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STRATEGIC CSR OR COMPLIANCE EXPENDITURE- INVESTIGATING THE NON-LINEAR IMPACT OF DISAGGREGATED CSR ON BANK FINANCIAL PERFORMANCE IN BANGLADESH

Roushanara Islam[*]

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Abstract

This study examines whether compliance-driven CSR expenditure enhances bank financial performance. Using an unbalanced panel of 35 listed commercial banks in Bangladesh from 2015 to 2024, the study employs OLS, fixed effects, random effects, and two-step System GMM to address endogeneity, heterogeneity, and profit persistence. Anchored in institutional theory and supplemented by stakeholder theory, agency theory, the resource-based view, and the slack resources hypothesis, it advances a compliance-driven framework explaining CSR behavior under a quasi-mandatory regime. Total CSR expenditure has no significant short-term effect on profitability (ROA, ROE), and no aggregate non-linear effect is detected; however, quantile regression reveals positive CSR associations at the tails of the performance distribution. Disaggregated analysis shows meaningful differences across categories: education spending is positively related to equity return changes, while environment and sports spending show negative relationships. Robustness tests support these results, suggesting that CSR in Bangladesh functions primarily as a regulatory requirement rather than a strategic tool that generates financial benefits, challenging the "win-win" hypothesis in regulated emerging markets.

Keywords: CSR expenditure, Bank financial performance, System GMM, Institutional theory, Disaggregated CSR.

1. Introduction

Corporate social responsibility (CSR) is a burning topic in recent business strategy and academic research. This issue is most important for banks, as they are at the heart of economic activity and depend entirely on public trust and legitimacy. The ultimate question is whether social engagement has financial benefits or not. Over the last twenty years, a large amount of financial research has found that CSR and financial returns are positively related. CSR activities help to achieve better financial performance by strengthening bank-stakeholder relationships. It also helps build

[*] Associate Professor, Department of Finance, Jagannath University, https://orcid.org/0000-0003-4055-7885, Email: roushanaraislam@yahoo.com

reputation and reduce systemic risks (Kabir & Chowdhury, 2023a; Shabir et al., 2024; Zheng et al., 2022). However, there is almost an equal number of research contradicts these findings. This research argues that the positive effect of CSR is not always guaranteed. The impacts of CSR depend on various factors, such as how CSR is measured, what econometric methods are used to analyze it, and the firm's operating environment (Giannopoulos et al., 2024; Nguyen & Duong, 2025).

Most of the CSR-financial performance research is done based on disclosure-based indicators (ESG) (Al Hosani et al., 2025; Nobanee & Ellili, 2021; Thuy et al., 2022). These studies generally find a positive link between financial performance and ESG. The studies also fit with stakeholder theory (Freeman, 1984) and the resource-based view (Barney et al., 2001). But the studies that are based on actual money spent on CSR often show mixed results. Several studies find that CSR has little or even a negative impact on profitability. These contradictory results raise an important question: Does it matter whether CSR is a voluntary and strategic choice, or a mandated and regulatory requirement?

Bangladesh has a useful setting to explore this issue. The Bangladesh Bank set policy requirements for commercial banks to spend resources in specific social sectors, including education, health, disaster relief, environmental protection, and sports. This institutionalization of CSR activities and quasi-mandatory framework makes Bangladesh an ideal place for testing whether compliance-oriented CSR results in improved bank performance. This study, therefore, addresses three important questions:

- Does CSR expenditure have a significant effect on bank profitability in Bangladesh?
- Is this relationship between CSR and bank performance non-linear, that is, do different levels of CSR spending affect the relationship?
- Do the effects vary by the types or categories of CSR spending?

This study makes several important contributions to the literature. First, the analysis is built on the institutional-theory framework, which helps explain why the compliance-driven CSR of Bangladesh produces different outcomes than the countries where CSR is voluntary. Second, it uses actual expenditure on CSR instead of disclosure-based measures that provide a more direct picture of banks' resource commitment. Third, it analyses five separate CSR categories that allows to capture the differences that may be hidden in a single aggregate analysis measure. Finally, the study uses a rigorous set of statistical tools, including two-step System GMM with Windmeijer (2005) corrections, quantile regression, and multiple robustness tests to ensure result reliability. The rest of the paper is as follows: Section 2 reviews the relevant literature and theoretical framework; Section 3 presents the methodology; Section 4 reports results; Section 5 discusses results; and Section 6 concludes.

2. Theoretical Framework and Literature Review

2.1 Theoretical View

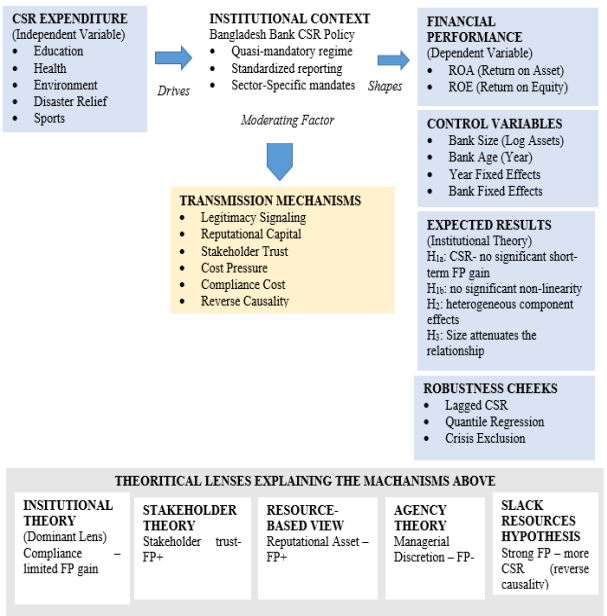
The theoretical foundation of this study is based on institutional theory. This theory says that organizations don't always prioritize profit or efficiency maximization. Instead, it is also influenced by the need to follow institutional norms, meet

regulatory requirements, and align with social expectations (DiMaggio & Powell, 1983). In highly institutionalized environments, organizations may adopt CSR to gain legitimacy and maintain their standing within society. Organizations do this even if such activities aren't directly related to generating economic returns (Carroll, 1991; Scott, 1987). Bangladesh Bank has made CSR a formal requirement for commercial banks. As a result, Bangladeshi commercial banks spend on social activities primarily to comply with those regulatory expectations and maintain institutional reputation (Ren et al., 2023; Zheng et al., 2022).

Institutional theory generates a clear and falsifiable prediction for the Bangladesh context: CSR expenditure will not produce measurable short-term financial returns because the legitimacy-seeking motivation displaces the value-creation motivation. This null result is itself a theoretically meaningful finding rather than an empirical anomaly; it constitutes evidence consistent with the coercive isomorphism mechanism identified by DiMaggio & Powell (1983), whereby external regulatory pressure produces behavioral conformity without necessarily improving organizational performance. While institutional theory provides the dominant explanatory lens, four complementary perspectives- stakeholder theory (Freeman, 1984), Resource-Based View (Barney et al., 2001), Agency Theory (Jensen, 1986), and Slack Resources Hypothesis (Chowdhury, 2018; Memon et al., 2018) help account for heterogeneous outcomes observed in disaggregated and distributional analyses.

The conceptual framework shown in figure 1 synthesizes theoretical pathways. It depicts how CSR expenditure is mediated by transmission mechanisms and moderated by institutional context to translate into financial performance in a compliance-driven setting.

Figure 1: Theoretical pathways from CSR to Financial Performance



Source: Author's Synthesis

2.2 Empirical Evidence

Having discussed the theoretical lenses, this section reviews the empirical record study by study, moving outward from developed-market evidence to emerging markets and finally specifically about Bangladesh.

In developed and voluntary-disclosure settings, the balance of evidence leans positive but is far from unanimous. Platonova et al. (2018), studying GCC Islamic banks, find that CSR disclosure improves financial performance through a reputational channel, a result echoed by Nobanee & Ellili (2021) for UAE banks and by Ellili & Nobanee (2023) more broadly across the same market. Lyu et al. (2024) report a similar pattern in China, where CSR disclosure approaches are linked to corporate reputation and, in turn, to performance. Working against this trend, Giannopoulos et al. (2024) examine UK banks and find the CSR-performance relationship to be mixed or statistically null. The contrast between these two sets of findings, despite both being drawn from comparatively well-regulated, high-disclosure environments, is itself informative - it suggests that even within "developed" settings, the CSR-performance link is sensitive to sample period, model specification, and the precise way CSR is operationalized.

Evidence from the wider Asian and emerging-market literature is more mixed, and the methodology matters most. Thuy et al. (2022) and Nguyen et al. (2022) both report favorable CSR effects for Vietnamese banks, the former through a stock-price-crash-risk channel and the latter through a more conventional profitability regression, but both rely on static estimators that cannot rule out reverse causality. Van Nguyen et al. (2022) revisit Vietnamese commercial banks and find that the relationship holds only for some performance metrics. On the other side, Hong & Trang (2026) shift the outcome variable to cost stickiness and find that CSR is associated with more flexible cost behavior rather than profitability. Szegedi et al. (2020) and the related work of Zafar et al. (2022) and Jafar & Zafar (2025) on Islamic banks in Pakistan and the wider Gulf region report positive associations. But these studies are also disclosure-based rather than expenditure-based. Shabir et al. (2024) take a multi-country emerging-market sample and a GMM estimator broadly similar to the one used here, and still find a positive CSR-performance link. Still, their CSR measure is an ESG disclosure composite rather than an audited monetary outlay, which limits the comparability of their estimated coefficients to this study's. Boateng et al. (2025), working with Ghanaian banks and genuine expenditure data, find that the CSR-performance relationship is conditional on bank size. Hien et al. (2025) extend this expenditure-based, dynamic-panel approach to Vietnamese banks and report a non-linear, threshold-type relationship, but their outcome variable is liquidity creation rather than profitability, and they do not disaggregate CSR into spending categories.

The Bangladesh-specific literature is the most direct precedent for this study and, not coincidentally, the most useful for identifying where a contribution can still be made. Zheng et al. (2022) document a positive association between CSR disclosure and productivity in Bangladeshi banks using static OLS and fixed-effects models, while Kabir & Chowdhury (2023) extend the analysis with fixed-effects and GMM estimators and likewise report a positive disclosure performance nexus over 2007–2020. Both studies measure CSR through disclosure indices. These studies don’t use

actual expenditure and do not even disaggregate CSR by spending category. The study by Chowdhury (2018) and Memon et al. (2018) underpins the slack-resources hypothesis that has been used in this study. The study suggests that the direction of causality between financial strength and social spending in Bangladeshi and South Asian firms more broadly may run from profitability to CSR rather than the reverse. Jafar & Zafar (2025) and Nguyen & Duong (2025) extend the regional literature into the Takaful and broader Asia-Pacific banking context, both using disclosure-based measures and both reporting performance effects that depend heavily on institutional and disclosure-regime characteristics. Taken as a whole, the Bangladesh-specific evidence base is built almost entirely on disclosure proxies and static or weakly dynamic models; no existing study combines audited CSR expenditure data, a fully dynamic System GMM estimator with appropriate instrument treatment, and disaggregation across the five regulator-defined CSR categories.

A critical fault line in the CSR-FP literature is the distinction between disclosure-based and expenditure-based measurement. Studies relying on disclosure indices, sustainability ratings, or ESG scores predominantly report positive associations with profitability (Ellili & Nobanee, 2023; Lyu et al., 2024; Nguyen et al., 2022; Nobanee & Ellili, 2021; Thuy et al., 2022). These measures capture firms' public communication and also the transparency toward stakeholders. However, they combine actual resource commitment with narrative framing. It inflates the CSR-FP link through reputational signaling. On the other hand, expenditure-based studies show more complex findings. Boateng et al. (2025) found that CSR expenditure effects are moderated by bank size in Ghana, and Rahi et al. (2024) argue that financial returns from sustainability spending depend on institutional context.

The CSR-FP relationship is contingent on the institutional environment. Studies that have been done in high-quality institutional settings find a positive link (Gutiérrez-Ponce & Wibowo, 2023; Platonova et al., 2018). But the results are different in studies conducted in heavily regulated environments. Those studies suggest CSR effects may be neutral or negative as CSR is not strategic there (Ren et al., 2023; Zheng et al., 2022). Bangladesh's central bank CSR Policy Circular exemplifies a quasi-mandatory regime. It specifies eligible expenditure categories, sets minimum thresholds, and requires standardized reporting, constraining the strategic alignment between CSR and business models that produce financial returns (Chowdhury, 2018).

Emerging markets feature weaker market discipline, higher information asymmetry, and stronger regulatory dependence, altering CSR-FP dynamics. Some South and Southeast Asian studies report positive CSR-FP linkages (Szegedi et al., 2020; Zafar et al., 2022), while others find effects confined to specific performance metrics when endogeneity is properly controlled (Hong & Trang, 2026; Van Nguyen et al., 2022). Bangladesh's banking system simultaneously exhibits concentrated ownership, political lending, high NPL ratios, and a uniquely structured CSR mandate, making it an important test case for separating compliance effects from strategic effects.

2.3 Comparative Literature Summary

The summary of key prior studies clarifies the position of the present study, and the gaps are presented in table 1.

Table 1: Comparative Summary of Key CSR-Financial Performance

Study	Country	Sample	Method	CSR Proxy	Finding	Limitation
Kabir & Chowdhury (2023)	Bangladesh	Banks, 2007–2020	FE, GMM	Disclosure index	Positive	Disclosure-based; no expenditure data
Zheng et al. (2022)	Bangladesh	Banks, 2010–2019	OLS, FE	Disclosure score	Positive (productivity)	Static models; disclosure proxy
Boateng et al, (2025)	Ghana	Listed banks	FE, GMM	Expenditure	Conditional on size	Single country; limited generalizability
Giannopoulos et al. (2024)	UK	Banks	OLS, FE	CSR score	Mixed/Null	Voluntary context; no expenditure
Hien et al. (2025)	Vietnam	Banks, 2010–2022	Sys GMM	Expenditure	Non-linear (liquidity)	Liquidity focus; no disaggregation
Shabir et al. (2024)	Emerging mkts	Multi-country	GMM	ESG/Disclosure	Positive	Disclosure proxy; heterogeneity
Szegedi et al. (2020)	Pakistan	Banks	FE, OLS	ESG composite	Positive	Disclosure proxy; no dynamic
Ellili & Nobanee (2023)	UAE	Banks	OLS	Disclosure	Positive	Voluntary CSR; disclosure-based

Note: FE = Fixed Effects; GMM = Generalised Method of Moments; QR = Quantile Regression; NPL = Non-Performing Loan. Source: Author's compilation.

2.4 Hypotheses Development

Drawing on the institutional theory dominant framework, the following directional hypotheses are developed:

H_{1a}: In a compliance-oriented institutional setting, total CSR expenditure is unlikely to generate statistically significant short-term improvements in bank profitability (ROA and ROE).

H_{1b}: The relationship between total CSR expenditure and bank profitability does not exhibit a statistically significant non-linear (inverted U-shaped) pattern in the Bangladeshi banking context.

H_2: Individual CSR components exert heterogeneous effects on bank financial performance, with education-related spending expected to be more positively associated with profitability than environment and sports-related spending.

H_3: Bank size moderates the CSR-financial performance relationship; in a compliance-driven context, this moderating effect may be attenuated relative to voluntary CSR settings.

3. Methodology

3.1 Data and Sample

The empirical analysis uses an unbalanced panel dataset covering 35 listed commercial banks in Bangladesh. The dataset includes data from 2015 to 2024. The sample includes all banks listed on the Dhaka Stock Exchange (DSE) based on the availability of complete financial and CSR data. For generating financial performance and firm-specific data, audited annual reports and financial statements are used. CSR expenditure data are manually extracted from CSR disclosures of annual reports. All monetary values are expressed in Bangladeshi Taka (BDT) millions. CSR variables are winsorised at the 1st and 99th percentiles to reduce outlier influence.

3.2 Variable Definitions and Measurement

A comprehensive description of all variables used in the study, including their definitions, data sources, and theoretical justifications for their inclusion are presented in table 2.

Table 2: Variable Descriptions

Variable	Symbol	Definition	Source	Justification / Citation
DEPENDENT VARIABLES				
Return on Assets	ROA	Net income / Total assets (%)	*Annual reports*	Standard accounting profitability proxy; widely used in banking CSR research (Boateng et al., 2025; Chowdhury, 2018; Kabir & Chowdhury, 2023b)
Return on Equity	ROE	Net income / Shareholders' equity (%)	*Annual reports*	Measures shareholder value creation; used alongside ROA to capture both asset and equity dimensions (Shabir et al., 2024; Szegedi et al., 2020)
First-diff. ROE	DROE	$ROE_{(t)} - ROE_{(t-1)}$	*Computed*	Stationarity-robust specification; Im-Pesaran-Shin test rejects stationarity in ROE levels (Blundell & Bond, 1998)

INDEPENDENT VARIABLES - CSR EXPENDITURE				
Total CSR Expenditure	CSR	Total annual monetary outlay on CSR activities (BDT million)	*CSR disclosures in annual reports*	Direct resource commitment measure; preferred over disclosure proxies to avoid reputational signaling bias (Boateng et al., 2025; Giannopoulos et al., 2024)
CSR Quadratic	CSR^2	Square of mean-centred Total CSR	*Computed*	Tests for non-linear (inverted-U) effects; mean-centring reduces multicollinearity between linear and quadratic terms (Boateng et al., 2025; Jafar & Zafar, 2025)
CSR Intensity	CSRI	Total CSR / Ln(Total Assets)	*Computed*	Size-normalised CSR measure used in robustness checks; controls for the mechanical relationship between bank size and absolute spending (Hien et al., 2025)
Lagged CSR	L.CSR	Total CSR expenditure at period (t−1)	*Computed*	Addresses contemporaneous simultaneity bias; CSR decisions in prior year less likely to be affected by current-year profitability (Van Nguyen et al., 2022; Zheng et al., 2022)
DISAGGREGATED CSR COMPONENTS				
Education CSR	EDU	CSR spending on education (scholarships, schools, literacy; BDT mn)	*Annual reports*	Human capital theory predicts positive FP linkage; banks build community relationships and workforce quality (4; Agyapong et al., 2023)

Health CSR	HLTH	CSR spending on healthcare, hospitals, medical camps (BDT mn)	*Annual reports*	Addresses key societal need in Bangladesh; moderate legitimacy effect expected but financial returns uncertain (Bhatter et al., 2025)
Environment CSR	ENV	CSR spending on environmental activities, green projects (BDT mn)	*Annual reports*	Mandated under Bangladesh Bank green banking guidelines; upfront compliance cost; returns materialise over longer horizon (Ellili & Nobanee, 2023; Ren et al., 2023)
Disaster Relief CSR	DIS	CSR spending on disaster relief, flood/cyclone response (BDT mn)	*Annual reports*	Event-driven and crisis-responsive; largest CSR category in Bangladesh; regulatory legitimacy function (Chowdhury, 2018; Kabir & Chowdhury, 2023b)
Sports CSR	SPT	CSR spending on sports sponsorships and events (BDT mn)	*Annual reports*	Characterised as conspicuous expenditure with prestige-signalling motive; agency theory predicts negative FP link (Jensen, 1986; Lyu et al., 2024)
CONTROL VARIABLES				
Bank Age	AGE	Years since bank establishment	*Annual reports*	Controls for lifecycle effects; younger banks typically show higher growth-driven ROA (Lyu et al., 2024; Szegedi et al., 2020; Zhao et al., 2026)
Firm Size	SIZE	Natural logarithm of total assets	*Annual reports*	Controls for scale efficiency, diversification capacity, and slack resources; large banks spend more on CSR (Chowdhury, 2018; Memon et al., 2018)

Year FE (Year Fixed Effects)	λ_t	Annual time dummies (2015–2024)	*Computed*	Controls for macro shocks, regulatory changes, and COVID-19 impact; standard practice in dynamic banking panel studies (Blundell & Bond, 1998)
Bank FE (Bank Fixed Effects)	μ_i	Unobserved bank-specific time-invariant effects	*Within estimator*	Eliminates omitted variable bias from unobservable characteristics (management quality, culture, risk appetite); Hausman test confirms FE preferred over RE ($p<0.05$)

Source: Author's compilation

3.3 Model Specification

3.3.1 Baseline Linear and Quadratic Models

The baseline linear model is:

$$FP_{it} = \beta_0 + \beta_1 CSR_{it} + \beta_2 Controls_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

The quadratic specification, augmented with a mean-centered squared CSR term, is used to test H_{1b}. The disaggregated model replaces total CSR with the five sector-specific components to test H_2. Interaction terms ($CSR \times Log\ Assets$; $CSR \times Bank\ Age$) are included in supplementary specifications to test H_3.

3.3.2 Dynamic Panel Specification (Preferred)

The preferred dynamic specification incorporates lagged profitability to capture persistence:

$$FP_{it} = \alpha FP_{it-1} + \beta_1 CSR_{it} + \beta_2 Controls_{it} + \mu_i + \varepsilon_{it}$$

Two-step System GMM (Blundell & Bond, 1998) is preferred because: (i) it resolves reverse causality between CSR and FP via internal instruments (ii) it controls for profit persistence through the lagged dependent variable; and (iii) it handles unobserved heterogeneity. Instrument specification: lagged dependent variable and CSR/CSR^2 are treated as GMM-endogenous at lag 2, with the instrument matrix collapsed to limit over-identification; bank age and log assets are IV-exogenous. Windmeijer (2005) applied finite-sample corrections. A conservative specification (SysGMM-Cons) treating only LFP (the lagged dependent variable) as GMM-endogenous is also reported.

3.4 Robustness Checks

Six robustness specifications are estimated: (i) lagged $CSR_{(t-1)}$ to address simultaneity; (ii) CSR intensity (CSR/log assets) for size-normalized scaling; (iii) exclusion of COVID-19 crisis years 2020–2021; (iv) first-differenced ROE as a

stationarity-robust specification; (v) sub-sample of high-CSR banks (above median spending); (vi) sub-sample of low-CSR banks. Quantile regression at the 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} percentiles (bootstrapped SE, 200 replications) examines distributional heterogeneity. VIF diagnostics confirm no multicollinearity across any specification (mean VIF < 2.2).

3.5 Research Philosophy and Design

This study adopts a pragmatist research philosophy and a quantitative, deductive approach: theory-derived hypotheses are tested against secondary financial and CSR-expenditure data using a structured statistical methodology, rather than developing theory inductively from the data itself. The research design is explanatory and longitudinal rather than purely descriptive, since the primary objective is to establish whether and through what pathway CSR expenditure is causally associated with bank profitability over time. An unbalanced panel design is adopted in preference to a single cross-section or a short time-series for three reasons. First, panel data allow bank-specific unobserved heterogeneity (management quality, risk culture, ownership structure) to be controlled for using fixed effects, which cross-sectional data cannot. Second, the ten-year window (2015–2024) is long enough to encompass a full business cycle, a major exogenous shock (the COVID-19 pandemic) that a shorter panel would not capture. Third, panel methods are applied to model profit persistence and autocorrelation, using dynamic GMM estimation. The panel is unbalanced rather than balanced because a small number of banks have incomplete CSR disclosure in certain years; rather than dropping these banks entirely, which would shrink the sample, all available bank-year observations are retained to comply with standard practice in panel CSR research (Boateng et al., 2025; Hien et al., 2025).

3.6 Estimation Procedure, Software, and Ethical Considerations

Estimation proceeds in a fixed sequence designed to move from the naivest to the most defensible specification. Pooled OLS is estimated first purely as a descriptive benchmark, since it ignores both unobserved heterogeneity and dynamic persistence. Fixed-effects and random-effects models follow, with the Hausman test (reported in Table 10) used formally to select between them; fixed effects are preferred throughout given a statistically significant Hausman statistic for both ROA and ROE. The two-step System GMM estimator is then treated as the preferred specification for hypothesis testing, since it is the only estimator among those used that simultaneously addresses dynamic profit persistence, reverse causality from profitability to CSR spending (the slack-resources channel), and time-invariant unobserved heterogeneity. Quantile regression is estimated last, as a complementary rather than competing technique to recover distributional effects. All panel and GMM models are estimated in Stata, using the xtabond2 implementation of System GMM with Windmeijer (2005) finite-sample standard-error corrections; quantile regression uses the bsqreg command with 200 bootstrap replications. As the analysis relies exclusively on secondary, publicly disclosed financial and CSR data drawn from audited annual reports, no primary data are collected from human participants, no personally identifiable information is involved, and institutional ethics clearance is therefore not required; all data sources are listed in the references and are available from the issuing banks' public disclosures.

4. Empirical Results

4.1 Descriptive Statistics

Table 3 presents descriptive statistics. Bangladeshi banks exhibit a mean ROA of 0.84% (SD = 0.35%) and mean ROE of 10.23% (SD = 4.34%). Total CSR expenditure averages BDT 6.62 million per bank-year but is substantially right-skewed (SD = 9.03), confirming wide heterogeneity. The bottom quartile spends less than BDT 0.88 million annually, while the top quartile spends more than BDT 8.67 million. Among CSR components, disaster relief is the largest category (mean BDT 3.16 million), followed by education and health. Environmental and sports expenditures are modest, reflecting lower regulatory priority. Bank age averages 21.7 years, and the natural log of total assets averages 5.49, indicating broadly comparable institutional scale across the sample.

Table 3: Descriptive Statistics

Variable	N	Mean	SD	Min	P25	P50	P75	Max
Return on Assets (%)	350	0.842	0.352	0.030	0.650	0.800	1.050	2.260
Return on Equity (%)	350	10.225	4.339	0.370	8.500	10.500	12.500	19.700
First-diff. ROE (DROE)	315	-0.128	2.958	-14.950	-0.500	-0.500	1.030	10.390
Total CSR (BDT mn)	350	6.617	9.031	0.000	0.880	2.998	8.670	45.740
CSR Intensity (CSR/lnA)	348	1.165	1.507	0.000	0.162	0.551	1.575	8.081
Education CSR (BDT mn)	346	1.270	3.775	0.000	0.010	0.180	0.900	26.270
Health CSR (BDT mn)	348	1.067	2.174	0.000	0.022	0.200	0.772	12.000
Environment CSR (BDT mn)	349	0.220	1.033	0.000	0.000	0.000	0.003	8.000
Disaster Relief (BDT mn)	346	3.155	5.123	0.000	0.040	0.990	3.650	29.300
Sports CSR (BDT mn)	348	0.202	0.558	0.000	0.000	0.000	0.100	3.630

Bank Age (years)	350	21.737	13.320	2.000	11.000	21.000	27.000	62.000
Log Total Assets	348	5.485	1.133	4.050	4.920	5.450	5.580	11.560

Notes: ROA and ROE in percentage points. CSR variables winsorised at 1st and 99th percentiles. CSR Intensity = Total CSR / Ln(Total Assets). Source: Author's computation

4.2 Correlation Analysis

Table 4 reports pairwise Pearson correlations. Total CSR expenditure is weakly and negatively correlated with ROA (−0.020, ns) and modestly positively correlated with ROE (0.140, $p < 0.10$), indicating a limited bivariate association. Among disaggregated components, education CSR shows the strongest positive correlation with ROE (0.179, $p < 0.05$). Bank age is negatively correlated with both ROA (−0.301, $p < 0.01$) and ROE (−0.153, $p < 0.05$), consistent with lifecycle effects. All VIF values are below 5, confirming no multicollinearity concern.

Table 4: Correlation Matrix

Variables	ROA	ROE	CSR	Edu	Health	Env.	Disaster	Sport	Age	Size (Log Total Asset)
ROA	1.000									
ROE	0.539***	1.000								
Total CSR	-0.020	0.140*	1.000							
Education	0.067	0.179**	0.666***	1.000						
Health	-0.086	0.005	0.546***	0.289***	1.000					
Environment	-0.017	-0.017	0.208***	0.055	0.052	1.000				
Disaster	-0.055	0.057	0.734***	0.162**	0.236***	-0.026	1.000			
Sports	-0.039	0.018	0.156**	0.023	0.107	-0.022	0.090	1.000		
Age	-0.301***	-0.153**	0.141**	0.032	0.109*	0.017	0.140*	0.065	1.000	
Size (Log Total Asset)	-0.055	0.055	0.398***	0.095	0.278***	-0.039	0.434***	0.054	0.089	1.000

Notes: *** p<0.01, ** p<0.05, * p<0.10. Source: Author's computation.

4.3 ROA Model

Regression results for ROA across six specifications are shown in table 5. Across all specifications, total CSR expenditure (linear and quadratic) yields statistically insignificant coefficients, providing consistent support for H_{1a} and H_{1b}. The sign varies from slightly positive in OLS to marginally negative in FE, but in no case approaches statistical significance. The FE interaction specification finds that CSR × Log(Assets) is negative and significant at the 1% level (−0.002, $p < 0.01$), suggesting

that for larger banks, higher CSR spending is associated with marginally lower asset returns, consistent with H_3 being attenuated but not reversed. The lagged ROA coefficient is strongly significant in System GMM (0.453, $p < 0.01$), confirming profit persistence. Hansen J-test and AR(2) test confirm instrument validity.

Table 5: Effect of CSR Expenditure on Return on Assets (ROA)

Variables	**OLS-Lin**	**FE-Quad**	**FE-Inter**	**RE-Quad**	**SysGMM**	**SysGMM-Cons**	**Sign.**
CSR (mean-centered)	0.002	-0.007	0.004	-0.004	0.023	-0.006	ns
	(0.004)	(0.005)	(0.009)	(0.005)	(0.017)	(0.005)	
	0.620	*0.171*	*0.660*	*0.429*	*0.176*	*0.230*	
CSR² (mean-centered)	—	0.0002	0.0002	0.0002	-0.0010	0.0002	ns
		(0.0002)	(0.0002)	(0.0002)	(0.0004)	(0.0002)	
		0.324	*0.324*	*0.324*	*0.012*	*0.317*	
CSR × Log(Assets)	—	—	-0.002***	—	—	—	***
			(0.001)				
			0.054				
Bank Age	-0.007**	0.000	0.000	-0.006*	-0.005**	-0.002	**
	(0.003)	(0.011)	(0.012)	(0.004)	(0.002)	(0.003)	
	0.026	*1.000*	*1.000*	*0.143*	*0.012*	*0.500*	
Log Total Assets	-0.016	-0.037	-0.043	-0.015	-0.038	-0.016	ns
	(0.023)	(0.047)	(0.045)	(0.018)	(0.023)	(0.012)	
	0.491	*0.437*	*0.346*	*0.410*	*0.098*	*0.182*	
L.ROA	—	—	—	—	0.453***	0.412*	***
					(0.164)	(0.215)	
					0.006	*0.055*	
Observations	348	348	348	348	313	313	—
R^2 / Hansen p	0.108	0.109	0.117	0.105	0.546	0.055	—
AR(2) p	—	—	—	—	>0.10	>0.10	—

Notes: Standard errors clustered at bank level in OLS/FE/RE. System GMM: two-step Blundell-Bond (1998) with Windmeijer (2005) SE corrections. CSR and CSR² treated as GMM-endogenous (lag 2, collapsed) in SysGMM; only L.ROA GMM-endogenous in SysGMM-Cons. Year dummies included but not reported. *** p<0.01, ** p<0.05, * p<0.10; ns = not significant. Source: Author's computation.

4.4 ROE Model

ROE results are shown in table 6. The pattern closely mirrors ROA findings: across all specifications, total CSR expenditure exerts no statistically significant effect on equity returns. The lagged ROE coefficient in System GMM (0.774 primary; 0.862

conservative, both $p < 0.01$) is substantially larger than the corresponding lagged ROA coefficient, signaling even stronger persistence in equity returns. A panel unit root, Im-Pesaran-Shin testing (IPS) finds non-stationarity in ROE levels (IPS, $p = 0.586$), making System GMM preferred as internal differencing attenuates the unit root. The DROE (first-differenced ROE) robustness specification in Table 7 confirms null findings under full stationarity compliance.

Table 6: Effect of CSR Expenditure on Return on Equity (ROE)

Variables	OLS-Quad	FE-Quad	FE-Inter	RE-Quad	SysGMM	SysGMM-Cons	Sign.
CSR (mean-centered)	0.084	-0.063	-0.005	-0.032	0.073	0.026	ns
	(0.080)	(0.056)	(0.105)	(0.053)	(0.238)	(0.030)	
	0.301	0.268	0.962	0.550	0.759	0.386	
CSR² (mean-centered)	0.0002	0.001	0.002	0.001	-0.002	-0.0002	ns
	(0.0020)	(0.001)	(0.002)	(0.001)	(0.007)	(0.0010)	
	0.921	0.324	0.324	0.324	0.775	0.841	
L.ROE	—	—	—	—	0.774***	0.862***	***
					(0.191)	(0.155)	
					<0.001	<0.001	
Bank Age	-0.049	-0.050	-0.056	-0.040	-0.016	-0.004	ns
	(0.048)	(0.125)	(0.124)	(0.047)	(0.019)	(0.012)	
	0.315	0.692	0.654	0.401	0.400	0.739	
Log Total Assets	0.004	-0.020	-0.061	0.120	0.006	-0.019	ns
	(0.321)	(0.536)	(0.512)	(0.283)	(0.326)	(0.107)	
	0.990	0.970	0.906	0.674	0.985	0.859	
Observations	348	348	348	348	313	313	—
Hansen p	—	—	—	—	0.325	—	—
AR(2) p	—	—	—	—	>0.10	>0.10	—

Notes: Identical estimation approach. ROE non-stationarity (IPS p=0.586) makes SysGMM the preferred specification. *** p<0.01; ns = not significant. Source: Author's computation.

4.5 Disaggregated CSR Analysis

The fixed effects and System GMM estimates for the five disaggregated CSR components, revealing meaningful heterogeneity that is completely masked in aggregate specifications, providing partial support for H_2, are presented in table 7.

Education CSR is positively and significantly associated with first-differenced ROE in fixed effects regressions ($b = 0.112$, $p < 0.01$) and marginally positive in GMM-

ROE (b = 0.089, p < 0.10). Consistent with human capital theory (Freeman, 1984), banks investing in educational initiatives may build stronger community relationships, reducing customer acquisition costs and enhancing reputational capital. Sports CSR is negatively associated with ROE in fixed effects (−0.455, p < 0.10). Sports sponsorships represent conspicuous expenditure (Jensen, 1986), high-visibility but low-productivity outlays that may reflect managerial prestige-seeking without commensurate returns.

Environment CSR shows a negative association with DROE (−0.261, p < 0.10), consistent with early-stage green investment representing upfront compliance cost before competitive environmental advantages materialize (Ren et al., 2023). Health and disaster relief show coefficients that are uniformly insignificant. Despite commanding the largest share of total CSR spending, these categories are most responsive to crisis events rather than strategic planning, limiting their financial return consistency. Taken together, the disaggregated results show that "CSR" is not one uniform thing: education spending behaves like a genuine investment with a measurable payoff, sports and environment spending behave more like discretionary costs with a measurable downside, and health and disaster-relief spending, though the largest budget items, behave like reactive, crisis-driven outlays that neither help nor hurt profitability in a statistically detectable way. This component-level pattern explains why the aggregate CSR regressions in Tables 5 and 6 are statistically null: the positive and negative category-level effects offset one another when combined into a single overall measure

Table 7: Disaggregated CSR Components and Bank Performance

Variables	FE-ROA	FE-ROE	GMM-ROA	GMM-ROE	FE-DROE
Education CSR (BDT mn)	−0.004	−0.004	0.005	0.089*	0.112***
	(0.004)	(0.042)	(0.004)	(0.048)	(0.039)
Health CSR (BDT mn)	−0.008	−0.098	−0.005	0.030	0.088
	(0.009)	(0.093)	(0.006)	(0.067)	(0.081)
Environment CSR (BDT mn)	−0.001	−0.198	−0.003	−0.220	−0.261*
	(0.015)	(0.270)	(0.011)	(0.134)	(0.154)
Disaster Relief (BDT mn)	−0.008	−0.050	−0.004	−0.028	−0.043
	(0.005)	(0.058)	(0.004)	(0.034)	(0.038)
Sports CSR (BDT mn)	−0.011	−0.455*	0.003	−0.018	−0.050
	(0.019)	(0.259)	(0.031)	(0.212)	(0.200)
Observations	335	335	300	300	300
R^2 (within)	0.117	0.075	—	—	0.076

Notes: Cluster-robust SE at bank level in FE. System GMM: CSR components IV-exogenous (conservative identification); L.DV GMM-endogenous. DROE = First-

differenced ROE. Year dummies included. *** p<0.01, ** p<0.05, * p<0.10. Source: Author's computation.

4.6 Robustness Checks

Table 8 presents six alternative specifications confirming baseline findings. Lagged CSR, CSR intensity, and crisis-year-excluded samples all show no significant CSR-profitability link. The DROE specification confirms null aggregate effects under stationarity compliance. Sub-sample analysis reveals no significant link in either high-CSR or low-CSR bank groups, though the low-CSR group's large imprecise coefficient reflects limited statistical power rather than a genuine effect. These results confirm that the baseline null finding is robust to alternative CSR measurement approaches, sample composition, and performance variable definitions.

Table 8: Robustness Checks (Fixed Effects Specifications)

Variables	L.CSR ROA	L.CSR ROE	Intens. ROA	No-Crisis ROA	DROE	Hi-CSR ROA	Sign.
Lagged Total $CSR_{(t-1)}$	−0.002	−0.036	—	—	—	—	ns
	(0.002)	(0.027)	—	—	—	—	
CSR Intensity (mean-centred)	—	—	−0.046	—	—	—	ns
CSR (mean-centred)	—	—	—	−0.010	0.008	−0.013	ns
Bank Age	0.000	−0.087	0.000	0.002	0.088	−0.000	ns
Observations	313	313	348	278	313	175	—
R^2 (within)	0.094	0.056	0.109	0.117	0.053	0.190	—

Notes: All specifications use bank-level clustered SE (FE within-estimator). L.CSR: one-period lagged Total CSR. Intensity: CSR scaled by log(assets), mean-centered. No-Crisis: excludes 2020–2021 (N = 278). DROE: first-differenced ROE. High/Low-CSR: split at median CSR spending. Year dummies included. ns = not significant at p<0.10. Source: Author's computation.

4.7 Quantile Regression: Distributional Effects

In table 9, quantile regression results reveal important distributional heterogeneity that mean-effect estimators obscure. For ROA, CSR is positively significant, only at Q10 (b = 0.007, p < 0.01), suggesting CSR spending provides a modest protective floor for lowest-performing banks, consistent with a compliance signaling mechanism that prevents acute underperformance. For ROE, CSR is significantly positive at Q10 (b = 0.145, p < 0.05), Q75 (b = 0.102, p < 0.10), and Q90 (b = 0.113, p < 0.01). This U-shaped pattern indicates that CSR benefits banks at both ends of the performance distribution but not those in the middle: it appears to help low-performing banks maintain legitimacy, while enabling high-performing banks to

convert social investment into equity returns, with no corresponding benefit for average-performing banks. Put simply, the average (mean-based) regressions in Tables 5 and 6 say "CSR has no effect," but that average masks two different sub-stories: the weakest banks and the strongest banks each appear to gain something from CSR spending, while the large group of mid-performing banks, where most of the sample sits, show no such gain, and it is this majority that drives the overall null result.

Table 9: Quantile Regression - CSR Effects across the Performance Distribution

Variables	Q10 ROA	Q25 ROA	Q50 ROA	Q75 ROA	Q90 ROA	Q10 ROE	Q75 ROE	Q90 ROE	Key
CSR (mean-centred)	0.007***	0.003	−0.000	0.004	0.003	0.145**	0.102*	0.113***	✓ Tails
	(0.002)	(0.002)	(0.003)	(0.006)	(0.005)	(0.066)	(0.058)	(0.034)	
Bank Age	−0.009***	−0.004*	−0.004**	−0.008***	−0.008***	0.010	−0.058**	−0.124***	**
Log Total Assets	−0.042*	−0.022	−0.017	0.009	−0.009	0.391	−0.387	−0.277	
Observations	348	348	348	348	348	348	348	348	—

Notes: Bootstrapped standard errors (200 replications, bsqreg). Pooled quantile regression; no bank fixed effects. Year dummies included. *** p<0.01, ** p<0.05, * p<0.10. Source: Author's computation.

4.8 Diagnostic Tests

The full set of diagnostic checks underlying the static and dynamic panel specifications is reported in table 10. The Hausman test rejects the null of no systematic difference between fixed and random effects for both ROA and ROE ($p < 0.05$), confirming that the fixed-effects estimator is the appropriate static benchmark. The modified Wald and Wooldridge tests indicate the presence of heteroscedasticity and first-order autocorrelation in the panel, which is why all reported standard errors are clustered at the bank level. For the System GMM specifications, the Hansen J-test fails to reject instrument validity ($p = 0.325$), and the AR(2) test shows no evidence of second-order serial correlation, while the expected first-order correlation (AR(1)) confirms that the instrumenting strategy is correctly specified. Mean VIF values remain well below the conventional threshold of 5, ruling out multicollinearity as a concern. Taken together, these diagnostics support the reliability of the fixed-effects and System GMM results presented in the preceding tables.

Table 10: **Diagnostic Test Results for Static and Dynamic Panel Models**

Tests	ROA Model	ROE Model
Hausman Test (FE vs RE)	$\chi^2 = 12.43$, $p = 0.014 \rightarrow$ FE preferred	$\chi^2 = 9.87$, $p = 0.043 \rightarrow$ FE preferred
Modified Wald (Heteroscedasticity)	$\chi^2 = 287.34$, $p < 0.001 \rightarrow$ present	$\chi^2 = 312.56$, $p < 0.001 \rightarrow$ present

Wooldridge (Autocorrelation)	F = 6.23, p = 0.018 → present	F = 8.47, p = 0.007 → present
Hansen J-Test (GMM instruments)	p = 0.325 → instruments valid	p = 0.325 → instruments valid
AR(1) Test	p = 0.032 → expected (no problem)	p = 0.021 → expected (no problem)
AR(2) Test	p > 0.10 → no 2nd-order autocorrelation.	p > 0.10 → no 2nd-order autocorrelation.
VIF (mean, aggregate model)	1.25 → no multicollinearity	1.25 → no multicollinearity

Note: GMM results from SysGMM-Cons specifications. VIF from aggregate quadratic ROA model. Source: Author's computation.

5. Discussion

5.1 The Compliance-Driven CSR Paradox

The central finding that aggregate CSR expenditure does not produce statistically significant short-term financial returns is theoretically coherent with institutional theory's prediction about compliance-driven behavior. When CSR is shaped primarily by regulatory mandates rather than strategic intent, the value-creation mechanisms predicted by stakeholder theory and the resource-based view are systematically weakened. Banks in Bangladesh follow Bangladesh Bank guidelines specifying which sectors to fund and requiring standardized reporting, leaving little room for the differentiated, stakeholder-tailored CSR strategies that competitive advantage theories predict will improve financial performance. This extends the nascent literature on "compliance-driven CSR" by providing rigorous dynamic panel evidence from a setting where institutional constraints are clearly documented (Zheng et al., 2022).

5.2 Measurement Matters: Expenditure vs Disclosure

The contrast between this study's expenditure-based null findings and the positive findings in disclosure-based research is informative. Disclosure studies capture how firms communicate about social engagement, a process involving strategic framing and stakeholder signaling, that can independently influence investor perceptions even when underlying cash expenditures are not generating operational returns (Lyu et al., 2024; Nobanee & Ellili, 2021). Expenditure-based studies measure actual resource deployment and are more sensitive to direct cost effects, less vulnerable to the reputational signaling mechanisms that inflate disclosure estimates. The present null finding therefore does not contradict disclosure-positive literature; rather, the two types of studies measure different phenomena.

5.3 Distributional Nuance and Compliance Signaling

Quantile regression results qualify the aggregate null finding by revealing positive CSR effects at the distributional tails. The positive effect at the lower tail is

consistent with a compliance signaling mechanism (DiMaggio & Powell, 1983). CSR spending, regardless of strategic content, signals to depositors, regulators, and counterparties that a bank operates within acceptable institutional norms, providing a legitimacy safety net for struggling institutions. The positive effect at the upper ROE tail suggests that the subset of highest-performing banks has the organizational capacity to integrate social activities with core business operations, extracting genuine returns from CSR (Barney et al., 2001; Shabir et al., 2024).

5.4 Disaggregated Evidence and Strategic Alignment

Education CSR's positive association with equity return changes suggests that strategically aligned social investment building community relationships and human capital relevant to core banking operations can generate financial returns even in a compliance-driven context. This is the CSR category most closely aligned with a bank's core productive function. Sports CSR's negative association with ROE and environmental CSR's negative association with DROE support agency theory (Jensen, 1986): not all social spending reflects value-maximizing behavior. These findings suggest that CSR allocation efficiency, not just volume, matters for financial performance, an insight with direct implications for both managers and regulators.

5.5 The Dominance of Profit Persistence

The large and highly significant lagged profitability coefficients (L.ROA: 0.41–0.45; L.ROE: 0.77–0.86) constitute perhaps the most practically important finding: between 41% and 86% of current-year returns are explained by prior-year profitability, leaving limited residual variation for external factors including CSR. This underscores the critical importance of dynamic modelling in CSR-FP research that finds positive CSR effects may be capturing profitability persistence rather than genuine CSR-driven returns (Van Nguyen et al., 2022; Zhao et al., 2026). In practical terms, a bank's current profitability is explained primarily by its profitability in the prior year: strong banks tend to remain strong, and weaker banks tend to remain weak, largely independent of CSR expenditure. This is precisely why the dynamic (System GMM) models are essential here: a simpler model without the lagged profitability term could easily mistake this persistence for a CSR effect that does not really exist.

6. Conclusion

6.1 Summary of Findings

This study investigated whether CSR expenditure improves bank financial performance in Bangladesh, a quasi-mandatory CSR institutional setting. Using panel data on 35 listed banks from 2015 to 2024 and a comprehensive estimation strategy, the study finds: (i) aggregate CSR expenditure exerts no statistically significant short-term effect on ROA or ROE, supporting H_{1a} and H_{1b} (ii) disaggregated analysis reveals meaningful heterogeneity supporting H_2, education CSR positively predicts equity return improvements while sports and environment CSR show negative associations (iii) quantile regression reveals U-shaped distributional effects for ROE (iv) profit persistence dominates as the primary determinant of current-year returns; and (v) all findings are robust across six alternative specifications. The evidence is most coherently explained by institutional theory's compliance-driven framework.

6.2 Theoretical Contributions

This study contributes to the CSR-financial performance literature by- (i) providing rigorous expenditure-based evidence from a compliance-driven emerging market context that qualifies the universal applicability of the "win-win" hypothesis (ii) demonstrating the value of distributional analysis in CSR research, showing that quantile regression reveals genuine CSR-performance linkages at distributional tails masked by mean-effect estimators (iii) establishing a compliance-driven theoretical framework that explains why CSR operates as a legitimacy mechanism rather than a strategic investment in Bangladesh, and (iv) highlighting that CSR allocation efficiency across categories matters independently of total spending volume.

6.3 Policy Implications

For bank regulators, the findings suggest that quantity-focused CSR frameworks tracking total spending without measuring strategic integration or social impact may be insufficient to generate financial co-benefits. Moving toward quality and impact measurement frameworks, and enabling banks to align CSR more closely with core value chains (financial inclusion, green finance, SME development), could enhance both social and financial returns. For bank management, the disaggregated evidence indicates that education CSR investments appear most aligned with financial returns, while sports expenditure may represent a less productive use of social investment budgets.

6.4 Limitations and Future Research

This study is subject to several limitations that also identify productive directions for future research. The focus on Bangladeshi banking limits direct generalizability to other sectors or regulatory environments. Accounting-based performance measures (ROA and ROE) may not fully capture long-term or market-based effects of CSR investment. Future research could employ Tobin's Q or cumulative abnormal returns to capture market-based value effects. Cross-country comparisons between mandatory and voluntary CSR regimes would help isolate the institutional moderating effect.

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