}_{\text{option value of default}}\right]$$

- In period 1, firm borrows b at price $q(b)$ and gets tax rebate on interest

$$\max_{b,I} \underbrace{E_v[V(v,b)]}_{\text{continuation value}} - \underbrace{I}_{\text{equity investment}}$$
$$\text{s.t. } \kappa = \underbrace{q(b)b}_{\text{borrowing}} + I$$

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Lender Problem

- In period 1, firms face menu of bond prices pinned down by lender profit condition

$$0 = \underbrace{-q(b; s_7)b}_{\text{loan}} + Pr(\text{firm default}) \underbrace{(s_7 - c_7)}_{\text{liquidation value}} + Pr(\text{no firm default}) \underbrace{b}_{\text{repayment}}$$

$$\begin{aligned} \implies q(b, s_7) &= Pr(v < b)\frac{s_7 - c_7}{b} + Pr(v > b) \\ &= b\frac{s_7 - c_7}{b} + (1 - b) \\ &= \underbrace{1 - b}_{\text{probability of not default}} + \underbrace{s_7}_{\text{collateral}} - \underbrace{c_7}_{\text{deadweight loss of liquidation}} \end{aligned}$$

- Combining firm and lender problems $\implies b(s_7) = \frac{\tau + s_7 - c_7}{1+\tau}$
- Aggregate capital liquidated is equal to default threshold, which equals $b(s_7)$

$$K_7^s(s_7) = \int_0^{b(s_7)} 1dv = b(s_7) = \frac{\tau + s_7 - c_7}{1 + \tau}$$

- *Logic*: $\uparrow s_7 \implies$ higher bond price $\uparrow q \implies$ more borrowing $\uparrow b \implies \uparrow K_7^s$

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- *Logic*: $\uparrow s_7 \implies$ higher bond price $\uparrow q \implies$ more borrowing $\uparrow b \implies \uparrow K_7^s$

Liquidators

- Project is irreversible to firm but liquidators have technology to convert project capital into final good (Antill and Clayton, 2022)

$$f_7(k_7) = B\frac{k_7^{1-\xi_7}}{1-\xi_7}$$

- Liquidator use project capital in own production process, so tech. does not depend on realization of v (Eisfeldt and Rampini, 2006)
- Liquidators buy liquidated capital at price s_7 following inverse demand

$$s_7^d(K_7^s) = B(K_7^s)^{-\xi_7}$$

so ξ_7 is elasticity of demand for liquidated capital

- Market clearing $K_7^d(s_7) = K_7^s(s_7)$

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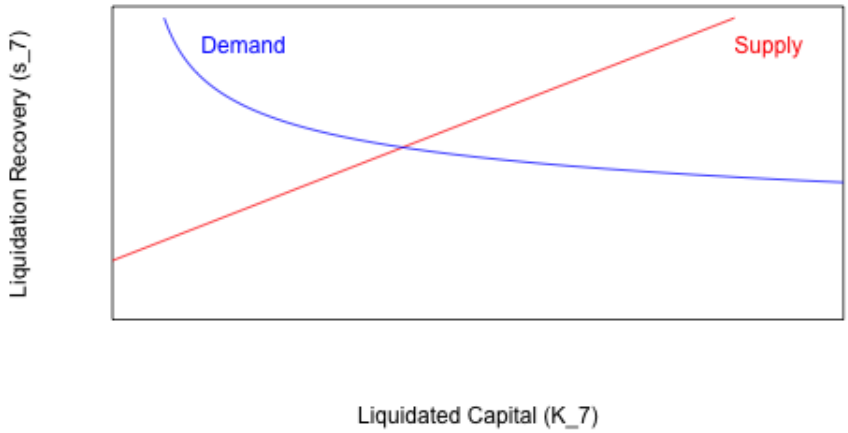
Market for Liquidated Capital



Add Aggregate Uncertainty $\implies$ Supply Shocks

- At beginning of $t = 2$, aggregate state ω is also realized w/ probability π_ω
- Firm idiosyncratic project return $v \sim U(0,1)$ is scaled by A^ω, so supply of liquidated capital is

$$K_7^s(s_7;\omega) = \frac{b(s_7)}{A_\omega}$$

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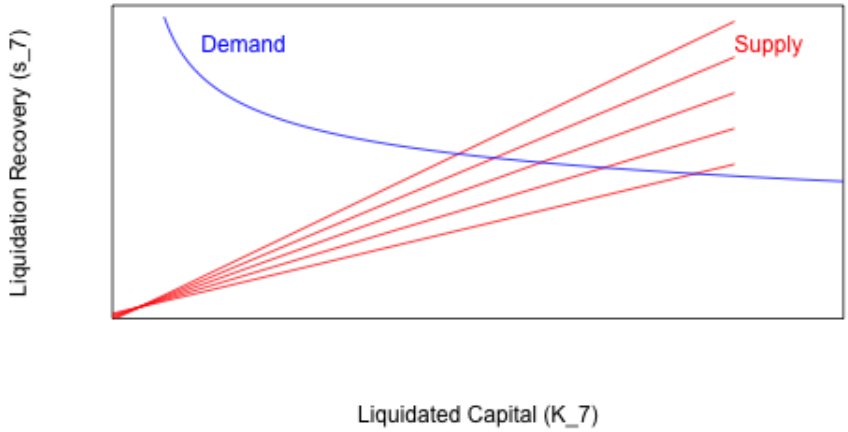
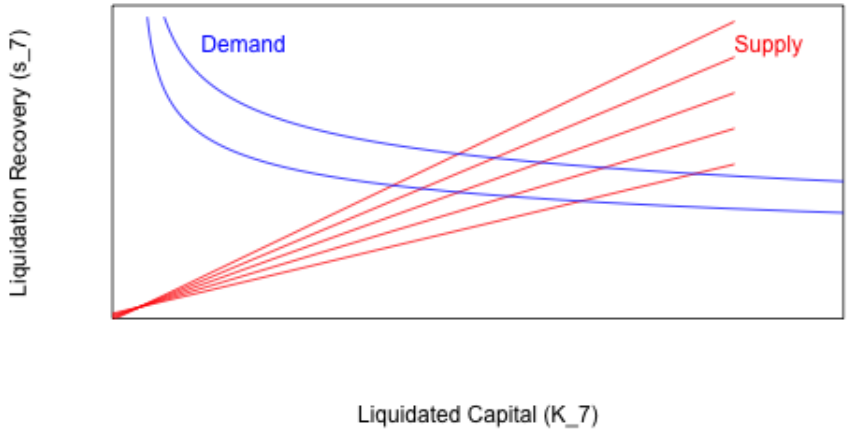
Market for Liquidated Capital w/ Supply Shocks



Market for Liquidated Capital w/ Supply and Demand Shocks



Today's Experiment

- Reduced-form semi-estimate of elasticity of demand for liquidated capital
- *Data*: Large public firm bankruptcies between 1979-2022
- *Approach*: Regress proxy for s_7 on proxy for K_7, firm controls, and recession dummy
- *Finding*: Recovery rates are lower when more assets are liquidated w/ semi-elasticity ≈ 0.25
- *Interpretation*: \$1 billion $\uparrow$ in aggregate liquidated capital $\iff$ %0.25 $\downarrow$ in recovery rate
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- Florida-UCLA-LoPucki Bankruptcy Research Database
- Comprehensive dataset on bankruptcies of public large firms between 1979 and 2022
- "Large" means assets of $100 million in 1980 dollars ($314 million in current dollars) or more
- 1,218 observations in total. Throwing out service and finance sectors $\implies$ 903 observations
- Proxy for s_τ:

$$\tilde{s}_\tau = \frac{\text{Distributions to (Unsecured and Secured) Creditors and Equity-Holder} + \text{Bankruptcy Fees}}{\text{Assets Quarter Before Bankruptcy}}$$

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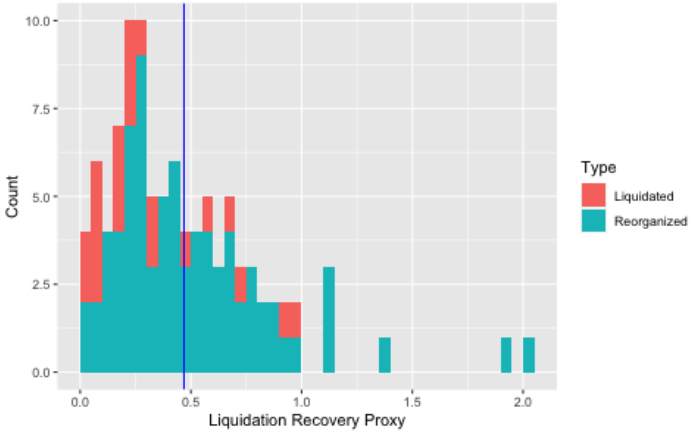
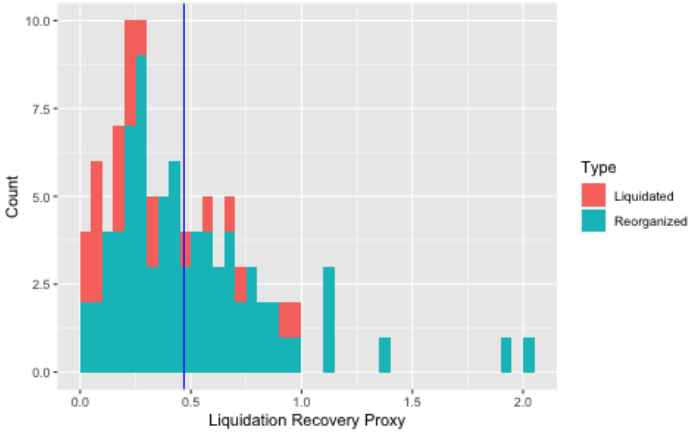


Min.	0.00
1st Qu.	0.23
Median	0.38
Mean	0.47
3rd Qu.	0.66
Max.	2.03

- Few observations $\implies$ use both recoveries from liquidations and reorganization
- $\tilde{s}_7$ distribution is relatively spread out
- For six reorganizations, proxy is larger than one



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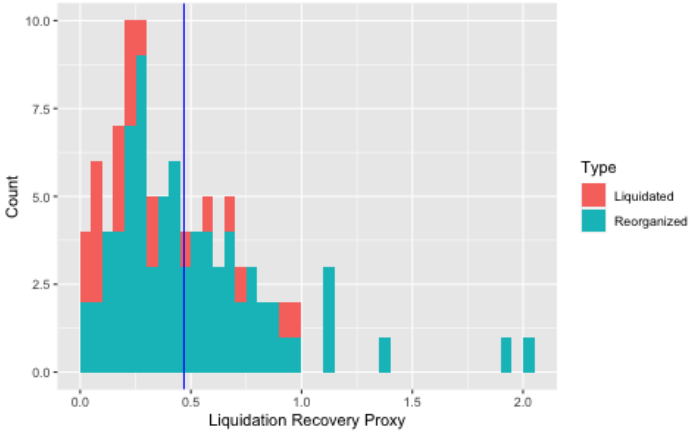

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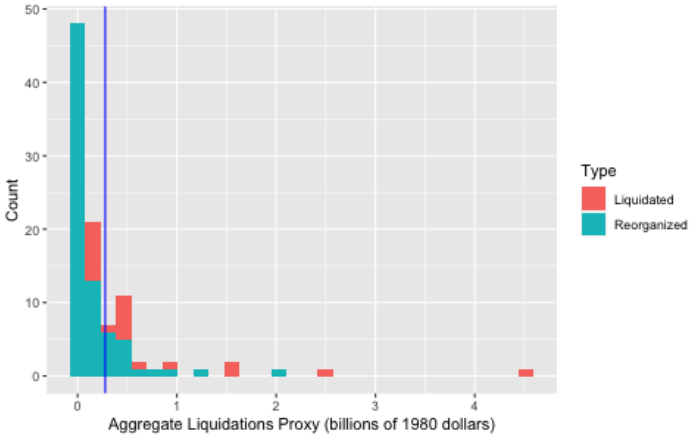

Min.	0.00
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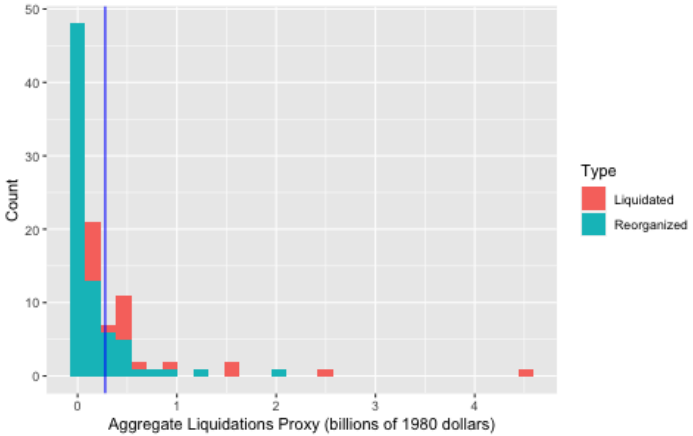
- 47 out of 98 bankruptcies were not preceded by any liquidations
- Elasticities drop zeros $\Longrightarrow$ estimates are insignificant $\Longrightarrow$ focus on semi-elasticities



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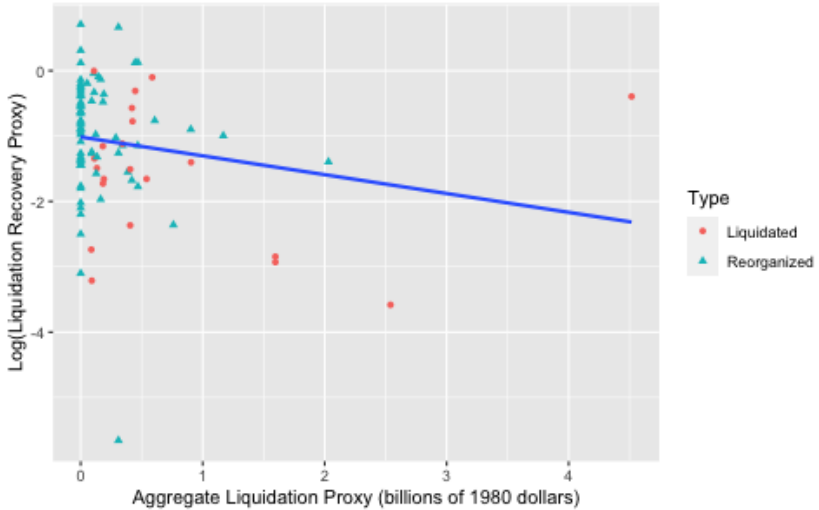

- More aggregate liquidations correlates with lower liquidation recoveries

Regression Specification

- Run the following regression

$$\log(\tilde{s}_7) = \xi_7 \tilde{K}_7 + \alpha \mathbb{1}\{\text{Bankruptcy is Liquidation}\} + \beta \mathbb{1}\{\text{Disposal during Recession}\} + \gamma' X + \varepsilon$$

where X includes following firm characteristics 1 quarter before filing for bankruptcy

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- Run the following regression

$$\log(\tilde{s}_7) = \xi_7 \tilde{K}_7 + \alpha \mathbb{1}\{\text{Bankruptcy is Liquidation}\} + \beta \mathbb{1}\{\text{Disposal during Recession}\} + \gamma' X + \varepsilon$$

where X includes following firm characteristics 1 quarter before filing for bankruptcy

  - 1-digit SIC code
  - Return on assets (= EBIT / assets)
  - Leverage (= liabilities / assets)
  - log(no. of employees)
  - Prepackaged bankruptcy dummy

Table: Liquidation Recovery Proxy vs. Aggregate Liquidation Proxy

	Dependent variable:			
	log(Liquidation Recovery Proxy)			
	(1)	(2)	(3)	(4)
Aggregate Liquidation Proxy (1980 billion dollars)	−0.288*	−0.226	−0.309*	−0.227
	(0.158)	(0.172)	(0.158)	(0.172)
Liquidated		−0.217		−0.244
		(0.260)		(0.262)
Recession			−0.683	−0.559
			(0.485)	(0.599)
Firm Controls?	No	Yes	No	Yes
Observations	98	98	98	98
Adjusted R^2	0.023	0.143	0.033	0.141
Note:				*p<0.1; **p<0.05; ***p<0.01

- $\hat{\xi}_7$ is significantly negative; liquidation recovery proxy seems lower in recession Full Table w/o outliers

Alternative Specifications

1. Different windows for aggregate liquidations proxy (90 days, 60 days, 30 days, 7 days before) More
   - Tighter windows $\implies$ more zeros $\implies$ larger standard errors
   - Estimates generally decrease in magnitude w/ window length
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   - Similar pattern to windows before disposal date
3. Counting liquidations only within same sector More and different sectors More
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4. Calendar-month-level observations More
   - Regress mean recovery rate on sum of liquidated assets in calendar month
   - $\hat{\xi}$ estimates are significant and similar magnitude to firm-level regressions
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   - Smaller and insignificant like firm-level 90-day regressions

Takeaway: 30-day point estimates are generally significant with magnitudes around -0.22 to -0.3

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  - Recovery rates are uncertain and pricing implies recovery risk premium (Schlafer et al, 2014)
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  - Distressed firm stocks are risky (high volatility and betas) but average returns are low

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- Recovery rates in corporate bonds issued by public firms
  - Recovery rates and default rates negative correlated (Altman et al, 2005)
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Appendix

Key Ingredients of CD (2021)

- Firms produce with capital k and labor with productivity z following idiosyncratic exogeneous Markov transition G
- Firms can borrow using one-period noncontingent defaultable discount bonds $b > 0$
  - Bonds are noncontingent in the sense that prices depend on k', b', and z but not z'

  Interest is tax deductible $\implies$ tax advantage of debt
- Firms can also retain earnings (with $b < 0$) and issue costly equity or pay dividends
- Firms can exit or default on debt and go either through Ch. 7 liquidation or Ch. 11 reorganization
- Firms maximize expected value of dividend stream
- What breaks MM? Bankruptcy costs, taxes, and transaction costs (i.e., costly equity issuance)

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Key Equilibrium Objects in CD (2021)

- Given bond prices, wages, and taxes, we can solve for firm decisions including
  - $\Lambda(b', k', z)$ is probability of default of firm z that chooses b' and k'
  - $D_7(k, b)$ is set of z given k and b that choose Ch. 7 liquidation
  - $D_{11}(k, b)$ is set of z given k and b that choose Ch. 11 reorganization
- In Ch. 7 liquidation, capital is liquidated at fire-sale price s_7, productivity-specific bankruptcy costs $c_7(z)$ are paid, and lenders are paid up to the face value of the bond b'

$$R(b', k', z; s_7) = \begin{cases} 0 & \text{if } s_7 k' - c_7(z) < 0 \\ s_7 k' - c_7(z) & \text{if } 0 \leq s_7 k' - c_7(z) < b' \\ b' & \text{if } b' \leq s_7 k' - c_7(z) \end{cases}$$

  Importantly, in CD (2021), $s_7 = 0.4$ is fixed parameter so it does not change w/ counterfactuals
- In Ch. 11 reorganization, firms and lenders Nash bargain over amount of debt to repay $\Longrightarrow$ bargain problem engenders lender repayment fraction of $\phi(z', k', b')$

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How is debt priced in CD (2021)?

- Bonds are priced (bond-by-bond) using condition that lender in expectation makes zero profit

$$0 = \Omega(b', k', z) \equiv \underbrace{-q(b', k', z)b'}_{\text{loan}} + \underbrace{\frac{1}{1+r}[1 - \Lambda(b', k', z)]b'}_{\text{expected repayment}}$$
$$+ \underbrace{\frac{1}{1+r}R(b', k', z; s_7) \sum_{z' \in D_7(k', b')} G(z'|z)}_{\text{expected recovery from Ch. 7 liquidations}} + \underbrace{\frac{1}{1+r} \sum_{z' \in D_{11}(k', b')} \phi(z', k', b')b' G(z'|z)}_{\text{expected recovery from Ch. 11 reorganizations}}$$

where r is risk-free rate

- Computation: Guess $q \implies$ solve firm and bargaining problems (i.e., $\Lambda, D_7, D_{11}, \phi$) $\implies$ update guess of q using lender zero-profit condition

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Computation

- Computation boils down to adding an extra outer loop:
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    Update guess of s_7 based on clearing condition for liquidated capital market

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Appendix

Chapter Filing vs. Actual Liquidated in Bankruptcy

Chapter	Company Liquidated in Bankruptcy?	No. Obs	% of Sample
7	Liquidated	3	0.3
11	Liquidated	211	23.4
11	Reorganized	689	76.3

- **Problem:** Dataset focuses on large firms $\implies$ Ch. 11 are over represented compared to Ch. 7.
- For comparison, Ch. 11 accounts for 80 percent of all public firm bankruptcies (CD, 2021)
- **Solution:** Some firms who filed for Ch. 11 didn't emerge from bankruptcy and were liquidated
- Thus, classify bankruptcies as
  - "Liquidations" as firms who either filed for Ch. 7 or filed for Ch. 11 but did not emerge
  - "Reorganizations" as firms who filed for Ch. 11 and emerged
- Reorganizations are larger, more levered, and more profitable before bankruptcy than liquidations (consistent sample of all public firms from CD, 2021) More

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- Thus, classify bankruptcies as
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- **Solution:** Some firms who filed for Ch. 11 didn't emerge from bankruptcy and were liquidated
- Thus, classify bankruptcies as
  - "Liquidations" as firms who either filed for Ch. 7 or filed for Ch. 11 but did not emerge
  - "Reorganizations" as firms who filed for Ch. 11 and emerged
- Reorganizations are larger, more levered, and more profitable before bankruptcy than liquidations (consistent sample of all public firms from CD, 2021) More

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Constructing Proxy for Liquidation Recovery Rate $\tilde{s}_7$

- **Problem:** Data do not have the direct measure of proceeds from liquidating a firm
- **Solution:** Use distributions to creditors and equity-holders over assets in quarter before bankruptcy filing

$$\tilde{s}_7 = \frac{\text{Unsecured and Secured Creditor Distribution} + \text{Equity-holder Distribution} + \text{Legal Fees}}{\text{Assets in Quarter Before Bankruptcy}}$$

- **Problem:** This proxy is missing for a lot of observations

Bankruptcy Type	Has Proxy?	No. Obs	% of Sample
Liquidated	No	193	21.4
Liquidated	Yes	21	2.3
Reorganized	No	612	67.8
Reorganized	Yes	77	8.5

- Coverage better for 1980s and 2000s, but largely missing for most observations in 1990s More
- **Solution:** Include observations of both bankruptcy types in regressions w/ dummy for liquidiated

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Constructing Proxy for Aggregate Liquidated Capital $\tilde{K}_7$

- Recap about data:
  - 98 observations have proxy for liquidation recovery (*dataset A*)
  - 214 observations of liquidations (*dataset B*)
- For each observation with proxy for liquidation recovery (from *dataset A*)
  - Look at disposal date
  - Subset liquidations (in *dataset B*) with disposal dates between 30 and 1 days before
  - Sum assets from 1 quarter before of this subset
- Proxy measures assets of other liquidated firms in prior 30 days

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  - Subset liquidations (in *dataset B*) with disposal dates between 30 and 1 days before
  - Sum assets from 1 quarter before of this subset
- Proxy measures assets of other liquidated firms in prior 30 days

Back

Constructing Proxy for Aggregate Liquidated Capital $\tilde{K}_7$

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  - 98 observations have proxy for liquidation recovery (*dataset A*)
  - 214 observations of liquidations (*dataset B*)
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Back

Table: Firm Characteristics and Bankruptcy Type (Probit Coefficient Estimates)

	Dependent variable:			
	Liquidation = 1			
	(1)	(2)	(3)	(4)
Recession	0.066 (0.189)	−0.006 (0.191)	−0.132 (0.194)	−0.040 (0.198)
roa	−0.482*** (0.175)	−0.503*** (0.169)	−0.548*** (0.178)	−0.515*** (0.190)
leverage	−0.755*** (0.149)	−0.774*** (0.148)	−0.623*** (0.149)	−0.593*** (0.151)
log(EmplBefore)	−0.032 (0.031)			
log(AssetsBefore)		−0.188*** (0.046)	−0.161*** (0.047)	−0.164*** (0.048)
Prepackagednot applicable			4.987 (83.192)	5.292 (132.743)
Prepackagedprenegotiated			−0.649*** (0.137)	−0.633*** (0.139)
Prepackagedprepackaged			−1.188*** (0.225)	−1.174*** (0.227)
sicB: Mining				4.762 (127.338)
sicC: Construction				4.330 (127.338)
sicD: Manufacturing				4.617 (127.338)
sicE: Transportation, Communications, Electric, Gas				4.759 (127.338)
sicF: Wholesale Trade				4.842 (127.338)
sicG: Retail Trade				4.955 (127.338)
Constant	0.241 (0.271)	1.260*** (0.342)	1.143*** (0.343)	−3.606 (127.338)
Observations	880	882	882	882
Log Likelihood	−467.566	−459.655	−429.729	−424.785
Akaike Inf. Crit.	945.131	929.310	875.459	877.570

Note: *p<0.1; **p<0.05; ***p<0.01

- Reorganizations tend to be larger, more profitable, and more levered than liquidations Back

Table: Firm Characteristics and Missing Liquidation Recovery (Probit Coefficient Estimates)

	Dependent variable:			
	Missing Liquidation Recovery			
	(1)	(2)	(3)	(4)
Recession	0.250 (0.254)	0.249 (0.255)	0.286 (0.255)	0.453* (0.270)
Liquidated	0.048 (0.138)	0.064 (0.138)	0.112 (0.142)	0.069 (0.145)
roa	−0.662* (0.393)	−0.784** (0.389)	−0.744* (0.386)	−0.420 (0.378)
leverage	−0.014 (0.114)	−0.005 (0.107)	−0.041 (0.107)	−0.012 (0.112)
log(EmplBefore)	−0.056 (0.038)			
log(AssetsBefore)		0.026 (0.051)	0.020 (0.051)	0.014 (0.054)
Prepackagednot applicable			3.748 (133.411)	3.887 (131.983)
Prepackagedprenegotiated			0.257* (0.153)	0.244 (0.157)
Prepackagedprepackaged			0.206 (0.187)	0.143 (0.193)
sicB: Mining				1.503* (0.800)
sicC: Construction				1.543* (0.898)
sicD: Manufacturing				0.846 (0.773)
sicE: Transportation, Communications, Electric, Gas				1.106 (0.782)
sicF: Wholesale Trade				1.029 (0.812)
sicG: Retail Trade				1.406* (0.789)
Constant	1.627*** (0.338)	0.989*** (0.377)	0.978*** (0.377)	−0.052 (0.850)
Observations	880	882	882	882
Log Likelihood	−302.427	−303.572	−301.544	−292.092
Akaike Inf. Crit.	616.853	619.143	621.087	614.185

Note: *p<0.1; **p<0.05; ***p<0.01

- More likely to miss liquidation recovery rate for less profitable firms and from a few sectors Back

Table: Liquidation Recovery Proxy vs. Aggregate Liquidation Proxy

	Dependent variable:			
	log(Liquidation Recovery Proxy)			
	(1)	(2)	(3)	(4)
aggregate_liquidations	−0.288* (0.158)	−0.226 (0.172)	−0.309* (0.158)	−0.227 (0.172)
Liquidated		−0.217 (0.260)		−0.244 (0.262)
sicB: Mining		0.011 (0.991)		−0.474 (1.119)
sicC: Construction		0.237 (1.306)		−0.327 (1.439)
sicD: Manufacturing		−0.440 (0.920)		−0.948 (1.069)
sicE: Transportation, Communications, Electric, Gas		−0.225 (0.930)		−0.763 (1.095)
sicF: Wholesale Trade		−0.449 (0.991)		−0.978 (1.143)
sicG: Retail Trade		−0.429 (0.978)		−0.961 (1.132)
roa		0.715 (0.637)		0.450 (0.698)
leverage		0.261 (0.174)		0.279 (0.175)
log(EmplBefore)		0.234*** (0.087)		0.227** (0.087)
Prepackagedprenegotiated		0.435 (0.278)		0.433 (0.278)
Prepackagedprepackaged		0.851** (0.335)		0.806** (0.338)
Recession			−0.683 (0.485)	−0.559 (0.599)
Constant	−1.015*** (0.106)	−2.952*** (1.066)	−0.981*** (0.108)	−2.370* (1.235)
Observations	98	98	98	98
Adjusted R^2	0.023	0.143	0.033	0.141

Note: *p<0.1; **p<0.05; ***p<0.01

- More levered, larger firms w/ pre-negotiated bankruptcy $\iff$ higher liquidation recovery rates

Back

Table: Liquidation Recovery Proxy vs. Aggregate Liquidation Proxy (No Outliers)

	Dependent variable:			
	log(Liquidation Recovery Proxy)			
	(1)	(2)	(3)	(4)
Aggregate Liquidation Proxy (1980 billions of dollars)	−0.575	−0.579	−0.673	−0.628
	(0.434)	(0.485)	(0.436)	(0.488)
Liquidated		0.113		0.090
		(0.270)		(0.271)
Recession			−0.663	−0.568
			(0.443)	(0.566)
Firm Controls?	No	Yes	No	Yes
Observations	86	86	86	86
Adjusted R^2	0.009	0.094	0.023	0.094
Note:				*p<0.1; **p<0.05; ***p<0.01

- Drop obs w/ $\tilde{s}_7$ over 1 and $\tilde{K}_7$ over 1 billion $\implies \hat{\xi}$ is insignificant but larger Back

Table: Different Windows Before Disposal Date

	Dependent variable:			
	log(Liquidation Recovery Proxy)			
	(1)	(2)	(3)	(4)
Aggregate Liquidation Proxy over 90 Days	−0.147 (0.109)			
Aggregate Liquidation Proxy over 60 Days		−0.160 (0.142)		
Aggregate Liquidation Proxy over 30 Days			−0.227 (0.172)	
Aggregate Liquidation Proxy over 7 Days				−0.124 (0.183)
Recession	−0.637 (0.602)	−0.612 (0.603)	−0.559 (0.599)	−0.544 (0.603)
Liquidated	−0.254 (0.258)	−0.268 (0.262)	−0.244 (0.262)	−0.334 (0.255)
Firm Controls	Yes	Yes	Yes	Yes
Number of Zeros	24	36	47	62
Observations	98	98	98	98
Adjusted R^2	0.142	0.136	0.141	0.128
Note:				*p<0.1; **p<0.05; ***p<0.01

- Tighter windows have more zeros $\implies$ larger standard errors
- Coefficient estimate larger for tighter windows Back

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Table: Different Windows After Disposal Date

	Dependent variable:			
	log(Liquidation Recovery Proxy)			
	(1)	(2)	(3)	(4)
Aggregate Liquidation Proxy over 90 Days	−0.156 (0.102)			
log(Aggregate Liquidation Proxy over 60 Days)		−0.133 (0.133)		
log(Aggregate Liquidation Proxy over 30 Days)			−0.111 (0.164)	
log(Aggregate Liquidation Proxy over 7 Days)				−0.098 (0.188)
Recession	−0.593 (0.597)	−0.569 (0.601)	−0.566 (0.604)	−0.539 (0.605)
Liquidated	−0.222 (0.261)	−0.295 (0.257)	−0.319 (0.265)	−0.330 (0.272)
Firm Controls	Yes	Yes	Yes	Yes
Number of Zeros	23	30	46	64
Observations	98	98	98	98
Adjusted R^2	0.147	0.134	0.128	0.126
Note:				*p<0.1; **p<0.05; ***p<0.01

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Observations by Sector

1-Digit SIC Code	Count - Recovery Proxies	Count - Liquidations
A: Agricultural Production Crops	1	3
B: Mining	5	131
C: Construction	1	23
D: Manufacturing	57	362
E: Transportation, Communications, Electric, Gas	20	197
F: Wholesale Trade	5	40
G: Retail Trade	9	147

- Majority of firms are in manufacturing; then transportation, then retail trade
- These sectors are relatively capital intensive Back

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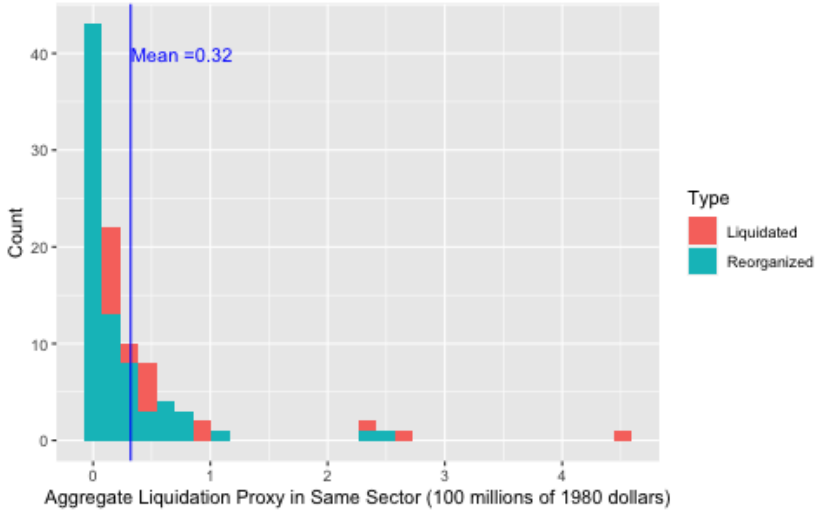
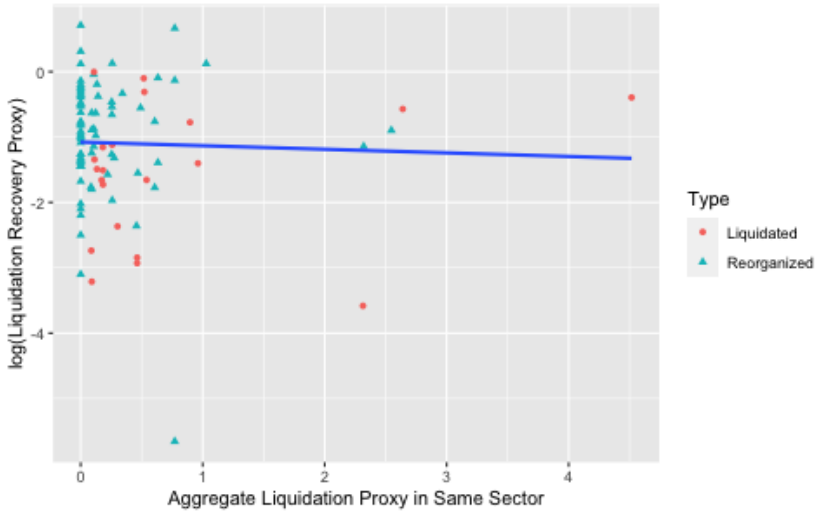

Mean =0.32
Count
40
30
20
10
0
0
1
2
3
4
Aggregate Liquidation Proxy in Same Sector (100 millions of 1980 dollars)
Type
Liquidated
Reorganized

Back

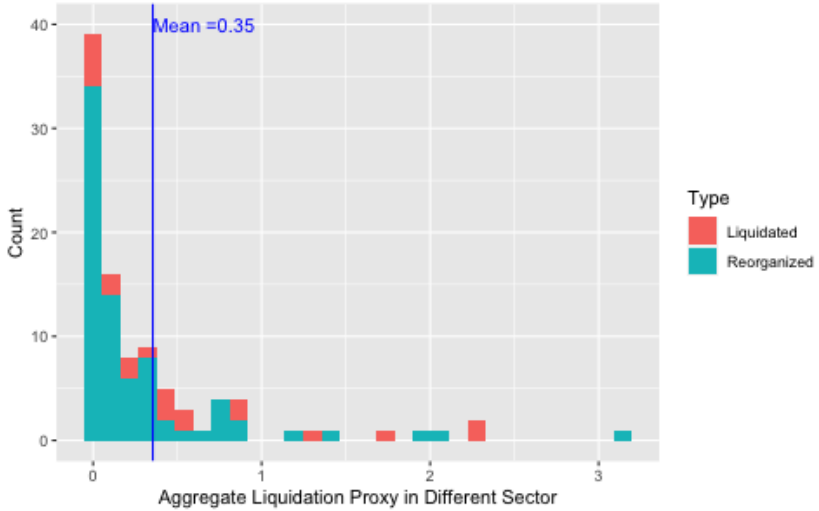


- More liquidations *in same sector* does not correlate with lower liquidation recoveries Back

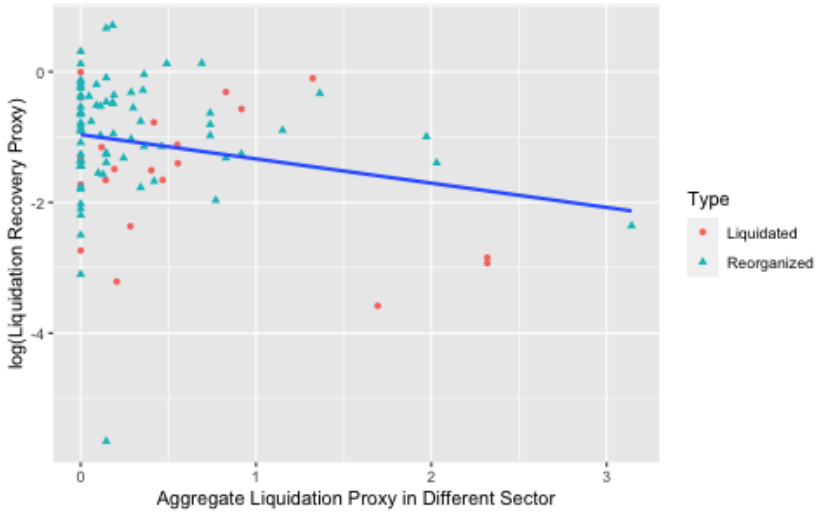
Table: Liquidation Recovery Proxy vs. Aggregate Liquidation Proxy in Same Sector

	Dependent variable:			
	log(Liquidation Recovery Proxy)			
	(1)	(2)	(3)	(4)
Aggregate Liquidation Proxy (1980 billions of dollars)	−0.055	−0.026	−0.072	−0.029
	(0.146)	(0.159)	(0.146)	(0.159)
Liquidated		−0.357		−0.382
		(0.255)		(0.257)
Recession			−0.616	−0.556
			(0.494)	(0.605)
Firm Controls?	No	Yes	No	Yes
Observations	98	98	98	98
Adjusted R^2	−0.009	0.125	−0.003	0.124
Note:				*p<0.1; **p<0.05; ***p<0.01

- Smaller coefficients and insignificant Back


Mean =0.35
Count
40
30
20
10
0
0
1
2
3
Aggregate Liquidation Proxy in Different Sector
Type
Liquidated
Reorganized

Back

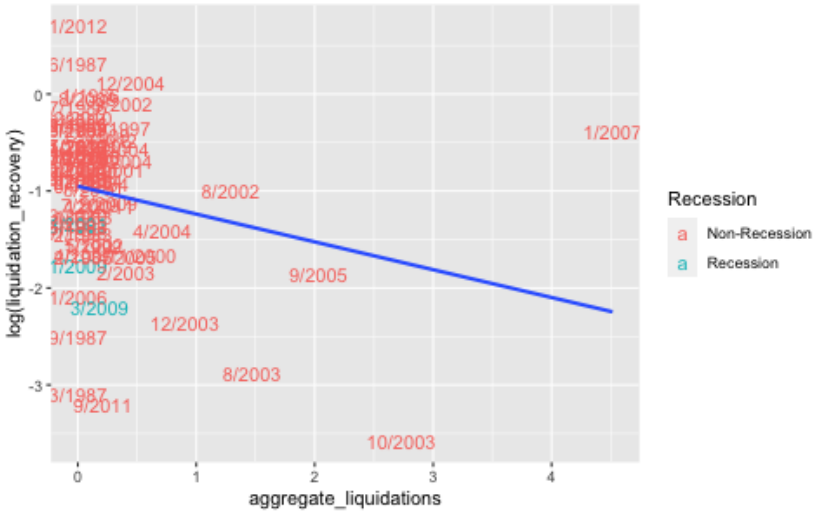


- More liquidations *in different sector* correlates with lower liquidation recoveries Back

Table: Liquidation Recovery Proxy vs. Aggregate Liquidation Proxy in Different Sector

	Dependent variable:			
	log(Liquidation Recovery Proxy)			
	(1)	(2)	(3)	(4)
Aggregate Liquidation Proxy	−0.371**	−0.296*	−0.403**	−0.324*
	(0.163)	(0.167)	(0.164)	(0.168)
Liquidated		−0.260		−0.285
		(0.238)		(0.239)
Recession			−0.742	−0.713
			(0.481)	(0.598)
Firm Controls?	No	Yes	No	Yes
Observations	98	98	98	98
Adjusted R^2	0.041	0.156	0.055	0.161
Note:				*p<0.1; **p<0.05; ***p<0.01

- Larger magnitude than baseline results Back



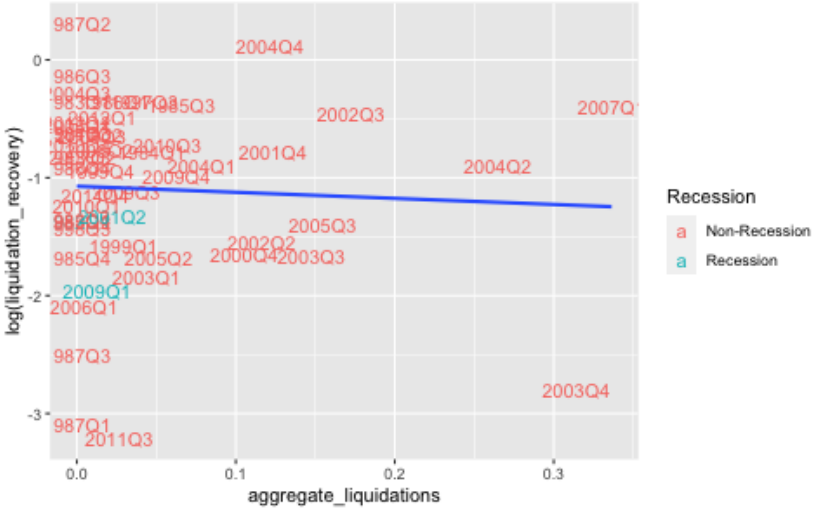
- More liquidated assets in a month correlates with lower average liquidation recovery

Back

Table: Calendar Month Level

	Dependent variable:	
	log(Liquidation Recovery Proxy)	
	(1)	(2)
Aggregate Liquidation Proxy	−0.287**	−0.307**
	(0.137)	(0.135)
recession		−0.745*
		(0.402)
Constant	−0.951***	−0.905***
	(0.099)	(0.101)
Observations	74	74
Adjusted R^2	0.045	0.076
Note:	*p<0.1; **p<0.05; ***p<0.01	

- Magnitude of coefficients similar to baseline results Back



- At quarter-level, correlation between liquidated assets and average liquidation recovery basically zero (similar to firm-level results) Back

Table: Calendar Quarter Level

	Dependent variable:	
	log(Liquidation Recovery Proxy)	
	(1)	(2)
Aggregate Liquidation Proxy	−0.516	−0.707
	(1.374)	(1.381)
recession		−0.511
		(0.461)
Constant	−1.072***	−1.031***
	(0.129)	(0.134)
Observations	50	50
Adjusted R^2	−0.018	−0.013
Note:	*p<0.1; **p<0.05; ***p<0.01	

- Similar to firm-level 90-day-window results Back