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The Path Analysis of Board Structure and Debt On Firm Performance of Listed Companies In the Stock Exchange of Thailand

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Abstract

Corporate governance through board structure (BS) is a crucial factor influencing financial decision-making and firm performance. The proportion of independent directors, as well as the strength and expertise of the board, can clearly determine debt repayment and capital policy. Board structure (BS) exerts a direct negative influence on the firm's debt to equity ratio (DE), indicating that a strong board encourages cautious financial strategies and reduces reliance on debt financing. Conversely, the debt-to-equity ratio (DE) has a direct positive effect on firm performance (FP), suggesting that debt, when maintained at an optimal level, enhances financial efficiency. Furthermore, board structure also exhibits an indirect negative effect on firm performance through the firm's debt to Equity ratio. This finding implies that when the board is excessively stringent, leading to an undue reduction in debt financing, the firm may lose investment opportunities and consequently diminish its capacity to generate returns. Therefore, firms should emphasize establishing an appropriate target for the debt-to-equity (DE) ratio and promoting diversity within the board in terms of experience and perspectives. Such measures would enable a balance between risk control and the pursuit of enhanced firm performance in the future.

Keywords: Board Structure, Debt, Firm Performance, The Stock Exchange of Thailand

1. Introduction

In the era of globalization, interconnectedness and exchanges among countries had significantly influenced society and the economy in all areas, such as international trade, technology, communication, and cultural exchange, as well as finance and investment. Consequently, individuals had more opportunities to invest in debt instruments, equity investments, derivative instruments, or various types of mutual funds, with different objectives depending on desired returns, risk level, and investment liquidity.

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Investment in equity instruments was one of the most popular options. According to the statistics from the Stock Exchange of Thailand, the trading value in 2023 was 169,467,669.60 million baht, increasing from 153,252,846.8 million baht in 2021 (SET, 2024) indicating the significant increase of trading value in the capital market. Nevertheless, while investors primarily focused on the returns, some also took other factors into account, such as the firm's credibility, performance policies (Nazir et al., 2021; Arhinful & Radmehr, 2023), and past performance.

Previous studies indicated that board structure played an important role in corporate governance and strategic decision-making. It was also crucial in monitoring and evaluating performance, as well as fostering effective and transparent corporate governance. As a result, the firm was enabled to operate efficiently and credibly, leading to sustainable growth and enhancing their capacity to adapt to changing market conditions (Bunnun & chancharat, 2023). In addition, many studies pointed out that the appropriate board structure, including independent directors and specialists in various fields, could enhance the efficiency of the firm's performance. Moreover, Arhinful & Radmehr (2023) found that debt management was one of the significant factors in a firm's performance. Excessive debt could lead to finance problems and increased risk for a firm (Nazir et al., 2021), while properly managed debt could help firms expand and grow sustainably. Therefore, this study investigated the board structure and debt influencing the firm's performance listed on the Stock Exchange of Thailand. As the Stock Exchange of Thailand (SET) is an attractive investment option for investors, both present and future, this study would help investors better understand its relationship with the SET, which would aid in effective investment decisions. Providing investors with complete and comprehensive information to support their investment decisions would help reduce risk and increase the opportunity for future returns.

2. Literature Review and Theoretical Framework

2.1 Board Structure and Debt to Equity ratio

Debt financing is an important source of capital for businesses to support performance and expansion. The ability to access sources of debt financing and the cost of debt depend on many factors, such as the firm's finances, market conditions, and, importantly, corporate governance, which is one of the key components of board composition. A well-structured board plays a crucial role in enhancing corporate credibility and transparency, as well as reducing risks in the view of creditors and investors. According to the agency theory of Jensen and Meckling (1976), creditors often use board structure as an indicator of the strength of corporate governance. A board structure with an adequate proportion of independent directors can reduce conflicts between directors and shareholders, thereby gaining trust among creditors, which may result in lower interest rates (Owusu et al., 2023). Anderson, Mansi, and Reeb (2004) found that companies with a high percentage of independent directors had significantly lower debt costs, indicating the role of board in reducing the information asymmetry. From the viewpoint of resource dependence theory (Pfeffer & Salancik, 1978), a board structure that has a diverse range of skills and networks can connect the firm to external resources, including banks and bond investors, thereby facilitating more effective debt financing. Hillman, Withers, and Collins

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(2009) supported the board that served not only corporate governance but also as a mechanism for generating strategic resources that enhanced credibility in the capital market.

Moreover, recent research has considered the gender diversity of board. Board gender diversity has been found to influence cost of debt, either reducing it or altering debt structure (Fleitas-Castillo et al., 2025). The Influence of Board Diversity on Capital Structure also demonstrates that gender diversity and board independence help improve debt financing under different market regimes (Elmoursy et al., 2025). Similarly, studies show that corporate governance variables such as board independence and gender diversity significantly reduce cost of debt. Regarding board size, empirical evidence suggests a non-linear relationship with leverage: an appropriate board size may improve debt access, but beyond a point the costs of complexity outweigh benefits (AHamida et al., 2025). However, an excessively large board may lead to slower decision-making and lower efficiency. Another aspect is the power of executives. CEO duality can weaken board oversight and lead to capital structure decisions unfavourable to creditors (AHamida et al., 2025). In some contexts, firms with strong CEO power adopt more debt (The Role of Board Gender Diversity in UK Firms, 2025). Based on the literature review and related studies, Hypothesis 1 was formulated.

H_1*:* Board structure influences the debt-to-equity ratio

2.2 The Debt-to-Equity ratio and Firm Performance

Capital structure is an important aspect of firm financial management, especially the debt-to-equity ratio and the firm's equity. The level of debt not only reflects a firm's ability to raise capital but also directly affects firm's performance, both positively and negatively, depending on the level and context of the firm. Following trade-off theory, a firm chooses an optimal level of debt by balancing between tax shields and bankruptcy risk. Maintaining an optimal level of debt reduces the overall cost of capital and improves the shareholder returns. However, excessive levels of debt increase the liquidity risk and the possibility of bankruptcy (Kreaus & Litzenberger, 1973; Tian et al., 2024). According to agency theory, debt can act as a disciplinary mechanism to enable executives to use the cost of capital efficiently due to the timely payment of interest and principal (Jensen, 1986). On the other hand, high debt may create conflict between shareholders and creditors and lead to high-risk investment decisions that may affect long-term performance (Jensen & Meckling, 1976; Ezeani, 2024).

Many empirical studies demonstrated the relationship between the debt-to-equity ratio and firm performance. For example, Abor (2005) studied firms in Ghana and found that short-term debt had a positive relationship with performance, while long-term debt had a negative relationship. Similarly, the study of Gill, Biger, and Mathur (2011) in the Canadian market found that debt had a positive effect on return on assets (ROA) but had a negative effect on return on equity (ROE) in some industries. Margaritis and Psillaki (2010) examined multiple firms in Europe and found that debt had a positive relationship with performance efficiency, especially in the highly efficient firm. Consequently, debt is a pressure to promote more effective management.

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However, the influence of debt on performance is not linear. Low to moderate levels of debt often have a positive effect on tax shields and financial discipline. In contrast, with excessively high levels of debt, performance decreases due to the increased debt burden and the heightened risk of bankruptcy (Frank & Goyal, 2009; Tian et al., 2024; Tran, 2025). This finding indicates the importance of determining debt level in accordance with the conditions of business, industry, and national context. Based on a literature review and related studies, Hypothesis 2 was formulated.

H_2*:* The debt-to-equity ratio influences firm's performance

2.3 Board structure, The Debt-to-Equity ratio, and Firm's Performance

Board structure and debt to equity ratio are two critical factors influencing firm performance. As a corporate governance mechanism, the board plays a crucial role in determining financial and funding policies, while debt decisions directly affect firms' financial costs and profitability (Bunnun & chancharat, 2022; Palmieri et al., 2025). Consequently, the interaction between board structure, debt, and firm performance has received considerable attention in financial and management research. According to agency theory, executives may pursue investments that serve their own interests rather than those of shareholders (Jensen & Meckling, 1976). In this regard, the board—particularly independent directors—mitigates such issues through monitoring and governance. On the other hand, debt can act as a tool for fostering financial discipline (Jensen, 1986), as it compels executives to manage cash flows efficiently to meet repayment obligations. Nevertheless, excessive debt creates interest burdens and increases bankruptcy risk, underscoring the board's crucial role in determining the appropriate debt to equity ratio for the firm's context.

Several studies have investigated this relationship. For instance, Anderson, Mansi, and Reeb (2004) found that firms with independent directors and strong audit committees had lower debt costs, suggesting that board quality facilitated access to debt at an optimal capital structure and positively influenced performance. Similarly, Abor (2005) found that while short-term debt had a positive effect on firm profitability in emerging markets, long-term debt had a negative effect, highlighting the importance of balancing the structure of debt. Supporting this, Gill, Biger, and Mathur (2011) examined North American firms and reported consistent results.

From trade-off theory (Kraus & Litzenberger, 1973), it indicated that an optimal level of debt can increase the firm value by taking advantage of text-deductible interest, but highly excessive debt can increase the bankruptcy risk. It is the duty of board to determine the level of debt balancing between the benefit and risk (Govindan et al., 2023; Palmieri et al., 2025). From resource dependence theory (Pfeffer & Salancik, 1978), it demonstrated that the diversity of board and the connection with financial institutions will help firm access to capital at low cost resulting in a positive impact on performance. From a literature review and previous studies, Hypothesis 3 was formulated.

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H_3*:* Board structure has an impact on performance through the firm debt burden

From the study of concepts, theories and related research, it leads to the research conceptual framework as shown in Figure 1.

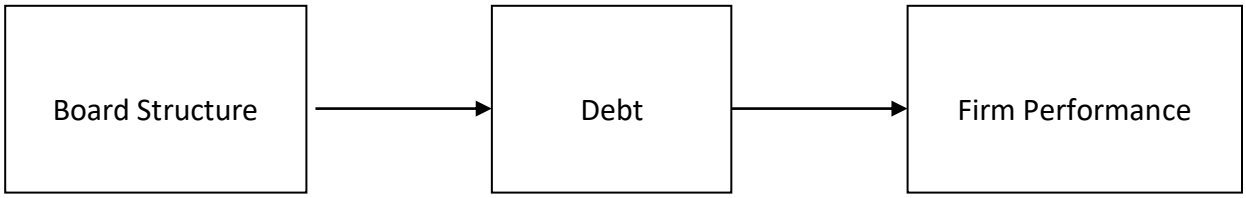

Figure 1: *Research Conceptual Framework*

3. Method

3.1 Population and sample

The population of this study comprises listed companies in the Stock Exchange of Thailand (SET), categorized into eight industrial sectors which are Agro & Food Industry, Consumer Products, Financials, Industrials, Property and Construction, Resources, Services, and Technology. Data were collected from 2020 to 2024, representing a five-year period. Purposive sampling was employed to meet the research objectives and test the hypotheses.

3.2 Data Collection

The population of this study consists of companies listed on the Stock Exchange of Thailand (SET). Firms in the financial sector and property funds were excluded because their accounting practices differ from other industries and they are regulated by the central bank and other governmental authorities (Arora, 2024; Garcia-Ramos, 2021). Companies subject to possible delisting or undergoing business rehabilitation were also excluded, as their financial status and performance do not meet SET requirements (Silpachai, 2024). In addition, firms listed on the SET for less than five years were omitted, since this study employed a five-year retrospective dataset (2020–2024), consistent with prior studies emphasizing sample stability (Miao, 2023; Yip & Pang, 2023). After applying these criteria, the final sample comprised 156 firms, yielding 780 firm-year observations.

3.3 Data Analysis

In this study employed quantitative analysis using AMOS (Analysis of Moment Structure) and SPSS (Statistical Package for the Social Sciences) as analytical tools. The analysis included descriptive and inferential statistics. The study comprised two main parts: 1) preliminary analysis of the variables, and 2) testing of initial assumptions and path analysis. The details are as follows.

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1. Preliminary Analysis of the Variables

The preliminary analysis of the variables was conducted to explain general information, examine missing data, and summarize the characteristics of the variables.

2. Analysis for Testing Initial Assumptions and Path Analysis

The analysis for testing initial assumptions and conducting path analysis is detailed as follows.

2.1 Normality test was conducted from the sample to determine whether it followed a normal distribution. To do so, skewness and kurtosis values were assessed, with acceptable thresholds set at a skewness coefficient within ±3 and a kurtosis coefficient within ±10 (Kline, 2015). If any variable was found to deviate from normal distribution, a logarithmic transformation was applied to normalize the data (Hair et al., 2010).

2.2 The correlations among observed variables were assessed to identify potential multicollinearity. Pearson correlation coefficients were examined, and correlations exceeding ±0.75 were considered indicative of high intercorrelation among independent variables. Moreover, tolerance values and variance inflation factor (VIF) values were above 1.00 and 5.00, respectively. These were regarded as signs of multicollinearity (Hair et al., 2010). In such cases, only one variable would be retained for further analysis.

2.3 After testing the preliminary assumptions, path analysis was conducted to examine the consistency of the structural model with the empirical data. This analysis was conducted to explain both the direct and indirect correlation of independent variables on the dependent variable, as well as the direction and magnitude of these effects (Hair et al., 2010). The overall model consistency was then evaluated using Goodness of Fit indices, as presented in Table 1.

Table 1: Criteria for evaluating Goodness of Fit indices

Goodness-of-Fit index	**Criterion**
P-value	$p > 0.05$
χ^2/df	< 5.00
CFI	> 0.90
GFI	> 0.90
NFI	> 0.90
RMSEA	< 0.05

Source: Hair et al. (2010)

4. Result

In the study on the path analysis of board structure and debt on the performance of listed companies in the Stock Exchange of Thailand, quantitative analysis was employed as the analytical approach including descriptive statistics and inferential statistics. The research findings are presented as follows:

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4.1 Preliminary Data Analysis

The preliminary data analysis consisted of the calculation of standard deviation (SD), skewness, and kurtosis, as shown in Table 2.

Table 2: Results of Descriptive Statistics Analysis

Variables	N	Mean	SD	Skewness	Kurtosis
BS	780	41.55	9.27	1.14	1.23
DE	780	37.53	15.76	-0.26	-0.62
FP	780	7.30	7.41	-0.39	6.24

Note: BS = Board Structure, DE = Debt to equity, and FP = Firm Performance

According to Table 2 the results obtained from descriptive statistics analysis was conducted on a total of 780 samples. It revealed that the Board Structure (BS) had a mean of 41.55 with a standard deviation of 9.27. The Debt-to-Equity ratio (DE) had a mean of 37.53 with a standard deviation of 15.76, while the Firm Performance (FP) had a mean of 7.30 with a standard deviation of 7.41. Moreover, the normality of the data distribution was tested. The skewness coefficient ranged from –0.39 to 1.14, which did not exceed the threshold of ±3, and the kurtosis coefficient ranged from –0.62 to 6.24, which did not exceed the threshold of ±10. These results indicated that the data followed a normal distribution (Brown, 2015; Kline, 2015). Pearson correlation coefficients

Table 3: Pearson's Correlation Analysis, Tolerance, and VIF

Variables	BS	DE	ROA	Tolerance	VIF
BS	1			0.994	1.022
DE	-0.148**	1		0.986	1.134
ROA	0.00	0.08	1	0.978	1.012

Note: BS = Board Structure, DE = Debt to equity, and FP = Firm Performance

According to Table 3, Pearson's Correlation Analysis was conducted to examine the linear correlation among independent variables. The findings indicated that Board Structure (BS), Debt to equity (DE), and Firm Performance (FP) have correlation coefficients ranging from -0.148 to 0.08. The Tolerance values ranged from 0.978 to 0.994, while the VIF (Variance Inflation Factor) values ranged from 1.012 to 1.134. Since the Tolerance values are greater than 0.1 and the VIF values do not exceed 10, it can be concluded that multicollinearity is not a concern among the independent variables (James et al., 2017; Soewigyno, 2020).

4.2 Results of Path Analysis

Path Analysis is a statistical technique used to examine causal relationship among variables as shown in Table 4.

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Table 4: Direct, Indirect, Total Effects

	BS			DE		
	DE	**IE**	**TE**	**DE**	**IE**	**TE**
DE	-0.148	-	-0.148	-	-	-
FP	-	-0.021	-	0.177	-	0.177

Note: BS = Board Structure, DE = Debt to equity, and FP = Firm Performance
DE = Direct Effect, IE = Indirect Effect, and TE = Total Effect
Source: AMOS Program

According to Table 4, the analysis was conducted to examine the magnitudes of effects among the variables. The findings showed that the path from Board Structure (BS) had a negative direct effect on the company's Debt-to-Equity ratio (DE), with a coefficient of -0.148. This indicated that board structure significantly reduced the level of capital structure, consistent with the notion that a strong board and effective corporate governance may encourage firms to be more cautious in debt repayment. In addition, the company's debt-to-equity ratio (DE) had a positive direct effect on firm performance (FP), with a coefficient of 0.177, suggesting that an appropriate level of debt repayment can enhance the firm's return. Furthermore, the results showed that board structure indirectly affects firm performance through the firm's debt, with a coefficient of –0.021. This demonstrated that board structure has a negative indirect effect on firm performance via debt management, implying that if the board structure reduces debt excessively, it may constrain the firm's financial resource utilization and negatively impact performance. Overall, the results confirmed that the empirical data align well with the model, as shown in Table 5.

Table 5: The Consistency of the Structural Model with the Empirical Data

Statistics	**Criterion**	**Obtained Value**	**Result**
P-value	> 0.05	0.827	Accepted
χ^2/df	< 5.0	0.048	Accepted
CFI	> 0.9	1.000	Accepted
GFI	> 0.9	0.982	Accepted
NFI	> 0.9	0.998	Accepted
RMSEA	< 0.05	0.012	Accepted

5. Conclusion and Implications

Path analysis was conducted to examine board structure on firm performance of listed companies in the Stock Exchange of Thailand during 2020–2024, a total of five years. Statistical data were collected, including board structure (BS), debt to equity ratio (DE), and firm performance (FP). The data distribution was examined using skewness and kurtosis tests, which indicated that all variables were normally distributed. Correlations between variables were tested using Pearson Correlation Analysis, together with tolerance and Variance Inflation Factor (VIF) tests, showing that multicollinearity is not a concern among the variables. Path analysis results revealed that corporate governance through board structure (BS) is a critical factor influencing financial decisions and firm performance. A large number of empirical research provides evidence that the

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proportion of independent directors, the strength, and expertise of the board can determine debt repayment and capital policy (Omenihu, 2025; Singh et al., 2025). Board structure (BS) had a direct negative effect on the firm's debt to equity ratio (DE), demonstrating that stronger boards encourage companies to pursue more cautious financial strategies and reduce reliance on debt. This finding is consistent with Agency Theory stating that boards act to monitor and protect shareholder interests by limiting financial risk (Byrd, 2005; Bathula, 2008; Shakri, 2025).

Regarding the debt-to-equity ratio (DE), the results showed a direct positive effect on firm performance (FP), consistent with Trade-off Theory, stating that moderate repayment of debt enhances financial efficiency by exploiting tax shields and imposing discipline on the board to use resources more efficiently (Kraus & Litzenberger, 1973; Sattar et al., 2022; Ahmed et al., 2024). In many countries, studies in emerging markets also indicated that the relationship between capital structure and firm performance is positive, and in some cases bidirectional (Akinlo & Asaolu, 2012; Ronoowah, 2022; Priyan, 2024). Furthermore, board structure was found to have an indirect negative effect on firm performance through debt-to-equity ratio, suggesting that overly strict boards that reduce debt repayment excessively may cause firms to lose investment opportunities and lower their ability to generate returns (Coles et al., 2008; Omole & Ayodeji, 2024). This highlighted the importance of balancing capital structure decisions (Chang, 2025). This can be concluded that strong board structures help control risk and limit unnecessary debt. If boards are excessively strict, however, companies may fail to utilize debt as financial leverage to enhance returns. Therefore, firms should prioritize setting an appropriate target debt-to-equity ratio (DE) and building board diversity in terms of expertise, experience, and perspectives to balance risk control with value creation.

6. Limitations and Suggestions for Future Research

6.1 Implications

Strong board structures help control risks and reduce debt to equity ratios, but excessive strictness may negatively affect firm performance.

6.2 Suggestions

Specific characteristics of boards should be examined in more detail, such as the number of independent directors, financial expertise, gender, and tenure, and their impact on debt repayment and firm performance. Furthermore, cross-country comparisons could be conducted to obtain more comprehensive conclusions.

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