Dividend Policy Determinants of Companies Listed on the Egyptian Exchange in Terms of Firm Size and Industry Type

محددات سياسة توزيع الأرباح للشركات المقيدة بالبورصة المصرية من خلال حجم الشركة ونوع الصناعة

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Abstract:

This paper aims at investigating the factors affecting the dividend policy, with firm size and industry type as variables of companies listed on the Egyptian Exchange, as applied on a sample of 48 companies across five sectors, according to the nature of each of these sectors in terms of type of industry, as follows: food, beverages and tobacco sector, manufacturing sector, health care & pharmaceuticals sector, real estate sector, and services sector over the period of from 2019 to 2023 using panel regression models. The findings reveal that return on assets (RoA) has a weak positive correlation with dividend payouts, while return on equity (RoE) significantly negatively impacts dividends, indicating a preference for reinvestment. The debt-to-equity ratio (DER) also negatively affects dividends due to higher leverage, whereas the debt-to-assets ratio (DAR) positively influences payouts through effective debt management. Current and quick ratios showed no significant effects but were positively correlated. Firm activity is positively linked to higher dividends, and industry-type matters, with the healthcare sector providing the highest dividends, compared to the lower payouts in real estate. Firm size had no significant effect on dividends but

correlated moderately with RoE and DER. These findings enhance the understanding of the relationships between firm-specific factors and dividend policies in a developing market context.

Keywords: dividend policy – profitability – liquidity – leverage – activity – firm size – industry type – current ratio – quick ratio.

ملخص البحث:

يهدف هذا البحث إلى دراسة العوامل المؤثرة على سياسة توزيع الأرباح، مع حجم الشركة ونوع الصناعة كمتغيرات تحكم للشركات المدرجة في البورصة المصرية، كما تم تطبيقها على عينة من ٤٨ شركة عبر خمس قطاعات، وفقًا لطبيعة كل من هذه القطاعات من حيث نوع الصناعة، على النحو التالي: قطاع الأغذية والمشروبات والتبغ، قطاع التصنيع، قطاع الرعاية الصحية والأدوية، قطاع العقارات، وقطاع الخدمات خلال الفترة من ٢٠١٩ إلى ٢٠٢٣ باستخدام نماذج الانحدار. تكشف النتائج أن العائد على الأصول (RoA) له ارتباط إيجابي ضعيف بتوزيعات الأرباح، في حين يؤثر العائد على حقوق الملكية (RoE) سلبًا بشكل كبير على توزيعات الأرباح، مما يشير إلى تفضيل إعادة الاستثمار. كما تؤثر نسبة الدين إلى حقوق الملكية (DER) سلبًا على توزيعات الأرباح بسبب ارتفاع الرافعة المالية، في حين تؤثر نسبة الدين إلى الأصول (DAR) بشكل إيجابي على السداد من خلال إدارة الديون الفعالة. ولم تظهر النسب السيولة ونسب السيولة السريعة أي تأثيرات كبيرة ولكنها كانت مرتبطة بشكل إيجابي. يرتبط نشاط الشركة بشكل إيجابي بارتفاع توزيعات الأرباح، كما أن نوع الصناعة مهم، حيث يقدم قطاع الرعاية الصحية أعلى توزيعات للأرباح، مقارنة بالعقارات. لم يكن لحجم الشركة أي تأثير كبير على توزيعات الأرباح ولكنه ارتبط بشكل معتدل بعائد حقوق الملكية ونسبة الديون إلى حقوق الملكية. تعزز هذه النتائج فهم العلاقات بين العوامل الخاصة بالشركة وسياسات توزيع الأرباح في سياق السوق النامية.

الكلمات الافتتاحية:

توزيعات الأرباح – السيولة – النشاط – الديون – العائد على الأصول – العائد على حقوق الملكية – حجم الشركة – نوع الصناعة.

Introduction:

In corporate finance, dividend policy decisions are particularly complex, as managers must balance the needs for investment and growth against the desire to distribute profits to shareholders (Auliarrahman, & Pinem, 2024) Ultimately, the goal should be to adopt a dividend policy that best serves the interests of the firm's owners - the shareholders (Zahid, et. al., 2023). Dividend policy remains an active area of research in corporate finance, as scholars continue to explore the factors that influence this important strategic decision. It is a crucial financial decision with wide-ranging implications for the company and its investors. The fundamental question that naturally emerges is what exactly dividend policy entails and what crucial decisions need to be made regarding it.

Dividend policy refers to a firm's strategic approach to balancing the need to retain earnings for investment and growth purposes versus the distribution of cash dividends to its shareholders (Omerhodžić, 2014). It represents a portion of the profits of the company that are distributed to its shareholders in proportion to their investment in the firm (Hussain, & Akbar, 2022).

Leverage reflects a company's debt level relative to its equity, potentially affecting its ability to distribute dividends. Profitability, as a critical indicator of financial performance, often determines the sustainability of dividend distributions. (Kathuo et al., 2020). Similarly, liquidity, which measures a company's capacity to meet short-term obligations, may influence the funds available for dividend payments (Stereńczak, & Kubiak, 2022).

Activity ratios offer insights into a firm's operational efficiency and the effectiveness of its asset utilization, which measures activity levels of the company that may significantly influence its capacity to generate cash flows and, consequently, its ability to distribute dividends to shareholders (Arsyad, et. al., 2021).

As for firm size, it should be noted that larger firms may possess different characteristics and financial flexibility

compared to smaller counterparts, while the industry in which a firm operates can influence its investment and financing needs, and consequently, its dividend decisions. By examining these dynamics, this research aims to investigate the determinants of dividend policy in Egyptian listed companies (Kılınçarslan, 2018).

In brief, this study tries to answer the following main questions:

• Does financial performance affect the dividend policy of Egyptian listed companies?

• How does firm size influence the effect of financial performance on the dividend policies of firms listed in Egypt?

• How does industry type influence the effect of financial performance on the dividend policies of firms listed in Egypt?

1. Literature Review:

Dividend policy has been a central focus of corporate finance research for decades, attracting considerable attention from researchers. Early studies established foundational insights into how firms determine dividend distributions and their relationship with shareholder value. As the field has progressed, more complex factors such as leverage, profitability, and liquidity have come into play, prompting deeper investigations. Despite the valuable contributions of classical theories, gaps remain in reconciling these perspectives with contemporary empirical findings, particularly in emerging markets like Egypt.

In recent years, the literature on dividend policy has shifted its focus to examining specific firm-level factors. The following sections will explore the specific effects of leverage, profitability, and liquidity on dividend payout ratios, highlighting key findings, methodological approaches, as well as areas of agreement and disagreement within the existing literature. The goal of this review is to identify gaps in current understanding and suggest directions for future research in this critical area of corporate financial decision-making.

A. The Effect of Liquidity on Dividend Policy:

The relationship between a firm's liquidity and its dividend policy has been widely studied in the field of corporate finance. Several researchers have examined this issue, with varying findings.

Banerjee (2016) analyzed the effect of liquidity on dividend payment decisions of the top 4 information technology (IT) companies in India over a 5-year period. The findings indicated that liquidity had no significant influence on the dividend payout ratio (DPR) of these firms.

Several other studies have also found no significant relationship between liquidity and dividend policy. Simorangkir (2020), Sulhan and Herliana (2019), Susetyo et al. (2023), and Angela and Daryanti (2023), all examined samples of manufacturing firms in Indonesia and concluded that liquidity, measured by ratios like current ratio and quick ratio, did not affect the DPR.

Similarly, Sugianto and Maran (2022) investigated the primary consumer goods sector in Indonesia and found that liquidity did not have a significant impact on dividend policy.

However, some studies have reported a positive association between liquidity and dividend payouts. Susilo (2023) examined index companies listed on the Indonesia Stock Exchange and found that liquidity had a positive and significant effect on dividend policy. Bai et al. (2024) and Farooq et al. (2024) also documented a positive relationship between stock market liquidity/firm-specific liquidity and dividend payout ratios in Chinese and Pakistani firms, respectively.

Conversely, Pattiruhu and Paais (2020) and Wahjudi (2020) found a negative relationship between liquidity and dividend policy in real estate and manufacturing companies in Indonesia.

In summary, the existing literature presents a mixed picture on the role of liquidity in shaping a firm's dividend policy.

While some studies have found a positive influence, others have reported no significant relationship or even a negative association. These conflicting findings highlight the need for further research, especially in the context of emerging markets like India and Indonesia, to better understand the complex dynamics between a firm's liquidity and its dividend payout decisions.

B. The Effect of Leverage on Dividend Policy:

The relationship between a firm's financial leverage and its dividend policy has been an area of significant research interest. Several studies have examined this connection; some studies have found a positive relationship between leverage and dividend policy. Banerjee (2016) analyzed the top 4 IT companies in India and found that firms with higher leverage tend to have higher dividend payout ratios. Similarly, Simorangkir (2020) examined 24 manufacturing firms in Indonesia and reported that the debt-to-equity ratio has a positive and significant effect on dividend policy. Adiputra (2021) and Chindengwike (2024) also found a significant positive influence of financial leverage on dividend payouts in their respective samples of manufacturing firms in Indonesia and Tanzania.

In contrast, other studies have documented a negative relationship between leverage and dividends. Hanifah et al. (2024) and Al-Sabah (2015) reported that leverage has a negative and significant effect on dividend policy in their samples of firms in Indonesia and Kuwait, respectively. Kathuo et al. (2020), Susilo (2023), and Basri (2019) also found that financial leverage has a negative impact on dividend payout ratios.

Some studies, however, found no significant relationship between leverage and dividends. Angela and Daryanti (2023) and Farooq et al. (2024) examined manufacturing firms in Indonesia and Pakistan, respectively, and concluded that leverage does not affect dividend policy. Surya and Malinda (2024) also found that leverage has no direct effect on dividend policy in their sample of Indonesian firms.

The mixed findings in the literature suggest that the relationship between leverage and dividend policy may be context-dependent and influenced by other firm-specific factors. For instance, El-Sayed, & Hammam, (2023) found a positive relationship between leverage and dividends in real estate, property, and construction companies in Egypt, while Jadiyappa and Kakani (2023) reported a negative effect of leverage on dividends.

In summary, the extant literature presents a nuanced picture of the leverage-dividend policy nexus; with some studies indicating a positive relationship, others a negative relationship, and a few finding no significant association. The inconsistent findings highlight the need for further research to better understand the complex dynamics between a firm's capital structure and its dividend decisions.

C. The Effect of Profitability on Dividend Policy:

The relationship between profitability and dividend policy has been widely studied in the field of corporate finance. The studies provided present a mixed picture on this relationship, with some finding a positive and significant impact, while others report a negative or insignificant effect.

Most of the studies found a positive and significant relationship between profitability and dividend policy. For instance, Banerjee (2016), Simorangkir (2020), Sulhan and Herliana (2019), Hanifah et al. (2024), Susilo (2023), and Januarsi and Sanusi (2024) all reported that higher profitability, measured by metrics such as ROE, ROA, and EPS, led to higher dividend payouts. These findings suggest that more profitable firms have greater financial capacity to distribute dividends to their shareholders.

However, a few studies have observed a contrasting relationship. Susetyo et al. (2023) found a significant negative effect of profitability (ROE) on dividend payout ratio. Similarly, Barus (2021) reported a significant negative impact of profitability (net profit margin) on dividend payments. These studies indicate that highly profitable firms may prioritize

reinvesting their earnings for growth and expansion over distributing dividends.

Adding to the mixed findings, some studies found no significant relationship between profitability and dividend policy. Adiputra (2021) and Auliarrahman and Pinem (2024) concluded that profitability was not a key determinant of dividend distribution decisions. This suggests that other firm-specific factors, such as liquidity, leverage, or growth opportunities, may play a more important role in shaping dividend policies.

Interestingly, a few studies examined the relationship in specific industry contexts. Kilincarslan and Demiralay (2021) focused on the travel and leisure industry in the UK and found a significant positive impact of profitability on dividend payments. El-Sayed, & Hammam, (2023) studied real estate, property, and construction companies in Egypt and also reported a positive relationship between profitability and dividend policy.

Overall, the literature presents a mixed picture on the profitability-dividend policy nexus, with some studies supporting a positive relationship, others finding a negative association, and a few reporting an insignificant effect. The inconsistencies may be attributed to differences in sample selection, industry focus, time periods, and methodological approaches. Further research is needed to reconcile these divergent findings and provide a more comprehensive understanding of the factors influencing corporate dividend decisions.

D. The Effect of Activity on Dividend Policy:

The effect of activity ratios, particularly Total Asset Turnover (TATO), on dividend policy has been a subject of interest in financial research, with studies examining this relationship across various industries and time periods to understand its potential impact on companies' dividend payout decisions.

The studies by Arsyad, et. al., (2021), Sari et. al., (2022), Nerviana, (2015), and Setyaningsih, & Yuliana, (2020), all investigated the relationship between activity ratios, particularly

total asset turnover (TATO), and dividend policy, measured by the dividend payout ratio (DPR), in the context of Indonesian manufacturing companies. These studies shared several similarities but also exhibited notable differences in their approaches and findings.

However, the studies differed in their specific time frames and industry focus. Arsyad's study covered the period from 2015 to 2019 and focused on the consumer goods industry. Sari examined the food and beverage sector from 2016 to 2020. Nerviana's research spanned the period from 2009 to 2013 and included a broader range of manufacturing companies. Setyaningsih & Yuliana's study concentrated on the consumer goods sector from 2016 to 2018.

In conclusion, these studies collectively demonstrate that total asset turnover does not significantly influence dividend policy in Indonesian manufacturing companies across various subsectors and time periods.

E. The Effect of Firm Size on Dividend Policy:

Several researchers have investigated this relationship in different sectors and time periods. Angela and Daryanti (2023) examined the manufacturing sector, finding a significant positive effect of firm size, measured by the size variable, on the dividend policy of 43 companies listed on the Indonesian Stock Exchange (IDX) from 2018 to 2020.

In contrast, Pattiruhu and Paais (2020) and Salsabillah and Purwanto (2023) focused on the real estate and property sectors. Pattiruhu and Paais, using a sample of 9 companies from 2016 to 2019, reported that firm size had no positive and significant effect on dividend policy. Meanwhile, Salsabillah and Purwanto, analyzing 11 companies from 2019 to 2022, found a significant negative effect of firm size on dividend policy.

Building on these mixed findings, the most recent study by Ontorael et al. (2024) took a different approach. Rather than examining the direct relationship between firm size and dividend policy, they investigated the moderating role of firm size on the

relationship between financial performance and dividend policy. Using a population of 84 property and real estate companies listed on the IDX from 2017 to 2022, their findings revealed that financial performance has a significant and positive relationship with dividend policy and that firm size plays a moderating role in this relationship.

In summary, the existing literature on the firm size-dividend policy nexus in the Indonesian context presents a mixed picture. While some studies found a positive relationship, others reported no significant or even a negative effect. The most recent study by Ontorael et al. (2024) suggests that the relationship may be more complex, with firm size acting as a moderating factor on the link between financial performance and dividend policy. These conflicting findings highlight the need for further investigation to better understand the nuances of this relationship in the Indonesian business environment.

F. The Effect of Industry Type on Dividend Policy:

The existing studies on the relationship between the industry sector and dividend policy present conflicting evidence on the influence of a firm's industry or sector on its dividend policy decisions. Some studies, such as Tinashe (2016), have found no significant effect of industry on firms' dividend decisions.

In contrast, other researchers have reported notable differences in dividend policies across industries. Martono et al. (2020) found that manufacturing firms in Indonesia had a greater propensity to pay dividends compared to non-manufacturing companies and attributed this to differences in income characteristics. Similarly, Pinto and Rastogi (2019) determined that the industry sector significantly influenced the dividend policies of Indian firms.

The mixed evidence suggests that the industry-dividend relationship is complex, with some sectors exhibiting distinct dividend behaviors due to factors like profitability and investment opportunities, while other studies find no significant industry

effects on payout choices. Further research is needed to better understand this relationship.

The literature on dividend policy determinants reveals significant gaps in research, particularly regarding the Egyptian context. Most existing studies focus on Asian markets, such as Indonesia and India, with little attention given to Egypt's stock market. The proposed research aims to fill this gap by examining the period from 2019 to 2023, which includes the COVID-19 pandemic. This timeframe is crucial for understanding how economic shocks influence corporate financial decisions and dividend policies.

Furthermore, the current literature shows inconsistencies in how leverage, profitability, and liquidity affect dividend payouts in emerging markets. There is also a lack of exploration into specific Egyptian market factors, such as local economic conditions and cultural influences, that might shape dividend policies. A cross-sectoral analysis could provide valuable insights into how these determinants vary across different industries within Egypt. By addressing these gaps, the proposed research could significantly contribute to our understanding of dividend policy determinants in the Egyptian context, offering valuable insights for both academic literature and practical financial decision-making in emerging markets.

2. Data Description and Hypotheses Developing:

Required data regarding dependent and independent variables could be shown as follows:

Table 1: Variables:

Variable	Symbol	Description	Variable Type
Dividend Payout Ratio	DPR	Dividend per share/ Earnings per share	Dependent variable
Leverage	DAR	T. Debt / T. Assets	Independent variable
	DER	T. Debt / T. Equity	Independent variable
Liquidity	CR	T. Assets / T. Liabilities	Independent variable
	QR	(T. Assets – Inventory) / T. Liabilities	Independent variable
Profitability	RoA	Net income / T. Assets	Independent variable
	RoE	Net income / T. Equity	Independent variable
Activity	TOTA	Sales / T. Assets	Independent variable
Firm Size	SIZE	Natural Logarithm of T. Sales	Control variable
Industry Type		Dummy variable	Control variable

Source: the researcher

This Paper Aims to Test the Following Hypotheses:

• There is no significant effect of profitability on the dividend policy of Egyptian listed companies.

• There is no significant effect of liquidity on the dividend policy of Egyptian listed companies.

• There is no significant effect of leverage on the dividend policy of Egyptian listed companies.

• There is no significant effect of activity on the dividend policy of Egyptian listed companies.

• There is no significant effect of industry type on the relationship between leverage, liquidity and profitability, influencing dividend distribution decisions in firms listed on the Egyptian Stock Exchange.

• There is no significant effect of firm size on the relationship between leverage, liquidity and profitability, influencing dividend distribution decisions in firms listed on the Egyptian Stock Exchange.

3. Results of Empirical Study:

This section presents the empirical findings of the study, which examines the impact of several key financial ratios, including return on assets (RoA), return on equity (RoE), debt-to-equity ratio (DER), debt-to-assets ratio (DAR), current ratio, quick ratio, and firm activity on dividend payouts, while incorporating firm size as a control variable. The analysis employs panel data models, specifically comparing the fixed effects, random effects, and pooled ordinary least squares (OLS) models to determine the most appropriate specification for our data. The panel data models were chosen to account for the longitudinal nature of the data, which includes observations of the same firms and sectors over multiple time periods. This approach allows for the exploration of both cross-sectional and temporal variations in the variables of interest. Subsequent sections detail the model choice, diagnostics and the comparative analysis outcomes, followed by an interpretation of the regression coefficients and their implications for the relationship between the financial ratios, firm size, and dividend policies (Epaphra & Nyantori, 2018; Nasution et al., 2019; Thamrin et al., 2020; Arshad et al., 2022; Mahirun et al., 2023; Karmilah & Komara, 2024; Edokpa et al., 2024). The issue of missing data was investigated, and it was indicated that some variables contain missing data with a missing percentage less than 5%; to address this issue, the EM algorithm was utilised as it offers the best accurate estimates at all levels of missing data (Little and Rubin, 2019).

3.1 Descriptive Statistics and Correlations

The objective of this section is to provide several descriptive statistics and a range of multiple Pearson correlations among the different variables that were selected. As indicated in Table 1, these statistics encompass the minimum (Min), maximum (Max), mean (M), and standard deviation (SD). The results indicated for RoA & RoE that food, beverages and tobacco sector has the highest average while services sector has the lowest average. For DER, real estate sector has the highest average while food, beverages and tobacco sector has the lowest average. For DAR, real estate sector has the highest average while services sector has the lowest average. For Current Ratio, the health care & pharmaceuticals sector has the highest average while food, beverages and tobacco sector has the lowest average. For Quick Ratio, services sector has the highest average while food, beverages and tobacco sector has the lowest average. For firm activity, food, beverages and tobacco sector has the highest average while real estate sector has the lowest average.

Table 2: Descriptive Statistic

Sector		RoA	RoE	DER	DAR	Current Ratio	Quick Ratio	TATO	Dividends Payout	Firm Size
Food, Beverages, & tobacco	Min	-16.4%	-31.2%	27.3%	21.4%	0.80	0.28	0.64	-15.6%	7.77
	Max	35.1%	52.4%	174.9%	63.6%	2.58	1.85	2.78	769.4%	9.80
	Mean	14.8%	28.3%	99.8%	48.1%	1.43	0.76	1.53	68.9%	8.78
	SD	10.2%	18.4%	38.1%	10.5%	0.50	0.38	0.54	136.2%	0.63
Health Care	Min	-2.3%	-4.8%	17.3%	14.7%	0.55	-13.07	0.11	-2936.1%	2.88
	Max	30.3%	54.2%	1180.1%	92.2%	7.30	6.15	2.03	2875.9%	10.43
	Mean	6.4%	13.8%	195.3%	49.9%	2.00	1.18	0.77	185.3%	6.79
	SD	5.9%	10.8%	286.3%	19.4%	1.51	3.00	0.56	934.7%	2.25
Manufac-turing	Min	-7.2%	-16.2%	25.3%	20.2%	0.36	0.09	0.00	-1466.5%	1.62
	Max	28.8%	57.2%	497.7%	83.3%	4.46	4.01	3.50	5298.0%	11.93
	Mean	6.1%	13.0%	140.1%	52.8%	1.44	0.88	0.90	98.0%	8.10
	SD	6.6%	13.5%	97.4%	14.9%	0.68	0.66	0.58	644.8%	1.85
Real Estate	Min	-1.3%	-8.9%	20.8%	17.2%	0.34	0.24	0.04	0.0%	3.84
	Max	17.5%	28.5%	612.8%	269.8%	7.57	6.23	1.06	463.2%	10.26
	Mean	4.8%	13.0%	259.2%	68.4%	1.76	0.92	0.23	18.5%	7.35
	SD	3.9%	8.4%	166.5%	30.7%	1.21	0.88	0.15	58.2%	1.82
Services	Min	-15.5%	-25.0%	10.6%	9.6%	0.51	0.43	0.00	-10.4%	1.23
	Max	19.1%	30.7%	277.7%	73.5%	3.20	3.10	1.38	239.5%	10.95
	Mean	4.6%	9.5%	109.3%	45.4%	1.64	1.47	0.44	34.2%	6.49
	SD	6.6%	12.3%	78.1%	19.5%	0.75	0.77	0.37	51.7%	2.42
Total	Min	-16.4%	-31.2%	10.6%	9.6%	0.34	-13.07	0.00	-2936.1%	1.23
	Max	35.1%	57.2%	1180.1%	269.8%	7.57	6.23	3.50	5298.0%	11.93
	Mean	6.6%	14.4%	169.1%	54.8%	1.63	1.01	0.70	73.1%	7.55
	SD	7.2%	13.6%	158.9%	22.7%	0.99	1.26	0.61	491.1%	2.03

Source: ***SPSS V. 29 Output***

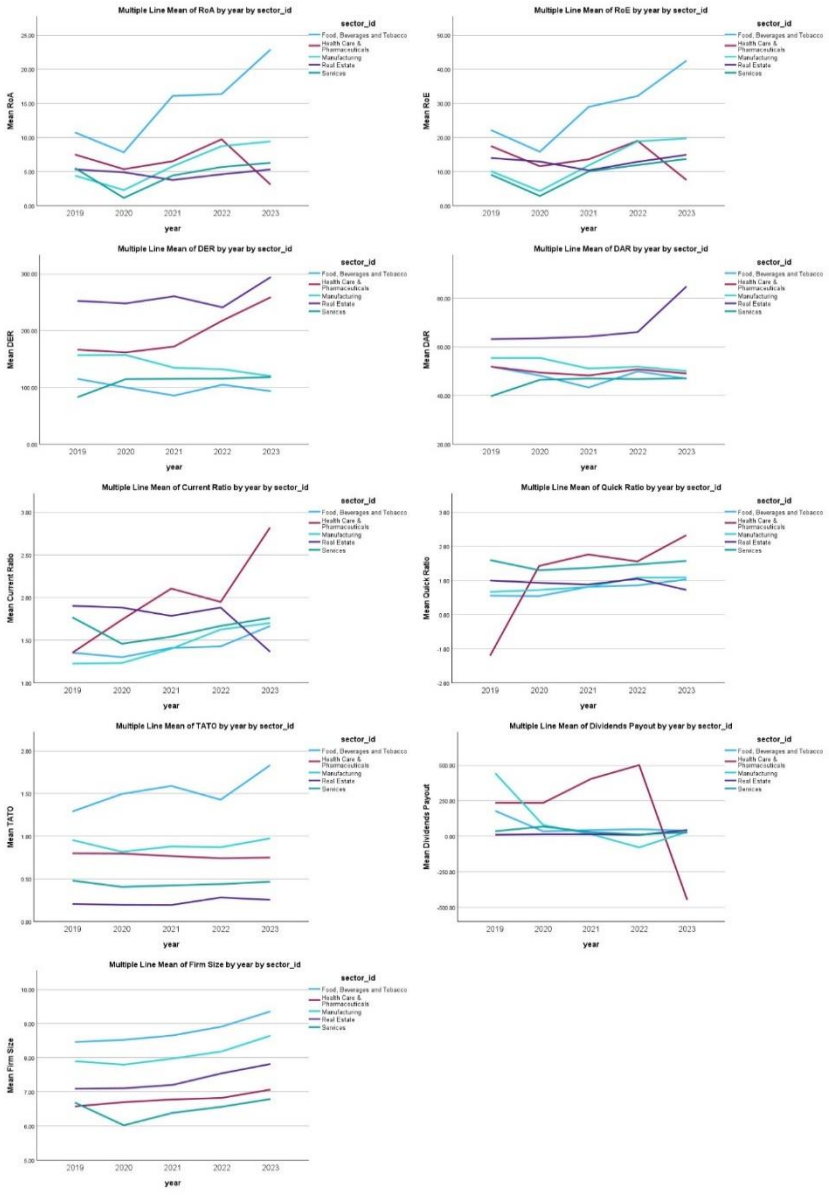

Figure 1: Clustered bar chart for the selected variables across sectors over the selected period of time.

For Dividends Payout, health care & pharmaceuticals sector has the highest average while real estate sector has the lowest average. Finally, for Firm Size, Food, beverages and tobacco sector has the highest average while services sector has the lowest average. We construct a clustered line chart for the selected variables across the different sectors of interest for the 5-year period of time, which provides a clear vision of the trend of the variables over time. The correlation matrix in Fig. 2 is a visual representation of the relationships between the variables. The heatmap suggested that redder shades indicate stronger positive correlations, and bluer shades indicate stronger negative correlations.

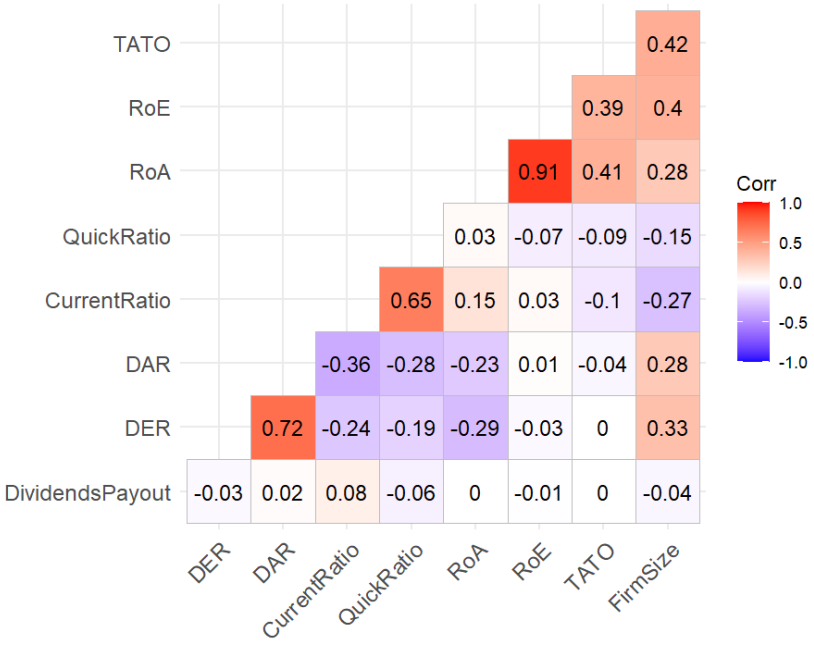

Figure 2: Visualization of Correlation Matrix between the variables

The results indicated that dividends exhibit very weak correlations with all other variables. The most prominent positive correlation is between ROA and RoE (r=0.91), as well as the relationship between DER and DAR (r=0.72) in addition to the

relationship between quick ratio and current ratio (r=0.65). There's a moderate positive correlation between firm size with RoE (r=0.4) and DER (r=0.33). There's a moderate negative correlation between RoA and DER (r=-0.29). Moreover, DAR has a negative moderate relationship with current ratio (r=-0.36) and quick ratio (r=-0.28). Firm activity has a moderate positive relationship with both ROA (r=0.41) and ROE (r=0.39). While the heatmap shows relationships between variables, it doesn't establish cause-and-effect. Overall, the correlation matrix provides a preliminary understanding of the relationships between dividends and other financial metrics. However, further analysis is needed to draw more robust conclusions. Before going for further analysis using panel data models, we conduct the standard linear regression and found that the model was not significant with R-squared value of 4%. Given the initial low R-squared value and the outliers given in the boxplot in Fig. 3, we employed a subset selection based on Residuals approach to identify observations where the independent variables demonstrated a stronger relationship with the dependent variable. This method involves, (a) calculating residuals from the initial linear model, (b) identifying observations with smaller absolute residuals (in this case, those below the 85th percentile), (c) creating a subset of data using these observations, and (d) re-estimating the model using this subset. This approach is grounded in the concept of influential observations in regression analysis (Cook, 1977) and extends the idea to identify a subset of data where the model performs better. It is particularly useful in panel data contexts where heterogeneity across units or time periods may lead to varying model performance (Baltagi, 2008). The rationale behind this method is that by focusing on observations where the model's predictions are closer to actual values, we can potentially uncover stronger relationships between variables that might be obscured in the full dataset due to noise or outliers (Chen et al., 2016). In our analysis, this method improved the model's explanatory power, with the R-squared increasing from (4%) to (47.6%). This suggests that the original data had a series of influential observations that highly affected our model.

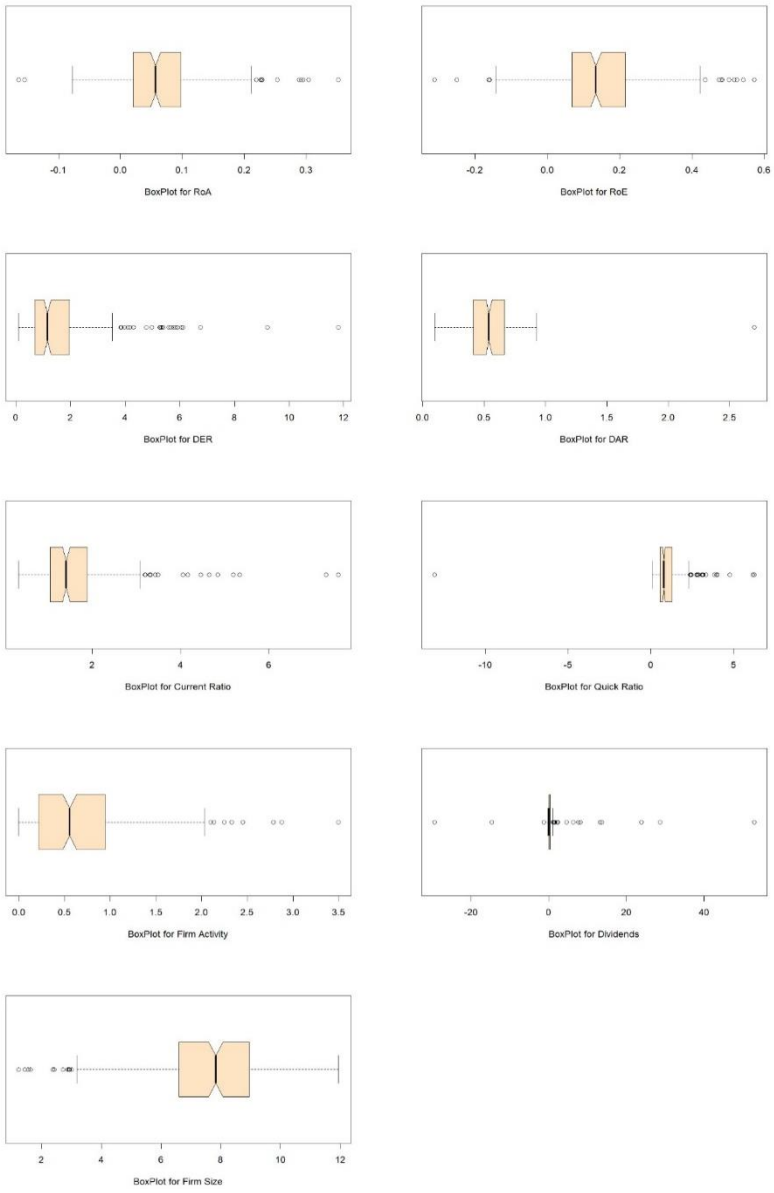

Figure 3: Visualization of Boxplot

3.2 Panel Unit Root Testing

Prior to conducting the panel data analysis, it is essential to examine the stationarity of the variables. This study employs the Im-Pesaran-Shin (IPS) unit root test, which is a widely used panel data unit root test especially when the data is unbalanced (Sehrawat & Giri, 2016; Chapsa et al., 2018; Sezgin, 2022). The IPS test is designed to test the null hypothesis of a unit root against the alternative hypothesis of at least one cross-section being stationary. The researcher applied the individual intercepts and trends as exogenous variables, and the number of lags was determined using automatic selection based on AIC values.

Table 3: Im-Pesaran-Shin Unit Root Test Results

Variable	Test Statistics (wtbar)	P-value
RoA	-6.682	<0.001
RoE	-6.678	<0.001
DER	-3.341	<0.001
DAR	-5.027	<0.001
Current Ratio	-4.351	<0.001
Quick Ratio	-4.84	<0.001
Dividends Payout	-8.003	<0.001
Firm Activity	-1.859	0.032
Firm Size	-1.823	0.034

Source: *R Software Output*

The results of the IPS unit root test are presented in Table 2. The test statistics (wtbar) and corresponding p-values indicate that the null hypothesis of a unit root can be rejected for all the variables included in the analysis, including dividend, RoA, RoE, DER, DAR, current ratio, quick ratio, firm activity and firm size. This finding suggests that the data is stationary, and there is no presence of unit roots.

3.3 Panel Data Models

To examine the impact of the financial ratios and firm size on dividend payout, this study employs three panel data models: fixed effects, random effects, and pooled model. The panel data approach is well-suited for this analysis as it allows for the exploration of both cross-sectional and temporal variations in the variables of interest (Baltagi, 2015). The general specification of the panel data model can be represented as follows:

$$\begin{aligned}\mathbf{Dividend_{it}} = {} & \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\mathbf{RoA_{it}} + \boldsymbol{\beta_2}\mathbf{RoE_{it}} + \boldsymbol{\beta_3}\mathbf{DER_{it}} \\ & + \boldsymbol{\beta_4}\mathbf{DAR_{it}} + \boldsymbol{\beta_5}\mathbf{Current\_Ratio_{it}} \\ & + \boldsymbol{\beta_6}\mathbf{Quick\_Ratio_{it}} + \boldsymbol{\beta_7}\mathbf{Firm\_Activity_{it}} \\ & + \boldsymbol{\beta_8}\mathbf{Firm\_Size_{it}} + \boldsymbol{\varepsilon_{it}}\end{aligned}$$

where Dividend_{it} represents the dividend payout of sector i at time t, RoA_{it}, RoE_{it}, DER_{it}, DAR_{it}, $\text{Current\_Ratio}_{it}$, and Quick_Ratio_{it} are the corresponding financial ratios, Firm_Size_{it} is the control variable for firm size, β_0 is the constant term, β_1 to β_8 are the regression coefficients, and ε_{it} is the error term.

Table 3: Panel Data Model Results

Variable	Fixed Effects	Random Effects	Pooled Model
(Intercept)	-	-0.865 (<0.001)	-0.838 (<0.001)
RoA	1.639 (0.239)	1.929 (0.083)	1.946 (0.070)
RoE	-1.305 (0.046)	-1.320 (0.014)	-1.117 (0.036)
DER	-0.166 (0.002)	-0.199 (<0.001)	-0.207 (<0.001)
DAR	2.182 (<0.001)	2.150 (<0.001)	2.072 (<0.001)

Current_Ratio	0.187 (0.226)	0.102 (0.277)	0.092 (0.232)
Quick_Ratio	-0.022 (0.895)	0.050 (0.616)	0.048 (0.552)
Activity	0.194 (0.262)	0.173 (0.007)	0.140 (0.004)
Firm_Size	-0.038 (0.412)	0.005 (0.815)	0.010 (0.496)
Adj. R-Squared	0.42868	0.50911	0.45434
F-statistic (P-value)	25.7898 (<0.001)	219.739* (<0.001)	22.1281 (<0.001)

Notes:* Results of Wald Chi-Square test; P-value in parentheses.

Source: *R Software Output*

Table 3 presents the results of the panel data analysis using three different models: fixed effects, random effects, and pooled model. **The fixed effects model shows** that RoA has an insignificant effect on dividend payout (β =1.639, p=0.239). RoE (β =-1.305, p=0.046) has a negative and significant impact on dividend payout at the 5% level of significance. DER (β =-0.166, p<0.01) and DAR (β =2.182, p<0.001) have statistically significant effects on dividend payout, with DER being negative and DAR being positive. Both current ratio (β =0.187, p=0.226) and quick ratio (β =-0.022, p=0.895) were not statistically significant. Both firm activity (β =0.194, p=0.262) and firm size (β =-0.038, p=0.412) had an insignificant effect on dividend payout. The adjusted R-squared for the fixed effects model is 0.42868, indicating that the model explains approximately 42.9% of the variation in dividend payout. **The random effects model** shows that RoA (1.929, p=0.083) has a significant effect at the 10% level of significance,

and DAR (2.150, p<0.001) also has positive and significant impacts on dividend payout. RoE (-1.320, p=0.014) and DER (-0.199, p<0.001) have negative and significant effects. Both current ratio (0.102, p=0.277) and quick ratio (0.050, p=0.616) were not statistically significant. Firm activity (0.173, p<0.01) has a statistically significant positive effect on dividend payout. Firm size (0.005, p=0.815) has a positive but insignificant effect on dividend payout. The adjusted R-squared for the random effects model is 0.50911, indicating that the model explains approximately 50.9% of the variation in dividend payout. **The pooled model** shows that RoA (1.946, p=0.070) has a significant effect at the 10% level of significance, in addition to DAR (2.072, p<0.001) that has positive and significant impacts on dividend payout. RoE (-1.117, p=0.036) and DER (-0.207, p<0.001) have negative and significant effects. Both current ratio (0.092, p=0.232) and quick ratio (0.048, p=0.552) were not statistically significant. Firm activity (0.140, p<0.01) has a statistically significant positive effect on dividend payout. Firm size (0.010, p=0.496) has a positive but insignificant effect on dividend payout. The adjusted R-squared for the pooled model is 0.45434, indicating that the model explains approximately 45.4% of the variation in dividend payout. The model comparisons indicate that the random effects model has the highest explanatory power, followed by the pooled effects and the fixed models.

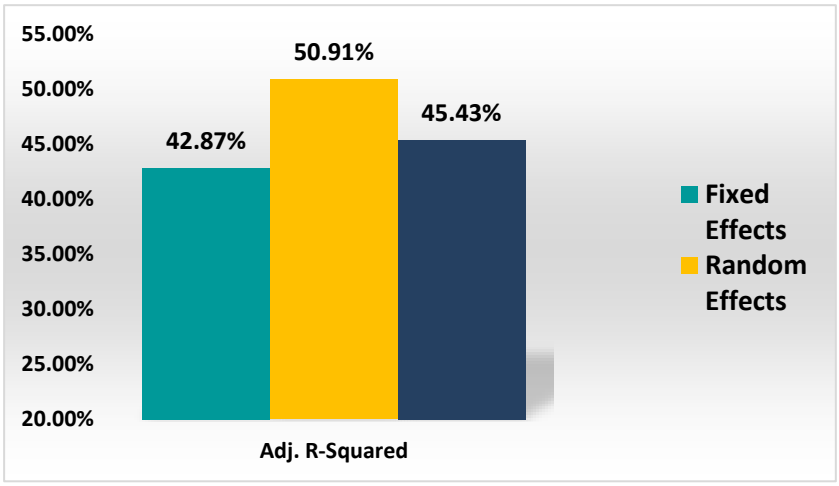

Figure 4: Visualization of Adj. R-Squared values

3.4 Model Selection

To determine the most appropriate model for the panel data analysis, we conducted three diagnostic tests: the Chow test, the Hausman test, and the Breusch-Pagan Lagrange Multiplier (LM) test (Baltagi, 2021). The Chow test was performed to determine whether the fixed effects model is preferred over the pooled model, while the Hausman test was conducted to decide between the fixed effects model and the random effects model, and finally, the Breusch-Pagan LM test was used to determine whether the random effects model is preferred over the pooled model. These methodological steps ensured robust model selection and the reliability of our results. The Chow test was statistically significant at the 0.05 level, indicating that the null hypothesis can be rejected. This suggests that the fixed effects model is more appropriate than the pooled model for the data. The Hausman test was statistically insignificant at the 0.05 level, leading to the acceptance of the null hypothesis. This implies that the random effects model is preferred over the fixed effects model. The Breusch-Pagan LM test was statistically significant at the 0.05 level, indicating that the null hypothesis can be rejected. This suggests that the random effects model is more appropriate than the pooled model. In summary, the results of the selected test

indicate that the random effects model is the most appropriate model for the panel data analysis, as it accounts for the existence of individual-level effects and their potential dependence with the explanatory variables.

Table 4: Panel Data Model Selection

Test	Null Hypothesis (H0)	Alternative Hypothesis (H1)	Test Statistic	P-value	Conclusion
The Chow test	The Pooled model is appropriate (no individual-level effects)	The fixed effects model is appropriate (individual-level effects are present)	F = 2.744	<0.001	fixed effects model is appropriate
Hausman test	The random effects model is appropriate (individual-level effects are uncorrelated with the explanatory variables)	The fixed effects model is appropriate (individual-level effects are correlated with the explanatory variables)	χ^2= 7.0123	0.5353	random effects model is appropriate
Breusch-Pagan LM test	The pooled model is appropriate (no individual-level effects)	The random effects model is appropriate (individual-level effects are present)	χ^2= 27.197	<0.001	random effects model is appropriate

Source: *R Software Output*

3.5 Robustness Checks and Diagnostic Tests

In this section, we present additional analyses to assess the reliability and validity of our random effects model. To account for potential heteroskedasticity and to ensure the reliability of our coefficient estimates, we computed robust standard errors for our random effects model (Bell & Jones, 2015). The results are presented in Table 5. The robust standard errors provide a more conservative estimate of the statistical significance of our coefficients. As shown in Table 5, our key findings remain consistent even after accounting for potential heteroskedasticity, lending additional credibility to our results.

Table 5: Random Effects Model with Robust Standard Errors & Diagnostic Tests

	Estimate	**Std. Error**	**t-value**	**P-value**	**VIF**
(Intercept)	-0.865	0.135	-6.392	0.000	-
RoA	1.929	0.900	2.144	0.03327	9.093
RoE	-1.320	0.542	-2.436	0.01573	7.962
DER	-0.199	0.028	-7.108	<0.001	2.442
DAR	2.150	0.161	13.368	<0.001	2.049
Current_Ratio	0.102	0.084	1.220	0.22377	5.213
Quick_Ratio	0.050	0.096	0.525	0.60051	5.411
TATO	0.173	0.070	2.483	0.01387	1.383
Firm_Size	0.005	0.015	0.311	0.75648	1.499
Breusch-Godfrey/Wooldridge test for serial correlation: $\chi^2 = 0.024, \mathrm{P} - \mathrm{value} = 0.878$					
Studentized Breusch-Pagan test of heteroskedasticity: $\mathrm{Bp} = 11.237, \mathrm{P} - \mathrm{value} = 0.188$					

Source: *R Software Output*

To assess the potential issue of multicollinearity among our independent variables, we calculated the variance inflation factors (VIF) for each predictor. As a general rule, VIF values below 10 indicate that multicollinearity is not a significant concern (Gujarati, 2022). Our results show that all VIF values are

below this threshold, with the highest VIF being 9.093 for RoA. This suggests that multicollinearity is not a substantial issue in our model, and our coefficient estimates can be interpreted with confidence. We employed the Breusch-Godfrey/Wooldridge test to check for the presence of serial correlation in our panel data model. The results of this test are χ^2=0.024,P-value= 0.878, this high p-value (p > 0.05) indicates that we fail to reject the null hypothesis of no serial correlation (Greene, 2018). This suggests that serial correlation is not a significant concern in our model, supporting the validity of our random effects specification. To test for the presence of heteroskedasticity in our model, we employed the Breusch-Pagan test. This test examines whether the variance of the errors from the model is dependent on the values of the independent variables. The results of this test are Bp=11.24,P-value= 0.188, this high p-value (p > 0.05) indicates that we fail to reject the null hypothesis of no heteroscedasticity problem (Baltagi, 1998). This suggests that heteroskedasticity is not a significant concern in our model, supporting the validity of our random effects results.

Conclusion:

This study examined several key financial ratios to assess their impact on dividend payouts. Return on assets (RoA) displayed a weak positive correlation with dividends, indicating that firms with better asset efficiency tend to distribute dividends, though the effect is not significant. Additionally, RoA showed a negative correlation with the debt-to-equity ratio (DER), suggesting that increased reliance on debt financing may hinder asset productivity.

Return on equity (RoE) was identified as a significant factor, demonstrating a negative and statistically significant relationship with dividend payouts. This finding implies that higher returns on equity do not necessarily lead to increased dividend distributions, potentially reflecting a management preference for reinvesting profits. Moreover, RoE had a strong positive correlation with RoA, indicating that firms with greater returns on equity typically also exhibit better asset utilization.

The debt-to-equity Ratio (DER) itself negatively affected dividends, indicating that firms with higher leverage are less likely to pay out dividends. This ratio positively correlated with the debt-to-assets ratio (DAR), suggesting that as firms increase their debt relative to equity, their overall debt levels also rise.

In contrast, the debt-to-assets ratio (DAR) positively influenced dividend payouts, implying that firms handling their debt effectively may prioritize dividend distributions. However, DAR revealed a negative correlation with both the Current Ratio and the quick ratio, indicating that firms with higher liquidity may be less inclined to incur additional debt.

Both the current ratio and quick ratio did not show significant effects on dividend payouts. The current ratio did, however, positively correlate with the quick ratio, suggesting that firms maintaining strong liquidity are effectively managing their short-term obligations.

Firm activity positively impacted dividend payouts, highlighting the significance of operational efficiency. This ratio had moderate positive correlations with both RoA and RoE, indicating that more active firms often achieve better asset utilization and returns on equity, which may result in higher dividends.

The research indicates that the type of industry significantly impacts dividend payouts. The health care & pharmaceuticals sector provides the highest dividends, while the real estate sector offers the lowest. Companies in health care focus on returning profits to shareholders owing to stable cash flows, whereas real estate firms tend to reinvest earnings for managing debt due to their higher leverage. Additionally, industries like food, beverages, and tobacco, known for efficient asset management, also affect dividend strategies. Consequently, recognizing industry specifics is essential for assessing dividend-paying companies.

Finally, firm size was found to have no significant effect on dividend payouts, though it showed moderate positive correlations with RoE and DER. This suggests that larger firms may experience higher returns on equity and leverage, indirectly influencing their dividend policies.

Overall, these financial ratios offer a comprehensive understanding of the factors affecting dividend decisions, illustrating the intricate relationships between profitability, leverage, liquidity, and operational efficiency in shaping corporate dividend strategies.

Recommendations:

- Companies should enhance profitability metrics (RoA and RoE) to improve dividend capacity. They need to consider optimal capital structures to balance growth and dividend payouts, while adopting effective debt management practices.
- Dividend strategies should be tailored to industry characteristics, especially for sectors like healthcare that may afford higher dividends.
- Maintaining a healthy liquidity position is crucial for meeting operational and dividend obligations.
- Firms should balance reinvestment with shareholder returns and communicate plans transparently.
- Regular reviews of dividend policies are essential to adapt to market conditions.
- Companies should be aware of macroeconomic factors and develop contingency plans.
- Open communication with shareholders can boost confidence and align strategies with their preferences.

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