The Effect of Hostile Takeover Threats on Capital Structure: Evidence from Half a Century

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Abstract: Capitalizing on a distinctive measure of takeover susceptibility mainly based on the staggered passage of anti-takeover state legislations, we examine the effect of the takeover market on corporate leverage. Stretching over half a century from 1964 to 2014, our sample includes nearly 180,000 observations and spans the entire spectrum of state laws in the past five decades. Our results show that more hostile takeover threats diminish leverage considerably. Specifically, an increase in takeover vulnerability by one standard deviation reduces leverage by 3.42%. Further analysis validates the results, i.e., propensity score matching, and entropy balancing.

1. INTRODUCTION

The takeover market, also referred to as the market for corporate control, has long been regarded as one of the most critical instruments of external governance (Manne, 1965; Fama, 1980; Fama and Jensen, 1983; Cain, McKeon, and Solomon, 2017: Ongsakul et al., 2022).[1] Understandably, extensive research has been conducted on the influence of the takeover market on a wide variety of corporate policies, tactics, and outcomes (Bertrand and Mullainathan, 2003; Garvey and Hanka, 1999). One of the most serious challenges in the literature in this area is the issue of endogeneity, which prevents researchers from making causal inferences. It is exceedingly difficult to identify exogenous changes in takeover vulnerability (Cain et al., 2017).

Exploiting a unique measure of takeover vulnerability primarily based on the staggered adoption of anti-takeover state legislations, we explore the effect of the takeover market on capital structure, which is one of the most crucial corporate policies. Our empirical strategy offers two advantages over prior studies in the literature. First, our measure of takeover susceptibility is principally grounded in state legislations, which are probably exogenous to individual firms' characteristics. The staggered implementation of state legislations across different states over time represents a powerful

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[1] Additional recent research on the takeover market can be found in Chatjuthamard et al. (2022), Ongsakul, Chatjuthamard, and Jiraporn (2022), Wongsinhirun et al. (2022), Chatjuthamard, Ongsakul, and Jiraporn (2022), Ongsakul et al. (2021), Ongsakul, Chatjuthamard, Jiraporn, and Jiraporn (2020).

identification strategy. Second, prior research concentrates on only one or just a few state legislations. Our study, by contrast, spans half a century of data, encompassing seventeen state legislations, a full spectrum of state laws going back as far as the 1960's. Our sample is one of the most comprehensive in the literature and should offer a more complete picture than prior research.

Based on nearly 180,000 observations across half a century (1964-2014), our results suggest that companies exposed to more hostile takeover threats are significantly less leveraged. Our findings imply that the disciplinary mechanism associated with the takeover market substitutes for the governance role of leverage. Greater financial leverage helps mitigate agency conflicts in two ways. First, more leverage increases the probability of liquidation, which causes personal losses to managers in terms of salaries, reputation, perquisites etc. (Williams, 1987; Berger and Di Patti, 2006). Second, greater leverage puts more pressure on managers to generate cash flows to pay interest expenses (Jensen, 1986), which reduce the free cash flow that could otherwise be exploited by opportunistic managers. A more active takeover market, which represents an external governance mechanism, makes the governance function of leverage less necessary, thereby leading to lower leverage in the capital structure. In terms of economic significance, a rise in takeover vulnerability by one standard deviation reduces leverage by 3.42%. So, the effect is not economically trivial.

2. SAMPLE SELECTION AND DATA DESCRIPTION

a. Sample Selection

The data for the hostile takeover index are from Cain et al. (2017). The data on firm-specific attributes are from COMPUSTAT. Outliers are winsorized at the 1% and 99% levels. Stretching over half a century from 1964 to 2014, our U.S.

Table 1. Descriptive Statistics.

The Hostile Takeover Index is Constructed as Described in Cain et al. (2017). Non-debt Tax Shields are the Ratio of Depreciation and Amortization Divided by Total Assets.

	Mean	S.D.	25th	Median	75th
Leverage					
Total Debt/Total Assets	0.259	0.278	0.049	0.208	0.375
Takeover Vulnerability					
Hostile Takeover Index	0.124	0.094	0.052	0.101	0.173
Firm Characteristics					
Total Assets	1284.763	10368.280	16.273	71.485	360.262
EBIT/Total Assets	-0.006	0.295	-0.024	0.069	0.129
Non-Debt Tax Shields	0.046	0.034	0.024	0.038	0.057
Capital Expenditures/Total Assets	0.065	0.068	0.02	0.044	0.084
Advertising Expense/Total Assets	0.012	0.028	0	0	0.009
R&D Expense/Total Assets	0.049	0.109	0	0	0.047
Dividends/Total Assets	0.01	0.022	0	0	0.013
Cash Holdings/Total Assets	0.169	0.211	0.026	0.078	0.226
Fixed Assets/Total Assets	0.504	0.366	0.218	0.428	0.718
SG&A Expense/Total Assets	0.328	0.3	0.116	0.257	0.449

sample is comprised of 178,365 observations. Our sample is among the most comprehensive in the literature in this area and spans a total of 17 takeover-related state legislations. Following the literature, our measure of leverage is the ratio of total debt to total assets.

b. The Hostile Takeover Index

In accordance with recent research, we use the hostile takeover index to measure takeover susceptibility (Cain et al., 2017). This index has a significant advantage in that it is based on plausibly exogenous variables. The index comprises three components: 1) legal determinants (17 state takeover laws); 2) macroeconomic determinants (capital liquidity); and 3) a company-specific factor that is not subject to firm choice (firm age). A higher index value suggests more susceptibility to a hostile takeover. This metric is considerably less vulnerable to endogeneity than any other metric previously adopted in the literature. Cain et al. (2017) create a company-level takeover index based on the results of their logistic regression analysis. Cain et al. (2017) provide further details about the methodology used to develop the takeover index.

c. Additional Variables

We include several control variables that potentially influence leverage. Specifically, we include firm size (Ln of total assets), profitability (EBIT/total assets), non-debt tax shields (depreciation and amortization/total assets), leverage (total debt/total assets), investments (capital expenditures/total assets), intangible assets (R&D/total assets and advertising

expense/total assets), discretionary spending (SG&A expense/total assets), cash holdings (cash holdings/total assets), dividends (total dividends/total assets) and asset tangibility (fixed assets/total assets). Crucially, we include firm fixed effects, which account for any time-invariant company-specific characteristics. Year fixed effects are also included to control for variation over time. Table **1** shows the descriptive statistics for the variables.

3. RESULTS

The results of the regression analysis are shown in Table **2**, where the dependent variable is the ratio of total debt to total assets. The standard errors are clustered by firm and year. The coefficients of the hostile takeover index are significantly negative in both Model 1 and Model 2, suggesting that more takeover threats result in significantly lower leverage. Because our measure of takeover susceptibility is based on plausibly exogenous factors, our results probably imply a causal influence, rather than merely a correlation.

As far as economic significance, we estimate the magnitude of the takeover market as follows. The standard deviation of the hostile takeover index is 0.094. The coefficient of the takeover index in Model 2 is -0.101, so a rise in takeover vulnerability by one standard deviation lowers leverage by 0.094 times 0.101, which is 0.009. Given that the standard deviation of the debt ratio is 0.278, a decline by 0.009 represents a 3.42% drop in leverage. Not only is the effect of takeover exposure statistically significant, it is also economically meaningful.

Table 2. The Effect of the Takeover Market on Capital Structure.

	(1)	(2)	(3)	(4)
	Full Sample	**Full Sample**	**Propensity Score Matching**	**Entropy Balancing**
	Leverage	Leverage	Leverage	Leverage
Hostile Takeover Index	**-0.050****	**-0.101*****	**-0.070*****	**-0.049****
	(-2.242)	**(-4.263)**	**(-3.089)**	**(-2.487)**
Ln (Total Assets)		-0.004	0.004	0.004
		(-1.606)	(1.040)	(1.364)
EBIT/Total Assets		-0.167***	-0.255***	-0.250***
		(-11.525)	(-8.506)	(-11.594)
Capital Expenditures/Total Assets		-0.161***	-0.186***	-0.160***
		(-7.779)	(-6.168)	(-6.172)
Non-Debt Tax Shields		0.229***	0.312**	0.308**
		(3.142)	(2.273)	(2.667)
Advertising Expense/Total Assets		-0.149***	-0.079	-0.059
		(-2.711)	(-0.979)	(-0.904)
R&D Expense/Total Assets		-0.128***	-0.143**	-0.179***
		(-5.831)	(-2.082)	(-3.621)
Dividends/Total Assets		-0.366***	-0.437***	-0.692***
		(-4.032)	(-3.368)	(-3.684)
Cash Holdings/Total Assets		-0.352***	-0.359***	-0.357***
		(-29.319)	(-19.946)	(-21.601)
Fixed Assets/Total Assets		0.055***	0.019	0.017
		(5.359)	(1.456)	(1.499)
SG&A Expense/Total Assets		0.017*	-0.024	-0.035**
		(1.692)	(-1.018)	(-2.306)
Constant	0.265***	0.325***	0.326***	0.316***
	(98.416)	(29.333)	(14.589)	(16.516)
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	178,365	178,365	87,925	178,365
Adjusted R-squared	0.452	0.500	0.604	0.571
Robust t-statistics in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

While our measure of takeover vulnerability is already plausibly exogenous, we still execute robustness checks to mitigate endogeneity further. First, using propensity score matching, we validate our findings (Rosenbaum and Rubin, 1983). The sample is divided into quartiles based on the hostile takeover index. The treatment group includes observa-

tions from the top quartile (greatest takeover vulnerability). Then, for each observation in the treatment group, we choose the observation from the remaining sample that is most similar using 10 firm characteristics (i.e., the 10 control variables included in the regression analysis). Except for their susceptibility to takeover threats, our treatment and control compa-

nies are thus virtually identical in every observable aspect. The result based on propensity score matching is shown in Model 3. Again, the coefficient of the takeover index remains significantly negative.

Finally, we execute entropy balancing, a new technique that has gained traction in the recent literature. Basically, entropy balancing adjusts the weight of each observation in the control group such that the mean, variance, and skewness of the variables in the control group match those in the treatment group, making the comparison more appropriate (Hainmueller, 2012: Balima2020). The result based on entropy balancing is shown in Model 4. The takeover index still retains a significantly negative coefficient.

4. CONCLUSIONS

Exploiting a distinctive measure of takeover vulnerability principally based on the staggered enactment of anti-takeover state legislations, we explore the effect of the takeover market on capital structure choices. Unlike prior research, our sample is unique in that it encompasses the entire spectrum of state laws in the past five decades, including almost 180,000 observations. Our results reveal that greater takeover vulnerability results in significantly lower leverage. The disciplinary mechanism associated with the takeover market substitutes for the governance function of leverage, therefore reducing the need for leverage.

One critical challenge in the literature in this area is the presence of endogeneity. Our study is particularly advantageous because our measure of takeover vulnerability is based on the staggered implementation of state laws, which are beyond the control of each individual firm, and is thus much more likely to be exogenous. Consequently, our results probably reflect a causal effect, rather there merely an association. In addition, our study is the first to use an all-encompassing data set that covers half a century. So, our results provide a complete picture of the effect of takeover threats on leverage over an extended period of time. As far as we are aware, our sample period is one of the longest in the literature in this area.

Our research has several practical implications. First, we show that the takeover market constitutes a vital external governance mechanism that influences important corporate policies, such as leverage. Second, we extend the body of knowledge on corporate capital structure by demonstrating that one of the crucial determinants of capital structure is the market for corporate control. Finally, we show that any state legislation related to the takeover market should be carefully contemplated as it can exert a great deal of influence on corporate policies. Our study should have relevant implications for shareholders and investors, as well as regulators.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

REFERENCES

Balima, H. W. (2020). Coups d'état and the cost of debt. *Journal of Comparative Economics*, *48*(3), 509–528. https://doi.org/10.1016/j.jce.2020.04.001

Berger, A. N., & Bonaccorsi Di Patti, E. (2006). Capital structure and firm performance: A new approach to testing agency theory and an application to the banking industry. *Journal of Banking & Finance*, *30*(4), 1065–1102. https://doi.org/10.1016/j.jbankfin.2005.05.015

Bertrand, M., & Mullainathan, S. (2003). Enjoying the Quiet Life? Corporate Governance and Managerial Preferences. *Journal of Political Economy*, *111*(5), 1043–1075. https://doi.org/10.1086/376950

Cain, M. D., McKeon, S. B., & Solomon, S. D. (2017). Do takeover laws matter? Evidence from five decades of hostile takeovers. *Journal of Financial Economics*, *124*(3), 464–485. https://doi.org/10.1016/j.jfineco.2017.04.003

Chatjuthamard, P., Boonlert-U-Thai, K., Jiraporn, P., Uyar, A., &Kilic, M. (2022). Hostile takeover threats, managerial myopia and asset redeployability. *Corporate Governance: The International Journal of Business in Society*. https://doi.org/10.1108/cg-11-2021-0402

Chatjuthamard, P., Ongsakul, V., & Jiraporn, P. (2022a). Corporate complexity, managerial myopia, and hostile takeover exposure: Evidence from textual analysis. *Journal of Behavioral and Experimental Finance*, *33*, 100601. https://doi.org/10.1016/j.jbef.2021.100601

Chatjuthamard, P., Ongsakul, V., & Jiraporn, P. (2022b). Do hostile takeover threats matter? Evidence from credit ratings. *PLOS ONE*, *17*(1), e0260688. https://doi.org/10.1371/journal.pone.0260688

Fama, E. F. (1980). Agency Problems and the Theory of the Firm. *Journal of Political Economy*, *88*(2), 288–307. https://doi.org/10.1086/260866

Fama, E. F., & Jensen, M. C. (1983). Separation of Ownership and Control. *The Journal of Law and Economics*, *26*(2), 301–325. https://doi.org/10.1086/467037

Garvey, G. T., &Hanka, G. (1999). Capital Structure and Corporate Control: The Effect of Antitakeover Statutes on Firm Leverage. *The Journal of Finance*, *54*(2), 519–546. https://doi.org/10.1111/0022-1082.00116

Hainmueller, J. (2012). Entropy Balancing for Causal Effects: A Multivariate Reweighting Method to Produce Balanced Samples in Observational Studies. *Political Analysis*, *20*(1), 25–46. https://doi.org/10.1093/pan/mpr025

Lel, U., & Miller, D. P. (2015). Does Takeover Activity Cause Managerial Discipline? Evidence from International M&A Laws. *The Review of Financial Studies*, *28*(6), 1588–1622. https://doi.org/10.1093/rfs/hhv002

Lennox, C. S., Francis, J. R., & Wang, Z. (2011). Selection Models in Accounting Research. *The Accounting Review*, *87*(2), 589–616. https://doi.org/10.2308/accr-10195

Low, A. (2009). Managerial risk-taking behavior and equity-based compensation☆. *Journal of Financial Economics*, *92*(3), 470–490. https://doi.org/10.1016/j.jfineco.2008.05.004

Manne, H. G. (1965). Mergers and the Market for Corporate Control. *Journal of Political Economy*, *73*(4), 351. https://doi.org/10.1086/259036

Ongsakul, V., Chatjuthamard, P., Jiraporn, N., & Jiraporn, P. (2020). Does the market for corporate control influence executive risk-taking incentives? Evidence from takeover vulnerability. *Corporate Governance: The International Journal of Business in Society*, *21*(1), 62–77. https://doi.org/10.1108/cg-03-2020-0106

Ongsakul, V., Chatjuthamard, P., & Jiraporn, P. (2022). Does the market for corporate control impede or promote corporate innovation efficiency? Evidence from research quotient. *Finance Research Letters*, *46*, 102212. https://doi.org/10.1016/j.frl.2021.102212

Ongsakul, V., Chatjuthamard, P., Jiraporn, P., &Chaivisuttangkun, S. (2021). Corporate integrity and hostile takeover threats: Evidence from machine learning and "CEO luck." *Journal of Behavioral and Experimental Finance*, *32*, 100579. https://doi.org/10.1016/j.jbef.2021.100579

Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, *70*(1), 41–55. https://doi.org/10.1093/biomet/70.1.41

Williams, J. (1987). Perquisites, Risk, and Capital Structure. *The Journal of Finance*, *42*(1), 29–48. https://doi.org/10.1111/j.1540-6261.1987.tb02548.x

Wongsinhirun, N., Chatjuthamard, P., Jiraporn, P., & Phiromswad, P. (2022). Do takeover threats influence corporate social responsibility? Evidence from hostile takeover vulnerability. *Corporate Social Responsibility and Environmental Management*. https://doi.org/10.1002/csr.2264