

The Role of ESG Performance in the Capital Structure-Market Competition Nexus: Some Evidence from Japan

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Abstract

This study investigates the relationship between market competition and capital structure and the respective role of ESG performance. Using 5112 firm-year observations from firms listed on the Tokyo Stock Exchange between 2002 and 2020, we document a negative relationship between market competition and capital structure. Also, we find that ESG performance moderates this relationship. Our findings support the “deep pocket” theory of predation and emphasize the benefits of a superior ESG performance.

Keywords

Capital Structure, Market Competition, ESG, Predation Models, Limited Liability Models

1. Introduction

Since the “capital structure irrelevance theorem” of Modigliani and Miller (1958), part of the consequent research seeks to identify the factors that influence the capital structure decision (indicatively see Öztekin, 2015). In this study, drawing from the financial and industrial economics disciplines, we focus on market competition as a capital structure determinant. Moreover, we seek to understand whether ESG performance influences the capital structure-market competition relationship. Our motive is three-fold. First, the theoretical and empirical literature on the market competition-capital structure nexus has yielded conflicting results (Guney et al., 2011; Danso et al., 2021; Babar & Habib, 2021). Second, extant studies on this relationship are rather limited, while the financing decision is likely to be influenced by country-specific cultural, legal and institutional cha-

racteristics (La Porta et al., 1997, 2000). Third, an emerging body of literature documents the effect of ESG performance on several firm dimensions; however, no study investigates whether and how ESG performance influences the market competition-capital structure relationship.

Considering the above, our study contributes to the literature in the following ways. We investigate the market competition-capital structure nexus in the Japanese market, a market with distinct traits, using recent data. Moreover, we assess whether ESG performance influences this relationship filling the relevant research gap. Accordingly, the remainder of this study is organized as follows: Section 2 reviews the literature and develops testable hypotheses, Section 3 presents our sample and methodology, Section 4 discusses our results and Section 5 concludes.

2. Literature Review and Hypotheses Development

The theoretical link between product market competition and capital structure is predominantly based on limited liability and “deep pocket” predation models, which produce conflicting predictions. In limited liability models, firms strategically utilize debt financing to influence market competition. Higher financial leverage for oligopoly firms relaxes Bertrand price competition or amplifies Cournot quantity competition (Brander & Lewis, 1986; Bolton & Scharfstein, 1990; Shownwaller, 1999). Thus, limited liability models predict a positive relationship between market competition and capital structure. The opposite is predicted by the “deep pocket” predation theory (Opler & Titman, 1994; Telser, 1966). The notion is that firms with higher financing capabilities (i.e. lower leverage) can drive out the competition via practices that financially exhaust their rivals such as price wars or increases in output. From this perspective, firms have an incentive to reduce their debt levels and thus a negative relationship between market competition and capital structure is expected. Considering the discussion in this paragraph we formulate the following set of hypotheses:

H1a: There is a positive relationship between market competition and capital structure.

H1b: There is a negative relationship between market competition and capital structure.

A firm’s external financing capabilities and position vis-à-vis its competitors are likely to be influenced by its ESG performance. In recent years investors are embracing ESG investing on an enormous scale, as PwC¹ reports that “ESG-focused institutional investment seen soaring 84% to US\$33.9 trillion in 2026, making up 21.5% of assets under management”. Moreover, ESG performance relates to several key firm dimensions as it influences key stakeholders, such as the investor community, employees, consumers, and suppliers (Gillan et al., 2021). Considering the rise of awareness towards ESG and the increase in values-based ESG-investing, firms which invest towards a superior ESG performance will enjoy cheaper

¹<https://www.pwc.com/gx/en/news-room/press-releases/2022/awm-revolution-2022-report.html>.

access to external financing, and higher valuations and operating and financial performance, thus gaining a competitive edge over their rivals (Byoun & Xu, 2016; Giese et al., 2019; Fafaliou et al., 2022). From a predation theory point of view, we expect that, all else equal, a superior ESG performance will mitigate the incentive for lower debt levels to strengthen a firm's competitive position. Nevertheless, if firms utilize debt levels strategically, a superior ESG performance will ease access to debt financing. Considering the above, we formulate our next hypothesis:

H2: ESG performance affects the relationship between capital structure and market competition.

3. Sample and Methodology

3.1. Sample

We draw our data from two widely used databases (indicatively see Aevoae et al., 2023 and Hoang & Hoxha, 2021), the Compustat Global Database and Thomson's Reuters Refinitiv Eikon. Specifically, as our analysis focuses on the Japanese market, we utilize the Compustat Global database to collect financial data for Tokyo Stock Price Index (TOPIX) firms. TOPIX includes the domestic companies listed in the First Section of the Tokyo Stock Exchange. To measure ESG performance, we obtain the ESG Combined Score from Thomson's Reuters Refinitiv Eikon database. We merge the two datasets and remove financial firms and utility sectors (SIC codes 6000 - 6999 and 4900 - 4999, respectively), as well as, observations with missing values. Finally, we choose 2019 as the end year of our analysis to avoid the likely distortionary impact of Covid-19. Our final sample, is an unbalanced panel of 5112 firm-year observations from 351 firms. We retain the unbalanced form of our panel to mitigate selection and survivorship bias. To reduce the potential effect of outliers, we follow common practice and winsorize all variables at the 1st and 99th percentiles.

3.2. Methodology

To investigate the relationship between capital structure and market competition, we regress firm leverage (Leverage) on market competition (MarketCompetition) and a set of control variables (Controls). Specifically, we estimate Equation (1), below:

$$\text{Leverage}_{it} = a_0 + a_1\text{MarketCompetition}_{it} + a_2\text{Controls}_{it} + u_{it} \quad (1)$$

We estimate Equation (1) using a high-dimensional fixed effects (firm and year) estimator. Finally, to mitigate endogeneity concerns, we follow Iyer et al. (2017) and Hossain et al. (2022) and employ a lead-lag specification where all explanatory variables are lagged by one year. For robustness purposes, we use two alternative measures of leverage and market competition.

The first measure of leverage is MarketLeverage (defined as the sum of long and short-term liabilities to the sum of the market value of equity and the book values of long and short-term debt). For our second measure of leverage, Book-

Leverage, we use book values for both debt and equity. To construct our market competition measures, we follow a similar approach to Heise et al. (2022). We first classify firms into industries using their 3-letter SIC codes. We then calculate for each industry on an annual basis the Herfindahl-Hirschman Index of sales, as well as, the percentage of total sales of the top four firms in the industry. Since higher values of both calculations correspond to less market competition, we multiply each by -1 , so that higher values correspond to higher market competition. Thus, we reach our two measures of market competition, HHI and Top4, respectively. A positive (negative) a_1 will support H1a (H1b).

Our set of control variables, is drawn from the capital structure determinants literature (indicatively see Antoniou et al., 2008 and Öztekin, 2015) and includes profitability (Profitability), firm size (FirmSize), asset tangibility (Tangibility), growth opportunities (Growth), capital investment (Capex) and earnings volatility (EarningsVol).

To test whether ESG performance affects the capital structure-market competition nexus we extend Equation (1) by including the (HighESG) variable as well as its interaction term with market competition (MarketCompetition*ESG), reaching Equation (2) below:

$$\text{Leverage}_{it} = \beta_0 + \beta_1 \text{MarketCompetition}_{it} + \beta_2 \text{MarketCompetition}_{it} * \text{HighESG}_{it} + \beta_3 \text{Controls}_{it} + \varepsilon_{it} \quad (2)$$

ESG is an indicator that takes a value of one if a firm-year' ESG score is above 50 and zero otherwise. Variable definitions and descriptive statistics are provided in Table 1 and Table 2, respectively. The average firm in our sample has a

Table 1. Variable definitions.

Variable	Definition	Source
<i>MarketLeverage</i>	Book value of short- and long-term liabilities divided by the sum of market value of equity plus the book value of short- and long-term liabilities.	Compustat
<i>BookLeverage</i>	Calculated as the book value of short- and long-term liabilities dividend by the sum of the book value of equity plus the book value of short- and long-term liabilities.	Compustat
<i>HHI</i>	Herfindahl-Hirschman Index of sales classified using the 3-letter SIC code and multiplied by -1 . Higher scores indicate higher market competition.	Compustat
<i>Top4</i>	The % of total sales of the top 4 firms in the industry, classified using the 3-letter SIC code and multiplied by -1 . Higher scores indicate higher market competition.	Compustat
<i>ESG</i>	Thomson Reuters ESG Scores, an overall company score ranging from zero to 100 and based on the self-reported information in the environmental, social and corporate governance pillars. Higher scores indicate higher ESG performance.	Thomson Reuters
<i>HighESG</i>	An indicator variable that takes the value of 1 if <i>ESG</i> > 50 and 0 otherwise.	Authors' Calculation
<i>Profitability</i>	EBITDA divided by total assets	Compustat
<i>FirmSize</i>	The natural logarithm of total assets	Compustat
<i>Tangibility</i>	Fixed assets to total assets	Compustat
<i>Growth</i>	Market to book value of equity ratio	Compustat
<i>EarningsVol</i>	Standard deviation of net income during the last 5 years.	Compustat

Table 2. Descriptive statistics.

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
<i>MarketLeverage</i>	5112	0.261	0.234	0.000	0.866
<i>BookLeverage</i>	5112	0.190	0.151	0.000	0.659
<i>HHI</i>	5112	-0.300	0.218	-0.98	-0.063
<i>Top4</i>	5112	-0.772	0.166	-0.97	-0.390
<i>ESG</i>	5112	0.414	0.201	0.004	0.899
<i>Profitability</i>	5112	0.107	0.056	-0.082	0.372
<i>FirmSize</i>	5112	13.535	1.039	10.284	15.451
<i>Tangibility</i>	5112	0.296	0.165	0.010	0.876
<i>Growth</i>	5112	1.414	1.028	0.289	11.361
<i>Capex</i>	5112	0.043	0.029	0.001	0.285
<i>EarningsVol</i>	5112	0.025	0.020	0.000	0.365

mean market leverage (book leverage) of 26.1% (19%). It exhibits a 10.7% profitability ratio, while 29.6% of its assets are tangible. Moreover, it has a 4.3% ratio of capital expenditures to total assets (Capex) and a market to book ratio of 1.41.

4. Results

Table 3 presents results from estimating Equation (1) using high-dimensional fixed (firm and year) effects. Results indicate a negative relationship between competition and capital structure which is statistically significant at conventional levels. This relationship holds across both measures of leverage and market competition. Specifically, the coefficient of HHI is -0.112 (-0.082) in the MarketLeverage (BookLeverage) regression and statistically significant at the 5% (1%) level. Moreover, the coefficient of Top4 is -0.185 (-0.087) in the market leverage (book leverage) regression and is statistically significant at the 1% (5%) level. Results are consistent with the notion that as market competition intensifies firms have an incentive to reduce debt levels to avoid predation from low-leverage firms. Our findings are in line with [Guney et al. \(2011\)](#) who document a negative relationship between market competition and capital structure in a sample of Chinese firms while the authors support predation incentives.

In terms of our control variables, profitability has a negative effect on capital structure which is in line with the Pecking Order Theory of capital structure ([Myers, 1984](#)). FirmSize and Tangibility exhibit a positive relationship to capital structure supporting the notion that bigger firms with more collateral have easier access to debt financing. Our findings suggest no relationship between earnings volatility (EarningVol) and capital investment (Capex). The coefficient on Growth is generally positive but statistically significant at conventional levels only in the MarketLeverage regression. This may indicate that firms with higher growth opportunities resort more often to debt financing, resulting in higher leverage.

Table 3. The relationship between capital structure and market competition. This table presents results from estimating eq.1 using high dimensional fixed effects (firm and year). The dependent variable is market leverage (*MarketLeverage*) in Columns 1 and 2 and book leverage (*BookLeverage*) in Columns 3 and 4. Robust standard errors are reported in parentheses. Variable definitions are provided in **Table 1**, $p < 0.01$, $**p < 0.05$, $*p < 0.1$.

	MarketLeverage		BookLeverage	
	(1)	(2)	(3)	(4)
<i>HHI</i>	-0.112** (0.048)		-0.082*** (0.026)	
<i>Top4</i>		-0.185*** (0.068)		-0.087** (0.037)
<i>Profitability</i>	-0.987*** (0.078)	-0.980*** (0.081)	-0.514*** (0.040)	-0.481*** (0.040)
<i>FirmSize</i>	0.095*** (0.011)	0.106*** (0.012)	0.074*** (0.006)	0.075*** (0.007)
<i>Tangibility</i>	0.413*** (0.050)	0.389*** (0.058)	0.201*** (0.033)	0.171*** (0.035)
<i>Growth</i>	0.008* (0.004)	0.011** (0.005)	0.003 (0.003)	0.002 (0.003)
<i>Capex</i>	-0.059 (0.107)	-0.137 (0.120)	0.069 (0.060)	0.042 (0.062)
<i>EarningsVol</i>	0.038 (0.150)	0.089 (0.151)	-0.015 (0.084)	-0.024 (0.087)
Constant	-1.085*** (0.152)	-1.330*** (0.180)	-0.847*** (0.089)	-0.895*** (0.094)
Observations	5112	5112	5112	5112
R-squared	0.791	0.790	0.832	0.846
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
ROBUST	YES	YES	YES	YES

Table 4 presents results from estimating Equation (2) using high-dimensional fixed (firm and year) effects. Results indicate that the interaction term between market competition and ESG performance is positive and statistically significant at conventional levels, supporting H2. This relationship holds across both measures of leverage and market competition. Specifically, the coefficient of $HHI \cdot HighESG$ is 0.053 (0.029) in the *MarketLeverage* (*BookLeverage*) regression and statistically significant at the 5% (5%) level. Specifically, in Column 1 the coefficient for *HHI* is -0.122^{***} which is the slope of the regression line for the low ESG performance group (i.e. $HighESG = 0$). The value of the $HHI \cdot HighESG$ is 0.053

Table 4. The moderating role of ESG performance on the relationship between capital structure and market competition. This table presents results from estimating Equation (2) using high dimensional fixed effects (firm and year). The dependent variable is market leverage (*MarketLeverage*) in Columns 1 and 2 and book leverage (*BookLeverage*) in Columns 3 and 4. Robust standard errors are reported in parentheses. Variable definitions are provided in Table 1, $p < 0.01$, $**p < 0.05$, $*p < 0.1$.

	MarketLeverage		BookLeverage	
	(1)	(2)	(3)	(4)
<i>HHI</i>	-0.122*** (0.041)		-0.089*** (0.020)	
<i>Top4</i>		-0.189*** (0.068)		-0.090*** (0.032)
<i>HighESG</i>	0.030*** (0.011)	0.118** (0.047)	0.017*** (0.005)	0.067*** (0.022)
<i>HHIxHighESG</i>	0.053** (0.026)		0.029** (0.012)	
<i>Top4IxHighESG</i>		0.129** (0.060)		0.067** (0.029)
<i>Profitability</i>	-0.989*** (0.061)	-0.982*** (0.065)	-0.515*** (0.030)	-0.482*** (0.031)
<i>FirmSize</i>	0.096*** (0.009)	0.106*** (0.010)	0.074*** (0.005)	0.075*** (0.005)
<i>Tangibility</i>	0.412*** (0.046)	0.389*** (0.051)	0.200*** (0.022)	0.171*** (0.024)
<i>Growth</i>	0.008** (0.004)	0.011*** (0.004)	0.003* (0.002)	0.002 (0.002)
<i>Capex</i>	-0.056 (0.105)	-0.133 (0.117)	0.071 (0.050)	0.044 (0.055)
<i>EarningsVol</i>	0.036 (0.138)	0.083 (0.145)	-0.016 (0.066)	-0.028 (0.068)
Constant	-1.105*** (0.129)	-1.337*** (0.150)	-0.856*** (0.062)	-0.899*** (0.071)
Observations	5112	5112	5112	5112
R-squared	0.791	0.791	0.882	0.886
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
ROBUST	YES	YES	YES	YES

which is the difference in slope between the low and high ESG performance groups, i.e. the slope for the high ESG performance group would be $-0.122 + 0.053 =$

0.069. Moreover, the coefficient of Top4*HighESG is 0.129 (0.067) in the market leverage (book leverage) regression and statistically significant at the 5% (5%) level. Thus, our results indicate that superior ESG performance moderates the negative effect of market competition on capital structure. This is in line with the notion that firms with superior ESG performance have a competitive advantage as they benefit from cheaper debt financing, higher valuation and performance; and consequently, have fewer incentives to lower their debt levels as a response to market competition.

5. Conclusion

In this study, we investigate the market competition-capital structure nexus and assess whether ESG performance affects this relationship. Using a sample of Japanese listed firms, we document a negative relationship between market competition and capital structure which is supportive of the “deep pocket” theory of predation. Moreover, our results suggest that ESG performance moderates the negative relationship between market competition and capital structure. This supports the notion that a superior ESG performance grants firms several advantages over their rivals, which in turn moderates the need to enhance their financial capabilities via lower leverage. Our study contributes to the literature by testing the aforementioned relationships in a market with distinct traits, thus assessing the robustness of findings from earlier country-specific studies. Moreover, our results highlight the importance of ESG reputational risk and market competition on capital structure decisions and thus are expected to be of interest to market participants.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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