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Corporate Social Responsibility, Ownership Structure, and Firm Investment Efficiency: Evidence from the Saudi Stock Market

Rayed Obaid Hammoud Alobaid [1], Ameen Qasem [1,2,*] and Adel Ali Al-Qadasi [3,4]

[1] Department of Accounting, College of Business Administration, University of Hail, Hail 55471, Saudi Arabia; r.alobaid@uoh.edu.sa
[2] Accounting Department, Faculty of Administrative Sciences, Taiz University, Taiz 6803, Yemen
[3] Department of Accounting, College of Science and Humanities, Shaqra University, Al-Dawadmi 17431, Saudi Arabia; alqadasi@su.edu.sa
[4] Department of Accounting, Hodeidah University, Hodeidah 9676, Yemen
* Correspondence: ameen_102003@yahoo.com or a.qasem@uoh.edu.sa

Abstract: This study investigates the relationship between corporate social responsibility (CSR), ownership structure, and investment efficiency in the Saudi stock market. Analyzing data from non-financial companies listed on the Saudi Stock Exchange (Tadawul) from 2016 to 2021, the findings revealed that higher CSR disclosures were positively associated with investment efficiency. Additionally, the study found that firms with higher levels of institutional, family, or foreign ownership demonstrated more efficient investment practices. However, the study did not support the moderation effect of ownership structure on the CSR–investment efficiency nexus. These results remain robust across different alternative measures and methods. This research fills a gap in the literature by examining these relationships in an emerging market with unique governance and ownership structures. Specifically, it extends the understanding of the CSR–investment efficiency nexus beyond developed economies to include the developing context of Saudi Arabia. Furthermore, the study highlights the varying effects of different ownership structures on investment efficiency and provides a detailed analysis of how investor types respond to CSR disclosures, revealing differences from established CSR frameworks in developed markets. The study's results offer new insights for investors, policymakers, and regulators, and open avenues for further research for academics and business professionals.

Keywords: CSR disclosures; ownership structure; investment efficiency; sustainable investment; Saudi stock market

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1. Introduction

Over the past four decades, the ongoing discourse concerning the financial ramifications of corporate social responsibility (CSR) remains unresolved within academic circles [1]. Investors and various stakeholders have progressively integrated CSR considerations into their assessments and decision-making processes regarding investments [2]. A strategy aimed at bolstering investor confidence involves enhancing CSR initiatives within firms, thus fostering a positive corporate image and augmenting their overall value [3]. Researchers have observed that elevated engagement in CSR correlates with enhanced firm performance and increased firm valuation [4,5]. In this regard, previous studies offer corroborative evidence indicating that heightened CSR engagement enhances firms' investment efficiency [1,6–14].

CSR practices affect investment efficiency through multiple mechanisms. According to stakeholder theory, when firms embrace CSR practices, they acknowledge the significance of not only shareholders but also other stakeholders [15]. Fulfilling the expectations and needs of these stakeholders through CSR endeavors can enhance firms' reputation, trust, and relationships with these parties. Enhanced trust and reputation foster a more

favorable investment environment, as stakeholders are more likely to support and invest in firms perceived as socially responsible. The authors of [7] suggest multiple rationales for how CSR could improve investment efficiency. They claim that CSR broadens managerial accountability, enhances oversight, and forms implicit contracts with a wider range of stakeholders, thereby mitigating agency conflicts between managers and shareholders. Furthermore, managerial decision-making efficiency is improved by considering and balancing the interests and needs of various stakeholders. Additionally, CSR improves both environmental quality and the accuracy of accounting data [7,16]. An improved information environment and increased monitoring of managerial actions should result in more effective and timely decision-making. This enhanced decision-making process substantially improves investment efficiency. While these patterns are common in developed settings, they may vary in developing countries due to the distinct characteristics of these regions. This study adds to the current body of research by investigating the correlation between CSR disclosure and investment efficiency in developing contexts, particularly focusing on Saudi Arabia.

Capital markets in developed countries, such as the United States and the United Kingdom, are characterized by dispersed ownership and well-established corporate governance frameworks. Conversely, emerging economies, such as Saudi Arabia, pose distinctive challenges owing to concentrated ownership structures and insufficient governance mechanisms [17,18]. The diversity of company ownership, whether by institutional investors, family, or foreign, leads to inconsistencies in economic priorities, causing firms to operate and invest differently [12,19–21]. For instance, the authors of [20] analyzed panel data from 2395 publicly listed firms in China spanning 2007 to 2020 and documented that common institutional investors' ownership (IOW) significantly enhances corporate investment efficiency by curbing overinvestment. The authors of [18] utilized a sample of global public firms and found that family firms make fewer effective investments compared to non-family firms. The authors of [21,22] provided evidence that foreign ownership (FOW), consistent with predictions regarding different degrees of information asymmetry and agency problems, enhances investment sensitivity and consequently increases investment efficiency. This emphasizes the intricate nature of the relationship between ownership structure and investment efficiency, highlighting the necessity for customized approaches to enhance investment outcomes across diverse ownership categories. Therefore, our second objective is to investigate how different ownership types, such as institutional, family, or foreign ownership, affect investment efficiency in emerging markets, particularly in Saudi Arabia.

The positive relationship between CSR and investment efficiency, as documented in numerous previous studies, is underpinned by the assertion that robust CSR performance reduces information asymmetry between owners and management, thereby enhancing the overall investment efficiency [12]. However, researchers argue that the ownership structure of firms, including institutional, family, and foreign ownership (OWSTR), can lead to varying levels of information asymmetry and agency problems, thereby influencing distinct investment behaviors [12,20,21]. Hence, the third objective of this study is to examine how the ownership structure moderates the relationship between CSR and investment efficiency. This aims to enhance the understanding of how different ownership types (e.g., institutional, family, or foreign) influence the effects of CSR initiatives on firm investment efficiency in the context of emerging economies, such as the Saudi market.

The Saudi market presents an ideal environment for investigating the association between CSR, OWSTR, and investment efficiency due to a variety of compelling factors. First, in 2016, the Saudi government introduced the ambitious Saudi Vision 2030, a comprehensive national initiative for sustainable development that places significant prominence on environmental, social, and governance (ESG) issues [23]. Second, a significant portion of businesses in Saudi Arabia are family owned [17,18,24–26], and notable differences exist between family firms in emerging economies and those in developed regions, such as Europe and the USA [27]. According to [28], two-thirds of the globe's biggest family-owned

companies are situated in Asia. Asian family firms are distinguished by pyramidal structures and cross-holdings, and their behavior differs from that of non-family-controlled businesses [12]. Third, the regulatory and institutional landscape in Saudi Arabia diverges from that of developed nations, characterized by factors such as market uncertainty, family ownership (FAMW), government ownership, information asymmetry, extensive government intervention, limited external governance mechanisms, and potential risks of minority shareholder rights' expropriation [26,29]. Fourth, following the introduction of Vision 2030, Saudi Arabia's equity market has opened to foreign investors, fostering institutional investment growth and asset management. This initiative includes a qualified foreign investment scheme, granting foreign investors equal voting rights as domestic counterparts, leading to increasing foreign ownership [30,31]. Therefore, the unique context of the Saudi market, combined with its regulatory, institutional, and ownership characteristics, makes it an attractive setting for scholarly investigation into CSR, ownership structure, and investment efficiency.

Utilizing data from non-financial companies listed on the Saudi Stock Exchange (Tadawul) from 2016 to 2021, our study first investigates the empirical relationships among CSR, ownership structure (OWSTR), and investment efficiency. We then explore the impact of OWSTR on the association between CSR disclosure and investment efficiency. Our findings indicate a positive relationship between CSR disclosure and investment efficiency, suggesting that firms actively engaging in CSR activities tend to reduce investment inefficiencies and achieve higher levels of investment efficiency. Furthermore, the study identifies that companies with higher levels of institutional, family, or foreign ownership demonstrate more efficient investment practices. However, our analysis does not reveal evidence supporting the moderation effect of OWSTR on the relationship between CSR and corporate investment efficiency. The lack of significant influence from institutional, family, and foreign ownership on the CSR–investment efficiency relationship highlights a passive role of governance, which is an area that Saudi regulators should prioritize addressing. Our results remain robust even after employing various measurements for investment efficiency and CSR disclosures, utilizing different regression approaches, and addressing endogeneity issues

This study advances the literature on CSR and investment efficiency in three distinct ways. First, it revisits the association between CSR and investment efficiency within the context of emerging markets. Second, it examines the impact of ownership structure—encompassing institutional, family, and foreign ownership—on firms' investment efficiency. Third, it provides additional evidence that the impact of CSR on companies' investment efficiency is more pronounced compared to the effects of various ownership structures. These findings underscore the critical role of CSR in enhancing investment efficiency across different ownership contexts.

2. Literature Review and Hypothesis Development

2.1. CSR and Investment Efficiency

Strong CSR performance is theorized to increase investment efficiency by improving information environments and enhancing accounting quality [32]. Stakeholder theory posits that companies prioritizing CSR initiatives meet stakeholder expectations, thereby enhancing reputation, trust, and relationships [15]. This stakeholder-focused approach improves oversight and governance of managerial conduct, leading to better decision-making and greater investment efficiency [32]. Additionally, strong CSR commitments establish implicit agreements with stakeholders, boosting managerial accountability and decision-making quality [33,34].

Legitimacy theory extends stakeholder theory by suggesting that CSR initiatives align with societal values, principles, and norms [35]. Ignoring these societal concerns can adversely affect a firm's long-term success. Consequently, firms that adopt practices aligning with societal expectations create an environment of legitimacy [36]. Thus, we posit that a strong commitment to CSR fosters legitimacy, reducing financial constraints

and enhancing investment efficiency. High CSR performance facilitates access to external financing, attracting affordable equity financing and reducing debt costs [37,38]. Moreover, CSR contributes to improved environmental quality and the accuracy of accounting information [7,16]. A stronger information environment and increased managerial monitoring led to more effective and timely decisions. While these dynamics are well documented in developed contexts, variations may occur in developing countries due to distinct regional characteristics.

Prior studies suggest that companies with strong CSR frameworks adopt more effective investment approaches, mitigating both underinvestment and overinvestment risks [1]. These firms align their investment decisions with the goal of maximizing shareholder wealth, indicating superior investment efficiency compared to those with weaker CSR performance [7,32]. Although many studies have concluded that CSR positively impacts investment efficiency [1,6–14,39], a significant number have identified either a negative or nonsignificant relationship between CSR and investment efficiency. For example, the authors of [40] analyzed U.S.-listed companies from 2016 to 2022 and found that environmental and social disclosure were positively associated with investment efficiency, especially for companies with lower managerial entrenchment. In addition, the authors of [41], using a sample of S&P 500 index companies for the period from 2012 to 2018, found that the transparency of environmental and social disclosures was positively associated with firms' investment efficiency. The authors of [6] expanded this investigation to a cross-country sample of firms in seven emerging markets from 2011 to 2019, identifying a positive correlation between stronger ESG performance and investment efficiency. The authors of [42] focused on Chinese-listed firms post-COVID-19, discovering that those with robust environmental governance maintained more efficient investments, particularly among non-state-owned enterprises and firms facing higher financial constraints. Similarly, the authors of [43] found a positive association between CSR scores and investment efficiency in Western European firms. Conversely, the authors of [3] analyzed data from over 3000 U.S. firms from 1996 to 2016 and found that high CSR involvement led to overinvestment and associated inefficiencies. Similarly, the authors of [44] examined data from the largest companies in nine Asian emerging economies from 2015 to 2017 and found no statistically significant relationship between CSR activities and investment efficiency. Collectively, these studies underscore the multifaceted relationship between CSR and investment efficiency, highlighting both potential advantages and challenges.

Drawing from the aforementioned discussion, we hypothesize that CSR disclosure practices alleviate information asymmetry issues, thereby enhancing investment efficiency. Accordingly, we propose the following hypothesis:

Hypothesis 1 (H1). *CSR disclosure practices positively influence a company's investment efficiency.*

2.2. Institutional Ownership and Investment Efficiency

Institutional investors are widely recognized as significant stakeholders in financial markets, impacting corporate decisions, enhancing governance structures, and improving company performance [45]. Their capacity to gather information promotes capital market development by facilitating efficient transactions, robust risk assessment, and effective governance [46]. They exert direct influence through ownership and monitoring, disciplining firm management, and indirect influence through share sales [46].

According to agency theory, institutional investors, with their substantial holdings and professional expertise, actively oversee firm activities, thereby reducing agency costs and aligning managerial actions with shareholder interests, which fosters more efficient investment decisions [47,48]. Their superior information and resources enable comprehensive evaluations of potential investments, enhancing risk management practices and the overall quality of investment decisions [46,49–51]. Additionally, institutional investors promote improved corporate governance practices [50,52,53], which further boosts investment efficiency by enhancing transparency, accountability, and strategic alignment with

long-term shareholder value creation. Consequently, higher IOW is associated with improved investment efficiency through enhanced monitoring, superior information access, and strengthened governance influence.

Empirically, numerous prior studies document a positive relationship between IOW and firms' investment efficiency [20,46,51,54–59]. For example, the authors of [51] provided cross-country evidence showing that IOW is linked to improved investment efficiency, particularly in firms prone to overinvestment and agency problems. Recent research [20] on Chinese companies demonstrated a significant positive relationship between common IOW and corporate investment efficiency, largely driven by a reduction in overinvestment. Moreover, the authors of [47] provided evidence that voting rights significantly influence institutional investment decisions, finding that institutional ownership is significantly lower in dual-class firms compared to single-class firms after controlling for other determinants of institutional investment. However, most of these studies are conducted in developed nations or outside the Saudi context.

In the Saudi market, the Capital Market Authority (CMA) has made significant efforts to increase IOW by gradually allowing foreign IOW, particularly for those with long-term investment objectives [60]. Additionally, the Saudi Corporate Governance Code (CGC) encourages institutional investors to actively enhance governance practices within Saudi firms [29]. These developments raise questions about the firm characteristics that attract institutional investors to select certain companies for equity investment in Saudi Arabia. However, previous research in the Saudi context has produced mixed findings regarding the influence of IOW on corporate outcomes. Some studies have demonstrated a significant positive association between IOW and corporate governance disclosure [29] as well as audit quality [61]. Conversely, other research indicates that IOW does not significantly impact CSR reporting [62,63].

Building on the preceding discussion, we hypothesize that institutional investors, due to their enhanced monitoring capabilities, superior information access, and strengthened governance, have the ability to mitigate market frictions and thereby improve investment efficiency. Consequently, we propose the following hypothesis:

Hypothesis 2 (H2). *Institutional investors' ownership positively influences a company's investment efficiency.*

2.3. Family Ownership and Investment Efficiency

The authors of [64] argued that investment inefficiency (*InvInef*) arises from tangible frictions, particularly information asymmetry between external suppliers and managers. This asymmetry can lead to adverse selection and moral hazards. Adverse selection occurs when managers, possessing superior knowledge about the firm's intrinsic value and future opportunities, issue equities during periods of overvaluation, resulting in overinvestment if they successfully sell at inflated prices [65]. Conversely, if investors act contrary to managers' expectations, underinvestment may occur due to insufficient funds [66]. Moral hazard theory posits that conflicts of interest between external investors and managers can lead to suboptimal investments aimed at maximizing personal welfare. This can manifest as empire building or adopting a risk-averse approach to maintain a quiet life [67]. Such misalignment can result in either overinvestment or underinvestment, depending on the firm's capital resources [68]. For instance, managers might overinvest if the firm has ample resources, while external constraints may lead to underinvestment [66]. Thus, addressing information asymmetry and moral hazards is crucial for aligning managerial actions with optimal investment strategies to enhance investment efficiency.

Family-owned enterprises, characterized by high FAMW and often having family members in managerial roles, exemplify the influence of family control on strategic decision-making. According to agency theory [69], owner-managers mitigate traditional agency issues. However, high FAMW introduces significant information asymmetry between large family shareholders and smaller external shareholders [27]. This ownership structure

moderates such disparities, as family owners who also serve as managers possess unique insights into the firm's investment opportunities [70]. Their dual role incentivizes optimal investment strategies, which are crucial for preserving their substantial ownership stakes [70]. This alignment reduces the negative consequences of information asymmetries and promotes optimal investment policies. Nevertheless, family-owned firms often prioritize stability and long-term sustainability over immediate profitability, driven by socioemotional wealth preservation, such as family legacy [71]. This focus typically results in conservative investment strategies aimed at minimizing both excessive risk-taking (overinvestment) and missed growth opportunities (underinvestment).

Recent research has explored the disparities in investment efficiency between family-owned and non-family firms. For instance, the authors of [72], focusing on the Pakistan market, found a positive correlation between higher levels of FAMW and increased investment efficiency. Similarly, the authors of [70] investigated non-financial companies in Thailand and revealed that firms with higher levels of FAMW tended to exhibit higher investment ratios, whether measured by fixed assets or cash flow. These studies enhance our understanding of how ownership dynamics influence firms' investment strategies and operational efficiency. However, the authors of [19] analyzed a sample of publicly traded companies globally and found that family firms generally demonstrated lower investment efficiency compared to non-family firms. Their study highlighted significant variations in investment behavior driven by ownership structure.

Considering the prevalence of family-owned firms in Saudi Arabia and the results from previous studies, the relationship between FAMW and investment efficiency is complex and nuanced. While the alignment of interests, long-term focus, and enhanced access to information within family-owned enterprises theoretically support investment efficiency, factors such as socioemotional wealth and potential risk aversion introduce additional complexities that can influence investment strategies. Therefore, we propose the following hypothesis:

Hypothesis 3 (H3). *Family ownership positively influences a company's investment efficiency.*

2.4. Foreign Ownership and Investment Efficiency

The authors of [73] argued that corporate investment decisions should be based solely on available investment opportunities. However, corporate investment often deviates from its optimal level due to market frictions. The literature identifies information asymmetry and agency problems as key frictions affecting corporate investment [21,64]. Information asymmetry models suggest that managers, possessing private information, may issue overvalued securities, leading to underinvestment, as investors discount these issues. In contrast, agency problems arise when self-interested agents' actions diverge from owners' interests, causing investment inefficiencies [69]. The authors of [74] observed that foreign investors frequently avoid firms with weak governance due to heightened information asymmetry. Regarding the impact of FOW on investment efficiency, the authors of [21] argued that foreign investors excel in reducing information asymmetry and enhancing managerial control, thereby improving a firm's investment efficiency. Foreign investors are perceived to bring global experience, advanced technology, and financial expertise [21,75,76].

However, previous studies present contradictory findings regarding the relationship between FOW and firm investment efficiency. For instance, the studies [21,22,51] reported a positive relationship between FOW and investment efficiency, while [77] identified a negative correlation between FOW and investment efficiency in a sample of 621 Vietnamese firms from 2007 to 2017. These inconsistencies may be attributed to factors such as differences in sample characteristics and the use of varying proxies for measuring investment efficiency. In Saudi Arabia, the CMA established a qualified foreign investment scheme, allowing foreign investors to invest in Saudi companies with voting rights equivalent to those of local investors. Consequently, FOW has increased in this rapidly expanding

equity market. As a result, foreign investors in Saudi Arabia may possess a comparative advantage in effectively overseeing investment decisions within this market.

Building on the preceding discussion, we hypothesize that the monitoring capabilities and information channels possessed by foreign investors enable them to mitigate frictions, thereby enhancing investment efficiency. Consequently, we propose the following hypothesis:

Hypothesis 4 (H4). *Foreign ownership positively influences a company's investment efficiency.*

2.5. The Moderating Effect of Ownership Structure on the Relationship between CSR and Investment Efficiency

The authors of [12,72] argued that CSR positively correlates with investment efficiency by reducing information asymmetry between owners and management, thereby enhancing overall investment efficiency. However, this relationship may vary depending on the firm's ownership structure, which influences the degree of information asymmetry, agency issues, motivations, and preferences, resulting in diverse investment behaviors. The authors of [78] contended that institutional investors play a crucial role in corporate governance by overseeing management and boards, thereby improving governance practices. This oversight is particularly significant when institutional investors hold substantial equity, as it increases their involvement in governance [79]. Leveraging their expertise, these investors actively monitor firms and influence decision-making processes, prioritizing transparent information disclosure and promoting accountability [80].

Institutional investors often support CSR initiatives, viewing them as a means to enhance long-term performance and signal corporate responsibility [81]. Their influence tends to encourage firms to increase their CSR activities, as evidenced by prior studies [80]. By promoting efficient resource allocation and rigorous managerial oversight, institutional investors help mitigate issues related to overinvestment and agency problems [82]. This enhanced oversight not only improves investment efficiency but also reinforces the positive impact of CSR on investment decisions. Conversely, recent research [83] suggested that institutional investors may not always prioritize the social aspects of ESG disclosures. Influential investors can sometimes exacerbate conflicts with non-investing stakeholders, potentially disrupting firm disclosures and widening information gaps [84]. Their pursuit of private benefits might undermine firm value and reduce the effectiveness of CSR initiatives in enhancing investment efficiency [84]. Therefore, higher levels of IOW could potentially diminish the positive impact of CSR initiatives on investment efficiency.

Firms with concentrated FAMW and strong managerial oversight benefit from enhanced information access and robust monitoring mechanisms [85]. While these advantages help to mitigate conflicts and close information gaps between managers and shareholders, they may also be susceptible to exploitation, potentially leading to wealth expropriation from minority shareholders. As a result, the impact of CSR on investment efficiency may be reduced due to increased information asymmetry [12]. However, family owners often place significant value on non-economic goals, such as family image, social relationships, emotional ties, and dynasty succession [71]. Enhanced CSR performance is thought to improve a firm's image and reputation [86], thereby motivating family shareholders to strengthen their social and emotional connections with stakeholders and prioritize social responsibility [12,86]. This alignment with societal norms can potentially enhance long-term viability and the positive impact of CSR on investment efficiency.

Foreign investors often seek to establish legitimacy in host countries through 'symbolic image building' [87]. This approach involves engaging in socially desirable activities and publicizing these efforts to gain local acceptance [88]. By leveraging CSR activities, foreign investors aim to enhance their legitimacy, which can lead domestic firms to improve their environmental and social performance in response, thereby signaling trustworthiness to foreign investors [88]. However, this focus on local acceptance and symbolic image building may dilute the impact of CSR on investment efficiency. On the other hand, foreign investors introduce advanced management practices, transparency

standards, and governance mechanisms [89,90], which can amplify CSR's positive effects on investment efficiency by reducing information asymmetry, improving decision-making, and fostering accountability. Nonetheless, an emphasis on short-term financial gains over long-term CSR objectives may result in underinvestment in socially responsible activities. Additionally, cultural differences and varying expectations between foreign investors and local stakeholders can further diminish the effectiveness of CSR initiatives in enhancing investment efficiency.

Based on the preceding discussion, the association between CSR activities and investment efficiency may vary depending on firms' ownership structures—such as institutional, family, or foreign ownership—which influence levels of information asymmetry, agency concerns, motivations, and preferences that shape distinct investment behaviors. Therefore, we propose the following hypotheses:

Hypothesis 5a (H5a). *Institutional ownership does significantly influence the positive relationship between CSR disclosures and investment efficiency.*

Hypothesis 5b (H5b). *Family ownership does significantly influence the positive relationship between CSR disclosures and investment efficiency.*

Hypothesis 5c (H5c). *Foreign ownership does significantly influence the positive relationship between CSR disclosures and investment efficiency.*

3. Research Methodology and Data

3.1. Sample and Data

To test our hypotheses, this study focused on non-financial companies listed on the Tadawul during the period from 2016 to 2021. The year 2016 was chosen as the starting point because it marks the announcement of Saudi Vision 2030, a strategic initiative emphasizing sustainable social development [91]. This national agenda likely led to an increase in CSR activities among Saudi companies, as supported by [92], which documented heightened CSR disclosures following the Vision 2030 announcement. The selected timeframe (2016–2021) is significant due to several pivotal institutional changes, including the implementation of the revised CGC in 2017, the rollout of Saudi Vision 2030, and the impact of the global COVID-19 pandemic. Financial institutions were excluded from this study due to their distinct regulatory and governance frameworks under the Saudi Central Bank (SAMA), which renders their inclusion unsuitable for this sample [81,93]. Therefore, the final dataset consisted of 154 companies with 837 company-year observations across the 11 sectors of Tadawul, as detailed in Table 1. Data on CSR activities, board characteristics, and ownership were sourced from the annual reports of the sampled companies and the CMA database, while financial data were obtained from the Thomson Reuters DataStream database.

Table 1. Sample selection.

Panel A		
Description		**No. of Firm-Years**
Companies listed in Tadawul from 2016 to 2021		1189
Less: Financial and insurance companies		323
Less: Missing data		29
Final Sample		837
Panel B		
Sector	Observations	Percentage
Information Technology	11	1.31

Table 1. *Cont.*

Utilities	15	1.79
Energy	27	3.23
Diversified Financials	31	3.70
Communication Services	37	4.42
Healthcare	51	6.09
Real Estate	63	7.53
Consumer Staples	98	11.71
Industrials	118	14.10
Consumer Discretionary	142	16.97
Materials	244	29.15
Total	837	100

3.2. Variables' Measurements

3.2.1. Dependent Variable: Investment Efficiency

Investment efficiency refers to a company's capability to effectively pursue projects that yield a favorable net-present value (NPV) [1,94]. In accordance with prior research [6,10,95], we utilized a model widely used by scholars in accounting and finance to assess ideal growth opportunities [68,96]. Inefficient investments occur when there are deviations from the expected model, including both instances of overinvestment (positive deviations from expected levels of investment) and underinvestment (negative deviations from expected levels of investment) [97]. Below is a description of the model:

$$INVESTMENT_{it} = \beta_0 + \beta_1 SalesGrowth_{it-1} + \varepsilon_{it} \quad (1)$$

where $INVESTMENT_{it}$ is the aggregate investment of company i in year t, computed as the capital expenditure divided by lagged total assets. $SalesGrowth_{it-1}$ denotes the percentage change in the sales of the company i from the year $t-2$ to year t. We ran the cross-sectional estimations of the investment model (Model 1) for each year and industry, utilizing the Tadawul sectors classification for industry categorization. The residuals obtained from these regression analyses reflect deviations from expected levels of investment, where negative residuals indicate underinvestment and positive residuals indicate overinvestment. These residuals serve as the primary proxy for the firm *InvInef*. Hence, a negative relationship between our main independent, interaction variables, and the dependent variable (residuals from the investment model) suggests that our main independent and interaction variables mitigate investment inefficiencies, thereby enhancing investment efficiency.

3.2.2. Independent Variables

CSR

Our study's primary independent variable was the CSR disclosure score, calculated using a custom 37-item checklist aligned with established frameworks, such as the Global Reporting Initiative (GRI-G4), International Organization for Standardization (ISO) 26000 [98], and CMA ESG disclosure guidelines 2022. This checklist, consistent with prior research in the Saudi Arabian market and similar emerging economies, encompasses categories including environment, community, customer, employees, products and services, and energy [81,99–103]. We utilized manual content analysis, a robust method for evaluating disclosure quality based on predefined criteria, to assess the significance of CSR items for reporting firms [93,104]. This method, widely employed for both qualitative and quantitative assessments of disclosures [62], ensures repeatability and validity in extracting data references [105]. Each checklist item was rated on a scale of 0 to 3 based on CSR activities disclosed in annual reports, with a score of 0 attributed to firms providing no CSR

data for a specific index item. Subsequently, the CSR index for each firm was computed by determining the ratio of actual scores to the total number of items, as outlined in the provided formula:

$$CSR_j = \frac{\sum_{t=1}^{n} x_{ij}}{n_j}$$

where:

CSR_j denotes the CSR disclosures of the jth firm, scored on a scale of 0 to 3.

n_j represents the total number of disclosure items (37 for each firm).

X_{ij} is scored as follows: 3 for quantitative data disclosure, 2 for qualitative data with precise explanation, 1 for general qualitative data disclosure, and 0 for no disclosure.

Ownership Structure

Institutional investors' ownership

The IOW was calculated by dividing the total number of shares held by institutional investors by the overall number of outstanding shares [52,106]. Consistent with previous studies [54,107,108], we determined the ownership of institutional investors holding more than 5% of the company's outstanding common shares.

Family ownership

FAMW was calculated as the percentage of outstanding shares held by family boards. This measurement is extensively used in the family business literature to measure the extent of family ownership [109–111].

Foreign ownership

Consistent with prior research, this study defined FOW as the proportion of shares held by foreign shareholders in relation to the total shares outstanding [77,112].

Control Variables

Consistent with previous research [6,94,95,97], various control variables were incorporated into our empirical models to account for potential influences on the dependent variable. In particular, we controlled for board size (BSIZE), board independence (BIND), company's leverage (LEVEGE), company size (LNSIZE), cash holding (CASH), company age (AGE), operating cash flow (OPCF), return on assets (ROA), and market-to-book ratio (MTB).

3.3. Model Specification

The following models were estimated to assess our proposed hypotheses:

$$InvInef_{it} = \beta_0 + \beta_1 CSR_{it} + \beta_2 OWSTR_{it} + \beta_3 CONTROLS_{it} + Year\ dummies + Sector\ dummies + \varepsilon_{it} \quad (2)$$

$$InvInef_{it} = \beta_0 + \beta_1 CSR_{it} + \beta_2 OWSTR_{it} + \beta_3 OWSTR_{it} \times CSR_{it} + \beta_4 CONTROLS_{it} + Year\ dummies + Sector\ dummies + \varepsilon_{it} \quad (3)$$

where $InvInef_{it}$ represents the residual values derived from the investment model (model 1), CSR_{it} denotes the CSR disclosure score, $OWSTR_{it}$ represents the ownership structure variables (institutional, family, and foreign), $OWSTR_{it} \times CSR_{it}$ is the interaction effect between the CSR disclosure score and ownership structure variables, $CONTROLS_{it}$ signifies control variables, which include $BSIZE_{it}$, $BIND_{it}$, $LEVEGE_{it}$, $LNSIZE_{it}$, $CASH_{it}$, AGE_{it}, $OPCF_{it}$, ROA_{it}, and MTB_{it}, which are defined above; finally, i and t indicate company and years, respectively. Variables' definitions are summarized in Table 2.

Table 2. Variables' definitions.

Variables	Abbreviation	Descriptions
Dependent variable		
Investment efficiency	*InvInef*	Investment inefficiency is estimated as the residual outcome derived from a basic investment model: $INVESTMENT_{it} = \beta_0 + \beta_1 SalesGrowth_{it-1} + \varepsilon_{it}$
	INVESTMENT	The aggregate investment of company i in year t, measured as the capital expenditure divided by lagged total assets
	SalesGrowth	Represents the percentage change in the sales of the company i from the year $t-2$ to year t
Independent variables		
Corporate social responsibility	CSR	CSR disclosure score
Institutional investors ownership	IOW	The percentage of outstanding shares held by institutional investors
Family ownership	FAMW	The percentage of outstanding shares held by family board members
Foreign ownership	FOW	The percentage of outstanding shares held by foreign shareholders
Control variables		
Board size	BSIZE	The aggregate count of members comprising the board of directors
Board independence	BIND	The proportion of independent directors to the total board members
Leverage	LEV	The ratio of total debt to total assets
Size	LNSIZE	The natural logarithm of a company's total assets
Cash holding	CASH	The proportion of cash and short-term investments relative to total assets
Company age	AGE	The natural logarithm of the number of years a company has been in operation
Operating cash flow	OPCF	Net operating cash flow scaled by book value of total assets
Return on assets	ROA	The ratio of net income to total assets
Market-to-book ratio	MTB	The ratio of market value of equity to book value of equity

We utilized ordinary least squares (OLS) regression techniques to compute the estimations for Models 2 and 3. To address issues of heteroskedasticity and serial and cross-sectional correlation, we adopted the methodology outlined in [97,113] to cluster standard errors at both the company and annual levels. This approach helps to enhance the robustness of our findings. In our estimation models, we incorporated industry dummy variables to account for industry-specific attributes that may influence our results. These dummy variables were defined according to the Tadawul sectors classification. Additionally, to address fluctuations in economic conditions over time, we introduced dummy variables for each year within our sample period, thereby controlling for temporal variations. Finally, we winsorized all continuous variables at the 1st and 99th percentiles, in order to alleviate the influence of outliers.

4. Empirical Results

4.1. Descriptive Statistics

Table 2 presents the summary statistics for all variables utilized in the regression analyses conducted in this study. The findings depicted in Table 3 indicate that the mean (median) value of *InvInef* stands at 0.000 (−0.061), with a range spanning from −2.114 to 2.627. These results are generally in line with previous research [1]. Moreover, the mean CSR disclosure score in our study was recorded at 0.991 (33%), with values ranging from 0.000 to 2.784 (out of a possible 3). This result corroborates earlier research conducted in Saudi Arabia, such as in [81] recording 33%, in [93] reporting 27%, in [63] finding 24%, and in [114] indicating 36%, thereby demonstrating a consistent pattern of relatively lower average CSR scores among Saudi companies. Regarding the ownership structure variables, the findings revealed that the average IOW stood at 8.588%, spanning from 0 to 98%, aligning with prior studies in Saudi Arabia, where the authors of [81] reported a mean of 8.6%, and slightly higher than the 7% average noted in [29]. Additionally, the results presented in Table 3 demonstrate that the mean FAMW was 6.948%, ranging from 0 to 95%.

Moreover, the results demonstrated that the average FOW was 1.391%, with a range from 0 to 37.5%.

Table 3. Descriptive statistics.

Variable	Mean	p50	SD	Min.	Max.
InvInef	0.000	−0.061	0.742	−2.114	2.627
CSR	0.991	0.919	0.716	0.000	2.784
IOW	8.588	0.000	18.833	0.000	98.440
FAMW	6.948	0.001	15.605	0.000	95.000
FOW	1.391	0.000	6.095	0.000	37.500
BSIZE	8.147	8.000	1.557	3.000	12.000
BIND	0.476	0.444	0.159	0.000	1.000
LEVEGE	24.360	22.940	19.467	0.000	80.930
FSIZE	18,900,000	1,949,078	121,000,000	19,084	2,150,000,000
SIZE	14.605	14.483	1.686	9.857	21.488
CASH	0.082	0.054	0.090	0.000	0.772
AGE	27.060	26.000	14.085	2.000	88.000
FAGE	3.146	3.258	0.585	0.693	4.477
OPCF	0.072	0.063	0.090	−0.575	0.568
ROA	3.669	3.550	8.690	−62.420	47.220
MTB	2.39	1.76	1.89	0.29	14.32

The figures in Table 3 also illustrate that the mean of BSIZE was around 8. The mean BIND stood at 47%, aligning with previous research in Saudi Arabia, which reported average scores ranging from 42% to 52% [91]. Additionally, the mean LEVEGE was 24%, in line with the findings in [28]. The average SIZE amounted to SR18.9 bn, spanning from SR19 m to SR2.1 tn. The average value of CASH was 0.082. Furthermore, the average age of the companies was 27 years, consistent with findings in [62] within the Saudi context. OPCF averaged at 0.072. The results also showed an average ROA of 3.7%. Lastly, the mean MTB was 2.39, ranging from 0.29 to 14.32.

4.2. Correlation Analysis

To assess correlations between all variables and the potential for multicollinearity, we examined Pearson correlation coefficients among the variables incorporated in the regression analyses. Our findings showed a significant negative relationship between CSR disclosure scores, most ownership structure variables, and *InvInef*. These results lend initial support to our hypotheses, suggesting that companies with greater CSR disclosures and higher proportions of ownership structure variables exhibited increased investment efficiency. Additionally, Table 4 illustrates that the highest correlation coefficient was 0.54 between SIZE and CSR and IOW, falling below the threshold of 0.80, indicating the absence of multicollinearity [115]. Furthermore, we estimated the variance inflation factors (VIFs) for all variables (not reported), all of which were below 10 in all models, confirming the absence of multicollinearity concerns in this study.

4.3. Regression Results and Discussion

Table 5 presents the outcomes of estimating Models 2 and 3 utilizing OLS regression, employing cluster-robust standard errors at the company and year levels to address heteroscedasticity and autocorrelation concerns. The regression results of the direct association between CSR, IOW, FAMW, FOW, and *InvInef* are stated in column 1, while the findings of regressing the moderating effect of ownership structure variables on the CSR–*InvInef* nexus using the interaction term are reported in columns 2, 3, and 4. All regression models showed high statistical significance, with *p*-values below the 0.01 significance level. Additionally, the R-squared values across the models indicate the robust explanatory power of the data.

Table 4. Correlation matrix.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) InvInef	1.00													
(2) CSR	−0.23 ***	1.00												
(3) IOW	−0.18 ***	0.34 ***	1.00											
(4) FAMW	−0.04	−0.15 ***	−0.20 ***	1.00										
(5) FOW	−0.09 ***	0.01	0.02	−0.10 ***	1.00									
(6) BSIZE	−0.06 *	0.26 ***	0.23 ***	−0.28 ***	0.15 ***	1.00								
(7) BIND	0.15 ***	−0.13 ***	−0.16 ***	−0.13 ***	−0.16 ***	−0.12 ***	1.00							
(8) LEVEGE	−0.10 ***	0.11 ***	0.00	0.04	0.18 ***	0.05	−0.12 ***	1.00						
(9) SIZE	−0.16 ***	0.54 ***	0.54 ***	−0.17 ***	0.26 ***	0.48 ***	−0.24 ***	0.32 ***	1.00					
(10) CASH	−0.03	0.09 **	0.21 ***	−0.06 *	−0.07 **	−0.01	−0.02	−0.37 ***	−0.07 **	1.00				
(11) FAGE	−0.02	0.12 ***	−0.01	−0.07 **	−0.18 ***	0.08 **	−0.04	−0.10 ***	0.02	0.02	1.00			
(12) OPCF	−0.20 ***	0.23 ***	0.16 ***	0.07 *	−0.06 *	0.11 ***	−0.11 ***	−0.14 ***	0.16 ***	0.14 ***	−0.02	1.00		
(13) ROA	−0.18 ***	0.17 ***	0.13 ***	0.16 ***	−0.08 **	0.10 ***	−0.16 ***	−0.16 ***	0.19 ***	0.14 ***	−0.10 ***	0.60 ***	1.00	
(14) MTB	−0.14 ***	0.03	0.03	0.09 ***	−0.09 ***	−0.09 **	−0.04	−0.02	−0.19 ***	0.13 ***	−0.06*	0.15 ***	0.10 ***	1.00

*** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

Table 5. OLS regression results (dependent variable (DV) = *InvInef*).

Variables	(1)	(2)	(3)	(4)
CSR	−0.124 ***	−0.124 ***	−0.119 ***	−0.124 ***
	(0.034)	(0.034)	(0.035)	(0.034)
IOW	−0.118 ***	−0.124 ***	−0.115 ***	−0.118 ***
	(0.028)	(0.029)	(0.028)	(0.028)
FAMW	−0.071 **	−0.071 **	−0.062 **	−0.071 **
	(0.030)	(0.030)	(0.031)	(0.030)
FOW	−0.106 ***	−0.105 ***	−0.106 ***	−0.106 ***
	(0.024)	(0.024)	(0.024)	(0.024)
IOW × CSR		0.011		
		(0.019)		
FAMW × CSR			0.025	
			(0.026)	
FOW × CSR				0.004
				(0.024)
BSIZE	0.020	0.022	0.019	0.019
	(0.029)	(0.030)	(0.030)	(0.030)
BIND	0.053 **	0.053 **	0.051 **	0.053 **
	(0.025)	(0.025)	(0.025)	(0.025)
LEVEGE	−0.004 ***	−0.004 **	−0.004 ***	−0.004 ***
	(0.002)	(0.002)	(0.002)	(0.002)
SIZE	0.052 *	0.048	0.050 *	0.052 *
	(0.029)	(0.030)	(0.029)	(0.029)
CASH	0.158	0.157	0.156	0.158
	(0.319)	(0.319)	(0.319)	(0.319)
FAGE	−0.107 **	−0.104 **	−0.111 **	−0.108 **
	(0.044)	(0.045)	(0.045)	(0.044)
OPCF	−1.096 ***	−1.100 ***	−1.094 ***	−1.096 ***
	(0.423)	(0.424)	(0.423)	(0.423)
ROA	−0.007 *	−0.007	−0.007 *	−0.007 *
	(0.004)	(0.004)	(0.004)	(0.004)
MTB	−0.048 ***	−0.048 ***	−0.050 ***	−0.048 ***
	(0.016)	(0.016)	(0.016)	(0.016)
_cons	0.026	0.060	0.082	0.021
	(0.463)	(0.479)	(0.467)	(0.468)
Obs.	837	837	837	837
R-squared	0.204	0.204	0.205	0.204
Year/Sector Dummies	Yes	Yes	Yes	Yes

*** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

The findings presented in Table 5, column 1, revealed a significant negative correlation between CSR and *InvInef*. Specifically, the CSR coefficient exhibited statistical significance at the 1% level ($p < 0.001$). This supports our first hypothesis, which suggests a positive relationship between CSR disclosure and investment efficiency. These findings indicated that companies more engaged in CSR activities experienced reduced investment inefficiency, thereby achieving a higher level of investment efficiency. The results align with the assertion that companies with higher levels of CSR disclosures tend to exhibit reduced information asymmetry, increased transparency, superior management quality, and lower levels of earnings management, thus enhancing their investment efficiency [1]. Our study's findings align with those of [6–12], demonstrating that companies with higher CSR disclosures tend to show enhanced investment efficiency.

Regarding the ownership structure variables, the findings in Table 5, column 1, showed that IOW was significantly and negatively correlated with *InvInef*. The coefficient of IOW was statistically significant at the 1% level ($p < 0.001$), supporting our second hypothesis. This finding suggests that IOW decreased investment inefficiency and, therefore, increased investment efficiency in Saudi firms. This result is consistent with prior studies that found a positive and significant impact of IOW on investment efficiency [20,46,51,54–59]. Addi-

tionally, the findings in Table 5, column 1, showed a negative and significant association between FAMW and *InvInef* at the 5% level ($p < 0.05$), which supports our third hypothesis. This result implies that FAMW reduced investment inefficiency and, consequently, enhanced investment efficiency in Saudi firms. This study's results emphasized the beneficial influence that FAMW may have on company governance and decision-making processes, which in turn enhance the overall firm investment efficiency. Our findings align with prior research [12,19,70,72], which demonstrated that FAMW improves firms' investment efficiency.

Furthermore, as shown in Table 5, column 1, FOW was negatively and significantly linked with *InvInef* at the 1% significance level ($p < 0.001$). These results are consistent with our fourth hypothesis, which posits that FOW positively affects firms' investment efficiency. This suggests that an increase in FOW led to lower investment inefficiency and, consequently, improved investment efficiency in Saudi companies. This finding aligns with the anticipated benefits of FOW, which include enhancing firms' investment through the transfer of advanced technologies, managerial expertise, and innovative practices to local firms [22]. Our findings corroborate those of prior studies, such as [21,22,51], which also observed a positive influence of FOW on companies' investment efficiency.

In Table 5, columns 2, 3, and 4, we examined the moderating role of structure OWSTR on the association between CSR disclosures and *InvInef*. The findings indicated that the coefficients of OWSTR*CSR interaction variables were not significant across all columns, suggesting that OWSTR did not significantly influence the negative relationship between CSR disclosures and *InvInef* in Saudi firms. These results suggested that ownership structure variables do not lead to improved information disclosure practices in Saudi firms. This lack of significance may be attributed to the prevalence of concentrated ownership structures in Saudi companies, where dominant owners prioritize goals other than enhancing transparency through CSR [69,116,117]. Notably, about one-third of Saudi-listed companies' capital is owned by public institutions, and another third by founding families [24–26].

Another reason for the insignificant moderating effect of OWSTR is the varying motivations behind CSR disclosures. Recent research indicated that institutional investors often prioritize financial aspects of ESG disclosures, potentially increasing conflicts with non-investing stakeholders and undermining firm disclosures [78,79]. This focus on private benefits might diminish firm value and weaken CSR's impact on investment efficiency, aligning with findings that institutional investors prioritize short-term financial performance [118,119]. Consequently, IOW could reduce CSR's effectiveness in enhancing investment efficiency. Moreover, the insignificant moderating effect of FAMW may be due to the fact that family-owned firms may engage in CSR primarily for reputational reasons, rather than transparency [12], while firms with concentrated FAMW and strong managerial oversight benefit from enhanced information access and monitoring mechanisms [85]. However, this advantage can also lead to conflicts and information gaps, potentially diminishing CSR's impact on investment efficiency due to increased information asymmetry [12]. Foreign investors, on the other hand, often pursue local acceptance and symbolic image building through CSR activities, influencing local firms to improve environmental and social performance [89,90]. Yet, their emphasis on short-term gains may result in underinvestment in sustainable activities. Cultural differences and divergent expectations between foreign investors and local stakeholders further complicate CSR's effectiveness in enhancing investment efficiency. However, our findings on the insignificant impact of ownership structure variables aligned with previous Saudi studies that found ownership structure variables, such as FAMW or IOW, to have either a negative or insignificant effect on CSR disclosures [62,63].

With regard to control variables, the findings in Table 5 showed that companies with higher LEVEGE, longer FAGE, higher OPCF, more profitable ROA, and higher MTB had a negative and statistically significant association with *InvInef*. This indicates that firms are more likely to enhance firms' investment efficiency, in tandem with earlier studies [6,39,97]. In contrast, the findings in Table 5 showed that BIND and SIZE had a positive and sig-

nificant relationship with *InvInef*, while BSIZE and CASH had no significant relationship with *InvInef*.

5. Further Investigation

In this section, we conducted additional robustness tests to further ensure the validity of our results, which indicated a positive relationship between CSR, OWSTR, and investment efficiency. These additional investigations assessed the sensitivity of our results to different measurements of investment efficiency and CSR, various estimation approaches, and several methods to address endogeneity and self-selection bias.

5.1. Using Alternative Measurements for Investment Efficiency

As an additional robustness test, we utilized two different measurements for investment efficiency. First, we followed previous studies [46,120] and used companies' capital expenditure ratio (CAPEX) as a measure for company investment efficiency. The CAPEX is calculated by dividing the capital expenditure by the book value of total assets. This is a direct measurement for investment efficiency; hence, we assumed a positive relationship between CSR disclosure, ownership structure variables, and CAPEX. The findings in Table 6, column 1, show a positive and significant association between CSR, OWSTR, and CAPEX, suggesting that firms with more CSR disclosure and higher ownership structure variables achieved a higher level of investment efficiency. These results strengthened our main findings presented in Table 5.

Table 6. Alternative measurement approach results.

Variables	Alternative Measurements for Investment Efficiency		Alternative Measurements for CSR Disclosures
	DV = *CAPEX*	DV = *NERG*	DV = *InvInef*
CSR	0.140 ***	−0.116 ***	
	(0.036)	(0.033)	
$CSR_{quantity}$			−0.125 ***
			(0.033)
IOW	0.122 ***	−0.092 ***	−0.120 ***
	(0.029)	(0.026)	(0.028)
FAMW	0.064 **	−0.083 ***	−0.073 **
	(0.032)	(0.030)	(0.030)
FOW	0.101 ***	−0.099 ***	−0.107 ***
	(0.025)	(0.022)	(0.024)
BSIZE	−0.016	0.008	0.020
	(0.031)	(0.029)	(0.029)
BIND	−0.079 ***	0.034	0.054 **
	(0.029)	(0.025)	(0.025)
LEVEGE	0.007 ***	−0.003 **	−0.004 ***
	(0.002)	(0.001)	(0.002)
SIZE	−0.083 **	0.048 *	0.049 *
	(0.032)	(0.027)	(0.028)
CASH	−0.170	0.201	0.143
	(0.348)	(0.295)	(0.319)
FAGE	0.089 *	−0.115 ***	−0.108 **
	(0.046)	(0.044)	(0.044)
OPCF	1.545 ***	−1.067 ***	−1.073 **
	(0.466)	(0.408)	(0.423)
ROA	0.014 ***	−0.005	−0.007 *
	(0.004)	(0.004)	(0.004)

Table 6. *Cont.*

Variables	Alternative Measurements for Investment Efficiency		Alternative Measurements for CSR Disclosures
	DV = *CAPEX*	DV = *NERG*	DV = *InvInef*
MTB	0.038 **	−0.049 ***	−0.049 ***
	(0.017)	(0.015)	(0.016)
_cons	2.113 ***	0.005	0.079
	(0.523)	(0.445)	(0.452)
Observations	837	837	837
R-squared	0.292	0.175	0.206
Year/Sector Dummies	Yes	Yes	Yes

*** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

In our second measurement, we followed [6,10] and considered the possibility that the relationship between investment and revenue growth may change based on whether companies report positive or negative revenue growth. Thus, we computed the predicted investment employing the following regression model:

$$INVESTMENT_{it} = \beta_0 + \beta_1 NERG_{it-1} + \beta_2 SalesGrowth_{it-1} + \beta_3 NERG_{it-1} \times SalesGrowth_{it-1} + \varepsilon_{it} \quad (4)$$

where $NERG_{it-1}$ is defined as a dummy variable, taking the value of 1 if the company i has a negative sales growth, and 0 otherwise. We conducted cross-sectional estimations for Model 4 annually and across industries, utilizing the residuals from Model 2 as an alternative measure of *InvInef*. Model 2 was re-estimated with this new proxy for investment inefficiency. The results, displayed in Table 6, column 2, indicated a negative and significant association between CSR, ownership structure variables, and NERG (i.e., an alternative measure of *InvInef*). These findings corroborated our baseline findings presented in Table 5.

5.2. Using Alternative Measurements for CSR Disclosure

An alternative methodology was employed to evaluate the quantity of CSR disclosure ($CSR_{quantity}$). The study employed the same 37-item disclosure checklist, as detailed in Section CSR, to assess the quality of CSR disclosure. Following the methodology of prior studies conducted in Saudi Arabia [62,63,93], a dichotomous scoring system was used. Each disclosed item on the checklist was assigned a score of 1, while non-disclosed items were scored as 0. The $CSR_{quantity}$ was then determined by dividing the total score by the maximum possible score of 37 for each company, using the formula below:

$$CSR_{quantity} = \frac{\sum Actual\ items\ disclosed_{it}}{Maximum\ checklist\ items}$$

Based on this measurement, we re-estimated Model 2. The findings, displayed in Table 6, column 3, supported our initial findings, demonstrating a positive association between CSR and investment efficiency.

5.3. Alternative Regression Approaches

In this section, we strengthened our findings by employing various regression techniques. These alternative estimations helped to confirm that our primary results were not compromised by any estimation errors. Table 7 displays the findings of regressing *InvInef* on CSR disclosures and ownership structure variables utilizing the following models: feasible generalized least squares (FGLS) in column 1, the panel-corrected standard error (PCSE) in column 2, the quantile regression in column 3, and the Newey–West regression in column 4. Based on the reported results, the CSR and ownership structure variables exhibited a negative and statistically significant association with *InvInef* across all regression models. This implies that the primary findings presented in Table 5 remained consistent despite the application of various estimation methods.

Table 7. Alternative estimation approach results (dependent variable = *InvInef*).

Variables	FGLS Estimation	PCSE Estimation	Quantile Estimation	Newey Estimation
CSR	−0.123 ***	−0.124 ***	−0.127 ***	−0.124 ***
	(0.026)	(0.033)	(0.030)	(0.034)
IOW	−0.111 ***	−0.118 ***	−0.107 ***	−0.118 ***
	(0.025)	(0.027)	(0.025)	(0.028)
FAMW	−0.064 ***	−0.071 **	−0.059 ***	−0.071 **
	(0.023)	(0.031)	(0.018)	(0.030)
FOW	−0.108 ***	−0.106 ***	−0.093 ***	−0.106 ***
	(0.022)	(0.024)	(0.030)	(0.024)
BSIZE	−0.004	0.020	0.036	0.020
	(0.022)	(0.029)	(0.026)	(0.029)
BIND	0.041 **	0.053 **	0.048 *	0.053 **
	(0.019)	(0.026)	(0.025)	(0.025)
LEVEGE	−0.004 ***	−0.004 ***	−0.004 ***	−0.004 ***
	(0.001)	(0.002)	(0.001)	(0.002)
SIZE	0.030	0.052 *	0.031 *	0.052 *
	(0.022)	(0.028)	(0.019)	(0.029)
CASH	0.060	0.158	0.192	0.158
	(0.235)	(0.326)	(0.289)	(0.319)
FAGE	−0.103 ***	−0.107 **	−0.110 ***	−0.107 **
	(0.034)	(0.044)	(0.040)	(0.044)
OPCF	−0.716 ***	−1.096 ***	−1.052 ***	−1.096 ***
	(0.260)	(0.395)	(0.359)	(0.423)
ROA	−0.007 ***	−0.007 *	−0.010 ***	−0.007 *
	(0.003)	(0.004)	(0.004)	(0.004)
MTB	−0.056 ***	−0.048 ***	−0.040 ***	−0.048 ***
	(0.010)	(0.015)	(0.015)	(0.016)
_cons	0.192	0.026	0.112	0.026
	(0.358)	(0.462)	(0.345)	(0.463)
Observations	828	837	837	837
Wald chi^2	646.41	386.01		
Pseudo R^2			0.157	
F-test				13.37
Year/Sector Dummies	Yes	Yes	Yes	Yes

*** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

5.4. Endogeneity

Previous research has suggested that the association between CSR disclosure and investment efficiency may be affected by endogeneity issues [3,6,10]. To mitigate potential issues of endogeneity and ensure the reliability of our results, we conducted three rigorous robustness checks by including a lagged independent variable, employing a two-stage least squares (2SLS) regression approach, and applying the Heckman (1979) [121] two-stage self-selection model.

First, in line with previous research [122–124], we conducted an additional analysis where we regressed the independent variables lagged by one year against *InvInef*. This approach mitigates endogeneity bias arising from potential reverse causality issues [125]. The findings presented in Table 8, column 1, indicate that the negative and significant relationship between CSR, ownership structure variables, and *InvInef* persisted, indicating that reverse causality did not affect our model.

Table 8. Addressing endogeneity issues.

Variables	Lagged Independent Variables *DV = InvInef*	Instrumental Variable (IV)		Heckman Two-Stage Self-Selection Model	
		First Stage	Second Stage	First Stage	Second Stage
		DV = CSR	*DV = InvInef*	*DV = CSR_DUM*	*DV = InvInef*
CSR_IND		0.735 ***			
		(0.186)			
CSR_INI		1.181 ***			
		(0.033)			
CSR	−0.130 ***		−0.117 **		−0.122 ***
	(0.038)		(0.046)		(0.034)
IOW	−0.116 ***		−0.091 ***		−0.116 ***
	(0.032)		(0.027)		(0.028)
FAMW	−0.070 **		0.019		−0.070 **
	(0.033)		(0.031)		(0.030)
FOW	−0.103 ***		−0.102 ***		−0.107 ***
	(0.026)		(0.024)		(0.024)
BSIZE	0.015	−0.013	0.014	0.148 **	0.015
	(0.030)	(0.018)	(0.030)	(0.063)	(0.031)
BIND	0.064 **	0.052 ***	0.070 ***	0.073	0.049 *
	(0.027)	(0.017)	(0.026)	(0.056)	(0.026)
LEVEGE	−0.003 *	0.001	−0.004 **	−0.006 *	−0.004 ***
	(0.002)	(0.001)	(0.002)	(0.003)	(0.002)
SIZE	0.062 **	0.095 ***	0.020	0.545 ***	0.037
	(0.031)	(0.016)	(0.032)	(0.058)	(0.040)
CASH	−0.256	0.213	0.154	0.795	0.136
	(0.400)	(0.210)	(0.329)	(0.689)	(0.317)
FAGE	−0.132 ***	0.034	−0.145 ***	0.093	−0.111 **
	(0.051)	(0.028)	(0.045)	(0.097)	(0.044)
OPCF	−0.788 *	0.501 **	−1.012 **	2.103 ***	−1.163 ***
	(0.441)	(0.250)	(0.425)	(0.806)	(0.445)
ROA	−0.009 **	0.005 *	−0.006	−0.010	−0.007
	(0.004)	(0.003)	(0.004)	(0.009)	(0.004)
MTB	−0.047 ***	0.003	−0.044 ***	0.059 *	−0.049 ***
	(0.017)	(0.013)	(0.016)	(0.035)	(0.016)
IMR					−0.049
					(0.122)
_cons	−0.035	−3.215 ***	0.625	−9.897 ***	0.348
	(0.494)	(0.297)	(0.508)	(1.006)	(0.792)
Observations	683	776	776	837	837
R-squared	0.213	0.811	0.207		0.204
Pseudo R^2				0.310	
Year/Sector Dummies	Yes	Yes	Yes	Yes	Yes

*** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

Second, we applied an instrumental variable (IV) estimation method that involves a two-step regression process. In line with previous research [6,10,39], we employed two instruments that were likely exogenous to CSR. In the first step, we utilized two instruments: the industry-year average of CSR (CSR_IND) and the initial CSR value of the firm (CSR_INI). This initial stage involved regressing CSR on these instruments, alongside all control variables included in the baseline model. In the subsequent stage, we regressed *InvInef* on the predicted CSR value and the identical set of control variables. The first-stage regression results, as shown in Table 8, column 2, revealed that the coefficients for the two instruments were positive and statistically significant at the 1% level with respect to CSR. In addition, the second-stage regression results, as shown in Table 8, column 2, indicated that the impact of CSR on *InvInef* remained significantly negative, suggesting that endogeneity did not influence our main findings.

Third, to mitigate potential self-selection bias in our primary findings, we employed the Heckman (1979) two-step approach. This involved introducing a dummy variable (CSR_DUM) that was set to 1 if the company's CSR disclosures exceeded the median of the study, and 0 otherwise [6]. In the initial stage, a probit model was employed to regress CSR_DUM against all control variables used in the primary regression. Subsequently, in the second stage, the analysis utilized *InvInef* as the dependent variable, with CSR serving as the principal independent variable. This model includes additional independent and control variables, along with a self-selection parameter derived from the first stage, represented by the inverse Mills ratio (IMR). The findings of the Heckman two-step model, shown in Table 8, columns 3 and 4, supported our main regression findings, indicating that higher CSR disclosures enhanced firms' investment efficiency.

6. Conclusions

CSR disclosure practices are crucial in enhancing investment efficiency by reducing information asymmetry and improving firms' reputation, trust, and relationships with stakeholders. This study contributed to the existing literature on CSR and investment efficiency by examining the impact of CSR disclosure on investment efficiency. Additionally, it explored how ownership structure—specifically institutional, family, and foreign ownership—may moderate the relationship between CSR disclosure and investment efficiency. The analysis utilized a sample of 154 firms listed on Tadawul from 2016 to 2021, totaling 837 firm-year observations. The findings provided statistically significant evidence that CSR disclosure is positively linked with investment efficiency. Additionally, the results demonstrated that ownership structure variables (i.e., institutional ownership, family ownership, and foreign ownership) also positively impacted firms' investment efficiency. However, the study indicated that none of the ownership structure variables moderated the positive relationship between CSR disclosure and investment efficiency. Further analysis, incorporating various measurements for CSR and investment efficiency, different estimation methods, and approaches to address endogeneity and self-selection bias, confirmed the robustness of these relationships.

These findings enhanced the existing literature by providing a more comprehensive understanding of the impact of CSR and the interaction between CSR initiatives and ownership structures on investment outcomes in several key ways. Firstly, the study explored the relationship between CSR and investment efficiency specifically within emerging markets. By extending prior findings to a developing economy, such as Saudi Arabia, this research offered new insights into this novel context. Secondly, it examined how various ownership structures—namely, institutional, family, and foreign—affect firms' investment efficiency. Unlike many CSR studies, which focus on contexts with well-established CSR practices, our findings revealed distinct implications of ownership structures in developing settings compared to developed contexts. Thirdly, the study advanced existing research by providing a detailed analysis of investor heterogeneity, specifically examining how different investor types (i.e., institutional, family, and foreign) prefer CSR disclosures and their impact on investment efficiency. This included exploring the criteria that influence these investors' preferences regarding CSR performance and its effect on investment efficiency.

Based on the findings, several practical implications can be inferred. The identified positive relationship between CSR disclosure and investment efficiency suggested that firms can stimulate growth and safeguard stakeholder interests by implementing effective CSR strategies. Furthermore, the observed positive relationships between institutional, family, and foreign ownership and investment efficiency indicated that these ownership structures can enhance corporate governance, facilitate access to international resources, foster innovation, improve capital availability, and boost market credibility. However, the lack of significant moderation by institutional, family, and foreign ownership on the CSR–investment efficiency relationship highlights the passive role of governance in this context. This finding underscores the need for Saudi regulators to address and strengthen the governance frameworks surrounding CSR initiatives.

While this study provided valuable insights, it is subject to several limitations. Firstly, the research was constrained to a single emerging market, Saudi Arabia, which may limit the broader applicability of the findings. Future studies could replicate this research in other emerging markets to enhance generalizability. Additionally, this study did not account for potential variations in ownership types, such as government ownership or different forms of institutional ownership, including mutual funds, insurance companies, and financial institutions. Future research should explore the impacts of these diverse ownership structures to provide a more comprehensive understanding.

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