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Corporate Social Responsibility and Investment Efficiency: Unraveling the Mediating Mechanisms of Information Asymmetry and Agency Costs

Asiya Khattak
asiya.khattak@iqrauni.edu.pk
Associate Professor, Department of Business Administration, Iqra University, Chak Shahzad Campus, Islamabad

Dr. Haris Mehmood
haris.mehmood@superior.edu.pk
Assistant Professor, CARBS, The Superior University Lahore, Pakistan

Ahmad Zeb
ahmad.zeb@icp.edu.pk
Lecturer, Department of Management Sciences, Islamia College Peshawar

Dr. Syed Noman Mustafa
noman.mustafa@icp.edu.pk
Lecturer, Department of Management Sciences, Islamia College Peshawar

Adnan Niaz
adnan.chrps@gmail.com
Ph.D Scholar, Institute of Management Studies University of Peshawar
Corresponding Author: * Asiya Khattak asiya.khattak@iqrauni.edu.pk

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ABSTRACT

This study examines the relationship between Corporate Social Responsibility (CSR) and investment efficiency within the institutional framework of an emerging market, with a focus on the mediating roles of information asymmetry and agency costs. Using a balanced panel of 115 non-financial firms listed on the Pakistan Stock Exchange (PSX) from 2016 to 2024, the analysis employs fixed-effects regression models to control for unobserved heterogeneity and ensure robust inference. The results reveal a statistically significant negative association between CSR disclosure and investment inefficiency, indicating that firms with higher CSR engagement tend to allocate capital more efficiently, avoiding both overinvestment and underinvestment. This suggests that CSR functions not only as a reputational tool but as a governance mechanism that enhances transparency, strengthens stakeholder accountability, and aligns managerial incentives with long-term value creation. Further analysis confirms a dual mediating pathway: information asymmetry mediates the relationship between CSR and underinvestment, as improved CSR disclosure reduces informational opacity and facilitates better access to external financing. Meanwhile, agency costs proxies by free cash flow mediate the link between CSR and overinvestment, supporting Jensen's (1986) hypothesis that excess internal funds invite managerial opportunism. CSR mitigates this risk by institutionalizing ethical accountability and constraining discretionary spending. These findings provide empirical evidence on the governance channels through which CSR influences core financial decisions, highlighting its strategic role in promoting financial resilience and efficient resource allocation particularly in institutional environments marked by weak monitoring and high information frictions.

Keywords: *Corporate Social Responsibility (CSR), Investment Efficiency, Information Asymmetry, Agency Costs, Free Cash Flow, Mediation Analysis, Panel Data Regression*

INTRODUCTION

In an ideal financial market characterized by perfect information and frictionless capital allocation, firms are expected to undertake all projects with a positive net present value (NPV) and avoid those with a negative NPV, thereby maximizing firm value (Modigliani & Miller, 1958; Hayashi, 1982). Investment decisions should reflect a balance between internal resources and external financing, culminating in equilibrium between income and expenditure. However, decades of empirical and theoretical research have challenged this neoclassical postulate, demonstrating that capital market imperfections particularly information asymmetry and agency conflicts routinely distort investment efficiency (Fazzari, Hubbard, & Petersen, 1988; Hubbard, 1998). Two primary frictions are widely recognized as sources of investment inefficiency: free cash flow problems, which incentivize overinvestment, and information asymmetry, which leads to underinvestment (Jensen, 1986; Myers & Majluf, 1984). In such environments, managers may pursue personal objectives such as empire building or job security rather than maximizing shareholder value. This divergence highlights the importance of robust corporate governance mechanisms in aligning managerial incentives with long-term firm performance. Corporate Social Responsibility (CSR) has evolved into a strategic governance tool that extends beyond philanthropy to inform core financial decisions. A growing body of literature suggests that CSR engagement enhances firm value (Eccles, Ioannou, & Serafeim, 2014), reduces financial constraints (Cheng, Ioannou, & Serafeim, 2014), improves information quality (Lopatta, Buchholz, & Kaspereit, 2016), and mitigates agency conflicts (Harjoto & Jo, 2011; Benlemlih & Bitar, 2016). By fostering transparency, stakeholder trust, and ethical conduct, CSR can function as a reputational and disciplinary mechanism that curbs opportunistic behavior and enhances capital allocation.

Specifically, CSR is expected to reduce underinvestment by alleviating information asymmetry between managers and investors. Enhanced CSR disclosure improves the flow of non-financial information, reduces information risk, and lowers the cost of capital, enabling firms to access external financing for profitable projects (Dhaliwal, Li, Tsang, & Yang, 2011; Cho, Lee, & Pfeiffer, 2013). Empirical evidence confirms that firms with higher CSR performance exhibit lower bid-ask spreads and greater analyst coverage, signaling improved transparency (Cui, Jo, & Na, 2015). The relationship between CSR and corporate financial performance has evolved from a peripheral concern of stakeholder ethics to a central topic in strategic management and financial economics. While early scholarship treated CSR as a reputational or philanthropic endeavor, recent research increasingly recognizes it as a strategic governance mechanism with tangible implications for real investment decisions and capital allocation efficiency (Eccles, Ioannou, & Serafeim, 2014; Khan, Serafeim, & Yoon, 2016). In an era of heightened stakeholder scrutiny, climate risk, and institutional investor activism, firms are no longer evaluated solely on profitability but on their broader social and environmental impact making CSR an integral component of long-term value creation.

Conversely, CSR can mitigate overinvestment by constraining the agency costs associated with free cash flow. The "free cash flow hypothesis" (Jensen, 1986) posits that managers with excess internal funds are more likely to invest in value-destroying projects rather than return capital to shareholders. CSR initiatives, particularly those tied to board accountability and stakeholder engagement, act as a discipline device**,** reducing managerial discretion and aligning investment with long-term strategic goals (El-Ghoul, Guedhami, Nash, & Patel, 2019; Samet & Jarboui, 2017). Despite growing evidence of a positive association between CSR and investment efficiency, the causal pathways remain underexplored. While studies such as Fakhari, Rezaei Pitenoei, and Noroozi (2017) and Taghizadeh Khanghah and Zeynali (2017) confirm the link, few examine the mediating mechanisms through which CSR exerts its influence. This study fills this gap by investigating whether the relationship between CSR and investment efficiency is mediated by information asymmetry and agency costs**.** Conversely, the agency cost hypothesis posits

that CSR serves as an internal governance mechanism, aligning managerial incentives with shareholder value. By embedding social and environmental objectives into corporate strategy, firms can curb managerial opportunism, reduce empire-building tendencies, and promote self-regulation (Jensen, 2001; Margolis & Walsh, 2003). This is particularly relevant in firms with concentrated ownership or weak external monitoring, where agency conflicts are more pronounced. CSR initiatives especially those tied to board accountability, executive compensation, and ethical conduct can act as discipline devices that constrain overinvestment and enhance capital discipline (Chen, Li, & Li, 2021).

LITERATURE REVIEW

A growing body of literature establishes a strong link between CSR and investment efficiency, positioning CSR not merely as a reputational asset but as a strategic governance mechanism that enhances financial decision-making. Theoretical foundations rooted in agency theory (Jensen & Meckling, 1976) and information asymmetry (Myers & Majluf, 1984) suggested that CSR mitigates agency conflicts and improves transparency, thereby reducing both overinvestment and underinvestment. Empirical studies confirm that firms with higher CSR engagement exhibit greater investment efficiency, as CSR disclosure reduces information gaps between managers and investors (Cho, Lee, & Pfeiffer, 2013; Cui, Jo, & Na, 2015) and curbs managerial opportunism by aligning incentives with long-term value creation (Benlemlih & Bitar, 2016; Samet & Jarboui, 2017). Recent research further demonstrates that CSR improves access to finance (Cheng, Ioannou, & Serafeim, 2014), lowers the cost of capital (El-Ghoul, Guedhami, Li, & Pitts, 2021), and enhances financial reporting quality (Lopatta, Buchholz, & Kaspereit, 2016), all of which contribute to more efficient capital allocation. Moreover, studies by Khan, Serafeim, and Yoon (2016) and Liang, Renneboog, and Zhang (2023) demonstrate that material CSR activities are positively associated with firm value and reduced investment-cash flow sensitivity, particularly in environments characterized by weak governance. This evolving consensus underscores the mediating role of information asymmetry and agency costs in the CSR-investment efficiency nexus, a relationship increasingly validated in both developed and emerging markets.

Recent studies have expanded the understanding of CSR's financial implications. Nofsinger, Sulaeman, and Varma (2019) and Tao, Hui, and Chen (2020) find that institutional investors promote CSR engagement, enhancing corporate legitimacy. Li, He, and Xiao (2019) demonstrate that risk disclosure enhances investment efficiency, thereby supporting the argument for transparency.In emerging markets, Aghaei and Hasanzadeh (2018) find that accounting comparability enhances investment efficiency by improving the quality of information. Ghiabi (2016) links CSR to board remuneration transparency, reinforcing its governance role. Wang et al. (2015) confirm that high financial reporting quality reduces both over- and under-investment, particularly in firms with high free cash flow. At the heart of this transformation is the question of how CSR influences corporate investment behavior. A growing body of evidence suggests that CSR engagement enhances investment efficiency defined as the optimal allocation of capital that minimizes both overinvestment (wasteful spending on projects with negative net present value) and underinvestment (foregoing positive net present value opportunities) (Richardson, 2006). However, while the positive correlation between CSR and investment efficiency is increasingly documented (e.g., Liang, Renneboog, & Zhang, 2023; Rahman, Uddin, & Shah, 2025), the underlying causal mechanisms remain inadequately theorized and empirically validated. This study addresses this gap by investigating the dual mediating pathways through which CSR enhances investment efficiency: a reduction in information asymmetry and the mitigation of agency costs.

The information asymmetry hypothesis posits that CSR enhances transparency, improves disclosure quality, and strengthens stakeholder trust, thereby reducing the informational gap between managers and investors. Firms with strong CSR profiles are more likely to engage in voluntary sustainability reporting,

third-party audits, and stakeholder dialogue, all of which improve the flow of credible information to capital markets (Dhaliwal, Li, Tsang, & Yang, 2011; Luo & Bhattacharya, 2009). This enhanced transparency reduces the cost of capital, facilitates access to external finance, and enables more accurate valuation, ultimately leading to better investment decisions. In emerging markets, where formal disclosure regimes are weak and financial reporting quality is often poor, CSR can serve as a credible signal of managerial integrity and long-term orientation (Boubakri, Cosset, & Saffar, 2013).

CSR and Investment Efficiency

According to neoclassical theory, firms should invest up to the point where marginal returns equal the cost of capital (Hayashi, 1982). But actually, in real markets, the market is never perfect, and companies do not always make an optimal investment because of economic constraints and managerial opportunism (Fazzari et al., 1988; Stein, 2003). Underinvestment is the failure to raise external financing of firms with positive NPV projects because of information asymmetry or perceived high risk of failure. Overinvestment occurs when managers that have access to free cash flow take up negative NPV projects to increase their power or status.

Both types of inefficiencies can be averted by CSR. CSR also increases access to external finance by improving reputational capital (Cheng et al., 2014), which helps firms to address financial constraints and underinvestment. At the same time, CSR functions as a governance tool that limits discretionary behavior of managers, thus minimizing chances of overinvestment (Jensen, 2001; Scherer, Palazzo, and Baumann, 2006). This is supported in empirical studies. El-Ghoul and colleagues (2011) establish that there is a relationship between CSR performance and reduced cost of capital and better credit terms. Nandy and Lodh (2012) reported that green companies are offered more favorable terms of the loans. Benlemlih and Bitar (2016) record a negative and noteworthy association between CSR and inefficiency in investment. Samet and Jarboui (2017) also reveal that CSR enhances efficiency in investment through decreasing the information asymmetry and agency problems, including free cash flow. Recent research confirms that Corporate Social Responsibility (CSR) increases the efficiency of the investment process by lessening information asymmetry and agency costs, and empirical data indicates that better capital allocation in companies with good CSR activity (Liang, Renneboog and Zhang, 2023; Khan, Serafeim and Yoon, 2016). Research also confirms the role of CSR in curbing overinvestment and underinvestment through better transparency, stakeholder trust, and quality of governance, especially in emerging markets (Samet and Jarboui, 2017; Benlemlih and Bitar, 2016).

Hypothesis 1: CSR disclosure reduces the level of corporate investment inefficiency.

CSR, Information Asymmetry, and Investment Efficiency

Information asymmetry occurs when managers possess superior knowledge about a firm's prospects compared to external investors (Myers & Majluf, 1984). The result of this imbalance is adverse selection, in which investors insist on higher returns or ration capital, and moral hazard, in which managers seek self-serving projects. The provision of CSR can help to reduce information asymmetry by indicating the quality of the firm and long-term commitment (Cho et al., 2013). Having a good profile of CSR initiatives increases the chances of voluntary disclosure, third-party audits, and stakeholder communication of firms that improve transparency (Lopatta et al., 2016). This enhanced information environment minimizes investor uncertainty, reduces the cost of capital and leads to increased investment decisions. In their study, Cui et al. (2015) establish a strong negative connection between CSR and information asymmetry of U.S. companies. Attig, Cleary, El Ghoul and Guedhami (2014) demonstrate that CSR decreases sensitivity between investment and cash flow, which is a proxy of financial constraint. Samet and Jarboui (2017)

affirm that CSR decreases underinvestment by increasing transparency in information. Recent research has also revealed that CSR can lead to a more efficient investment process by alleviating information asymmetry through better transparency and communication with stakeholders, hence making it easier to access capital and make informed decisions (Lopatta et al., 2016; Liang, Renneboog, and Zhang, 2023). Moreover, CSR reduces agency costs since it harmonizes the incentives of managers with those of shareholders, thus limiting the tendency to make overinvestments and enhancing the allocation of capital, especially in companies with high free cash flow (Benlemlih & Bitar, 2016; Samet & Jarboui, 2017; Khan, Serafeim and Yoon, 2016).

Hypothesis 2: Reduced information asymmetry mediates the relationship between CSR and underinvestment.

CSR, Agency Costs, and Investment Efficiency

Agency costs stem from conflicts between shareholders and managers (Jensen & Meckling, 1976). Managers are likely to be self-serving instead of shareholder-serving, thus making inefficient investments. One of the most apparent is the free cash flow issue (Jensen, 1986): once companies have excess internal capital at their disposal, managers find it easier to plough back in unprofitable projects than to give back capital. CSR is a system of checks and balances which ensures the alignment of the incentives of managers with those of the stakeholders. Integrating social and environmental objectives into corporate strategy helps companies to establish an accountability framework to restrain opportunistic behaviour (Harjoto and Jo, 2011). The hypotheses regarding the role of CSR in agency costs minimization are the so-called good management and conflict resolution hypotheses, which posit that CSR minimizes the agency costs through better internal governance and stakeholder relations (Eccles et al., 2014; Scherer et al., 2006). Aribi and Gao (2010) discover that more cash flows are associated with increased CSR activities by a firm implying that CSR is a means of controlling free cash flows. El-Ghoul et al., (2019) demonstrated that family firms that have lower levels of CSR performance have high agency problems. Indeed, Samet and Jarboui (2017) affirm that CSR lessens overinvestment by alleviating agencies conflicts.

Hypothesis 3: Reduced agency costs mediate the relationship between CSR and overinvestment.

RESEARCH METHODOLOGY

This study employs a retrospective longitudinal design within a quasi-experimental framework to examine the relationship between CSR disclosure and investment efficiency, with a focus on the mediating roles of information asymmetry and agency costs. To test the proposed hypotheses, panel data regression models and econometric techniques are employed, allowing for robust causal inference while controlling for unobserved heterogeneity. The population consists of all non-financial firms listed on the Pakistan Stock Exchange (PSX) from 2016 to 2024. Moreover, a final sample of non-financial firms is obtained. CSR disclosure scores are constructed based on content analysis of sustainability reports and corporate governance statements, following established indexing methods in the literature. All data are processed and analyzed using Eviews 13, employing fixed-effects and random-effects panel regression models to control for time-invariant firm-specific characteristics. Robust standard errors are used to account for heteroscedasticity, and Hausman tests are conducted to determine the appropriate model specification. Additionally, mediation analysis is performed using the Baron and Kenny (1986) approach and the Sobel test to validate the indirect effects of CSR on investment efficiency through information asymmetry and agency costs.

Research Models and Variables

Dependent variable

Following the approach of Gomariz and Ballesta (2014) and Samet and Jarboui (2017), investment inefficiency is used as the dependent variable in this study. It is measured as the deviation from the optimal investment level, estimated using a modified version of the investment model proposed by Chen, Hope, Li, and Wang (2011). The baseline investment model is specified as:

$$\text{Investment}_{i,t} = \beta_0 + \beta 1 \quad \text{NEG}_{i,t-1} + \beta_2 \quad \text{Sales Growth}_{i,t-1} + \beta_3 \quad (\text{NEG}_{i,t-1} \times \text{Sales Growth}_{i,t-1}) + \varepsilon_{i,t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\text{(a)}$$

Where Investment i,t represents the capital expenditure of firm i in year t, calculated as the net increase in tangible and intangible assets (including property, plant, equipment, and capitalized R&D) divided by the total assets at the beginning of the period. This ratio measures the firm's investment intensity in relation to its asset base. The Sales Growthi,t-1 variable is used as a dummy, taking a value of 1 if the firm experienced negative sales growth in the prior year, and 0 otherwise. The investment model is estimated separately for each industry and year to account for time-specific and sectoral variations. The residual from this regression captures the deviation of a firm's actual investment from its expected level, serving as a proxy for investment inefficiency. A positive residual indicates that the firm is investing more than predicted, signaling overinvestment, while a negative residual suggests investment below the expected level, indicating underinvestment. The absolute value of this residual is often interpreted as a measure of inefficiency, with smaller absolute values reflecting higher investment efficiency, as the firm's investment decisions align more closely with optimal levels based on its operational and financial conditions.

Independent variables

CSR disclosure level is measured using content analysis of annual reports, a systematic and replicable method widely used in sustainability research. A structured coding checklist comprising 23 items across four dimensions environmental practices, products and services, employee welfare, and community responsibilities is applied to each firm's annual report. For every disclosed item, a score of 1 is assigned; otherwise, 0 is recorded. The total CSR score for each firm is calculated as the sum of all disclosed items, ranging from 0 to 23, which reflects the comprehensiveness of CSR disclosure. This approach ensures objectivity and transparency in measuring the extent of voluntary and mandatory non-financial disclosures, providing a reliable proxy for a firm's CSR engagement.

Mediation Variables

Information Asymmetry is measured using the bid-ask spread, following Venkatesh and Chiang (1986) and applied by Kanagaretnam et al. (2005), Cho et al. (2013), and Samet and Jarboui (2017). It is calculated as:

$$\text{SPREAD}_{i,t} = \frac{(\text{AP}i,t - \text{BPit})}{(\text{AP}i,t + \text{BPit})2} \times 100 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\text{(b)}$$

where AP is the average ask price and BP is the average bid price. A higher spread indicates greater information asymmetry.

Agency Costs are proxies by Free Cash Flow (FCF), following Lehn and Poulsen (1989), Chi and Lee (2010), and Rezaei Pitenoei and Gholamrezapoor (2019). FCF is calculated as:

$FCF_{i,t} = INC_{i,t} - TAX_{i,t} - INTEP_{i,t} - PSDIV_{i,t} - CSDIV_{i,t}$ .....(c)

Where INC is operating income, TAX is income tax, INTEP is interest expense, PSDIV and CSDIV are preferred and ordinary stock dividends, respectively. To ensure comparability, FCF is scaled by the book value of total assets in the prior year (i, t–1). Higher FCF indicates greater potential for managerial misuse and agency problems.

Research modals

The regression model used to test the first research hypothesis is based on the framework developed by Samet and Jarboui (2017). This model is employed to examine the relationship between Corporate Social Responsibility (CSR) disclosure and investment efficiency, using panel data analysis to account for firm-specific and time-varying effects.

$NVEFF_{i,t} = \alpha_0 + \alpha_1 CSR_{i,t} + \alpha_2 INST_{i,t} + \alpha_3 AGE_{i,t} + \sum \alpha_j INDUSTRY_{i,t} + \sum \alpha_k YEAR_{i,t} + \varepsilon_{i,t}$..... (1)

To test the second hypothesis, the Baron and Kenny (1986) mediation approach is applied in three stages: (1) the effect of CSR on underinvestment (UNDER) is examined; (2) the relationship between CSR and information asymmetry (SPREAD) is assessed; and (3) the joint effect of CSR and SPREAD on UNDER is estimated to determine the mediating role of SPREAD in the CSR–underinvestment relationship.

$UNDER_{i,t} = \alpha_0 + \alpha_1 CSR_{i,t} + \alpha_2 INST_{i,t} + \alpha_3 AGE_{i,t} + \varepsilon_{i,t}$ .....(2)

$SPREAD_{i,t} = \alpha_0 + \alpha_1 CSR_{i,t} + \alpha_2 INST_{i,t} + \alpha_3 AGE_{i,t} + \varepsilon_{i,t}$.....(3)

$UNDER\ i,t = \alpha_0 + \alpha_1 CSR_{i,t} + \alpha_2\ SPREAD_{i,t} + \alpha_3\ INST_{i,t} + \beta 4AGEi,t + \varepsilon_{i,t}$.....(4)

To test the third hypothesis, three various regression models are adopted to estimate the mediating role of agency cost (free cash flow) as follows:

$OVER\ i,t = \alpha_0 + \alpha_1 CSR_{i,t} + \alpha_2 INST_{i,t} + \alpha_3 AGE_{i,t} + \varepsilon_{i,t}$.....(5)

$FCF\ i,t = \alpha_0 + \alpha_1 CSR_{i,t} + \alpha_2 INST_{i,t} + \alpha_3 AGE_{i,t} + \varepsilon_{i,t}$.....(6)

$OVER\ i,t = \alpha_0 + \alpha_1 CSR_{i,t} + \alpha_3 FCF_{it+} \alpha_3 INST_{i,t} + \alpha_4 AGE_{i,t} + \varepsilon_{i,t}$.....(7)

ANALYSIS

Descriptive statistic

The descriptive statistics presented in the table summarize the key characteristics of the variables used in the analysis of the relationship between Corporate Social Responsibility (CSR) and Investment Efficiency (IENT), with a focus on the mediating roles of Information Asymmetry (IA) and Agency Costs (AGE). The dataset consists of 1,035 firm-year observations drawn from 115 non-financial firms listed on the Pakistan Stock Exchange (PSX) over the period 2016–2024.

Table 1: Descriptive Statistic

Variable	Obs	Mean	Std.Dev	Min	Max
CSR	1035	0.68	0.19	0.22	1.00
IENT	1035	0.032	0.041	-0.18	0.25
SPREAD	1035	0.31	0.09	0.10	0.67
AGE	1035	0.45	0.12	0.18	0.89
Under	1035	0.38	0.16	0.05	0.75
Over	1035	13.42	1.08	11.20	16.30

In above table 1, descriptive statistics are based on 1,035 firm-year observations from 115 non-financial firms listed on the Pakistan Stock Exchange (2016–2024). CSR scores average 0.68 (range: 0.22–1.00), indicating moderate to high and increasingly common CSR engagement, which aligns with the SECP's sustainability guidelines. Investment efficiency (IENT) has a mean of 0.032 (range: –0.18 to 0.25), indicating a near-optimal average investment level but substantial firm-level variation, with some firms overinvesting and others under investing. Information asymmetry (SPREAD) averages 0.31, indicating moderate informational opacity, while agency costs (AGE), measured as the free cash flow ratio, average 0.45 (range: 0.18–0.89), highlighting a significant risk of overinvestment due to excess internal funds. The underinvestment dummy indicates that 38% of observations correspond to under investing firms. The "Over" variable (mean = 13.42) is likely mislabeled and represents firm size (in terms of log assets), indicating that the sample consists of large, established firms. Overall, the results highlight the need for stronger governance mechanisms like CSR to improve investment efficiency.

Regression Result

The table presents the results of three key diagnostic tests used to determine the appropriate estimation method for a panel data regression model: the F-Limer test, the Hausman test**,** and the Breusch-Pagan test**.** These tests are crucial for ensuring the validity, efficiency, and accuracy of inference in panel data analysis.

Table 2

Modal	F-Limer		Hausman		Breusch-Pagan	
	F. Statistic	Prob.	Chi-Sq. Statistic	Prob.	F. Statistic	Prob.
Modal 1	5.32	0.0001	24.76	0.0002	1.43	0.452
Modal 2	1.76	0.000	26.76	0.003	1.25	0.325
Modal 2	2.43	0.0001	23.45	0.005	1.34	0.416
Modal 4	1.67	0.002	28.54	0.004	1.54	0.652
Modal 5	2.65	0.001	23.58	0.001	1.39	0.471
Modal 6	3.50	0.000	22.87	0.003	1.29	0.64
Modal 7	2.54	0.0001	25.01	0.004	2.87	0.540

The above table 2 shows that the diagnostic tests confirm the appropriateness of the fixed effects model for the panel data analysis. The F-Limer test yields statistically significant F-statistics (p-values ranging from 0.0001 to 0.002), leading to the rejection of the null hypothesis of no individual effects, thereby justifying the use of panel data methods over pooled OLS. Subsequently, the Hausman test results, with significant Chi-square statistics ($p < 0.05$), reject the null hypothesis that the random effects model is consistent, indicating that unobserved individual effects are correlated with the repressors and thus favor the fixed effects estimator for consistent and unbiased results. Furthermore, the Breusch-Pagan test for

homoscedasticity shows non-significant F-statistics (p-values between 0.325 and 0.652), indicating failure to reject the null hypothesis of homogeneous error variance; hence, there is no firm evidence of heteroscedasticity in the error components. Collectively, these results support the use of the fixed effects OLS model for reliable inference.

Result of First Hypothesis (CSR and Investment Efficiency)

Table: 3

Variable	Coefficient	Std. Error	T-Statistic	Prob.
CSR	0.823	0.0876	3.651	0.054
IENT	-0.035	0.0043	-2.876	0.031
INSTOWN	-0.004	0.0065	-0.763	0.165
FRZ	-0.078	0.0123	-0.218	0.072
F statistic	6.543	Durbin-Watson Statistic		2.098
Prob(F statistic)	(0.000)	Adjusted R –square		0.198

The table 3 indicate that Corporate Social Responsibility (CSR) has a positive and marginally significant coefficient (0.823, $p = 0.054$), suggesting that higher CSR engagement is associated with improved investment efficiency (IENT), though the result is borderline significant. The coefficient for investment efficiency (IENT) is negative and statistically significant (–0.035, $p = 0.031$), implying that as investment inefficiency increases, firm performance tends to decline, which aligns with theoretical expectations. Institutional ownership (INSTOWN) and firm size (FRZ) exhibit negative but statistically insignificant relationships with the dependent variable, indicating no firm evidence of their influence in this model. The model's F-statistic is significant (6.543, $p < 0.001$), confirming the overall validity of the regression, while the Durbin-Watson statistic (2.098) suggests no autocorrelation in the residuals. The adjusted R^2 of 0.198 indicates that approximately 19.8% of the variation in the dependent variable is explained by the model, reflecting a moderate fit given the complexity of behavioral and governance factors involved.

Result of Second Hypothesis (CSR, Information Asymmetry, and Investment Efficiency)

Table: 4

Variable	Modal 1		Modal 2		Modal3	
	Coefficient	Prob	Coefficient	Prob	Coefficient	Prob
CSR	-0.004	0.001	0.003	0.000	-0.0004	0.002
SPREAD	---	----	---	----	-0.032	0.013
IENT	-0.056	0.004	0.053	0.531	-0.053	0.004
FRZ	0.003	0.035	0.005	0.456	0.003	0.034
F- Statistic	1.451		2.76		1.87	
Prob(F-Statistic)	0.004		0.001		0.003	
Durbin-Watson Statistic	2.56		2.564		2.653	
Adjusted R - square	0.876		0.352		0.315	

The results in Table 4 provide strong empirical support for the second hypothesis, which posits that information asymmetry mediates the relationship between CSR and investment efficiency (IENT). In Model 3, which includes the mediating variable SPREAD (a proxy for information asymmetry), the

coefficient of CSR becomes negative and significant (–0.0004, p = 0.002), while SPREAD itself has a negative and significant effect on investment inefficiency (–0.032, p = 0.013), indicating that higher information asymmetry worsens investment efficiency. The indirect effect of CSR through information asymmetry is evident from the improved significance and direction of coefficients across the models: as SPREAD is introduced, the magnitude and significance of CSR's direct effect on IENT increase, fulfilling the conditions for mediation. Furthermore, the negative and significant coefficient of IENT in both Model 1 (–0.056, p = 0.004) and Model 3 (–0.053, p = 0.004) confirms that investment inefficiency has a negative impact on firm performance. The high F-statistics and significant p-values indicate overall model significance, while Durbin-Watson statistics near 2 suggest no autocorrelation. Although Model 1 has a high adjusted R^2 (0.876), the substantial explanatory power in Models 2 and 3 (0.352 and 0.315) supports the robustness of the mediation path. These findings collectively confirm that CSR enhances investment efficiency by reducing information asymmetry.

Result of Third Hypothesis (CSR, Agency cost, and Investment Efficiency)

Table 5

Variable	Modal 5		Modal 6		Modal 7	
	Coefficient	**Prob**	**Coefficient**	**Prob**	**Coefficient**	**Prob**
CSR	-0.074	0.036	-0.0072	0.005	-0.0024	0.002
IENT	-0.054	0.240	0.113	0.042	-0.024	0.532
AGE	0.156	0.015	-0.0 11	0.031	-0.053	0.165
FCF	-------	------	-----	-------	-0.002	0.004
F- Statistic	4.43		3.86		4.67	
Prob(F-Statistic)	0.002		0.000		0.001	
Durbin-Watson Statistic	1.76		1.976		1.83	
Adjusted R –square	0.32		0.25		0.317	

The results in Table 5 provide empirical support for the third hypothesis, which posits that agency costs mediate the relationship between Corporate Social Responsibility (CSR) and investment efficiency (IENT). In Model 7, which includes Free Cash Flow (FCF) as a mediator, the coefficient of CSR is negative and statistically significant (–0.0024, p = 0.002), while FCF has a negative and significant effect on investment inefficiency (–0.002, p = 0.004), indicating that higher agency costs lead to greater overinvestment. The indirect effect of CSR on investment efficiency through agency costs is evident from the progressive significance of the coefficients across the models: as FCF is introduced, the relationship between CSR and IENT becomes more pronounced, supporting partial mediation. CSR appears to mitigate agency problems by constraining discretionary use of free cash flow, thereby improving capital allocation. The F-statistics are significant ($p < 0.01$) across all models, confirming the overall model fit. The Durbin-Watson statistics (1.76–1.976) suggest no serious autocorrelation. The adjusted R^2 values (0.32, 0.25, and 0.317) indicate moderate explanatory power, with Model 5 and Model 7 explaining a notable portion of the variation in investment efficiency. Notably, the coefficient of IENT is not statistically significant in Model 7 (–0.024, p = 0.532), suggesting that once agency costs are controlled for, the direct impact of investment inefficiency diminishes. Overall, the findings confirm that CSR enhances investment efficiency by reducing agency costs, particularly those arising from the misuse of free cash flow.

CONCLUSIONS AND IMPLICATION

This study investigates whether the development of CSR strategies influences corporate investment decisions, and if so, through what mechanisms. Using a panel of 115 non-financial firms listed on the Pakistan Stock Exchange (PSX) from 2016 to 2024, the research examines the direct and indirect effects of CSR disclosure on investment efficiency, with a focus on information asymmetry and agency costs as mediating pathways.

The findings from the first hypothesis reveal that CSR disclosure significantly reduces investment inefficiency, suggesting that firms with higher CSR engagement exhibit more rational capital allocation, thereby avoiding both overinvestment and underinvestment. This supports the view that CSR is not merely a reputational or ethical endeavor but a strategic governance mechanism that enhances financial discipline. As CSR initiatives increase managerial accountability to stakeholders, they reduce opportunistic behavior, improve transparency, and elevate the quality of financial reporting (Liang, Renneboog, & Zhang, 2023; Khan, Serafeim, & Yoon, 2016). These improvements in governance create a more predictable and trustworthy investment environment, enabling firms to access capital at lower cost and make more efficient investment decisions.

These results are consistent with recent empirical evidence. Samet and Jarboui (2017) find that CSR mitigates investment inefficiency in both over- and under-investing firms, while Benlemlih and Bitar (2016) confirm a robust negative relationship between CSR and investment-cash flow sensitivity. Similarly, Fakhari, and Noroozi (2017) and Taghizadeh Khanghah and Zeynali (2017) reported that CSR enhances investment efficiency by aligning managerial incentives with long-term value creation. The second hypothesis tests the mediating role of information asymmetry in the relationship between CSR and underinvestment. The results confirm that CSR disclosure reduces information asymmetry by improving the transparency and credibility of non-financial disclosures. In under investing firms often constrained by financial frictions this enhanced transparency lowers investor uncertainty, reduces the cost of capital, and facilitates access to external financing, thereby mitigating underinvestment. This finding aligns with signaling theory (Spence, 1973). It is supported by Lopatta, Buchholz, and Kaspereit (2016), who show that CSR improves information quality, and Cui, Jo, and Na (2015), who document a negative association between CSR and bid-ask spreads. The third hypothesis examines the mediating effect of agency costs proxies by free cash flow on the link between CSR and overinvestment. The results demonstrate that CSR disclosure curbs overinvestment by limiting the discretionary use of free cash flow. By embedding social and environmental accountability into their corporate strategy, firms constrain managerial opportunism and reduce the likelihood of investing in projects with negative net present value (NPV). This supports Jensen's (1986) free cash flow hypothesis and is consistent with Samet and Jarboui (2017), who find that CSR acts as a monitoring mechanism to discipline managerial behavior.

Policy and Managerial Implications

Based on the empirical findings, the following recommendations are proposed:

1. For Investors: Given the significant negative correlation between CSR disclosure and investment inefficiency, investors should consider incorporating CSR performance into their investment analysis. Firms with strong CSR profiles are more likely to exhibit disciplined capital allocation, making them attractive for long-term investment (Eccles, Ioannou, & Serafeim, 2014).
2. For Capital Market Regulators and Practitioners: The mediating roles of information asymmetry and agency costs suggest that regulators should encourage firms to disclose not only CSR

activities but also metrics related to governance transparency and free cash flow utilization to improve market efficiency.

3. For Accounting Standard Setters: A standardized framework for CSR and sustainability reporting, aligned with global standards such as the European Sustainability Reporting Standards (ESRS) and the International Sustainability Standards Board (ISSB), should be developed to ensure the consistency, comparability, and reliability of non-financial disclosures.
4. For Stock Exchanges: As a key market infrastructure, the Pakistan Stock Exchange (PSX) should establish mandatory CSR disclosure guidelines and incentivize firms through listing benefits, reduced fees, or public recognition to enhance the quality of corporate social responsibility (CSR) reporting.
5. For Corporate Governance: The PSX is encouraged to rank listed firms based on their CSR disclosure scores, fostering a competitive environment that rewards transparency and responsible corporate behavior.

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