

Article

The Impact of Internationalization of the Boardroom on Capital Structure

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Abstract: We develop a theoretical model based on several theories, mainly pecking order theory and theory of information economics, as well as on theoretical arguments provided by economic sociology and psychology to investigate for the first time the impact of the presence of a foreign board member on capital structure. The sample of study covers 3773 non-financial U.S. firms and includes 23,196 observations over the period from 2010 to 2018. We used pooled OLS, fixed effects, random effects, and the general method of moments (GMM) in order to analyze the impact of foreign directors on capital structure after controlling for a range of factors, including size, year, and industry effects. The results of this empirical analysis support the proposed hypothesis. Of particular note is the finding that the proportion of foreign directors on the board correlates negatively with debt structure. Furthermore, we demonstrate that our findings hold up in the face of all appropriate robustness checks. Our study contributes to the existing literature by including an international dimension of board diversity, specifically the influence of foreign directors on corporate capital structure. We argue that increasing international diversity in the boardroom improves both the quantity and quality of the information exchange between insiders and shareholders, thereby reducing adverse selection costs.

Keywords: capital structure; internationalization of the boardroom; corporate governance; foreign directors

1. Introduction

Since the publication of [Modigliani and Miller \(1958\)](#), many studies have attempted to explain the capital structure decisions made by corporations. One important branch of such research relates to the pecking order theory developed by [Myers \(1984\)](#) and [Myers and Majluf \(1984\)](#). This model argues that because of adverse selection costs, companies have an order of preference in the use of their financing sources. Specifically, the theory predicts that given the inherent information asymmetries between managers and investors, firms will choose to use retained earnings before debt and debt before equity ([Alhashel 2015](#)).

One related stream of recent literature investigates how the mechanisms of corporate governance relate to companies' debt (e.g., [Bradley and Chen 2011](#); [Lorca et al. 2011](#); [Fields et al. 2012](#); [Meah 2019](#); [Khanh et al. 2020](#)). According to [Bradley and Chen \(2011\)](#), the self-serving behavior of entrenched managers may not negatively impact bondholders insofar as they adhere to low-risk, self-serving operating strategies since such tactics may ultimately benefit corporate bondholders as well. [Lorca et al. \(2011\)](#) and [Fields et al. \(2012\)](#), on the other hand, conclude that companies whose boards are more highly engaged in the advisory role may experience a reduction in the agency costs associated with debt financing. These researchers assert that the board's monitoring role can contribute

to a reduction in both information asymmetry and the opportunistic behavior of managers, with the consequent reduction of creditors' perception of likelihood of default in loan repayments, which results in a lower cost of debt.

It is possible that the impact of diverse directors on capital structure can be explained with reference to risk aversion (Sila et al. 2016; Bernile et al. 2018). According to the pecking order model, when choosing sources of finance, companies prefer less risky sources of funding, such as retained earnings and debt, due to the fact that high-risk securities, such as issuing new equity, tend to be associated with greater levels of information asymmetry (Myers and Majluf 1984). Evidence suggests that board diversity may promote market efficiency by increasing levels of information disclosure (Ahmed et al. 2017). For example, boards featuring greater numbers of female directors have been shown to engage in more public disclosure and improved management reporting, which in turn enhances earnings quality (Gul et al. 2011). Furthermore, Alves et al. (2015) conclude that greater gender diversity on boards correlates positively with increased use of external equity and decreased use of debt. In addition, Mirza et al. (2019) indicate that female directors enhance the investment efficiency of the companies as they play a monitoring role, reduce agency problems and improve the efficiency of allocation of resources.

The previous studies conclude that board room diversity tends to improve monitoring and the processes of corporate governance more generally by providing a signal of best practices and positively impacting on both the quality and quantity of information disclosure, which reduces information asymmetry between insiders and the market according to the information economics literature. Overall, the literature implies that capital structure models are incomplete if they ignore governance features. In the present study, we take the additional step of analyzing the impact of boardroom internationalization on capital structure for non-financial U.S. firms.

We focus on this subject and the U.S. for a number of reasons. First, in the U.S., shareholders play an important part in board decision-making. Previous research indicates that U.S.-based investor institutions take a part in board decision making and effect firm operating performance positively (Becht et al. 2009; Buchanan et al. 2012). In the current situation, we look into this matter further regarding capital structure. Second, the appointing of foreign board members signifies a change in U.S. corporate boards that has occurred over recent years in an attempt to improve corporate governance due to feeble governance systems being revealed as a key factor in the dot-com bubble crisis and the 2008 financial crisis. Third, most of the extant research is restricted to financial performance, and, hence, we investigate the role foreign directors play further in relation to capital structure in the U.S., where the financial market is mature and institutions are well-established, so strict regulatory and governance provisions are in place.

In order to analyze, for the first time, the impact of the presence of foreign board members on capital structure, this study builds on the basic ideas of pecking order theory. We argue that increasing international diversity in the boardroom improves both the quantity and quality of the information exchange between insiders and shareholders, thereby reducing adverse selection costs. We test this hypothesis by analyzing the impact of the presence of foreign directors on debt structure (i.e., financial leverage). In other words, the research question addressed in this study is whether or not boardroom internationalization has an impact on capital structure.

In the process of analysis, we control for a wide array of variables, including size, year, and industry effects, and we also conduct appropriate robustness tests. The results of our investigation support the hypothesis of our study. In particular, we find that the proportion of foreign directors on the board correlates negatively with debt structure. Furthermore, we show that companies with more non-executive directors tend to exhibit capital structures which rely less on financial leverage. Some evidence is also provided that greater levels of gender diversity on the board can reduce dependence on leverage as a means of finance. All of these findings are robust to a satisfactory level based on a number of robustness checks.

Our study contributes to the existing literature by including an international dimension of board diversity, specifically the influence of foreign directors on corporate capital structure. We assert that the presence of one or more foreign board members may improve information disclosure and decrease information asymmetry, a factor which according to pecking order theory has an impact on firms' financing decisions. We support this claim by arguing that foreign directors may improve board effectiveness by bringing new knowledge and experience, and hence improving the overall quality of corporate governance in general (Masulis et al. 2012). Additionally, foreign directors may prove capable of better coordination of a firm's resources than domestic directors given their exposure to a wide array of global business practices and environments, thus leading to overall improvements in productivity and performance (Hooghiemstra et al. 2019). Our research thus participates in an emerging field of study focusing on the precursors and impacts of international diversity on boards of directors.

The rest of the paper is organized as follows: Section 2 discusses the capital structure theories; Section 3 presents the related literature and hypothesis development; Section 4 describes the sample of study and data collection; Sections 5 and 6 present the results of empirical analysis and robustness checks; Section 7 presents the conclusions.

2. Theories of Capital Structure

Capital structure theory can be divided into two primary branches: trade-off theory and pecking order theory. While not mutually exclusive, these theories can help to predict managerial behavior with respect to financing decisions by taking into account board composition as a driver of these choices. Both of these theories are discussed extensively in the corporate finance literature, so our explanation here will remain brief.

The key idea in the trade-off model is that companies aim to achieve an optimum mix of debt and equity in their financing in order to maximize the benefits and minimize the costs associated with each type of funding. The benefit associated with debt capital is the tax shield, i.e., the tax advantages which accompany the obligation to make interest payments to debt holders (Modigliani and Miller 1963). Given this tax shield, Modigliani and Miller (1963) stipulate that, theoretically, 100% debt financing should present the optimal capital structure for companies. In practice, however, financial distress costs also come into play thanks to imperfections in the market, and companies are therefore generally reluctant to rely on such a capital structure imbalance. Financial distress costs include the cost of bankruptcy and the agency costs associated with financial distress (Jensen and Meckling 1976). When gearing levels are high, shareholder funds are subject to less risk, causing them to prefer projects which are considered high risk–high return. In other words, high levels of leverage tend to mean that managers will cater to equity-holder preferences by forcing the brunt of the risk onto creditors, a behavior known as the “asset substitution problem”. In such a situation, debt holders respond by implementing restrictive measures which involve higher debt premiums, thus effectively tying the hands of managers. All costs are then effectively the responsibility of shareholders, so that the greater a firm's reliance on debt, the higher the risk of financial distress (Jensen and Meckling 1976). The crux of trade-off theory, therefore, is that companies aim for a level of leverage which maximizes firm value by matching the marginal costs of debt to the marginal benefits.

Pecking order theory challenges the notion that each company utilizes a unique combination of debt and equity in order to minimize the cost of capital. The model's basic assumption is that when deciding how to finance long-term investments, companies follow an order of preference for the various types of available funding. The first choice in this pecking order is reliance on retained earnings. If greater amounts of capital are needed, the second choice will be external finance in the form of bank loans or corporate bonds. Finally, only as a last resort will firms turn to equity issuance as a source of capital under this theory. This is because it is thought that investors view equity issuance as a negative signal and will usually only consent to purchase it at a discounted rate. Furthermore,

offering new equity at a low price is likely to be viewed negatively by existing shareholders, who will see it as a reduction in their own value.

The order of preference outlined in the pecking order model is based on associated costs and relative ease of access. Internal finance is readily available and carries no cost of use; for this reason, it falls in the first position. According to [Myers \(1984\)](#), the order of preference also relates to the information asymmetry between companies and investors. If there is a lack of information available to the market about the nature of a firm's activities, potential investors may be reluctant to finance the firm. Therefore, company insiders who are in possession of sufficient information may rely on retained earnings in the hope that the firm's projects will benefit existing shareholders. Therefore, according to the model, lower levels of information asymmetry correspond to less costly issuance of securities, and greater levels of information asymmetry will force firms to fall back on retained earnings. In terms of external finance, managers are thus likely to prefer low-risk securities, since high-risk options, such as issuing new equity, are much more sensitive to issues of information asymmetry ([Myers and Majluf 1984](#)).

Although the trade-off and pecking order models are considered the most influential capital structure theories, it is generally believed that other forces may also come into play. Agency theory, for example, predicts that use of debt financing can mitigate the agency costs associated with the inherent conflict of interest between shareholders and managers ([Jensen 1986](#)). Managers of companies with ample cash flow are considered "entrenched" and thus more likely to overinvest and squander perquisites. Using debt as a means of finance reduces the current and future cash flow available for managerial spending and, thus, increases organizational efficiency. Furthermore, shareholders tend to prefer debt over equity funding since the latter dilutes both control of the firm as well as their own wealth in favor of new shareholders. To reiterate, then, according to [Jensen \(1986\)](#), the use of debt financing is thought to go some way toward mitigating the agency costs associated with this conflict of interest between shareholders and managers.

3. Related Literature and Hypothesis Development

In a general sense, board diversity can be defined as the variety of human characteristics present in a board's composition. The more specific quality of foreign director diversity is an issue that has generated a great deal of debate with regard to its role in boardroom dynamics. In addition to managerial operating and investment choices, board composition can have an impact on the quantity and quality of a firm's information disclosure, i.e., board diversity can play a role in the level of information asymmetry between a company and the external market. Much of the existing literature on board diversity is primarily descriptive and involves no explicit reference to theoretical models ([Terjesen et al. 2009](#)). Nonetheless, the impact of international diversity on a firm's reporting decisions is supported by various theoretical approaches from several different academic fields. In this study, we draw on agency theory, pecking order theory, theories of information economics, and ideas from economic sociology and psychology.

According to agency theory, the mechanisms of corporate governance help to reduce levels of information asymmetry between business insiders and the external market, and within this model, the board of directors plays a key role in protecting and promoting the interests of shareholders ([Jensen and Meckling 1976](#)). [Bilgin et al. \(2017\)](#) argue that a good corporate governance environment increases the degree of transparency and reduces the degree of investment risk. Diversity amongst board members can broaden the types of experiences and skills available to the board as a whole, and this is likely to have a positive impact on the overall effectiveness of the board in terms of controlling and supervising management and reducing agency conflicts ([Terjesen et al. 2009](#)). One way to improve board diversity is through director nationalities; it is thought that foreign board directors may often be active, valuable members who can provide essential insight by asking novel questions and improving the board's monitoring function. In this sense, foreign directors may help improve both the independence and efficiency of the board as well as improving the quality of financial reporting by

helping the board to fulfil its fiduciary duties to shareholders, promote informational transparency, and prevent opportunistic behavior on the part of managers (e.g., [Armstrong et al. 2010](#)).

The improvement in information disclosure linked to the presence of foreign board members may not be solely a result of improved monitoring, however. Theories of economic sociology and psychology stipulate that the presence of international directors could also impact the dynamics of board deliberation processes, and this could also have a positive effect on a firm's information policies. For example, foreign board members may be able to contribute fresh perspectives which can help solve complex issues, and this could reduce the level of bias inherent in strategy formulation. Furthermore, international directors may actively promote good communication practices, both amongst board members and with various groups of external stakeholders, which ultimately reduces information asymmetry.

According to the theory of information economics, improved information disclosure on the part of firms lowers the information asymmetry occurring between companies and the stock market. Improving the quality of the information disclosed, for example, is thought to reduce information asymmetry by increasing the confidence of investors and reducing their incentive to seek out private information ([Easley and O'hara 2004](#)). There are costs associated with high levels of information asymmetry due to the adverse selection this condition introduces into transactions between buyers and sellers. Lower levels of asymmetry can thus help investors to make more precise valuations, which in turn helps to increase market liquidity.

It is believed that high-quality corporate governance may have a positive impact on the quantity and quality of the information a firm discloses, with higher levels of disclosure, as noted above, potentially leading to reduced information asymmetry ([Kanagaretnam et al. 2007](#)). Given these assertions, it could be expected that companies with a high quality of corporate governance, including higher numbers of foreign directors on the board, may be associated with lower levels of information asymmetry.

In line with the pecking order model, it can be concluded that problems of information asymmetry between the company and capital providers constitute an important determinant of capital structure. Because different finance providers have varying levels of access to key information about the firm and therefore varying capacity to monitor company behavior, the precise sources of finance a company chooses to rely on is an important consideration. According to the pecking order model, lower levels of information asymmetry between firm and market will mean a lower cost of issuing equity, and, therefore, companies with high levels of information disclosure should rely more heavily on external stock and less heavily on debt ([Yousef 2019](#)).

Based on these arguments and in conjunction with the agency and pecking order models as well as the theory of information economics, a diverse board of directors that includes more foreign members ought to decrease the level of information asymmetry between inside managers and outside investors and, in turn, reduce the risk of relying on stock issuance instead of using debt financing. A board composed with the aim of minimizing information asymmetry, in other words, should streamline the process of issuing external finance, and in such cases, there should be a shift from less risky methods of finance, such as debt, to those generally thought to entail higher levels of risk, such as common stock equity. In our study, therefore, we expect to see a negative correlation between the proportion of foreign directors on the board and the use of debt in a firm's capital structure. Based on this assertion, then, we will test the following hypothesis of study:

The greater the proportion of foreign directors on a firm's board, the lower the proportion of debt used in its capital structure.

4. Data and Methodology

To address our aim of exploring the impact of corporate governance on capital structure, this study gathers annual data for non-financial firms in the U.S. from several different sources, primarily Compustat, BoardEx, and the Financial Ratios Suite by Wharton Research Data Services (WRDS). The period covered is 2010 to 2018, and we construct our sample by first pulling annual accounting data from all corporations with non-negative total assets for this period from Compustat.

In order to compute certain important variables, such as return on assets (ROA), we then match these data with data from the Financial Ratios Suite by WRDS. Finally, for our corporate governance data, we match the Compustat data with data from BoardEx. Financial companies are excluded from our sample since they are subject to capital requirement regulations which are thought likely to influence their capital structure decisions (Alves and Ferreira 2011). Our final sample thus includes 23,196 observations from 3773 non-financial American firms.

This article hypothesizes that the composition of a company's board of directors can have an impact on debt structure/financial leverage. In particular, we assert that diverse board compositions which lend themselves to the reduction of information asymmetry make it less likely a given firm will rely on financial leverage. We measure financial leverage using the standard technique of calculating the ratio of book value of total debt divided by the book value of assets as well as using market capitalization. However, it is acknowledged that corporate governance is a complex concept which is difficult to quantify numerically. In contrast with the standard literature, we include variables of corporate governance as additional determinants of leverage in order to account for the impact of governance mechanisms on capital structure, and one of our specifications uses the four individual governance characteristics of foreign directors, board size, gender diversity, and non-executive directors.

Based on this study's proposed hypothesis, however, the primary independent variable examined in this research is the percentage of foreign directors on a board, as measured by the ratio of the number of foreign directors to overall board size. Although it is not a focus of this study, we attempt to control for any element which has been found by previous literature to robustly explain the variation in corporate capital structures. Therefore, the following are used as corporate governance control variables in this study: (1) the proportion of non-executive directors; (2) the proportion of female directors; and (3) the overall board size, as measured by the logarithm of the total number of directors on the firm's board. Furthermore, we include several additional firm-specific control variables which previous studies (e.g., Yousef 2019; Vintilă et al. 2019; Ahmed and Bhuyan 2020; Kedzior et al. 2020) have shown to play a role in capital structure decisions; these include firm size, profitability, tangibility, and growth opportunities.

With respect to firm-year data, the most widely-used techniques of panel data as pooled regression along with the fixed effects and random effects models are used in this study. In order to assess the impact of corporate governance on capital structure, we rely on a panel data model using the following baseline and extended forms:

Baseline model:

$$LEV_{i,t} = \beta_0 + \beta_1 FS_{i,t} + \beta_2 ROA_{i,t} + \beta_3 TANG_{i,t} + \beta_4 GRTH_{i,t} + \varepsilon$$

Extended model:

$$LEV_{i,t} = \beta_0 + \beta_1 FS_{i,t} + \beta_2 ROA_{i,t} + \beta_3 TANG_{i,t} + \beta_4 GRTH_{i,t} + \beta_5 BS_{i,t} + \beta_6 FEM_{i,t} + \beta_7 NONEX_{i,t} + \beta_8 FRGN_{i,t} + \varepsilon$$

where the index i denotes a firm; t denotes a year; $LEV_{i,t}$ is one of two measures of capital structure: first, total debt divided by total assets (book debt ratio) and second, total debt divided by market capitalization (market debt ratio). $FS_{i,t}$ is firm size measured by the logarithm of total assets; $ROA_{i,t}$ is firm profitability measured by return on total assets; $TANG_{i,t}$ is tangibility, using the standard measure of asset tangibility of the ratio of total tangible assets to total assets; $GRTH_{i,t}$ is firm growth measured by market-to-book ratio.

In the extended model, we use three corporate governance control variables: $BS_{i,t}$ is the size of the board measured by the logarithm of the total number of directors on the board; $FEM_{i,t}$ is gender diversity as measured by the total number of female directors divided by the total number of directors on the board; $NONEX_{i,t}$ is the fraction of non-executive directors measured by the total number of non-executive directors divided by the total number of directors on the board.

Finally, the main corporate governance independent variable is the fraction of foreign directors ($FRGN_{i,t}$) measured by the total number of foreign directors divided by the total number of directors on the board. We collected the data of foreign director variable from the BoardEx database, where based on BoardEx, foreign director (Nationality Mix) is the proportion of directors from different countries at the Annual Report. In our case, a foreign director is a director of non-American nationality.

5. Empirical Results

In accordance with the above, we begin by estimating the baseline model, which includes financial variables only. The results are presented in Table 1, and it can be seen that the pooled OLS, fixed effects, and random effects results for this model are in line with theoretical predictions, with all coefficient estimates demonstrating high statistical significance.

Table 1. Regression analysis for baseline model. Table 1 shows the results of regression analysis for a baseline model using pooled OLS, fixed effects (FE), and random effects (RE). The dependent variable for models 1–3 is book debt ratio measured by total debt divided by total assets, and for models 4–6, it is market debt ratio measured by total debt divided by market. FS is firm size measured by the logarithm of total assets; ROA is firm profitability measured by return on total assets; TANG is tangibility measured by the ratio of total tangible assets to total assets; GRTH is firm growth measured by market-to-book ratio. Asterisks indicate significance at 5% (**), 1% (***).

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	RE	FE	OLS	RE	FE
Book Debt Ratio			Market Debt Ratio			
FS	0.079 *** (37.384)	0.085 *** (20.880)	0.095 *** (12.577)	0.166 *** (13.867)	0.182 *** (8.655)	0.265 *** (4.400)
TANG	0.096 *** (27.555)	0.107 *** (25.911)	0.112 *** (23.024)	0.359 *** (18.182)	0.292 *** (10.582)	0.195 *** (4.995)
ROA	−0.097 *** (−12.329)	−0.117 *** (−14.321)	−0.122 *** (−13.790)	−0.233 *** (−5.246)	−0.217 *** (−3.788)	−0.250 *** (−3.489)
GRTH	−0.002 *** (−5.666)	−0.001 (−0.058)	−0.001 (−0.825)	−0.015 *** (−8.031)	−0.009 *** (−4.604)	−0.006 *** (−2.795)
cons	−18.199 *** (−11.845)	−20.540 *** (−22.311)	−20.105 *** (−20.276)	−20.696 ** (−2.395)	−23.464 *** (−3.269)	−20.932 *** (−2.644)
Wald chi2 statistic	2123.674			247.433		

Firm size is shown to have a significant positive effect on leverage, revealing that large firms use more debt than smaller firms. This can be attributed to the fact that large companies tend to have an advantage over smaller firms in terms of bargaining power given that the growth opportunities of a large company tend to exceed its assets, which can then be used as collateral, and this allows such firms to better exploit economies of scale. This also means that capital markets tend to be more accessible to larger firms than to smaller ones. In addition, large companies tend to be more diversified than their smaller counterparts given that they tend to be subject to lower expected bankruptcy costs, and this permits them to take on higher debt. In other words, the financing options available to firms tend to expand as they gain in size, age, and informational transparency, all of which provide improved access to public long-term debt.

The tangibility of a firm's assets is shown to have a significant positive impact on both book and market debt ratios, which is in line with the idea that companies with high-value tangible assets will find themselves able to borrow more. It is important for both borrowing and lending organizations to consider the factor of tangible assets since they provide collateral for borrowers and security for lenders. In other words, if a company defaults on loan payments, assets are what is used to recover

the missing funds. For this reason, tangibility of assets should demonstrate a positive correlation with leverage in a given firm's capital structure. Asset tangibility increases a firm's access to external finance since tangible assets have less asset specificity than intangible assets. In this way, this feature has maximum benefit as a means of debt collateralization, which also improves the lender's guarantee. High levels of intangible assets, on the other hand, tend to create difficulty when it comes to accessing credit since such assets cannot be used as collateral. Collateral assets are also useful, therefore, when it comes to overcoming information asymmetry, adverse selection, and moral hazard. The lending of funds is granted primarily based on the value of underlying tangible assets as determined by company outsiders and not based on the inherent creditworthiness of the company.

On the other hand, profitability is shown to have a significant negative impact on leverage, revealing that more profitable companies rely more on internal financing in the form of retained earnings and tend to take on debt only when facing projects, so expensive additional funds become necessary. Because these firms tend to generate so much profit from their operational activities, they are less likely to need to borrow.

The correlation between leverage and growth is generally a bit more ambiguous, but the results here indicate that growth tends to have a negative impact on leverage. The decision to fund firm operations using debt means that the firm is committed to servicing the debt. Growing companies may wish to avoid taking on debt since the servicing obligations may force them to pass up profitable investment opportunities (Myers 1984). As noted by Titman and Wessels (1988), "growth opportunities are capital assets that add value to a firm but cannot be collateralized and do not generate current taxable income", and this implies a negative association between growth and debt, which is consistent with the theories referred to above. Conversely, in order to fund their desired investments, growing companies may be more likely to require large amounts of capital beyond what is available internally, and in this sense, they may in fact be more likely to seek debt as a means of finance. This possibility coincides with Myers and Majluf's (1984) pecking order model.

The results are not reported here, but it should be noted that the static panel model has been cross-checked with both time effects (i.e., a fixed effects regression) and industry sector effects (i.e., a random effects regression) to find no significant changes.

The next step is to test our hypotheses of study as discussed above. In order to do this, we turn to our extended model, which integrates the control variables relating to the board of directors (i.e., board size, proportion of non-executive directors, and proportion of female directors) and adds the variable of proportion of foreign directors. We focus primarily on the impact of internationalization of the boardroom on capital structure by measuring and analyzing the proportion of foreign directors. Based on the results of a Hausman test, our estimates are obtained using the fixed effects instead of the random effects model, and our regression results are presented in Table 2. The robustness analysis of these results is discussed in the following section.

It can be seen in Table 2 that the validity of the selected variables in the extended model is verified in all cases by the Wald test for the joint significance of the regressors. Second, the results of the Hausman test confirm the null hypothesis positing no correlation between the individual effects and the regressors, thus confirming the appropriateness of fixed effects when using a static panel model.

All financial control variable estimates resemble those presented in the baseline regressions in Table 1, and all corporate governance control variables demonstrate a level of impact on capital structure, except the participation of non-executive directors. The proportion of foreign board directors yields a highly significant negative correlation with both market and book leverage, indicating that a board comprised of a higher ratio of foreign members correlates with lower levels of debt in the capital structure mix.

These results are thus in line with our proposed H: the greater the proportion of foreign directors on a firm's board, the lower the proportion of debt used in its capital structure. This is primarily due to the idea that international presence on the board can have a positive impact on a firm's information environment. In other words, a higher proportion of foreign board directors tends to increase (a)

corporate transparency, (b) the quality of the information disclosed by management, (c) the accuracy of analysts' predictions, and (d) effective communication with the market, all of which lead to reductions in information asymmetry. According to the pecking order model, such a situation will improve the capacity of companies to fund their activities through the issuance of new stock rather than relying on debt.

Table 2. Regression analysis for extended model. Table 2 shows the results of regression analysis for an extended model using pooled OLS, fixed effects (FE), and random effects (RE). The dependent variable for models 1–3 is book debt ratio measured by total debt divided by total assets, and for models 4–6, it is market debt ratio measured by total debt divided by market. FS is firm size measured by the logarithm of total assets. ROA is firm profitability measured by return on total assets. TANG is tangibility measured by the ratio of total tangible assets to total assets. GRTH is firm growth measured by market-to-book ratio. BS is the size of the board measured by the logarithm of the total number of directors on the board. FEM is gender diversity as measured by the total number of female directors divided by the total number of directors on the board. NONEX is the fraction of non-executive directors measured by the total number of non-executive directors divided by the total number of directors on the board. FRGN is the fraction of foreign directors measured by the total number of foreign directors divided by the total number of directors on the board. Asterisks indicate significance at 5% (**), 1% (***).

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	RE	FE	OLS	RE	FE
Book Debt Ratio			Market Debt Ratio			
FS	0.088 *** (36.802)	0.106 *** (24.875)	0.146 *** (18.388)	0.206 *** (15.208)	0.209 *** (9.196)	0.283 *** (4.381)
TANG	0.091 *** (26.028)	0.098 *** (23.677)	0.107 *** (22.110)	0.353 *** (17.749)	0.293 *** (10.497)	0.193 *** (4.936)
ROA	−0.023 ** (−2.532)	−0.065 *** (−7.584)	−0.074 *** (−8.054)	−0.259 *** (−5.053)	−0.225 *** (−3.655)	−0.233 *** (−3.148)
GRTH	−0.002 *** (−5.380)	−0.000 (−0.119)	−0.000 (−0.527)	−0.014 *** (−7.560)	−0.009 *** (−4.443)	−0.006 *** (−2.737)
BS	−0.009 *** (−16.543)	−0.009 *** (−18.135)	−0.009 *** (−18.240)	−0.001 (−0.111)	0.001 (0.065)	−0.003 (−0.660)
FEM	−0.093 *** (−5.466)	−0.088 *** (−4.810)	−0.080 *** (−3.999)	−0.398 *** (−4.134)	−0.438 *** (−3.425)	−0.398 ** (−2.468)
NONEX	−0.067 *** (−3.152)	0.032 (1.430)	0.030 (1.253)	−0.359 *** (−2.970)	−0.143 (−0.907)	0.109 (0.563)
FRGN	−0.042 *** (−3.828)	−0.024 ** (−1.961)	−0.045 *** (−2.751)	−0.280 *** (−4.450)	−0.207 ** (−2.453)	−0.055 *** (−3.870)
cons	−19.225 *** (−12.470)	−20.586 *** (−21.521)	−18.215 *** (−17.288)	−27.703 *** (−3.170)	−30.857 *** (−4.150)	−26.255 *** (−3.079)
Wald chi2 statistic	2524.807		267.988			

With respect to our analysis of the corporate governance control variables, the results for the impact of gender diversity on the board indicate that more women being on the board correlates negatively with use of leverage. Previous research in both behavioral and financial economics has demonstrated that increasing female representation on boards may be a way to reduce risk since a great deal of empirical evidence has revealed that women may be more risk-averse than men (Chen et al. 2016). Furthermore, recent research on the attitudes of women in the general population towards risk suggest that men tend to be more overconfident than women in this regard; men were shown to believe the precision of their own knowledge was higher than the reality, while women were shown to underestimate their own knowledge, making them less likely than men to take extreme

positions. Thus, based on this evidence, it seems a greater proportion of female directors on the board may reduce use of leverage.

The impact of board size on the various types of finance is statistically significant only for specifications (1) to (3), which use book debt ratios as dependent variables. The findings indicate that companies with larger boards correlate with lower debt levels, implying that, in such cases, owner-managers emphasize the use of equity capital to improve company performance. In other words, it seems that larger boards may urge managers to adhere to lower levels of gearing in order to improve financial performance. Furthermore, the view that larger boards maintain lower leverage levels than smaller boards is based on the managerial entrenchment perspective stipulating that entrenchment is reduced on smaller boards, which perform a more active monitoring role. According to [Berger et al. \(1995\)](#), less entrenched managers have been shown to favor higher levels of leverage in their capital structure mix, and smaller boards are thus associated with higher levels of leverage. Similarly, smaller boards may be more effective at monitoring management and may thus be more successful in influencing managerial decisions. Perhaps most importantly, the existing literature suggests that high levels of debt can limit managerial flexibility by decreasing cash flow and curbing the ability of managers to increase their own compensation. This disciplining function ([Morellec et al. 2012](#)) may lead managers to avoid this problem by relying on lower levels of leverage. For these reasons, smaller boards may correlate with higher leverage.

The results further indicate that the proportion of non-executive directors on the board has a significant negative impact on the use of debt in capital structure; however, the results are statistically significant only for specifications (1) and (4). [Pfeffer and Salancik \(2003\)](#) note that non-executive directors play a key role in improving a firm's capacity to gain recognition from external stakeholders, and this can reduce general uncertainty about a company and improve its capacity to raise equity as a source of finance. Therefore, increased board representation by non-executive directors correlates with lower levels of gearing.

6. Robustness Checks

Our baseline specification comprises both year and industry fixed effects. The industry effects are captured using the Global Industry Classification Standard (GICS) created by Standard and Poor's and are included (as opposed to firm fixed effects) for two reasons. First, using firm fixed effects necessitates variation in the variables of interest (i.e., proportion of non-executive directors, proportion of female directors, and board size) within companies over time, and in the case of our sample, these variables remain relatively invariant for the time period in question (2010 to 2018) across a majority of the sampled firms, with many firms showing no change in representation by non-executive and female directors. If we estimate the parameters of equation (1) with firm fixed effects, the impacts of the non-time-variant variables for those specific firms are not taken into account. [Wooldridge \(2002\)](#) stresses that when key independent variables show little variation over time, using firm fixed effects can produce inaccurate estimates. Furthermore, [John and Litov \(2010\)](#) and [Ghosh et al. \(2011\)](#) also note a failure to employ firm fixed effects in this way. Second, it has often been noted within the capital structure literature that firm industry acts as a major determinant of financing strategies. [Frank and Goyal \(2009\)](#), for example, provide evidence that companies operating in industries with high median leverage tend to have higher individual leverage and assert that this can be considered a core element influencing leverage choices across firms.

However, one potential downside of using industry rather than firm fixed effects is that it assumes exogeneity with respect to independent variables. We deliberated the chance that endogeneity may exist since the anticipated determinants of capital structure might also be effected by capital structure. If endogeneity were present, OLS, fixed effect, and random effect estimations would be inconsistent and it would lead to bias results. In this case, our remaining choices were two-stage least squares (2SLS) and the general method of moments (GMM). With no valid instruments that are cardinal requirements of the 2SLS, we used the GMM to make estimations. Therefore, we used this to test the

robustness of the measurements of the effect of various factors on capital structure decisions (Table 3). Flannery and Rangan (2006); Nunkoo and Boateng (2010); and Nguyen et al. (2019) note that studies performed recently in developed countries tend to use the GMM estimation method to carry out empirical analyses in relation to capital structure issues. Furthermore, Kannadhasan et al. (2018) emphasize that the GMM always estimates the dynamic model as well as dealing with endogenous issues. To gain robust results through the use of the GMM, the lagged values of the independent variables are used as tools. The validity of these tools is checked here using the Arellano–Bond test for first-order autocorrelation AR(1) and second-order autocorrelation AR(2) in the first-differenced errors, which are performed to verify the degree and robustness of the empirical results.

Table 3. Robustness checks (1). Table 3 shows the results of regression analysis for both baseline and extended model using the general method of moments (GMM). The dependent variable for models 1–3 is book debt ratio measured by total debt divided by total assets, and for models 4–6, it is market debt ratio measured by total debt divided by market. FS is firm size measured by the logarithm of total assets. ROA is firm profitability measured by return on total assets. TANG is tangibility measured by the ratio of total tangible assets to total assets. GRTH is firm growth measured by market-to-book ratio. BS is the size of the board measured by the logarithm of the total number of directors on the board. FEM is gender diversity as measured by the total number of female directors divided by the total number of directors on the board. NONEX is the fraction of non-executive directors measured by the total number of non-executive directors divided by the total number of directors on the board. FRGN is the fraction of foreign directors measured by the total number of foreign directors divided by the total number of directors on the board. Asterisks indicate significance at 10% (*), 5% (**), 1% (***).

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Book Debt Ratio			Market Debt Ratio		
FS	0.085 *** (34.91)	0.089 *** (30.91)	0.091 *** (31.13)	0.178 *** (15.97)	0.203 *** (14.49)	0.215 *** (14.63)
TANG	0.095 *** (11.54)	0.092 *** (11.7)	0.091 *** (11.44)	0.295 *** (10.17)	0.294 *** (10.1)	0.285 *** (9.77)
ROA	−0.133 *** (−5.22)	−0.055 ** (−2.11)	−0.057 ** (−2.2)	−0.287 *** (−7.81)	−0.285 *** (−6.32)	−0.301 *** (−6.58)
GRTH	−0.004 *** (−5.16)	−0.004 *** (−4.901)	−0.004 *** (−5.001)	−0.028 *** (−10.97)	−0.028 *** (−10.7)	−0.027 *** (−10.6)
BS		−0.008 *** (−3.95)	−0.008 *** (−4.04)		−0.002 (−1.01)	−0.003 (−1.53)
FEM		−0.074 *** (−3.81)	−0.072 *** (−3.76)		−0.188 * (−1.69)	−0.181 (−1.62)
NONEX		−0.085 *** (−3.08)	−0.091 *** (−3.27)		−0.428 *** (−2.66)	−0.39 ** (−2.44)
FRGN			−0.047 *** (−3.33)			−0.313 *** (−6.87)
cons	−0.073 *** (−9.22)	−0.155 *** (−7.06)	−0.160 *** (−7.25)	−0.182 *** (−6.11)	0.1208 (1.02)	0.085 (0.73)
AR(1)	−5.74 ***	−4.55 ***	−4.53 ***	−4.34 ***	−4.26 ***	−4.22 ***
AR(2)	−0.690	−1.34	−1.33	−0.23	−0.641	−0.713

Finally, in order to account for potential heteroskedasticity and autocorrelation in the error term, all coefficient t-statistics are determined using heteroskedasticity-consistent errors clustered by firm (Petersen 2009). We also estimate t-statistics-based errors clustered by industry and country as a robustness check. The estimates were made by the xtglm procedure of Stata (Table 4). xtglm fits panel data linear models by using feasible generalized least squares. This command allows estimation in the

presence of AR(1) autocorrelation within panels and cross-sectional correlation and heteroskedasticity across panels (StataCorp 2001). Importantly, the results prove to be qualitatively similar, where the formulated hypotheses are still fulfilled with the financial and corporate governance control variables inserted into the model in levels. Moreover, the findings remain unaltered when the regressions include the robust options of heteroskedasticity, endogeneity, year, and industry fixed effects.

Table 4. Robustness checks (2). Table 4 shows the results of regression analysis for both baseline and extended model using xtgl. The dependent variable for models 1–3 is book debt ratio measured by total debt divided by total assets, and for models 4–6, it is market debt ratio measured by total debt divided by market. Asterisks indicate significance at 1% (***).

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Book Debt Ratio			Market Debt Ratio		
FS	0.078 *** (80.813)	0.086 *** (80.513)	0.086 *** (81.962)	0.149 *** (64.281)	0.160 *** (60.333)	0.163 *** (59.587)
TANG	0.078 *** (44.614)	0.073 *** (40.869)	0.074 *** (41.625)	0.224 *** (38.290)	0.228 *** (36.591)	0.220 *** (34.556)
ROA	−0.057 *** (−21.971)	−0.034 *** (−13.535)	−0.035 *** (−13.665)	−0.076 *** (−18.057)	−0.086 *** (−16.897)	−0.085 *** (−16.462)
GRTH	−0.001 *** (−9.186)	−0.001 *** (−9.786)	−0.001 *** (−9.725)	−0.003 *** (−15.252)	−0.003 *** (−14.684)	−0.003 *** (−13.735)
BS		−0.005 *** (−17.383)	−0.005 *** (−17.020)		−0.001 *** (−3.156)	−0.001 *** (−4.120)
FEM		−0.030 *** (−8.488)	−0.031 *** (−8.646)		−0.127 *** (−12.635)	−0.131 *** (−12.625)
NONEX		−0.010 *** (−2.979)	−0.011 *** (−3.149)		−0.080 *** (−7.511)	−0.080 *** (−7.279)
FRGN			−0.016 *** (−7.267)			−0.122 *** (−17.279)
cons	−17.674 *** (−55.356)	−17.353 *** (−51.072)	−17.389 *** (−51.183)	−7.690 *** (−11.050)	−8.517 *** (−10.401)	−7.712 *** (−9.165)
Year-Effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Effect	Yes	Yes	Yes	Yes	Yes	Yes
Wald chi2 statistic	19,807.874	17,933.278	18,422.304	6098.674	5515.719	5440.341

7. Conclusions

To the best of our knowledge, no rigorous empirical research to date has attempted to answer the question of whether the proportion of foreign directors on the board has any implications with respect to capital structure. This study empirically analyzes the extent to which the internationalization of the boardroom might impact the financial leverage of firms. The research relies on a sample of panel data from 3773 U.S. firms over the period from 2010 to 2018, and capital structure is analyzed using the two measures of book debt ratio and market debt ratio. The hypotheses developed for this article are tested using the three panel regression methods of OLS, RE, and FE estimation.

After controlling for a wide range of capital structure determinants, our findings reveal that increasing international representation in the boardroom is more likely to correspond to lower leverage levels. The results show that companies with higher proportions of foreign directors tend to have lower levels of gearing, and this corresponds with the view that increased international directors may indicate lower reliance on leverage within a firm, thus rendering such companies less susceptible to the risk of bankruptcy. These findings are in line with our hypothesis stipulating that more foreign directors should help companies reduce levels of information asymmetry between managers and investors, thus also reducing the costs associated with relying on riskier sources of funding, such as

stock, as forecast by the pecking order model (Myers 1984; Myers and Majluf 1984). Our findings also provide some support for the notion that increased representation by foreign directors can improve the board's efficiency and independence, which can also translate into increased reliance on debt financing.

The implications entailed by these results are significant. For example, the risk of bankruptcy coinciding with higher gearing levels provides a powerful reason to recommend increasing foreign board representation to practitioners and policymakers since this variable has been shown to reduce leverage in firms. The findings also have important implications for securities regulators since our study implies that increasing the internationalization of the boardroom means a company is less likely to resort to debt. In such a case, regulators could therefore recommend the inclusion of foreign members on the boards of listed companies as a means to develop financial markets and reduce overall risk. Finally, our findings also contribute to a discussion on theories of capital structure. For the trade-off model to stand alone, i.e., without the influence of pecking order theory, such a strong impact of board structure on leverage should not be apparent. In fact, the results of the current study imply that managers select funding sources based on levels of information asymmetry and that the presence of foreign directors on the board is not only crucial for aligning managerial and shareholder interests but also those of other stakeholders, such as creditors and bondholders.

When it comes to the question of board composition, the diversity element is broad and can be broken down into a number of subcategories, including age diversity, cultural diversity, and educational diversity. Testing the impact of some of these other types of diversity, in addition to international diversity, would have deepened the understanding of the impact of board representation on capital structure provided by this study. Unfortunately, data and space constraints have prevented a more in-depth analysis of this type. For this reason, additional future research is encouraged to help close this gap.

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