

**CAPITAL UNIVERSITY OF SCIENCE AND  
TECHNOLOGY, ISLAMABAD**



**Evaluating the Impact of Green  
Accounting Disclosures on Corporate  
Performance: A Study of Pakistani  
Listed Companies**

by

**Tassawar Kareem**

A thesis submitted in partial fulfillment for the  
degree of Master of Science

in the

**Faculty of Management & Social Sciences**

**Department of Accounting and Finance**

2025

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*I wholeheartedly dedicate this thesis to those whose love, support, and encouragement have been the pillars of my journey. To my **elder brother, Colonel Khurram Tariq Kayani**, whose strength, guidance, and belief in me have always inspired me to aim higher. To **Raja Ameer Mukhtar**, for his constant motivation and unwavering support. To my **sister, Aqsa Naseer**, for her encouragement and prayers throughout this journey and most importantly, to my **beloved wife, Rimsha Hassan**, whose patience, love, and sacrifices made this achievement possible. This accomplishment is as much theirs as it is mine.*



## CERTIFICATE OF APPROVAL

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## *Acknowledgement*

In the name of Allah, The Most merciful and Gracious. All thanks to Almighty Allah. I want to sincerely thank everyone for giving me the opportunity to finish this thesis. I am really grateful to my supervisor, **Dr. Iftikhar Ali Janjua**, whose knowledge, compassion, and endurance greatly enhanced my graduate experience. Their extensive knowledge and proficiency in several fields, together with their help with report writing and their readiness to order input on this thesis, are really appreciated. The tools and platform that, Capital University of Science & Technology, Islamabad, provided for me to continue my studies are another thing for which I am appreciative. My gratitude is extended to my friends, who supported me and offered insightful advice during this project. Their support and advice were invaluable. I sincerely appreciate all of my family's encouragement and support during this journey, especially my mother and spouse. Their belief in me enabled me to get over challenges and maintain my focus on my objectives. I would really like to congratulate myself for making this thesis writing feasible. In conclusion, I would want to express my gratitude for the money I spent along the way, which I used to support my work travel and enable this research. My sincere gratitude is extended to everyone listed above as well as to everyone who has assisted me in any way while I've been studying.

## *Abstract*

This study investigates both the drivers and effects of green accounting disclosures by thirty Pakistani companies on the Pakistan Stock Exchange from 2011 to 2020. Applying Stakeholder, Legitimacy, Agency and Resource-Based View theories, the analysis draws up a Green Accounting Disclosure Index (GADI) using information from annual reports relating to environmental policies, resource use, emissions, managing waste and their transparency. Endogeneity and the persistence of financial disclosure are examined in this study using the two-step GMM method and by reviewing debt leverage, ownership concentration, ROA, ROE and NPM. Results reveal that higher use of borrowed funds decreases chosen voluntary GAD, while greater concentration of ownership in a few hands raises it and stronger profitability (return on assets or ROA) encourages it. At the same time, firms with bigger net profits are less likely to provide information on the environment. When we observe negative returns from lagged GADI, this indicates that lower disclosure intensity follows higher disclosure intensity. The results suggest that certain measures such as required sustainability disclosure, green loan and fund options and stronger involvement by investors, are needed to promote good environmental transparency in developing nations.

**Keywords:** Green Accounting Disclosure; Corporate Performance; Financial Leverage; Ownership Concentration; Pakistan Stock Exchange; Dynamic Panel GMM; Sustainability Reporting.

# Contents

<b>Author's Declaration</b>	<b>iv</b>
<b>Plagiarism Undertaking</b>	<b>v</b>
<b>Acknowledgement</b>	<b>vi</b>
<b>Abstract</b>	<b>vii</b>
<b>List of Tables</b>	<b>xiii</b>
<b>Abbreviations</b>	<b>xiv</b>
<b>1 Introduction</b>	<b>1</b>
1.1 Background of the Study . . . . .	5
1.1.1 Introduction to Green Accounting and Corporate Performance	5
1.1.2 Green Accounting Disclosure in Developing Economies . . . . .	5
1.1.3 The Role of Leverage Ratio in Green Accounting Disclosure	6
1.1.4 The Impact of Ownership Structure on Sustainability Disclosures . . . . .	7
1.1.5 The Relationship between Green Accounting and Corporate Performance . . . . .	7
1.2 Problem Statement . . . . .	8
1.2.1 Green Accounting Disclosure Challenges in Developing Economies . . . . .	9
1.2.2 Leverage Ratio as a Constraint to Green Accounting Disclosure	10
1.2.3 Ownership Structure and Its Influence on Green Accounting Disclosure . . . . .	11
1.2.4 Research Gap and Need for This Study . . . . .	11
1.3 Research Objectives . . . . .	13
1.3.1 General Objective . . . . .	13
1.3.2 Specific Objectives . . . . .	14
1.3.3 Justification of the Research Objectives . . . . .	15
1.4 Research Questions . . . . .	15
1.4.1 Primary Research Question . . . . .	16
1.4.2 Specific Research Questions . . . . .	16

1.4.3	Justification for Research Questions . . . . .	17
1.5	Significance of the Study . . . . .	18
1.5.1	Contribution to Academic Research . . . . .	19
1.5.2	Practical Implications for Corporate Managers and Investors . . . . .	19
1.5.3	Policy Implications for Regulators and Government Agencies . . . . .	20
1.5.4	Contribution to Sustainable Business Practices . . . . .	21
1.5.5	Addressing Research Gaps . . . . .	21
1.6	Scope of the Study . . . . .	22
1.6.1	Conceptual Scope . . . . .	22
1.6.2	Geographical Scope . . . . .	23
1.6.3	Population and Sample Scope . . . . .	23
1.6.4	Time Frame of the Study . . . . .	24
1.6.5	Methodological Scope . . . . .	24
1.6.6	Limitations of the Study . . . . .	24
1.6.7	Justification of Scope . . . . .	25
<b>2</b>	<b>Literature Review</b> . . . . .	<b>26</b>
2.1	Theoretical Framework . . . . .	29
2.1.1	Stakeholder Theory . . . . .	30
2.1.2	Legitimacy Theory . . . . .	30
2.1.3	Agency Theory . . . . .	31
2.1.4	Resource-Based View (RBV) . . . . .	31
2.1.5	Integration of Theories in the Study . . . . .	32
2.2	Empirical Studies on Green Accounting Disclosure and Corporate Performance . . . . .	33
2.2.1	Relationship between Green Accounting Disclosure and Financial Performance . . . . .	34
2.2.2	The Role of Leverage Ratio in Green Accounting Disclosure . . . . .	34
2.2.3	Ownership Structure and Green Accounting Disclosure . . . . .	35
2.2.4	Green Accounting Disclosure in Developing Economies . . . . .	35
2.2.5	Financial Benefits of Green Accounting Disclosure . . . . .	36
2.3	Determinants of Green Accounting Disclosure . . . . .	37
2.3.1	Leverage Ratio and Green Accounting Disclosure . . . . .	37
2.3.2	Ownership Structure and Green Accounting Disclosure . . . . .	38
2.3.3	Profitability and Green Accounting Disclosure . . . . .	39
2.3.4	Corporate Governance and Regulatory Compliance . . . . .	40
2.3.5	Industry-Specific Determinants of Green Accounting Dis- closure . . . . .	40
2.4	The Impact of Green Accounting Disclosure on Corporate Perfor- mance . . . . .	41
2.4.1	Green Accounting Disclosure and Financial Performance . . . . .	41

2.4.2	Green Accounting Disclosure and Risk Management . . . . .	42
2.4.3	Green Accounting Disclosure and Investor Confidence . . . . .	43
2.4.4	Long-Term Sustainability and Corporate Growth . . . . .	43
2.5	Challenges in Implementing Green Accounting Disclosure . . . . .	44
2.5.1	Regulatory and Standardization Issues . . . . .	45
2.5.2	Financial Constraints and Cost Burdens . . . . .	45
2.5.3	Lack of Expertise and Skilled Professionals . . . . .	46
2.5.4	Corporate Resistance to Green Accounting Disclosure . . . . .	47
2.5.5	Technological and Data Limitations . . . . .	47
2.6	Future Directions in Green Accounting Research . . . . .	48
2.6.1	Integration of Green Accounting into Financial Decision-Making . . . . .	48
2.6.2	The Role of Emerging Technologies in Green Accounting . . . . .	49
2.6.3	Regulatory Standardization and Policy Frameworks . . . . .	49
2.6.4	Green Accounting in Industry-Specific Contexts . . . . .	50
2.6.5	Assessment of Financial Impact of Green Accounting Dis- closure . . . . .	50
<b>3</b>	<b>Research Methodology</b>	<b>52</b>
3.1	Research Design . . . . .	53
3.2	Data Collection . . . . .	54
3.3	Variables and Measurement . . . . .	55
3.4	Construction of Green Accounting Disclosure Index . . . . .	58
3.5	Justification of Green Accounting Disclosure Index (GADI) . . . . .	59
3.6	Sample Selection . . . . .	61
3.7	Data Processing and Summary Statistics . . . . .	61
<b>4</b>	<b>Results and Findings</b>	<b>64</b>
4.1	Overview and Roadmap . . . . .	64
4.2	Data, Variables, and Estimation Notes . . . . .	65
4.3	Descriptive Statistics . . . . .	66
4.4	Correlation Structure . . . . .	67
4.5	Multicollinearity . . . . .	68
4.6	Stationarity and Why Unit-Root Tests Matter . . . . .	69
4.7	Static Panel Estimates (FE and RE) . . . . .	69
4.8	FE vs. RE: Hausman Test and Reporting Strategy . . . . .	71
4.9	Dynamic Panel Results (Difference GMM) . . . . .	71
4.10	Robustness: Alternative Profitability Measure (ROE) . . . . .	73

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4.10.1	Static FE with ROE	73
4.10.2	Dynamic GMM with ROE	74
4.11	Additional Notes on Endogeneity, Instruments, and Controls	74
4.12	Mapping Findings to the Research Questions	75
4.12.1	RQ1: Does the Leverage Ratio Affect Green Accounting Disclosure (GADI) among Pakistani Listed Firms?	75
4.12.2	RQ2: Does Ownership Concentration Influence GADI?	76
4.12.3	RQ3: Does GADI Influence Firm Performance (ROA)?	76
4.12.4	RQ4: Does Profitability Moderate the Relationships among Leverage, Ownership Concentration, and GADI?	77
4.13	Robustness and Sensitivity	77
4.13.1	Alternative Outcome (ROE)	77
4.13.2	Winsorisation of Most Core Continuous Variables at the 1st/99th Percentile	78
4.13.3	GMM Diagnostics	78
4.14	Practical Interpretation and Theoretical Alignment	78
4.15	What This Means for the PSX Context	79
4.16	Limitations and Directions for Extension	79
4.16.1	Instrument Parsimony	79
4.16.2	Distributed Impact	80
4.16.3	Determinants Model for GADI	80
4.16.4	Sectoral Heterogeneity	80
4.16.5	Performance Metrics	80
4.17	Summary of Key Results	80
4.17.1	Descriptives	80
4.17.2	Correlations	81
4.17.3	Stationarity	81
4.17.4	Static FE/RE	81
4.17.5	Hausman	81
4.17.6	Dynamic GMM	81
4.17.7	Bottom Line	81
<b>5</b>	<b>Discussion and Conclusion</b>	<b>82</b>
5.1	Chapter Overview and Purpose	82
5.2	Restating the Problem and Objectives of the Study	83
5.3	Integrative Summary of Findings	84
5.4	Answering the Research Questions	87
5.5	Theoretical Contributions	88
5.6	Methodological Reflections	90

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5.7	Implications for Corporate Managers . . . . .	91
5.8	Implications for Investors . . . . .	92
5.9	Implications for Regulators and Policy- Makers . . . . .	93
5.10	Limitations . . . . .	93
5.11	Directions for Future Research . . . . .	94
5.12	Final Recommendations . . . . .	96
5.13	Concluding Statement . . . . .	97
	<b>Bibliography</b>	<b>98</b>

# List of Tables

3.1	Description of Variables . . . . .	57
3.2	GADI Components . . . . .	58
4.1	Descriptive Statistics (N = 300) . . . . .	66
4.2	Pearson Correlations (p-values in Parentheses) . . . . .	67
4.3	Multicollinearity (VIF) . . . . .	68
4.4	Panel Unit-Root Tests (Trend Included) . . . . .	69
4.5	Static Models (DV = ROA), Firm-Clustered SEs, Year FE . . . . .	70
4.6	Dynamic Difference-GMM (DV = ROA), Two-Step Robust . . . . .	72
4.7	Dynamic Difference-GMM (DV = ROE), Two-Step Robust . . . . .	74

# Abbreviations

<b>CDP</b>	Carbon Disclosure Project
<b>ESG</b>	Environmental, Social and Governance
<b>GAD</b>	Green Accounting Disclosure
<b>GADI</b>	Green Accounting Disclosure Index
<b>GMM</b>	Generalized Method of Moments
<b>GRI</b>	Global Reporting Initiative
<b>IFRS</b>	International Financial Reporting Standards
<b>IIU</b>	International Islamic University
<b>ISO</b>	International Organization for Standardization
<b>NFRD</b>	Non-Financial Reporting Directive (EU)
<b>NPM</b>	Net Profit Margin
<b>PSX</b>	Pakistan Stock Exchange
<b>RBV</b>	Resource-Based View
<b>REM</b>	Random Effects Model
<b>ROA</b>	Return on Assets
<b>ROE</b>	Return on Equity
<b>RRULE</b>	Recurrence Rule
<b>SASB</b>	Sustainability Accounting Standards Board
<b>SEC</b>	U.S. Securities and Exchange Commission
<b>SECp</b>	Securities and Exchange Commission of Pakistan
<b>SME</b>	Small and Medium-sized Enterprise
<b>TCFD</b>	Task Force on Climate-related Financial Disclosures
<b>VIF</b>	Variance Inflation Factor

# Chapter 1

## Introduction

Green accounting or environmental accounting is an emerging financial reporting framework of accounting which includes integrating the environmental costs, sustainability risks and the corporate social responsibility endeavors (CSR) into the traditional financial statements. Green accounting is different from conventional accounting systems since they pursue profit maximization and focus on economic transactions only (2025). (Lu, Liang, Hu, & Liu, 2024) states that applying this method allows businesses to measure and report on their environmental footprint, their carbon emissions, water consumption, waste generation, and compliance with sustainability rules.

The study aims to examine whether Green Accounting Disclosure (GAD), measured using a GADI instrument for content analysis, is significant with greater corporate financial performance among firms listed on the Pakistan Stock Exchange (PSX) from 2011 to 2020. Building on stakeholder theory, we claim that transparent disclosure of environmental performance drives down uncertainty and improves legitimacy with investors, creditors, and regulators and thereby reduces financing and compliance friction. Thus, we test the effect of GADI (independent variable) on profitability (dependent variable: ROA), controlling for firm size, leverage, common time shocks, and endogeneity problems.

The global sustainability challenges, increasing investor demands for transparency and evolving regulatory issues have significantly heightened the importance of green accounting disclosures in recent years (Tamasiga, Onyeaka, Bakwena, &

[Ouassou, 2024](#)). This has metamorphosed corporations globally to adopt sustainability focused financial practises ([Ratmono, Mail, Cahyonowati, & Janie, 2024](#)) as there is a rising recognition of Environmental, Social and Governance (ESG) factors as important source of financial stability. Further along this unfortunate chain, companies that do not disclose their environmental impacts and sustainability efforts run the risk of losing their investor confidence, penalty from regulation, and even will damage their reputation ([Even-Tov, She, Wang, & Yang, 2025](#)).

Corporate finance has received an injection of ESG integration and this comes to revolutionize the financial territory of how companies assess themselves. When it comes to measuring customer performance, rather traditionally, financial metrics such as revenue growth, profit margins and ROI have been used. Nevertheless, contemporary investors, consumers, and policy makers understand that a company's sustainability and resilience in the long run is contingent on effective management of environmental risks as well as an ethical labor and governance practice ([Chrzan & Pott, 2024](#)).

The appearance of sustainable finance was thus due to the appearance of ESG-focused investing, in which investing decisions are made relying on a company's commitment to environmental responsibility, ethical governance, and corporate accountability. ([Khalid, Su, Weiwei, Voinea, & Srivastava, 2025](#)) indicates that companies with strong ESG disclosures tend to perform better financially, are valued higher by the market and attract investors more attractively than their peers. This raises the strong need for firms to incorporate green accounting principles in their accounts to reflect with global trends in sustainability.

One, is that the increasing amount of research is showing that green accounting does have direct bearing in the corporate financial performance. By adopting sustainability reporting practices, companies can gain easy access to capital, and increase investor's trust and improve its brands reputation ([Camilleri, 2025](#)). By integrating environmental cost assessments with the financial planning businesses can pin point units that need to be improved, optimize the resource use, and prevent or reduce long term financial impacts from climate change or regulatory noncompliance ([Lusiana et al., 2021](#)).

They have studied according to (Even-Tov et al., 2025), that companies with higher ESG ratings had lower stock price volatility, lower regulatory penalties and higher profitability. In this aspect, correlation between green accounting disclosures and the strategic tool of risk management and the confidence of the investors can be seen as the significance of green accounting disclosures. Firms that proactively disclose their sustainability efforts also usually benefit from increased consumer loyalty, lower insurance costs and competitive advantage in environmentally conscious markets (Chrzan & Pott, 2024).

Green accounting adoption is motivated from both market pressure and regulatory mandate too. Many governments and financial institutions around the globe have mandated that companies publish sustainability reports to promote corporate transparency and environmental accountability (Fang, 2025). Currently, the U.S. Securities and Exchange Commission (SEC) climate disclosure rules, International Financial Reporting Standards (IFRS) Sustainability Disclosure Standards, and the European Union's Non-Financial Reporting Directive (NFRD) strongly impact how companies report on their environmental and social impact (Cho, Kajüter, & Stacchezzini, 2022).

Apart from the regulatory norms, the accountability principles of the Global Reporting Initiative (GRI), Carbon Disclosure Project (CDP), and the Task Force on Climate related Financial Disclosures (TCFD) encouraged firms to adopt an uniform green accounting practice. One thing these frameworks do is to provide structured way to measure, report, and manage environmental risks for corporations; developing cultural of corporate sustainability.

However, with these advancements, a lot of companies, particularly in the developing economies such as Pakistan, have challenges when it comes to inconsistent regulatory enforcement, non existence of standardized reporting frameworks, and tight monetary motivations to embrace sustainability. Pakistan did not integrate green accounting practices as a nation since there is no mandatory ESG reporting in the country, which restricted that country from achieving global sustainability rigours (Tamasiga et al., 2024). Green accounting, on the one hand, has many financial and reputation benefits, but implementing green accounting, on the other hand, is difficult in developing economies. The barriers are following:

1. There is an expense barrier of sustainability reporting that arises from the expense of obtaining data, carbon auditing and third party verification – all of which can be quite costly for SMEs (Khalid et al., 2025).
2. Since there is no standardized reporting framework, environmental disclosures differ from market to market, and differences between markets don't offer much help when trying to compare the sustainability performance of one company against that of another (Lu et al., 2024).
3. Limited Awareness and Expertise: A large number of corporate executive in performing emerging economies lack knowledge of green accounting principles, sustainability risk assessment, or regulatory compliance (Ratmono et al., 2024).
4. Yet, according to (Even-Tov et al., 2025) some firms finally took the position that sustainability reporting is not unlike any other cost, and they decided not to bear these irrelevant costs for the sake of short term financial gains instead of long term environmental stewardship. To tackle these challenges, stronger policy interventions, financial incentives to report on sustainability, and better corporate understanding of integrating ESG is needed (Cho et al., 2022).

This is a major shift in provisioning of green accounting and ESG disclosures to corporate finance, investment strategy and regulatory governance. While developing sustainable businesses is a typical objective for businesses, sustainability based economic system is on the rise, which in turn necessitates businesses to adopt transparent environmental reporting practices to remain financially sound in the future, meet regulatory requirements and attract investors (Fang, 2025).

The research shows that the companies that adopt green accounting practice are having great financial gains such as low capital cost, high market value and lower regulatory risk. Main Problems remain in green accounting adoption in developing countries such as Pakistan; namely, problems in implementation, regulatory inconsistencies, as well as financial constraints. In order to bridge this gap, this study assesses the effects of green accounting disclosures on the firm's performance; the effects of the ownership structure and the financing decisions on sustainability reporting for the case of Pakistani listed companies; and regulatory barriers for ESG adoption among the Pakistani listed companies.

## 1.1 Background of the Study

### 1.1.1 Introduction to Green Accounting and Corporate Performance

Green Accounting Disclosure (GAD) has become one of performance area of corporate financial transparency and sustainability management owing to the increasing importance of environmental sustainability to corporate reporting. Green accounting is a form of accounting that employs processes and uses tools to calculate environmental costs, carbon emissions and some sustainability initiatives into the financial statements of companies in order to determine how the firms are doing environmentally (Saeed, Kamil, & Wiredu, 2024). Firms have increasingly recognized the need to assist with these relationships by balancing one's profitability and the firm's responsibility towards the environment, especially in developing economies where financial constraints and inconsistent regulatory enforcement largely remain (Lusiana et al., 2021).

Accordingly, there are costs to firms that engage in all aspects or comprehensive Green Accounting Disclosures that makes the investors more confident, lowers regulatory risks and enhancement in firm's financial performance (Baltagi & Baltagi, 2008). Though, green financial reporting is still very low in the developing economies mainly because of lack of regulatory frameworks, weak institutional pressures, and financial constraints. Research has confirmed that high leverage and concentration of ownership indeed influence a presentation of a Green Accounting Disclosure. Firms are driven to the short term obligations at the time of writing rather than the long term environmental sustainability (Liu, Zhu, Zhu, Wang, & Xing, 2022).

### 1.1.2 Green Accounting Disclosure in Developing Economies

Green Accountability Assertion is quite slow to be adopted in growing economies than the developed ones as there is no regulatory compliance, no buyer demand

and financial constraints that relate to them (Saeed et al., 2024). Resource based manufacturing, mining and energy industries are key to heavy use in many developing countries and lead to tremendous environmental degradation (Wiredu, Osei Agyemang, & Agbadzidah, 2023). However, these industries are not very willing to disclose their environmental impact, as there are weak disclosure requirements and no financial incentives for sustainability investments.

Several studies have revealed that the barriers of green accounting adoption in emerging markets come from high compliance costs, lack of technical expertise, and weak enforcement (Kalbouneh, Aburishah, Shaheen, & Aldabbas, 2023). For example, a study in Vietnam and Bangladesh showed that firms with higher levels of environmental reporting scores were more likely to be able to obtain foreign direct investment (FDI) and international capital markets, and that this is associated with financial benefits of the transparency of sustainability (Huu Anh, La Soa, & Hanh, 2020).

### **1.1.3 The Role of Leverage Ratio in Green Accounting Disclosure**

The existence of a firm's capital structure is crucial in the practice of the firm's sustainability reporting. Overall, firm with higher debt financing has more resources available for debt servicing at the expense of environmental investment (Beck, Frost, & Jones, 2018). The studies suggest that firms with higher degree of leverage are less likely to Voluntary Green Accounting Disclosure (Zhang & Vigne, 2021).

Although empirical studies show the positive role of green financial mechanisms in fostering corporate environmental responsibility, there are still conflicting views between those who denounce its effectiveness and the multiples insisting on the positive role it plays in increasing environmental responsibility of firms. Where such financing solutions involve strict ESG reporting requirements, firms that take them up are also more compliant with sustainability reporting standards (Liu et al., 2022). Research discovered, however, that access to green credit program in China's pollution clogged plate industries improved firms' sustainability reporting

and financial performance (Khurram, Xie, Mirza, & Tong, 2023). However, while this has been established, green financing adoption rates remain low in Pakistan and other developing economies, largely because of the lack of regulatory incentives, lack of green banking policies, and poor awareness in investors about the ESG benefits (Hassan, Ahmed, & Latif, 2024).

#### **1.1.4 The Impact of Ownership Structure on Sustainability Disclosures**

The results of Green Accounting Disclosure are very sensitive to corporate ownership concentration. As greater shareholder activism and institutional investor pressure (Wiredu et al., 2023) is more likely to be present in dispersed ownership structure firms, it is more likely that dispersed ownership structure firms voluntarily report Environment, Social and Governance (ESG). On the contrary, it has been observed that the owners of firms with high ownership concentration, especially family-controlled business, tend to disclose less sustainability information because the controlling shareholders prioritize profitability over environmental concerns (Deb, Saha, & Rahman, 2020). Family control has been found to decrease the probability of undertaking green accounting in ASEAN markets. That is of great concern, especially to corporate transparency and corporate accountability in these industries with a large environmental footprint (Liu et al., 2022). It is shown, however, that controls measured by board diversity and independent directorships reduce the adverse impact of ownership concentration on Green Accounting Disclosure. A study by (Kalash, 2021) in India for instance, observed that firms with independent boards being more likely to disclose on sustainability when faced with higher regulatory scrutiny and investor expectations.

#### **1.1.5 The Relationship between Green Accounting and Corporate Performance**

Thus far, the financial impact of Green Accounting Disclosure has been a discussed issue in the literature on Green Accounting Disclosure. Other studies (Friede,

Busch, & Bassen, 2015) claim that the cost to comply is placed on sustainability reporting, but the relationship with corporate profitability, stock valuation and long term stability is positive. The green accounting financial benefits rely on regulatory frameworks and investor sentiment in developing economies. Solar installation in this formative stage offers a window of opportunity for investors to gain the trust of firms that actively pursue carbon footprint reduction, energy efficiency, and environmental compliance programs, and lower the firms' capital cost. Nevertheless, the study on Turkish manufacturing firms indicates that adoption of green accounting improves corporate reputation, but does not lead to the significant effect on short term profitability, which are ascribed to high implementation costs, and weak demand of investors in green accounting disclosures (Kalash, 2021).

Fueled by these challenges, long term studies find that those firms that invest in green accounting practices are better financially stable, for higher ability to adjust to regulatory changes, acquire more responsible investors, and gain efficiency in operations (Liu et al., 2022). Adoption of Green Accounting Disclosure is limited in developing economies as an agenda for corporate sustainability and financial performance, because of financial constraints, ownership concentration and enforcement of weak regulatory. Evidence from the empirical research suggests that Green Accounting Disclosure is differently determined by debt financing and by ownership structure, with highly leveraged firms and firms with family owners less likely to comply with sustainability reporting. However, given the efforts from regulatory bodies to encourage more corporate transparency, implement the green financing mechanism, and to ensure that investors are aware of the ESG benefits. This will assist firms and stakeholders to comprehend the challenges around corporate sustainability in such unregulated areas.

## 1.2 Problem Statement

In Pakistan, environmental disclosure remains voluntary and heterogeneous, with uneven assurance and limited standardization. While international evidence often links better environmental transparency with improved corporate outcomes,

context-specific evidence for Pakistan on whether higher green disclosure translates into stronger profitability remains scarce. Profitability is persistent over time and may itself enable greater disclosure, raising endogeneity concerns. There is a need to (i) construct a consistent firm-year GADI for PSX-listed firms, and (ii) test whether higher GADI predicts higher ROA after controlling for firm characteristics and addressing disclosure–performance simultaneity.

The mounting pressures on the organization to imbibe the corporate environmental responsibility has created ways for Green Accounting Disclosure (GAD) to be known commonly as the measuring and reporting tool for the environmental impacts of the organization (Saeed et al., 2024). The adoption of green accounting practice in developing economies such as Pakistan is, at large. Being in emerging markets also brings financial constraints, weak regulatory enforcement and governance challenge and therefore challenges the inclusion of sustainability in their financial corporate disclosures (Lusiana et al., 2021).

Financial structures affect sustainability disclosures and this impact is greatly debated, in line with corporate finance. Firms with higher leverage ratios however, are inclined to take short term financial obligations, and are yet to be interested in disclosing of environmental transparency (Gracia & Siregar, 2021). Like in family owned and state-controlled firms, ownership concentration is also likely to reduce the extent of Green Accounting Disclosures (Lian, Gao, & Ye, 2022), Sustainability information and more likely to focus on profitability than sustainability. Considering that there is no ample empirical work on the financial determinants of Green Accounting Disclosure in Pakistan, this paper tests leverage ratios and concentration of ownership as drivers of adoption of Green Accounting Disclosure and how they affect firm performance subsequently.

### **1.2.1 Green Accounting Disclosure Challenges in Developing Economies**

Due to regulatory weaknesses, higher compliance costs and inability of an investor to figure out relevant information during pricing, implementing Green Accounting Disclosure in the developing economies is particularly demanding (Kalbouneh et

al., 2023). Because of such, environmental disclosures are viewed by numerous corporate executives as a cost rather than investment and, hence, several sustainability reporting is voluntarily limited (Wiredu et al., 2023). Besides, there is a missing green finance incentive and thus, firms do not financially cooperate in recording sustainably (Al Hawaj & Buallay, 2022). Empirical evidence supports that in Pakistan, in Bangladesh and Nigeria, where family owned business is a sizeable part of the market, these firms have little or no chance of being voluntary Green Accounting Disclosures (Akpan & Nkanta, 2023). This foreign investor participation almost guarantees inactivity of the environmental liabilities disclosure, as the there is no mandatory sustainability reporting law, and low level of regulatory enforcement is reported by (Huu Anh et al., 2020). Moreover, most developing economies do not have generally administered green accounting frameworks that can help guide reporting practices hence leading to very poor consistency in the subsequent reporting practices and minimal cross examinations among firms (Zhang & Vigne, 2021). However, the companies are still reluctant to report their environmental liabilities as there is a rising recognition of climate change related financial risks, which has been blamed to the fear of backlash from investors and litigation risks (Liu et al., 2022).

### **1.2.2 Leverage Ratio as a Constraint to Green Accounting Disclosure**

As such, the capital structure of a firm is vital to a firm's ability to surrender capital to being spent on sustainability disclosures. As has been stated, in most cases, companies with high leverage ratios have debt servicing obligations that come first before voluntarily making Green Accounting Disclosures because lenders focus on financial stability than a company's commitment to its sustainability (Lian et al., 2022). Firms with a high level of leverage are unlikely to make Green Accounting Disclosure in the backdrops of under developed credit market and limited green financing options (Zhang & Vigne, 2021) as confirmed from the empirical results. In ASEAN market, profit making firms with high financial leverage are accustomed to disguising the liability for its environmental as a means to block the credit

rating degradation. However, green loans and ESG linked credit instruments are still unavailable in Pakistan which restricts firms to incorporate environmental disclosure in their financial strategies (Hassan et al., 2024). Without financial incentives or mandatory regulatory enforcement, firms will continue to ‘flip the bird’ at sustainability performance in order to obsess about short term financial performance at the expense of them.

### **1.2.3 Ownership Structure and Its Influence on Green Accounting Disclosure**

Green Accounting Disclosures exhibit high levels of higher concentration of corporate ownership. The likelihood of this sort of firm to undertake ESG reporting voluntarily is heightened when its ownership structure is dispersed as this can of firm will be subjected to both external regulatory scrutiny and pressure from institutional investors (Wiredu et al., 2023). In contrast, Deb et al. (2020), produce less disclosures on sustainability. Corporate governance in ASEAN countries was researched, observing that business of family character is characterized by a tending to profitability rather than environmental accountability causing opposite influence on GAD. The situation is the same in China and India: the companies whose shareholder structure is dominated by the companies (Liu et al., 2022). The latest evidence however suggests that the effects of ownership concentration on Green Accounting Disclosures can be modulated by presence of independent board members and institutional investors (Kalash, 2021). The purpose of this research is to investigate the function of ownership concentration on Green Accounting Disclosure of Pakistani firms and to see if it is mitigated by independent directors and institutional investors.

### **1.2.4 Research Gap and Need for This Study**

In countries with a developing economy, there is a scarcity of information regarding the impact of GAD on performance which focuses specifically on Pakistan (Muttakin et al. 2017; Ahsan 2009; Shamshad and Anjum 2005). Most of the

work already cited in this chapter pays attention to which determinants that lead to disclosure (e.g., leverage or ownership) instead of outcomes of disclosure for firm profitability, but within institutional settings where enforcement and assurance are not balanced (Lusiana et al., 2021; Deb et al., 2020) Liao & Zhang 2018, Regulatory power, litigation danger, and investor monitoring are different from established markets, and also conclusions about disclosure–performance associations cannot simply be generalised with established capital markets (Liu et al., 2022; Nguyen, Le, Nguyen, Luong, & Ngo, 2023). Therefore, there is a significant divergence in the literature on whether higher GAD results in good financial performance for PSX-listed firms.

The second gap is attributable to the lack of measurement consistency. Existing studies use heterogeneous checklists or specific proxies, which makes the comparison across companies and over time difficult. Such emerging markets as Pakistan suffer from large knowledge gaps and cost and capability constraints amongst the firms — sourcing of expertise, non-standard templates and reporting costs are envisaged to be higher, especially at the level of SMEs, resulting in uneven coverage and depth; LED disclosure (Khalid et al., 2025), simultaneous to Korea or Turkey, Mexico or Brazil (Lu et al., 2024; Cho et al., 2022) Meanwhile, policy concerns and market pressure on sustainability reporting are increasing, but the adoption in both timing and scope is Another gets around specific although (Fang, 2025; Lusiana et al., 2021; Huu Anh et al., 2020). This point highlights the requirement for a transparent, replicable index (GADI) that can encapsulate key dimensions of green accounting disclosure in the PSX setting but across an adequate time frame.

Third, a gap of methodology the simultaneity of disclosure and performance suggests that information choices are likely persistent because profitable firms can afford more extensive coverage, whereas good disclosure alleviates finance risk and improves operations. Numerous cited studies employing cross-sectional or static models might inadequately control for endogeneity, unobserved heterogeneity, and dynamic persistence (Zhang & Vigne, 2021; Hassan et al., 2024; Even-Tov et al., 2025). A more robust manner would be by introducing firm fixed effects and year dummies in the traditional dynamic panel estimators (e.g., two-step Arellano–Bond GMM) along with all diagnostics—correlation matrix, panel unit-root

checks, AR(1)/AR(2) tests, and Hansen J—for sound inference in the PSX environment.

This study addresses these gaps with a firm-year Green Accounting Disclosure Index (GADI) tailored to PSX firms for the period 2011–2020, least-squares fixed/random effects and two-step General Method of Moment (GMM) estimations for  $GADI \rightarrow$  profitability (ROA), with findings robust in alternative profitability (i.e., ROE), estimation methods, and index specifications.

### 1.3 Research Objectives

The purpose of this research is to find out which factor(s) motivate the public listed firms of Pakistan in disclosing the data of GAD especially in regard to leverage ratio and ownership concentration. With the increased international concentration on corporate environmental conscience, green accounting practices are vital to the organizations that intend to fuse financial performance and related sustainability pledges (Saeed et al., 2024). Despite the growing awareness of sustainability reporting, many firms, including ones from developing economies, are unwilling to adopt green accounting within their financial reporting frameworks due to constraint of financial resources, governance problems and weak regulatory enforcement (Kalbouneh et al., 2023).

Concerning this study, the gap in empirical literature is filled by looking into the model of the financial performance (ROA) on Green Accounting Disclosure and whether these disclosures influence leverage ratio and ownership concentration. The study attempts to give insights into the proximate factors of corporate sustainability practices in emerging markets as regards to financial and governance.

#### 1.3.1 General Objective

The study has the following general objective: to examine the effect of Green Accounting Disclosure (GAD), proxied by GADI, on firm profitability in terms of ROA among PSX-listed companies, having considered leverage and ownership concentration to pertain to the context of finance and governance conditions in

Pakistan (Hassan et al., 2024). Despite the growing awareness of sustainability reporting, many firms, including ones from developing economies, are unwilling to adopt green accounting within their financial reporting frameworks due to constraint of financial resources, governance problems and weak regulatory enforcement (Kalbouneh et al., 2023). This is an advance over the emergent literature of sustainability reporting and financial performance in developing economies, where the practice of reporting and regulator expectations are still cohering (Hassan et al., 2024).

### 1.3.2 Specific Objectives

1. Using annual reports to construct a Green Accounting Disclosure Index (GADI), which is used to measure the depth and breadth of a firm's green accounting disclosure over 2011–2020 for PSX-listed companies.
2. (ROA model) We estimate the relationship between GADI and firm profitability to assess claims of mixed support for the cost-benefit of sustainability reporting. (Transaction Costs Theory) (Deb et al., 2020).
3. Account for financing and governance circumstances by adding leverage and ownership concentration to the static panel models, as leverage may restrict discretionary disclosure actions higher, whereas ownership concentration may form transparency incitements (Beck et al., 2018; Palomares-Aguirre, Barnett, Layrisse, & Husted, 2018).
4. Explicitly control potential endogeneity and performance persistence by estimating a dynamic specification (two-step GMM) since highly profitable firms can have higher internal capability to accommodate sustainability processes or reporting (Kalash, 2021; Deb et al., 2020).
5. (Palomares-Aguirre et al., 2018; Deb et al., 2020) Perform robustness and heterogeneity tests: (a) Use ROE as an alternative proxy for profitability, (b) Other specifications of GADI, and (c) Investigate whether the relationship between GADI-Performance varies across leverage and ownership concentration strata (Beck et al., 2018).

### 1.3.3 Justification of the Research Objectives

Despite the boom in global sustainability reporting, scant Pakistan-specific evidence exists on the relationship between green accounting disclosure and financial performance (Hassan et al., 2024), an important gap considering that emerging-market settings are still evolving in terms of their reporting practices and regulatory expectations. Thus, the objectives focus on a panel-based evaluation on PSX (GADI) and its relationship with profitability (ROA).

Disclosure performance may be conditioned on the financial and governance environment. The economic debate, however, remains unsettled about whether disclosures manifest in a net financial gain or an expenditure to be recovered over the short term (Deb et al., 2020). On the other hand, ownership structures affect managerial transparency incentives and monitoring pressures but might also further determine disclosure breadth as well as the precise way in which markets digest such behavior (cf. (Palomares-Aguirre et al., 2018)). Thus, it is also important to incorporate leverage and ownership concentration as controls and to investigate heterogeneity in our objectives.

Therefore, by setting the framing in light of GADI  $\rightarrow$  ROA testing objectives with an explicit focus on Pakistan as a context of financing and governance, this study seeks to provide some decision-useful grounding for managers, investors, and regulators when and how environmental transparency interacts along with (or is detached from) firm performance. These results can be useful in practice and policy improvements regarding sustainability reporting and financial outcomes in the Pakistani corporate sector (Hassan et al., 2024; Palomares-Aguirre et al., 2018; Deb et al., 2020).

## 1.4 Research Questions

Formulating precise and well defined research questions are very essential requirements in academic research to keep the whole study careful and organized. The research question adopted in the present study derives from the problem statement

and research objectives, and they answer how the relationship between Green Accounting Disclosure (GAD) and leverage ratio, concentrated ownership, and corporate performance works. They serve as a guide for the analysis and provide a framework to evaluate what determines the extent of a firm's sustainability disclosure practices among Pakistan Stock Exchange (PSX) listed firms.

The research questions seek to fill the gap that currently exists in the literature on sustainability accounting, financial performance and corporate governance by examining the determinants of Green Accounting Disclosure, and the effects of Green Accounting disclosure on financial performance amongst firms. Past studies on sustainability disclosure have mainly involved studies on general disclosures, and scant empirical data is available about the impact of financial leverage and ownership structures on voluntary green accounting practice in developing economies such as Pakistan (Hassan et al., 2024). This study aims to understand the financial and governance determinants of sustainability transparency by resolving these issues.

#### 1.4.1 Primary Research Question

The research question addressed by this study is:

**Does a higher level of Green Accounting Disclosure (GADI) associate with higher profitability (ROA) among PSX-listed firms (2011–2020), after controlling for firm size and leverage?**

In the first place, this primary research question is based on this study, which seeks to determine the major financial and corporate governance factors that influence environmental sustainability disclosures and their effects on corporate financial performance.

#### 1.4.2 Specific Research Questions

These follow up with operationalizing the main question of this study by looking at Green Accounting Disclosure (GAD) as the independent variable and profitability as the dependent variable under Stakeholder Theory: Thus, specific research

questions are rephrased into a set of related hypotheses: Contextualization from the literature to hypotheses → and these are → our RQs.

**RQ2:** Is the GADI→ROA association robust after accounting for financing constraints and ownership structure, entered as controls (leverage, ownership concentration) alongside firm size?

Leverage reduces the resources expended by firms on sustainability activities and more type-of-action coverage in disclosures (Lian et al., 2022), but concentrated ownership changes external demands for transparency (Palomares-Aguirre et al., 2018). Therefore, we then test whether that connection with ROA holds and is significantly positive with leverage, ownership concentration, and size.

**RQ3:** Does the GADI–ROA association remain after addressing potential endogeneity and performance persistence using dynamic panel estimation (two-step Arellano–Bond GMM)?

Given that more profitable firms may have greater ability to fund their sustainability processes and reporting (Kalash, 2021), and that the disclosure–performance relation is mixed (Deb et al., 2020), we explicitly control for simultaneity and dynamic persistence in our estimation of GADI impact on ROA.

**RQ4:** Does the magnitude of the GADI–ROA association differ across firms with (a) higher leverage and/or (b) higher ownership concentration?

In an environment where leverage limits discretionary spending on disclosure (Sheng, Xu, Qin, & Jiang, 2022) or where concentrated ownership weakens outside monitoring pressure (Palomares-Aguirre et al., 2018), the performance payoff from disclosure could vary across these firm environments. We thus investigate heterogeneity in leverage and ownership concentration strata.

### 1.4.3 Justification for Research Questions

These research questions are purposefully drafted to streamline the study with its original intent and test whether Green Accounting Disclosure (GAD), which is measured by the Green Accounting Disclosure Index (GADI), is positively related

to one of its main goals, profitability proxies (ROA). The management transparency choice in Pakistan's corporate sector is molded by the financing structure and ownership concentration; hence, our tests control for these firm characteristics to differentiate the disclosure and its linkage with performance (Hassan et al., 2024).

In particular, SRQ1 investigates the influence of GADI on ROA. It further controls for leverage, ownership concentration, and firm size, fearing that managers in Pakistan might use leverage and ownership as their weapon of choice to shape the outcome of their own decisions, making the above association weaker. To address possible endogeneity and performance persistence, the SRQ3 uses dynamic panel estimation to ensure that any positive effect of disclosure on profitability is not due to endogeneity or routing unobserved, time-discipline factors. As such, SRQ4 investigates the heterogeneity in the GADI–ROA association across differentially leveraged and owned firms so as to acknowledge that financing constraints and governance structures can affect whether disclosure pays off (Hassan et al., 2024).

Saying this allows the questions to be framed analytically in terms of whether green disclosure is related to firm-level characteristics or moves with corporate performance. The results are beneficial for corporate stakeholders, including managers, investors, and state policymakers in Pakistan who aim to advance sustainability practices as well as financial outcomes.

## 1.5 Significance of the Study

This research finds significance in augmenting the existing information on Green Accounting Disclosure (GAD) association with leverage ratio, ownership concentration, and corporate performance in developing economies, mainly Pakistan. With the environmental concerns continuing to be among the shaping principles of the global economic policies, firms are compelled to include green accounting practices in their financial reporting. Yet, there is a limited empirical research on the impact of financial and governance structure on GAD in emerging markets (A. Agyemang, Yusheng, Kongkuah, Musah, & Musah, 2023). Amidst this

lack of empirical studies, this study contributes to the literature in view of examining the association between leverage ratio and ownership concentration and Green Accounting Disclosure and the way this disclosure affects corporate financial performance.

### **1.5.1 Contribution to Academic Research**

In addition, these empirical findings provide insights into the drivers and resultant outcomes of Green Accounting Disclosure, a form of sustainability disclosure that yet cannot be closely intimately connected to concerns of corporate finance and corporate governance mechanism. This topic has been extensively discussed in the developed market by existing literature, however, there is a scarcity of this literature in Pakistan and the emerging market (Nguyen et al., 2023).

In this study, we contribute to theoretical discussions in corporate sustainability, accountability transparency and responsible corporate financial decisions of leverage ratio and ownership structure based financial and governance determinants of Green Accounting Disclosure. In addition, it goes further in explaining existing theories of corporate environmental responsibility with concomitant financial conditions and control variables in the analysis of environmental disclosure. According to Ikpor et al. (2022), studies in the past have shown that firms with higher financial leverage are less likely to undergo voluntary sustainability reporting for financial constraints. The focus of this study is to test if the negative influence of financial leverage on GAD also extends to the Pakistani business environment from where further empirical support of the relationship between capital structure and sustainability transparency would be received.

### **1.5.2 Practical Implications for Corporate Managers and Investors**

Corporate managers and investors gain valuable insights from this study, as it offers practical guidance on sustainability reporting and the governance choices

that affect disclosure. It illuminates financing and ownership choices that characterize transparency in the corporate sector of Pakistan (Ikpor et al., 2022). The output of this model can be used by managers—particularly at more highly leveraged firms—for the design of policies that strike a balance between debt service constraints and sustainability commitments that are also consistent with financial stability.

The study could help investors to understand the association between both GAD (Green Accounting Disclosure) and financial performance, which is defined as ROA. This is consistent with the idea that poor sustainability disclosure may be indicative of more severe financing frictions and therefore a higher cost of capital (Dhaliwal, Li, Tsang, & Yang, 2011), incentivizing investors to internalize ESG factors within pricing and allocation decisions. A better understanding of the GAD–performance nexus may hence facilitate more informed portfolio decisions in emerging economies as well.

### 1.5.3 Policy Implications for Regulators and Government Agencies

Given the ongoing debate regarding environmental reporting standards in Pakistan and other emerging economies by regulators and government agencies alike, study findings are useful to craft a pragmatic as well as decision-relevant regulation. Arguably the most pervasive problem is that of missing green accounting standards, which gives rise to widespread idiosyncratic disclosures; greater convergence in distinct, cohesive metrics may enhance transparency and interpretability of sustainability data (Khan & Gupta, 2024). More specifically, our findings on the disclosure–performance nexus can help to guide evidence-based proportionate, phased rules that acknowledge the conditionality of financing and ownership structures in firm-specific disclosure capacity, as well as metrics, assurance pathways, and board oversight (Khan & Gupta, 2024).

Third, regulators might explore selective (joint) incentives where financing-related or governance concentration inhibits firms from disclosure, such as signaling reliefs

or capability-development directed at leveraged/family-controlled entities, bundled with accountability safeguards. Likewise, transparency or disclosure mechanisms can be directly supported by mainstream financial regulators to benefit from green finance channels such as sustainability-linked bonds or ESG-related lending policies issued by public agencies and private sector banks to advance credible environmental climate data disclosers and transitional investments (Nguyen et al., 2023). These efforts, collectively, can enhance the comparability, bring a reduction in the reporting frictions, and lead to more authentic green accounting disclosure consistent with the market demand of Pakistan.

#### 1.5.4 Contribution to Sustainable Business Practices

The analysis grounds disclosure practice within the tensions of the broader agenda of sustaining your business, linking GAD financial outcomes as well as considering how this maps onto the financing and governance worlds. Globally, firms are coming to see environmentally friendly practices as essential rather than optional—finding that they pay dividends over the long term and thus reinforcing the corporate logic of verifiable transparency (Bala, Ja'afar, & Lawal, 2021). The study is one of the first to examine how GAD associates with financial performance in Pakistan—and provides decision-useful evidence for corporate sustainability officers, environmental accountants, and ESG analysts. The find can provide a better understanding of the determinants of internal control and reporting frameworks for environmental safety as well as financial prudence so that conditions of disclosure are consistent with sustainability strategy (Bala et al., 2021).

#### 1.5.5 Addressing Research Gaps

While work is emerging on corporate sustainability reporting, there is a gap for Pakistan in specifically how financing and governance conditions affect disclosure practices and how this relates to firm financial performance. Originality: A significant portion of the literature relies only on developed-market settings in terms of regulatory infrastructures and green-finance options (since many parties may

not have them all established), which limits external validity for emerging markets (KEHINDE, 2024). In view of Pakistan's high ownership concentration and variable enforcement and financing frictions, this research adds context-specific evidence on disclosure and performance.

Contrary to the many strands of governance and sustainability research that view transparency as primarily a compliance or reputational outcome, with financial performance frequently as the dependent variable, this study makes financial performance the dependent variable, offering more direct economic insights for adopting GAD (Baba & Baba, 2021). By doing so, this study further advances the ongoing debate on whether or not sustainability reporting is beneficial for operational and financing outcomes, as well as provides a resource to aid future empirical work on analysis of the effectiveness of disclosure in emerging market contexts (KEHINDE, 2024; Baba & Baba, 2021).

## 1.6 Scope of the Study

This section describes the setting, factors studied, population, period of time, and location of the research; methods, a pre-test and post-test for event participants such as data collection (observed variable coding); limitations of the study; and why this research is important. The current study focuses on Green Accounting Disclosure (GAD) in relationship with corporate performance among public listed firms of Pakistan by inputting financing [leverage] and governance [ownership concentration], which work to depict the institutional norms in a developing economy (A. Agyemang et al., 2023).

### 1.6.1 Conceptual Scope

In conception, it depicts Green Accounting Disclosure (GAD) as the inclusion of the environmental elements into accounting format and judgment—incorporating not just carbon emissions disclosures but also energy periodicals and waste connection coupled with abatements, among others, and even a disclosure on mitigation efforts (Nguyen et al., 2023). In addition to incorporating different levels of

exposure, financial and governance indicators related to disclosure capacity and incentives are input into the analysis since they are predominant mechanisms in affecting corporate financial performance by examining the relationship between GAD and company-end outcomes that consist mainly of Return on Assets (ROA) as well as additional analysis with Return on Equity (ROE) as robustness. Theoretical contributions, specific to financial accounting and corporate governance, are the integration of financial structure along with governance context to investigate disclosure–performance linkage in an emerging economy (Khan & Gupta, 2024; Nguyen et al., 2023).

### 1.6.2 Geographical Scope

The empirical context is Pakistan and, specifically, firms listed on the Pakistan Stock Exchange (PSX). Focus on Pakistan The study will be particularly taking into account the situation of Pakistan because of recent regulatory attention to sustainability, high family ownership and leverage in financial reporting, and relative voluntary environmental disclosure (A. Agyemang et al., 2023) as opposed to mature regimes in developed markets. At the same time, it provides a context that allows a study of disclosure and performance in an environment where there are double rules to report consecutively (A. Agyemang et al., 2023).

### 1.6.3 Population and Sample Scope

The population consists of PSX-listed companies, and particularly ecology-intensive industries (manufacturing, energy, textiles, and chemicals) that are predominantly characterized by substantial sustainability challenges as evidenced by the requirements for reporting (Miroshnychenko, Miller, De Massis, & Le Breton-Miller, 2025). A purposive sampling approach is employed to guarantee a standardized panel: firms that are continuously listed over the period of our study and thus have an excess or adequacy in terms of both annual and sustainability disclosure, as well as within the industries targeted (Miroshnychenko et al., 2025). Insist yields are representative firm-years for statistical analysis and align to sectors where environmental transparency is most decision-relevant (Miroshnychenko et al., 2025).

### 1.6.4 Time Frame of the Study

Our study period (2011–2020) is also pertinent because of the ongoing maturation of global sustainability frameworks and ESG expectations that have placed growing pressure on firms to integrate environmentally responsible accounting practices into their reporting requirements (Lian et al., 2022). By using firm-year financial reports, sustainability disclosures, and governance data within this timeframe, it provides comparable longitudinal evidence that aligns with ongoing policy discussions (Lian et al., 2022).

### 1.6.5 Methodological Scope

This study has been conducted via quantitative research design with the help of secondary data (financial reports, sustainability disclosures, and governance filings) taken from PSX-listed firms. A firm-year GADI is built based on environmental (return and finance) disclosures via content analysis, and the relationships between GD, leverage, ownership concentration, and performance are tested using specific regression models and panel-data models suitable for the study's longitudinal nature at the firm level (Nguyen et al., 2023). Such indicators cover carbon emissions, sustainability policies, and energy-efficiency projects (Nguyen et al., 2023).

### 1.6.6 Limitations of the Study

Second, GAD may vary across industries; also, the sample is from environmentally impactful sectors, hence not generalizable to low-impact industries (Miroshnychenko et al., 2025). Second, dependence on secondary disclosures included the risk of inconsistency in reporting across firms, despite efforts to cull reliable sources (Miroshnychenko et al., 2025). Thirdly, the analysis is situated within a single country (Pakistan) and may not be generalizable to other states with different regulatory and market structures; however, it offers an illustrative context for developing countries that encounter similar sustainability reporting issues (A. Agye-mang et al., 2023).

### 1.6.7 Justification of Scope

This is good because it always remains justified that this study cannot be done for the entire scope and so can add to the corporate sustainability, financial decision-making, and governance structures in emerging economics literature. By examining the corporate sector of Pakistan, this research has studied a number of factors, namely financial leverage and ownership concentration, on the association of corporate sustainability disclosure. The study results are relevant to corporate executives, investors, the scientific community, policymakers, and regulatory bodies and give practical recommendations on how sustainability reporting frameworks can be reconstructed in order to incline financial decision-making ways.

The boundaries of the study have been defined in terms of geographical, population, methodological, and conceptual boundaries of the study. As an example, the study of (Ikram & Akhtar, 2021) employing a sample of publicly listed Pakistani firms analyzed these interactions among green accounting disclosure, financial leverage, ownership structure, and corporate performance. While the study is not without limitations, it charts important pathways for corporate sustainability research, financial transparency, and corporate governance practices related to emerging economies. These results can provide inputs to the designs of corporate sustainability strategies and policies that focus on investors and regulators encouraging green accounting disclosure in Pakistan or similar economies.

# Chapter 2

## Literature Review

The publicity around Green Accounting Disclosure (GAD) has been continuously increasing in corporate reporting due to tightening regulatory scrutiny, growing investor focus on sustainability performance, and top-down commitments from global leaders in the climate change battle. Green accounting is therefore a practical form of reporting that complements financial reporting in the sense that it integrates a company's environmental performance, serving as an output channel to stakeholders regarding ecological footprint and sustainability chain. Such metrics are usually reported on carbon emissions, waste management, energy conservation approaches, and environmental policies (A. Agyemang et al., 2023), thus improving transparency and accountability. Over time, as reporting frameworks such as GRI (Global Reporting Initiative), TCFD (Taskforce on Climate-Related Financial Disclosures), and SASB (Sustainability Accounting Standards Board) have changed, environmental disclosures have grown to serve web ecology as a part of corporate reporting (Nguyen et al., 2023).

GAD is still mostly voluntary where it exists in many developing economies, such as Pakistan, and is evolving regulation with capability constraints. Previous Work (Ikpor et al., 2022) have shown how financial and governance frictions prevent complete disclosure from happening. This study adds to the literature by including these frictions at the firm level (leverage, ownership concentration) to shed some light on the association between GAD and corporate financial performance in Pakistan.

Stakeholders are increasingly demanding more transparency with regard to corporate environmental impacts, and as a result, corporate sustainability has become a strategic imperative for firms around the world. Firms that involved in disclosing Green accounting in the form of Green Accounting Disclosure have advantages in the market place alongside improving corporate reputation by demonstrating that their business adheres with the overall trend of globalization and sustainability (Dhaliwal et al., 2011). It has been found in research that green disclosures can help in increasing the investor's confidence, attract future environmentally conscious consumers and decrease the financial risk associated with the environmental regulations (Khan & Gupta, 2024).

Nevertheless, Green Accounting Disclosure is adopted in significantly different ways among industries and economies. Firms operating in markets such as the United States, European Union, and Japan as developed markets impose stringent environmental reporting standards and these firms in effect have adopted sustainability reporting as part of their financial disclosures. But in developing economies, a weaker regulatory enforcement, lack of investors' awareness and financial constraints restrict the practice of Voluntary Green Accounting Disclosure by firm's (KEHINDE, 2024).

With only a few of the firms in Pakistan engaging in environmental reporting, the stage of corporate sustainability as regards environmental reporting is in the early stages. Pakistani firms do not adopt Green Accounting Disclosure (GAD) easily due to the lack of regulatory mandates and financial incentives which leads to low adoption rates, and that is where empirical research comes in to uncover the key determinants and effect of financial implication on GAD (Ikpor et al., 2022).

Corporate environmental responsibility depends on financial structure and corporate governance. However, leverage ratio (financial leverage) has been determined among the financial determinants of Green Accounting Disclosure which is a key factor in encouraging corporate sustainability practices. Debt servicing is often more important to firms that are financially leveraged than voluntary sustainability reporting in which there is greater financial constraint and short term performance pressure (Lian et al., 2022). On the one hand, some studies show

that debt-laden firms eschew environmental disclosures to shield them from creditor attentions (Nguyen et al., 2023), but other studies argue that highly leveraged firms are motivated to disclose more environmental information as that would help assuage lenders and secure more favourable lending terms (Nguyen et al., 2023).

In addition, corporate transparency and sustainability disclosures are affected by ownership concentration, which measures the degree of shares concentration of a certain issuer among a small group of shareholders or in the hands of institutional investors. According to research, family owned firms and state controlled enterprises do not usually value Green accounting disclosure as being secondary to profitability instead of being environmental knowledgeable (Gomez-Mejia, Mendoza-Lopez, Cruz, Duran, & Aguinis, 2024). On the other hand, firms with diversified ownership structure and having higher institutional investors' presence are more susceptible to adopt green accounting practices because of outside pressure from shareholders and sustainability conscious investors (Dhaliwal et al., 2011).

The Green Accounting Disclosure as one of the key debates in sustainability accounting research focuses on whether it improves the financial performance. Firms that engage in sustainability disclosures are said to improve their financial performance mainly through building brand reputation, customer loyalty, and investor trust (A. Agyemang et al., 2023). Investors view companies that are voluntarily Environmental Reporters as companies that are less risky to invest in and as such they are able to enjoy higher stock valuations and lower the cost of capital (Khan & Gupta, 2024).

Critics however, hold the view that the costs of implementing Green Accounting Disclosure far outweigh its financial benefits. Achieving sustainability reporting frameworks compliance demands a huge amount of financial resources, specialized expertise, and always being on a monitoring mode, which is a drain on company profits especially in developing markets (KEHINDE, 2024). The purpose of this research is to investigate the effect on corporate performance of net financial impact of Green Accounting Disclosure in Pakistan (use of ROA and ROE as key performance indicators). However, there is a relative limited empirical scrutiny of Green Accounting Disclosure in Pakistan. However, the effect of leverage ratio and ownership concentration in enhancing corporate sustainability transparency

in Pakistani corporate sector has remained un-examined. In addition, there is still limited empirical evidence around Green Accounting Disclosure for improving financial performance of firms in emerging markets, and hence further research on these financial implications of Green Accounting for firms in Pakistan is warranted (A. Agyemang et al., 2023).

This study shall fill this gaps by contributing to the domain of sustainability accounting literature, corporate finance as well as corporate governance research, and provide useful insights to corporate executives, investors, policymakers and regulatory bodies. Finally, the findings provide practical recommendations on how firms can simultaneously balance financial constraints and sustainability commitments to achieve the immediate goal of making Green Accounting Disclosure a tool for improved corporate transparency and a tool for financial performance success in developing countries.

This chapter introduces the relevance of Green Accounting Disclosure, the role of financial leverage and ownership structure in determining the level of sustainability transparency and the theoretical impact of environmental disclosure on firm's financials. This research paper presents the existing research gap and significance for the empirical investigation in Pakistan. The next section of this chapter take account in more detailed references on theoretical frameworks, empirical evidence, and methodological approaches for Green Accounting Disclosure and corporate performance, in helping to lay the research model and hypothesis development of the study.

## 2.1 Theoretical Framework

This study applied stakeholder theory as its sole theoretical perspective. For example, although discussions on this topic exist in multiple perspectives (for example, (Shoeb, Aslam, & Aslam, 2022; Akpan & Nkanta, 2023)), stakeholder theory most clearly implies that environmental disclosure heightens value adding through enhanced transparency, which alleviates compatibility frictions between firms and stakeholders in the determination of material indicators; hence, it reduces information frictions (GAD)  $\rightarrow$  ROA—potentially also upheld by Nigerian experience.

### 2.1.1 Stakeholder Theory

[Freeman \(2010\)](#) introduced the Stakeholder Theory: Corporations have to consider the interest of more than shareholders as stakeholder, including employees, customers, suppliers, as well as investors, governments and the general community. According to the theory, firms act to conform to the expectations of stakeholders when it comes to environmental responsibility in Green Accounting Disclosure by adopting sustainability reporting practices ([Helmina, Sutomo, & Respati, 2022](#)).

The fact that firms with diverse and engaged stakeholders are more prone to disclose environmental information is indicated by the research, as stakeholders ask for transparency in corporate sustainability practices. For example, institutional investors have a lot of pressure on companies to practice Environmental, Social, and Governance standards (ESG), thus forcing companies to engage in voluntary green accounting disclosure ([Kalash, 2021](#)). Accordingly, firms disclose environmental information to fulfill stakeholder expectations—especially where ESG is significant for institutional investors (and thus reputation, access to capital, and operating legitimacy), leading to improved profitability (ROA) in cases including those of Pakistan ([Helmina et al., 2022](#); [Kalash, 2021](#); [Bala et al., 2021](#)).

### 2.1.2 Legitimacy Theory

According to Legitimacy Theory, organization try to maintain and gain legitimacy by doing what that is expected from them. In this theory, the existence of Green Accounting Disclosure is resulted as a result of firms to show corporate environmental responsibility and to maintain its legitimacy to the investors, regulators and publics array.

This theory is important for green accounting development to firms in the developing economy, where developing regulatory framework in green accounting. Companies disclose voluntary sustainability related information to declare compliance with the international standards of environment and receive foreign investments and international market access ([Alshirah & Alshira'h, 2024](#)). The highly leveraged firms disclose less environmental information when it comes to resources and

large, well established firms with international exposure are more likely to disclose more Green Accounting Disclosure in order to ensure its legitimacy (Akhter, Hossain, Elrehail, Rehman, & Almansour, 2023).

### 2.1.3 Agency Theory

The conflict among the corporate managers (agents) and owners (principals) in the Agency Theory is developed under the context of financial transparency and corporate governance, as asserted by Jensen and Meckling in 1976. According to this theory, managers may not focus on shareholder value but in their self-interests, and end up corrupting corporate accountability and disclosure practices (Kalash, 2021). Under Green Accounting Disclosure, Agency Theory explain which firms with concentrated ownership structure (such as family owned firms and state controlled firms) disclose less environmental information, because controlling shareholders prioritize profitability and not transparency to the sustainability (Ika, Rahayu, Elrifi, & Widagdo, 2021).

However, firms with institutional ownership and shareholding structure dispersed firms tend to be involved with voluntary green accounting disclosure to attract responsible investors and to improve corporate accountability. Just as agency conflicts exist in highly leveraged firms, managers of such firms may be unwilling to disclose Green Accounting Disclosure, for instance, to avoid bank and equity investors' scrutiny. Previous research has revealed that high leverage ratio is associated with decreasing level of sustainability disclosure (Baba & Baba, 2021).

### 2.1.4 Resource-Based View (RBV)

According to RBV, firms with sustainable competitive advantage are those who make use of exceptional combination of capital (such as financial resources, governance structures etc.) and sustainability initiatives. Based on this theory, we get a strong basis to explain why financially stable firms with good governance mechanisms are more likely to disclose information through Green Accounting Disclosure.

RBV posits that firms integrating environmental sustainability within business model benefit their corporate reputation, attract investment, and acquire competitive edge in global market (KEHINDE, 2024). In other words, proactive engagement in green accounting by companies increases their future long term sustainability and is ultimately associated with better financial performance via build brand loyalty, regulatory compliance or relieving environmental liabilities (A. O. Agyemang et al., 2021). Moreover, firms involved in green technologies investments, carbon reduction programs and green accounting disclosure experience lower risk of operations and higher financial nexus, confirming the relationship between green accounting disclosure and corporate performance (Akpan & Nkanta, 2023).

### 2.1.5 Integration of Theories in the Study

1. Green Accounting Disclosure in the corporate sector of Pakistan has been explained using Stakeholder Theory, Legitimacy Theory, Agency Theory, and Resource Based View.
2. The external pressures coming from investors, regulators, and the public are indicated by Stakeholder Theory, which requires firm to provide green accounting practices.
3. Green Accounting Disclosure is explained in terms of its use by firms to aid corporate reputation and a conforming to international standards of sustainability through the use of Legitimacy Theory.
4. Using Agency Theory, we contribute to how ownership concentration and financial constraints influence corporate sustainability transparency, *ceteris paribus*, in highly leveraged firms.
5. Resource Based View (RBV) suggests that firm with financial stability and good governance competency are in a better position to incorporate sustainability within the business model whereby outcome is positive in a financial performance dimension.

This study then examine the effect of leverage ratio and ownership concentration on Green Accounting Disclosure and then the impact of the effect of Green Accounting Disclosure on corporate financial performance. The results of this study is as empirical evidence for the policymakers, the investors and the corporate managers, in particular to help them in generating sustainable financial and governance strategy in Pakistan's corporate sector.

As such, it was on the basis of this theoretical framework that the relationship between Green Accounting Disclosure, leverage ratio, ownership structure and corporate performance were explained. In this section, four key theories that capture the firm's motives to sustain reporting and how financial and governance factors affect such reporting are outlined.

This study integrates these theoretical perspectives to develop a robust study of the gap in the research of corporate sustainability transparency in emerging countries, followed by Pakistan. Contributions to ongoing discourse in sustainability accounting, corporate governance, and financial decision making is made to academia, industry practitioners and policymakers through the findings.

## **2.2 Empirical Studies on Green Accounting Disclosure and Corporate Performance**

There has been an increased momentum in the recent years on the empirical research on Green Accounting Disclosure (GAD) and the relationship with it and corporate financial performance, leverage ratio and ownership structure, largely in response to global calls for corporate sustainability transparency. There are, in fact, several studies of financial impacts of environment disclosures, in theory testing whether subjects that implement sustainability reporting will enjoy heightened financial performance (Lusiana et al., 2021; Bala et al., 2021). Results have, however, been mixed, with a part of specialties Breporting positive financial performance, but with others arguing that Green Accounting Disclosure boasts will counteract its strengths (Nguyen et al., 2023; Bao & Yu, 2023).

### **2.2.1 Relationship between Green Accounting Disclosure and Financial Performance**

Conversely, the discussions ensuing the green accounting disclosures' effect on financial performance have been in the sustainability and corporate finance literature. Empirical studies suggest that firms that genuinely commit to sustainability disclosures (Khan & Gupta, 2024; A. Agyemang et al., 2023) will experience enhanced financial performance since investors perceive these firms as socially responsible and less risky; thereby, their equity capital costs are lower and stock prices are higher.

However, some research points out that the financial implication of the Green Accounting Disclosure is dependent on the industry and regulatory environment. According to a study by (Fuadah, Mukhtaruddin, Andriana, & Arisman, 2022), firm in the highly regulated industries (such as the energy and manufacturing sectors) gains from their green disclosure but the firms in the unregulated industry do not enjoy any additional financial gain. In addition, the financial burden of sustainability reporting most of firms in developing economies is often a burden and hence inconsistent adoption rates and variable financial impacts (Alkurdi, Hamad, Thneibat, & Elmarzouky, 2021).

### **2.2.2 The Role of Leverage Ratio in Green Accounting Disclosure**

The financial leverage as indicated by the leverage ratio (debt-to-equity ratio, total debt ratio) is a very important determinant of the Green Accounting disclosure. The empirical studies regarding the relationship between the high leverage and sustainability reporting find mixed results of whether highly leveraged firms invest more or less (given the same return) in this kind of reporting. From one side, as argued by (Helmina et al., 2022; Nguyen et al., 2023), research points to the fact that firms with higher financial leverage may tend to restrain Green Accounting Disclosure in order to lower the likelihood that creditors carry out intense scrutiny. However, a group of other scholars posit that highly leveraged firms can make

greater disclosure of environmental information in order to demonstrate financial stability, thereby earning the advantage of loans and investors (Widiyanto, Sari, et al., 2020; A. Agyemang et al., 2023). Firms in emerging markets had been less likely offered to disclose environmental data simply because lenders would attempt to avert financial depravity and impose short term profit pressures. However, in turn, (Akpan & Nkanta, 2023) conducted research they use Green Accounting Disclosure strategically to earn the confidence of their investors to finance their sustainability projects.

### **2.2.3 Ownership Structure and Green Accounting Disclosure**

The level of firms' ownership concentration proved to be an important factor affecting their sustainability transparency. According to studies, family owned firms as well as state controlled enterprises reveal less environment information as their main interest is income rather than sustainability (Akhter et al., 2023; Alshirah & Alshira'h, 2024). However, compared to such firms, firms with larger institutional investor presence are more likely to embrace Green Accounting Disclosure for the reason that they face external pressure from shareholders and sustainability-conscious investors (A. Agyemang et al., 2023). In a study regarding corporate governance and voluntary disclosures in the GCC region, (Garas & ElMassah, 2018) collated that firms with dispersed ownership structure. Such studies showed that in Indonesian and Vietnamese firms studied by (Nguyen et al., 2023), firms with a high foreign ownership share were more likely to disclose more environmental data as foreign investors exert greater influence in corporate sustainability.

### **2.2.4 Green Accounting Disclosure in Developing Economies**

There are great differences in the enforcement of regulations, corporate governance structures, and financial incentives in the adoption of Green Accounting Disclosure amongst the developed and the developing economies. The real data shows

that developed markets have strict sustainability reporting regulations, but the firms in emerging economies are depending on voluntary disclosures, resulting in inconsistencies in the reporting quality and adoption rates (Baba & Baba, 2021; Akhter et al., 2023).

A. Agyemang et al. (2023) in their study came to the conclusion that China, Nigeria, India, and other firms in these countries say they encounter serious financial and regulatory hurdles to adopting Green Accounting Disclosure hence making sustainability reporting less uniform. Likewise, evidence from Pakistani firms indicates that only large firms having international exposure do sustainable voluntary disclosure while the small and medium enterprises (SMEs) fail to comply with the cost and complexities associated with the sustainability reporting frameworks (KEHINDE, 2024).

### 2.2.5 Financial Benefits of Green Accounting Disclosure

Similarly, the empirical studies investigate the financial returns of Green Accounting Disclosure, its impact on return on assets (ROA), return on equity (ROE) and stock market performance. It's also claimed that along the lines of the vision of Social Responsibility of the firm, and persevering with the idea that sustainability reporting is not merely an obligation, but has become a responsibility, it's safe to say that, firms with strong sustainability reporting practices attract long term investors (A. Agyemang et al., 2023; Khan & Gupta, 2024) hence enhanced financial performance and lower cost of capital.

However, some of the scholars suggest that the financial benefits associated with Green Accounting Disclosure are biased by the context, and firms from highly regulated and consumer sensitive industries (e.g. retail, food, and beverage) can reap the most benefits. Lusiana et al. (2021) in their study found that there is a positive link between environmental reporting practices of the firm and investor trust, brand loyalty and hence ultimately the firm's financial performance. Contrary to this, research done by (Alsaifi, Elnahass, & Salama, 2020) suggests that in sectors with lower levels of environmental exposure (for instance, the financial services), firms report no significant economic gains from disclosure on sustainability.

The empirical results on the relation between Green Accounting Disclosure and both financial leverage and ownership structure, and corporate performance are ambivalent. On the one hand, the positive financial effects of sustainability disclosure are stated in some studies, while other studies state that Green Accounting Disclosure introduces financial burdens on firms, especially firms in developing economies. This study aims to further existing empirical evidence in building towards our knowledge of what determines Green Accounting Disclosure of companies in the Pakistan, in the context of corporate sustainability, financial transparency and regulatory enforcement in developing markets.

## **2.3 Determinants of Green Accounting Disclosure**

However, few studies exist investigating determinants of Green Accounting Disclosure (GAD) in the corporate governance, financial structure and the firm specific characteristics. Environmental information disclosure by a firm is also subject to the influence of other factors such as leverage ratio, ownership structure, firm size, profitability, regulatory requirements, and industry type (Akpan & Nkanta, 2023; Nguyen et al., 2023). These determinants determine how extensive and of good quality GAD is, especially in developing economies where regulatory enforcement is weak and almost all sustainability initiatives are still voluntary (Angela & Handoyo, 2021; Baba & Baba, 2021). The determinants of Green Accounting Disclosure, financial leverage, ownership concentration, corporate governance and profitability are the key determinants in this section which explore on how the disclosure of sustainability transparency is affected by them.

### **2.3.1 Leverage Ratio and Green Accounting Disclosure**

Green Accounting Disclosure is needed to the degree that the leverage ratio of the firm is high that is depending upon the debt the extent up to what level is the capital of the firm depended. Additionally, financial constraints have been found to be involved in making voluntary disclosures of sustainability by the follower

firms; they have fewer financial constraints which make it difficult for them to invest in this disclosure (A. Agyemang et al., 2023; Lusiana et al., 2021). Since debt obligations of firms are greater and such firms are financially oriented and are more concerned with debt repayment, firms are likely to limit additional costs linked to environmental reporting (A. Agyemang et al., 2023).

Nevertheless, some studies maintain that highly leveraged firms adopt Green Accounting Disclosure to minimize the financial risks and win investor confidence. As explained by (Alshirah & Alshira'h, 2024), research has shown in companies that are relatively highly debt, voluntarily tend to increase environmental disclosures in an attempt to achieve corporate transparency and attract more favorable lending terms with banks and financial institutions. Ji, Ji, and Dong (2022) showed that high-risk industries (for example oil and gas) disclose more environmental information to soothe stakeholders that the firm is dedicated to sustainability and financial solidity.

### 2.3.2 Ownership Structure and Green Accounting Disclosure

A firm's sustainability transparency is influenced by the ownership structure of a firm, since ownership types with different incentives and pressures of environmental report have different pressures. When there is a few shareholders having majority ownership of a firm, they are focused on profitability instead of sustainability commitments, thus firms with concentrated ownership are less likely to disclose environmental information because of their focus on profitability rather than their commitment to sustainability (Rahaman, Akter, Hossain, Chowdhury, & Wu, 2024).

For example, family owned businesses and the state-controlled enterprises often avoid voluntary sustainability reporting in order to ensure maximization of profit and long-run of financial gains as compared to the environmental concerns (Ika et al., 2021). Specifically, firms in the GBG are more likely to be get involved in Green Accounting Disclosure, unlike firms with high institutional ownership and

dispersed shareholding structure, because institutional investors seek higher levels of corporate transparency and conformity with ESG standards (Bala et al., 2021). Also, findings suggest that there is more environmental information disclosure by foreign owned firms who use international sustainability standards (Lian et al., 2022; Akpan & Nkanta, 2023). This is to highlight the issue of corporate sustainability practices in emerging markets with respect to issues of ownership diversity where regulations are yet to be enforced.

### 2.3.3 Profitability and Green Accounting Disclosure

It is clear that a firm's ability to engage in Green Accounting Disclosure is highly dependent on the profitability of a firm. According to studies, highly profitable companies are more likely to invest in sustainability initiatives due to the capability of allocating funding to environmental transparency and corporate social responsibility efforts (Baba & Baba, 2021; Ji et al., 2022). Green Accounting Disclosure is not it, for example, as companies with strong financial status are found to have strong intent to use Green Accounting Disclosure not as a disclosure tool for Green Accounting, but as a strategic tool to support the firm's corporate reputation and attract socially responsible investor.

For instance, underperforming and financially unstable organizations discharge less environment information since that will be less expensive for them to bother about cutting costs while concentrating on survival and keeping the economy (Nguyen et al., 2023; Kalash, 2021). Firms with higher Return on Assets (ROA) and Return on Equity (ROE) disclosed more on sustainability and thus, confirmed the positive association of financial performance and sustainability transparency.

Furthermore, some papers address how profitability acts as a moderating factor to the relationship of financial leverage, ownership concentration and Green Accounting Disclosure. Firms with high profit enjoy a better capability to offset the damage of financial leverage on sustainability reporting as they have room for a better management of environmental investments (Bala et al., 2021; Alkurdi et al., 2021).

### 2.3.4 Corporate Governance and Regulatory Compliance

The role of the corporate governance mechanisms such as board composition, audit committees, and executive compensation in influencing Green Accounting disclosure is very important. The fact that firms with independent boards or strong governance structures are more accountable, hence there is more disclosure of environmental information because they have been demanded to publish more environmental information (Ji et al., 2022; Widiyanto et al., 2020).

The extensiveness of Green Accounting Disclosure is found to be higher in highly regulated environment where the firm is operating for the mandatory reporting and legal obligations (Rahaman et al., 2024; Lusiana et al., 2021). Firms in less regulated industries frequently participate in voluntary sustainability reporting with a variety of disclosure practices across sectors. Of particular interest is that the fighting of the lack of enforcement mechanisms coupled with the low investor awareness have led to lower supply of sustainability disclosure rate in the developing economy (Baba & Baba, 2021; Nguyen et al., 2023). However, companies in developing countries are compelled to follow a given sustainability reporting framework (Alshirah & Alshira'h, 2024). (A. Agyemang et al., 2023; Akpan & Nkanta, 2023).

Of particular interest is that the fighting of the lack of enforcement mechanisms coupled with the low investor awareness have led to lower supply of sustainability disclosure rate in the developing economy (Baba & Baba, 2021; Nguyen et al., 2023). However, companies in developing countries are compelled to follow a given sustainability reporting framework (Alshirah & Alshira'h, 2024).

### 2.3.5 Industry-Specific Determinants of Green Accounting Disclosure

Beyond the technology, industry type influences Green Accounting Disclosure, since environmentally sensitive firms are under more regulatory, investor and consumer scrutiny (Angela & Handoyo, 2021; Akhter et al., 2023). In the energy, mining, manufacturing and chemicals sectors, companies generally try to achieve

higher levels of reporting sustainability to overcome the environmental risk and regulatory penalties that may occur (Kalash, 2021; Clark, Feiner, & Viehs, 2015). Compared to firms in industries with less environmental exposure (e.g. financial services, technology and retail), firms in industries with higher environmental exposure (e.g. health care, energy and public administration) will have more incentives to engage in Green Accounting Disclosure, and therefore are associated with higher adoption rates (Nguyen et al., 2023; Akpan & Nkanta, 2023).

## **2.4 The Impact of Green Accounting Disclosure on Corporate Performance**

Recently, there has been extensive empirical research conducted that examines the impacts of Green Accounting Disclosure (GAD) on corporate performance. Such information disclosure is sometimes associated with corporate reputation, financial efficiency, investor confidence and regulatory compliance and is therefore pertinent to corporation's prosperity and sustainable growth (Lusiana et al., 2021; Iliemena, 2020).

However, although existing studies commonly imply positive correlations across Green Accounting Disclosure and corporate performance, the literature equally proposes that the cost incurred for sustainability action may exceed its benefits, particularly in developing economies, characterized by limited financial inputs (Friede et al., 2015; Alsaifi et al., 2020). This section discusses the empirical evidence on effects of Green Accounting Disclosure in the improvement of financial performance, risk management reduction, investment attractiveness and long-term sustainability of the firms.

### **2.4.1 Green Accounting Disclosure and Financial Performance**

Several studies have been made to show that the Green Accounting Disclosure has a positive effect on the financial performance through attracting more investors

and customers. [Friede et al. \(2015\)](#) took a study on the relationship of environmental disclosure, equity and ROE of a firm, that stated an increase in stock prices, increase in ROE and ROA by the firms with high quality environmental disclosure. Secondly, [Khan and Gupta \(2024\)](#) did a meta-analysis of sustainability reporting and firm financial performance, where a company with Green Accounting Disclosure was found to possess a lower financial risk and higher profitability. Nevertheless, it is argued that the financial benefits of Green Accounting Disclosure depend on the industry. For instance, [Iliemena \(2020\)](#) studied the oil and gas firms in Nigeria and discovered that sustainability reporting affected the brand value positively, and although there was a statistically insignificant direct impact of profitability, this was attributed to the fact that environmental compliance is expensive in that industry. According to [Delmas & Toffel \(2008\)](#), this signifies that the business sectors with larger environmental hazards might not be able to reconcile the benefits of sustainable actions with competitive profits.

#### **2.4.2 Green Accounting Disclosure and Risk Management**

Within the ambit of Green Accounting Disclosure, one of the key advantages of this risk management tool for companies include helping them to prepare to face the risk. Firms that report environmental and social performance actively face lower regulatory risks, lower legal liabilities, good stakeholder relations, all of which lead to financial stability ([Eccles, Ioannou, & Serafeim, 2014](#); [Friede et al., 2015](#)). According to [Saleh, Jawabreh, al Amro, and Saleh \(2023\)](#) who conducted a study, companies with more transparent sustainability disclosures were capable to counteract operational risks to a greater degree through doing in advance to preclude [environmental] problems ahead of becoming operational liabilities. It is more relevant to industries with strong regulatory oversight like mining, manufacturing and energy sector as noncompliance can result in hefty fines and tarnish its image ([Ferrer, Malagon, & ter Horst, 2023](#)).

But some firms only report sustainability selectively to appear as though they are being environmentally responsible despite no real change. [Al-Shmam et al., \(2021\)](#) in their study discovered some corporations that are utilizing greenwashing

techniques that inflate their environmental performance in disclosure but do not make significant improvements of the environmental realm. Such caveats, however, cause fear about the value of Green Accounting Disclosures to be credible and reliable, particularly in markets where regulatory enforcement strength are weak.

### **2.4.3 Green Accounting Disclosure and Investor Confidence**

Consequently, environmental transparency has become an important criterion in investment decisions of investors. [Lin and Qamruzzaman \(2023\)](#) find that firms opting to the voluntary Green Accounting Disclosure are perceived to be more environmentally friendly and risk free that attract more investment influx and better stock market performance.

In a study, [Kalbouneh et al. \(2023\)](#) discovered that firms with extensive sustainability reports showed higher stock returns and greater availability to capital markets. Furthermore, [Dura, Suharsono, et al. \(2022\)](#)'s research also precisely shows that institutional investors choose companies that are equipped with strong environmental disclosures due to their being more resistant to long run financial and regulatory risks.

However, Green Accounting Disclosure is not effective in attracting investments unless there is a high level of standardization and transparency in the reporting. [Ratmono et al. \(2024\)](#), cite some studies that claim that firm in developing economies are unable to attract investor's confidence because there is an absence of verification mechanism and inconsistent reporting framework. The fact that this happened, demonstrates a serious oversight in regulatory supervision as well as the lack of globally accepted sustainability reporting standards that would warrant investor trust in Green Accounting Disclosures.

### **2.4.4 Long-Term Sustainability and Corporate Growth**

The association of Green Accounting Disclosure with long term corporate sustainability is also evident, since it brings firms to adopt environmentally friendly

practices, to improve their resource efficiency, and to tune their business models with SDGs (Saleh et al., 2023; Eccles et al., 2014).

It was revealed that companies that were able to integrate environmental accounting in the form of business strategy will earn the advantage of long term financial resilience and market competitiveness. Such firms can lower operational costs via energy efficiency programs and waste reduction and carbon foot printing initiatives to achieve sustainable business growth (Kalbouneh et al., 2023). Indeed, the impact of the Green Accounting Disclosure to spark corporate growth relies upon the extent to regulatory environment and financial support towards the inclusion of sustainability oriented practices. Carandang and Ferrer (2020) study suggest that firms in the developed economies. However, complying with the green accounting practices becomes costlier and less financially supported in firms located in developing countries (A. O. Agyemang et al., 2021).

Green Accounting Disclosure has mixed empirical evidence on its influence on the corporate performance; however, most studies show a positive correlation between the transparency of sustainability and financial performance. Being more comprehensive in environmental. In order for the firms to get the advantages of Green Accounting Disclosure, they should follow transparent, standardized, and verifiable sustainability reporting practices. In addition, stronger incentives and frameworks will have to be developed by policymakers and regulators for the sustainability disclosures to be carried out, including in the emerging markets where weak financing constraints always prevent firms from participating in the green accounting practices.

## 2.5 Challenges in Implementing Green Accounting Disclosure

Despite that GAD has come under recognition as a critical aspect of corporate sustainability and financial transparency; its implementation is riddled with numerous imposing challenges. In many respects, firms worldwide experience difficulties in adopting green accounting practices due to regulatory, financial, technological,

and institutional reasons. However, regulations in emerging market economies in developing economies such as lack of regulation enforcement, lack of expertise and economic constrain still impose severe challenges (Saputra, Manurung, Rachmawati, Siskawati, & Genta, 2021). By exploring the major barriers pertaining to the effective implementation of Green Accounting Disclosure, it highlights the regulatory loopholes, cost constraint, the absence of expertise, corporate resistance, and technological limitations.

### 2.5.1 Regulatory and Standardization Issues

First of all, one of the challenges for Green Accounting Disclosure implementation is the global shortage of sustainability reporting standards. Unlike developed economies, with clear frameworks like the GRI, International Financial Reporting Standards (IFRS) on sustainability, the Task Force on Climate-related Financial Disclosures (TCFD); many developing countries do not have clear regulations or are not enforced. (Chrzan & Pott, 2024).

Businesses are left confused with fragmentation on sustainability reporting due to regulatory inconsistencies. Thus, for most firms, one of the common practice tends to be greenwashing, wherein firms selectively disclose environmental information to make them appear compliant without truly undergoing full environmental audits (Kalbouneh et al., 2023). Moreover, due to its cross border nature, cross border corporations also experience the challenge of having to abide with multiple sustainability regulations in several jurisdictions, complicating corporate environmental reporting processes (Ioannou & Serafeim, 2012).

### 2.5.2 Financial Constraints and Cost Burdens

However, the financial cost of implementing Green Accounting Disclosure is still a major deterrent, especially to small and medium-sized enterprise (SMEs). There are significant financial resources spent for sustainability reporting as it necessitates to set up data collection systems, carrying out environmental audits and compliance processes (Christensen, Hail, & Leuz, 2021).

Ratmono et al. (2024) study finds that firms with capital intensive activity (oil, mining, manufacturing) are likely to face higher sustainability compliance costs as it requires the firm to follow the carbon tracking, emissions reduction initiatives and environmental impact assessments. As a result, several firms, particularly in developing economy, either reduce their disclosures to avoid sustainability reporting or abstain from reporting altogether owing to high costs.

Besides, firms are less prone to voluntarily develop Green Accounting Disclosure if financial incentives for such disclosure are understated. While governments from the developed markets do provide tax breaks and other financial incentives for corporate sustainability efforts, many developing countries have not met the support to drive the same level of financial sustainability in the environmental transparency aspect (Lusiana et al., 2021). As a result, several firms, particularly in developing economy, either reduce their disclosures to avoid sustainability reporting or abstain from reporting altogether owing to high costs.

### 2.5.3 Lack of Expertise and Skilled Professionals

However, it is clear from another critical challenge in Green Accounting Disclosure implementation: scarcity of professionals with experience in handling sustainability accounting, environmental reporting. There are many firms, especially in developing economies, that do not have trained accountants, auditors and sustainability officers that can prepare high quality environmental disclosures (Al-Shmam, Riyadh, & Alfaiza, 2021; Ratmono et al., 2024).

According to A. Agyemang et al. (2023), firms in China and in Sub-Saharan Africa have difficulty recruiting sustainability experts resulting in less than consistent and less than reliable sustainability reports. This only compounds the problem further as there is no standardized education and training programs in environmental accounting; as many universities and professional accounting bodies have yet to include green accounting in their curricula (Creel & Paz, 2018). Errors in environmental impact understanding, measurement, and reporting also greatly impede the environmental reporting of many companies, resulting in low quality or misleading sustainability reports (Qian, Tilt, & Belal, 2021).

## 2.5.4 Corporate Resistance to Green Accounting Disclosure

Corporate resistance to Green Accounting Disclosure is related to both economic and strategic concerns. A lot of companies think that sustainability reporting is not a key business function, and this is one of the reasons for their reserve in adopting green accounting practices (Dura et al., 2022). The main arguments made by these people are:

- a) Fear of Negative Publicity – A few companies are afraid of disclosing sustainability information as this may expose them to illegal environmental practices, and hence they may draw public criticism, civil charges, or financial sanctions (Neu, Warsame, & Pedwell, 1998).
- b) Short-Term Profit Orientation – The firms that are profit-oriented decide not to invest in Green Accounting Disclosure, prioritizing short-term financial gains over long-term sustainability commitments (Delmas & Toffel, 2008).
- c) Lack of Regulatory Pressure – In jurisdictions where no sustainability reporting laws are mandatory, the majority of companies prefer not to disclose their environmental impacts because in these jurisdictions the enforcement of regulations is very weak (Delmas & Toffel, 2008).

The implementation of Green Accounting Disclosure is very demanding on technology and data management systems. A specific example is those companies that are directly influenced by lack of technological infrastructure in getting the correct information and subsequently reporting environmental data accurately (KPMG, 2020).

## 2.5.5 Technological and Data Limitations

A research study by EY (2020) proved that unconversant companies with digital reporting tools and automated environmental control systems are struggling with data misobservations, measuring errors, and sustainability reporting delays. The involvement of block chain into the verification process can be figured out the authenticity, and therefore the reliability of sustainability reports is under

question. Suffice to say that however the companies are prophesied to partly counter this problem by investing in advanced environmental reporting technologies which might include AI-powered sustainability analytics, automated carbon tracking software, and cloud-based sustainability databases to enhance the Green Accounting Disclosure's data accuracy and efficiency (Deloitte, 2020).

## 2.6 Future Directions in Green Accounting Research

Green Accounting is a new activity of corporate governance and sustainability. Nevertheless, as the field advances, researchers must overcome new challenges, and refine methodologies for the successful use of Green Accounting Disclosure (GAD). Thus, technological advancements are the key for the future green accounting research, standardization of regulatory, integration of green accounting with financial decision making, methodologies of impact assessment, and the sector specific applications are called for (Delmas & Toffel, 2008; Christensen et al., 2021). It is evident that more research could be conducted in the areas outlined in this section, which present key themes to extend.

### 2.6.1 Integration of Green Accounting into Financial Decision-Making

Future research will need to include the integration of green accounting metrics into the corporate decision making processes in financial matters. Although ESG reporting has been broadly adopted, green accounting is still considered a separate function from financial analysis even by the majority of the firms (Swalih, Ram, & Tew, 2024; Hyvönen, Laine, & Pellinen, 2024).

The link between green accounting metrics and subsequent decision making, such as capital budgeting, risk assessment, and investment strategies, should be further studied by future research to see how corporations can embed green metrics in their decision processes. Therefore, standard sustainability performance indicators will

be needed to link environmental accounting data and to financial performance (Guenther, Endrikat, & Guenther, 2016; Burritt, Hahn, & Schaltegger, 2002).

### **2.6.2 The Role of Emerging Technologies in Green Accounting**

Given the rapid progress of the digitalization and artificial intelligence (AI), it is necessary that we learn its potential for Green Accounting Disclosure in this exertion. However, the application of the appropriate technologies such as the blockchain, big data analytics and machine learning will enable them in delivering more accurate, transparent and efficient sustainability reporting (Vinuesa et al., 2020).

For instance, blockchain technology is capable of being a proof of the voice of corporate sustainability claims, the green wash risks and the authenticity of environmental disclosures (Saber, Kouhizadeh, Sarkis, & Shen, 2019). With AI sustainability analytics, one can also automate customer reporting; automated carbon footprint and performance measurement in analytics (Nguyen et al., 2023). Research should be conducted further on these technologies to investigate their effectiveness as well as their cost of adoption and compatibility difficulties (Casino, Dasaklis, & Patsakis, 2019; Andoni et al., 2019).

### **2.6.3 Regulatory Standardization and Policy Frameworks**

Consequently, one of the biggest challenges is the absence of globally standardized regulatory framework. Future research needs are also delineated that revolves around the harmonization of international sustainability reporting standards with a focus on how standards can be harmonized in the face of lack of regulatory enforcement in developing economies (Dhaliwal et al., 2011) United Nations Conference on Trade and Development [UNCTAD], 2024).

Industry is switching to mainstream sustainability reporting frameworks including GRI, ISSB, IFRS Sustainability Standards, among others, which are now embraced by the majority (IFRS Foundation, 2023; Global Reporting Initiative, 2023). in

other words, no universal framework forces the adoption of standardized green accounting practices of all industries and different geographical locations (Dhaliwal et al., 2011).

#### **2.6.4 Green Accounting in Industry-Specific Contexts**

The use of the green accounting practices in the sector specific is another potential area of research for the future. There are distinguishable environmental footprints and sustainability challenges in each distinct industry, which explain why Green Accounting Disclosure frameworks for each sector should be designed specifically for that industry (Eccles et al., 2014; Dhaliwal et al., 2011).

And an example is that manufacturing firms need robust carbon emissions reporting, whereas financial institutions need sustainable finance disclosure mechanisms. In the same manner, agriculture-based companies need to include biodiversity impact assessments to their accounting systems (Schaltegger & Burritt, 2018).

Future research should be to develop industry specific sustainability disclosure models as aligned globally best practices but considering the distinct operational realities of distinct business sectors (Michelon, Pilonato, & Ricceri, 2015; Pramesti, Novita, et al., 2024).

#### **2.6.5 Assessment of Financial Impact of Green Accounting Disclosure**

Although there is plenty of evidence establishing the relationship between Green Accounting Disclosure and corporate sustainability, research on this relationship's direct financial impact has not reached a clear conclusion. Future papers should quantify the financial benefits of green accounting with special reference to stock market performance, cost saving and investment attractiveness (Dhaliwal et al., 2011; Friede et al., 2015).

It is important for research to explore the extent to which the companies practice Green Accounting Disclosure can enjoy the long term financial benefits such as lower capital cost, improved credit rating and better access to investment capital

(Al-Shmam et al., 2021). However, studies should be made regarding the costs and benefits of sustainability reporting assuming the costs of reporting against environmental gains or investments (Eccles et al., 2014; Schaltegger & Burritt, 2018).

# Chapter 3

## Research Methodology

The present study is a quantitative-based one that has been laid down to examine the nexus among the Green Accounting Disclosure Index (GADI) and the Corporate Financial Performance (ROA) of 30 firms of Pakistan Stock Exchange-listed companies for the period 2011–2020. Panel-data regression procedures combined with diagnostic tests are used to improve the robustness of the estimates. Only data based on annual reports of selected audited, standardized, and publicly available firms. Annual reports have been found to be reliable for financial and environmental disclosure studies, as they meet regulatory requirements; hence, they afford corporate accountability (Cormier & Magnan, 1999). The PSX database was used to confirm firm coverage and consistency over years.

First, the dataset was checked for completeness and internal consistency to avoid potential biases from missing observations in panel settings (Wooldridge 2010). We then tested the regressors for multicollinearity with the VIF, as high multicollinearity inflates standard errors and compromises each individual contribution served by one regressor. VIF values above 10 are usually considered to indicate multicollinearity that could impede statistical tests (O'Brien, 2007); in our sample all VIF values were below this threshold.

The next step is testing for stationarity using the Augmented Dickey–Fuller (ADF) method. The risk of spurious regression (i.e., that some variables were in levels and stationary, whilst others needed differencing before being estimated) was present

for non-stationary series. Stationarity is key in order to guarantee valid inference in the panel settings (Butar-butar, Pangestu, & Itan, 2024).

We estimated Fixed Effects (FE) and Random Effects (RE) models, guided by the specification choice using the Hausman test. The Random Effects Model (REM) was preferred by this test, suggesting that unobserved firm effects are uncorrelated with the regressors (Nguyen et al., 2023). Nevertheless, firm performance is often persistent over time, so a model with a static effect will not provide the complete development.

To account for the persistence in both variables and the potential endogeneity issue, we estimated a dynamic panel using the Generalized Method of Moments (GMM). This approach is advantageous in addressing simultaneity and omitted-variable bias, which are often faced in the investigation of sustainability contexts, and allows for autocorrelation of the dependent variable (Dossa, 2025). GMM estimators with robust errors  $\lambda\epsilon$  are consistent in the presence of heteroskedasticity, which is not a rare feature of financial panels (Gabr & ElBannan, 2025). Finally, results on the study's hypotheses are tested in the form of dynamic effects.

In short, the methodology is in line with standard procedures: panel analysis, unit-root tests, FE/RE selection following guidelines of the Hausman test, and dynamic GMM estimation for robustness. Working with audited annual reports grounds the findings in actual disclosures (Cormier & Magnan, 1999), hence providing strong evidence on how green disclosure connects to firms' performance.

### 3.1 Research Design

The study uses quantitative research that assesses the association between GADI (independent variable) and firm performance (ROA, dependent variable) of 30 PSX firms for the time-span from 2011 to 2020. To control for unobserved firm heterogeneity, panel-data regression is used (Baltagi 2008). Such measures firstly rely on secondary data which means consistent because it is collected from annual reports and financial statements. Secondly, those are transparent measure

(Sekaran, 2016). The estimates from dynamic panel models are considered to control for the lagged effects of sustainability reporting.

The positivist paradigm is employed in this research in the body of knowledge so as to facilitate the objective study of the relationship between financial structure and green accounting disclosures (Creswell & Creswell, 2017). However, the panel data approach allows identifying firm specific variations over time which cross-sectional analyses miss (Baltagi & Baltagi, 2008). In particular, such design also accommodates that the use of Generalized Method of Moments (GMM) can tackle the endogeneity problems, which are likely associated with the interdependence of financial decision making and environmental reporting (Arellano & Bond, 1991; Roodman, 2009). Furthermore, this study incorporates longitudinal analysis that tends to be a common approach in previous environmental accounting studies to explain sustainability practices (Cho, Roberts, & Patten, 2010).

## 3.2 Data Collection

The data for this study comprised 10 years (2011–2020) data of 30 listed firms operating in Pakistan Stock Exchange (PSX) annual reports. As the most credible source of financial and non financial disclosures, annual reports fulfill its audit requirements and regulates its compliance (Healy & Palepu, 2001). Increasingly, sustainability disclosures appear within companies and industries' annual reports and are standardizing to a Global Reporting Initiative (GRI) guideline, which helps in cross firm and industry comparisons (Ajibade et al., 2021).

Data validation techniques were used to ensure completeness and reliability of the dataset. First, a preliminary review of each firm's sustainability disclosure was conducted where all key financial indicators and environmental disclosure elements were fully recorded for each year. Finally, we checked the missing values and excluded firms with insufficient environmental report from the sample (Butar-Butar et al., 2024). This is in line with corporate sustainability research that focuses on data integrity as a prerequisite for carrying out robust statistical models (Hackston & Milne, 1996).

### 3.3 Variables and Measurement

To analyze the impact of financial and ownership structures on Green Accounting Disclosure (GAD), the study uses a set of well defined variables. Content analysis is employed to measure the dependent variable, GAD, using environmental disclosures in firms' annual reports. However, this method is commonly used in sustainability research because it provides a systematic evaluation of qualitative and quantitative environmental information declared by firms (Ajibare et al., 2024). Content analysis addresses an aspect of standardization and replicability of measurement, which mitigates the potential subjectivity bias caused by the voluntary disclosure (Butar-Butar et al., 2024). This in line with previous studies that saw corporate annual reports as a reliable source because they stick to regulatory requirements and independent audits and as such, are transparent enough in environmental disclosure practices (Hackston & Milne, 1996).

In this study, leverage, ownership concentration and corporate performance serve as the independent variables hypothesized to affect the firm's disclosure on sustainability behavior. Firms' debt to assets ratio is the measurement of leverage ratio, which reflects the proportion of a firm's asset financed through debt. In addition, firms with moderate leverage may disclose more environmental information to appease creditors and investors (Arellano & Bond, 1991; Roodman, 2009), since highly leveraged firms may incur financial constraints hindering their ability to invest in sustainability initiatives.

The degree of control exercised by major investors in corporate decision making is measured by Ownership concentration (OC) as the percentage of shares held by largest shareholder. In accordance with (Putra, Turana, & Handajani, 2024), the nature of the effects of sustainability disclosure on firms with high ownership concentration is positive or negative, based on the degree of the domination of the shareholders in the firm that emphasizes on the sustainability of the environment or focuses on getting short term financial benefit.

It also incorporates an independent variable that is Corporate performance (CP) measured by means of Return on Assets (ROA) and Return on Equity (ROE),

representing the benefits to the shareholders. These financial metrics are widely known to be indicators of how profitable and efficient a firm's operations have been. Firms with higher ROA and ROE have more flexibility to use its resources in environmental initiatives hence these firms will engage more in corporate social responsibility (CSR) and sustainability reporting (Ajibade et al., 2021). Additionally, the sustainability disclosures are used by highly profitable firms to promote corporate reputation and improve investor relation by appealing to stakeholder expectations (Gabr & ElBannan, 2025).

In this further, there are other primary variables of explanation apart from the above and additionally, a control variable, Profitability is brought in because earlier studies have found a very strong relationship between profitability and voluntary disclosure practices (Ajibade et al., 2021). Firms with the ability to produce higher profits are more likely to publish more extensive environmental reports as these firms have more resources at their disposal to invest in sustainability initiatives and improvements of corporate governance. The effects of controlling for profitability in the empirical model are to control for profitability; such that the study isolates the effect of leverage, ownership structure and corporate performance on green accounting disclosure without potential bias (Ajibade et al., 2021).

The employment of these variables in the study instils the assurance of a broad based assessment of financial determinants of sustainability disclosure leading to sound exploration of empirical policy implications for the rulemaking bodies, investors as well as the corporate managers.

$$ROA = \frac{NetIncome}{TotalAssets} \times 100$$

$$LEV = \frac{TotalDebt}{TotalAssets} \times 100$$

$$OC = \frac{Shareheldbylargestshareholders}{TotalShareOutstanding} \times 100$$

Model Equation:

$$ROA_{it} = \beta_0 + \beta_1 GADI_{it} + \beta_2 LEV_{it} + \beta_3 OC_{it} + \gamma_i + \delta t + \epsilon_{it} \quad (3.1)$$

TABLE 3.1: Description of Variables

Variable Category	Variable Name	Measurement	Abbreviation
Dependent Variable	Green Accounting Disclosure	Content analysis of environmental disclosures in annual reports	<b>GAD</b>
Independent Variables	Leverage Ratio	Total Debt to Total Assets	<b>LEV</b>
	Ownership Concentration	Percentage of shares held by the largest shareholder	<b>OC</b>
	Corporate Performance (ROA)	Net Income / Total Assets	<b>ROA</b>
	Corporate Performance (ROE)	Net Income / Shareholders' Equity	<b>ROE</b>
Control Variable	Profitability	Net Profit Margin (Net Profit / Total Revenue)	<b>PRO</b>

Notes: Content analysis mitigates subjectivity by using a consistent checklist ([Butar-butur et al., 2024](#); [Hackston & Milne, 1996](#)).

### 3.4 Construction of Green Accounting Disclosure Index

A content analysis-based checklist methodology is used for developing the Green GADI's indexing method of constructing the framework is in line with the widely recognized environmental review frameworks such as Global Reporting Initiative (GRI), Carbon Disclosure Project (CDP), and ISO 14001 standards (Global Reporting Initiative, 2013; Carbon Disclosure Project, 2015). A binary scoring system (1 = disclosed, 0 = not disclosed) is adopted, thanks to the fact that it is widely accepted in environmental disclosure literature for its simplicity and objectivity (Haniffa & Cooke, 2005). The following formula is used to compute the final GADI score:  $GADI = \text{Sum of scores achieved by the company} / \text{Total Possible Score} \times 100$ . The formula converts disclosure scores into a percentage and makes data comparable between firms and industries, so as to permit to quantify firms' sustainability reporting practice (Gray, 2001).

TABLE 3.2: GADI Components

Category	Checklist Item
Environmental Policy and Governance	Presence of an Environmental Policy Environmental Management System (EMS) or Certification (e.g., ISO 14001)
Compliance and Legal Obligations	Compliance with Environmental Laws Disclosure of Environmental Fines or Penalties
Resource Usage	Energy Consumption Water Management (combining Water Consumption and Water Recycling) Renewable Energy Usage
Emissions and Climate Change	Carbon Emissions (Direct and Indirect) Reduction in Emissions Targets Disclosure of Climate Change Risks
Waste Management	Waste Reduction Initiatives Hazardous Waste Disposal
Reporting and Transparency	Environmental KPIs Alignment with Global Frameworks (e.g., GRI, CDP)

### 3.5 Justification of Green Accounting Disclosure Index (GADI)

Through a structured approach to the construction of a disclosure index methodology, that is accepted in the environmental accounting and sustainability research, I state the justification for the construction of the Green Accounting Disclosure Index (GADI). Second, the checklist approach is a systematic and objective means of measuring the degree of environmental disclosure, since it enables an assessment of firms using a consistent framework.

Studies in prior have focused on importance of index-based disclosure evaluation, especially in the context of corporate social responsibility (CSR) and sustainability reporting, that makes a homogeneous analysable field for companies in one industry and between different periods of time (Global Reporting Initiative, 2013; Carbon Disclosure Project, 2015).

inary scoring method (1 if disclosed and 0 if not disclosed) increases objectivity in measurement and reduces bias of the subjectivity when doing qualitative measurements (Haniffa & Cooke, 2005). Not only does the calculation of GADI in percentage terms reinforce its ability to be used, but it provides the additional ability to compare firms and industries across stable periods and over time (Gray, 2001).

Also, the literature on disclosure informs the diverse scope of the checklist. The extant literature has shown the ways in which environmental policies, compliance statements, KPIs, and alignment with global frameworks can increase stakeholder decision-usefulness (Deegan, 2002; Freeman, 2010; DiMaggio & Powell, 1991).

ugh useful to guide selection of items to be included, this theory does shed light on reasons for the observed behavior and thus still applies as an overarching theoretical lens. To make the relevance of the country, it is foregrounded by using Pakistan-salient issues (for example, water and energy) that have been embedded with national imperatives (Khan & Gupta, 2024) Government of Pakistan, 1997; SECP, 2017) as well as giving reference to GRI, ISO 14001, and CDP guidelines (Global Reporting Initiative, 2013; Carbon Disclosure Project, 2015).

Another reason for adoption of GADI in the Pakistani context is that the relevance of GADI to Pakistan is crucial. The index is aimed to focus on country specific environmental issues, such as water resource management and energy efficiency, which are utmost sustainability issues in Pakistan (Khan & Gupta, 2024). First, compliance with Pakistan Environmental Protection Act (1997) and Corporate Governance Code assures that the index is measured within national regulatory framework and makes the index applicable to policy-level decision making (Government of Pakistan, 1997; SECP, 2017). Additionally, including global sustainability standards (GRI, ISO 14001, CDP) in GADI guarantees that Pakistani firms are being benchmarked with international best practices, providing additional credibility to environmental disclosures, for foreign investors, regulatory bodies and as well as sustainability analysts.

The structured categorisation of GADI into six key areas makes a very important methodological justification by yielding Environmental Policy and Governance, Compliance and Legal Obligations, Resource Usage, Emissions and Climate Change, Waste Management and Reporting Transparency. The categorization guarantees a thorough evaluation of corporate green accounting practices, both obligatory compliance and voluntary sustainability. In structured classification, the classification follows GRI and CDP, which reflects consistency with global disclosure (Global Reporting Initiative, 2013; Carbon Disclosure Project, 2015). Ensuring that each category of the index corresponds to a particular dimension of corporate environmental responsibility, the index makes it possible to obtain an empirical and policy relevant holistic measurement of the degree of sustainability disclosure.

Third, the methodology and scoring system that are checklists based serves as a straightforward and evidence based approach to observe the extent to which a company is practicing green accounting practices. However, across disciplines, in common use in the disclosure literature, binary scoring is accepted because it can be easily interpreted, be objective, and is applicable in industries such as auditing and information security (Hackston & Milne, 1996). Also, disclosure quantification into a percentage score allows firms, regulators, and policymakers to track time series data of progress towards sustainability benchmarking, and

corporate accountability. With the growing international significance on environmental transparency and ESG reporting, GADI acts as a scientifically valid, policy relevant, and internationally comparable measure of green accounting disclosure practice, hence forms an indispensable part of corporate sustainability analysis for corporate sector in Pakistan and beyond.

### 3.6 Sample Selection

Purposive sampling was utilized to select 30 firms based on the selection criteria of each firm had consistently reported sustainability related disclosures for at least three years during the study period. This is a common approach in environmental accounting research because not all the firms publish sustainability report (Al-Tuwaijri, Christensen, & Hughes II, 2004). For example, the study gave priority to firms from industries that have high environmental impact so that, for instance, manufacturing, energy, and industrial goods firms are more likely to engage in green accounting disclosure; (Ajibade et al., 2021).

Aligning with prior research in environmental accounting (cf. (Ajibade et al., 2021), firms within environmentally intrusive sectors (e.g., manufacturing, energy, and industrial goods) were specifically targeted to guarantee sufficient decision-useful differences on the level of disclosure. The conditions improve the applicability and are used in later dynamic model estimation (Blundell & Bond, 1998; Windmeijer, 2005; Roodman, 2009).

### 3.7 Data Processing and Summary Statistics

Prior to regression analysis, all of the variables were run through a descriptive statistical summary so the data could be understood. These included mean, standard deviation, minimum and maximum values to detect anything unusual or discrepancies in the dataset. Financial indicators and sustainability disclosures can be understood in terms of their distribution, and so extreme values do not bias regression results (Hair Jr, Black, Babin, & Anderson, 2010).

The dataset was tested for a completeness check, and we confirmed that there were no missing values existing in the dataset hence unbiased statistical estimation becomes possible (Agweda, Okoye, Amahalu, Egolum, & Obi, 2024). One important step when carrying out panel data regression is ensuring a balanced data set because missing values in the dataset will bias coefficient estimates and reduce model efficiency (Ajibade et al., 2021). In addition, these checks improved the validity of the subsequent econometric tests and thus the robustness of the analysis.

For testing multicollinearity among independent variables, the study carried out Variance Inflation Factor (VIF) analysis. Inflation standard errors because of multicollinearity make difficult regression estimates interpret the individual effect of each predictor variable (Belsley, Kuh, & Welsch, 2005). The VIF test results showed that all independent variables had VIF values less than 10 indicating no bias toward serious collinearity.

In corporate finance studies, the multicollinearity should be handled, as the widespread correlated indicators, such as leverage, ownership structure, profitability, etc., typically exist. Statistical independence of variables in the regression model ensures the validity of the model, which makes the results of the analysis more reliable when recommending policy (Olaide et al., 2024).

In order to be sure of the reliability of panel data regression, Augmented Dickey-Fuller (ADF) test was used to test for stationarity. As with any other time-series or panel data research, nonstationary variables have the tendency to result in spurious regression outcomes, making interpretations meaningless (Dickey & Fuller, 1979; Levin, Lin, & Chu, 2002). ADF tested that some variables were stationary at level and some variables needed to take the first order differencing to achieve stationarity.

A standard procedure in panel data econometrics is to transform non stationary variables into stationary series so that hypothesis testing is valid (Hackston & Milne, 1996). As such, the study adopts best practices on disclosure studies in green accounting and mitigates the risk of false statistical inferences by ensuring the data used is stationary.

Two panel data models, the Fixed Effects (FE) and Random Effects (RE) models were estimated. The appropriate specification was determined by the Hausman test. The results indicated that Random Effects Model (REM) was chosen for the reason that variations that were firm specific were independent of independent variables (Arellano & Bond, 1991; Roodman, 2009). Given persistence and potential endogeneity, we additionally estimated a dynamic panel using GMM with robust errors to address heteroskedasticity and serial correlation common in financial panels (Windmeijer, 2005; Roodman, 2009; Blundell & Bond, 1998).

Financial disclosure research requires selection of an appropriate panel regression model because results need to be statistically sound and practical (Healy & Palepu, 2001). In studies where the firm specific characteristic is as random variable distributed over the sample, the REM model is widely used in view of the efficiency of the model (Oladejo et al., 2024).

As GADI is a lagged model, the empirical methodology employed a robust econometric technique for dynamic panel data model based on Generalized Method of Moments (GMM) estimator. To correct for the endogenous factors created when independent variables be correlated with error terms, the GMM model was used (Ajibade et al., 2021). In addition, the GMM approach also corrects for heteroskedasticity and serial correlation which are rather common in financial panel data research (Windmeijer, 2005; Roodman, 2009).

The study uses GMM estimation, a more extensive analysis of the trends in green accounting disclosure, to make the findings econometrically robust as well as practically useful for corporate sustainability reporting (Blundell & Bond, 1998).

# Chapter 4

## Results and Findings

### 4.1 Overview and Roadmap

This chapter provides the result collectively for Green Accounting Disclosure (GADI) and Firm Performance of the firms on the Pakistan Stock Exchange (PSX) over a period of 2011–2020. Following the order validated in the methodology for empirical strategy, which is as follows:

1. Sample description and data preparation;
2. Descriptive statistics (mean, median, mode), variability (range of the variable)
3. VIF for multicollinearity diagnostics and bivariate associations (correlation matrix);
4. Panel unit-root tests (LLC, IPS) for testing stationarity and why it is important;
5. Static panel models (FE and RE) with year fixed effects and firm-clustered SEs,
6. Model selection via Hausman;

7. If there may be some endogeneity: Dynamic panel estimator with 2-step difference GMM (Arellano & Bond, 1991) w/ Windmeijer-robust standard errors (Roodman, 2009), differences w/o constant and year dummies kept;
8. Additional robustness to an alternative profitability measure (ROE) and discussion of instrument diagnostics.
9. Testing of results vs. research hypotheses and theoretical assumptions in the study

We continue to focus on ROA as the key performance variable (as per our direction from the supervisor of needing only one profit metric) and use ROE as an ancillary performance measure primarily to replicate or qualify our main findings. We now specifically indicate where the testing reconciles the concrete technical issues identified by the referee: correlation matrix (clarified), endogeneity (treated through GMM), robustness (clarified), unit-root rationalizations (kindly explained), constant in GMM clashes with differences, and Hansen J/instrument set reported. Finally, FE/RE tables are accompanied by a Hausman test.

## 4.2 Data, Variables, and Estimation Notes

The balanced panel consists of 30 firms over a 10-year period (2011–2020), which results in  $N = 300$  firm-year observations. We extracted all variables included in the estimation from audited annual reports and standardized them as described above. We follow standard convention in financial panel work (e.g., (Wooldridge, 2010; Baltagi & Baltagi, 2008)):

1. Specify the layout of the panel & check the weight (balance).
2. Winsorize specific continuous variables at the 1st and 99th percentiles to prevent any outlying values from exerting too much influence;
3. Add year dummies in every regression specification to control for macro shocks that affect each firm uniformly.

4. Cluster standard errors at the firm level for static FE/RE models to correct the within-firm serial correlation and heteroskedasticity;
5. Switch to dynamic panel GMM for the performance equation (Arellano & Bond, 1991; Roodman, 2009) in order to model state dependence and possible endogeneity by means of collapsed instrument sets with lag limits that control for excessive instrument proliferation (Windmeijer, 2005).

### 4.3 Descriptive Statistics

All core variables were presented in **Table 4.1**, by means of standard deviations and ranges. Averages in ROA are 9.67 percent with a wide spread ( $SD \approx 10.08$ ), implying substantial amounts of cross-sectional and intertemporal heterogeneity in performance results. The disclosure index (GADI) averages 38.96, with a large spread ( $SD \approx 22.58$ ), indicating substantial variations in the depth and breadth of environmental disclosure among listed firms. Leverage (LEV) is around 51.33 with  $SD \approx 21.95$ , and ownership concentration (OC) has a mean value of 61.28 with  $SD \approx 24.80$ , which indicates that most firms have dominant blockholders. The ROE and NPM measures are kept for descriptive completeness and robustness, although the effects are not focused on in the study.

TABLE 4.1: Descriptive Statistics (N = 300)

Variable	Mean	SD	Min	Max
ROA	9.669	10.083	-7.665	47.355
GADI	38.964	22.579	0	82.143
LEV	51.329	21.948	11.545	95.28
OC	61.275	24.797	12.43	99.335
ROE	25.506	43.626	-68.940	260.515
NPM	8.629	8.563	-10.800	35.345

Interpretation. GADI ranges from 0 to 82, reflecting large variance in the coverage of environmental information regardless of whether firms are operating in the

same market. Such heterogeneity has the advantage of identification in static as well as dynamic models. Validation of Outcome Variability: The wide range of ROA provides enough variation in outcomes needed to detect plausible effects of disclosure, leverage, and ownership structure as adjusted for time effects.

## 4.4 Correlation Structure

**Table 4.2** shows Pearson correlations and p-values. Unsurprisingly, ROA and ROE are highly and positively correlated with each other, which confirms that the use of a confirmatory robustness outcome is appropriate. H3 (LEV) is consistent with the common sense that higher balance sheet levels of debt may reduce accounting profitability, as LEV is significant and negatively related to ROA ( $p < 0.01$ ). Results show weak and statistically insignificant correlations between GADI and all other covariates, so a bivariate relationship is not simply rescaled to imply large linear relationships; this further confirms the usefulness of panel regression with controls and dynamics.

TABLE 4.2: Pearson Correlations (p-values in Parentheses)

	ROA	GADI	LEV	OC	ROE
ROA	1				
GADI	-0.020 (0.728)	1			
LEV	-0.150** (0.009)	0.016 (0.787)	1		
OC	-0.006 (0.913)	-0.056 (0.330)	0.287** (0.000)	1	
ROE	0.636** (0.000)	0.064 (0.267)	0.218** (0.000)	0.132* (0.022)	1

Notes: \*\*  $p < 0.01$ , \*  $p < 0.05$ .

Interpretation. The weakness of the empirical findings and the lack of substantive theoretical inputs to justify them is in line with much research on emerging

markets, which all too often collapses into stating that a result is endogenous because... it depends on how over-leveraged firms are as they teeter about their optimal investment—a la: “Ah, but leverage gravitates toward firms with more financing opportunities,” or conversely, “Leverage will attenuate more in high-ROA pre-reform spells, so we should be bullish there.” Caution is required to not over-interpret the disclosure-performance link and a univariate, non-temporal model as a weak raw correlation between GADI and ROA. There is a medium level of correlation between OC and LEV ( $p < 0.01$ ), yet multicollinearity is tested systematically in **Table 4.2**.

## 4.5 Multicollinearity

Variance inflation factors (VIF) were calculated from a pooled OLS with year effects to assess for potential redundancy among regressors. As can be seen in **Table 4.3**, below any conventional threshold (e.g., 10), with a mean VIF of 3.23 (somewhat higher than the other scenarios) and a top individual case (5.69 for a year dummy), it was not severe.

TABLE 4.3: Multicollinearity (VIF)

Variable	VIF
GADI	5.63
LEV	1.11
OC	1.1
Year FE (max)	5.69
Mean VIF	3.23

Interpretation. The regressors used in the models are sufficiently independent for meaningful coefficient interpretation. The moderate VIF for GADI largely reflects shared variance with time effects and is not high enough to bias inference under cluster-robust SEs.

## 4.6 Stationarity and Why Unit-Root Tests Matter

$$\Delta X_{it} = \rho X_{it, t-1} + \sum_{j=1}^{p_i} \phi_{ij} \Delta X_{it-j} + \alpha_i + \tau t + \epsilon_{it} \quad (4.1)$$

Best practice in panel econometrics (Dickey & Fuller, 1979; Levin et al., 2002) recommends that we test for unit roots since nonstationary panels can lead to spurious regression results (significance levels obtained due to trending series). We also operate each LLC and IPS assessment (trended) as a variable by the use of a variable. Across tests, **Table 4.4** attributes unit root for ROA, GADI, and LEV (rejection at some level), while OC is strongly stationary under LLC (Stata could not report IPS non-away test back the options). Since the difference-GMM approach is required to deal with persistence in dynamic models, our results support this specification when working with levels in FE/RE.

TABLE 4.4: Panel Unit-Root Tests (Trend Included)

Variable	LLC adj. t*	p-value	IPS Z-t bar	p-value
ROA	-7.439	0	-1.692	0.045
GADI	-6.651	0	-3.151	0.001
LEV	-8.826	0	-3.061	0.001
OC	-74.611	0	-	-

Interpretation. The levels of the series appear to be  $I(0)$ , so that spuriousness in the static models is less of a worry. Moreover, the dynamic model is exploited with lagged instruments and first-differencing to additionally secure inference in the existence of persistence (Arellano & Bond, 1991; Roodman, 2009).

## 4.7 Static Panel Estimates (FE and RE)

We estimate two static models for ROA as the dependent variable: a firm fixed-effects (FE) model and a random-effects (RE) model, each with year dummies and firm-clustered standard errors. Results are summarized in **Table 4.5**.

TABLE 4.5: Static Models (DV = ROA), Firm-Clustered SEs, Year FE

	<b>FE (<math>\beta</math> / SE)</b>	<b>RE (<math>\beta</math> / SE)</b>
GADI	-0.0976 / 0.0588 (p=0.108)	-0.0940 / 0.0586 (p=0.108)
LEV	-0.0550 / 0.0593 (p=0.361)	-0.0558 / 0.0513 (p=0.276)
OC	-0.1210 / 0.1063 (p=0.264)	-0.0746 / 0.0807 (p=0.355)
Year FE	Included	Included
N (groups)	300 (30)	300 (30)
R <sup>2</sup> within	0.151	0.148

Across FE and RE, the GADI coefficient is negative ( $\approx 0.095$ ), but not statistically significant at 10% or 5% with firm-clustered SEs. Financially, each 10-point gain in disclosure intensity is related to a roughly 0.95%-point decrease in ROA, *ceteris paribus* from year effects, but this link cannot be pinned down tightly within static models.

1. As anticipated, leverage (LEV) loads negatively on ROA, yet point estimates are small and statistically insignificant after taking into account time effects and clustering.
2. OC is also statistically indistinct from zero or is negative (FE) or close to zero (RE).
3. Several year dummies are positive and significant (2013–2018), pointing to large time-specific shocks on accounting profitability that affect all firms.

The pattern of signs is in line with a cautious interpretation of the emerging markets literature (e.g., debt burdens might squeeze profitability, and voluntary disclosure could either divert resources or be indicative of firms operating in more sophisticated regulatory environments), but static models mildly suffer from limited statistical precision.

## 4.8 FE vs. RE: Hausman Test and Reporting Strategy

We run a Hausman test using non-robust versions of FE and RE (as the Hausman statistic is not defined with cluster-robust VCE).

$$H = (\beta^F E - \beta^R E)T[Var(\beta^F E) - Var(\beta^R E)]^{-1}(\beta^F E - \beta^R E) \sim \chi^2_k \quad (4.2)$$

The test result is:

$\chi^2(3) = 3.88$ ;  $p = 0.2748$ ; the variance matrix is not positive definite (a common occurrence when regressor sets include many time dummies), and the test fails to reject the null that RE is consistent.

**Table 4.6.** Hausman test (FE vs. RE)

1. Test statistic:  $\chi^2(3) = 3.88$
2. p-value: 0.2748
3. Decision: RE not rejected  $\rightarrow$  RE acceptable (we still present FE for completeness).

With firm-clustered SEs in reporting models, we provide both FE and RE estimates but read them in light of RE acceptability. Where FE and RE tell a similar story (they do here), this strengthens confidence that findings are not an artifact of a single static specification.

## 4.9 Dynamic Panel Results (Difference GMM)

Static models fail to resolve state dependence (ROA depends on its past) and endogeneity (e.g., disclosure-performance simultaneity). One should always be wary of attributing much to models like these, so it is best to just say: for our estimate we used a two-step difference-GMM model (Arellano & Bond, 1991) with

(Windmeijer, 2005) correction (Roodman, 2009), no constant in the differences equation, and year dummies preserved to soak up common shocks. L.ROA and GADI get their own lagged levels (from t-2 or deeper), while LEV may be endogenous/predetermined; OC and year dummies enter IV-style at levels.

TABLE 4.6: Dynamic Difference-GMM (DV = ROA), Two-Step Robust

Term	Coef	SE	p
L.ROA	0.432	0.236	0.077
GADI	-0.136	0.096	0.169
LEV	-0.033	0.065	0.616
OC	0.017	0.045	0.703
Year FE	Included		
N / Groups	270 / 30		
# Instruments	63		
AR(1) p	0.063		
AR(2) p	0.882		
Hansen p	1		

The lagged dependent variable is indeed positive ( $\approx 0.43$ ) and marginally significant ( $p \approx 0.077$ ), an indication of state dependence in ROA, i.e., the persistence of today's profitability due to yesterday's too—as also hypothesized earlier about sticky performance.

Disclosure. However, once endogeneity and persistence are accounted for in the model, GADI remains small and statistically insignificant ( $-0.136$ ;  $p \approx 0.17$ ). An increase of ten points in GADI is related to  $\approx 1.36$  pp lower ROA when all else is estimated here for incommodiously but precisely (Table III).

Financial structure and governance. In the dynamic panel, LEV and OC are still not significant. Serial correlation. At zero, the model does not require an auto regressor of order 1 in the plt approximation, as expected in first differences; and we do clearly reject at order 2 (AR (2)  $p \approx 0.882$ ), supporting instrument validity (Arellano & Bond, 1991).

Overidentifying restrictions. This is extraordinarily high (unreasonably so):  $p = 1.000$  in the Hansen J output. On the one hand, we would like to avoid rejecting in principle, but very high p-values can escalate towards 1.0 for a weakly informative or overfitted instrument set (Roodman, 2009). We collapsed instruments and

also limited the lags, yet the number of instruments (63) remains greater than the number of groups (30). This is a well-known tension in micro panels, so we are cautious about interpreting GMM estimates and emphasize more on sign agreement across static and dynamic models crossing any significant thresholds.

Takeaway. We find little robust evidence that higher GADI improves contemporaneous ROA once endogeneity is addressed; if anything, the point estimate is negative but statistically insignificant. These results are in line with the mixed evidence from developing countries, where significant costs of establishing disclosure systems can exceed short-term accounting benefits (e.g., Deb et al. 2020; Agyemang et al. 2024).

## 4.10 Robustness: Alternative Profitability Measure (ROE)

To test whether results hinge on the profitability metric, we replicate the static FE and dynamic GMM using ROE as the dependent variable. ROE is not the focal outcome (by design we selected one primary measure—ROA), but it serves as a robustness lens.

### 4.10.1 Static FE with ROE

In the FE model with year effects and firm-clustered SEs (table omitted for brevity):

1. GADI: 0.198 (SE 0.220, p=0.377)
2. LEV: 0.328 (SE 0.336, p=0.336)
3. OC: -0.383 (SE 0.279, p=0.181)
4. N = 300; groups = 30

None of the regressors is statistically significant at 10%. The signs differ slightly from ROA (as expected, because ROE is more sensitive to equity base and leverage effects), but the insignificance pattern remains.

### 4.10.2 Dynamic GMM with ROE

The two-step robust difference-GMM with ROE (Table 4.8) shows strong persistence but no significant GADI effect.

TABLE 4.7: Dynamic Difference-GMM (DV = ROE), Two-Step Robust

Term	Coef	SE	p
L.ROE	0.738	0.104	\$.001
GADI	-0.413	0.316	0.201
LEV	0.108	0.197	0.586
OC	-0.062	0.103	0.555
Year FE	Included		
N / Groups	270 / 30		
# Instruments	63		
AR(1) p	0.042		
AR(2) p	0.479		
Hansen p	1		

Consistent with our expectations, ROE is very persistent ( $p < .001$ ). The GADI coefficient is negative and insignificant again. The diagnostic patterns are similar to the ROA GMM: AR (1) present, no AR (2), and a very high Hansen p-value—once more indicating that interpretation should be cautious and stressing that parsimony of instruments for small panels is critical ([Roodman, 2009](#); [Windmeijer, 2005](#)).

## 4.11 Additional Notes on Endogeneity, Instruments, and Controls

Endogeneity sources. Specifically, the OLS specification allows for (i) (i) simultaneity—disclosure choices and contemporaneous performance might co-move; (ii) state dependence in performance; and (iii) unobservables that are time-invariantly fixed effects at the firm level and time-varying fixed effects year dummies.

Instrument strategy. In the dynamic models, we instrument:

1. L.ROA (or L.ROE) as endogenous, using deeper lags in levels for the differenced equation;

2. GADI and LEV as endogenous/predetermined, likewise using lagged levels and collapsed instruments;
3. OC and year dummies as IV-style exogenous in levels.

Constant in GMM. With your supervisor: constant should not be there in GMM. The diff equation is without a constant (but we keep year dummies to control for common shocks). This is of course standard in difference-GMM, where differencing removes a constant term in levels by construction (Arellano & Bond, 1991).

Hansen J (J or Z statistic) and instrument count Hansen p-values are the test of overidentifying restrictions we report. Since extremely high p-values ( $\approx 1.00$ ) can result from setting weakly informative instruments, it is worth noting that signs and robustness are more important to us than over-interpretation of J based on precise instrument p-values.

Control variable choice. For the first part we do not include firm size as a control since it was one of those that the supervisor suggested to take one profitability measure and change the control variable size from that is simply profitability (ROA primary, ROE robustness). As a tautology, we did not enter net profit margin NPM as a regressor (though it is preserved in descriptives).

## 4.12 Mapping Findings to the Research Questions

Although the estimation emphasis in this chapter is the performance equation, we map the findings carefully to each pre-specified question (finalized in Chapter I).

### 4.12.1 RQ1: Does the Leverage Ratio Affect Green Accounting Disclosure (GADI) among Pakistani Listed Firms?

While there is indirect evidence here because the core regressions of this chapter use GADI as an explanatory variable for performance. The correlation between LEV

and GADI is, however, not significant (Table 4.2): the bivariate link is therefore not considered as a linear one (Table 4.2). A full determinants model (GADI as DV) would give sharper inference for RQ1, and in this chapter, the performance-focused models show that once we control for time effects and persistence, LEV does not significantly influence performance, which is consistent with a mixture of muted LEV-GADI linkage in this sample.

#### **4.12.2 RQ2: Does Ownership Concentration Influence GADI?**

Once again, the bivariate correlation between OC and GADI is low and non-significant (Table 4.2). In the most definitive models, OC itself contributes little to ROA/ROE over controls and dynamics in the performance models, indicating that any OC-related governance channel influencing disclosure is not significantly reflected in contemporaneous profitability within our sample period. For a clearer RQ2 validation, and alternatively as a complementary exercise, GADI-determinants regression can be added.

#### **4.12.3 RQ3: Does GADI Influence Firm Performance (ROA)?**

The estimate for the coefficient of GADI is negative in all models for both FE and RE as well as dynamic GMM (Table 4.4). The dynamic model (addressing endogeneity) keeps the sign and is non-significant at 10%. On average the point estimates suggest that 10-point increases in GADI are associated with  $\sim 0.95$ - $1.36$  pp lower ROA econometrical (point estimates) of credit environment for the firm per pp increment in widespread global institutional investors indices at the firm level from regression analysis, empirically estimating the economically significant and negative effect on official Regulator ROA.

However, the estimates are relatively imprecise; their standard error is relatively high (statistical insignificance). Overall, we find relatively mixed data on the hours

effect and that higher GADI does not improve short-run accounting profitability in this sample from the Bushoglu & Kleine-Albers paper over 2011-2020.

#### **4.12.4 RQ4: Does Profitability Moderate the Relationships among Leverage, Ownership Concentration, and GADI?**

The performance models do not include formal moderation (interaction) terms, but in theory profitability is the dependent variable (ROA). Nonetheless, as all of the main effects are near zero and dynamic persistence remains a statistically significant influence, any moderation is unlikely to alter our central conclusions. If moderation is explored, this would be appropriate in a distinct determinants equation for GADI (e.g.,  $LEV \times \text{profitability}$  or  $OC \times \text{profitability}$  predicting GADI) that we estimate as an extension. Synthesis. Based on this sample and period, the findings indicate that voluntary environmental disclosure does not lead to a positive change in accounting profitability in the short term. This is in line with the literature, which posits that the costs of establishing powerful disclosure systems and so on may be “up-front-loaded”, if enacted, or bear benefit only over time (e.g., lower cost of capital, brand value) with lags post-establishment (Deb et al., 2020; A. Agyemang et al., 2023; Khan & Gupta, 2024). Lagged performance starts getting at some of this inertia for the dynamic specification, but distributed-lag versions of GADI could be an interesting topic given additional space.

### **4.13 Robustness and Sensitivity**

We report three robustness pillars that match the supervisor’s checklist:

#### **4.13.1 Alternative Outcome (ROE)**

If I use ROE as the DV in FEs and dynamic GMM, then even though the sign is negative, there’s no significant GADI effect. This indicates the neutrality of the disclosure–profitability link isn’t caused by the ROA metric.

### 4.13.2 Winsorisation of Most Core Continuous Variables at the 1st/99th Percentile

This diminishes the excessive leverage of outliers, without throwing away observations. After this conservative treatment, the GADI pattern not only remains negative but also minimally enduring.

### 4.13.3 GMM Diagnostics

AR(1)/AR(2) pattern as desired (AR(1) yes; no AR(2)), consistent with the moment conditions. It likely warns us to join the ranks of parsimony with respect to instrument sets, as  $p \approx 1.00$  for Hansen J. We have already reduced the number of lags and collapsed instruments; further parsimony (e.g., tightening lag windows) is the next sensitivity if the committee asks us to even more stringently respect instrument discipline ([Roodman, 2009](#); [Windmeijer, 2005](#)).

## 4.14 Practical Interpretation and Theoretical Alignment

Stakeholder-theoretic predictions ([Freeman, 2010](#); [Helmina et al., 2022](#); [Bala et al., 2021](#)) suggest that enhanced transparency would ultimately result in lower financing terms and legitimacy, which might lend itself to a performance boost. Therefore, the evidence exists on this path, but it is not observable in short-run accounting returns in the context of PSX between 2011 and 2020. This does not disprove the theory, nor is it proof of a negative; it simply means timing and measurement are important:

1. Similarly, the benefits of disclosure may manifest themselves indirectly (e.g., through a lower cost of capital or better access to markets) and with lags that are not fully reflected in contemporaneous ROA or even one-period dynamics.

2. This can potentially drag down short-term margins even if the strategy pays off in the future (A. Agyemang et al., 2023; Khan & Gupta, 2024), as firms that move early on disclosure might be those under greater scrutiny, likely embedded within higher environmental risks, or internationally exposed.

In the financial sphere, the negative (albeit non-significant) relation between LEV and ROA is theoretically consistent for emerging markets, but clustering and time-fixed effects suggest that firm-specific performance nuances and macro-year anomalies overshadow in-sample findings. Concentration of ownership = 0 also has no immediate profitability impact, reporting incentives in a way not immediately translated into within-year accounting returns.

## 4.15 What This Means for the PSX Context

Adoption of disclosure seems heterogeneous (over 80 GADI spread), however, higher adoption does not mean that there will be near-term LDA profitability gains. In the short term, decision-makers should not assume there is an easy more disclosure → higher ROA rule. Neither debt policy nor block holder structure shows particularly strong first-order effects on ROA when macro shocks and firm clustering are accounted. With respect to mandatory environmental reporting, the results offer support in that regulators attempting to standardise reporting (GRI/ISSB/IFRS-S) can lead to enhanced comparability and credibility, but firms will incur losses up-front. Green financing incentives, tax breaks or ESG-linked lending... Such complementary policy tools can assist in ensuring the smooth transition (discussed in previous sections).

## 4.16 Limitations and Directions for Extension

### 4.16.1 Instrument Parsimony

The Hansen J p-value near 1.00 indicates possible overfitting; while we aggregated instruments and restricted lags, a tighter instrument cap (e.g., lag (2 3) only)

would be an important sensitivity.

#### **4.16.2 Distributed Impact**

GADI may also have delayed effects (i.e., lagged L. GADI) that could only be detected through a full dynamic system of models (and possibly instrument it).

#### **4.16.3 Determinants Model for GADI**

Correlations suggest weak bivariate relationships, so a specific panel model with DV GADI and (LEV, OC as regressors) would speak more to RQ1–RQ2. This would amount to a panel of the dependent and right-hand-side variables.

#### **4.16.4 Sectoral Heterogeneity**

Splitting by environmentally sensitive sectors (manufacturing, energy, chemicals) might reveal stronger patterns that are obscured in the pooled sample, which has been found for disclosure–performance nexus prior evidence to also be a function of sector exposure ([A. Agyemang et al., 2023](#); [Lusiana et al., 2021](#)).

#### **4.16.5 Performance Metrics**

Accounting profitability, as captured by ROA/ROE, has a weaker relation to transparency compared with capital market outcomes, as the cost of capital may be sensitive to transparency ([Dhaliwal et al., 2011](#)). Future work could extend the outcome set wherever data availability allows.

### **4.17 Summary of Key Results**

#### **4.17.1 Descriptives**

Large dispersion in both GADI and ROA, with balanced panel coverage across firms and years.

### 4.17.2 Correlations

LEV and ROA are modestly negatively correlated ( $p < 0.01$ ). GADI shows weak bivariate ties to ROA, LEV, and OC.

### 4.17.3 Stationarity

Panel unit-root tests support stationarity in levels; dynamic modeling addresses persistence appropriately.

### 4.17.4 Static FE/RE

GADI is negative and insignificant; LEV and OC are likewise insignificant once clustering and year FE are included.

### 4.17.5 Hausman

RE acceptable ( $\chi^2(3) = 3.88$ ,  $p = 0.2748$ ).

### 4.17.6 Dynamic GMM

No AR (2), AR (1) present as expected; Hansen  $p \approx 1.00$  (interpret cautiously). GADI remains negative and insignificant for ROA; ROE robustness confirms the overall neutrality.

### 4.17.7 Bottom Line

In the PSX sample (2011–2020), higher GADI does not show a statistically robust short-run impact on accounting profitability, after controlling for time effects, persistence, and endogeneity.

# Chapter 5

## Discussion and Conclusion

### 5.1 Chapter Overview and Purpose

The chapter summarises theoretical assumptions, empirical methodologies and statistical results to provide a comprehensive response to the research question, highlight the contribution to theory and practice, and suggest targeted recommendations for corporate managers, investors and politicians. It also openly discusses methodological and contextual limitations whilst suggesting a research agenda more attuned to the context of corporate Pakistan as well as the changing landscape of global sustainability reporting.

The argument unfolds in prose, with each subsection adding to the evidence collectively introduced beforehand that is based on balanced panel analyses for 30 PSX-listed firms during 2011–2020 performed using fixed and random effects, taking into account the Hausman specification choice and utilising dynamic panel estimators developed by (Arellano & Bond, 1991) and (Roodman, 2009) specifically to address endogeneity and performance persistence.

The rationale also consistently places the stakeholder theory side by side with how managerial disclosure choices relate to investor, lender, regulator, employee and community expectation (Freeman, 2010; Helmina et al., 2022; Bala et al., 2021). Although other theories may shed light on complementary mechanisms, the stakeholder model would fully account for why green accounting disclosure takes place in environments where information transparency (a move to build reputation

capital and capitalise on access to finance) and stakeholder responsiveness are shown to be co-determined.

The chapter follows an organised style. An opening restatement of the research problem and objectives, typically followed by a synthesis of empirics to the questions posed in Chapter 1 which soon thereafter transitioned into theoretical/methodological contributions highlighted against the background previously established in developing/emerging market contexts e.g., (Dhaliwal et al., 2011; Deb et al., 2020; A. Agyemang et al., 2023; Khan & Gupta, 2024). It then lays out a series of recommendations for three dominant target groups—corporate executives, investors and regulators—that translate the evidence into actionable items vis-a-vis Pakistan’s extant state of reporting and institutional arrangements (Government of Pakistan, 1997; SECP, 2017; Global Reporting Initiative, 2013; Carbon Disclosure Project, 2015).

Limitations are then as judiciously acknowledged in the chapter, focusing especially on challenges arising from instrument proliferation and over-identification in small-sample dynamic panels, the constraints of short-horizon accounting outcomes, and a mere absence of counterfactual data that would lend greater focus to causal attributions. The final ending lists an agenda for future research that is both targeted and methodologically feasible, sector conscious, etc., and finally a summing-up statement should be provided in response to the primary research question.

## 5.2 Restating the Problem and Objectives of the Study

Their research grew out of a practical and theoretical conundrum. Agricultural firms and other environmentally intensive companies in Pakistan face growing demands to disclose their environmental performance and policies. However, the legal requirement is still incomplete and fragmented, the sustainability data & assurance ecosystem lacks maturity, and the costs vs benefits of disclosure are far from easy to decide in the medium term. Within this context, the aim of the study

was to investigate the financial and governance factors that affect green accounting disclosure (GAD) and finally to explore whether this kind of disclosure is related positively with corporate performance tribunal in the case of profitability based on accounting variables. On the advice of the supervisor to ensure parsimony and interpretability, we therefore centred our empirical analysis on ROA as the main performance measure, using ROE only as a sensitivity check. Remaining variables used to generate this illustrative decomposition were GADI (the disclosure index or generalised announcement date intensity value), CAAB, LEV and OC. Controls: Year fixed effects absorbed shocks to the macroeconomic environment and potential market-wide events. To control for endogeneity problems—specifically simultaneity between disclosure and performance and the state dependence of profitability—the difference GMM estimators were used along with fixed and random effects models (Arellano & Bond, 1991; Baltagi & Baltagi, 2008; Wooldridge, 2010; Roodman, 2009).

The study articulated four practical research questions at the outset. The question here is: Does leverage influence firms in disclosing environmental information? Finally, what is the relationship between ownership concentration and depth and breadth of disclosure? Third, do EPAs lead to PBT by enhancing ROA (and, in robustness, ROE)? Finally, what moderating role does profitability have in these relationships of leverage, ownership and GAD? The empirical chapters stuck close to these questions, but they also tried to follow the supervisor’s good advice of writing a simple correlation matrix and explaining the stationarity tests, documenting FE/RE with a Hausman decision, re-estimating dynamic models for endogeneity, displaying the constant treatment in GMM, providing J-statistics and keeping documentation on instruments, as well as moving straight away into robust results yet within constraints of a balanced panel of modest size.

### 5.3 Integrative Summary of Findings

The descriptive statistics showed considerable heterogeneity between countries in both disclosure and profitability. As portrayed in Fig. 6, the variation for GADI is broader, with some firms reporting a large number of environmental policies,

resource use, emission reduction targets and waste management information as well as alignment with GRI and ISO 14001 standards, while others provided much less than the mandatory minimum. Because ROA also exhibited large dispersion, this suggested that the differences in profitability across firms and years might be large enough to detect any historical relationships if they existed.

The correlation matrix indicated only a slight negative relationship between leverage and ROA, in line with both the predictions of capital structure theories and, more generally, how leverage can at least temporarily reduce accounting returns through heavier debt service [81]. Yet, the GADI had only a weak and non-significant bivariate correlation with ROA and with our financial and governance predictors (Table 1). This was not predictive about the regression findings but warned that it might be about the magnitude of any unconditional relationships in the PSX sample during our period of investigation.

The unit-root tests – Levin–Lin–Chu and Im–Pesaran–Shin (IPS) – brought relatively strong evidence of the stationarity in levels for ROA, GADI, and LEV, with the OC demonstrating healthy LLC stationarity as well, justifying the level specification in the FE/RE and strengthening the credibility of the first-difference transformation in the dynamic estimator to prevent potential spurious regression issues. More reassuringly, the multicollinearity diagnostics demonstrated optimal variance inflation factors for quite comprehensive year dummies, permitting proper estimation and interpretable coefficients in the static model. The results of the core regressions seemed quite robust. Both static FE and RE models with firm-clustered standard errors and year fixed effects produced the same pattern. Namely, the GADI coefficient was negative and statistically insignificant in both. While this negative implied a possible one percentage point decline in ROA would occur with a ten-fold increase in disclosure intensity, the estimate’s imprecision and statistical insignificance precluded speculation on a true negative causal effect. LEV was also negative and insignificant, and OC was relatively zero or negative and equally insignificant. A near-majority of the year dummies was indeed positive and significant, highlighting the important role of macro shocks and sectoral shifts in determining the accounting profitability. The Hausman test, calculated under non-robust covariance matrices due to the FE/RE idiosyncrasy, did

not reject the RE model, which gives confidence that the RE specification for the statics is congruent. Nonetheless, both FE and RE are reported for robustness and transparency.

The dynamic difference The GMM model was, by far, the most direct test of the study's main causal argument, as it specified state-dependent profitability and directly instrumented the potentially endogenous regressors with their prior levels. The lagged dependent variable was positive and marginally significant ( $p = 0.051$ ), supporting the finding that profitability is persistent, a phenomenon observed in real-world firm dynamics. The coefficient on GADI, although negative in all cases, results are not entirely bivariate and was never significant. The diagnostic tests were as expected for first differences, passing the AR(1) test and failing an AR(2) test, verifying that the moment conditions are valid. This result suggested some red flags<sup>13</sup> common in small panels: The Hansen J test returned a p-value near 1.00, again reflecting that even when instruments are collapsed and lag depths limited, very high p-values can reveal weakly informative or overfit instrument sets (Roodman, 2009). Our study reported instrument counts openly, kept them as few as feasible given the number of groups and took a cautionary interpretation of results from the GMM. Thus, while the evidence provided across both static and dynamic estimators is consistent in its direction, the net conclusion appears straightforward: within the sample/horizon considered here, greater green accounting disclosure does not significantly increase year-adjusted persistence-corrected endogenous short-run accounting profitability. The robustness check that relied on ROE as an alternative outcome metric confirmed this neutrality: persistence in ROE was high, and a negative, non-precise coefficient estimate for GADI remained intact, with diagnostics pointing to not reading too much into any single realization of the GMM estimation.

These results, in the context of a market like Pakistan's, do make sense practically. Systems of environmental disclosure through quality construction and maintenance require considerable financial, organizational and human-capital resources. In an environment where regulatory mandates are in flux and verification, accountability, and the pricing by investors of ESG information remain unsettled, these costs will be front-loaded, whereas reputational and financing benefits will be delayed

and joined mediated via channels such as credit access, equity risk premia, or customer loyalty. The empirical design of this paper aims to isolate time zero as well as one-period-ahead effects on accounting profitability. Longer-horizon profitability or changes in capital market outcomes, such as cost of debt (cost of equity), might have had a weaker impact on return to long-run profits due to learning curve flattening and supply chains, processes, and technologies maturing to transparent regime—effects expected post-transparency evolution period occur (Dhaliwal et al., 2011) So, the neutrality seen here is actually fairly consistent with an environment in flux.

## 5.4 Answering the Research Questions

In other words, the study can now answer quite clearly and in a theoretically coherent way with Ch. I's stakeholder-theoretic framing of the questions posted there.

The first question concerning the direct determinants model of leverage affecting green accounting disclosure in PSX-listed firms is not included in this chapter, as performance is the dependent variable here. On the one side, leverage did not show a strong and significant correlation with GADI, and performance regressions of the finance channel resulted in a weak approach to an indirect financial structure channel improving ROA in the short term. Altogether, despite several studies conducted in international work that lenders may either punish opacity or request more disclosure for highly leveraged firms, the evidence here indicates non-observation of a first-order relation over this sample period. A direct determinants regression with GADI as the dependent variable would clarify this conclusion that can be explored in the same data.

The question if the impact of ownership concentration on GADI varies, secondly, is only indirectly answered in this chapter (Section 6). The bivariate relationship between OC and GADI was small, however non-significant in each case, and in any specification did an operational capacity have a statistically significant influence on performance. Given the corporate governance structure in Pakistan, it

is possible for block holders to be more concerned with control over cash flows and operations, whereas disclosure choices are influenced by regulatory visibility and reputational concerns rather than pressure from dispersed shareholders. This theory is therefore consistent with stakeholder theory in that it implies that the salience of external claimants determines the marginal utility of disclosure. Again, a direct determinants model of GADI would be the correct next step to substantiate this claim rigorously.

Lastly, the core question if GAD improves firm performance — is approached directly and cautiously. The GADI coefficient on ROA remains statistically insignificant and negative (with the neutrality also present in Table 4.6) under FE, RE, and dynamic GMM. Stakeholder theory provides valuable guidance in this context, as it predicts that disclosure is instrumentally rational for legitimacy, access to finance, and long-term value creation but does not yet result in short-term gains (ROA), particularly when the reporting ecosystem has just started developing and early adopters have first-mover costs.

Fourth, the question of whether profitability has a structural moderating effect on the leverage, ownership, and disclosure relations could not be examined without circularity fallacy since profitability is one of the dependent variables in the subjects' models. However, lack of meaningful main effects along with high performance persistence suggests that any moderation cannot overturn the headline finding simply in the short run. A more sensible specification that avoids reverse causality would therefore turn the equations around and regress GADI on leverage, ownership, and interactions with lagged profitability (since it might be easier for a firm that is profitable to find ways of financing important systems to provide good-quality financial reporting). This task falls beyond the scope of this chapter, but it is possible as an extension.

## 5.5 Theoretical Contributions

A major theoretic contribution of this study is in refining stakeholder-theoretic intuitions for an environment such as an emerging market that still needs time

to consolidate its sustainability reporting infrastructure. Such a claim manifests in stakeholder theory, which provides an explanation of why firms disclose information for diverse constituencies to maintain legitimacy, reputational capital, and gain access to resources (Freeman, 2010; Helmina et al., 2022). This study suggests that contemporaneous accounting profitability, even after adjusting for endogeneity and persistence, does not automatically imply such disclosure. So the point is not that I am saying we should ignore stakeholder accountability, but rather that any value is likely to transmit through intertemporal or capital market channels—lower cost of capital, reduced regulatory risk, smoother stakeholder relations and so on—rather than immediate improvements in ROA. That is, the stakeholder benefits of disclosure are tangible (Section 2), but they are contingent and mediated (Sections 3 & 4).

A second contribution is methodological. Abstract Different types of FE/RE are tested here, with these a Hausman decision (static) and differenced GMM Arellano-Bond–Bover–Blundell–Bond tests, proposing what can serve as an appropriate strategy when short learning-by-doing endogenous likely panels are considered. The careful correction of the constant term in the GMM, the open presentation of AR(1)/AR(2) and Hansen J, as well as a static approach to overdetermination, provide some guidelines for further work in settings with low N and T, while results advise caution in favouring a single estimator: Consistency between non-significant results across conceptually different models makes it more probable that margins are truly thin due to PSX peculiarities rather than estimation artefacts (see (Baltagi & Baltagi, 2008; Wooldridge, 2010; Roodman, 2009)).

Third, the evidence contributes to literature that examines the trade-off between environmental transparency at various stages of economic development (e.g., (A. Agye-mang et al., 2023; Khan & Gupta, 2024; Deb et al., 2020)). This is consistent with evidence that business cases for disclosure are dependent on the sector and regulation (see Busch et al. The neutrality found here is in keeping with the high up-front costs and longer-run benefits and motivations not exclusively rooted in short-term profit-seeking but also orientated towards legitimacy, compliance and reputations for some firms. These nuances ought to dampen universal pronouncements that disclosure always (or never) pays; the reality, clearly, can be contextual

and ever-changing.

## 5.6 Methodological Reflections

The study uses a number of specific methodological decisions in order to isolate the research design from threats to internal validity given current data availability. The choice to base the disclosure index exclusively on audited annual reports and harmonise the scoring framework with established frameworks like GRI or ISO 14001 had considered comparability, transparency and feasibility (Global Reporting Initiative, 2013; Carbon Disclosure Project, 2015). The panel was calibrated for this specific purpose, to reduce the biases of unbalanced estimators and make them easier to interpret. Symmetric winsorization was implemented for the outliers instead of removing them and deleting any extreme slope. These detail the transformations that occurred over the past decade not only in competitiveness rank but also in various country-specific factors, most crucially the price of oil (oil producers ranked high), exchange rates and whether resource endowments ever benefited enough from tax incentives to adjust heat-capture levels. The endogeneity strategy was specified in terms of first-differenced GMM with collapsed instruments and short lags to avoid using too many groups given the small sample size used, a recommended approach for similar panels (Arellano & Bond, 1991; Roodman, 2009).

Simultaneously, the study was aware of boundaries to these methods. Any Hansen J p-value near unity must be met with caution – and hopefully additional parsimony tests. These models assume that the interplay between disclosure and profitability is linear, when it may not be (i.e., reputational or efficiency benefits from higher levels of disclosure could only become apparent beyond certain thresholds). Since the utilisation of accounting results is emphasised by market channels, which plays an important role in stakeholder theory, the capital markets channel is not completely included. These caveats do not detract from the validity of the core finding in this study for the sample but rather highlight potentially fruitful paths for future research.

## 5.7 Implications for Corporate Managers

Managers are interested in determining how much to invest in disclosure and, at the same time, not eat into the short-run financial stability. Based on the evidence in this dissertation, it could be concluded that boosting disclosure quality is not a viable tool to uplift ROA for short-term gains. But that is not an argument for giving up trying to disclose; it is a prompt. . . that organization should be done in an orderly fashion. Congruent with the stakeholder-theoretic perspective, managers should specify which stakeholder demands are most relevant to their firm and how information meets those demands.

This may in turn require companies to build transparent and verifiable emissions data streams and governance disclosures, enabling them to thaw credit constraints or deliver or support more favourable loan covenants over time. Aligning such disclosure with the assurance expectations of multinational customers, many of whom place a premium on supply-chain transparency, may stabilize demand and reduce renegotiation frictions to boot. These effects accumulate beyond the horizon of one fiscal year and will not manifest as contemporaneous increases in ROA.

Managers can directly influence the cost curve by incorporating disclosure into operational processes that operate throughout the year as opposed to treating it as a one-off annual reporting event. On a global level, all studies suggest that the firms fared even better if they integrated collection of environmental data with their production systems, energy management and/or procurement routines. Consequently, these systems reduce the marginal cost of disclosure gradually and generate a signal for management that can thereafter pave the way to systemic efficiency gains in energy, water & waste efficiencies that would not only enhance net profits over time by rendering ever-cheaper efficient resource recycling but do so thanks to process innovation as opposed to mere publication.

Practical steps include the mapping of disclosure categories to internal owners, ensuring tangible data lineage, and adopting recognized frameworks (e.g., GRI, ISO 14001) in a modular manner. It is a checklist only; the real work to be done when resources are scarce involves ordering according to stakeholder salience and regulatory momentum.

Managers should also explain to their boards and investors—in language that resonates as strongly with finance and risk management, not just corporate citizenship—how disclosure relates to financing rationale. Track metrics that will demonstrate a direct causation should there be one, with particular emphasis on capital-market outcomes (e.g., borrowing spreads, analyst coverage, and institutional ownership) along with operational metrics wherever possible. If things start looking up there, the business case for disclosure would also become more sustainable—even if ROA does not budge immediately.

## 5.8 Implications for Investors

Environmental disclosures: They are being used by investors in greater numbers as a way to evaluate risk or resilience and generally that measures the top quality of information management (Dhaliwal et al., 2011; Khan & Gupta, 2024). Given the parochial reporting and patchy independent assurance market in Pakistan, investors should take interest — but beware of greenwashing. The non-directional relationship between disclosure and profitability in this study demonstrates that investors cannot consider GADI scores as solo predictors of next-year ROA. What they more likely should be recognizing, however, is disclosure as a sign of managerial focus and governance engagement with environmental issues, one that probably will be associated with long-term risk (and hence cost of capital) rather than short-term margins.

This really means adding GADI-type measures as an ingredient in multi-period models valuation models or credit risk using any particular period projection, not a cash profitability screen at one single point in time. Investors may also want to add to what companies disclose with qualitative diligence on the quality of implementation – are emissions baselines credible, are reduction targets backed by capex and process changes (not just energy markets), are suppliers being engaged and are governance structures enabling sustainability officers rather than relegating them to marketing roles? In such a case, investors will likely be willing to absorb a temporary profitability decline through the announcement of an equally credible and quality disclosure-filled transition plan that looks disciplined

and value-creative over a horizon of multiple years. On the other hand, if there are gaps in detail or consistency, that might open up some good follow-up questions to understand where the operational blind spots and regulatory risks are hiding.

## 5.9 Implications for Regulators and Policy-Makers

Regulators ought to regard the neutrality of short-run profitability effects as a reason for further measures and not a verdict against increased transparency. These could be usefully paired with tax concessions for environmental management systems, enablement of regulated ESG scoring mechanisms to provide preferential access to development finance and the creation of norms for ESG-linked lending structures in the banking sector that are easily sortable by all existing authorities consonant with the national environment protection framework (Government of Pakistan, 1997; SECP, 2017). Alignment of national guidance with global frameworks decreases compliance ambiguity and enhances consistency for international investors (Global Reporting Initiative, 2013; Carbon Disclosure Project, 2015).

Regulators also need to engage the assurance ecosystem. Accuracy, consistency and verifiability in disclosure prompt the trust of its stakeholders. To the extent they help to professionalise environmental auditing—by developing training curricula, setting standards for professionals, and providing more assurance services—information in reports will be of higher quality, and capital markets can price sustainability more effectively. That the neutrality witnessed by this past decade’s panel may lean towards more favourable relationships, as firms will experience yield-generating transparency and further investors and lenders will use verified disclosures.

## 5.10 Limitations

The primary limitations of the study are empirical and arise from the sample characteristics, measurement choices, data structure, and econometric trade-offs

enforced by sample sizes. The panel is wide-ranging and representative of a decade, including thirty companies. The downside of this, however, is that it restricts cross-sectional variation, amplifies the sectoral composition effect and reduces the number of potentially feasible instruments compared to dynamic panel-group models. The GMM results, though well-specified, were insignificant with a Hansen J p-value near one. While the instrument set and restrictions in terms of lag depths were restricted to adhere to best practice recommendations for small panels, we should still treat a p-value of 0.27725 as quite high and additionally follow up with further parsimony checks, such as using even tighter lag windows. Our dependent variables were narrow accounting measures of profitability, which are neither the only nor likely even the primary mechanisms through which stakeholder-orientated transparency creates value. Finally, since one of the chapter's key equations was also a key theme that performance is to be modelled as a function of disclosure, leverage and governance those other measures were but indirect answers to what determines GHDI. The use of a complementary determinants model would provide unambiguous validation regarding whether leverage and ownership concentration are the triggers for the disclosure in the PSX context.

Despite these limitations, such contribution of the study is not null. Instead, they consider the scope of the neutrality finding to depend on boundary conditions and suggest where more data and refined estimation could open up their understanding. The cautious conclusion is that, at least for the firms and period considered, more environmental disclosure does not lead to greater short-term accounting performance once controlling for persistence and macro shocks. Within its limits, the result is plausible and compatible with other evidence emerging in developing countries.

## 5.11 Directions for Future Research

We believe that there are many possible and interesting ways forward from this point. Foremost, we estimate a determinants model with GADI as the dependent variable and leverage and ownership concentration as the main regressors (and potentially lagged in profitability). Dynamic estimators could also be used with

fixed and random effects if endogeneity is a concern. It could, in one swoop, answer the first two research questions and test whether claims that private information is a luxury good capture an important part of what we observe. This would also be consistent with the introduction of sectoral heterogeneity through interactions or sub-sample splits, given the prominence of environmental sensitivity as a driving factor behind disclosure adoption (A. Agyemang et al., 2023; Lusiana et al., 2021).

A second approach is to expand the outcome space beyond financial profit to consider measures such as the cost of capital, credit spreads, analyst coverage, institutional ownership, or market-to-book ratios. According to stakeholder theory, disclosure should decrease at least two of the stipulated channels through which price might get priced into debt covenant terms relative to contemporaneous margins, i.e., information asymmetry and perceived risk (Dhaliwal et al., 2011). Panel estimators similar to that employed in this study would be very informative if data could be reliably gathered, especially for the subset of firms with more advanced reporting.

Third, we classify the GADI models based on their methodological approach, that is, whether or not they involve distributed-lag modelling (Fig. Disclosure might pay off with a term which kicks in after a delay; incorporating lagged GADI terms in the regressand could show whether there are impacts beyond time  $t$  or  $t+1$  (depending on one or two lags included), on the proviso that both remain parsimonious and diagnostic results continue to pass muster. One might also test non-linearities—there could be some minimum threshold of disclosure quality or alignment with global frameworks below which stakeholders revise their beliefs not at all much, implying a convex benefit function.

Lastly, the channel of assurance is worth examining more closely. Research is needed to determine whether or not certain types of disclosures (e.g., assured vs. unassured) are more highly associated with financing outcomes as well as long-run performance once independent verification becomes more regularly practiced in this medium. Embedding this line of inquiry would then bring the answers related to credibility in response to stakeholder issues across the domains of managerial practice, professional standards and capital market reactions.

## 5.12 Final Recommendations

Based on bringing the evidence and reflections together, the study provides some sustained prose guides for managers, investors and regulators in the PSX ecosystem. Environmental disclosure should not be a paper document in the annual report cycle but integrated into operational systems and process controls. They ought to prioritise important disclosure elements from their stakeholder map, starting where investor, lender and customer demand is greatest, and link such elements to established frameworks to improve comparability and credibility. By monitoring financial and risk metrics along with operational ones, they can develop an internal business case for transparency that will survive changes in short-term profitability. Similarly, they must stage investments such that they reap early wins in data quality and assurance all the while managing cash flow constraints.

But investors should no less avoid disclosure indices as proxies for near-term profitability and instead consider them as future signals to company quality of risk management, governance priorities and readiness levels. They must verify the trustworthiness of the disclosures by reviewing data lineage, target and plans & budgets consistency and by checking internal accountability arrangements. They should be prepared to accept slightly lower current margins in return for a diminished medium-term risk, particularly in environmentally exposed sectors where transparency is believable and expanding. Investors should push for improved data and minimal alignment with industry-supported reporting frameworks where transparency is poor or weak before too much of the valuation premium streams from sustainable attributes.

They need to steer the market toward more uniform transparency requirements for reporting, reduce regulatory uncertainty and enhance the attestation framework. Transition costs should be more efficiently supported by introducing incentives based on target sets of actions that firms would take to invest in better reporting systems, not just write-from-scratch narratives. As the regulatory framework evolves, maintaining an element of proportionality will be important to ensure rules are suitable for smaller issuers and do not unintentionally serve to deter

listing or discourage investment. The system itself is only as credible as the information it carries, and so investment in professional development for environmental assurance should be much more of a priority.

### **5.13 Concluding Statement**

The study was designed to challenge the operational proposal that better, cleaner accounting should be more resilient and to refute investors who simply cannot allow accounting debris from defunct corporate crises to provide a fair reading of contemporary balance sheet snapshots. It did so by developing a methodological approach that accounts for fixed and random effects with high-ordered dynamics specifically fitted to short panels and adjusts for endogeneity. The conclusion you come to is quite wicked, as confession is always agonising — it reveals a lack of strong lifting power evidence across (local Pakistani) firms with more disclosure; the improvement in contemporaneous accounting profitability attributable to high green accounting disclosure under controlled conditions fails the robustness test (in our PSX sample 2011–2020). Neither the surprise nor the disillusion is unusual. Stakeholder theory does not guarantee a good deed will immediately yield better margins; it guarantees that responding to stakeholder expectations generates legitimacy, reduces risk and builds resource bases over time. The street from disclosure to worth belief is a winding one spanning 12 months and mosaicking gracefully through the capital markets by the method of smaller efficiencies and via reputational relationships constructed on a period-by-period foundation. If managers invest prudently, investors evaluate both VE and OFRR holistically, and regulators construct robust but proportionate standards with meaningful assurance, then the longer arc tends toward future resilience as well as sustainability. Through this, the thesis adds its piece of evidence to guide that trajectory in Pakistan's corporate sector and similar emerging-market contexts - by making explicit what is (not) seen in short-run accounting outcomes.

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