THE EFFECT OF GENDER DIVERSITY, FIRM SIZE, AND LEVERAGE ON PERFORMANCE AND GOVERNANCE IN TELECOM SECTOR COMPANIES

Nurhadiansjah [*], Mansur [**]

[**] *Corresponding author*, Faculty of Economics and Business, Mulawarman University, Samarinda, Indonesia
Contact detail: Faculty of Economics and Business, Mulawarman University, Samarinda 75119, Indonesia
** Regional Research and Innovation Agency of East Kutai, Sangatta, Indonesia

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Abstract

This study aims to determine the effect of gender diversity, firm size, and leverage on firm performance and governance in telecommunications sector companies listed on the Indonesia Stock Exchange (IDX) during the 2018–2023 period. This study uses a quantitative approach with data sources derived from secondary data in the form of the company's annual financial statements obtained from the official IDX website. The study population included 21 telecommunication sector companies, and through the purposive sampling technique, 18 companies were obtained as samples that met the research criteria. Data analysis was carried out using the panel data regression method to identify the effect of independent variables on company performance. The results showed that gender diversity has a negative, but insignificant effect on firm performance. Firm size contributes positively, also insignificant to firm performance. In contrast, leverage is shown to have a negative and significant influence on firm performance. These findings indicate that financial structure and gender composition in the firm have not had a significant impact on firm performance in the telecommunications sector, while high leverage tends to potentially reduce firm performance. This study provides practical implications for corporate managers, policymakers, and investors.

Keywords: Firm Performance, Gender Diversity, Firm Size, Leverage, Telecommunication Sector

Authors' individual contribution: Conceptualization — N.; Methodology — N.; Formal Analysis — N.; Investigation — N.; Resources — N.; Writing — Original Draft — N.; Writing — Review & Editing — N.; Funding Acquisition — M.

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1. INTRODUCTION

Over the past few decades, the global business sector has witnessed substantial growth in the number of companies operating across different industries. According to the annual growth in the number of companies worldwide from 2001–2021 report, global company growth showed a steady trend, with an increase of 1.59% in 2021, after a slight decrease of 0.21% in 2020 (Dyvik, 2024). This increase reflects

intensifying competition, where companies must innovate, improve efficiency, and maintain product and service quality to maintain relevance and competitiveness in an increasingly dynamic global market (Organisation for Economic Co-operation and Development [OECD], 2023; D'Aveni & Gunther, 1994; Gereffi, 2015).

In Indonesia, the telecommunications industry plays a vital role in digital transformation and contributes significantly to the national economy. For example, Telkom Indonesia (Persero) Tbk recorded significant growth in 2022, with consolidated revenue reaching IDR 147.31 trillion, an increase of 2.9% year-over-year, and net profit rising 7.7%. This success is supported by the innovative "Five Bold Moves" strategy that aims to create added value, while supporting the company's sustainable growth (Telkom Indonesia, 2023). However, company performance in this sector is not only influenced by external factors, such as regulation and technology, but also by internal factors, including gender diversity, firm size, and leverage (Alotaibi & Al-Dubai, 2024; Lien & Thuy, 2024; Shaban & Al Hawatmah, 2024; Hidayah et al., 2022).

Several previous studies have explored firm performance, but there is a gap in understanding how the combination of gender diversity, firm size, and leverage affects firm performance, particularly in the Indonesian telecommunications sector. Previous research examining the relationship between these factors tends to produce inconsistent findings, leaving room for more in-depth explanations. For example, studies by Liu et al. (2014), Charles et al. (2018), Duppati et al. (2019), Brahma et al. (2020), and Arora (2021) have shown that gender diversity on the board positively impacts company performance. They argue that gender diversity can improve decision-making dynamics, broaden strategic perspectives, and create a more inclusive work culture. In contrast, Ujunwa et al. (2012) and Chen et al. (2021) actually found a negative impact of gender diversity on company performance. According to them, differences in gender backgrounds can lead to internal conflicts or slow down the decision-making process, which has the potential to reduce company performance.

In addition, the results of research on firm size on performance also show mixed findings. Rahman and Yilun (2021), Bahri et al. (2022), and Khan and Mahmood (2023) concluded that larger companies tend to have competitive advantages related to the ability to access more resources, improve operational efficiency, and attract investor confidence. This in turn can have a positive impact on company performance. In contrast, Nguyen et al. (2021) show that larger company size can have a negative impact on performance. This is because large companies are often faced with higher operational complexity, excessive bureaucracy, and an inability to adapt quickly to market changes, which can limit company performance.

Similarly, the effect of leverage on firm performance is still a widely debated issue. Several studies, such as Yang et al. (2016), Danso et al. (2020), Ramlan (2020), Nguyen et al. (2021), and Bahri et al. (2022) show that high leverage tends to increase the company's financial risk, including bankruptcy risk and can reduce the company's financial flexibility in the face of changing market conditions. On the other hand, research by Iqbal and Usman (2018) and Khan and Mahmood (2023) shows that leverage can have a positive impact on firm performance under certain conditions. According to them, well-managed leverage can increase returns to shareholders due to the leveraging effect of using debt.

Many previous studies have explored these factors in a more general industry context or in other countries. However, this study offers a new perspective that is more focused on the telecommunications industry in Indonesia using the latest data from the period from 2018 to 2023. This research seeks to identify current trends that are relevant in the post-pandemic era, where economic and business dynamics have undergone significant changes. In addition, this study utilizes a more comprehensive analysis method to further examine the interplay between gender diversity, firm size, and leverage in influencing firm performance.

The telecommunications sector is one of the industries most affected by technological advances and changes in consumer behavior (Lin et al., 2018; Jawad, 2024; Muthivhi, 2022). As demands for business sustainability and gender inclusiveness increase, a deeper understanding of the impact of board gender diversity on firm performance is becoming increasingly important (Groupe Speciale Mobile Association [GSMA], 2015). This study also seeks to determine whether larger telecommunications companies have a competitive advantage over smaller companies, and how higher leverage affects the financial stability and performance of companies in this industry.

This study provides significant practical implications for corporate managers, policymakers, and investors in the telecommunications sector. For firms, the findings on gender diversity may motivate increased representation of women on boards to support improved performance. An understanding of firm size and leverage also provides strategic insights, especially in terms of expansion and debt management. For investors, the results of this study offer a new perspective to assess company performance based on internal factors that are not always visible in financial analysis. In addition, this research opens up opportunities for further studies and can serve as a basis for broader research, both at the regional and global levels so that it is academically relevant while making practical contributions to stakeholders in the telecommunications industry and the Indonesian business sector.

This research is organized into several sections. Section 2 introduces key concepts and examines relevant literature on the subject. Section 3 describes the research methodology, including content analysis and empirical investigation. Section 4 provides documentation and visualization of the research results. Section 5 offers a detailed discussion of the findings, emphasizing the study's novelty. Finally, Section 6 provides conclusions, along with discussions on limitations and recommendations for future research.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Agency theory

Agency theory was first introduced by Jensen and Meckling (1976), discussing the relationship between the principal (owner or shareholder) and the agent (manager), where the agent acts on behalf of

the principal in making delegated decisions. This theory arises in response to two main problems in the relationship, namely the existence of information asymmetry and conflicts of interest caused by differences in objectives between the principal and the agent (Eisenhardt, 1989). The separation of ownership and control, especially in large companies, exacerbates this conflict and generates agency costs that need to be managed to improve company performance (Amin et al., 2022). Agency costs occur when the agent's actions deviate from the principal's best interests, so a mechanism is needed to align the objectives of both parties.

One approach implemented is promoting gender diversity within the board of directors. Studies indicate that the inclusion of women on the board can help mitigate opportunistic behavior and enhance awareness of ethical issues, thereby reducing the likelihood of excessive risk-taking (Cumming et al., 2015; Jensen, 1993; Krishnan & Parsons, 2008). In addition, financial leverage is often considered an effective governance tool to handle conflicts between shareholders and managers (Jensen & Meckling, 1976). In large firms, agency problems are more prominent because the separation between ownership and control is clearer than in small firms (Berger & Udell, 1998). Therefore, agency theory remains an important framework for understanding and managing conflicts of interest in corporate governance.

2.2. Pecking order theory

The pecking order theory, proposed by Myers and Majluf (1984), explains how firms rank preferences of funding sources for investment. Companies tend to prefer to use internal funds, such as retained earnings, before turning to external funding. If internal funds are insufficient, debt will be considered first, with equity issuance as the last option. This order arises because internal funding avoids dependence on external parties, maintains financial autonomy, and minimizes the risk of sensitive information leakage (Nguyen & Nguyen, 2020). The theory also highlights the negative relationship between capital structure and firm value, where excessive leverage may increase the risk of bankruptcy due to financial liabilities (Altman, 1984). Thus, the pecking order theory emphasizes the importance of balance in funding decisions to minimize risk and maintain firm stability.

2.3. Signalling theory

Signalling theory, introduced by Spence (1973), explains how internal parties send useful signals to external parties to reduce information asymmetry between company managers and stakeholders. Companies provide financial reports to external parties, such as investors and creditors to reduce uncertainty about the company's future prospects (Meiryani et al., 2020). By disclosing positive and reliable information, companies try to provide positive signals to the market and stakeholders.

One of the signals used is leverage. High debt levels can indicate greater risk and potentially be an indication of poor performance due to dependence on external capital (Lestari et al., 2022). In addition, company size, which is seen from total assets, also serves as a performance indicator. Larger firms generally have greater access to both internal and external funding, enabling them to convey positive signals to investors regarding their financial stability and performance (Bchini, 2015). Thus, signaling theory helps explain how companies use financial information to influence external views and increase market confidence.

2.4. The effect of gender diversity on firm performance

Based on various studies, gender diversity on the board can improve corporate governance and performance. Dalton and Dalton (2010) state that the presence of women on the board encourages more effective communication between the board and shareholders so as to mitigate agency problems in accordance with agency theory. Adams and Ferreira (2009), Chen et al. (2016), and Gul et al. (2011) emphasize that such measures can improve corporate governance by demanding better information disclosure and more effective monitoring practices. Jurkus et al. (2011) found that gender diversity can reduce agency costs, especially in the context of less competitive markets without strong external governance.

Empirical studies by Campbell and Minguez-Vera (2008), Menicucci et al. (2019), Song et al. (2020), Brahma et al. (2020), Pucheta-Martínez and Gallego-Álvarez (2020), and Arora (2021) support the view that gender diversity on boards contributes to innovation, creativity, and more diverse problem-solving methods, as well as enhances supervisory effectiveness. However, Adams and Ferreira (2009), Wellalage and Locke (2013), and Chen et al. (2021) offer a contrary view, that excessive oversight and increased agency costs can be detrimental to firm performance, especially in the context of firms with strong governance.

H1: Gender diversity has a positive effect on firm performance.

2.5. The effect of firm size on firm performance

Company size is one of the important factors affecting company performance. Large companies generally have more assets, revenue, and tax management capabilities, which can directly increase profitability and performance (Oyelade, 2019). Larger companies also tend to pay larger dividends, provide positive signals to investors regarding the company's financial condition (Ross, 1977), and reduce excess cash that can trigger agency problems (Jensen & Meckling, 1976).

Empirical research by Pervan and Višić (2012), Hashmi et al. (2020), Rahman and Yilun (2021), Bahri et al. (2022), and Khan and Mahmood (2023) indicate that larger firms tend to achieve higher performance due to improved asset efficiency and stronger market influence. However, some studies such as Meiryani et al. (2020) and Nguyen et al. (2021) show that firm size has a negative influence or no significant effect on performance. Overall, firm size has an important influence on performance, although the strength of this relationship may vary depending on external market conditions and internal management practices.

H2: Firm size has a positive effect on firm performance.

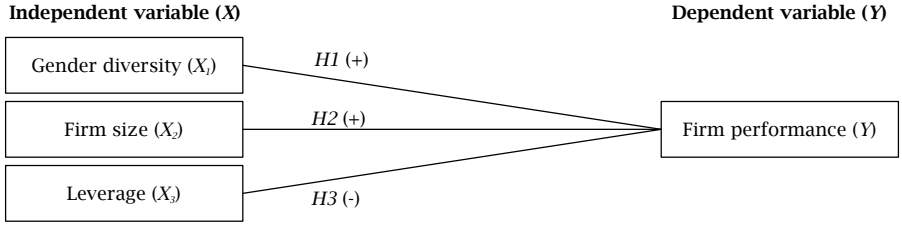
2.6. The effect of leverage on firm performance

Leverage, measured as the ratio between debt and internal capital, plays an important role in assessing the efficiency of a company's use of debt. Jensen and Meckling (1976) state that leverage can align the interests between managers and shareholders by potentially reducing agency costs from free cash flow and avoiding excessive risk-taking that can damage firm value (Jensen, 1986; Berger & di Patti, 2006). However, the pecking order theory states that firms with high profitability tend to use less debt (Myers & Majluf, 1984), given that debt can create a fixed financial burden and less flexibility for the firm (Yang et al., 2016).

Several empirical studies support the view that leverage can improve firm performance through stricter external (creditor) monitoring and encourage firms to invest in more profitable projects (Connelly et al., 2012; Iqbal & Usman, 2018; Khan & Mahmood, 2023). However, other studies show that high leverage is detrimental to profitability as debt costs and increased risks dominate, reducing the firm's focus on productivity improvements (Coricelli et al., 2012; Yang et al., 2016; Danso et al., 2020; Ramlan, 2020; Nguyen et al., 2021; Bahri et al., 2022; Lestari et al., 2022). High leverage can also increase risk for shareholders, making investors more cautious in investing. In general, leverage has a multifaceted impact on firm performance, exhibiting both positive and negative effects depending on the debt level and prevailing market conditions.

H3: Leverage has a negative effect on firm performance.

Figure 1. Research conceptual framework



Source: Authors' elaboration.

3. RESEARCH METHODOLOGY

This study utilizes two types of variables: dependent and independent. The dependent variable, *Firm performance*, represents the company's success in meeting its financial and operational goals. Meanwhile, the independent variables of *Gender diversity, Firm size*, and *Leverage* each contribute to shaping firm performance.

The research population consists of all telecommunications sector companies listed on the Indonesia Stock Exchange (IDX) during the 2018–2023 period, totaling 21 companies. The sample selection was conducted using a non-probability sampling method with the purposive sampling technique. This technique ensures that the selected samples meet predetermined criteria, making them relevant to the research objectives. Based on these criteria, 18 companies were selected as the research sample.

The type of data used in this study is quantitative data, which is sourced from secondary data. Data collection was carried out through the documentation method by accessing financial reports and annual reports of telecommunications sector companies published on the official website of the IDX (www.idx.co.id). The collected data include various financial and operational information necessary for measuring the research variables (Yudaruddin, 2014). The measurement of each variable and the equation used in the analysis will be presented in the following table.

Table 1. Variable measurement

Variable	*Indicator*	*References*
Firm performance (*Y*)	$ROA = \frac{Net\ profit}{Total\ assets}$	Liu et al. (2014)
Gender diversity (X_1)	$GD = \frac{Number\ of\ female\ directors}{Number\ of\ directors\ on\ the\ board}$	Chen et al. (2021)
Firm size (X_2)	$FS = Ln\ (Total\ assets)$	Hashmi et al. (2020)
Leverage (X_3)	$DAR = \frac{Total\ liabilities}{Total\ assets}$	Liu et al. (2014), Yang et al. (2016)

Source: Authors' elaboration.

Firm performance in this study is measured using return on assets (ROA), which is calculated as the ratio of net profit to total assets. ROA measures a company's efficiency in generating profits from its assets. This measurement refers to the study conducted by Liu et al. (2014).

Gender diversity in this study is measured using the ratio of the number of female directors to the total number of directors on the board. This indicator represents the level of female representation in corporate leadership, as proposed in the study by Chen et al. (2021).

Firm size is measured using the natural logarithm (*Ln*) of total assets. The use of the *Ln* aims to reduce the scale differences between companies, providing a more proportional representation of firm size. This approach is based on the study conducted by Hashmi et al. (2020).

Leverage is measured using the debt-to-asset ratio (DAR), which is calculated as the ratio of

total liabilities to total assets. This ratio indicates the extent to which a company finances its assets with debt, providing insights into the company's financial risk level. This measurement follows the studies by Liu et al. (2014) and Yang et al. (2016).

Data analysis in this study was conducted quantitatively using EViews software version 12 (EViews 12). The analysis process starts with descriptive statistics, which serve to present a general overview of the phenomena observed in telecommunications sector companies listed on the IDX from 2018 to 2023. These descriptive statistics include various financial and operational indicators used to understand the characteristics of the data before proceeding with further analysis.

In panel data regression analysis, three models are applied: the common-effect model (CEM), fixed-effect model (FEM), and random-effect model (REM). The best model selection is determined using the Chow test, which assesses whether the FEM is more appropriate than the CEM, and the Hausman test, which compares whether the FEM or REM better fits the dataset (Yudaruddin, 2021).

Before conducting hypothesis testing, this study also performs a series of classical assumption tests to ensure the validity of the regression model used. These tests include the multicollinearity test to detect high correlations among independent variables, the heteroscedasticity test to examine variance consistency in residuals, and the autocorrelation test to evaluate relationships between residuals in the regression model (Yudaruddin, 2021). By conducting these tests, the model is expected to produce estimates that are valid, reliable, and unbiased in measuring the relationships among the research variables.

The equation model used in this study refers to Yudaruddin (2014) which can be described as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + e \quad (1)$$

The model is then adjusted to the research context to become:

$$FP = \alpha + \beta_1 GD_{i,t} + \beta_2 FS_{i,t} + \beta_3 LEV_{i,t} + e_{i,t} \quad (2)$$

where,

- α — constant ;
- $\beta_1, \ldots \beta_3$ — coefficient;
- *FP* — firm performance;
- *GD* — gender diversity;
- *FS* — firm size;
- *LEV* — leverage;
- *e* — confounding variable;
- *i* — research object (company);
- *t* — research object period (annual).

4. RESULTS

The descriptive statistics in this study are used to provide an overview of the data, including the sample size, maximum and minimum values, median, mean, and standard deviation for each variable. There are four variables in this study, namely Firm performance (*Y, FP*), Gender diversity (X_1, *GD*), Firm size (X_2, *FS*), and Leverage (X_3, *LEV*).

Table 2. Descriptive statistics

Statistical analytics	*FP*	*GD*	*FS*	*LEV*
Mean	0.020978	0.087004	21.35725	0.537875
Median	0.020722	0.000000	18.92546	0.543284
Maximum	0.120735	0.666667	30.85840	0.902063
Minimum	-0.106780	0.000000	12.56738	0.081171
Std. dev.	0.058581	0.159237	5.855896	0.256244
Observations	108	108	108	108

Source: Authors' elaboration.

Based on the results presented in Table 2, the data set consists of 108 observations. The firm performance (*FP*) variable has a mean value of 0.020978, indicating that, on average, the sampled companies exhibit positive but relatively low performance. The maximum *FP* value of 0.120735 suggests that the most profitable companies have a good ROA, whereas the minimum *FP* value of -0.106780 signifies the presence of firms experiencing negative financial performance. Additionally, the standard deviation, which exceeds the mean, highlights a broad distribution of firm performance, reflecting significant variations across the sample.

For the gender diversity (*GD*) variable, the mean value of 0.087004 indicates that, on average, the proportion of female directors on corporate boards is relatively low. The median value of 0 suggests that most firms do not have female representation on their boards. However, the maximum *GD* value of 0.666667 signifies that some companies have a relatively high level of gender diversity, while the minimum value remains at 0, confirming that certain firms do not appoint any female directors. The standard deviation of 0.159237 reflects a substantial variation in gender diversity among the companies in the sample.

Regarding the firm size (*FS*) variable, the mean value of 21.35725 suggests that the average logarithm of total assets varies significantly among firms. The median value of 18.92546 implies that half of the firms have a size smaller than the overall average. The maximum *FS* value of 30.85840 reveals the presence of very large companies in the sample, whereas the minimum value of 12.56738 indicates the existence of smaller firms. The standard deviation of 5.855896 further confirms significant dispersion in firm size, demonstrating a wide gap between large and small firms.

Finally, for the leverage (*LEV*) variable, the mean value of 0.537875 suggests that, on average, companies in the sample finance approximately 53.7% of their assets through debt. The maximum *LEV* value of 0.902063 indicates that some firms operate with very high leverage, while the minimum value of 0.081171 shows that certain companies maintain a very low level of debt financing. The standard deviation of 0.256244 reflects considerable variability in leverage levels across different firms in the sample.

Overall, the descriptive statistics offer valuable insights into the dataset's distribution and characteristics, illustrating variations in firm performance, gender diversity, firm size, and leverage among telecommunications sector companies listed on the IDX from 2018 to 2023.

4.1. Model selection

This study uses panel data regression techniques to analyze the influence between the variables studied. In panel data regression, three model approaches are used to identify the most suitable model: the CEM, FEM, and REM. To determine the best-fitting model for the data, this study employs two model selection tests: the Chow test and the Hausman test.

Table 3. Chow test

Effects test	*Statistic*	*d.f.*	*Probability*
Cross-section F	7.579227	(17,87)	0.0000
Cross-section Chi-square	98.135390	17	0.0000

Note: Redundant fixed effects tests, test cross-section fixed effects.
Source: Authors' elaboration using Eviews 12.

Table 4. Hausman test

Test summary	*Chi-square statistic*	*Chi-square d.f.*	*Probability*
Cross-section random	0.466229	3	0.9262

Note: Correlated random effects — Hausman test, test cross-section random effects.
Source: Authors' elaboration using Eviews 12.

Based on the Chow test results obtained using EViews 12, the significance values for both the F-test and Chi-square are 0.0000, which is less than 0.05. This indicates that the baseline null hypothesis (H_0) is rejected, making the FEM preferable to the CEM. Following this, the Hausman test is conducted, as it is required when the Chow Test yields significant results. The Hausman test output shows that the probability value for cross-section random is 0.9262, which is greater than 0.05. Consequently, H_0 is accepted, indicating that the REM is the more appropriate model for this study compared to the FEM.

Table 5. Model fit analysis — R-squared comparison

Model summary	*R-squared*
FEM	0.654238
REM	0.088041

Source: Authors' elaboration using Eviews 12.

However, considering the low R-squared value in the REM model, researchers should choose to use the FEM. This is because the FEM model shows a higher R-squared value, which means that this model is able to obtain better estimates and more precise interpretations of the influence between the variables studied.

4.2. Classical assumption test

The classical assumption test in this study consists of three main tests: the multicollinearity test, the heteroscedasticity test, and the autocorrelation test. The multicollinearity test is conducted to assess whether there is a high or perfect correlation among the independent variables in the model. This study utilizes the variance inflation factor (VIF) as an indicator to detect multicollinearity.

Table 6. Multicollinearity test

Variable	*Coefficient Variance*	*Uncentered VIF*	*Centered VIF*
C	0.000687	24.49586	NA
GD	0.001334	1.555575	1.195382
FS	9.78E-07	17.08874	1.184586
LEV	0.000482	6.090103	1.118008

Source: Authors' elaboration using Eviews 12.

As shown in Table 6, there is no indication of correlation among the independent variables, as evidenced by the VIF values for gender diversity, firm size, and leverage, which are 1.195382, 1.184586, and 1.118008, respectively all below the threshold of 10. This confirms that the regression model in this study is free from multicollinearity issues.

Table 7. Heteroscedasticity test

Test	*Value*	*Probability*	
F-statistic	3.317403	Probability F (3,104)	0.0228
Obs. * R-squared	9.432364	Probability Chi-square (3)	0.0241
Scaled explained SS	7.169752	P probability Chi-square (3)	0.0667

Source: Authors' elaboration using Eviews 12.

The heteroscedasticity test is conducted to assess whether there is an unequal variance of residuals across observations in a regression model. In this study, the Breusch-Pagan-Godfrey test is employed to determine the presence of heteroscedasticity. Table 7 reveals the presence of a heteroscedasticity problem, indicated by the probability value of Obs. * R-squared < 0.05, which is 0.0241.

The autocorrelation test is a test used to determine the existence of a relationship between residuals on one observation and other observations in a regression model. This study uses the Durbin-Watson (DW) test as a tool to determine whether autocorrelation exists or not in the regression model used. Assessment of the presence of autocorrelation can be done by comparing the DW value to the DW table criteria, where if $d_u < DW < 4 - d_u$ indicates

that no autocorrelation occurs. In this context, a regression model is considered good if it does not experience autocorrelation so that the interpretation and prediction results are reliable.

Table 8. Autocorrelation test

Test	*Value*
DW stat	1.381901

Source: Authors' elaboration using Eviews 12.

Based on Table 8, it can be seen that the autocorrelation test results in a DW value of 1.381901. Based on the DW table criteria, this value is in the range $0 < DW\ 40 < d_L$, namely $0 < 1.381901 < 1.6297$, which indicates a positive autocorrelation in the regression model of this study.

4.3. Regression results and hypothesis testing

Based on the results of panel data regression analysis with the help of EViews 12, the following results are obtained:

Table 9. Panel data regression analysis output

Dependent variable	*Independent variable*	*Regression coefficient*	*T-statistic*	*Probability*	*Directions*	*Description*
FP	Constant	-0.020111	-0.096973	0.9230		
	GD	-0.037226	-0.798168	0.4269	(-)	Insignificant
	FS	0.004228	0.429657	0.6685	(+)	Insignificant
	LEV	-0.085450	-2.647289	0.0096	(-)	Significant
R-squared	0.654238					
Adj. R-squared	0.574752					
F-statistic	8.230891					
Prob(F-statistic)	0.000000					

Source: Authors' elaboration using Eviews 12.

In the FEM, the coefficient of determination (R-squared) is 0.654238, indicating that the independent variables gender diversity, firm size, and leverage account for 65.42% of the variation in the dependent variable, firm performance. The remaining 34.58% is influenced by other factors not included in this research model.

The results of the panel data regression test indicate an F-statistic value of 8.230891, with a prob (F-statistic) of 0.000000, which is less than 5% ($0.000000 < 0.05$). These results explain that the three independent variables, namely gender diversity, firm size, and leverage together or simultaneously have a significant influence on firm performance in telecommunications sector companies sampled by the IDX for the 2018–2023 period. Thus, this model is considered feasible to explain the effect of independent variables on firm performance.

In the T-test with a significance level of 5% (0.05), the results obtained, namely the gender diversity variable (X_1) has a T-statistic value of -0.798168 with a probability value of $0.4269 > 0.05$. This indicates that partially, this variable has no significant effect on firm performance. Firm size (X_2) variable has a T-statistic value of 0.429657 with a probability value of $0.6685 > 0.05$. This means that partially, the variable has an insignificant effect on firm performance. The leverage variable (X_3) has a T-statistic value of -2.647289 with a probability value of $0.0096 < 0.05$. This indicates that partially, this variable has a significant influence on firm performance.

Based on the regression test results in Table 9, the research equation model is obtained as follows below.

$$FP = -0.020111 - 0.037226\,GD + 0.004228\,FS - 0.085450\,LEV + e \quad (3)$$

5. DISCUSSION

5.1. The effect of gender diversity on firm performance

The results of this study indicate that gender diversity has a negative and insignificant effect on firm performance in telecommunications sector companies in Indonesia. This means that the higher the gender diversity on the board, the company's performance tends to decline. This finding contradicts both the initial hypothesis and previous research by Liu et al. (2014), Charles et al. (2018), Duppati et al. (2019), Brahma et al. (2020), and Arora (2021), which suggest that gender diversity positively influences company performance.

In theory, gender diversity on the board is considered capable of increasing innovation, creativity, and more effective supervision, as well as strengthening managerial control. The presence of women on the board is expected to strengthen independence and reduce agency conflicts. However, the results of this study suggest that in practice, gender diversity may not always have a positive impact. For example, Adams and Ferreira (2009) suggest that in companies with strong governance, gender quota policies can lead to excessive supervision, which ultimately reduces shareholder value. This is also in line with the findings of Wellalage and Locke (2013) who state that gender diversity can increase agency costs due to differences in views among board members, slow down the decision-making process, and reduce operational efficiency.

For example, the decline in performance at PT Inti Bangun Sejahtera Tbk, which decreased from 0.006 to 0.004 in the 2021–2022 period, coincided with an increase in gender diversity on the board. This shows that although theoretically, gender diversity has potential benefits, its improper or overly rigid implementation can have a negative impact. Therefore, telecommunication companies in Indonesia need to consider organizational structures and corporate cultures that support the effective integration of the diverse perspectives that gender diversity brings.

5.2. The effect of firm size on firm performance

This study also shows that firm size has a positive but insignificant influence on firm performance in telecommunication sector companies in Indonesia. Although the relationship is positive, where larger companies tend to have better performance, the weak significance level makes the initial hypothesis unacceptable. These findings align with the study by Bahri et al. (2022), which demonstrated that firm size significantly influences financial performance in the food and beverage sector. However, in the telecommunications sector, this effect is not significant.

In theory, company size as measured by total assets, usually reflects the company's ability to generate greater profits, which in turn can reflect good financial performance. Investors tend to respond positively to such signals, thus strengthening the value of the company in the market. In addition, large companies tend to provide larger dividends so that investors are able to receive positive signals regarding the company's financial stability (Ross, 1977). Pervan and Višić (2012) argue that large firms with higher asset efficiency can improve their performance. The market advantage possessed by large companies tends to offer higher prices and achieve greater profits. Similar results were also found by Hashmi et al. (2020), Rahman and Yilun (2021), and Khan and Mahmood (2023) which state that company size is positively related to performance.

However, the insignificant results in the telecommunications sector suggest that firm size may not play a dominant role in this industry. This variation supports the argument that the impact of firm size on performance differs significantly across sectors. In the telecommunications industry, companies should prioritize operational efficiency and asset optimization rather than merely expanding their size. Additionally, adopting a more effective leverage strategy and implementing an appropriate dividend policy can contribute to improved long-term performance.

5.3. The effect of leverage on firm performance

The findings indicate that leverage has a negative and significant impact on firm performance among telecommunications sector companies in Indonesia. This means that the higher the use of leverage, the greater the risk that can reduce company performance. This finding is in line with the hypothesis proposed and supports previous research by Yang et al. (2016), Danso et al. (2020), Ramlan (2020), Nguyen et al. (2021), and Bahri et al. (2022), who also found that leverage has a negative relationship with firm performance.

Theoretically, companies that have high profitability tend to avoid using excessive debt because they rely more on internal funding before turning to external funding sources (Myers & Majluf, 1984). High leverage can increase the risk of financial distress, where companies focus more on meeting debt obligations rather than increasing productivity and innovation. This, in turn, has a negative impact on the company's profitability (Coricelli et al., 2012). For example, the decline in performance of PT Bali Towerindo Sentra Tbk from 0.014 to 0.011 in the 2018–2019 period is in line with the increase in leverage.

Overall, telecommunication companies in Indonesia should be more careful in managing their capital structure. While debt can provide the benefit of additional funds for expansion, excessive use of leverage can reduce focus on growth and innovation strategies, which ultimately hurts the company's performance in the long run. Therefore, companies need to strike an optimal balance between the use of debt and equity to minimize risk while maximizing financial performance.

6. CONCLUSION

Based on the results of the analysis and discussion that has been done, it can be concluded that gender diversity, firm size, and leverage have a different impact on firm performance in the telecommunications sector in Indonesia. First, gender diversity has a negative and insignificant impact on firm performance, indicating that a higher level of gender diversity on the board does not necessarily enhance performance and may, in some cases, even lead to a decline. Second, firm size exhibits a positive but insignificant influence on firm performance. Although larger firm size tends to improve performance, in the telecommunications sector in Indonesia, this influence is not dominant. Third, leverage has a negative and significant influence on firm performance, which indicates that the higher the level of corporate debt, the greater the risk of a decline in corporate performance.

Overall, these results reveal that factors such as gender diversity and firm size need to be managed carefully, especially in the context of different industries. While previous theories suggest that gender diversity and firm size should be positively related to firm performance, the results of this study suggest that the application of these concepts may not always be as expected, particularly in the telecommunications sector. Meanwhile, the excessive use of leverage has been shown to be detrimental to firm performance.

While this research provides valuable insights into the telecommunications sector in Indonesia, there are some limitations. First, the focus on gender diversity and its impact on board effectiveness is limited to the complexity of organizational culture and structural support mechanisms, which have not been fully addressed in this analysis. Future research may benefit from a more in-depth exploration of these support factors to more accurately assess the influence of gender diversity in the decision-making process.

Secondly, while asset efficiency and firm size have been analyzed in relation to performance, this study does not consider external market dynamics and technological developments, which are highly influential in the fast-growing telecommunications sector. This limits the generalizability of the findings, as such external factors may affect the optimal balance between asset efficiency and firm scale.

Third, the discussion on leverage and financial risk does not include detailed industry-specific economic conditions, such as interest rate fluctuations or differences in access to capital, which may impact the effectiveness of leverage strategies. This limitation suggests that future research needs to include a broader economic context to improve understanding of the optimal funding structure in this sector.

Lastly, while recommendations for further research covering more variables and various

industries are essential to gain a broader understanding, the scope of this study remains limited to a specific sector focus and a limited number of variables. Therefore, while these findings provide a basic understanding, further research across different industries and with additional variables is needed to strengthen these insights and increase the robustness of the conclusions obtained.

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