Corporate Leverage and Employees' Rights in Bankruptcy

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Outline

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- 2. Simple model of strategic debt and workers' protection in bankruptcy: predictions
- 3. Contrast with predictions of a non-strategic model of debt issuance with credit rationing
- 4. Measuring worker protection in bankruptcy around the world
- 5. Testing the theory: multi-country firm panel regressions
- 6. Conclusions

1. Why Debt can Have Strategic Value

A firm with revenue R and workers with reservation wage W₀ split the surplus S by Nash bargaining over the wage W:

$$S = R - W_0 = \underbrace{R - W}_{\text{profits}} + \underbrace{W - W_0}_{\text{quasi-rents}}$$

- Workers' bargaining power is lpha
- Before bargaining, the firm issues debt D and pays its value V_D to shareholders \Rightarrow reduces the surplus bargained upon \Rightarrow reduces the wage:

$$W = W_0 + \alpha \left(R - W_0 - D \right)$$

⇒ the greater unions' power, the greater debt's strategic value: Baldwin (1983), Bronars & Deere (1991), Perotti and Spier (1993), Matsa (2010), etc.

Key tacit assumptions

- Previous work in this area tacitly assumes that
- 1. employees' claim to unpaid wages, severance pay and social security contributions are **junior** to other debt in bankruptcy liquidation procedures: otherwise their claim could not be diluted by issuing debt (at least not entirely)
- 2. workers **cannot renegotiate** this claim with creditors if the firm is restructured rather than liquidated: again, if they had any bargaining power in such ex-post renegotiation, their claim would not be diluted by ex-ante debt issuance
- Yet these assumptions are not universally true: the legal standing of employees in bankruptcy differs a lot across countries!

Worker seniority in bankruptcy

Significant cross-country variation in ranking of workers in the case of bankruptcy liquidation: first in France, Mexico, Brazil, last in Austria, Finland and Germany (0 = most junior claim, 7 = most senior claim)



2. Strategic Debt Model with Liquidation

Time line:



Preferences and technology

- Shareholders and creditors are risk neutral, no discounting
- Workers maximize expected income minus expected loss from unemployment:

 $U = E(\tilde{Y}) - \operatorname{prob}(bankruptcy) \cdot (1 - \gamma)L$

where γ is the coverage of government insurance

- Revenue is uniformly distributed: $\tilde{R} \sim U(0, \overline{R})$
- Production is efficient: $E(\tilde{R}) W_0 > 0$
- Firm has initial assets with value A and continuation payoff C, increasing in the fim's size (A and $E(\tilde{R})$)

Actions

- Debt issuance (t = 1): firm issues debt with face value (pledged repayment) D and pays its value to shareholders
- Wage bargaining stage (t = 2): take-it-or-leave-it offers (random proposer model)
 - with prob. α union sets set $W=W_u$
 - with prob. $1-\alpha$ firm sets $W=W_f$
- Repayment stage (t = 3)
 - in solvency states, workers are paid the agreed wage W
 - in default states, workers are senior to other creditors for a fraction θ of the wage, junior for fraction $1-\theta$

Bankruptcy

 Bankruptcy occurs if realized value of firm's resources ("surplus") falls short of claims by creditors and employees:

$$\tilde{X} \equiv A + \tilde{R} < D + W$$

- Under liquidation, the firm's continuation value C is lost
- Under renegotiation, creditors and workers bargain on split of C: workers' bargaining power in renegotiation is β (possibly different from their power α in wage bargaining)
- Employees are protected by public insurance, which reduces their loss L from unemployment in bankruptcy states

Contractual wages

The union sets the wage at the level that maximizes employees' utility:

$$W_u^* = A + \overline{R} - (1 - \theta)D - (1 - \gamma)L$$

- seniority θ and insurance coverage γ raise wage demands
- *D* mitigates wage pressure (strategic role) unless $\theta = 1$
- The firm sets the wage at the employees' reservation level:

$$E(W_f^*(\tilde{X})) = W_0 + \max\left(\frac{D-A}{\overline{R}}, 0\right)(1-\gamma)L$$

prob(bankruptcy)

Workers' income when union sets wage



Optimal debt under liquidation

Value-maximizing debt balances its strategic value with the loss of continuation value C and the unemployment loss L:

$$\hat{D}_{l} = \frac{A + \overline{R}}{1 - \theta} - \frac{1 - \alpha(1 - \theta)}{\alpha(1 - \theta)^{2}}C - \frac{1 - \alpha}{\alpha(1 - \theta)^{2}}(1 - \gamma)L$$

- If $\theta < 1$, this optimal debt level is
 - increasing in workers' seniority θ if bankruptcy costs (C and L) are low enough: seniority encourages wage demands ⇒ calls for more strategic debt unless too risky
 - increasing in union power α and in insurance coverage γ
- The sensitivity of optimal debt to changes in A and \overline{R} has the same comparative statics properties as the level of debt with respect to θ , α and γ

If employees' participation constraint binds

- If the bankruptcy costs C and L are low and the reservation wage W_0 is high, then the optimal debt \hat{D}_l may be so high as to push workers' utility below its reservation level
- Then, debt must be set at the lower level \overline{D}_l that just meets the employees' PC: the optimal debt is

$$D_l^* = \min(\hat{D}_l, \overline{D}_l)$$

- If θ < 1, the debt level \bar{D}_l
 - is unambiguously increasing in workers' seniority θ : stronger result than for \hat{D}_l
 - has the same comparative statics properties as \hat{D}_l with respect to α and γ ; moreover, it is decreasing in W_0

2. Strategic Debt Model with Renegotiation

- In the baseline model, the firm is liquidated and the continuation payoff C is lost
- But if creditors are not dispersed, they have the incentive to restructure the firm \Rightarrow "save" the continuation payoff C
- To do so, they may have to renegotiate with workers: the split of the continuation payoff will depend on the workers' bargaining power β at renegotiation stage
- Higher β ⇒ workers take more surplus in bankruptcy, creditors less ⇒ ex ante, shareholders can extract less via debt issuance ⇒ keener to avoid bankruptcy ⇒ lower debt:

$$\hat{D}_{r} = \frac{A + \overline{R}}{1 - \theta} - \frac{\theta}{\left(1 - \theta\right)^{2}} \beta C - \frac{1 - \alpha}{\alpha (1 - \theta)^{2}} (1 - \gamma)L$$

Recap: testable predictions

- The sensitivity of leverage to an increase in the firm's asset value or expected revenue is larger if employees have:
 - higher seniority rights θ (unless the implied increase in bankruptcy costs is too large)
 - higher bargaining power α in wage negotiations
 - lower bargaining power β in firm restructuring
 - higher public insurance coverage γ in bankruptcy
- Intuition: if the firm's surplus increases,
 - workers with higher seniority, stronger unions or better public insurance bargain more aggressively \Rightarrow firm issues more debt
 - workers with higher power in restructuring are expected to leave less surplus to creditors ⇒ firm issues less debt
- How specific are these predictions to the strategic debt model? To answer this question, we consider an alternative model...

3. Alternative Model: Credit Constrained Firm

- Suppose that:
 - debt is issued after wage bargaining \Rightarrow no strategic value
 - it funds a profitable and scalable investment whose revenue cannot be pledged ⇒ firm can pledge only existing assets A and revenue R to fund it
- The firm invests all the money it can raise = choose the face value of debt D to maximize the market value of debt V_D

$$V_D = \frac{D^2 - A^2}{2\overline{R}} + \frac{\overline{R} + A - D}{\overline{R}} \cdot \frac{D}{\overline{R}} - \alpha \left(\frac{\theta W_u}{\overline{R}} - \frac{A^2}{2\overline{R}}\right)$$

 $\Rightarrow D_{\max} = A + \overline{R} - \alpha \theta W_u \implies \text{``operating leverage'' crowds} \\ \text{out financial leverage}$

Debt issued by the credit-constrained firm

- At the wage bargaining stage, workers anticipate debt issuance $D_{\max} \Rightarrow$ set W_u accordingly
- Substituting their optimal choice of W_u in D_{\max} , one gets the equilibrium level of debt issued by the firm:

$$D_{\max} = \frac{(1 - \alpha\theta)(A + \overline{R}) + \alpha\theta(1 - \gamma)L}{1 - \alpha\theta(1 - \theta)}$$

Hence:

- higher workers' seniority θ , union power α and/or public insurance coverage γ lower corporate debt
- higher θ , α and/or γ also lower the response of D to changes in asset value or expected revenue
- Opposite predictions compared to the strategic debt model!

4. Measuring Employees' Rights in Bankruptcy

- There is considerable cross-country variation in
 - workers' seniority in bankruptcy law (θ)
 - protection of their rights in reorganization procedures (eta)
 - government guarantees (γ)
- We collect data on these items via
 - questionnaires to Lex Mundi law firms and to legal scholars (mainly for OECD countries)
 - information drawn from the web (mainly for non-OECD countries)
- Important: these indicators have low correlation with EPL, which we use as a proxy of union power α (as in Simintzi et al., 2015)

Measuring θ : employee seniority

- Recall figure: employee seniority differs across countries
- We look at the rank of the 3 workers' claims (wage, pension benefits and severance pay) relative to 5 other claim classes:
 - secured debt (e.g. real estate mortgage loans)
 - expenses of the bankruptcy procedure
 - post-petition credit extended to debtor
 - unpaid taxes
 - unsecured debt
- 8 claim classes in total: seniority of each can ranks from 0 (most junior) to 7 (most senior)
- In case of tied ranks, use the average rank of the tied claims (Kendall, 1945)

Measuring β : workers' rights in restructuring

• Mapping questionnaire answers into β :



Employee rights in liquidation & reorganization

	Workers' Seniority (Pension) (1)	Government Insurance Fund (Pension) (2)	Workers' Rights in Reorganization (3)
Australia	3.5	0	0
Austria	4.5	1	7
Belgium	3	1	0
Brazil (pre-reform)	6	0	7
Brazil (post-reform)	2	0	7
Canada	4.5	0	8
Czech Rep.	5	0	7
Denmark	3	1	7
Finland	2	1	8
France	6	1	1
Germany	2	1	1
Greece	2	0	5
Hong Kong	4	0	5
India	5	0	0
Ireland	0.5	1	5
Israel	1	1	2
Italy	2	1	7
Japan	1	0	7
Mexico	5	0	0
Netherlands	3	1	5
New Zealand	3	0	5
Norway	5.5	1	7
Poland	3	1	7
South Korea	3.5	0	0
Spain	0.5	0	3
Sweden	2	1	5
Switzerland	3.5	0	5
Turkey	3	0	7
UK	4.5	1	6
United States	0.5	1	1

5. Empirical Analysis

We use these data to estimate the following specification:

$$D_{ijt} = (\lambda_0 + \lambda_1 \theta_c + \lambda_2 \beta_c + \lambda_3 \alpha_c + \lambda_4 \gamma_c) S_{ijt-1} + \delta' X_{ijt-1} + \phi' X_{ct} + \mu_i + \mu_t + \varepsilon_{ijt}$$

where S_{ijt-1} = firm j's "surplus" = variable capturing assets' value or cash flow of firm *i* in industry *j* at time *t*-1

Recall that the strategic debt model predicts:

$$\lambda_1 > 0 \text{ or } \lambda_1 \le 0, \ \lambda_2 < 0, \ \lambda_3 > 0, \ \lambda_4 > 0$$

Instead, the model with constrained debt issuance predicts:

$$\lambda_1 < 0, \quad \lambda_2 = 0, \quad \lambda_3 < 0, \quad \lambda_4 < 0$$

Sources of variation in firm surplus S

- Market value of the firm's real estate:
 - 1. Land only: historical cost valuation of land of each firm in the first year in which it appears in our data set
 - 2. Land and buildings: also includes the valuation of buildings adjusted for their accumulated depreciation

To evaluate land, each firm's initial holdings are inflated using alternatively (i) country-level residential real estate indices (source: BIS) or (ii) region-level commercial real estate indices (source: PMA)

 Firm profitability: we instrument firm ROA with 5 commodity price indices (crude oil, gold, silver, platinum, copper, from Bloomberg), to avoid endogeneity (similar to Bertrand and Mullainatahn, 2001), allowing for firm-specific exposures in the 1st stage regression

Company data

- Merge our indicators of workers' protection in bankruptcy with company-level data from Worldscope (non-US companies) and from Compustat (US companies) in 1988-2013
- Exclude financials and utilities; require at least 9 years of data
- Left with data for 13,809 firms from 28 countries \Rightarrow 221,835 firm-year observations

Leverage and workers' rights in bankruptcy: variation in asset value due to real estate prices

Real Estate Valuation \times Seniority	0.1381***	0.1260***	0.1103***	0.1041**	0.0907**
	(3.72)	(3.44)	(2.97)	(2.62)	(2.45)
Real Estate Valuation × Bargaining	0.1805***	0.1618**	0.1519**	0.1290**	0.0922*
Power	(2.82)	(2.09)	(2.35)	(2.21)	(1.88)
Real Estate Valuation × Rights in Reorganization	-0.1580**	-0.1309**	-0.1177**	-0.1028**	-0.0818*
	(-2.62)	(-2.44)	(-2.20)	(-1.96)	(-1.91)
Real Estate Valuation × Government-	0.1508**	0.1411**	0.1251*	0.0908	0.0806
Insurance Fund	(2.10)	(2.03)	(1.82)	(1.61)	(1.54)
Seniority	0.0302^{*}	-	-	-	-
Bargaining Power	-0.0206** (-2.37)	-0.0179** (-2.10)	-0.0144* (-1.88)	-	-
Rights in Reorganization	-0.0140 (-1.02)	-	-	-	-
Real Estate Valuation	0.2544***	0.2209***	0.2161***	0.1904***	0.1858***
	(3.73)	(3.06)	(3.98)	(3.46)	(3.35)
Fixed Effects	Industry- Year	Country- Industry, Year	Firm, Year	Firm, Country- Year	Firm, Country- Industry- Year

Leverage and workers' rights in bankruptcy: variation in profits due to commodity prices

Profitability \times Seniority	0.1919***	0.1786***	0.1733***	0.1545***	0.1397**
	(3.92)	(3.84)	(3.01)	(2.75)	(2.46)
Profitability × Bargaining Power	0.1855***	0.1679***	0.1572**	0.1409**	0.1014*
	(3.02)	(2.75)	(2.59)	(2.33)	(1.92)
Profitability × Rights in Reorganization	-0.1638***	-0.1399**	-0.1294**	-0.1108**	-0.0899*
	(-2.72)	(-2.64)	(-2.42)	(-2.15)	(-1.91)
Profitability × Government-Insurance	0.1588**	0.1521**	0.1276*	0.0807	0.0786
Fund	(2.35)	(2.21)	(1.91)	(1.61)	(1.44)
Seniority	0.0312*	-	-	-	-
Bargaining Power	(1.84) -0.0266*** (-2.71)	-0.0197**	-0.0158** (-2.05)	-	-
Rights in Reorganization	-0.0154	-	-	-	-
Profitability	0.3494***	0.3402***	0.3177***	0.2994***	0.2743***
	(4.11)	(3.31)	(3.07)	(3.01)	(2.88)
Fixed Effects	Industry- Year	Country- Industry, Year	Firm, Year	Firm, Country- Year	Firm, Country- Industry- Year

Results in line with strategic debt model

- Also economic significance:
 - e.g., a shift from the lowest employee seniority (0.5) to the highest (6) is associated with a rise in leverage of 39% of its standard deviation in regressions based on the value of real estate holdings
 - 48% in the regressions based on profitability and commodity prices
- If debt is used strategically, natural to expect our findings to be
 - stronger for short-term than for long-term debt: (i) short-term debt confers time-seniority to junior creditors, (ii) way to take temporary blips in surplus off the bargaining without spoiling long-term prospects
 - weaker for firms with a high fraction of intangible assets, as these(i) these employ workers with high reservation wage W_0 ; (ii) tend to have high growth opportunities (high "continuation value" C) relative to existing assets

Short-term vs. long-term debt: profit variation due to commodity prices

	Short-term Debt		Long-t	term Debt
	(1)	(2)	(3)	(4)
Profitability × Seniority	0.2158***	0.1996***	0.1183**	0.1147*
	(3.31)	(3.07)	(2.19)	(1.93)
Profitability × Bargaining Power	0.1831***	0.1318**	0.1056*	0.0761*
	(2.79)	(2.34)	(1.84)	(1.74)
Profitability × Rights in Reorganization	-0.1541***	-0.1367**	-0.0931*	-0.0674
	(-2.78)	(-2.49)	(-1.81)	(-1.43)
Profitability × Government-Insurance	0.0968*	0.0943*	0.0605	0.0589
	(1.93)	(1.71)	(1.25)	(1.08)
Profitability	Yes	Yes	Yes	Yes
Market-to-Book Ratio	Yes	Yes	Yes	Yes
Total Assets	Yes	Yes	Yes	Yes
Stock Returns	Yes	Yes	Yes	Yes
Asset Tangibility	Yes	Yes	Yes	Yes
Fixed Effects	Firm,	Firm,	Firm,	Firm,
	Country-	Country-	Country-	Country-
	Year	Industry-	Year	Industry-Year
		Year		

High- vs. low asset tangibility: profit variation due to commodity prices

	High Asset-Tangibility Industries		Low Asso	et-Tangibility Justries
	(1)	(2)	(3)	(4)
Profitability × Seniority	0.2215***	0.2159***	0.1279*	0.1138
	(3.93)	(3.26)	(1.71)	(1.61)
Profitability × Bargaining Power	0.1861***	0.1567**	0.0915	0.0659
	(2.97)	(2.42)	(1.54)	(1.25)
Profitability × Rights in Reorganization	-0.1407**	-0.1241**	-0.0721	-0.0584
	(-2.28)	(-2.11)	(-1.29)	(-1.21)
Profitability × Government-Insurance	0.1124**	0.0998*	-0.0524	-0.0511
	(1.98)	(1.72)	(-0.96)	(-0.92)
Profitability	Yes	Yes	Yes	Yes
Market-to-Book Ratio	Yes	Yes	Yes	Yes
Total Assets	Yes	Yes	Yes	Yes
Stock Returns	Yes	Yes	Yes	Yes
Asset Tangibility	Yes	Yes	Yes	Yes
Fixed Effects	Firm,	Firm,	Firm,	Firm,
	Country-	Country-	Country-	Country-
	Year	Industry-	Yea,	Industry-Year
		1 cai		

6. Conclusions

- Workers' rights in bankruptcy differ widely around the world
- The strength of these rights should
 - increase the strategic value of debt ⇒ increase debt responsiveness to increases in firms' asset value and profitability
 - reduce the debt capacity of constrained firms ⇒ lower debt responsiveness to increases in asset value and profitability
- Our evidence is consistent with the former, not the latter:
 - firms' real estate gains are associated with a greater increase in leverage in countries where employees have stronger seniority in liquidation and weaker rights in debt renegotiation
 - changes in profitability arising from changes in commodity prices are associated with a similar differential response of leverage depending on workers' rights in bankruptcy