

Mathematical Analysis of Family Ownership and Corporate Social Responsibility: Moderating Role of Risk Taking Behavior in Saudi Firms

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Abstract: The study examines the moderating role of risk-taking behavior on the relationship between family ownership and corporate social responsibility (CSR) in Saudi firms by using panel data from 66 companies (330 firm-year observations) over 2020–2024, where regression analysis reveals that family ownership significantly and positively affects CSR, consistent with socioemotional wealth theory. Where, the strategic innovation perspective, which sees CSR as a long-term investment, is supported when risk-taking behavior shows a positive impact on CSR. Importantly, the interaction between family ownership and risk-taking amplifies CSR performance, indicating that governance structures enhance social responsibility outcomes. Furthermore, firm size consistently shows a positive effect, but profitability, leverage, and growth remain insignificant. Hence, these results highlight the importance of integrating risk-taking with family ownership to advance CSR objectives in alignment with Saudi Vision 2030 and offer practical implications for policymakers and corporate leaders.

Keywords: Family Ownership - Corporate Social Responsibility- Risk Taking Behavior

1 Introduction

Corporate Social Responsibility (CSR) has increasingly emerged as a strategic necessity for companies worldwide, especially in growing economies as Saudi Arabia, where Vision 2030 emphasizes sustainability and social obligation, where evidence indicates that family firms, a significant component of the Saudi corporate environment, frequently exhibit unique CSR activities in contrast to non-family organizations [1]. Furthermore [2] assert that CSR disclosures are positively correlated with investment efficiency, and firms with increased family, institutional, or foreign ownership exhibit superior investment efficiency; however, ownership structure does not moderate the relationship between CSR and investment efficiency.

Study [3] provide that synthesizes socioemotional wealth (SEW), agency theory, and resource dependency theory to elucidate the diverse risk profiles found in family enterprises, their theory emphasizes emotional motivations, governance systems as key modifiers of risk-taking behavior, providing a basis for comprehending the interaction between internal dynamics and contextual effects. Evidence from Chilean publicly listed family enterprises suggests that families generally refrain from high-risk strategic decisions [4]. Comparable to Spanish publicly traded companies, the presence of numerous substantial shareholders aligns managerial and ownership interests, leading to more audacious strategic decisions and heightened risk exposure [5]. These findings collectively highlight the ability of external governance mechanisms and shareholder influence to adjust risk preferences in family firms.

In emerging markets with inadequate investor protection, concentrated family control correlates with increased firm-level risk-taking, while the adoption of conservative managerial policies, like prudent working capital management, reduces risk [6]. These data indicate that ownership concentration alone does not ensure an assertive risk approach;

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instead, it necessitates disciplined strategic management [5,7], where relation between ownership concentration and risk-taking exhibits a U-shaped pattern, where both low and high levels of concentration are associated with reduced risk, but moderate concentration correlates with increased risk exposure [5]. In privately held, enduring family enterprises, the core of familial engagement, demonstrated through trans generational information exchange, has been shown to positively impact risk-taking behavior [8]. Collaborative interaction with non-family employees, consumers, and community stakeholders enhances this impact, facilitating the implementation of growth-oriented plans. In multi-generational family enterprises, stakeholder collaboration, along with a robust trans generational focus, enhances risk-taking tendencies [8]. Also In institutional environments, increased participation of family members in management may inhibit risk-taking, indicative of a stewardship-driven inclination towards stability [9].

International literature highlights the intricate relationships among family ownership, corporate social responsibility, and risk-related behavior, where [10] demonstrate that family ownership adversely affects CSR, but institutional investors, while advantageous for CSR, diminish the positive effect of family ownership on CSR. Moreover, [11] suggest that robust ESG performance mitigates company risk; however, this advantageous impact is diminished in family-owned enterprises and can be enhanced by the establishment of an active CSR committee. These findings underscore the situational and multifaceted nature of risk behavior in family enterprises, influenced by the interplay of governance structures, ownership patterns, managerial conduct, and the broader institutional environment. Notwithstanding the expanding literature on CSR and ownership structure, a significant gap remains in comprehending how risk-taking behavior influences the relationship between family ownership and CSR performance, particularly in the Saudi context. These pragmatic insights provide managers and policymakers with actionable guidance; by aligning risk-taking strategies with CSR initiatives, Saudi family firms can enhance organizational resilience, improve corporate reputation, and effectively support the socioeconomic goals delineated in Vision 2030. The subsequent four components of the study encompass theoretical exploration, methodology, statistical hypothesis analysis, and results and suggestions.

2 Theoretical Study & Hypotheses Development

2.1 Family Ownership & CSR

A systematic literature analysis indicates that ownership concentration in family firms significantly influences CSR engagement, frequently mediated by context-specific dynamics [12]. Empirical evidence from Chinese publicly traded family enterprises demonstrates that ownership and control positively influence ESG performance, however market competition and inadequate institutional environments may mitigate these effects [13]. Consequently, the impact of family ownership on CSR is amplified in the context of stable government and limited competitive pressure. [13] utilized multivariate regression on a sample of 1,151 enterprises, demonstrating that both family ownership and family control significantly promote ESG adoption; however, these impacts are severely mitigated by market competition and institutional constraints. [14,15] assert that the context in which family Firms function significantly influences CSR. Utilizing stewardship theory and socio emotional wealth (SEW), [16] demonstrate that CSR engagement is positively associated with the preservation of family reputation and long-term orientation, particularly in contexts with underdeveloped CSR performance, highlighting the emotional motivations influencing family firms' CSR choices.

Consequently, while family ownership may favor socially responsible initiatives motivated by reputational considerations, the absence of governance frameworks to align external socio-emotional objectives could hinder the conversion of these CSR efforts into firm value, underscoring the significance of board-level oversight in optimizing CSR advantages [15]. [17] amplifies this perspective with a cross-country examination of 439 enterprises in 35 nations, demonstrating that family ownership positively moderates the association between CSR and financial success, hence enhancing firm indicators such as revenue and Tobin's Q. From an operational disclosure standpoint, [18]. Examines Indonesian companies and determines that familial ownership correlates positively with the level of CSR disclosure, especially when firms implement GRI-based structured reporting criteria. Research in the ASEAN 5 countries suggests that family ownership may adversely affect the efficacy of CSR strategies on ESG outcomes, unless mitigated by board diversity, specifically the inclusion of female directors and directors with specialized competencies [19]. This demonstrates that the governance structure significantly interacts with ownership to influence CSR impact. Systematic evaluations indicate that family enterprises participate in CSR variably based on ownership type and strategic orientation, serving as a boundary condition for the relationship between CSR antecedents and company outcomes [12]. They underscore the necessity of distinguishing between internal and external CSR activities considering familial aims and stages of succession [20]. Conversely, [10] examine French publicly traded companies and find that family ownership adversely influences CSR levels, but institutional ownership positively impacts them and mitigates the

detrimental effects of family control, this assertion that internal stakeholder such as institutional investors, can supersede or mitigate the inclinations of family owners, hence enhancing CSR outcomes beyond the family's immediate interests. Therefore, the first hypothesis:

H1: There is significant effect of family ownership on corporate social responsibility

2.2 Risk Taking Behavior & CSR

Risk taking behavior as a managerial inclination to make decisions characterized by high uncertainty in the quest for enhanced returns, has considerable ramifications for business strategy, performance, and sustainability [21], also (CSR) includes voluntary business activities that tackle social, environmental, and stakeholder issues in conjunction with profit-oriented goals [22]. As managerial risk attitudes can determine the degree and character of CSR involvement, while CSR strategies may subsequently affect a firm's overall risk profile [23]. Viewpoints differ on whether increased managerial risk tolerance promotes or obstructs CSR adoption. From a strategic innovation standpoint, CSR efforts are regarded as uncertain, long-term investments necessitating managerial risk taking for possible reputational and competitive benefits [24]. Leaders exhibiting higher risk tolerance may perceive CSR as an audacious, proactive approach to distinguish the organization, especially in competitive marketplaces [25].

Conversely, the risk management approach posits that managers with diminished risk tolerance may use CSR as a defensive strategy to preserve the firm's reputation, enhance stakeholder trust, and mitigate exposure to regulatory or societal repercussions [26]. For these executives, CSR functions as a mechanism of reputational insurance, alleviating potential adverse consequences from operational, environmental, or ethical failures [27]. Empirical research corroborates both viewpoints. In family firms, [6] discovered that CEOs exhibiting elevated individual risk tolerance were less inclined to participate in CSR, favoring high-return, short-term investments over enduring social commitments. Likewise, [28] noted that risk-seeking managers often underinvest in corporate social responsibility, particularly when immediate financial results are ambiguous. In contrast, [23] shown that risk-taking CEOs have a greater propensity for (CSR), while ownership identity influences both managerial risk attitudes and the strategic implementation of CSR. Family enterprises frequently demonstrate a dual orientation, selectively embracing CSR to safeguard SEW [29] while upholding conservative risk profiles [6]. Institutional investors typically require enhanced governance and sustainability performance to protect their portfolios, hence strengthening CSR's risk-mitigating role [30]. Furthermore [31] experimentally demonstrate that in family enterprises, the adoption of ESG initially mitigates risk taking by enhancing internal controls, up to a certain threshold. Beyond this threshold, increased ESG engagement is associated with heightened risk; hence, the integration of ESG is not inherently advantageous or detrimental, but rather contingent on context. Therefore, the second hypothesis:

H2: There is significant effect of risk taking behavior on corporate social responsibility

2.3 Risk Taking Behavior & CSR and Family Ownership

Evidence from Chinese publicly traded family enterprises indicates that moderate family control can promote strategic risk-taking; however, the implementation of disciplined working capital policies mitigates this behavior to ensure long-term stability. Studies [31,7] observe that in family firms, incremental enhancements in ESG initially diminish risk-taking, but beyond a specific threshold, additional ESG involvement may subsequently elevate risk once more. Also, study [1] indicate that family firms demonstrate reduced levels of CSR disclosure compared to non-family firms, while [2] reveal that increased CSR disclosure correlates with enhanced investment efficiency, and firms with elevated family ownership are inclined to invest more efficiently. Likewise, [32] contend that family enterprises obtain additional risk-management advantages from (CSR), aligning with the perspective that family proprietors employ CSR to maintain stability and SEW by mitigating downside risks. According to [33], the beneficial impact of family ownership on CSR disclosure is especially significant in contexts of elevated state ownership, as the existence of the state reduces expropriation threats. Also [13] discover that both family ownership a positively with ESG performance, suggesting that while familial influence typically enhances CSR/ESG results, external pressures and institutional considerations may limit socially responsible initiatives. Furthermore [16] observe that specific marketing and communication strategies do not inherently enhance CSR outcomes in family enterprises, while [34] highlight that the institutional governance context moderates CSR engagement, with more robust shareholder protection driving family firms towards superior CSR performance. Likewise, [35] emphasize that a family-centric focus on domestic harmony may occasionally deter the bold

investments required for ambitious environmental initiatives. [36] demonstrate that in Indian publicly traded enterprises, family, foreign, and government ownership correlate with increased CSR expenditure relative to widely-held firms, with family values exerting a predominant influence. Nonetheless, [37] observes that in descendant led family enterprises, CSR decoupling is more probable.

Consequently, the financial ramifications of CSR are apparent, [38] indicate that although CSR frequently yields bigger dividends, family proprietors may favor resource retention above CSR related distributions, also [39] illustrate that (CSR) can augment trade credit in family enterprises, however no notable impact is detected in non-family organizations, indicating that family proprietors utilize CSR to foster confidence and obtain supplier finance. Where [40] assert that family ownership can foster robust environmental responsibility; nevertheless, excessive control may result in complacency. Also, [41] ascertain that family members who function as both proprietors and managers exert the most significant positive influence on CSR outcomes, in alignment with SEW theory. Moreover, corporate social responsibility can yield competitive advantages, where the study [42] demonstrate that the implementation of comprehensive CSR policies enhances trust and relationships with stakeholders, hence increasing market performance, particularly in contexts of competitive intensity and public social concern. In addition to [43] indicate that female board representation enhances CSR strategy scores in family firms, but not in non-family firms. Conversely, [44,45] demonstrate that family firms surpass non-family firms in overall CSR performance due to increased investment in internal CSR initiatives.

Furthermore, [46] propose that as family proprietors prepare to transfer the business, they intensify CSR initiatives to safeguard the family's reputation and facilitate succession, also [47] emphasize that founding values significantly influence CSR levels, whereas [48] observe that cultural values can enhance CSR but may be superseded by SEW. Also, [49] emphasize the significance of variables in ascertaining when familial engagement either facilitates or obstructs (CSR). Furthermore [50] note that certain family enterprises exhibit strong transparency in ESG reporting to bolster their public image, whereas others provide limited disclosure to safeguard privacy. [51] ascertain that dividend policies can influence investor valuation of CSR disclosures, suggesting that CSR communication and profit distribution collaboratively affect views of corporate well-being. In addition to [52] assert that board diversity significantly enhances openness in enterprises with minimal family entrenchment; conversely, in closely held family firms, even robust boards may find it challenging to alter reporting standards. [53,39,54] demonstrate that family enterprises frequently derive greater financial advantages from (CSR) compared to publicly traded corporations, especially in collectivistic cultures that prioritize stakeholder harmony, hence enhancing the credibility and rewards of CSR initiatives.

H3: There is significant effect of risk taking behavior on relation between family ownership and corporate social responsibility

3 Research Design

3.1 Data and sample

The research objective is to examine the moderating effect of risk-taking behavior on the relationship between family ownership and corporate social responsibility (CSR) among enterprises listed on the Saudi Exchange (Tadawul). The Saudi Stock Exchange, regulated by the Capital Market Authority, was formally established in 2007 as the sole securities exchange in the Kingdom of Saudi Arabia. So, data for the analysis were obtained from the Mubasher database, an information platform widely utilized by professionals, practitioners, and academics for financial and market research [55, 56]. The dataset covers a five-year period from 2020 to 2024 and includes variables related to CSR, family ownership, risk-taking behavior, and other firm-level financial firms, the final sample consists of 330 firm-year observations representing 66 listed enterprises. Some data points are missing due to the inherent difficulty in obtaining complete and consistent disclosures within the Saudi market context.

3.2 Variables Measurement

Family ownership, as the independent variable, is the proportion of a company's equity owned by family owners, indicating the extent of family influence and governance control [57]. Additionally, Risk-Taking Behavior (RT) functions as the moderating variable, measured by the Z-Score, a commonly employed indicator for evaluating financial risk [58]. Furthermore, corporate social responsibility (CSR), the dependent variable, is quantified as a percentage score reflecting a firm's ESG performance in relation to a specified maximum. These scores are generally obtained using standardized

frameworks such as MSCI ESG Ratings, which consolidate performance across environmental, social, and governance dimensions for uniform cross-firm comparison [58,59]. To enhance model robustness, the subsequent control variables are integrated, all based on empirical research, where size, the natural logarithm of total assets, is frequently employed to standardize corporate scale [60]; Return on Assets (ROA) is determined by dividing net income by total assets, functions as a crucial statistic for performance efficiency in financial analysis [61]; Leverage (LEV) is calculated as total liabilities divided by total assets [62]; Return on Equity (ROE), net income divided by shareholders' equity, indicating returns in relation to the company's equity position; Loss (LOSS) is defined as a binary variable that equals 1 if the firm reports a net loss and 0 otherwise, which indicates adverse performance results. Finally, growth is assessed by the annual percentage variation in sales [63].

3.3 Empirical models

Testing the primary hypotheses of this research necessitates developing empirical models for each hypothesis separately. In this regard, testing the relationship between Family ownership and CSR require running the following empirical model from (1):

$$CSR = \alpha + \beta_1 Fam_Own + \beta_2 ROA + \beta_3 SIZE + \beta_4 Lev + \beta_5 ROE + \beta_6 Loss + \beta_7 Growth + \varepsilon \quad (1)$$

Also, testing the relationship between Risk-Taking Behaviour and CSR require running the following empirical model from (2):

$$CSR = \alpha + \beta_1 RT_Behaviour + \beta_2 ROA + \beta_3 SIZE + \beta_4 Lev + \beta_5 ROE + \beta_6 Loss + \beta_7 Growth + \varepsilon \quad (2)$$

Finally, testing the relationship between Family ownership, CSR and RT Behaviour require running the following empirical model from (3):

$$CSR = \alpha + \beta_1 Fam_Own + \beta_2 RT_Behaviour + \beta_3 Fam_Own \times RT_Behaviour + \beta_4 ROA + \beta_5 SIZE + \beta_6 Lev + \beta_7 ROE + \beta_8 Loss + \beta_9 Growth + \varepsilon \quad (3)$$

4 Data analysis & results

4.1 Descriptive statistics

Descriptive statistics for a sample of 330 observations showed the mean family ownership was 28.4%, indicating a moderate influence of family ownership structures with significant variation across firms. Also, the level of CSR was found to be high, with a mean of 0.968 and a low standard deviation, indicating relative homogeneity in firms' commitment to social practices. On the other side, the mean of risk-taking (Z-score) was 2.47, reflecting varying degrees of financial risk across firms. Regarding control variables, the mean of SIZE was 9.36, indicating that the sample represents medium to large companies; the mean of return on assets (ROA) was approximately 5%; and the return on equity (ROE) was approximately 9.9%, both reflecting moderate profitability. In contrast, (LEV) was 40.7%, indicating a moderate reliance on debt financing. The results also showed that 28.2% of companies recorded (LOSS), while the companies achieved a mean annual growth of 8.2%. These results reflect reasonable variation in sample characteristics and provide a suitable basis for advanced statistical analysis in (Table 1).

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Fam Ownership	330	.284	.298	0	.8
CSR	330	.968	.047	.793	1
RT	330	2.472	1.206	.5	4.5
SIZE	330	9.359	.664	7.148	11.496
ROA	330	.05	.019	-.015	.127
LEV	330	.407	.096	.135	.663
ROE	330	.099	.03	.019	.192
LOSS	330	.282	.451	0	1
GROWTH	330	.082	.03	-.006	.158

Figure 1 shows that the majority of the CSR index values are concentrated at the highest level (approximately 1), reflecting the prevalence of high levels of CSR among Saudi companies.

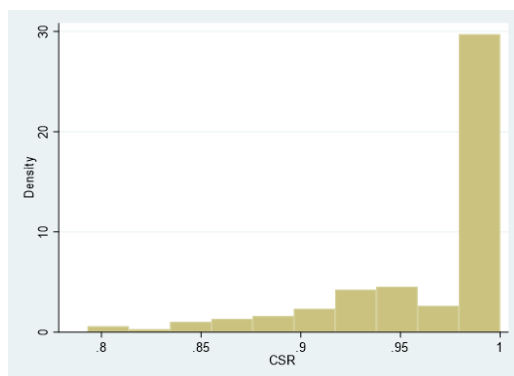


Fig. 1: CSR index values

Figure 2 shows that the distribution of the CSR index is skewed towards high values, with a clear centering at approximately 1, indicating that most companies achieve very high levels of the index.

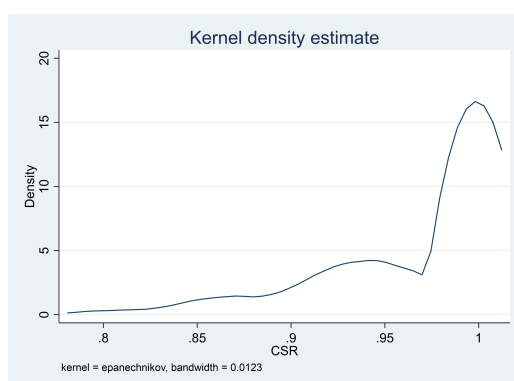


Fig. 2: Kernel density estimate

4.2 Correlation Analysis

Table 2 presents results of the correlation coefficient, revealing a strong and statistically significant positive relationship between (Fam_Owner) and (CSR) ($r = 0.645$, $p < 0.01$). This indicates that family-owned firms are more likely to engage in and disclose practices related to CSR, additionally, there is a significant positive relationship between family ownership and the RT (Z_SCORE) ($r = 0.127$, $p < 0.05$), so family ownership may positively influence firms' financial stability. A weak positive relationship also exists between family ownership and growth ($r = 0.112$, $p < 0.05$), indicating that family firms are motivated by growth and expansion. However, family ownership did not demonstrate a statistically significant relationship with financial performance indicators such as return on assets (ROA), return on equity (ROE), or losses, suggesting that the positive effects of family ownership are primarily seen in non-financial areas, such as social responsibility and stability. Furthermore, there is a significant positive relationship between CSR and firm size ($r = 0.358$, $p < 0.01$), as well as between growth and CSR ($r = 0.135$, $p < 0.05$), which supports the hypothesis that larger and faster-growing firms tend to exhibit higher levels of CSR.

Table 2: Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Fam_Owner	1.000								
(2) RT	0.127** (0.000)	1.000							
(3) CSR	0.645*** (0.000)	0.184** (0.000)	1.000						
(4) SIZE	-0.093* (0.091)	-0.079 (0.153)	0.358*** (0.000)	1.000					
(5) ROA	0.008 (0.892)	-0.004 (0.937)	-0.078 (0.155)	-0.074 (0.182)	1.000				
(6) LEV	0.084 (0.128)	0.078 (0.160)	0.060 (0.274)	-0.060 (0.276)	0.127** (0.021)	1.000			
(7) ROE	-0.051 (0.357)	0.014 (0.797)	0.000 (0.999)	0.034 (0.538)	0.013 (0.811)	-0.052 (0.349)	1.000		
(8) LOSS	-0.037 (0.506)	0.008 (0.887)	-0.079 (0.151)	0.000 (0.996)	0.031 (0.571)	0.079 (0.151)	-0.041 (0.461)	1.000	
(9) GROWTH	0.112** (0.043)	0.011 (0.847)	0.135** (0.014)	0.090* (0.104)	0.010 (0.853)	0.030 (0.588)	0.053 (0.338)	0.043 (0.441)	1.000

Table 3 presents the findings of the Variance Inflation Factor (VIF) assessment. All values fluctuate between 1.01 and 1.04, indicating minimal levels that suggest a lack of multicollinearity among the independent variables in the model, also average of VIF value is 1.03, much below the typical thresholds (5 or 10) that suggest high collinearity; thus, it can be asserted that the independent variables do not exhibit substantial informational overlap.

Table 3: Variance inflation factor

Variable	VIF	1/VIF
Fam_Owner	1.04	0.966174
RT	1.01	0.985679
LEV	1.04	0.960547
GROWTH	1.03	0.970770
SIZE	1.03	0.966735
ROA	1.02	0.977930
LOSS	1.01	0.987580
ROE	1.01	0.988589
Mean VIF	1.03	

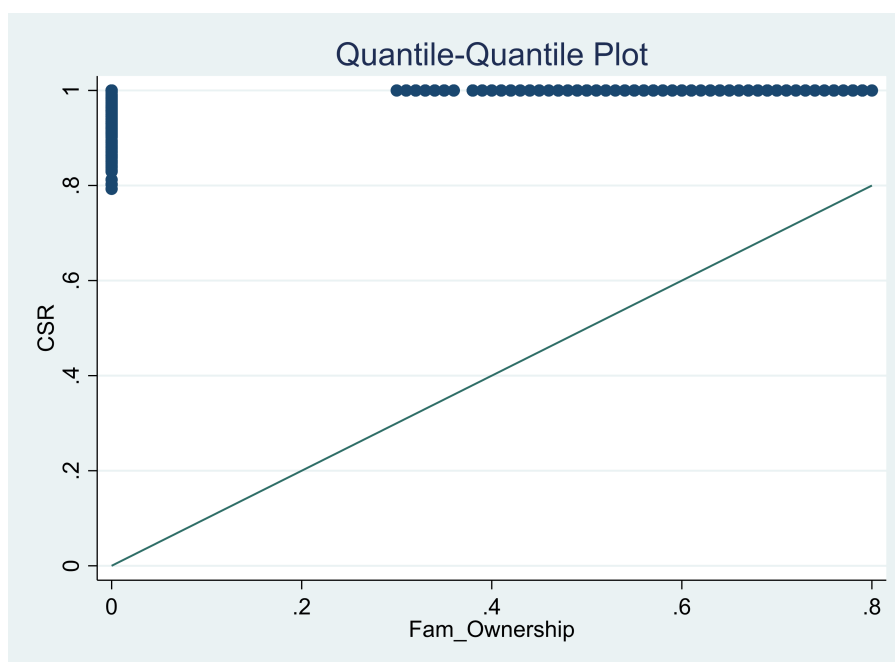
4.3 Regression Analyses

The results of (Table 4) the linear regression analysis for Model (1), showed that (Fam_Owner) has a positive and statistically significant effect on (CSR) at the 1% level ($\beta = 0.107$, $p < 0.01$), indicating that a higher percentage of family ownership is associated with higher levels of disclosure or performance in CSR; (SIZE) had a positive significant effect at the 1% level ($\beta = 0.030$, $p < 0.01$), which reflect the tendency of larger companies to disclose more. In contrast, the remaining variables (ROA, LEV, ROE, LOSS, and GROWTH) did not show significant effects on CSR. The explanatory value of the model (R^2) was approximately 0.601, meaning that the model explains 60.1% of the variance in CSR; a high percentage that supports the model's predictive power, these results indicates that the first hypothesis of a relationship between Fam_Owner and CSR in Saudi Arabia is accepted. This finding corroborates of [13, 17, 29], which asserts that family enterprises prioritize CSR to maintain reputation, foster stakeholder trust, and guarantee long-term sustainability.

Table 4: Linear regression (H1)

CSR	Coef.	St.Err.	t-value	p-value	[95% Conf. Interval]		Sig
Fam_Owner	.107	.006	18.90	0	.096	.119	***
ROA	-.138	.087	-1.59	.112	-.309	.032	
SIZE	.03	.003	11.67	0	.025	.035	***
LEV	.02	.018	1.13	.259	-.015	.054	
ROE	.031	.056	0.55	.581	-.079	.14	
LOSS	-.006	.004	-1.57	.116	-.013	.001	
GROWTH	.036	.056	0.64	.52	-.075	.147	
Constant	.654	.026	24.91	0	.603	.706	***

The divergence of the points from the reference line in the quantile-quantile chart indicates that the relationship between Fam_Ownership and CSR is not perfectly linear, which is not necessarily a negative indicator.

**Fig. 3:** Quantile-Quantile Plot

The results of the linear regression in (Table 5) showed that the RT Behavior variable had a strong positive and significant effect on CSR ($\beta = 0.086$, $t = 7.82$, $p < 0.01$), and it was also shown that SIZE ($\beta = 0.025$, $p < 0.01$) and GROWTH ($\beta = 0.169$, $p < 0.05$) had a positive and significant effect, while the effect of LEV was positive at a marginal significance level ($\beta = 0.048$, $p < 0.1$) and LOSS was negative at the same level ($\beta = -0.009$, $p < 0.1$), while both ROA and ROE did not show any statistical significance. At the level of the model as a whole, the results showed that the value of the coefficient of determination ($R^2 = 0.161$) indicates that the independent variables explain about 16.1% of the variance in the level of CSR, which reflects an average explanatory ability. So, the model's significance test ($F = 8.851$, $p < 0.001$) means accepting the second hypothesis that there is a relationship between TR behavior and CSR. These results are according to [23,25], where companies exhibiting a higher tolerance for strategic and financial risk are inclined to allocate more resources to CSR activities, perceiving them as proactive investments that might yield competitive benefits and enhance reputation.

Table 5: Linear regression (H2)

CSR	Coef.	St.Err.	t-value	p-value	[95% Conf. Interval]		Sig
RT Behavior	.086	.011	7.82	0	.064	.110	***
ROA	-.156	.126	1.24	.217	-.403	.092	
SIZE	.025	.004	6.68	0	.017	.032	***
LEV	.048	.025	1.88	.062	-.002	.098	*
ROE	-.023	.081	-0.28	.78	-.181	.136	
LOSS	-.009	.005	-1.74	.082	-.02	.001	*
GROWTH	.169	.081	2.09	.037	.01	.329	**
Constant	.724	.038	18.87	0	.648	.799	***

The linear regression results in (Table 6) indicate that the variables Fam_Owner ($\beta = 0.098$, $t = 7.50$, $p < 0.01$), RT Behavior ($\beta = 0.091$, $t = 8.27$, $p < 0.01$), and FamOwner_RT ($\beta = 0.099$, $t = 5.82$, $p < 0.01$) all have a strong positive and significant impact on the level of (CSR), reflecting the importance of fam_owner, RT behavior, and their interaction in promoting CSR practices. The results also showed that SIZE ($\beta = 0.029$, $p < 0.01$) has a positive and significant impact, while the remaining variables (ROA, LEV, ROE, LOSS, GROWTH) did not show statistical significance, indicating that the company's profitability, loss, or growth alone are not sufficient indicators to explain the level of CSR in Saudi firms. At the level of the model as a whole, the value of the coefficient of determination ($R^2 = 0.603$) indicates that the independent variables explain 60.3% of the variance in CSR, which is a high explanatory power. The overall significance test ($F = 53.928$, $p < 0.001$) confirms that the model is statistically strong, which enhances its reliance in analyzing the determinants of CSR, which means accepting the third hypothesis that there is an effect of risk behavior on the relationship between fam_own and CSR. This corresponds with [31] where the adoption of ESG in family enterprises may initially diminish risk-taking but fosters audacious CSR after governance procedures are established.

Table 6: Linear regression (H3)

CSR	Coef.	St.Err.	t-value	p-value	[95% Conf. Interval]		Sig
Fam_Owner	.098	.013	7.50	0	.072	.123	***
RT Behavior	.091	.011	8.27	0	.069	.113	***
FamOwner_RT	.099	.017	5.82	0	.066	.132	***
ROA	-.138	.087	-1.58	.114	-.309	.033	
SIZE	.029	.003	11.41	0	.024	.034	***
LEV	.023	.018	1.29	.198	-.012	.058	
ROE	.035	.056	0.63	.532	-.075	.145	
LOSS	-.006	.004	-1.57	.118	-.013	.001	
GROWTH	.038	.056	0.67	.506	-.073	.149	
Constant	.663	.027	24.47	0	.61	.716	***

5 Results & Recommendations

The results offer substantial theoretical contributions to understanding the relationship between family ownership, risk-taking behavior, and CSR in emerging markets, particularly within the Saudi Arabian context. The strong positive relationship between family ownership and CSR validates the SEW perspective, as supported by the study [29], which posits that family-controlled firms emphasize reputation, legacy, and stakeholder trust over short-term profit maximization. The results align with the study [13, 17], which observed similar findings in other emerging economies, and support that family ownership often acts as a driver of social and environmental initiatives. Furthermore, the significant positive association between risk-taking behavior and CSR supports the strategic innovation view [25], where CSR is treated as a long-term strategic investment. This result aligns with the study [23], which emphasizes the role of proactive leadership in leveraging CSR for competitive advantage. However, this result contrasts with the study [6], which reported that risk behavior tendencies can sometimes reduce CSR engagement; the difference here may be attributed to the regulatory emphasis on sustainability under Saudi Vision 2030, which creates incentives for CSR adoption even among risk-oriented managers.

Furthermore, the moderating role of risk-taking in amplifying the effect of family ownership on CSR performance reflects the interplay between governance structure and managerial orientation. This interaction supports the studies of [5, 31], which indicate that risk-taking, when aligned with strong family ownership, can enhance CSR practices. In this line, control variable analysis results show that firm size consistently and positively affects CSR, indicating that resource availability and firm capacity are important for CSR implementation [12]. From a practical standpoint, these results indicate that Saudi family firms can leverage their governance stability, long-term vision, and readiness to engage in risk-taking to strengthen CSR performance. Hence, this approach can enhance corporate reputation, attract responsible investors, and align business operations with the sustainability and social objectives outlined in Vision 2030. Based on the study's findings, it is advised that Saudi family firms incorporate risk-taking into their (CSR) strategies to foster innovation and achieve long-term social and environmental benefits while maintaining financial stability. Larger firms should leverage their scale and resources to create CSR programs that have a wider societal impact. Additionally, policymakers ought to develop targeted incentives and support mechanisms to assist small and medium-sized family firms in implementing effective CSR practices. Finally, aligning CSR initiatives with the priorities of Saudi Vision 2030 will enhance their national significance and strengthen the firm's contribution to broader sustainability objectives.

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