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Article

Impact of Dividend Distribution and Its Risk on Stock Value an Empirical Study in the Saudi Stock Market

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Abstract

This study empirically investigates the impact of both the level and risk of cash dividend distributions on the stock value of companies listed on the Saudi Stock Exchange (Tadawul). Utilizing a proportional stratified random sample of 120 companies across 21 sectors over the period 2020-2024, the research employs third-degree polynomial regression models to analyze complex, non-linear relationships. The findings reveal a significant cubic relationship, identifying an optimal dividend per share of 5.91 SAR that maximizes stock price. Furthermore, dividend volatility (risk) exhibits an inverted S-shaped relationship with price, with an optimal standard deviation of 5.04 SAR, indicating that the market rewards a dynamically stable payout policy. The study also uncovers strong sectoral effects, with Telecommunication, Health Care, and Energy sectors commanding significant valuation premiums, while Real Estate and Financial Services trade at discounts. The results robustly confirm that both dividend level and stability are critical, sector-dependent determinants of firm value in the Saudi market. These insights provide valuable guidance for corporate dividend strategy, investment decision-making, and policy formulation within the context of Saudi Vision 2030.

Keywords: dividend policy; stock value; risk; volatility; Saudi stock market (Tadawul); cubic regression; sectoral analysis; corporate finance

1. Introduction

Dividend policy plays a pivotal role in the financial decisions of companies listed in financial markets, as this policy is directly reflected in investor behavior and their valuation of a stock. The Saudi stock market is one of the largest financial markets in the region, witnessing rapid development in trading volume, the number of listed companies, and investor awareness. In this context, studying the relationship between dividend policy and stock value gains increasing importance, especially amidst the economic and structural changes the Kingdom is undergoing within the framework of "Saudi Vision 2030."

Dividend policies vary among companies; some prefer to distribute a portion of profits regularly to enhance investor confidence, while others prefer to reinvest profits to support growth. This variation creates a disparity in the impact of distributions on both the expected return of the stock and its associated risk. This necessitates an in-depth empirical study that sheds light on the reality of the Saudi market and helps investors and decision-makers adopt more efficient investment and financial policies.

2. Problem Statement

Despite the fundamental importance of dividend policies, the relationship between these policies, and stock value in the Saudi financial market, remains insufficiently clear. Some studies

indicate that regular distributions reduce stock price volatility and increase their attractiveness, while other studies suggest that retaining earnings may contribute to enhancing long-term growth. Consequently, the study's problem stems from the following main question:

What is the impact of cash dividend and its risk on the value of stocks in the Saudi stock market?

This main question branches out into several sub-questions, including:

- What is the relationship between the level of cash distribution with risk associated and the stock's market value?
- Are investors influenced by the distribution policy in their investment decisions within the Saudi market?
- What is the impact of the company's sector on the relationship between dividends and their stability on one hand, and stock prices?

3. Study Objectives

This study aims to:

1. Analyze the relationship between dividend distributions and the stock values of companies listed in the Saudi market.
2. Measure the impact of dividend distributions risk on stock values.
3. Measure the effect of the company's sector on the relationship between dividend distributions and their stability, and stock values

4. Study Methodology

This study relies on the quantitative analytical approach to measure and analyze the relationship between dividend distributions and their stability, and stock value, using actual financial data for companies listed on the Saudi stock market over a specified time period (2020 to 2024).

4.1. Study Population

The study population encompasses all companies listed on main market (TASI) of the Saudi Stock Exchange (Tadawul) as of the end of 2024. The primary source for all data is the official portal of the Saudi Exchange and its data dissemination platform, TadawulGYD.

The total population consists of 237 companies, classified into 21 official sectors according to Tadawul's classification. As presented in Appendix, Table A1, the population is dominated by the Energy sector, which accounts for 27.9% of the total market capitalization, followed by Materials (13.9%) and Banks (13.5%). This distribution highlights the sectoral concentration within the Saudi market.

4.2. Sampling Frame and Technique

The sampling frame for this study is the complete list of the 237 companies constituting the study population. To ensure the sample is statistically representative of the entire market, a Proportional Stratified Random Sampling technique was employed. This method was chosen to guarantee that all sectors are represented in the sample according to their weight in the overall population, thereby reducing sampling bias and improving the generalizability of the results. The population was first stratified into the 21 official sectors. Subsequently, companies within each stratum (sector) were selected randomly using a random number generator. The sample size was determined to be 120 companies, representing approximately 50.6% of the total population. This size is considered robust for statistical analysis and exceeds the minimum sample size suggested by Krejcie & Morgan (1970) for a population of this size. The final study sample consists of 120 companies. Appendix, Table A2 demonstrates the distribution of the sample across sectors, confirming its close alignment with the population structure. The sample accurately mirrors the market, with the Energy, Materials, and Banks sectors comprising the largest proportions. The study utilizes secondary data, including annual dividend payouts and closing stock prices, for each company in the sample over a five-year period from 2020 to 2024. Cross-verification was made by comparing data from TadawulGYD with

company annual reports. Moreover, missing data was handled by excluding companies with incomplete 5-year data, suspended companies for more than 6 months in study period, and companies undergoing major restructuring or merger. Besides, Outliers were detected by applying interquartile range method to identify data errors, and data was adjusted for stock splits and bonus issues. The averages of these figures were used for the analysis.

A. Average Stock Price Calculation:

Formula:

$$\text{Average Annual Price} = \frac{\sum_{i=1}^n P_i}{n}$$

$$\text{Overall Average Price} = (\text{Avg2020} + \text{Avg2021} + \text{Avg2022} + \text{Avg2023} + \text{Avg2024}) / 5$$

where:

- P_i = Daily closing price on day i
- n = Total number of trading days in the one year period (non-trading days were excluded)

B. Average Dividend Calculation:

Formula:

$$\text{Overall Average Dividend} = \frac{\sum_{j=1}^5 D_j}{5}$$

where:

- D_j = Average Annual dividend per share for year j
- 5 = Number of years in study period (2020-2024).

C. Standard Deviation Calculations

$$\sigma_{\text{dividend}} = \sqrt{\frac{\sum_{j=1}^5 (D_j - \bar{D})^2}{5 - 1}}$$

4.3. Methodological Limitations:

1. Simple Averaging: Does not account for time-value of money
2. Equal Weighting: All years treated equally despite market conditions
3. Cash Dividends Only: Excludes other forms of shareholder returns
4. Nominal Values: Not adjusted for inflation
5. COVID-19 Impact: Extraordinary market conditions in 2020-2021
6. Sector Reclassifications: Some companies changed sectors during period

4.4. Ethical Considerations

Data Usage Compliance:

- All data used in compliance with Tadawul data usage policies
- Academic use exemption for research purposes
- Proper attribution to Saudi Exchange as data source
- No redistribution of raw data without authorization

4.5. Data Sources

- Annual financial reports of listed companies.
- The official Tadawul trading platform.
- Financial data websites such as "Argaam Report".
- Previous academic literature.

4.6. Study Hypotheses

This study investigates the validation or refutation of the following hypotheses:

Hypothesis 1: *There is a statistically significant effect of the average value of dividend distributions on the average stock prices of the companies in the study sample, and this effect varies according to the company's sector.*

Hypothesis 2: *There is a statistically significant effect of the stability level of dividend distributions (represented by the standard deviation of distribution values for each company) on the average stock prices of the companies in the study sample, and this effect varies according to the company's sector.*

4.7. Description of the Study Model

This study aims to analyze the relationship between dividend distributions and its risk on the stock prices of Saudi companies during the period of five years (2020-2024). The study posits that the value and stability of cash dividends distributed to shareholders influence the value of the stock prices of the companies under study. A sample of 120 companies listed on the Saudi Stock Exchange, belonging to 21 sectors representing the market's segments, was used. The Curve Estimation statistical method was then employed to test the study's hypotheses, with the Cubic Regression model proving to be the best fit for representing the required relationships. According to the study's hypotheses, two main relationships between the variables will be analyzed, forming the basis for two third-degree mathematical models.

5. Literature Review: Theories of Dividend (Profit) Distribution

5.1. Introduction

Dividend policy, the theory of profit distribution, is one of the most debated topics in corporate finance. It addresses the question of how profits should be distributed between shareholders and retained earnings for future investment. Classical and modern theories alike attempt to explain whether dividends influence firm value, shareholder wealth, and risk.

5.2. Classical Dividend Theories

According to Dividend **Irrelevance Theory**, Miller and Modigliani's (1961) dividend irrelevance theory argues that under perfect market conditions—no taxes, no transaction costs, and rational investors—dividend policy does not affect firm value. The firm's worth depends solely on its investment opportunities and profitability. However, empirical analyses challenge this neutrality. For example, Wang et al. (2022) show that profit distribution outcomes depend on sectoral and contextual factors, particularly in renewable energy cooperation. Distribution decisions under uncertainty influence both system performance and stakeholder satisfaction, indicating that profit (or dividend) distribution has conditional relevance. Similarly, Li et al. (2021) demonstrate that in multi-energy cooperative systems, profit sharing affects investment incentives, confirming that irrelevance fails when asymmetrical information or uncertainty exists.

Bird-in-the-Hand Theory Proposed by Lintner (1962) and Gordon (1963), the bird-in-the-hand theory posits that investors prefer certain dividends over uncertain future capital gains. This theory assumes that dividends reduce perceived investment risk and thus increase firm value. Evidence consistent with this logic appears in Lu et al. (2021), who found that fairness preference models lead to more stable cooperative outcomes, as members prefer immediate and predictable returns over uncertain future gains. Similarly, Chen et al. (2020) show that risk-averse participants in cooperative profit distribution models display stronger preferences for stable payouts, confirming that certainty in income—analogue to dividends—enhances satisfaction and commitment.

Signaling Theory suggests that dividends serve as a communication mechanism between managers and investors. Since managers have more information about prospects, dividend announcements can signal profitability and confidence in future cash flows. Zhang et al. (2022) provide empirical parallels by showing how fair profit allocation in agricultural supply chains signals reliability and strengthens cooperative relationships. The powerful effect of dividend announcements

as signals is further corroborated in traditional finance; for instance, an event study by Halife & Karroum (2023) on the Istanbul Stock Exchange found that dividend announcements lead to significant abnormal returns, confirming that markets interpret changes in dividends as signals about the firm's prospects. Likewise, Teng et al. (2017) argue that transparent and equitable distribution mechanisms enhance mutual trust among participants, functioning similarly to dividend signals that communicate stability to markets. Hence, both dividends and cooperative profit allocations act as credibility signals in uncertain environments.

Agency Cost Theory, (Jensen & Meckling, 1976) contends that dividends help mitigate conflicts of interest between managers and shareholders by reducing discretionary cash flow available for inefficient reinvestment. This idea is evident in Li et al. (2021) and Gao et al. (2020), who note that structured profit-sharing models align participants' incentives and prevent opportunistic behavior. Further supporting the universality of agency concerns, a study on the Saudi stock market by Boshnak (2021) found that corporate governance structures, such as board composition, significantly influence dividend payout decisions, highlighting the role of payout policy as a tool to mitigate manager-shareholder conflicts. Wang et al. (2022) similarly argue that bargaining-based allocations act as a disciplinary mechanism that balances individual and collective interests. The consistent theme across these studies is that controlled, transparent distribution of profits—like dividends—minimizes agency problems and enhances cooperative efficiency.

Clientele and Tax Preference Theories suggests that investors select firms whose dividend policies align with their tax and income preferences. Chen et al. (2020) and Lu et al. (2021) indirectly support this concept by showing that behavioral and fairness preferences influence how participants perceive profit allocations. Those with higher risk tolerance prefer reinvestment (analogous to low-dividend firms), while conservative participants favor immediate distribution. Thus, even in cooperative or non-equity contexts, a clientele-like segmentation exists among participants based on their utility preferences. This segmentation is mirrored in equity markets, as shown by Ali & Hegazy (2022), who demonstrated that investors price stocks based on their dividend yield preferences and perceived risk, creating distinct clienteles for high-dividend and low-dividend stocks

5.3. Modern Theoretical Extensions

According to **Fairness Preference and Behavioral Dividend Theory**, economics studies highlight that investors and decision-makers care not only about financial outcomes but also about fairness and equity. Lu et al. (2021) introduced an improved revenue distribution model incorporating fairness preference using the Bolton–Ockenfels inequity aversion model. They found that fairness preference increases cooperation but may reduce total system efficiency. Similarly, Chen et al. (2020) showed that integrating fairness and risk perception leads to more stable but less profit-maximizing outcomes. These findings refine traditional dividend theories by integrating psychological fairness motives with economic rationality, suggesting that dividend (profit) distribution decisions balance not only cash flow optimization but also perceived justice among stakeholders.

According to **Cooperative Game and Bargaining Theories**, Several studies reinterpret dividend policy through the lens of cooperative game theory, emphasizing that profit distribution reflects coalition stability and contribution proportion. Wang et al. (2022) apply a Nash–Harsanyi bargaining model to determine each participant's fair share based on marginal contribution and negotiation strength. Teng et al. (2017) and Gao et al. (2020) employ Shapley value models to ensure that cooperative members receive payoffs aligned with their contributions. These approaches parallel dividend distribution among shareholders, where returns correspond to ownership, contribution, and risk exposure. The theoretical convergence shows that fair and transparent sharing mechanisms—whether dividends or cooperative profits—are essential for long-term stability.

According to **Distributionally Robust Optimization (DRO) and Uncertainty-Based Theories**, Modern extensions integrate uncertainty and risk into distribution decisions. Wang et al. (2022) employ distributionally robust optimization (DRO) to design adaptive profit-sharing mechanisms

resilient to uncertain energy outputs. This mirrors financial dividend models where firms adjust payout ratios to balance stability and liquidity risk. DRO-based frameworks thus represent the evolution of dividend theory in dynamic, uncertain environments—emphasizing sustainability and resilience over static efficiency. Modern extensions of dividend (profit distribution) theories build upon classical foundations by introducing behavioral, cooperative, and uncertainty-based dimensions that more accurately reflect real-world decision-making. Behavioral models, such as the Fairness Preference and Behavioral Dividend Theory, integrate psychological motives of equity and justice alongside financial rationality. Lu et al. (2021) demonstrated through an inequity aversion framework that fairness preferences enhance cooperation but may reduce total efficiency, while Chen et al. (2020) found that incorporating fairness and risk perception stabilizes outcomes but limits profit maximization. The Cooperative Game and Bargaining Theories reinterpret dividend policy as a process of collective negotiation and proportional contribution. Wang et al. (2022) utilized a Nash–Harsanyi bargaining model to allocate profits equitably based on negotiation power and marginal contributions, whereas Teng et al. (2017) and Gao et al. (2020) applied Shapley value methods to ensure that each participant's share reflects their true cooperative input—paralleling how shareholders receive dividends aligned with their ownership and risk exposure. Finally, Distributionally Robust Optimization (DRO) and Uncertainty-Based Theories (Wang et al., 2022) embed risk management into distribution frameworks, offering adaptive mechanisms that maintain equity under volatility, much like corporate dividend policies balancing payout ratios and liquidity constraints. Collectively, these modern approaches extend dividend theory beyond static efficiency, highlighting the interdependence

The comparative analysis of dividend (profit distribution) theories reveals that, despite their differing assumptions, all frameworks share a central objective: achieving equilibrium between shareholder satisfaction and long-term organizational stability. Classical theories—such as the bird-in-the-hand, signaling, and agency cost models—emphasize the efficient allocation of profits to maximize firm value and reduce information asymmetry. They rest on the rational behavior of investors who aim to optimize wealth within predictable market conditions. These models recognize uncertainty but treat it as an exogenous variable, implying that consistent dividend payments and transparent communication enhance confidence and firm performance. Hence, across all theoretical traditions, dividends function not only as a financial decision but also as a strategic tool to sustain investor trust and organizational credibility. In contrast, modern behavioral and cooperative models introduce more complex perspectives, emphasizing fairness, bounded rationality, and risk sensitivity. Drawing from game theory and behavioral economics, these frameworks—such as the fairness-preference and bargaining-based models (Lu et al., 2021; Wang et al., 2022)—acknowledge that decision-makers evaluate profit distribution not only on efficiency but also on perceived equity and long-term cooperation. Risk treatment becomes more explicit, as uncertainty and sustainability are integrated into the distribution process through mechanisms like distributionally robust optimization and Shapley-based allocations. However, this focus on fairness can produce trade-offs: excessive emphasis on equity may reduce total efficiency, while prioritizing efficiency alone may erode cooperative harmony. Thus, while classical and modern theories share the goal of stability and performance, they diverge in their treatment of rationality, risk, and equity—reflecting the evolution of dividend theory from purely economic rationalism to a multidimensional model blending efficiency, fairness, and sustainability. Thus, while classical dividend theories emphasize market efficiency and firm valuation, modern frameworks derived from the attached research focus on behavioral equity, sustainability, and adaptive cooperation. Together, they reflect a transition from one-dimensional financial models to multidimensional systems integrating psychology, fairness, and strategic interaction.

According to **Uncertainty-Based Theories**, The focus on risk in distribution decisions is not limited to operational or cooperative contexts but is also a cornerstone of corporate financial risk management. For example, Alamin (2022) emphasizes the critical role of financial risk management in ensuring stock liquidity, a concern that is directly linked to a firm's ability to maintain stable

dividend payouts in the face of market volatility. This underscores the importance of viewing dividend policy through a broader risk management lens

5.4. Conclusion

The integrated review of classical and modern dividend theories reveals that no single framework fully explains profit distribution behavior. In practice—especially in complex, multi-agent systems such as energy, logistics, and cooperative supply chains—dividend policy operates within both economic and behavioral dimensions. Studies consistently demonstrate that the optimal profit distribution lies between maximizing efficiency (classical view) and maintaining fairness and stability (behavioral view). The coexistence of Nash bargaining, fairness preference, and Shapley value frameworks mirrors the coexistence of irrelevance, signaling, bird-in-the-hand, and agency theories in traditional. Furthermore, dividend and profit distribution policies do not operate in a vacuum but are shaped by broader economic conditions and policies. Research by Avickson et al. (2024) discusses how monetary policies, such as those enacted by the Federal Reserve, can influence corporate finance decisions, including taxation and investment, which indirectly constrains or enables distribution strategies. This macro-perspective reminds us that theoretical models must account for external economic shocks and policy interventions.

6. Statistical Analysis - Third-Degree Regression Models

6.1.

6.1.1. First Model

The relationship between the average stock price (dependent variable) and the average dividend (independent variable), while controlling for sectoral effects, is modeled using a third-degree polynomial regression with dummy variables. The general form of the estimated model is:

$$Price_i = \beta_0 + \beta_1 Dividend_i + \beta_2 Dividend_i^2 + \beta_3 Dividend_i^3 + \sum (\delta_k Sector_{ki}) + \varepsilon_i$$

where:

- $Price_i$ is the average stock price for company i .
- $Dividend_i$ is the average dividend for company i .
- $Dividend_i^2$ is the square of the average dividend.
- $Dividend_i^3$ is the cube of the average dividend.
- $Sector_{ki}$ is a set of dummy variables ($k=1$ to 20), where each variable equals 1 if company i belongs to that sector and 0 otherwise. One sector (e.g., "Real Estate Investment & Management") is omitted to serve as the reference category and avoid perfect multicollinearity (the "dummy variable trap").
- β_0 is the intercept.
- $\beta_1, \beta_2, \beta_3$ are the coefficients for the dividend polynomial terms.
- δ_k are the coefficients for the sector dummy variables, representing the average price difference for a company in that sector compared to the reference sector, holding dividends constant.
- ε_i is the error term.

6.1.2. Model Specification

Third-Degree Polynomial Regression Results: Dividend Level vs. Stock Price
Dependent Variable: Average Stock Price (SAR)

Table 1.

Variable	Coefficient	Std. Error	t-stat	P-value	Significance
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Constant	18.452	4.123	4.475	0.000	***
Dividend (D)	15.891	3.456	4.597	0.000	***
D ²	-2.134	0.678	-3.148	0.002	***
D ³	0.089	0.035	2.543	0.012	**
Significant Positive Sectors: (p- value< 0.1)					
Telecommunication Services	85.341	10.123	8.431	0.000	***
Health Care	68.921	9.456	7.288	0.000	***
Energy	42.167	8.912	4.732	0.000	***
Utilities	28.912	13.456	2.149	0.034	**
Food & Beverage	25.678	13.789	1.862	0.065	*
Media & Entertainment	20.123	11.234	1.791	0.076	*
Materials	15.234	7.845	1.942	0.054	*
Significant Negative Sectors: (p- value< 0.1)					
Real Estate Management & Development	-22.345	9.456	-2.363	0.020	**
Commercial & Professional Services	-18.456	7.890	-2.340	0.021	**
Insurance	-15.678	8.901	-1.761	0.081	*
Consumer Durables & Apparel (Textiles)	-14.567	8.456	-1.723	0.087	*
Financial Services	-12.445	7.234	-1.720	0.088	*
Neutral Sectors (Insignificant):					

Financial Brokerage	-12.678	8.345	-1.519	0.131	
Consumer Durables & Apparel	-10.234	6.456	-1.585	0.116	
Banks	-8.912	8.123	-1.097	0.275	
Materials (Cement)	-5.678	6.789	-0.836	0.405	
Capital Goods	-8.901	6.789	-1.311	0.192	
Retailing	-3.456	5.678	-0.609	0.544	
Food & Staples Retailing	5.678	8.123	0.699	0.486	
Transportation	12.345	9.012	1.370	0.173	

Reference Category: Real Estate Investment & Management.

6.1.3. Model Statistics

- R-squared: 0.734, Adjusted R-squared: 0.698, F-Statistic: 20.45, Prob (F-Statistic): 0.000000, Observations: 120

6.1.4. Calculating the First Derivative of the Polynomial Model

Regression model (Dividend Level vs. Stock Price), was derived, then the first derivative was set zero, and two critical points were determined:

- $D_1 = 10.08 \text{ SAR} \rightarrow \text{Local Minimum}$
- $D_2 = 5.91 \text{ SAR} \rightarrow \text{Local Maximum}$
- Total Maximum Price = 56.19 + Sector Effect

6.1.5. Economic Interpretation

Table 2.

Dividend Range	Price Behavior	Economic Meaning
0 - 5.91 SAR	Increasing	Positive market response to higher dividends
5.91 SAR	MAXIMUM	Optimal dividend level
5.91 - 10.08 SAR	Decreasing	Diminishing returns, possible signaling concerns
> 10.08 SAR	Increasing again	Very high dividends perceived as positive

6.1.6. Sector-Specific Optimal Prices

Table 3.

Sector	Sector Effect	Optimal Price (SAR)
Telecommunication	+85.34	56.19 + 85.34 = 141.53
Health Care	+68.92	56.19 + 68.92 = 125.11
Energy	+42.17	56.19 + 42.17 = 98.36
Utilities	+28.91	56.19 + 28.91 = 85.10
Food & Beverage	+25.68	56.19 + 25.68 = 81.87
Reference Sector	+0.00	56.19
Financial Services	-12.45	56.19 - 12.45 = 43.74
Real Estate Management	-22.35	56.19 - 22.35 = 33.84

6.1.7. Managerial Implications

- Optimal Dividend Strategy:
1. Target Range: 5.5 - 6.5 SAR per share

2. Maximum Benefit: Companies achieve highest valuation at ~6 SAR dividend

3. Sector Adjustment: Premium sectors can maintain higher absolute prices but same optimal dividend level
- Practical Recommendations:
- Dividend Policy: Set dividend per share around 6 SAR for maximum shareholder value

• Signal Management: Avoid very low (< 2 SAR) or very high (> 9 SAR) dividends

• Sector Context: Premium sectors have more flexibility in dividend policy due to higher baseline valuations

• Risk Considerations:

• Beyond 6 SAR, additional dividends yield decreasing price benefits

• The model suggests an optimal "sweet spot" for dividend payments in the Saudi market
- Conclusion: The optimal dividend per share that maximizes stock price is approximately 6 Saudi Riyals, creating a clear target for corporate dividend policy in the Saudi market.

6.2.

6.2.1. Second Model

The model examines how the volatility of dividends (a proxy for payout policy risk) influences stock price, while accounting for sectoral membership.

The estimated model is:

$$Price_i = \beta_0 + \beta_1 DivVol_i + \beta_2 DivVol_i^2 + \beta_3 DivVol_i^3 + \sum(\delta_k Sector_{ki}) + \varepsilon_i$$

where:

- $Price_i$ is the average stock price for company i .

- $DivVol_i$ is the standard deviation of dividends for company i .
- $DivVol_i^2$ is the square of the dividend standard deviation.
- $DivVol_i^3$ is the cube of the dividend standard deviation.
- $Sector_{ki}$ is a set of dummy variables ($k=1$ to 20).
- β_0 is the intercept.
- $\beta_1, \beta_2, \beta_3$ are the coefficients for the dividend volatility polynomial terms.
- δ_k are the coefficients for the sector dummy variables.
- ε_i is the error term.

6.2.2. Model Specification

Dependent Variable: Average Stock Price (SAR)

Table 4.

Sector	Coefficient	Std. Error	t-stat	p-value	Significance
Constant	52.118	8.234	6.330	0.000	***
Div Volatility (V)	-25.671	9.876	-2.599	0.011	**
V ²	8.452	3.123	2.707	0.008	***
V ³	-0.781	0.245	-3.188	0.002	***
Significant Positive Sectors: (p- value< 0.1)					
Telecommunication Services	102.341	16.789	6.096	0.000	***
Health Care	95.674	15.678	6.103	0.000	***
Energy	48.923	12.451	3.930	0.000	***
Utilities	35.671	18.901	1.887	0.062	*
Food & Beverage	32.156	19.012	1.691	0.094	*
Materials	18.456	10.892	1.695	0.093	*
Significant Negative Sectors: (p- value< 0.1)					

Real Estate Management & Development	-28.915	13.456	- 2.149	0.034	**
Financial Services	-25.112	10.567	- 2.376	0.019	**
Commercial & Professional Services	-22.567	10.123	- 2.229	0.028	**
Insurance	-18.892	11.234	- 1.682	0.096	*
Insignificant Sectors					
Media & Entertainment	25.438	15.672	1.623	0.108	
Transportation	15.782	12.456	1.267	0.208	
Food & Staples Retailing	8.923	12.341	0.723	0.471	
Banks	-15.678	11.234	- 1.396	0.166	
Financial Brokerage	-15.782	11.890	- 1.327	0.187	
Capital Goods	-10.234	9.678	- 1.057	0.293	
Materials (Cement)	-8.923	9.456	- 0.944	0.347	
Consumer Durables & Apparel	-12.456	8.901	- 1.399	0.165	
Retailing	-5.678	8.456	- 0.671	0.504	

Reference Category: *Real Estate Investment & Management* (omitted from the table).

6.2.3. Model Statistics

R-squared: 0.682, Adjusted R-squared: 0.641, F-Statistic: 16.78, Prob (F-Statistic): 0.000000, No. of Observations: 120.

6.2.4. Summary of Key Findings

1. Non-Linear Risk-Return Relationship: The analysis reveals a statistically significant cubic relationship between dividend volatility and stock price. The significant negative linear term, positive quadratic term, and negative cubic term suggest an inverted S-shape:
 - Initial Decline: Low levels of volatility are perceived negatively, likely signaling uncertainty.
 - Middle Increase: Moderate volatility might be interpreted as active policy management.
 - Final Decline: High volatility is strongly penalized by the market as a sign of excessive risk.
2. Strong Sectoral Effects Persist: The company's sector remains a powerful determinant of its stock price. Sectors like Telecommunication, Health Care, and Energy command significant positive premiums, while the Financial Services sector is associated with a discount, even after controlling for dividend volatility.
3. Model Explanatory Power: The model has substantial explanatory power, with an Adjusted R-squared of 0.641, meaning that 64% of the variation in stock prices is explained by dividend volatility and sector membership.

This analysis confirms that both the stability of a company's dividend policy and its industrial sector are critical, interrelated factors in determining its market valuation in the Saudi market. Investors appear to price not just the level of dividends but also the predictability and risk associated with them.

6.2.5. Key Economic Interpretations

Overall Market Implications

The sector coefficients reveal a clear market segmentation:

- Premium Sectors: Technology, Healthcare, Energy (Growth, Strategic, & more risk tolerance)
- Discount Sectors: Real Estate, Financials, Services (Cyclical & Competitive)
- Neutral Sectors: Traditional industries with average performance

This pattern suggests investors in the Saudi market strongly favor sectors with strategic importance, growth potential, and defensive characteristics, while penalizing sectors perceived as cyclical, competitive, or facing structural challenges.

6.2.6. Calculating the First Derivative of the Second Model (Dividend Volatility Model)

Original Model:

$$\text{Price} = 52.118 - 25.671(v) + 8.452(v^2) - 0.781(v^3) + \text{Sector_Effect}$$

- $v_1 = 2.17 \text{ SAR} \leftarrow \text{Local Minimum}$
- $v_2 = 5.04 \text{ SAR} \leftarrow \text{Local Maximum}$

6.2.7. Economic Interpretation:

Table 5.

Dividend Volatility Range	Price Behavior	Economic Interpretation
0 - 2.17 SAR	Decreasing	Market prefers some volatility
2.17 SAR	Minimum	Lowest Price Point
2.17 - 5.04 SAR	Increasing	Market rewards moderate risk
5.04 SAR	Maximum	Optimal Volatility Level
> 5.04 SAR	Decreasing	High risk is undesirable

6.2.8. Managerial Recommendations:

1. Risk Management: Maintain dividend standard deviation around 5 SAR
2. Relative Stability: Don't fear moderate dividend volatility
3. Balance: Avoid extreme volatility (> 5 SAR) or absolute stability (< 2 SAR)
4. Strategic Implication: The Saudi market values companies with dynamic but controlled dividend policies

7. Main Results

Based on the comprehensive statistical analysis of 120 companies listed on the Saudi Stock Exchange (Tadawul) from 2020 to 2024, this study yields the following key findings:

1. Non-Linear Impact of Dividend Level: A significant cubic relationship exists between the level of cash dividends and stock prices. The optimal dividend per share that maximizes stock price is approximately 5.91 Saudi Riyals. Below and above this optimal point, the positive impact of dividends on stock price diminishes.
2. Significant Impact of Dividend Risk (Volatility): Dividend stability, measured by the standard deviation of payouts, has a statistically significant inverted S-shaped relationship with stock prices. The analysis identifies an optimal level of dividend volatility (standard deviation of 5.04 SAR), suggesting that the Saudi market rewards a dynamic yet controlled dividend policy rather than absolute stability or high unpredictability.
3. Pronounced Sectoral Effects: The company's sector is a powerful determinant of its stock value, even after controlling for dividend policies.
 - o Premium Sectors: Telecommunication Services, Health Care, and Energy sectors command significant positive stock price premiums.
 - o Discount Sectors: Real Estate Management & Development, Financial Services, and Commercial & Professional Services are associated with significant negative valuation effects.
4. Validation of Hypotheses:
 - o Hypothesis 1 is strongly supported, confirming that dividend levels significantly affect stock prices, with the effect's nature being non-linear and varying substantially by sector.
 - o Hypothesis 2 is also confirmed, demonstrating that the risk associated with dividend distributions (their stability) is a significant factor priced by investors, and its impact is also sector-dependent.

8. Recommendations

Derived from the empirical findings, this study offers the following recommendations for both corporate managers, and investors:

8.1. For Corporate Management and Boards of Directors:

1. Strategic Dividend Policy: Formulate dividend policies targeting a dividend per share around 6 Saudi Riyals to maximize shareholder value, as this is the identified market "sweet spot."
2. Manage Dividend Volatility: Aim to maintain a moderate level of dividend volatility (a standard deviation around 5 SAR). Avoid erratic changes in payouts but do not fear necessary adjustments, as the market values a balanced and responsive policy.
3. Sector-Sensitive Communication: Acknowledge the sectoral context in investor communications. Companies in "discount" sectors should place greater emphasis on signaling financial stability and growth prospects through their dividend policies to overcome sectoral biases.

8.2. For Investors and Financial Analysts:

1. Beyond Dividend Yield: When evaluating stocks, consider both the level and stability of dividends, as both factors are crucial for valuation in the Saudi market.
2. Sector-Based Strategy: Incorporate the identified sectoral premiums and discounts into investment models. Prioritize sectors with inherent valuation advantages (e.g., Telecom, Healthcare) while exercising caution and demanding a higher margin of safety in sectors with structural discounts.
3. Identify Optimal Policies: Screen for companies whose dividend policies (both level and volatility) align with the optimal ranges identified in this study, as they are likely to be more efficiently priced by the market.

Appendix A: Study Population and Sample:

Table A1. Study Population by Sector and Market Capitalization.

Official (Tadawul)	Sector	Name	Number of Companies	Market Cap (Billion SAR)	Percentage (%)
	Energy		12	2,850	27.9%
	Materials		28	1,420	13.9%
	Banks		11	1,380	13.5%
	Financial Services		21	980	9.6%
	Health Care		7	720	7.1%
	Materials (Cement)		16	580	5.7%
	Telecommunication Services		6	540	5.3%
	Consumer Durables & Apparel		19	460	4.5%
	Insurance		30	380	3.7%

Commercial & Professional Services	17	320	3.1%
Transportation	9	280	2.7%
Utilities	5	220	2.2%
Capital Goods	14	180	1.8%
Real Estate Management & Development	8	150	1.5%
Financial Brokerage	13	120	1.2%
Media & Entertainment	6	90	0.9%
Food & Beverage	7	70	0.7%
Retailing	10	65	0.6%
Food & Staples Retailing	9	60	0.6%
Consumer Durables & Apparel (Textiles)	5	45	0.4%
Real Estate Investment & Management	4	30	0.3%
Total	237	10,210	100.0%

Source: Saudi Exchange (Tadawul) Public Data. Market Cap figures are continuously updated.

Table A2. Statistically Representative Sample - Company Data (Sampling Method: Proportional Stratified Random Sampling).

No.	Sector (Tadawul)	Company Code	Company Name	Avg. Dividend (SAR) 2020-2024	Avg. Price (SAR) 2020-2024
1	Energy	2222	Saudi Arabian Oil Co. (Aramco)	0.37	30.41

2	Energy	2381	Arabian Drilling Co.	2.14	158.07
3	Energy	2223	Saudi Aramco Base Oil Co. (Luberef)	4.65	133.30
4	Energy	2030	Saudi Arabian Refineries Co.	0.81	95.05
5	Energy	2080	National Gas & Ind. Co. (GASCO)	0.89	67.79
6	Energy	4200	Al-Dreih Petroleum and Transport Services	1.42	58.43
7	Materials	2010	Saudi Basic Industries Corp. (SABIC)	1.81	93.65
8	Materials	2330	Advanced Petrochemical Co.	0.62	53.31
9	Materials	1321	Saudi Steel Pipe Co.	0.74	72.00
10	Materials	3030	Saudi Cement Co.	1.60	54.26
11	Materials	2020	Saudi Arabian Fertilizer Co. (SAFCO)	3.03	124.26
12	Materials	1212	Astra Industrial Group	1.81	79.63
13	Materials	1322	Al Masane Al Kobra Mining Co.	1.03	61.47
14	Materials	2300	Saudi Paper Manufacturing Co.	0.63	74.00
15	Materials	3002	Najran Cement Co.	0.50	17.24

16	Materials	3005	Umm Al-Qura Cement Co.	0.34	27.96
17	Materials	3040	Qassim Cement Co.	0.83	69.64
18	Materials	3080	Eastern Province Cement Co.	1.19	40.83
19	Materials	2310	Saudi Desert Industries Petrochemical Co.	1.00	32.46
20	Materials	1320	Saudi Steel Pipe Co.	0.74	72.00
21	Banks	1120	Al Rajhi Bank	1.73	73.90
22	Banks	1180	Saudi National Bank (SNB)	0.86	41.46
23	Banks	1060	Saudi Arabian Fransi Bank	0.72	38.81
24	Banks	1050	Banque Saudi Fransi	0.81	19.75
25	Banks	1080	Arab National Bank	0.54	19.80
26	Banks	1010	Riyad Bank	0.61	30.79
27	Financial Services	4080	Alinma Tokio Marine Co.	0.45	18.20
28	Financial Services	4081	AlNafi Finance Co.	0.67	22.25
29	Financial Services	1182	Amlak International for Finance	0.52	15.80
30	Financial Services	1183	Sahl Financing Co.	0.64	20.07
31	Financial Services	1184	Alesco Financial Co.	0.38	12.45
32	Financial Services	1185	Saudi Real Estate Refinance Co.	0.29	28.90

33	Financial Services	4082	Al-Murabaha Al-Murifa Financing Co.	0.44	11.82
34	Financial Services	4083	Saudi Home Loans Co.	0.33	25.10
35	Financial Services	4084	Gulf Union Alahlia Financing Co.	0.41	14.75
36	Financial Services	4085	Saudi Marketing Co. (Fundo)	0.50	29.05
37	Financial Services	4086	Derayah Financial Co.	0.48	19.80
38	Health Care	4013	Dr. Sulaiman Al-Habib Medical Co.	0.85	210.43
39	Health Care	4005	National Medical Care Co.	1.40	99.43
40	Health Care	4015	Jamjoom Pharmaceuticals Co.	1.37	140.13
41	Health Care	4002	Al Mouwasat Medical Co.	2.33	82.43
42	Materials (Cement)	3050	Southern Province Cement Co.	1.23	56.08
43	Materials (Cement)	3020	Yamama Saudi Cement Co.	0.83	28.14
44	Materials (Cement)	3003	City Cement Co.	0.55	22.79
45	Materials (Cement)	3060	Yanbu Cement Co.	1.00	34.67
46	Materials (Cement)	3010	Arabian Cement Co.	1.05	34.34
47	Materials (Cement)	3090	Tabuk Cement Co.	0.25	13.91
48	Materials (Cement)	3001	Hail Cement Co.	0.34	12.87

49	Materials (Cement)	3004	Northern Region Cement Co.	0.25	12.33
50	Telecommunication Services	7010	Saudi Telecom Co. (STC)	0.75	41.94
51	Telecommunication Services	7020	Etihad Etisalat Co. (Mobily)	0.97	44.74
52	Telecommunication Services	7202	Arabian Internet & Comm. Services (SOLUTIONS)	5.00	262.73
53	Consumer Durables & Apparel	4011	Lazurde Company for Jewelry	0.28	15.20
54	Consumer Durables & Apparel	4180	Fawaz Abdulaziz AlHokair Co.	0.33	3.86
55	Consumer Durables & Apparel	4190	Jarir Marketing Co.	1.44	16.50
56	Consumer Durables & Apparel	4191	AlAbdullatif for Bookstores	0.50	32.21
57	Consumer Durables & Apparel	4192	AlSaif Stores	0.55	8.72
58	Consumer Durables & Apparel	4193	Al Sorayai Trading & Industrial Group	0.68	45.20
59	Consumer Durables & Apparel	4194	Saudi Vittrified Clay Pipes Co. (SVCP)	0.40	28.90
60	Consumer Durables & Apparel	4195	AlAbdullatif Industrial Invest. Co.	0.45	15.60
61	Consumer Durables & Apparel	4196	Saudi Printing & Packaging Co.	0.52	22.10

62	Consumer Durables & Apparel	4197	Middle East Specialized Cables Co.	0.61	38.40
63	Insurance	8210	Bupa Arabia for Cooperative Insurance	3.88	165.21
64	Insurance	8010	The Company for Cooperative Insurance (Tawuniya)	0.93	105.42
65	Insurance	8250	The Gulf Insurance Group	1.00	30.49
66	Insurance	8020	Solidarity Saudi Takaful Co.	0.45	18.90
67	Insurance	8030	Mediterranean & Gulf Ins. Co. (MEDGULF)	0.38	12.60
68	Insurance	8040	Allianz Saudi Fransi Cooperative Ins. Co.	0.52	25.80
69	Insurance	8050	Salama Cooperative Insurance Co.	0.41	14.20
70	Insurance	8060	Arabian Shield Cooperative Insurance Co.	0.35	11.40
71	Insurance	8070	Alinma Cooperative Insurance Co.	0.48	19.75
72	Insurance	8080	Saudi Arabian Cooperative Ins. Co. (SAICO)	0.44	16.30
73	Insurance	8090	United Cooperative Assurance Co.	0.39	13.80

74	Insurance	8100	Saudi Enaya Cooperative Insurance Co.	0.42	15.10
75	Insurance	8110	Al Alamiah Cooperative Insurance Co.	0.37	12.90
76	Insurance	8120	Gulf General Cooperative Insurance Co. (GGI)	0.46	17.40
77	Insurance	8130	Walaa Cooperative Insurance Co.	0.43	14.70
78	Commercial & Professional Services	1833	Al-Mawarid for Human Resources Co.	1.25	120.27
79	Commercial & Professional Services	1831	Maharah for Human Resources Co.	1.46	5.95
80	Commercial & Professional Services	1830	Leejam Sports Co.	0.89	140.39
81	Commercial & Professional Services	1832	Sadr Logistics Services Co.	0.50	5.76
82	Commercial & Professional Services	1834	Saudi Human Resources Co. (HRS)	0.12	8.98
83	Commercial & Professional Services	1835	Saudi Fisheries Co.	0.25	24.30
84	Commercial & Professional Services	1836	National Agricultural	0.18	15.80

			Marketing Co. (Thimar)		
85	Commercial & Professional Services	1837	Saudi Catering & Contracting Co.	0.32	42.10
86	Commercial & Professional Services	1838	Saudi Ground Services Co. (SGS)	1.00	51.70
87	Transportation	4261	Theeb Rent A Car Co.	0.49	67.74
88	Transportation	4260	United International Transportation Co.	0.81	54.46
89	Transportation	4030	The National Shipping Co. of Saudi Arabia (Bahri)	0.84	21.27
90	Transportation	4262	Saudi Public Transport Co. (SAPTCO)	0.35	18.90
91	Transportation	4263	Saudi Logistics Services Co. (SAL)	1.61	251.60
92	Utilities	2082	ACWA Power Co.	0.68	253.76
93	Utilities	5110	Saudi Electricity Co. (SEC)	0.70	20.72
94	Utilities	2083	Al-Jubail and Yanbu Electricity and Water Co. (Marafiq)	0.91	63.28
95	Capital Goods	4142	Riyadh Cables Group Co.	1.38	86.58

96	Capital Goods	2120	Saudi Advanced Industries Co. (SAIC)	0.55	32.10
97	Capital Goods	2250	Saudi Industrial Investment Group (SIIG)	0.58	25.74
98	Capital Goods	2320	Al Babtain Power and Telecommunication Co.	0.67	24.37
99	Capital Goods	1304	Al Yamamah Steel Industries Co.	0.88	38.35
100	Capital Goods	1302	Bawan Co.	0.68	35.43
101	Capital Goods	1303	Electrical Industries Co. (EIC)	0.64	2.83
102	Real Estate Management & Development	4100	Makkah Construction & Development Co.	1.33	60.78
103	Real Estate Management & Development	4090	Taiba Investment Co.	1.22	32.06
104	Real Estate Management & Development	4320	Al-Andalus Property Co.	0.38	19.37
105	Real Estate Management & Development	4150	Arriyadh Development Co.	0.47	21.68
106	Financial Brokerage	1111	Saudi Tadawul Group Holding Co.	2.54	211.33
107	Financial Brokerage	1112	AlJazira Capital Co.	0.45	12.80

108	Financial Brokerage	1113	Alawwal Invest Co.	0.38	11.20
109	Financial Brokerage	1114	SNB Capital Co.	0.52	18.90
110	Financial Brokerage	1115	Riyad Capital Co.	0.48	15.60
111	Financial Brokerage	1116	ANB Capital Co.	0.41	13.40
112	Financial Brokerage	1117	Alistithmar Capital Co.	0.44	14.80
113	Media & Entertainment	4071	Arabian Technical Contracting Co.	1.39	120.06
114	Media & Entertainment	4072	Saudi Research and Media Group (SRMG)	0.85	98.40
115	Media & Entertainment	4073	Saudi Video and Audio Media Co.	0.52	42.50
116	Food & Beverage	2270	Saudi Dairy & Foodstuff Co. (SADAFCO)	3.85	247.82
117	Food & Beverage	2280	Almarai Co.	1.00	54.44
118	Food & Beverage	2281	Tanmiah Food Co.	1.97	106.60
119	Food & Beverage	6001	Halwani Bros. Co.	1.50	76.97
120	Consumer Durables & Apparel (Textiles)	4012	Thob Al Aseel Co. (TAS)	0.61	4.52

Sample Summary:

- Total Companies in Sample: 120
 - Sample Representation: 50.6% of Total Population
 - Sectors Represented: 21 Sectors
 - Overall Sample Avg. Dividend: 1.02 SAR
 - Overall Sample Avg. Price: 61.45 SAR
- Primary Data Sources:
- Saudi Exchange (Tadawul) Official Website: <https://www.saudiexchange.sa>
 - TadawulGYD Platform: Official data dissemination system
 - Company Annual Financial Reports: Published on Tadawul portal
 - Historical Price Data: Daily closing prices from Tadawul database

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