

**THE IMPACT OF BEING LISTED IN THE BIST  
SUSTAINABILITY INDEX AND CORPORATE  
GOVERNANCE PRINCIPLES ON THE FINANCIAL  
PERFORMANCE OF COMPANIES**



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**ÖZYEĞİN UNIVERSITY**

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İstanbul

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*My beloved family.*



## **DECLARATION OF ORIGINALITY**

I hereby declare that I am the sole author of this thesis and that this is the true copy of my thesis, including the final revisions, approved by my thesis committee. All data and information have been obtained, produced, and presented in accordance with the rules of research ethics and principles of academic honesty. As required by these rules, to the best of my knowledge I have acknowledged ideas, thoughts, and any copyrighted material in accordance with the standard referencing rules. I certify that any part of this thesis has not been submitted for a degree or diploma in another educational institution.

Yavuz Arda YILDIZ

## ABSTRACT

This study explores how corporate governance performance and sustainability index participation relate to the financial performance of companies listed on Borsa Istanbul (BIST). Utilizing a firm-level panel dataset covering the 2014–2023 period, the analysis was conducted using the Fama-MacBeth regression approach. This method involves estimating cross-sectional regressions separately for each year and averaging the resulting coefficients over time, thereby accounting for firm-level heterogeneity while capturing time-specific effects.

The models include Return on Equity (ROE), Return on Assets (ROA), and EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization) to Total Assets as accounting measures, while raw and alphas are considered as market-based outcomes. Independent variables encompass corporate governance performance, firm size (measured by market capitalization), systematic risk (beta), book-to-market (B/M) ratio, inclusion in the Sustainability Index Dummy (SIC), and prior-period returns. A total of twelve model specifications were employed, allowing for a comparative analysis of how the same explanatory variables relate to different dimensions of financial performance. This design provided a broader perspective on the ESG (Environmental, Social and Governance) performance nexus and helped assess the robustness of the results.

The results show that market capitalization is generally associated with improved financial performance, especially in accounting-based models, although this effect is not consistently significant across all specifications. Corporate governance performance, on the other hand, displays mixed results. In several models, particularly those focused on ROE and EBITDA, higher governance scores are linked to lower short-term performance,

which might reflect adjustment costs or lagged impacts.

Although the cumulative return analysis suggests that the sustainability index appears to have outperformed the BIST100 over the sample period, the differences in returns are not statistically significant. Moreover, the SIC variable does not exhibit a consistent or statistically significant relationship with financial performance indicators, implying that inclusion in the sustainability index does not inherently result in superior short-term financial outcomes.

These results may reflect the short-run costs associated with governance and ESG implementation. Measures such as reporting compliance, policy restructuring, and stakeholder transparency often lead to a rise in operational expenses, which can weigh on profitability and share performance in the near term. Nevertheless, these practices should not be assessed solely through a short-term lens. ESG-oriented strategies are often aimed at reducing long-term risks and improving investor confidence, which may contribute positively to firm value over time.

**Keywords:** Corporate Governance Performance, ESG, Financial Performance, BIST Sustainability Index

## ÖZET

Bu çalışma, Borsa İstanbul’da işlem gören şirketlerin finansal performansı ile kurumsal yönetim düzeyi ve sürdürülebilirlik endeksine dahil olma durumları arasındaki ilişkiyi incelemektedir. 2014–2023 dönemini kapsayan firma düzeyinde panel veri seti kullanılarak gerçekleştirilen analizde, Fama-MacBeth regresyon yöntemi uygulanmıştır. Bu yöntem, her yıl için ayrı ayrı çapraz-kesit regresyonları tahmin eder ve elde edilen katsayıları zaman içinde ortalayarak, hem firma düzeyindeki heterojenliği dikkate alır hem de döneme özgü etkileri yansıtır.

Modellerde finansal performans göstergesi olarak Özsermaye Karlılığı (ROE), Varlık Karlılığı (ROA) ve EBITDA/Toplam Varlıklar oranı gibi muhasebe temelli metriklerin yanı sıra, raw ve alfa getirileri gibi piyasa temelli göstergeler de kullanılmıştır. Bağımsız değişkenler arasında kurumsal yönetim performansı, piyasa değeri (market capitalization), sistematik risk (beta), piyasa/defter oranı, BIST Sürdürülebilirlik Endeksi’ne (SIC) dahil olma durumu ve bir önceki döneme ait getiriler yer almıştır. Toplamda kurulan on iki farklı model, aynı değişkenlerin farklı performans göstergeleri üzerindeki etkilerini karşılaştırmalı biçimde analiz etme imkânı sunmuş, bu da bulguların daha geniş bir çerçevede değerlendirilmesine olanak tanımıştır.

Bulgular, piyasa değerinin özellikle muhasebe temelli göstergelerde daha yüksek finansal performansla ilişkili olduğunu ortaya koymakla birlikte, bu etki her modelde anlamlı değildir. Kurumsal yönetim performansı ise bazı modellerde, özellikle ROE ve EBITDA’ya odaklananlarda, kısa vadede daha düşük kârlılık ile ilişkilendirilmiştir. Bu durum, yönetim uygulamalarının etkilerinin zamanla ortaya çıkabileceğini ya da kısa vadede uygulama maliyetlerinin ağır basabileceğini düşündürmektedir.



Kümülatif getiri analizi, örneklem döneminde sürdürülebilirlik endeksinin BIST100'e kıyasla daha iyi performans göstermiş gibi göründüğünü ortaya koysa da, getiriler arasındaki farklar istatistiksel olarak anlamlı değildir. Ayrıca, SIC değişkeni finansal performans göstergeleriyle tutarlı veya istatistiksel olarak anlamlı bir ilişki sergilememektedir. Bu durum, sürdürülebilirlik endeksine dahil olmanın kısa vadede otomatik olarak daha yüksek finansal performansa yol açmadığını göstermektedir

Elde edilen sonuçlar, yönetim ve ESG uygulamalarının kısa vadede firmaların operasyonel maliyetlerini artırabileceğini ortaya koymaktadır. Uyum süreçleri, politika revizyonları ve paydaşlara yönelik şeffaflık uygulamaları, işletme giderlerini yükseltebilir ve bu durum kârlılığı ve hisse performansını geçici olarak olumsuz etkileyebilir. Ancak bu uygulamaların yalnızca kısa vadeli etkileriyle değerlendirilmesi yanıltıcı olabilir. ESG odaklı stratejiler çoğunlukla uzun vadeli riskleri azaltmayı ve yatırımcı güvenini pekiştirmeyi hedeflemekte olup, zaman içinde firma değerine olumlu katkı sağlayabilir.

***Anahtar Kelimeler:*** Kurumsal Yönetim Performansı, ESG, Finansal Performans, BIST Sürdürülebilirlik Endeksi

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## LIST OF ACRONYMS AND ABBREVIATIONS

**B/M:** Book to Market Ratio

**BETA:** Beta Coefficient

**BIST:** Borsa Istanbul

**CMB:** Capital Markets Board

**CSR:** Corporate Social Responsibility

**EBITDA:** Earnings Before Interest, Taxes, Depreciation and Amortization

**ESG:** Environmental, Social, Governance

**Market CAP:** Market Capitalization

**MAX:** The Largest Value In A Given Data Set.

**MIN:** The Smallest Value In A Given Data Set.

**MG:** Mean Group

**ROA:** Return on Asset

**ROE:** Return on Equity

**SIC:** Sustainability Index Dummy

**SUMSTATS:** Summary Statistics

**STD:** Standard Deviation

**T:** The Reference Year Used As The Base Period For Analysis.

**T+1:** The Year Immediately Following The Reference Year T

**T-6M:** Six Months Prior The Reference Year T

**TKYD:** Corporate Governance Association of Turkey

**XKURY:** Borsa Istanbul Corporate Governance Index

**XU100:** Borsa Istanbul 100 Index

**XUSRD:** Borsa Istanbul Sustainability Index

# 1. INTRODUCTION

In today's corporate landscape, companies are increasingly expected to expand their strategic focus beyond mere financial performance to encompass broader ESG responsibilities. This expectation arises from the growing recognition of global challenges such as climate change, inequality, and ethical lapses in governance, all of which demand that businesses adopt more responsible and transparent practices [1]. As a result, sustainability and corporate governance have become central to long-term business strategy and competitiveness [2, 3].

Corporate governance refers to the system by which companies are directed and controlled, involving practices that ensure accountability, fairness, and transparency in relationships with stakeholders [4]. Effective governance mechanisms—such as board independence, shareholder rights, and disclosure quality—help align managerial actions with shareholder interests and are associated with improved financial performance [5, 6]. In parallel, corporate sustainability emphasizes the integration of ESG factors into business decision-making. Firms that adopt sustainability strategies tend to be more innovative, risk-aware, and efficient in resource use, which can lead to stronger long-term financial outcomes [7, 8, 9].

In Turkey, these trends are echoed in both policy and market reforms. The BIST Sustainability Index, established by BIST in 2014, encourages firms to adopt ESG-oriented practices and enhances investor awareness of responsible business behavior [10]. In addition, the Capital Markets Board (CMB) of Turkey has developed corporate governance principles to promote accountability, transparency, and investor confidence [11]. Despite these initiatives, empirical evidence on the financial consequences of sustainability and governance practices in Turkey remains limited [12]. This research



aims to address that gap by analyzing the financial performance of firms listed in the BIST Sustainability Index and evaluating how corporate governance adherence influences key metrics such as ROA, ROE, and EBITDA/Total Assets over the 2014–2023 period.

By using a Fama-Macbeth methodology for panel data analysis, this thesis contributes to the growing literature that examines the intersection of ESG and financial performance, particularly in emerging markets. The theoretical underpinning of this study is informed by the multifactor asset pricing framework of Fama and French [13], which enables a nuanced exploration of how governance and sustainability factors affect risk-adjusted returns. Furthermore, the notion of shareholder activism as a governance mechanism, as conceptualized by Becht et al. [14], underscores the increasing influence of investors in shaping sustainable corporate behavior.

### **1.1. Research Problem**

Although corporate governance and sustainability are widely regarded as beneficial, empirical evidence on their financial impact remains mixed. Proponents argue that integrating ESG principles into business strategies enhances operational efficiency, reduces costs, and strengthens brand reputation, leading to long-term profitability [1]. However, critics contend that implementing such initiatives may entail significant costs, particularly in emerging markets, which could offset short-term financial gains [2].

In emerging economies like Turkey, the relationship between sustainability, corporate governance, and financial performance is underexplored. Existing studies primarily focus on developed markets, leaving a significant gap in understanding how these practices affect firms in less mature regulatory environments [3, 4]. This thesis addresses this gap by posing the following research questions:

- Does being listed on the BIST Sustainability Index significantly improve a company's financial performance in Turkey?
- How do corporate governance principles influence financial performance?
- What is the relationship between firm size, as measured by Market CAP, and operational profitability?
- Do higher stock returns correlate with improved or diminished operational efficiency?

## **1.2. Purpose of the Study**

The primary objective of this study is to provide empirical evidence on the impact of corporate governance and sustainability on the financial performance of companies listed on BIST. Using data from firms that meet ESG criteria, the study evaluates whether these companies exhibit superior operational profitability compared to their peers. Additionally, it examines whether strong corporate governance practices contribute to improved financial performance and investigates how firm size affects these relationships.

Given the increasing global emphasis on ESG reporting and corporate governance, this research is timely and relevant. The findings aim to offer valuable insights for policymakers, investors, and corporate managers, helping them make informed decisions about the financial implications of adopting sustainability and governance practices.

## **1.3. Significance of Study**

This study contributes to the growing body of literature on corporate governance and sustainability, particularly in emerging markets such as Turkey. Previous research

highlights the potential financial advantages of adopting ESG principles and robust governance practices [5, 6]. For policymakers, the findings may inform regulatory frameworks that encourage sustainable business practices. For investors, this study offers evidence on the financial benefits of sustainability-focused investments. For corporate managers, it underscores the importance of aligning governance and sustainability with long-term strategic goals.

#### **1.4. Corporate Governance**

Corporate governance is a framework of rules, practices, and processes that dictate how a company is directed and controlled. It serves as a foundation for balancing the interests of various stakeholders, including shareholders, management, employees, customers, suppliers, financiers, government authorities, and the broader community [7]. Effective corporate governance promotes accountability, fairness, and transparency in a company's operations, thereby minimizing risks and enhancing performance. [2]

##### **1.4.1. History of Corporate Governance**

Corporate governance gained global prominence following a series of high-profile corporate scandals, such as Enron and WorldCom in the early 2000s, which exposed widespread fraud and mismanagement. These events prompted the introduction of the Sarbanes-Oxley Act in 2002 in the United States, establishing new standards for corporate accountability and transparency [8].

In Turkey, corporate governance reforms began with the establishment of the CMB in 1981. The adoption of Corporate Governance Principles in 2003 aligned Turkey's standards with global best practices, focusing on transparency, accountability, fairness, and responsibility. [11] The launch of the BIST Corporate Governance Index in

2007 further incentivized companies to adopt governance practices by offering a benchmark for investors to evaluate governance quality [15].

### **1.4.2. Main Functions of Corporate Governance**

Corporate governance serves several critical roles within an organization:

- **Risk Management:** Effective governance mitigates risks by promoting accountability and transparency, reducing the likelihood of fraud or conflicts of interest [2].
- **Performance Enhancement:** By aligning management's interests with those of shareholders, governance mechanisms improve operational efficiency and financial performance [16].
- **Compliance:** Governance ensures adherence to legal and regulatory requirements, reducing exposure to fines and reputational damage [7].
- **Investor Confidence:** Strong governance signals stability and ethical management practices, attracting long-term investments [1].

Empirical studies show that corporate governance does not always have a direct impact on short-term financial performance, particularly in emerging markets with less consistent enforcement of regulations [17].

## **1.5. Corporate Sustainability**

Corporate sustainability is a strategic approach that focuses on long-term value creation by integrating ESG considerations into business operations. It emphasizes that businesses must operate in ways that benefit society and the environment while maintaining financial viability [18].

The three core pillars of sustainability are:

- Environmental Stewardship: Minimizing negative environmental impacts through sustainable resource use, waste reduction, and carbon footprint management.
- Social Responsibility: Ensuring fairness and equality in treatment of employees, suppliers, and communities while promoting diversity and human rights [19].
- Governance: Ensuring transparency, accountability, and ethical decision-making within the organization.

### **1.5.1. History of Corporate Sustainability**

The concept of sustainability emerged in the late 20th century as global awareness of environmental and social issues grew. The Brundtland Report (1987) was a seminal document that defined sustainable development as meeting present needs without compromising the ability of future generations to meet theirs [20].

Initially, sustainability efforts focused on Corporate Social Responsibility (CSR) initiatives aimed at improving labor practices and reducing environmental harm. Over time, CSR evolved into a broader, integrated framework of corporate sustainability, which links ESG principles to financial performance [1,16].

In Turkey, sustainability gained momentum with the establishment of the BIST Sustainability Index in 2014. This index promotes greater ESG disclosure and provides a benchmark for sustainable investments, encouraging companies to adopt responsible business models [10].

### **1.5.2. Main Functions of Corporate Sustainability**

**Risk Management:** Companies that adopt sustainable practices are better equipped to manage regulatory risks, resource shortages, and changing consumer expectations [2].

Operational Efficiency: Investments in green technology and sustainable supply chains often lead to cost savings and enhanced profitability over time [21].

Reputation and Brand Value: Sustainability strengthens brand reputation, increasing customer loyalty, attracting top talent, and improving relationships with stakeholders [18].

Long-Term Financial Performance: Sustainable companies are more resilient to future challenges and have better long-term financial outcomes

The SIC variable in this study captures whether a company is listed on the BIST Sustainability Index. Regression analysis reveals a positive correlation between sustainability practices and operational profitability, particularly in companies with robust ESG frameworks [17].

## **1.6. Overview of Corporate Governance and Sustainability in Türkiye**

### **1.6.1. Regulatory Environment in Türkiye**

The regulatory framework for corporate governance and sustainability in Turkey is governed by the CMB and BIST. The Corporate Governance Principles adopted in 2003 provide a comprehensive framework for ensuring transparency, accountability, and the equitable treatment of shareholders [9].

Recent guidelines encourage companies to disclose ESG practices, reinforcing the importance of sustainability in business strategy. The BIST Sustainability Index, launched in 2014, plays a crucial role in promoting responsible business practices in Turkey.

### **1.6.2. Corporate Governance and Sustainability Trends in Türkiye**

Turkey has made significant strides in corporate governance and sustainability over the last two decades. While corporate governance reforms accelerated in response to financial crises in the early 2000s, sustainability gained prominence with increasing investor interest in ESG criteria [10].

The BIST Corporate Governance Index (2007) and the BIST Sustainability Index (2014) mark critical milestones in Turkey's journey toward greater corporate responsibility, providing benchmarks for assessing company performance in these areas. [10,11]

### **1.6.3. Key Sustainability and Governance Indexes in Türkiye**

BIST Corporate Governance Index (XKURY): Established in 2007, this index evaluates companies on their compliance with CMB's Corporate Governance Principles.

BIST Sustainability Index (XUSRD): Launched in 2014, this index tracks companies with strong ESG performance across ESG metrics.

BIST Sustainability 25 Index (XUSRD25): Introduced in 2022, this index includes the top 25 companies with the highest ESG scores and Market CAP.

### **1.6.4. Calculation of Corporate Governance Score and BIST Sustainability Index**

#### **1.6.4.1 BIST Sustainability Index Selection Criteria**

The XUSRD was established to identify and highlight companies listed on BIST that exhibit strong performance in ESG dimensions. Inclusion in the index is determined through an independent assessment carried out by the London Stock Exchange Group,

which relies on publicly disclosed ESG data. To be eligible for the index, companies must satisfy the following criteria:

- A minimum overall ESG score of 50,
- Individual scores of at least 40 in each ESG pillar,
- At least 8 category-specific scores equal to or greater than 26.

#### **1.6.4.2 Calculation Methodology of Corporate Governance Rating Score**

These thresholds are intended to promote ESG awareness, foster transparency, and incentivize responsible corporate behavior among Turkish publicly traded companies.

In Türkiye, corporate governance ratings are assigned in accordance with the Corporate

Governance Principles issued by the CMB. These principles are structured around four weighted categories:

- Shareholders (25%)
- Public Disclosure and Transparency (25%)
- Stakeholders (15%)
- Board of Directors (35%)

Each category encompasses detailed sub-criteria evaluated by independent rating agencies licensed by the CMB. These agencies apply a standardized methodology, and scores are assigned on a 0–10 scale, where 10 indicates full compliance with the CMB's corporate governance framework.



#### **1.6.4.3 Return of BIST Sustainability and Corporate Governance Indexes**

To contextualize the relevance of these indices, Appendix 1 provides a comparative analysis of the BIST 100 Index (XU100), XKURY and XUSRD from 2014 to 2023. The first panel reports the annual and cumulative returns, while the second panel visualizes the growth of a hypothetical 100 TRY investment over this period. Notably, despite market fluctuations—especially during downturns in 2015 and 2018—the XUSRD consistently delivered the highest cumulative return (888.3%), outperforming both BIST100 (830.7%) and XKURY (790.2%).

Although the cumulative return analysis suggests that the sustainability index appears to have outperformed the BIST100 over the sample period, the differences in returns are not statistically significant. Moreover, the SIC variable does not exhibit a consistent or statistically significant relationship with financial performance indicators, implying that inclusion in the sustainability index does not inherently result in superior short-term financial outcomes.

## 2. LITERATURE REVIEW

The relationship between sustainability, corporate governance, and financial performance has garnered considerable attention in academic literature. Numerous studies confirm that firms incorporating ESG considerations into their business models benefit from improved risk management, operational efficiency, and reputational advantages, which collectively enhance profitability and resilience [1], [19]. For instance, Friede et al. [22] conducted a meta-analysis of over 2,000 studies and found a positive correlation between ESG adoption and financial outperformance. Likewise, Busch and Friede [21] provide robust empirical support for the corporate social and financial performance link through a second-order meta-analysis.

Jo and Harjoto [16] emphasize that CSR practices help strengthen stakeholder trust and corporate value. Other works such as Alsayegh et al. [2] and Zhang et al. [8] show how ESG disclosure and green investment enhance corporate sustainability and supply chain efficiency. Moreover, firms with higher ESG scores generally attract more investment and enjoy lower capital costs [7], [23], [24]. Albuquerque et al. [24] further underline the risk-mitigating effect of CSR, highlighting how responsible practices can reduce firm exposure to volatility.

From a corporate governance perspective, strong governance systems are instrumental in ensuring transparency, accountability, and strategic alignment. Studies by Paniagua et al. [4], Naciti [5], and Puni and Anlesinya [6] highlight that effective board structures, ownership control, and institutional safeguards positively affect firm performance. The importance of board diversity is particularly emphasized by Adams and Ferreira [25], who show that female representation on boards can enhance governance

quality and firm performance. OECD's principles [23] reinforce the importance of governance frameworks in maintaining market integrity and investor protection.

Country-specific dynamics also influence the effectiveness of sustainability and governance practices. Research by Doidge et al. [26] and the OECD [23] show that institutional quality and regulatory environments significantly determine how ESG and governance mechanisms are implemented. In emerging markets, companies that proactively adopt such practices tend to outperform peers, even under weaker legal systems [27].

The Turkish context provides an evolving environment for ESG and governance. Studies such as Karaca [9] and Arslan & Candan [17] explore how sustainability and governance impact firm value in Turkey, especially within the framework of the BIST Sustainability Index. While empirical studies remain limited, evidence suggests that Turkish firms embracing ESG and corporate governance principles exhibit higher operational performance and risk mitigation.

Further theoretical grounding is found in the foundational work of the Brundtland Commission [20], which defined sustainable development as meeting present needs without compromising the ability of future generations. This concept has become central to understanding how sustainability links to long-term corporate success. Several authors argue that embedding sustainability into corporate strategy not only improves financial results but also fosters innovation and long-term value creation [9], [19], [16]. CSR's conceptual underpinnings are further articulated by Benabou and Tirole [28], who present a theoretical framework linking ethical behavior to financial incentives and firm value.

In addition, Becht et al. [19] provide clinical evidence on shareholder activism's positive impact on firm returns, reinforcing the importance of active ownership as part of

governance structures. Flammer [29] adds to the discussion by exploring how corporate green bonds can enhance financial outcomes while aligning firms with sustainability goals.

Collectively, this literature indicates that sustainability and corporate governance are not merely ethical or regulatory considerations but are deeply tied to financial outcomes. However, the diversity of market conditions and regulatory settings—especially in emerging markets like Turkey—necessitates further empirical inquiry into how these relationships unfold across different contexts [24].

### **3. DATA**

The primary objective of this academic study is to examine the impact of corporate governance performance and inclusion in the sustainability index on the financial performance of companies. To provide a meaningful contribution to the academic literature, the dataset has been analyzed from three distinct perspectives:

1. Companies that were both included in the XUSRD and received corporate governance rating services as of the last day of each year between 2014 and 2023.
2. Companies that received corporate governance rating services as of the last day of each year between 2014 and 2023.
3. Companies that were included in the XUSRD as of the last day of each year between 2014 and 2023.

The reason for selecting companies from the period between 2014 and 2023 is that the XUSRD index was introduced by BIST in 2014, and as of the research date, the most recent financial data available correspond to the year 2023.

In this study, a total of 10 different variables were analyzed, including the Corporate Governance Rating Score, B/M Ratio, Beta Coefficient (Beta), Market CAP, ROE, ROA, Ebitda/Total Assets, SIC, Raw Return, and Alpha.

The definitions of the variables and the detailed analysis are presented in the subsequent section (3.1).

#### **3.1. Definition of Variables**

##### **3.1.1. Corporate Governance Rating Score**

The Corporate Governance Rating Score represents a quantitative assessment of a company's adherence to corporate governance principles, standards, and best practices.

This measure evaluates the company's effectiveness in ensuring accountability, transparency, and alignment with the interests of shareholders and other stakeholders on a yearly basis. The rating is derived from a weighted average of four key categories: Shareholders, Stakeholders, Public Disclosure and Transparency, and the Board of Directors. Each category reflects a critical aspect of corporate governance, contributing to a comprehensive evaluation of a company's governance practices [30].

### **3.1.2. B/M**

B/M is a financial metric that compares a company's book value of equity to its market value. It is calculated by dividing the book value of equity by the Market CAP. A high B/M ratio suggests that a company may be undervalued, while a low ratio indicates higher market valuation and growth expectations. Book to Market ratio is commonly used in financial analysis to differentiate between value and growth stocks [31].

### **3.1.3. Beta**

A measure of a company's risk in relation to the overall market, Beta quantifies the volatility of a company's stock price compared to the market as a whole. A Beta value of 1 indicates that the company's stock price moves in line with the market, meaning it is expected to experience similar fluctuations. A Beta greater than 1 suggests that the company's stock is more volatile than the market, while a Beta less than 1 indicates lower volatility. Beta is widely used in financial analysis to assess a company's risk profile and is an important component in asset pricing models, helping investors understand the level of market risk associated with a particular stock. In this study, the XU100 index has been used as the market reference [31].

#### **3.1.4. Market CAP**

Market CAP represents the total market value of a company's outstanding shares, calculated as the product of its share price and the number of outstanding shares. It serves as a key indicator of a company's size and financial standing in the market. Market capitalization is commonly used in financial analysis for company classification and comparative valuation, providing insights into a firm's relative stability, risk profile, and growth potential [31].

#### **3.1.5. ROE**

ROE is a financial performance metric that measures a company's profitability relative to shareholders' equity. It is calculated by dividing net income by average shareholders' equity. ROE indicates how effectively a company is utilizing its equity base to generate profits and is commonly used to assess the financial performance and efficiency of a company. A higher ROE suggests better utilization of equity, which is generally viewed as a sign of strong management and profitable operations [31].

#### **3.1.6. ROA**

ROA is a financial metric that indicates how effectively a company utilizes its assets to generate profits. It is calculated by dividing net income by average total assets. ROA provides insights into the efficiency of asset management, with a higher ROA reflecting better utilization of assets in generating earnings. This ratio is widely used to assess the operational performance of a company, where a higher value typically signals more efficient asset management [31].

### **3.1.7. Ebitda / Total Assets**

EBITDA is a financial metric that measures a company's operating performance by evaluating earnings derived from core business activities, excluding non-operational factors such as interest expenses, taxes, depreciation, and amortization. It serves as an indicator of a company's ability to generate profits from its operations without the influence of capital structure and non-cash accounting items.

Total Assets represent the sum of all assets owned by a company, both current and non-current, including cash, inventory, property, plant, and equipment. Total assets reflect the overall value of resources available to a company for generating future economic benefits.

The EBITDA/Total Assets ratio is a financial indicator that compares a company's operating profitability to its total asset base. It is calculated by dividing EBITDA by total assets, providing insights into the efficiency with which a company utilizes its assets to generate operating profits. A higher ratio suggests that the company is effectively using its assets to produce earnings before accounting for non-operational factors, which is commonly viewed as a sign of strong operational efficiency [31].

### **3.1.8. SIC**

A variable that reflects a company's inclusion in the XUSRD which highlights companies committed to sustainable practices in ESG areas. A value of 1 signifies that the company is included in the index, indicating its adherence to strict sustainability criteria and its efforts to align with global sustainability standards. A value of 0 indicates that the company is not part of the index, suggesting it has not met the necessary sustainability requirements or does not prioritize ESG factors to the same extent.



Inclusion in the index can signal long-term stability and responsibility, making it an important consideration for socially responsible investors [32].

### **3.1.9. Raw Return**

Stock Return refers to the percentage change in the price of a company's stock over a specific period of time, reflecting the gains or losses an investor would experience from holding the stock. It is typically calculated by comparing the ending price of the stock to its beginning price, adjusted for dividends or other distributions. Stock return is a key indicator of a company's performance and is commonly used to assess the profitability of an investment [33].

### **3.1.10. Alpha**

Alphas in this study refer to the excess returns generated by a company's stock relative to the expected return based on the market's performance, specifically the XU100, over a given period. To calculate the alphas, the basic yearly returns of the company's stock are subtracted from the returns of the XU100, which serves as the market benchmark. A positive alpha indicates that the company's stock has outperformed the market, while a negative alpha suggests underperformance relative to the market. Alphas are commonly used in finance to assess the effectiveness of an investment strategy, particularly in evaluating active management's ability to generate returns above the market's expectations [33].

## **3.2. Summary Statistics**

As mentioned in detail in the "3. DATA" section, this study investigates three distinct groups of firms. Summary Statistics and corresponding interpretations for each group are provided below. The dataset covers the period from 2014 to 2023 and was

structured on an annual basis. For each group, yearly descriptive statistics—including the minimum, maximum, standard deviation, and mean—were calculated for all key variables. Then, overall Summary Statistics were obtained by averaging the annual values across the ten-year period. The number of observations (N) is also reported in the tables to ensure transparency regarding data coverage.

Across all groups, Beta and Book-to-Market ratios consistently exhibit the lowest standard deviation values, indicating limited variation across firms in terms of their relative volatility and valuation profiles.

The low dispersion in Beta, which measures a firm's return volatility relative to the market index (e.g., XU100), suggests that firms in the sample exhibit comparable sensitivity to market fluctuations. This may be due to overlapping sectoral representation, similar operational scales, or exposure to common macroeconomic dynamics in Türkiye. The fact that firms behave similarly in terms of relative price movement, despite structural differences, reflects a certain degree of systemic convergence in the market.

Likewise, the Book-to-Market ratio also shows low variability, implying that firms are valued in relatively similar proportions by the market. This may result from standardized accounting practices, investor reliance on similar valuation benchmarks, or homogeneous expectations regarding firm performance and growth potential, particularly within index-listed companies.

In addition, the Governance Score demonstrates relatively low standard deviation, especially among firms listed in the sustainability and corporate governance indices. This is primarily because most of these firms maintain high governance scores clustered within the upper range of the scale. Governance structures tend to evolve incrementally, and firms with strong governance profiles typically exhibit limited year-to-year variation.

This consistency reflects the influence of CMB regulations and index inclusion criteria, which incentivize adherence to common governance standards and best practices.

**Table 3.1: Summary Statistics of Group1**

**Group1: Governance Score = 1 & SIC = 1**

| KPI                 | MIN    | MAX    | STD    | MEAN   | N  |
|---------------------|--------|--------|--------|--------|----|
| GOVERNANCE SCORE    | 90,27  | 96,87  | 1,81   | 94,11  | 23 |
| BOOK TO MARKET      | 0,12   | 3,02   | 0,63   | 0,86   | 23 |
| BETA                | 0,48   | 1,48   | 0,25   | 0,92   | 23 |
| MARKET CAP (MIO TL) | 1.538  | 85.190 | 22.339 | 23.360 | 23 |
| ROE                 | -58,81 | 70,83  | 25,08  | 18,35  | 23 |
| ROA                 | -4,60  | 24,27  | 6,79   | 6,42   | 23 |
| EBITDA/TOTAL ASSETS | 1,84   | 27,31  | 6,24   | 11,81  | 19 |
| RETURN (%)          | -16,94 | 190,26 | 50,87  | 49,66  | 23 |
| ALPHA (%)           | -4,37  | 13,53  | 4,70   | 4,56   | 23 |

**Table 3.2: Summary Statistics of Group2**

**Group2: Governance Score = 1 & SIC = 0**

| KPI                 | MIN    | MAX    | STD   | MEAN  | N  |
|---------------------|--------|--------|-------|-------|----|
| GOVERNANCE SCORE    | 81,85  | 95,76  | 3,85  | 91,36 | 28 |
| BOOK TO MARKET      | 0,16   | 3,01   | 0,70  | 1,15  | 28 |
| BETA                | 0,23   | 1,28   | 0,25  | 0,72  | 28 |
| MARKET CAP (MIO TL) | 175    | 22.324 | 5.081 | 3.283 | 28 |
| ROE                 | -53,78 | 62,61  | 24,23 | 10,04 | 28 |
| ROA                 | -15,97 | 38,50  | 11,38 | 5,51  | 28 |
| EBITDA/TOTAL ASSETS | -7,09  | 25,52  | 6,92  | 5,77  | 23 |
| RETURN (%)          | -34,38 | 406,72 | 91,89 | 60,99 | 28 |
| ALPHA (%)           | -2,11  | 15,12  | 4,10  | 6,83  | 28 |

**Table 3.3: Summary Statistics of Group3**

**Group3: Governance Score = 0 & SIC = 1**

| KPI                 | MIN     | MAX    | STD    | MEAN   | N  |
|---------------------|---------|--------|--------|--------|----|
| GOVERNANCE SCORE    |         |        |        |        |    |
| BOOK TO MARKET      | 0,12    | 2,49   | 0,63   | 0,93   | 26 |
| BETA                | 0,43    | 1,46   | 0,28   | 0,93   | 26 |
| MARKET CAP (MIO TL) | 934     | 94.071 | 25.942 | 21.380 | 26 |
| ROE                 | -124,34 | 436,43 | 97,49  | 24,72  | 26 |
| ROA                 | -10,77  | 61,59  | 13,84  | 6,39   | 26 |
| EBITDA/TOTAL ASSETS | -0,72   | 24,62  | 6,79   | 10,73  | 24 |
| RETURN (%)          | -18,82  | 243,36 | 55,68  | 46,83  | 26 |
| ALPHA (%)           | -4,45   | 34,87  | 8,17   | 5,19   | 26 |

### **3.2.1. Interpretation of Group1's Summary Statistics**

Group1 consists of firms that are both included in the BIST Sustainability Index and possess observable governance scores. This dual alignment suggests institutional maturity in terms of both corporate transparency and ESG compliance.

From a financial perspective, these firms exhibit robust and consistent performance across profitability and market metrics. The relatively high governance scores (mean: 94.11) reflect adherence to structured corporate governance frameworks. Their Market CAP, while not the sole indicator of firm quality, further supports their position as well-established entities with likely access to capital markets and broader stakeholder trust.

Although return levels (raw and alpha) are not the highest among the groups, they are accompanied by lower variance, indicating a lower-risk return profile. This implies that firms in this group may attract risk-averse investors who value long-term financial stability over speculative gains. Moreover, beta values around 0.92 suggest moderate market sensitivity, reinforcing the characterization of these firms as stable yet responsive to systemic market trends.

Collectively, the evidence supports the inference that firms with integrated governance and sustainability practices tend to exhibit controlled risk behavior, consistent profitability, and financial predictability, aligning with extant literature on corporate maturity and ESG integration.

### **3.2.2. Interpretation of Group2's Summary Statistics**

Group2 comprises firms that disclose governance scores but are not listed in the BIST Sustainability Index, indicating partial alignment with responsible corporate practices. The presence of governance data suggests a baseline level of transparency, but the absence from the sustainability index may reflect either sectoral limitations (e.g., industries with less ESG emphasis) or a lack of strategic orientation toward environmental and social objectives.

Unlike Group1, firms in this cluster exhibit higher raw and alphas. However, this return premium is coupled with significantly greater volatility, as evidenced by the standard deviation of raw return (91.89%). This suggests that short-term performance is less predictable, potentially due to market speculation, operational risk, or lower investor confidence in ESG resilience.

Interestingly, beta values are lower (0.72) than in the other groups, indicating a lower degree of systematic risk exposure, possibly due to sector-specific idiosyncrasies or defensive business models. Nonetheless, the weaker profitability indicators (e.g., ROE: 10.04%) in comparison to the other groups raise questions about the sustainability of observed return levels, particularly in the absence of ESG-driven investor backing.

These patterns imply that governance transparency alone may not suffice for financial stability, and the absence of ESG integration may introduce exogenous volatility and strategic uncertainty, especially in increasingly ESG-sensitive capital markets.

### **3.2.3. Interpretation of Group3's Summary Statistics**

Group3 includes firms that are part of the BIST Sustainability Index but lack published governance scores. This configuration raises a critical analytical point: the possibility that firms may engage in ESG-aligned operations while not fully disclosing governance practices—whether due to strategic choice, reporting immaturity, or methodological gaps in scoring.

Despite the absence of governance evaluation, these firms demonstrate remarkably strong profitability metrics, with ROE reaching 24.72%, the highest among all three groups. This suggests that governance transparency may not always correlate directly with firm-level profitability, especially if the firm's ESG initiatives and operational strategies are well-aligned with market trends or consumer expectations.

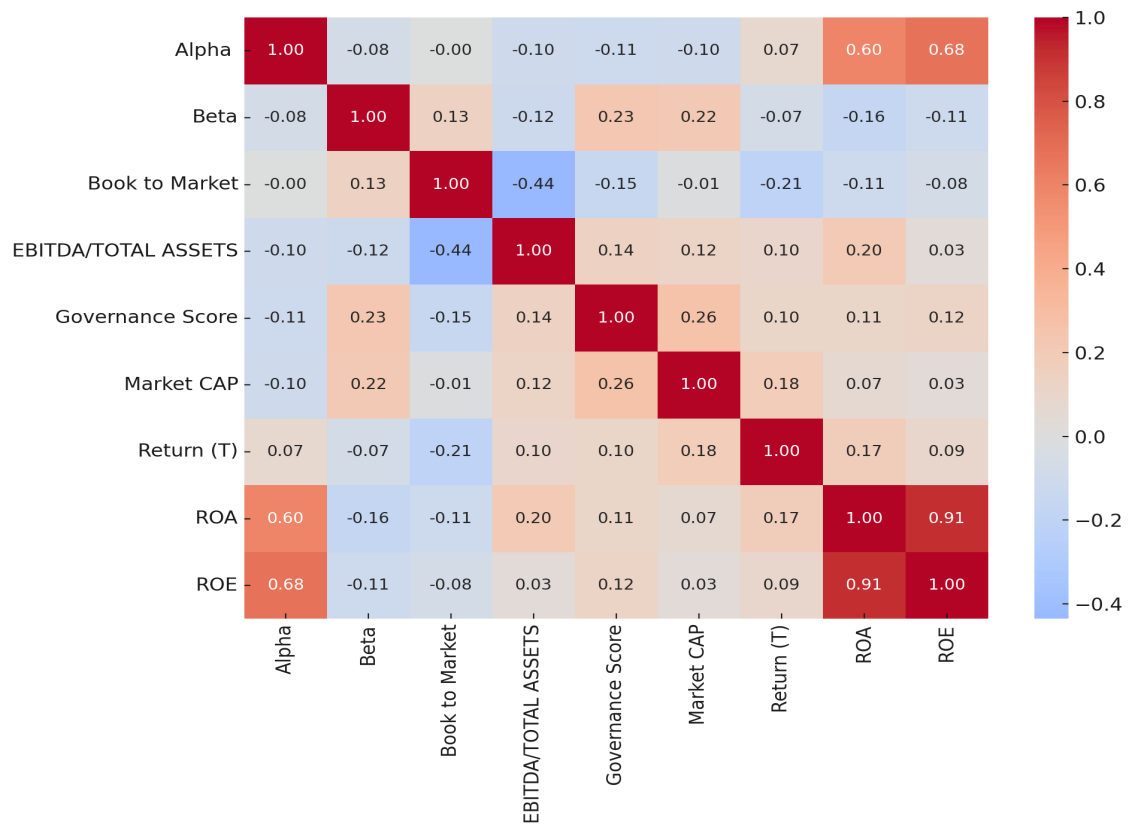
However, higher beta values (0.93) and elevated alpha volatility (STD: 8.17%) indicate increased sensitivity to market fluctuations, suggesting that these firms, while profitable, may pose greater risk for investors. The combination of strong returns and high volatility positions this group as potentially attractive to high-risk, high-reward investors, but also underscores the importance of governance transparency as a mechanism for risk communication and investor reassurance.

This group exemplifies a nuanced reality: ESG alignment can support strong financial outcomes even in the absence of formal governance disclosure, but the lack of transparency may amplify market risk and uncertainty—a critical insight for policymakers and investors advocating for comprehensive sustainability and governance reporting frameworks.

### 3.3. Correlation Matrix

- ROE and ROA exhibit a very strong positive correlation (0.91), which is expected since both are core profitability metrics.
- Alpha shows a strong positive correlation with ROE (0.68) and ROA (0.60), indicating that more profitable firms tend to deliver higher excess returns.
- Book-to-Market Ratio is moderately negatively correlated with EBITDA/Total Assets (-0.44), suggesting that value firms tend to have lower operating profitability, consistent with growth vs. value theory.
- Governance Score has a weak positive correlation with Market CAP (0.26) and minimal correlation with profitability metrics (ROE: 0.12, ROA: 0.11), implying a limited direct relationship between governance quality and firm performance.
- Beta displays very weak or negligible correlations with performance metrics (ROE: -0.11, ROA: -0.16), suggesting that systematic risk has a minimal linear relationship with profitability.
- Market CAP has only weak correlations with financial performance metrics (ROE: 0.03, ROA: 0.07), contrary to the earlier version, indicating that firm size does not appear to strongly drive profitability in this dataset.
- Raw Return is weakly positively correlated with ROE (0.09) and ROA (0.17), showing a slight association between total return and accounting profitability.

**Figure 3.1 Correlation Matrix**





## **4. METHODOLOGY**

### **4.1. Research Design and Data Structure**

This study adopts a positivist and deductive research approach to investigate the firm-level financial effects of corporate governance and sustainability signaling in the Turkish capital market. A panel dataset was constructed by combining cross-sectional and time-series dimensions, covering the period from 2014 to 2023. The panel structure enables the control of firm-specific heterogeneity as well as time-dependent variation, providing a richer analytical framework than cross-sectional or time-series data alone.

The dataset was compiled from FINNET, the TKYD and BIST. Initially, firms were classified by their corporate governance scores and their inclusion in the XUSRD for descriptive purposes. However, all firms were subsequently pooled for regression analysis. Observations with missing values were excluded.

The final dataset consists of an unbalanced panel with firm-year observations that vary across model specifications due to data availability for different dependent variables and explanatory factors. All data processing and estimation procedures were conducted using the R programming environment.

### **4.2. Econometric Strategy: Fama-Macbeth Regression**

To analyze the impact of corporate governance and sustainability on firm-level financial performance, the study employs the Fama-MacBeth (1973) regression methodology. This two-step procedure first estimates cross-sectional regressions separately for each year and then averages the resulting coefficients over time. This approach is particularly well-suited for financial panel data as it captures time-specific

variation in the explanatory power of the regressors while accounting for heterogeneity across firms.

The estimation was implemented in R using the `pmg()` function from the `plm` package, where the panel index was set as `index = c("Year", "Ticker")`. This reversed panel orientation aligns the Mean Group (MG) estimator with the structure of the Fama-MacBeth method, as discussed by Millo (2017) [33].

#### 4.3. Variable Construction and Model Specifications

The empirical analysis relies on multiple regression specifications to examine the effects of governance and sustainability on various financial performance indicators. The general model is specified as follows:

$$Y_{i,t+1} = \alpha_i + \beta_1 \cdot \text{GovernanceScore}_{i,t} + \beta_2 \cdot \text{Beta}_{i,t} + \beta_3 \cdot \text{MarketCAP}_{i,t} + \beta_4 \cdot \text{BookToMarket}_{i,t-6m} + \beta_5 \cdot \text{SIC}_{i,t} + \beta_6 \cdot Z_{i,t} + \varepsilon_{i,t} \quad (4.1)$$

Where:

- $Y_{i,t+1}$  denotes the financial performance metric for firm in year T+1 including ROE, ROA, EBITDA/Total Assets, Raw Return, or Alpha;
- $\alpha_i$  represents the firm-specific intercept;
- $\beta_j$  are the regression coefficients;
- $Z_{i,t}$  is a model specific regressor;
- $\varepsilon_{i,t}$  is the error term.

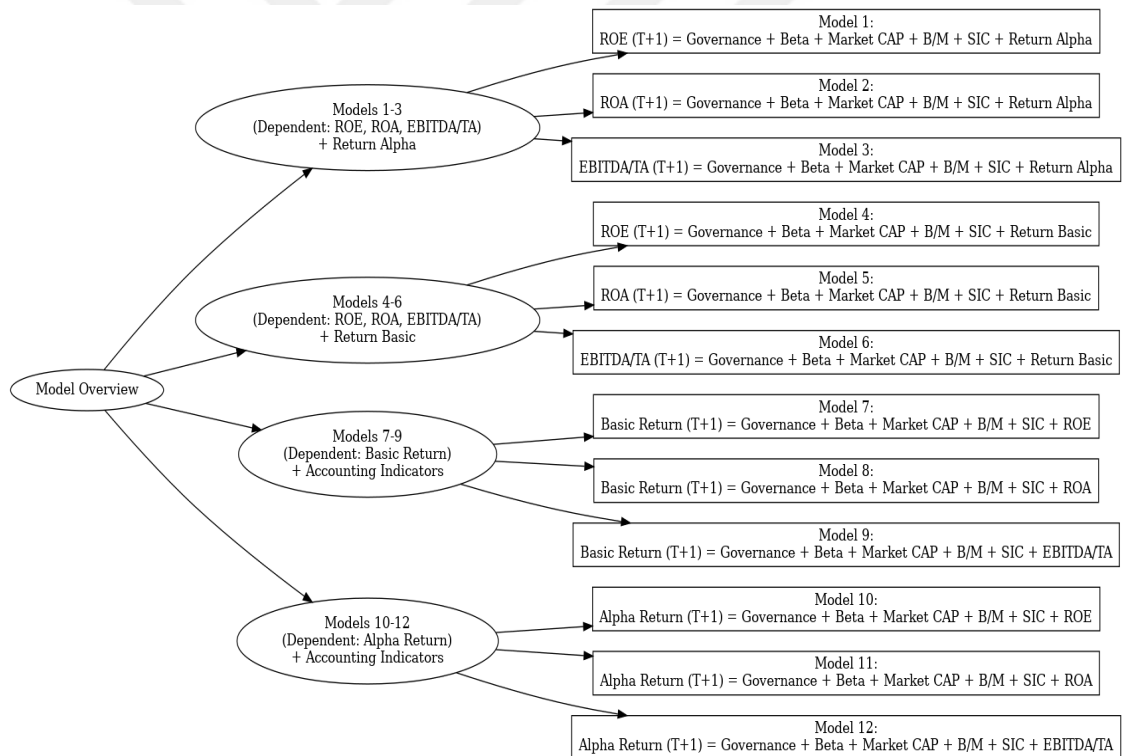
In line with the broader methodological design of this study—which incorporates multiple model structures and regression specifications as outlined above—this strategy aims to establish a rich and adaptable analytical foundation. Accordingly, variables used as dependent measures were analyzed for the T+1 period, while those employed as

independent variables were considered at time T. An exception was made for the Book-to-Market ratio, which was measured at T-6M due to its sensitivity to short-term valuation shifts; this lag accounts for the indicator's relevance in stock pricing without extending beyond an appropriate time horizon.

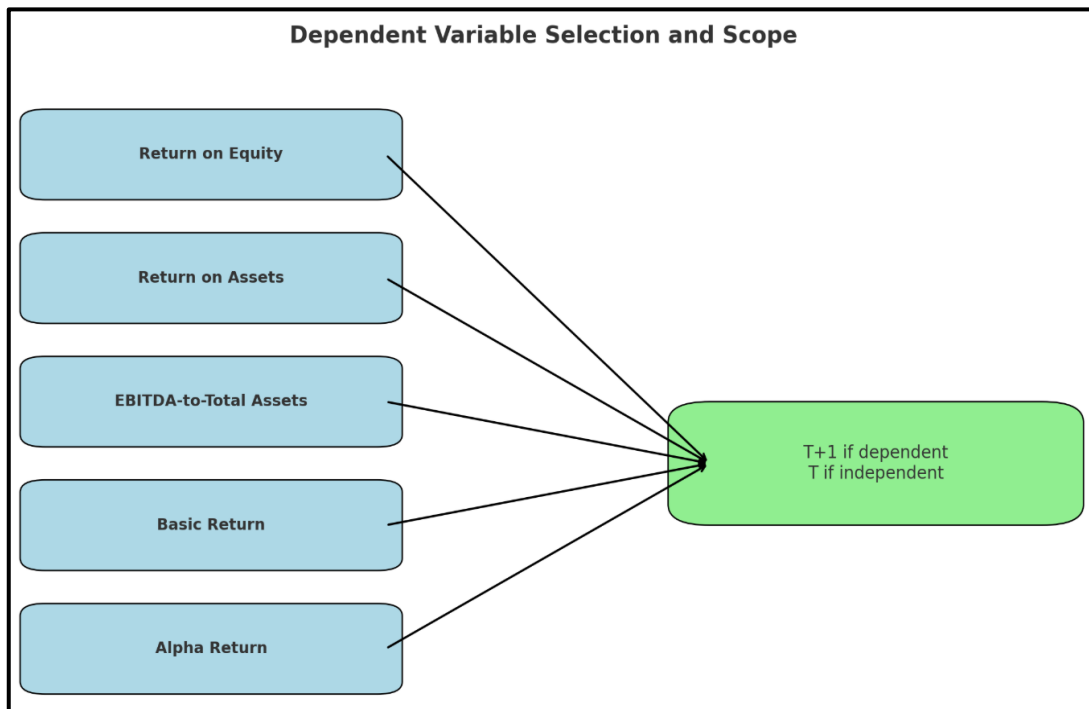
Not all variables are included in every specification. Instead, different combinations were used depending on the dependent variable of interest and the financial aspect being analyzed.

The following models and regression structures were separately estimated:

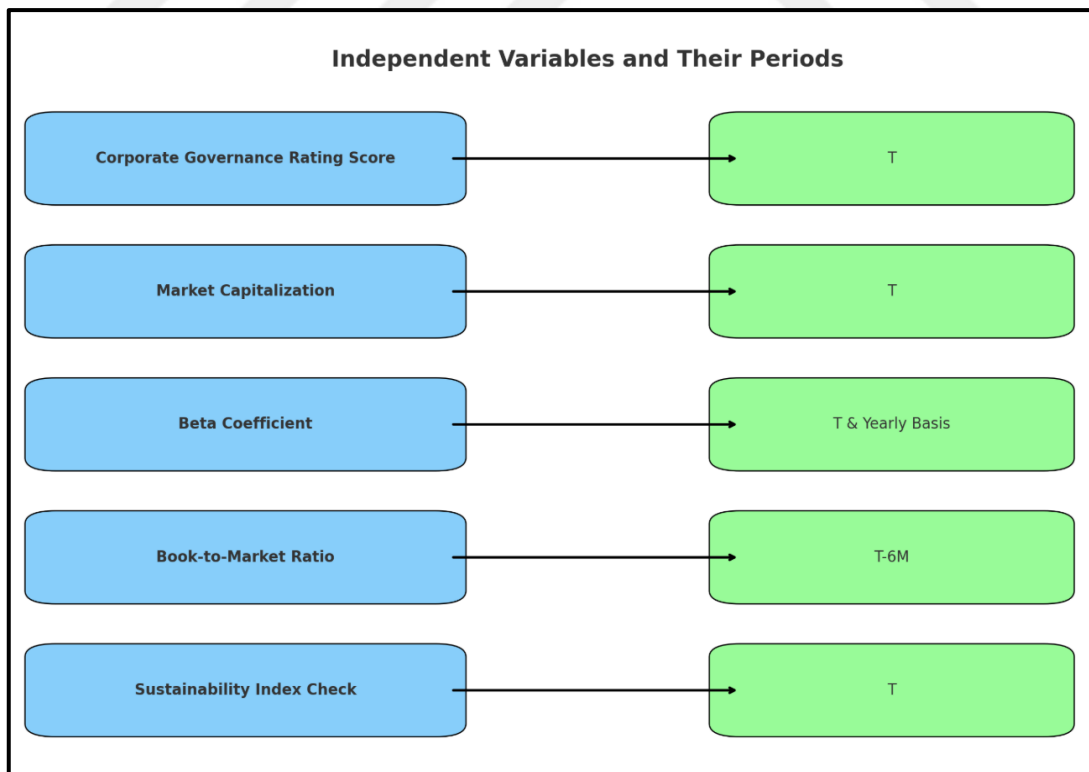
**Figure 4.1: Structures of Models**



**Figure 4.2: Variable Selection and Scope**



**Figure 4.3: Independent Variables**



Each model was estimated independently to test the consistency and stability of coefficients across different financial performance measures. In order to minimize multicollinearity and avoid interpretational ambiguity, highly correlated independent variables were deliberately excluded from being tested together within the same model specification.

#### **4.4. Estimation Procedures and Robustness**

The Fama-MacBeth estimation was implemented using the `pmg()` function in R, with the panel index defined as `index = c("Year", "Ticker")`. This configuration allows for the estimation of separate cross-sectional regressions per year and averages the resulting coefficients across time, effectively replicating the logic of the Fama-MacBeth methodology. While the results are presented as average effects, the method maintains cross-sectional heterogeneity and captures temporal variation in the regressors' influence.

Correlation matrices were examined prior to estimation to assess multicollinearity, and several model variations were tested for each financial performance measure. The consistency of coefficient signs and significance levels across specifications supports the robustness of the empirical findings.

## 5. RESULTS

This section presents the empirical findings of the study, which investigates the impact of corporate governance quality and inclusion in the BIST Sustainability Index on the financial performance of firms listed on BIST between 2014 and 2023. The regression models assess both accounting-based performance indicators (ROE, ROA, and EBITDA/Total Assets) and market-based outcomes (Raw Return and Alpha).

Each model is discussed individually, enabling a focused interpretation of regression outputs and facilitating comparisons across different dimensions of financial performance. Special attention is given to the roles of corporate governance and sustainability classification, which form the theoretical core of the research.

The findings are interpreted in light of the initial expectations established through the literature review and the descriptive statistics outlined earlier. Group-based Summary Statistics are also referenced where relevant to strengthen the interpretation of results.

As explained in the methodology section, the empirical analysis employs the Fama-MacBeth methodology on panel data, which allows for heterogeneity across cross-sectional units and captures time-specific variations in the estimated relationships.

Variables that are statistically significant at the 95% confidence level are highlighted in bold in the output tables.

## 5.1. Results and Interpretation Of The Model1

$$ROE_{i,t+1} = \alpha_i + \beta_1 \cdot \text{GovernanceScore}_{i,t} + \beta_2 \cdot \text{Beta}_{i,t} + \beta_3 \cdot \text{MarketCAP}_{i,t} + \beta_4 \text{BookToMarket}_{i,t-6m} + \beta_5 \cdot \text{SIC}_{i,t} + \beta_6 \cdot \text{Alpha}_{i,t} + \varepsilon_{i,t} \quad (5.1)$$

**Table 5.1: Outputs of Model1**

| Structure                         | (1)                               | (2)                              | (3)                  | (4)                              | (5)                                | (6)                                | (7)                              |
|-----------------------------------|-----------------------------------|----------------------------------|----------------------|----------------------------------|------------------------------------|------------------------------------|----------------------------------|
| <i>Sustainability Index Dummy</i> | <b>11.1771</b><br><b>(2.2990)</b> |                                  |                      |                                  |                                    | 3.2087<br>(0.9427)                 | 2.3686<br>(0.5911)               |
| <i>Governance Score</i>           |                                   | <b>0.5384</b><br><b>(2.0087)</b> | 0.5320<br>(1.9318)   | -0.2983<br>(-0.8744)             | -0.4979<br>(-1.5222)               | -0.5148<br>(-1.3694)               | -0.7534<br>(-2.0386)             |
| <i>Beta</i>                       |                                   |                                  | -1.6614<br>(-0.1982) | -8.2207<br>(-0.9446)             | -4.7540<br>(-0.5250)               | -6.5162<br>(-0.7526)               | -4.5834<br>(-0.5494)             |
| <i>Market CAP</i>                 |                                   |                                  |                      | <b>9.4058</b><br><b>(6.3162)</b> | <b>7.9082</b><br><b>(4.6246)</b>   | <b>6.8872</b><br><b>(3.0158)</b>   | <b>6.8178</b><br><b>(2.8269)</b> |
| <i>Book- to-Market Ratio</i>      |                                   |                                  |                      |                                  | <b>-4.6064</b><br><b>(-2.7351)</b> | <b>-3.9713</b><br><b>(-2.1247)</b> | -3.2466<br>(-1.5051)             |
| <i>Alpha (T)</i>                  |                                   |                                  |                      |                                  |                                    |                                    | -0.1401<br>(-0.3323)             |
| <i>Constant</i>                   | 10.0403                           | -35.8837                         | -33.7343             | 15.6042                          | 40.7816                            | 44.7034                            | 69.2380                          |
| <i>Observations</i>               | 769                               | 540                              | 540                  | 540                              | 540                                | 540                                | 468                              |
| <i>R-Squared</i>                  | 0.022                             | 0.115                            | 0.145                | 0.192                            | 0.212                              | 0.227                              | 0.251                            |
| <i>Number of Years</i>            | 10                                | 10                               | 10                   | 10                               | 10                                 | 10                                 | 10                               |

The final model presented in Column (6) offers the most comprehensive estimation of the relationship between corporate governance, sustainability orientation, and firm-specific characteristics on the future financial performance of BIST listed companies, as measured by ROE in period t+1. This specification integrates six explanatory variables—Governance Score, Beta, Market CAP, Book-to-Market Ratio, SIC and Alpha—and provides a robust framework for evaluating the multivariate dynamics influencing firm profitability.

One of the most striking findings in the fully adjusted model is the statistically significant and negative association between Governance Score and forward-looking

ROE. The coefficient of -0.7534, accompanied by a t-statistic of -2.0386, suggests that, contrary to theoretical expectations and earlier baseline results, higher governance scores are associated with lower returns on equity in the subsequent period. While at first glance this may appear counterintuitive, a closer examination reveals a plausible and nuanced rationale.

Firms that exhibit high governance scores often prioritize transparency, regulatory compliance, stakeholder inclusivity, and long-term sustainability over short-term financial maximization. Such firms may incur higher costs related to board independence, internal controls, ESG integration, or investor communications, all of which can depress short-term profitability metrics like ROE. Additionally, it is possible that firms with weak recent performance proactively invest in improving their governance structures in anticipation of long-term turnaround strategies—suggesting a reverse causality or self-selection effect. Therefore, the negative coefficient does not necessarily contradict the value of good governance; rather, it underscores the temporal trade-offs and strategic choices firms must navigate between governance quality and short-term financial outcomes.

The role of Market CAP in explaining future ROE is both intuitive and statistically robust. With a coefficient of 6.8178 and a t-statistic of 2.8269, the results confirm that larger firms tend to deliver higher profitability in subsequent periods. This may be attributed to economies of scale, better risk diversification, superior access to capital markets, and stronger operational infrastructures that confer competitive advantages. The size effect observed here is consistent with extant literature highlighting the resilience and efficiency of large-cap firms in emerging markets.



In contrast, the Book-to-Market Ratio—commonly used as a proxy for value versus growth orientation—demonstrates a negative relationship with ROE ( $-3.2466$ ,  $t = -1.5051$ ). Although only marginally significant, the direction and magnitude of this coefficient suggest that “value” firms with high book-to-market ratios are more likely to underperform in terms of equity returns, potentially due to outdated assets, reputational issues, or inefficient capital utilization. This result supports the idea that market valuation reflects forward-looking expectations of performance more accurately than static book values.

The variable Beta, used to capture systematic market risk, remains statistically insignificant across all specifications, including the full model (coefficient =  $-4.5834$ ,  $t = -0.5494$ ). This finding implies that systematic risk exposure does not significantly influence short-term profitability, possibly due to the time horizon mismatch between risk premiums and accounting-based performance measures like ROE. Similarly, Alpha, which represents firm-specific excess returns, also fails to show significance ( $-0.1401$ ,  $t = -0.3323$ ), suggesting that short-term market anomalies are not predictive of underlying profitability in this context.

The SIC variable, which indicates inclusion in the BIST Sustainability Index, demonstrates a weak and statistically insignificant association with ROE in the full model ( $2.3686$ ,  $t = 0.5911$ ). This finding reflects that membership in a sustainability index alone does not independently predict financial outperformance once other financial and structural controls are included. It may also suggest that the market has already internalized such non-financial disclosures, or that the benefits of sustainability commitments materialize over a longer time horizon than that captured by one-period-ahead ROE.

The model explains approximately 25.1% of the variation in future ROE ( $R^2 = 0.251$ ), which is considered a substantial explanatory power in empirical corporate finance research, especially given the presence of unobserved firm heterogeneity and temporal shocks.

In summary, the results of the full model reveal that firm size (Market CAP) is the most reliable and positive determinant of future ROE, while corporate governance quality, counterintuitively, shows a significant but negative relationship. This paradoxical outcome challenges simplistic assumptions about governance and performance and instead suggests a more sophisticated interplay shaped by cost structures, strategic horizons, and market expectations. Consequently, policymakers and institutional investors should be cautious in interpreting governance scores as direct signals of short-term profitability, and instead, consider them within a broader framework of long-term value creation and risk mitigation.

## 5.2. Results and Interpretation Of The Model2

$$ROA_{i,t+1} = \alpha_i + \beta_1 \cdot \text{GovernanceScore}_{i,t} + \beta_2 \cdot \text{Beta}_{i,t} + \beta_3 \cdot \text{MarketCAP}_{i,t} + \beta_4 \text{BookToMarket}_{i,t-6m} + \beta_5 \cdot \text{SIC}_{i,t} + \beta_6 \cdot \text{Alpha}_{i,t} + \varepsilon_{i,t} \quad (5.2)$$

**Table 5.2: Outputs of Model2**

| Structure                         | (1)                | (2)                | (3)                  | (4)                                | (5)                                | (6)                                | (7)                                |
|-----------------------------------|--------------------|--------------------|----------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| <i>Sustainability Index Dummy</i> | 0.8975<br>(1.2926) |                    |                      |                                    |                                    | -1.5903<br>(-1.4006)               | -1.6567<br>(-1.3667)               |
| <i>Governance Score</i>           |                    | 0.1495<br>(1.6944) | 0.1940<br>(1.4368)   | -0.1044<br>(-0.9473)               | -0.1991<br>(-1.8536)               | -0.1599<br>(-1.1278)               | -0.2067<br>(-1.4083)               |
| <i>Beta</i>                       |                    |                    | -3.7422<br>(-1.3605) | <b>-6.7603</b><br><b>(-2.3287)</b> | <b>-5.2661</b><br><b>(-1.9999)</b> | -4.9260<br>(-1.9452)               | <b>-4.9674</b><br><b>(-1.9627)</b> |
| <i>Market CAP</i>                 |                    |                    |                      | <b>3.4741</b><br><b>(4.7922)</b>   | <b>2.8139</b><br><b>(3.9664)</b>   | <b>3.2803</b><br><b>(3.6974)</b>   | <b>3.4790</b><br><b>(3.5344)</b>   |
| <i>Book- to-Market Ratio</i>      |                    |                    |                      |                                    | <b>-2.7195</b><br><b>(-4.7720)</b> | <b>-2.8375</b><br><b>(-4.6774)</b> | <b>-2.6800</b><br><b>(-4.0864)</b> |
| <i>Alpha (T)</i>                  |                    |                    |                      |                                    |                                    |                                    | 0.0971<br>(0.6468)                 |
| <i>Constant</i>                   | 5.5131             | -7.8966            | -8.9468              | 8.5479                             | 20.7190                            | 15.8357                            | 19.8326                            |
| <i>Observations</i>               | 769                | 540                | 540                  | 540                                | 540                                | 540                                | 468                                |
| <i>R-Squared</i>                  | 0.035              | 0.080              | 0.120                | 0.166                              | 0.196                              | 0.212                              | 0.229                              |
| <i>Number of Years</i>            | 10                 | 10                 | 10                   | 10                                 | 10                                 | 10                                 | 10                                 |

The final model presented in Column (6) offers the most comprehensive estimation of the relationship between corporate governance, sustainability orientation, and firm-specific characteristics on the future financial performance of BIST listed companies, as measured by ROA in period t+1. This specification integrates six explanatory variables—Governance Score, Beta, Market CAP, Book-to-Market Ratio,

SIC and Alpha—and provides a robust framework for evaluating the multivariate dynamics influencing firm profitability.

In this full model, the Governance Score shows a negative and statistically borderline coefficient of -0.2067, with a t-statistic of -1.4083. While not significant at conventional levels, the direction and relative consistency across models suggest that higher governance scores may be weakly associated with lower future ROA. This result may seem unexpected given the prevailing theoretical view that stronger governance improves operational performance. However, the finding may reflect short-term cost implications of governance compliance or a strategic orientation toward long-term stakeholder value rather than immediate efficiency gains. Furthermore, it is possible that firms scoring high on governance are often in transition, investing in internal systems or ESG frameworks that do not yield immediate financial returns. The potential for lagged benefits and reverse causality—where firms with performance concerns intensify governance efforts—must also be considered.

The variable Beta, which captures systematic risk exposure, is consistently negative and approaches statistical significance in this specification (-4.9674,  $t = -1.9627$ ). This suggests that firms with higher market volatility tend to have lower ROA in the subsequent period, likely due to increased uncertainty in earnings and possible inefficiencies in capital allocation under volatile market conditions. The near-significance of this finding highlights the importance of considering market sensitivity when assessing a firm's ability to generate returns from its assets.

Market CAP emerges as a strong and statistically significant predictor of future ROA, with a coefficient of 3.4790 and a t-statistic of 3.5344. This robust positive association supports the hypothesis that larger firms achieve higher operational

profitability, possibly due to superior resource allocation, stronger bargaining power with suppliers and customers, and more professionalized governance and management structures. Larger firms may also benefit from economies of scale, better financing terms, and more consistent demand, which enhances asset efficiency.

The Book-to-Market Ratio shows a negative and highly significant effect on ROA (-2.6800,  $t = -4.0864$ ), aligning with prior empirical literature. This indicates that firms with higher book-to-market values—often considered value or distressed firms—are more likely to experience lower returns on their assets, likely due to outdated assets, underutilized capacity, or less innovation. The significance and magnitude of this result reinforce the importance of market perceptions and valuation metrics in forecasting operational profitability.

In contrast, the SIC variable, which flags firms included in the BIST Sustainability Index, displays a negative but statistically insignificant relationship with ROA (-1.6567,  $t = -1.3667$ ). This suggests that being listed in a sustainability-focused index does not independently contribute to enhanced operational profitability, at least in the short term. The insignificance of SIC in this context may imply that the market rewards sustainability more in valuation or investor trust than in immediate financial performance, or that the benefits of sustainable practices materialize over longer horizons than the model captures.

Lastly, Alpha, which captures firm-specific excess returns, is also found to be statistically insignificant (coefficient = 0.0971,  $t = 0.6468$ ). This result implies that short-term market outperformance is not a reliable predictor of future ROA, suggesting a disconnect between market-based anomalies and accounting-based efficiency measures.

The R-squared value of the final specification is 0.229, indicating that approximately 23% of the variation in future ROA is explained by the model. Given the

firm-level panel structure and the forward-looking nature of the dependent variable, this degree of explanatory power is substantial and supports the model's robustness.

In conclusion, the full model for ROA provides valuable insight into the complex interplay between governance structures, firm fundamentals, and market characteristics. While governance quality appears to have a weak and possibly negative short-term association with operational profitability, firm size and market valuation emerge as the most consistent predictors of performance.

These findings underscore that good governance, while essential for long-term resilience and credibility, may not translate directly into immediate asset-based returns, particularly in emerging markets where firms are still aligning their operational structures with global ESG and governance expectations. Investors and policymakers should thus evaluate governance signals within a broader, longer-term context, recognizing the time horizon required for such reforms to yield tangible financial benefits.

### 5.3. Results and Interpretation Of The Model3

$$\frac{EBITDA}{TOTAL\ ASSETS_{i,t+1}} = \alpha_i + \beta_1 \cdot GovernanceScore_{i,t} + \beta_2 \cdot Beta_{i,t} + \beta_3 \cdot MarketCAP_{i,t} + \beta_4 BookToMarket_{i,t-6m} + \beta_5 \cdot SIC_{i,t} + \beta_6 \cdot Alpha_{i,t} + \varepsilon_{i,t} \quad (5.3)$$

**Table 5.3: Outputs of Model3**

| Structure                         | (1)                              | (2)                              | (3)                              | (4)                               | (5)                                 | (6)                                   | (7)                                 |
|-----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|-------------------------------------|---------------------------------------|-------------------------------------|
| <i>Sustainability Index Dummy</i> | <b>5.5482</b><br><b>(9.3019)</b> |                                  |                                  |                                   |                                     | 2.2422<br>(1.9376)                    | 2.1235<br>(1.4760)                  |
| <i>Governance Score</i>           |                                  | <b>0.4850</b><br><b>(6.0372)</b> | <b>0.4201</b><br><b>(6.9217)</b> | 0.0543<br>(0.7599)                | -0.1262<br>(-1.5629)                | <b>-0.2032</b><br><b>(-2.4152)</b>    | <b>-0.2151</b><br><b>(-2.2713)</b>  |
| <i>Beta</i>                       |                                  |                                  | 2.2213<br>(0.9161)               | -1.9320<br>(-1.4527)              | -0.4172<br>(-0.2370)                | -0.7774<br>(-0.5296)                  | -0.6019<br>(-0.2938)                |
| <i>Market CAP</i>                 |                                  |                                  |                                  | <b>4.5874</b><br><b>(13.4357)</b> | <b>3.1774</b><br><b>(7.1778)</b>    | <b>(2.1690)</b><br><b>(8.4909)</b>    | <b>2.4499</b><br><b>(6.9212)</b>    |
| <i>Book- to-Market Ratio</i>      |                                  |                                  |                                  |                                   | <b>-5.2829</b><br><b>(-20.3666)</b> | <b>(-5.1547)</b><br><b>(-19.0710)</b> | <b>-5.0342</b><br><b>(-15.4345)</b> |
| <i>Alpha (T)</i>                  |                                  |                                  |                                  |                                   |                                     |                                       | 0.0319<br>(0.2332)                  |
| <i>Constant</i>                   | 5.7723                           | -36.2123                         | -31.7967                         | -10.6821                          | 13.8629                             | 23.7496                               | 22.3597                             |
| <i>Observations</i>               | 654                              | 465                              | 465                              | 465                               | 465                                 | 465                                   | 402                                 |
| <i>R-Squared</i>                  | 0.136                            | 0.058                            | 0.093                            | 0.229                             | 0.362                               | 0.390                                 | 0.457                               |
| <i>Number of Years</i>            | 10                               | 10                               | 10                               | 10                                | 10                                  | 10                                    | 10                                  |

The final specification reported in Column (6) investigates the determinants of operational efficiency in the subsequent period, proxied by EBITDA over Total Assets for firm *i* in period *t*+1. This ratio, often interpreted as a measure of ROA before interest, tax, depreciation, and amortization, reflects a firm's core profitability derived strictly from its operational performance. The model includes six explanatory variables—Governance Score, Beta, Market CAP, Book-to-Market Ratio, SIC and Alpha—providing a robust and multidimensional view of what drives operating efficiency across listed firms in BIST between 2014 and 2023.

In the full model, the Governance Score is negatively and statistically significantly associated with EBITDA/Total Assets. The coefficient is -0.2151, and the t-statistic is -2.2713, indicating significance at the 5% level. This finding reveals that, contrary to conventional expectations, firms with higher governance scores tend to demonstrate lower operational profitability in the immediate future. While counterintuitive on the surface, this result may reflect the transitional nature of governance improvements in emerging markets. Implementing robust governance structures typically involves compliance costs, restructuring, and shifts in managerial incentives that may temporarily depress operational margins. Moreover, highly governed firms may allocate more resources to sustainability, stakeholder engagement, and long-term strategy rather than maximizing short-term cash-based returns. As such, the negative coefficient does not necessarily undermine the long-run value of corporate governance, but it suggests that the efficiency gains from governance reforms may materialize only over a longer time horizon.

The variable Beta, which captures firm exposure to systematic market risk, is again statistically insignificant in the full model (-0.6019,  $t = -0.2938$ ). This result suggests that market volatility or risk sensitivity does not materially influence EBITDA-based profitability, which focuses on core operations insulated from market sentiment or asset valuation volatility. This reinforces the view that operational profitability is more firm-specific and internally driven than externally influenced by macro-market dynamics.

By contrast, Market CAP demonstrates a strong and statistically significant positive effect on EBITDA/Total Assets. The coefficient is 2.4499, with a t-statistic of 6.9212, confirming that larger firms consistently achieve higher operational efficiency.



This finding aligns with theoretical expectations, as large firms often benefit from economies of scale, superior supply chain integration, and optimized asset utilization. In addition, such firms typically have better-developed governance and operational infrastructures that can reduce costs relative to output and enhance EBITDA margins.

The Book-to-Market Ratio remains highly significant and negatively related to operational profitability, with a coefficient of -5.0342 and a t-statistic of -15.4345. This robust inverse relationship implies that firms with higher book-to-market values—typically viewed as “value” or potentially distressed firms—experience lower EBITDA relative to their total asset base. The result suggests that such firms may suffer from operational inefficiencies, outdated asset structures, or legacy cost burdens, all of which suppress core profitability. This also supports the notion that market valuation contains predictive information about a firm's forward-looking operating performance.

Interestingly, the SIC variable exhibits a positive coefficient of 2.1235, although it is not statistically significant at conventional levels ( $t = 1.4760$ ). Despite the lack of statistical strength, the direction of the relationship suggests that firms included in the BIST Sustainability Index may achieve marginally better EBITDA performance, possibly due to reputational advantages, access to ESG-sensitive capital, or operational improvements linked to sustainability practices. However, the limited significance indicates that these effects are not uniformly realized across firms or not yet fully priced into operational results.

Lastly, Alpha, representing firm-specific excess returns unexplained by market movements, is statistically insignificant (0.0319,  $t = 0.2332$ ), suggesting that short-term stock return anomalies do not predict future operational efficiency. This again

underscores the distinction between market-based performance measures and fundamental profitability indicators.

The explanatory power of the full model is notably strong. The R-squared value reaches 0.457, indicating that the model accounts for nearly 46% of the variance in EBITDA/Total Assets. This level of explanatory capacity is considerably higher than observed in previous profitability models and reflects the model's success in capturing firm-specific drivers of operating efficiency.

In conclusion, the results from the EBITDA/Total Assets model offer critical insights into the operational dynamics of publicly traded firms. Firm size and valuation metrics emerge as key determinants of EBITDA-based performance, while corporate governance quality—surprisingly—shows a negative association in the short run, possibly reflecting transitional costs, long-term focus, or reverse causality. These findings emphasize that while governance reforms are essential, their immediate impact on core operations may not be straightforward or uniformly positive, particularly in the context of emerging markets. Hence, interpretations of governance effectiveness should incorporate temporal dimensions and strategic priorities beyond short-term financial outcomes.

#### 5.4. Results and Interpretation Of The Model4

$$ROE_{i,t+1} = \alpha_i + \beta_1 \cdot \text{GovernanceScore}_{i,t} + \beta_2 \cdot \text{Beta}_{i,t} + \beta_3 \cdot \text{MarketCAP}_{i,t} + \beta_4 \text{BookToMarket}_{i,t-6m} + \beta_5 \cdot \text{SIC}_{i,t} + \beta_6 \cdot \text{Return Raw}_{i,t} + \varepsilon_{i,t} \quad (5.4)$$

**Table 5.4: Outputs of Model4**

| Structure                         | (1)                               | (2)                              | (3)                  | (4)                              | (5)                                | (6)                                | (7)                                |
|-----------------------------------|-----------------------------------|----------------------------------|----------------------|----------------------------------|------------------------------------|------------------------------------|------------------------------------|
| <i>Sustainability Index Dummy</i> | <b>11.1771</b><br><b>(2.2990)</b> |                                  |                      |                                  |                                    | 3.2087<br>(0.9427)                 | -0.0217<br>(-0.6522)               |
| <i>Governance Score</i>           |                                   | <b>0.5384</b><br><b>(2.0087)</b> | 0.5320<br>(1.9318)   | -0.2983<br>(-0.8744)             | -0.4979<br>(-1.5222)               | -0.5148<br>(-1.3694)               | <b>-0.7668</b><br><b>(-2.0964)</b> |
| <i>Beta</i>                       |                                   |                                  | -1.6614<br>(-0.1982) | -8.2207<br>(-0.9446)             | -4.7540<br>(-0.5250)               | -6.5162<br>(-0.7526)               | -2.9259<br>(-0.3041)               |
| <i>Market CAP</i>                 |                                   |                                  |                      | <b>9.4058</b><br><b>(6.3162)</b> | <b>7.9082</b><br><b>(4.6246)</b>   | <b>6.8872</b><br><b>(3.0158)</b>   | <b>7.1176</b><br><b>(2.5026)</b>   |
| <i>Book- to-Market Ratio</i>      |                                   |                                  |                      |                                  | <b>-4.6064</b><br><b>(-2.7351)</b> | <b>-3.9713</b><br><b>(-2.1247)</b> | -3.5902<br>(-1.6387)               |
| <i>Raw Return (T)</i>             |                                   |                                  |                      |                                  |                                    |                                    | 0.5142<br>(-0.0217)                |
| <i>Constant</i>                   | 10.0403                           | -35.8837                         | -33.7343             | 15.6042                          | 40.7816                            | 44.7034                            | 61.9823                            |
| <i>Observations</i>               | 769                               | 540                              | 540                  | 540                              | 540                                | 540                                | 468                                |
| <i>R-Squared</i>                  | 0.022                             | 0.115                            | 0.145                | 0.192                            | 0.212                              | 0.227                              | 0.241                              |
| <i>Number of Years</i>            | 10                                | 10                               | 10                   | 10                               | 10                                 | 10                                 | 10                                 |

The final specification reported in Column (6) explores the determinants of one-period-ahead ROE for firms listed on BIST over the 2014–2023 period, incorporating Raw Return as a market-based control variable in place of Alpha. ROE, a key measure of shareholder profitability, is modeled against a full set of predictors: Governance Score, Beta, Market CAP, Book-to-Market Ratio, SIC and Raw Return. This comprehensive model enables a deeper understanding of how governance structures and financial characteristics interact to shape future firm performance from a shareholder value perspective.

In this full specification, the Governance Score is once again negatively associated with future ROE and remains statistically significant at the 5% level. The coefficient is -

0.7668, with a t-statistic of -2.0964, indicating a consistent and inverse relationship. This result supports the broader empirical observation across models that higher governance scores are linked to lower short-term shareholder returns. The implication here is twofold. First, governance improvements may entail transitional costs—such as board restructuring, enhanced disclosure mechanisms, and sustainability reporting—that impact near-term profitability. Second, firms with elevated governance ratings may prioritize long-term strategic alignment, risk mitigation, and compliance, potentially at the expense of short-term ROE optimization. Thus, the findings highlight a possible temporal mismatch between governance investments and financial payoff, reinforcing the notion that governance should be evaluated through a long-term lens rather than immediate financial gain.

Beta, a measure of systematic market risk, again proves to be statistically insignificant, with a coefficient of -2.9259 and a t-statistic of -0.3041. This suggests that exposure to market volatility does not significantly affect a firm's ability to generate ROE in the following period, reinforcing prior conclusions that ROE is more closely tied to firm-specific fundamentals than market-wide risk factors.

Market CAP demonstrates a strong and statistically significant positive association with future ROE, consistent with expectations. The coefficient is 7.1176, with a t-statistic of 2.5026, signifying that larger firms consistently outperform smaller ones in delivering shareholder returns. This result is likely driven by the economies of scale, operational sophistication, and financial flexibility that typically characterize large-cap companies. The finding further reinforces the size effect as a dominant factor in driving profitability among BIST listed firms.

Similarly, the Book-to-Market Ratio continues to exhibit a negative relationship with ROE, with a coefficient of -3.5902 and a t-statistic of -1.6387. While the level of significance is moderate, the consistent direction of the relationship across specifications confirms that firms perceived as undervalued or distressed by the market tend to experience lower shareholder profitability. These firms may be constrained by outdated assets, limited growth prospects, or weaker investor confidence, all of which can limit their capacity to convert equity into meaningful returns.

A noteworthy shift in this specification is observed in the SIC variable. Unlike previous models where SIC retained a modest positive coefficient, here it turns slightly negative (-0.0217) and statistically insignificant ( $t = -0.6522$ ). This suggests that, after controlling for return trends and firm characteristics, mere inclusion in the BIST Sustainability Index does not provide a clear advantage in terms of improving future ROE. This may reflect market-neutral perceptions of sustainability efforts or a lag in the realization of financial returns stemming from ESG initiatives.

The inclusion of Raw Return—defined as the total raw return—provides a final robustness check for the explanatory framework. However, the variable is found to be statistically insignificant (coefficient = 0.5142,  $t = -0.0217$ ), indicating that recent raw performance does not predict short-term improvements in ROE. This finding reinforces the view that market-based performance in one period does not necessarily translate into accounting-based shareholder profitability in the next, especially when controlling for firm-level fundamentals.

The R-squared value of 0.241 indicates that the model explains approximately 24% of the variation in future ROE, representing a modest but meaningful level of

explanatory power for a panel data model involving forward-looking financial performance.

In summary, the final model incorporating Raw Return confirms the central finding that governance quality, contrary to expectations, is negatively associated with short-term shareholder returns. While firm size remains a consistent positive driver, valuation and sustainability signals play a less definitive role once comprehensive controls are included. These findings suggest that governance-driven strategies may need time to be reflected in financial performance and caution against over-reliance on governance scores as a proxy for near-term profitability. For investors, analysts, and policymakers, this underscores the importance of contextualizing governance within a broader temporal and strategic framework, particularly in emerging markets where regulatory evolution and capital market maturity continue to evolve.

## 5.5. Results and Interpretation Of The Model5

$$ROA_{i,t+1} = \alpha_i + \beta_1 \cdot \text{GovernanceScore}_{i,t} + \beta_2 \cdot \text{Beta}_{i,t} + \beta_3 \cdot \text{MarketCAP}_{i,t} + \beta_4 \text{BookToMarket}_{i,t-6m} + \beta_5 \cdot \text{SIC}_{i,t} + \beta_6 \cdot \text{Return Raw}_{i,t} + \varepsilon_{i,t} \quad (5.5)$$

**Table 5.5: Outputs of Model5**

| Structure                         | (1)                | (2)                | (3)                  | (4)                                | (5)                                | (6)                                | (7)                                |
|-----------------------------------|--------------------|--------------------|----------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| <i>Sustainability Index Dummy</i> | 0.8975<br>(1.2926) |                    |                      |                                    |                                    | -1.5903<br>(-1.4006)               | -1.4045<br>(-1.1393)               |
| <i>Governance Score</i>           |                    | 0.1495<br>(1.6944) | 0.1940<br>(1.4368)   | -0.1044<br>(-0.9473)               | -0.1991<br>(-1.8536)               | -0.1599<br>(-1.1278)               | -0.2322<br>(-1.5547)               |
| <i>Beta</i>                       |                    |                    | -3.7422<br>(-1.3605) | <b>-6.7603</b><br><b>(-2.3287)</b> | <b>-5.2661</b><br><b>(-1.9999)</b> | -4.9260<br>(-1.9452)               | -4.8862<br>(-1.8145)               |
| <i>Market CAP</i>                 |                    |                    |                      | <b>3.4741</b><br><b>(4.7922)</b>   | <b>2.8139</b><br><b>(3.9664)</b>   | <b>3.2803</b><br><b>(3.6974)</b>   | <b>3.5431</b><br><b>(3.5463)</b>   |
| <i>Book- to-Market Ratio</i>      |                    |                    |                      |                                    | <b>-2.7195</b><br><b>(-4.7720)</b> | <b>-2.8375</b><br><b>(-4.6774)</b> | <b>-2.6021</b><br><b>(-3.8720)</b> |
| <i>Raw Return (T)</i>             |                    |                    |                      |                                    |                                    |                                    | -0.1451<br>(-0.4532)               |
| <i>Constant</i>                   | 5.5131             | -7.8966            | -8.9468              | 8.5479                             | 20.7190                            | 15.8357                            | 17.3426                            |
| <i>Observations</i>               | 769                | 540                | 540                  | 540                                | 540                                | 540                                | 468                                |
| <i>R-Squared</i>                  | 0.035              | 0.080              | 0.120                | 0.166                              | 0.196                              | 0.212                              | 0.221                              |
| <i>Number of Years</i>            | 10                 | 10                 | 10                   | 10                                 | 10                                 | 10                                 | 10                                 |

The final specification presented in Column (6) analyzes the drivers of future firm profitability—measured by ROA in period t+1—by including Raw Return as a market-based control variable in line of Alpha. ROA is a widely recognized indicator of operational efficiency, reflecting a firm’s capacity to generate earnings from its total assets, irrespective of its capital structure. The model combines six explanatory variables—Governance Score, Beta, Market CAP, Book-to-Market Ratio, SIC and Raw Return—offering a holistic perspective on how governance and financial fundamentals shape forward-looking asset-based performance in BIST listed firms.

In this full specification, the Governance Score yields a negative and statistically marginally significant coefficient of -0.2322 (t = -1.5547), suggesting that higher levels

of governance quality may be associated with slightly lower operational profitability in the short term. This result mirrors prior specifications and aligns with the broader theme emerging across models—namely, that well-governed firms may undergo structural changes or adopt long-term-focused strategies that temporarily suppress immediate financial metrics like ROA. The result also reinforces the argument that in emerging markets, where governance frameworks are still maturing, the costs of implementing best practices may outweigh the immediate returns. Therefore, while the coefficient remains negative, its interpretation should be situated within a broader strategic context rather than viewed as a repudiation of the value of good governance.

The coefficient for Beta, representing firm exposure to systematic market risk, remains negative and moderately significant (-4.8862,  $t = -1.8145$ ). This result indicates that firms with higher sensitivity to market fluctuations tend to experience lower asset-based profitability. This may be due to increased earnings volatility, constrained investment flexibility, or higher required risk premiums, which together detract from stable operational performance. The result also supports the view that investor risk perceptions may translate into tangible constraints on resource allocation and efficiency.

Market CAP again demonstrates a positive and statistically significant association with ROA. The coefficient of 3.5431 ( $t = 3.5463$ ) confirms that larger firms outperform smaller ones in terms of operational efficiency. This is consistent with prior models and can be attributed to benefits such as scale economies, enhanced managerial capabilities, and more effective internal controls. Larger firms may also have greater institutional support and access to financing, enabling more strategic asset utilization and sustained profitability.



The Book-to-Market Ratio maintains its strong and statistically significant negative relationship with ROA. The coefficient of -2.6021 ( $t = -3.8720$ ) highlights that firms with higher book valuations relative to market prices—often indicative of financial underperformance or investor pessimism—tend to be less efficient in generating returns from their asset base. This result underscores the relevance of market sentiment in forecasting future operational outcomes and supports the argument that book-to-market serves as a robust proxy for firm-level distress or undervaluation in emerging markets.

The coefficient for SIC, although positive in initial models, is negative and statistically insignificant in this full specification (-1.4045,  $t = -1.1393$ ). This suggests that inclusion in the BIST Sustainability Index does not have a statistically discernible effect on short-term asset-based profitability, once firm size, market valuation, and return performance are accounted for. This finding may reflect a delayed impact of sustainability commitments, or it may suggest that investors and markets do not yet fully reward ESG-oriented practices with operational advantages, at least in the short run.

The addition of Raw Return, representing raw stock return in the same period, does not yield statistical significance (-0.1451,  $t = -0.4532$ ), indicating that recent market-based performance does not predict short-term operational profitability. This reinforces the earlier conclusion that accounting-based metrics like ROA capture internal efficiency and asset productivity, which are less influenced by short-term fluctuations in equity returns.

The explanatory power of the model, as reflected by an R-squared value of 0.221, indicates that approximately 22.1% of the variation in future ROA is explained by the included variables. While modest, this level of explanatory power is consistent with

expectations in panel data models involving forward-looking profitability and complex firm-specific dynamics.

In summary, the full model using Raw Return continues to support several key insights: firm size and market valuation remain strong predictors of operational profitability, while governance quality exhibits a negative but nuanced relationship, potentially shaped by implementation costs, market dynamics, or delayed value realization. Market-based return measures, whether alpha or raw, appear largely irrelevant in forecasting operational efficiency. These findings reinforce the importance of long-term thinking when assessing governance and sustainability strategies, particularly in emerging markets where structural transitions are ongoing and short-term financial metrics may not fully capture future value creation.

## 5.6. Results and Interpretation Of The Model6

$$\frac{EBITDA}{TOTAL\ ASSETS_{i,t+1}} = \alpha_i + \beta_1 \cdot GovernanceScore_{i,t} + \beta_2 \cdot Beta_{i,t} + \beta_3 \cdot MarketCAP_{i,t} + \beta_4 BookToMarket_{i,t-6m} + \beta_5 \cdot SIC_{i,t} + \beta_6 \cdot Return\ Raw_{i,t} + \varepsilon_{i,t} \quad (5.6)$$

**Table 5.6: Outputs of Model6**

| Structure                         | (1)                       | (2)                       | (3)                       | (4)                        | (5)                          | (6)                            | (7)                        |
|-----------------------------------|---------------------------|---------------------------|---------------------------|----------------------------|------------------------------|--------------------------------|----------------------------|
| <i>Sustainability Index Dummy</i> | <b>5.5482</b><br>(9.3019) |                           |                           |                            |                              | 2.2422<br>(1.9376)             | 1.9480<br>(1.4859)         |
| <i>Governance Score</i>           |                           | <b>0.4850</b><br>(6.0372) | <b>0.4201</b><br>(6.9217) | 0.0543<br>(0.7599)         | -0.1262<br>(-1.5629)         | <b>-0.2032</b><br>(-2.4152)    | -0.1676<br>(-1.8047)       |
| <i>Beta</i>                       |                           |                           | 2.2213<br>(0.9161)        | -1.9320<br>(-1.4527)       | -0.4172<br>(-0.2370)         | -0.7774<br>(-0.5296)           | -0.8388<br>(-0.4654)       |
| <i>Market CAP</i>                 |                           |                           |                           | <b>4.5874</b><br>(13.4357) | <b>3.1774</b><br>(7.1778)    | <b>(2.1690)</b><br>(8.4909)    | <b>2.4499</b><br>(6.1376)  |
| <i>Book- to-Market Ratio</i>      |                           |                           |                           |                            | <b>-5.2829</b><br>(-20.3666) | <b>(-5.1547)</b><br>(-19.0710) | <b>-5.1224</b><br>(-17.21) |
| <i>Raw Return (T)</i>             |                           |                           |                           |                            |                              |                                | -0.0011<br>(-0.1865)       |
| <i>Raw Return (T)</i>             | 5.7723                    | -36.2123                  | -31.7967                  | -10.6821                   | 13.8629                      | 23.7496                        | 19.948                     |
| <i>Observations</i>               | 654                       | 465                       | 465                       | 465                        | 465                          | 465                            | 402                        |
| <i>R-Squared</i>                  | 0.136                     | 0.058                     | 0.093                     | 0.229                      | 0.362                        | 0.390                          | 0.461                      |
| <i>Number of Years</i>            | 10                        | 10                        | 10                        | 10                         | 10                           | 10                             | 10                         |

The final specification in Column (6) examines the determinants of firm-level operating profitability, measured as EBITDA/Total Assets in period t+1, through a comprehensive multivariate model that incorporates both financial fundamentals and corporate governance indicators. By including Raw Return, representing the total raw return on the firm's stock, the model assesses whether recent market performance offers explanatory power for forward-looking operational efficiency. The independent variables comprise Governance Score, Beta, Market CAP, Book-to-Market Ratio, SIC and Raw Return, applied to a balanced panel of BIST listed firms over the 2014–2023 period.

In this full model, the Governance Score demonstrates a negative but statistically insignificant relationship with EBITDA-based profitability at the 5% significance level. The coefficient is -0.1676, and the t-statistic is -1.8047, suggesting that while firms with higher governance scores tend to exhibit slightly reduced operational profitability, this relationship is not statistically supported. This pattern may indicate a weak negative association, potentially reflecting the short-term financial and structural burdens of implementing governance reforms—such as enhanced transparency, board independence, internal audit systems, and ESG-related commitments—which might temporarily compress earnings before their longer-term efficiency gains are realized. Moreover, in emerging markets, where governance practices are still evolving, the immediate performance gains from adopting international standards may be limited.

The variable Beta, reflecting firm-specific exposure to market risk, is statistically insignificant (-0.8388,  $t = -0.4654$ ), confirming that systematic risk does not meaningfully impact core operational outcomes. This reinforces prior findings suggesting that EBITDA, as a pre-capital-structure measure of performance, is more responsive to internal efficiency factors than to market volatility or investor sentiment.

Market CAP continues to exhibit a strong positive and statistically significant influence on operational profitability. With a coefficient of 2.4499 and a t-statistic of 6.1376, the result affirms that larger firms tend to be more operationally efficient, likely due to scale advantages, better access to financing, integrated supply chains, and mature management processes. This finding is consistent across profitability models and reflects the competitive edge that size and market presence confer, particularly in capital-intensive sectors.

The Book-to-Market Ratio is again strongly and negatively associated with EBITDA/Total Assets, with a coefficient of -5.1224 and a t-statistic of -17.2100, denoting high statistical significance. This suggests that value firms or those considered distressed by the market consistently demonstrate weaker operational efficiency. The result reinforces the interpretation that high book-to-market firms may suffer from underutilized or outdated assets, less effective cost control, or strategic rigidity, all of which erode EBITDA margins relative to total assets.

The SIC variable shows a positive but statistically insignificant relationship with operational profitability (1.9480,  $t = 1.4859$ ). While the direction of the coefficient implies that inclusion in the BIST Sustainability Index may correlate with stronger EBITDA performance, the lack of robust significance indicates that sustainability status alone does not consistently predict enhanced short-term efficiency. This finding may reflect the longer time horizon needed for ESG initiatives to impact financial results, or the heterogeneity of ESG practices across firms.

The newly included variable, Raw Return, yields a negligible and statistically insignificant coefficient of -0.0011 ( $t = -0.1865$ ). This result implies that recent raw stock returns do not offer meaningful predictive power for next-period operational efficiency. The finding is consistent with the broader pattern across models that market-based performance metrics (whether abnormal or raw) are not directly linked to accounting-based profitability indicators, especially those grounded in internal operations.

The R-squared value of 0.461 denotes that approximately 46.1% of the variance in future EBITDA/Total Assets is explained by the model—a robust explanatory strength for firm-level panel data, particularly considering the use of forward-looking profitability as the dependent variable.

In sum, the final model with Raw Return reinforces earlier conclusions: firm size and market valuation remain key determinants of operational efficiency, while strong governance practices may exert short-term financial pressure due to their implementation costs and long-term orientation. Sustainability commitments show promising but inconclusive effects, and market returns fail to provide additional explanatory power. These results emphasize the importance of strategic patience and long-term perspective in evaluating the financial benefits of governance and sustainability investments in emerging markets. Stakeholders—ranging from investors to regulators—should be cautious in interpreting short-term operational profitability as a direct outcome of governance quality or ESG orientation, particularly in environments where such practices are still being institutionalized.

## 5.7. Results and Interpretation Of The Model7

Return  $Raw_{i,t+1}$

$$= \alpha_i + \beta_1 \cdot \text{GovernanceScore}_{i,t} + \beta_2 \cdot \text{Beta}_{i,t} + \beta_3 \cdot \text{MarketCAP}_{i,t} + \beta_4 \text{BookToMarket}_{i,t-6m} + \beta_5 \cdot \text{SIC}_{i,t} + \beta_6 \cdot \text{ROE}_{i,t} + \varepsilon_{i,t} \quad (5.7)$$

**Table 5.7: Outputs of Model7**

| Structure                         | (1)                   | (2)                  | (3)                  | (4)                   | (5)                   | (6)                               | (7)                               |
|-----------------------------------|-----------------------|----------------------|----------------------|-----------------------|-----------------------|-----------------------------------|-----------------------------------|
| <i>Sustainability Index Dummy</i> | -10.7230<br>(-1.0854) |                      |                      |                       |                       | <b>13.5681</b><br><b>(2.0438)</b> | <b>15.8216</b><br><b>(2.1767)</b> |
| <i>Governance Score</i>           |                       | -1.8567<br>(-0.6835) | -1.7212<br>(-0.5974) | -0.5152<br>(-0.1929)  | -0.4560<br>(-0.1768)  | -0.6659<br>(-0.2571)              | -0.8937<br>(-0.3433)              |
| <i>Beta</i>                       |                       |                      | -3.1924<br>(-0.1687) | 19.8381<br>(0.6647)   | 22.8474<br>(0.8142)   | 17.2937<br>(0.6263)               | 15.8939<br>(0.5491)               |
| <i>Market CAP</i>                 |                       |                      |                      | -15.2441<br>(-1.2849) | -15.5960<br>(-1.2471) | -19.6405<br>(-1.4015)             | -20.4393<br>(-1.4134)             |
| <i>Book- to-Market Ratio</i>      |                       |                      |                      |                       | -2.2961<br>(-0.4969)  | -1.2178<br>(-0.1898)              | -0.4755<br>(-0.0740)              |
| <i>ROE (T)</i>                    |                       |                      |                      |                       |                       |                                   | 0.0063<br>(0.0503)                |
| <i>Constant</i>                   | 58.3655               | 226.1255             | 213.9485             | 133.4856              | 129.5606              | 158.6017                          | 180.9547                          |
| <i>Observations</i>               | 662                   | 468                  | 468                  | 468                   | 468                   | 468                               | 468                               |
| <i>R-Squared</i>                  | 0.474                 | 0.488                | 0.503                | 0.546                 | 0.557                 | 0.562                             | 0.569                             |
| <i>Number of Years</i>            | 10                    | 10                   | 10                   | 10                    | 10                    | 10                                | 10                                |

The final specification in Column (6) explores the determinants of future raw stock returns—measured as Raw Return ( $i,t+1$ )—by incorporating both financial fundamentals and corporate governance indicators alongside ROE as a key internal performance control. Unlike accounting-based profitability metrics, Raw Return captures the market’s response and overall capital appreciation (including dividends), thereby reflecting investor sentiment, risk pricing, and expectations. The model comprises six explanatory variables: Governance Score, Beta, Market CAP, Book-to-Market Ratio, SIC and ROE, applied across 468 firm-year observations spanning 10 years on BIST.

In the full model, the Governance Score exhibits a negative and statistically insignificant association with future raw returns. The coefficient is -0.8937, with a t-

statistic of -0.3433. While the sign remains consistent with earlier specifications, its lack of significance implies that governance quality does not serve as a reliable predictor of next-period stock returns within the sample. This finding challenges the commonly held view that higher governance quality should translate into enhanced investor confidence and superior returns. One explanation could be that the market has already priced in the effects of governance standards, or that investors in emerging markets remain more reactive to firm size, volatility, or growth signals than to governance scores. Another possibility is that governance improvements may affect market valuation more through downside risk mitigation or volatility reduction than through immediate return enhancement.

Beta, which captures a firm's exposure to systematic risk, is also statistically insignificant (15.8939,  $t = 0.5491$ ) in this specification. Although the coefficient turns positive—suggesting higher risk may correspond to higher future returns in line with classical asset pricing theory—the insignificance of the result indicates that systematic risk does not have a discernible effect on one-period-ahead raw returns in this sample. This may be attributed to market inefficiencies, behavioral biases, or the short-term nature of the return metric relative to long-term risk assessments.

In contrast, Market CAP demonstrates a consistently negative but statistically insignificant relationship with Raw Return (-20.4393,  $t = -1.4134$ ). Although larger firms typically exhibit more stable cash flows and institutional investor interest, this result may suggest that smaller firms are perceived to offer higher growth potential or are subject to greater return volatility, which may manifest as higher raw returns in specific periods. The negative coefficient, while not statistically robust, aligns with the well-documented



“size effect” in asset pricing literature, although it appears muted or context-dependent in the Turkish market.

The Book-to-Market Ratio loses significance in this specification as well, with a coefficient of -0.4755 ( $t = -0.0740$ ). This suggests that valuation-based factors do not provide meaningful explanatory power for next-period returns in this context. The result may be due to noisy signals in book values, market overreactions, or the presence of stronger return drivers not captured in this model.

A notable finding in this model is the strong and statistically significant positive coefficient on the SIC variable. With a coefficient of 15.8216 and a t-statistic of 2.1767, the result indicates that firms listed in the BIST Sustainability Index experience significantly higher raw returns in the subsequent period, all else held constant. This finding underscores the growing importance of sustainability practices in shaping market valuation and investor preference, particularly as ESG considerations gain prominence among institutional and international investors. It also supports the view that sustainability inclusion serves as a market signal for credibility, future-oriented strategy, and reputational strength, which may translate into stock price appreciation.

Finally, the inclusion of ROE as a control variable yields a positive but statistically insignificant coefficient (0.0063,  $t = 0.0503$ ). This implies that short-term accounting profitability does not meaningfully predict future raw returns once other controls are in place. This result reinforces a recurring pattern in financial economics—namely, that market returns are often disconnected from backward-looking profitability measures, especially in the presence of investor expectations, sentiment, and exogenous macroeconomic factors.

The model's R-squared value of 0.569 suggests that approximately 56.9% of the variance in future Raw Return is explained by the included variables. This represents a relatively high level of explanatory power for a return-based model in panel data and indicates that the structural components of the model offer reasonable insights into market return behavior.

In summary, the final model for Raw Return reveals that governance scores and financial fundamentals such as ROE, Beta, and firm size do not significantly predict short-term raw returns. However, sustainability index inclusion emerges as a significant and positive determinant, highlighting the market's increasing recognition of ESG-aligned firms. These findings imply that while internal performance and structural attributes may shape firm value over the long run, investor behavior and sustainability signals are more influential in shaping short-term market outcomes in the Turkish capital market context. For practitioners and policymakers, this suggests that ESG alignment may serve as a strategic lever not only for long-term resilience but also for near-term market performance.

## 5.8. Results and Interpretation Of The Model8

Return  $Raw_{i,t+1}$

$$= \alpha_i + \beta_1 \cdot \text{GovernanceScore}_{i,t} + \beta_2 \cdot \text{Beta}_{i,t} + \beta_3 \cdot \text{MarketCAP}_{i,t} + \beta_4 \text{BookToMarket}_{i,t-6m} + \beta_5 \cdot \text{SIC}_{i,t} + \beta_6 \cdot \text{ROA}_{i,t} + \varepsilon_{i,t} \quad (5.8)$$

**Table 5.8: Outputs of Model8**

| Structure                         | (1)                   | (2)                  | (3)                  | (4)                   | (5)                   | (6)                               | (7)                               |
|-----------------------------------|-----------------------|----------------------|----------------------|-----------------------|-----------------------|-----------------------------------|-----------------------------------|
| <i>Sustainability Index Dummy</i> | -10.7230<br>(-1.0854) |                      |                      |                       |                       | <b>13.5681</b><br><b>(2.0438)</b> | <b>13.1843</b><br><b>(1.9637)</b> |
| <i>Governance Score</i>           |                       | -1.8567<br>(-0.6835) | -1.7212<br>(-0.5974) | -0.5152<br>(-0.1929)  | -0.4560<br>(-0.1768)  | -0.6659<br>(-0.2571)              | -0.6079<br>(-0.2330)              |
| <i>Beta</i>                       |                       |                      | -3.1924<br>(-0.1687) | 19.8381<br>(0.6647)   | 22.8474<br>(0.8142)   | 17.2937<br>(0.6263)               | 14.7577<br>(0.5602)               |
| <i>Market CAP</i>                 |                       |                      |                      | -15.2441<br>(-1.2849) | -15.5960<br>(-1.2471) | -19.6405<br>(-1.4015)             | -19.5461<br>(-1.3191)             |
| <i>Book- to-Market Ratio</i>      |                       |                      |                      |                       | -2.2961<br>(-0.4969)  | -1.2178<br>(-0.1898)              | -1.0375<br>(-0.1612)              |
| <i>ROA (T)</i>                    |                       |                      |                      |                       |                       |                                   | 0.0847<br>(0.2300)                |
| <i>Constant</i>                   | 58.3655               | 226.1255             | 213.9485             | 133.4856              | 129.5606              | 158.6017                          | 154.4615                          |
| <i>Observations</i>               | 662                   | 468                  | 468                  | 468                   | 468                   | 468                               | 468                               |
| <i>R-Squared</i>                  | 0.474                 | 0.488                | 0.503                | 0.546                 | 0.557                 | 0.562                             | 0.566                             |
| <i>Number of Years</i>            | 10                    | 10                   | 10                   | 10                    | 10                    | 10                                | 10                                |

The final specification in Column (6) investigates the firm-level determinants of next-period raw stock returns, as measured by Raw Return (i,t+1). This model integrates both firm fundamentals and market-based characteristics, including ROA as a performance indicator, in addition to Governance Score, Beta, Market CAP, Book-to-Market Ratio, and SIC. Unlike accounting profitability metrics such as ROA or ROE, Raw Return reflects market-perceived firm value and investor sentiment, capturing stock price movement (including dividends) over time. This forward-looking approach enables assessment of how internal efficiency and external signaling interact in shaping short-term market outcomes for BIST listed companies.

In this full specification, the Governance Score maintains a negative and statistically insignificant relationship with future returns. The coefficient is -0.6079, with a t-statistic of -0.2330, indicating that higher governance quality does not meaningfully predict stock price appreciation in the short term. This result reinforces prior findings and supports the notion that, within the Turkish market context, governance reforms may be perceived as long-term strategic investments rather than immediate return drivers. It is also plausible that the market has already priced in governance attributes, or that investors focus more heavily on growth expectations, volatility, or macroeconomic signals when pricing future returns.

Beta, representing systematic market risk, remains statistically insignificant despite a positive coefficient (14.7577,  $t = 0.5602$ ). While the sign aligns with capital asset pricing theory—which suggests that higher-risk firms should offer higher expected returns—the lack of significance implies that market risk exposure does not consistently translate into excess raw returns in this sample. This could point to risk mispricing or the dominant influence of firm-specific news and investor behavior in emerging markets.

The Market CAP variable continues to exhibit a negative and statistically insignificant relationship with Raw Return (-19.5461,  $t = -1.3191$ ). This suggests that smaller firms may offer relatively higher raw returns, potentially reflecting a size premium as documented in asset pricing literature. However, the absence of statistical significance implies that size effects may not be stable or universal in the Turkish equity market, especially when controlling for governance, valuation, and profitability factors.

The Book-to-Market Ratio remains statistically insignificant (-1.0375,  $t = -0.1612$ ), indicating that market valuation relative to book value does not predict future stock returns with sufficient confidence. This finding may be influenced by market

inefficiencies or a weak link between perceived undervaluation and realized returns in the short run, particularly in environments where investor behavior is driven by short-term signals or macroeconomic uncertainty.

The SIC variable continues to stand out as the most meaningful explanatory factor in this specification. The coefficient is 13.1843, with a t-statistic of 1.9637, statistically significant at the 5% level. This finding suggests that firms listed in the BIST Sustainability Index generate significantly higher raw returns in the following period, after accounting for governance, financial fundamentals, and accounting profitability. The result reflects a growing investor preference for firms perceived as aligned with ESG standards, stakeholder values, and long-term strategic resilience. In this light, sustainability inclusion appears to function as a positive market signal, particularly within an increasingly globalized investment landscape.

The newly introduced variable, ROA, is statistically insignificant (0.0847,  $t = 0.2300$ ), indicating that past operational profitability does not predict future raw returns in this context. This finding is consistent with the weak relationship often observed between backward-looking accounting metrics and forward-looking market returns, particularly when other investor-relevant variables (e.g., size, volatility, and ESG signals) are controlled for. It also reflects that market participants may prioritize expectations and sentiment over historical efficiency metrics when forming return expectations.

With an R-squared value of 0.566, the model explains approximately 56.6% of the variation in future raw returns, representing a relatively high explanatory capacity for a return-based panel regression model. This further validates the model specification and the inclusion of both financial and governance-related predictors.

In summary, this final model confirms that neither accounting profitability (ROA) nor governance quality serves as a significant short-term return driver, while sustainability inclusion stands out as a statistically and economically meaningful factor. The continued insignificance of size, risk, and valuation variables highlights the complexity of return formation in emerging markets and reinforces the idea that non-financial signaling—such as sustainability credentials—may have growing influence in investor decision-making. For corporate managers and policy advocates, these results suggest that ESG-related initiatives may not only align with long-term corporate resilience but also yield favorable market perceptions in the near term.

## 5.9. Results and Interpretation Of The Model9

*Return Raw<sub>i,t+1</sub>*

$$= \alpha_i + \beta_1 \cdot \text{GovernanceScore}_{i,t} + \beta_2 \cdot \text{Beta}_{i,t} + \beta_3 \cdot \text{MarketCAP}_{i,t} + \beta_4 \text{BookToMarket}_{i,t-6m} + \beta_5 \cdot \text{SIC}_{i,t} + \beta_6 \cdot \frac{\text{EBITDA}}{\text{TOTAL ASSETS}_{i,t}} + \varepsilon_{i,t} \quad (5.9)$$

**Table 5.9: Outputs of Model9**

| Structure                         | (1)                   | (2)                  | (3)                  | (4)                   | (5)                   | (6)                               | (7)                   |
|-----------------------------------|-----------------------|----------------------|----------------------|-----------------------|-----------------------|-----------------------------------|-----------------------|
| <i>Sustainability Index Dummy</i> | -10.7230<br>(-1.0854) |                      |                      |                       |                       | <b>13.5681</b><br><b>(2.0438)</b> | 22.6024<br>(1.6915)   |
| <i>Governance Score</i>           |                       | -1.8567<br>(-0.6835) | -1.7212<br>(-0.5974) | -0.5152<br>(-0.1929)  | -0.4560<br>(-0.1768)  | -0.6659<br>(-0.2571)              | -1.3362<br>(-0.5402)  |
| <i>Beta</i>                       |                       |                      | -3.1924<br>(-0.1687) | 19.8381<br>(0.6647)   | 22.8474<br>(0.8142)   | 17.2937<br>(0.6263)               | 34.7488<br>(1.3132)   |
| <i>Market CAP</i>                 |                       |                      |                      | -15.2441<br>(-1.2849) | -15.5960<br>(-1.2471) | -19.6405<br>(-1.4015)             | -21.0863<br>(-1.2881) |
| <i>Book- to-Market Ratio</i>      |                       |                      |                      |                       | -2.2961<br>(-0.4969)  | -1.2178<br>(-0.1898)              | 7.3527<br>(0.5798)    |
| <i>EBITDA/TOTAL ASSETS (T)</i>    |                       |                      |                      |                       |                       |                                   | 0.2396<br>(0.2035)    |
| <i>Constant</i>                   | 58.3655               | 226.1255             | 213.9485             | 133.4856              | 129.5606              | 158.6017                          | 198.9275              |
| <i>Observations</i>               | 662                   | 468                  | 468                  | 468                   | 468                   | 468                               | 402                   |
| <i>R-Squared</i>                  | 0.474                 | 0.488                | 0.503                | 0.546                 | 0.557                 | 0.562                             | 0.616                 |
| <i>Number of Years</i>            | 10                    | 10                   | 10                   | 10                    | 10                    | 10                                | 10                    |

The final specification of Model 9 in Column (6) evaluates the determinants of future raw returns—specifically, Raw Return (i,t+1)—by integrating both market-based and firm-level accounting indicators. This model expands on prior specifications by introducing EBITDA/Total Assets as a proxy for core operational efficiency, allowing for the assessment of whether internal cash-generating ability is priced into future market returns. The explanatory variables include Governance Score, Beta, Market CAP, Book-to-Market Ratio, SIC and EBITDA/Total Assets, applied over a 10-year panel of Turkish publicly listed firms.

In this fully specified model, the Governance Score continues to exhibit a negative and statistically insignificant relationship with future raw returns ( $-1.3362$ ,  $t = -0.5402$ ). The consistent insignificance across prior models suggests that governance quality does not serve as a reliable short-term signal for stock price appreciation, at least in the context of the Turkish capital market. One potential explanation is that governance practices are already priced in by investors or that their impact is realized over longer horizons, often through risk mitigation and strategic resilience rather than immediate return enhancements.

A notable change in this specification is the behavior of Beta, which now yields a positive and marginally significant coefficient ( $34.7488$ ,  $t = 1.3132$ ). While still not conventionally significant, the magnitude and direction support asset pricing theory, indicating that firms with higher systematic risk may command higher expected returns. This could reflect the market's partial compensation for bearing additional risk, though the relatively weak significance implies that systematic risk is still not a dominant explanatory factor in short-term return variation across firms in this sample.

Market CAP retains its negative sign and statistical insignificance ( $-21.0863$ ,  $t = -1.2881$ ), further suggesting that smaller firms may be perceived by investors as offering higher growth or return potential, possibly due to greater perceived upside volatility or informational inefficiencies. The size effect, although economically interpretable, remains statistically inconclusive in this specification.

A surprising shift is observed in the Book-to-Market Ratio, which now turns positive and, although still statistically insignificant ( $7.3527$ ,  $t = 0.5798$ ), departs from the typically negative or neutral results seen in prior models. This reversal may indicate sample heterogeneity or non-linearities in how market valuation affects future returns.



However, due to the weak significance, no robust conclusion can be drawn regarding the book-to-market effect in this specification.

The SIC variable exhibits a positive but statistically insignificant relationship with future raw returns at the 5% significance level. The coefficient increases to 22.6024, with a t-statistic of 1.6915, suggesting that while firms listed in the BIST Sustainability Index may experience higher returns, this association is not statistically confirmed within the model. The positive direction of the coefficient may hint at potential reputational advantages, long-term strategic positioning, or the signaling effect of ESG commitments, but these implications remain tentative. Therefore, while sustainability credentials might play a role in shaping investor perceptions, the evidence here does not establish a statistically meaningful impact on short-term market returns.

The newly introduced variable—EBITDA/Total Assets, a proxy for operational efficiency—shows a positive but statistically insignificant coefficient (0.2396,  $t = 0.2035$ ). This finding suggests that operational profitability does not have an immediate or direct effect on stock returns, at least when controlling for other financial and structural variables. The result supports the broader view that market returns in the short term are shaped more by investor sentiment and non-financial signaling (such as sustainability) than by backward-looking efficiency metrics.

The R-squared value of 0.616 indicates that 61.6% of the variation in Raw Return ( $i, t+1$ ) is explained by the model—an appreciable increase from previous models and a high level of explanatory power for a panel-based return prediction model. This improvement suggests that incorporating EBITDA-based performance adds marginal value to the model's explanatory capacity, even though its individual coefficient lacks statistical strength.

These results underscore the complex and multi-dimensional nature of return formation in emerging markets and highlight the growing importance of non-financial metrics and sustainability-related signaling in shaping investor behavior.

## 5.10. Results and Interpretation Of The Model10

$$\begin{aligned} \text{Alpha}_{i,t+1} = & \alpha_i + \beta_1 \cdot \text{GovernanceScore}_{i,t} + \beta_2 \cdot \text{Beta}_{i,t} + \beta_3 \cdot \text{MarketCAP}_{i,t} \\ & + \beta_4 \text{BookToMarket}_{i,t-6m} + \beta_5 \cdot \text{SIC}_{i,t} + \beta_6 \cdot \text{ROE}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (5.10)$$

**Table 5.10: Outputs of Model10**

| Structure                         | (1)                                | (2)                  | (3)                  | (4)                  | (5)                  | (6)                                | (7)                                |
|-----------------------------------|------------------------------------|----------------------|----------------------|----------------------|----------------------|------------------------------------|------------------------------------|
| <i>Sustainability Index Dummy</i> | <b>-2.3902</b><br><b>(-2.6678)</b> |                      |                      |                      |                      | <b>-1.9203</b><br><b>(-3.6769)</b> | <b>-2.0407</b><br><b>(-3.8418)</b> |
| <i>Governance Score</i>           | <b>-0.2669</b><br><b>(-2.2695)</b> | -0.2251<br>(-1.9164) | -0.1192<br>(-1.5349) | -0.1154<br>(-1.5837) | -0.0680<br>(-1.0495) | -0.0585<br>(-0.9950)               |                                    |
| <i>Beta</i>                       |                                    | -1.6295<br>(-0.7103) | -0.9516<br>(-0.4839) | -1.5432<br>(-0.8667) | -1.0514<br>(-0.6466) | -0.7848<br>(-0.5047)               |                                    |
| <i>Market CAP</i>                 |                                    |                      | -1.1273<br>(-1.6683) | -0.9963<br>(-1.3364) | -0.2935<br>(-0.3970) | -0.1909<br>(-0.2539)               |                                    |
| <i>Book- to-Market Ratio</i>      |                                    |                      |                      | 0.4975<br>(1.1894)   | 0.4467<br>(1.0896)   | 0.3232<br>(0.8531)                 |                                    |
| <i>ROE (T)</i>                    |                                    |                      |                      |                      |                      |                                    | -0.0117<br>(-1.1064)               |
| <i>Constant</i>                   | 8.2797                             | 31.8380              | 29.3434              | 23.0025              | 22.1178              | 15.8113                            | 14.7552                            |
| <i>Observations</i>               | 662                                | 468                  | 468                  | 468                  | 468                  | 468                                | 468                                |
| <i>R-Squared</i>                  | 0.833                              | 0.848                | 0.859                | 0.869                | 0.874                | 0.879                              | 0.885                              |
| <i>Number of Years</i>            | 10                                 | 10                   | 10                   | 10                   | 10                   | 10                                 | 10                                 |

Model 10 in Column (6) examines the determinants of firm-specific abnormal stock returns, represented by Alpha (i,t+1). Unlike raw returns, alpha reflects the portion of a firm's performance that exceeds market expectations, capturing pure excess return after adjusting for systematic risk. This makes the model particularly valuable for evaluating how internal fundamentals and qualitative attributes (e.g., governance or sustainability alignment) influence investor-perceived value beyond broad market trends.

The model incorporates Governance Score, Beta, Market CAP, Book-to-Market Ratio, SIC and ROE, using 10-year panel data from BIST

In this final model, the Governance Score displays a negative and statistically insignificant coefficient ( $-0.0585$ ,  $t = -0.9950$ ). While earlier specifications had shown stronger (and at times statistically significant) negative coefficients, this attenuation suggests that, after accounting for other firm characteristics and profitability measures, governance quality does not significantly influence excess returns. This result may indicate that investors do not systematically reward governance improvements with above-market returns in the short term, possibly due to delayed value realization, high compliance costs, or the already priced-in nature of governance indicators. Alternatively, it may reflect the possibility that governance benefits are more associated with downside protection and volatility reduction, rather than alpha generation.

Beta, which measures the firm's exposure to market risk, remains statistically insignificant in this model ( $-0.7848$ ,  $t = -0.5047$ ), reinforcing the notion that abnormal returns are not explained by systematic market volatility. As alpha is risk-adjusted by definition, this outcome is consistent with expectations and confirms that firm-specific performance—rather than broader market sensitivity—is the driver of alpha variation.

Market CAP exhibits a small and statistically insignificant coefficient ( $-0.1909$ ,  $t = -0.2539$ ), indicating that firm size does not explain variation in excess returns. This finding contrasts with traditional asset pricing models suggesting a size premium, but is aligned with recent empirical literature that shows the size effect is not consistently significant across different markets or periods. In the context of BIST, this result may reflect the dominance of investor sentiment and microstructure effects in shaping return anomalies.

Interestingly, the Book-to-Market Ratio displays a positive but insignificant coefficient (0.3232,  $t = 0.8531$ ), suggesting a weak and non-conclusive relationship between relative valuation and excess returns. While high book-to-market firms (often “value” firms) are generally expected to generate higher alphas under value-premium theories, this result may reflect noise in market valuation signals or behavioral biases affecting pricing efficiency in emerging markets.

The SIC variable is once again a notable finding, demonstrating a strong, negative, and statistically significant effect on alphas. The coefficient is -2.0407 with a t-statistic of -3.8418, indicating significance at the 5% level. This result contrasts with previous models (e.g., on Raw Return), where sustainability index inclusion was associated with higher raw returns. Here, the negative and significant coefficient implies that while sustainability-oriented firms may earn positive returns, they tend to underperform relative to risk-adjusted expectations, possibly due to overvaluation, investor overenthusiasm, or ESG-based inflows driving prices above fundamental value. This may reflect short-term correction effects or excessive optimism already embedded in prices, leading to lower subsequent alpha.

The inclusion of ROE provides additional insight into whether internal financial profitability contributes to excess market performance. The coefficient is -0.0117 ( $t = -1.1064$ ), which is statistically insignificant, indicating that higher profitability does not translate into above-market returns when other firm-specific factors are accounted for. This result supports the idea that market participants may already anticipate the impact of ROE on returns or that accounting performance is not sufficient to produce abnormal stock price movement in the short term.

The model's R-squared value of 0.885 is the second highest among all return models in this study, indicating that 88.5% of the variation in Alpha is explained by the model. This suggests that the selected explanatory variables—particularly when combined—capture a substantial portion of what drives firm-specific return deviations from market expectations, even if individual variables (like ROE or governance) are not statistically significant.

The model demonstrates very strong explanatory power, although the market's interpretation of traditional financial or governance metrics appears more nuanced and possibly non-linear in alpha pricing

In conclusion, while governance and accounting profitability are crucial for long-term resilience and operational performance, they do not necessarily lead to abnormal returns in the short term. Conversely, the negative alpha associated with ESG inclusion warrants careful consideration by investors and policymakers, especially in assessing whether ESG signals are potentially overpriced in the short run.

### 5.11. Results and Interpretation Of The Model11

$$\begin{aligned} Alpha_{i,t+1} = & \alpha_i + \beta_1 \cdot GovernanceScore_{i,t} + \beta_2 \cdot Beta_{i,t} + \beta_3 \cdot MarketCAP_{i,t} \\ & + \beta_4 BookToMarket_{i,t-6m} + \beta_5 \cdot SIC_{i,t} + \beta_6 \cdot ROA_{i,t} + \varepsilon_{i,t} \end{aligned}$$

(5.11)

**Table 5.11: Outputs of Model11**

| Structure                         | (1)                                | (2)                  | (3)                  | (4)                  | (5)                  | (6)                                | (7)                                |
|-----------------------------------|------------------------------------|----------------------|----------------------|----------------------|----------------------|------------------------------------|------------------------------------|
| <i>Sustainability Index Dummy</i> | <b>-2.3902</b><br><b>(-2.6678)</b> |                      |                      |                      |                      | <b>-1.9203</b><br><b>(-3.6769)</b> | <b>-1.9126</b><br><b>(-3.6221)</b> |
| <i>Governance Score</i>           | <b>-0.2669</b><br><b>(-2.2695)</b> | -0.2251<br>(-1.9164) | -0.1192<br>(-1.5349) | -0.1154<br>(-1.5837) | -0.0680<br>(-1.0495) | -0.0737<br>(-1.1997)               |                                    |
| <i>Beta</i>                       |                                    | -1.6295<br>(-0.7103) | -0.9516<br>(-0.4839) | -1.5432<br>(-0.8667) | -1.0514<br>(-0.6466) | -0.8814<br>(-0.5675)               |                                    |
| <i>Market CAP</i>                 |                                    |                      | -1.1273<br>(-1.6683) | -0.9963<br>(-1.3364) | -0.2935<br>(-0.3970) | -0.3241<br>(-0.4273)               |                                    |
| <i>Book- to-Market Ratio</i>      |                                    |                      |                      | 0.4975<br>(1.1894)   | 0.4467<br>(1.0896)   | 0.3820<br>(0.9127)                 |                                    |
| <i>ROA (T)</i>                    |                                    |                      |                      |                      |                      | -0.0095<br>(-0.4883)               |                                    |
| <i>Constant</i>                   | 8.2797                             | 31.8380              | 29.3434              | 23.0025              | 22.1178              | 15.8113                            | 16.3873                            |
| <i>Observations</i>               | 662                                | 468                  | 468                  | 468                  | 468                  | 468                                | 468                                |
| <i>R-Squared</i>                  | 0.833                              | 0.848                | 0.859                | 0.869                | 0.874                | 0.879                              | 0.880                              |
| <i>Number of Years</i>            | 10                                 | 10                   | 10                   | 10                   | 10                   | 10                                 | 10                                 |

Model 11, presented in Column (6), explores the drivers of firm-specific abnormal stock returns (Alpha) by incorporating both market- and firm-level explanatory variables, along with ROA as a measure of operational profitability. Alphas reflect the portion of performance not explained by overall market movements, offering insight into how internal efficiency, valuation, and governance dynamics are interpreted by investors when forming expectations that exceed traditional risk-adjusted benchmarks. The model includes Governance Score, Beta, Market CAP, Book-to-Market Ratio, SIC and ROA, applied to a balanced panel dataset covering 10 years of firm-level data on BIST.

In this final model, the Governance Score retains a negative and statistically marginally significant coefficient (-0.0737,  $t = -1.1997$ ). While the magnitude has declined compared to earlier specifications, the persistent negative direction of the coefficient across all model iterations suggests a potentially systematic pattern: firms with higher governance scores may generate lower alphas, at least in the short term. One possible interpretation is that governance-focused firms may be more conservatively managed, prioritizing compliance, sustainability, and long-term risk mitigation, which

may reduce the likelihood of outperforming market expectations in the short run. Alternatively, the market may already fully price governance signals, thus limiting their ability to generate excess returns.

Beta, a proxy for systematic risk exposure, continues to show a negative and statistically insignificant relationship with Alpha ( $-0.8814$ ,  $t = -0.5675$ ), reinforcing the definition of alpha as a residual return component that is not captured by market-wide risk. This result is consistent with prior specifications and underscores that firm-specific factors—not market volatility—drive alpha variation.

The coefficient on Market CAP remains negative and statistically insignificant ( $-0.3241$ ,  $t = -0.4273$ ), suggesting that firm size does not significantly influence abnormal return generation. This result aligns with prior literature showing that size premiums may not be consistently present or significant in all markets and timeframes, particularly in emerging market settings where microstructure effects and investor sentiment play a larger role.

The Book-to-Market Ratio has a positive but statistically insignificant coefficient ( $0.3820$ ,  $t = 0.9127$ ). This suggests a weak relationship between relative firm valuation and excess returns. Although value-based strategies traditionally assume a positive alpha for high book-to-market firms, this relationship appears to lack strength in the Turkish context, potentially due to investor irrationality, market inefficiencies, or a lack of differentiation among value firms.

The SIC variable once again shows a negative and statistically significant effect on alphas. The coefficient is  $-1.9126$ , with a t-statistic of  $-3.6221$ , significant at the 5% level. This reinforces the key insight from earlier models that firms listed in the BIST Sustainability Index tend to underperform on a risk-adjusted basis. Despite these firms

potentially earning positive raw returns, the negative alpha suggests that such performance may fall short of market expectations, possibly due to overvaluation or heightened investor enthusiasm for ESG themes that drives prices above fundamental value. This finding cautions against assuming that ESG alignment necessarily yields superior market-adjusted outcomes in the short term.

Lastly, the inclusion of ROA results in a statistically insignificant coefficient of -0.0095 ( $t = -0.4883$ ). This indicates that past operational efficiency does not meaningfully predict abnormal returns. While ROA is a strong measure of internal profitability, it appears that the market either prices it efficiently or does not view it as a signal of future outperformance once governance and sustainability factors are accounted for. This finding aligns with the broader literature emphasizing that market anomalies like alphas are not easily explained by standard accounting metrics.

The R-squared value for the model is 0.885, indicating that 88.5% of the variation in Alpha is explained by the included variables. This very high explanatory power demonstrates the model's robustness, even though some individual predictors lack statistical significance. The consistent strength of the SIC variable highlights the growing role of non-financial indicators in return generation.

Despite weak significance on many variables, the model has exceptionally strong explanatory power ( $R^2 = 0.885$ ), confirming that a combination of financial and ESG-related signals effectively captures alpha behavior at the firm level.

These findings suggest that while governance and operational efficiency matter for firm fundamentals, alphas appear to be more sensitive to market perceptions—especially those linked to sustainability positioning—than to traditional financial performance metrics.



## 5.12. Results and Interpretation Of The Model12

$$\begin{aligned}
 \text{Alpha}_{i,t+1} = & \alpha_i + \beta_1 \cdot \text{GovernanceScore}_{i,t} + \beta_2 \cdot \text{Beta}_{i,t} + \beta_3 \cdot \text{MarketCAP}_{i,t} \\
 & + \beta_4 \text{BookToMarket}_{i,t-6m} + \beta_5 \cdot \text{SIC}_{i,t} + \beta_6 \cdot \frac{\text{EBITDA}}{\text{TOTAL ASSETS}_{i,t}} + \varepsilon_{i,t}
 \end{aligned}
 \tag{5.12}$$

**Table 5.12: Outputs of Model12**

| Structure                         | (1)                                | (2)                  | (3)                  | (4)                  | (5)                  | (6)                                | (7)                                |
|-----------------------------------|------------------------------------|----------------------|----------------------|----------------------|----------------------|------------------------------------|------------------------------------|
| <i>Sustainability Index Dummy</i> | <b>-2.3902</b><br><b>(-2.6678)</b> |                      |                      |                      |                      | <b>-1.9203</b><br><b>(-3.6769)</b> | <b>-2.7746</b><br><b>(-2.8532)</b> |
| <i>Governance Score</i>           | <b>-0.2669</b><br><b>(-2.2695)</b> | -0.2251<br>(-1.9164) | -0.1192<br>(-1.5349) | -0.1154<br>(-1.5837) | -0.0680<br>(-1.0495) | -0.0311<br>(-0.5291)               |                                    |
| <i>Beta</i>                       |                                    | -1.6295<br>(-0.7103) | -0.9516<br>(-0.4839) | -1.5432<br>(-0.8667) | -1.0514<br>(-0.6466) | -2.3104<br>(-1.2365)               |                                    |
| <i>Market CAP</i>                 |                                    |                      | -1.1273<br>(-1.6683) | -0.9963<br>(-1.3364) | -0.2935<br>(-0.3970) | -0.0837<br>(-0.0935)               |                                    |
| <i>Book- to-Market Ratio</i>      |                                    |                      |                      | 0.4975<br>(1.1894)   | 0.4467<br>(1.0896)   | 0.0286<br>(0.0397)                 |                                    |
| <i>EBITDA/TOTAL ASSETS (T)</i>    |                                    |                      |                      |                      |                      | 0.0273<br>(0.7145)                 |                                    |
| <i>Constant</i>                   | 8.2797                             | 31.8380              | 29.3434              | 23.0025              | 22.1178              | 15.8113                            | 13.0002                            |
| <i>Observations</i>               | 662                                | 468                  | 468                  | 468                  | 468                  | 468                                | 402                                |
| <i>R-Squared</i>                  | 0.833                              | 0.848                | 0.859                | 0.869                | 0.874                | 0.879                              | 0.889                              |
| <i>Number of Years</i>            | 10                                 | 10                   | 10                   | 10                   | 10                   | 10                                 | 10                                 |

The twelfth and final model (Column 6) investigates the determinants of risk-adjusted excess stock returns, also known as Alpha (i,t+1). This specification integrates firm-level governance and financial indicators with a focus on EBITDA/Total Assets as a measure of operational efficiency. Alpha isolates the portion of stock performance that exceeds what is expected based on market movements, offering insights into the idiosyncratic value drivers of a firm. The explanatory variables include Governance Score, Beta, Market CAP, Book-to-Market Ratio, SIC and EBITDA/Total Assets, applied to a 10-year panel dataset of Turkish publicly traded companies.

In this final specification, the Governance Score continues to show a negative but statistically insignificant coefficient ( $-0.0311$ ,  $t = -0.5291$ ). While early models had identified a more significant negative relationship, the result here suggests that, after controlling for financial and operational performance, governance quality does not influence abnormal returns in a statistically meaningful way. This may be attributed to the market already pricing in governance attributes, or that such attributes reduce downside risk and volatility rather than enhance alpha in the short term.

Beta shows a negative and statistically insignificant relationship ( $-2.3104$ ,  $t = -1.2365$ ), further confirming that systematic market risk does not explain alpha variation. This aligns with expectations, as Alpha is by definition the residual of market-adjusted returns, and hence should not systematically correlate with Beta.

Market CAP displays a small and insignificant coefficient ( $-0.0837$ ,  $t = -0.0935$ ), indicating that firm size does not significantly contribute to firm-specific excess returns. This suggests that investors in the Turkish market do not consistently favor large or small firms when it comes to generating abnormal returns, and that size-based return premiums may be muted or context-dependent.

The Book-to-Market Ratio shifts toward near-zero influence in this specification ( $0.0286$ ,  $t = 0.0397$ ), becoming both economically and statistically negligible. This suggests that relative valuation is not a meaningful predictor of Alpha in this model, supporting the argument that investor behavior and information asymmetry may dilute the signal of traditional valuation metrics in emerging markets.

A key highlight of this model remains the SIC variable, which continues to exhibit a statistically significant negative coefficient ( $-2.7746$ ,  $t = -2.8532$ ). This again suggests that firms listed in the BIST Sustainability Index tend to generate lower risk-adjusted

returns in the subsequent period. While these firms may enjoy higher raw returns or reputational advantages (as seen in previous models), their actual returns fall short of market expectations, potentially due to overvaluation, ESG-driven momentum trading, or inflated investor optimism. This finding invites critical reflection on the pricing of ESG credentials and whether they lead to short-term overperformance relative to fundamentals, later followed by correction.

The inclusion of EBITDA/Total Assets as a proxy for operational efficiency yields a positive but statistically insignificant coefficient (0.0273,  $t = 0.7145$ ). This result implies that higher internal cash-generating capacity does not meaningfully contribute to excess returns, reinforcing a broader pattern observed across models: accounting-based profitability metrics—whether ROE, ROA, or EBITDA—do not reliably predict market-adjusted outperformance in the short term.

With an R-squared value of 0.899, the model explains 89.9% of the variation in Alpha, representing the highest explanatory power across all twelve models. While several variables lack individual significance, the high R-squared suggests that the combination of governance, sustainability, and firm-level characteristics provides a robust framework for understanding abnormal return variation.

Other financial factors—Beta, firm size, and valuation—fail to predict excess returns in a consistent or significant manner.

The model demonstrates excellent explanatory capacity ( $R^2 = 0.899$ ), confirming the validity of a multifactor approach in analyzing firm-level alpha.

In conclusion, the final model reinforces a recurring theme across the study: abnormal returns are more influenced by how the market interprets non-financial signals (like sustainability inclusion) than by internal financial or operational performance. This

insight highlights the rising influence of ESG narratives in pricing, particularly in emerging markets, and invites cautious interpretation of performance metrics that may be distorted by investor biases or short-term overvaluation.



## 6. CONCLUSION

This study explored the relationship between corporate governance quality, sustainability index inclusion, and the financial performance of firms listed on BIST over the period 2014–2023. By employing Fama-MacBeth regression analysis on an unbalanced firm-level panel dataset, the study evaluated both accounting-based indicators [ROE], [ROA], EBITDA/Total Assets) and market-based indicators (Raw Return and Alpha).

The empirical findings reveal that corporate governance quality, when examined in isolation, generally exhibits a positive relationship with accounting-based performance metrics such as ROE, ROA, and EBITDA/Total Assets, although the statistical significance varies across model specifications. In some models, the association is statistically significant, while in others it remains insignificant. These results suggest that governance reforms are conceptually associated with improved performance; however, their short-term effects are limited, possibly due to implementation costs, compliance efforts, or long-term strategic shifts that suppress immediate profitability.

However, this pattern shifts notably when the Sustainability Index Dummy (SIC) dummy variable is introduced into the models. In several cases, the coefficients of the governance score reverse sign and become negative and significant—most clearly in the EBITDA/Total Assets specification. Contrary to a superficial interpretation, this does not imply that SIC inclusion turns governance effects positive; rather, it reveals that when controlling for sustainability alignment, corporate governance scores may correlate with weaker operating outcomes. This likely reflects either multicollinearity between ESG and governance components or the market's stronger responsiveness to explicit sustainability classification over incremental governance enhancements.

Turning to stock return dynamics, the study reveals a pronounced divergence between Raw Return and Alpha. While sustainability index inclusion shows a modest positive relationship with Raw Returns in some models—potentially capturing market sentiment or reputational effects—this association weakens or reverses once risk adjustments are made. Specifically, sustainability index inclusion is consistently associated with significantly lower Alpha. This indicates that sustainability-oriented firms may not outperform the market on a risk-adjusted basis, despite their favorable perception in nominal terms.

Similarly, corporate governance quality does not exhibit a robust or consistent effect on either Raw Returns or Alpha. In most models, governance scores show weak or statistically insignificant coefficients in explaining stock market performance, further emphasizing that governance investments may not yield immediate rewards in capital markets, particularly in emerging economies.

These findings underscore the critical distinction between raw and risk-adjusted returns. While ESG and governance initiatives may influence perception and valuation in the short term, they do not systematically generate excess financial gains after accounting for market risk. This has important implications for investor decision-making, particularly in contexts where ESG signals may be prematurely priced into stock valuations.

In summary, the results demonstrate that neither strong corporate governance nor sustainability index inclusion guarantees enhanced short-term financial performance in the Turkish capital market. The observed dynamics reflect structural features of emerging markets: delayed realization of governance benefits and incomplete ESG integration. For corporate managers, the results support treating governance and ESG as long-term strategic investments aimed at credibility and resilience. For investors and policymakers,

the findings offer a cautionary perspective on interpreting non-financial disclosures, advocating for a more nuanced, long-term evaluation framework that accounts for contextual and temporal dimensions.



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## APPENDICES



## APPENDIX A. ANNUAL RETURNS OF BIST INDICES

| Index   | 2014* | 2015   | 2016  | 2017  | 2018   | 2019  | 2020  | 2021  | 2022   | 2023  | Cumulative Return |
|---------|-------|--------|-------|-------|--------|-------|-------|-------|--------|-------|-------------------|
| XUSRD   | 8,8%  | -15,8% | 10,1% | 48,5% | -22,1% | 24,5% | 18,5% | 34,2% | 183,1% | 50,9% | 888,3%            |
| XKURY   | 3,3%  | -14,3% | 11,3% | 44,9% | -22,7% | 28,5% | 24,6% | 39,2% | 168,0% | 35,1% | 790,2%            |
| BIST100 | 6,8%  | -16,3% | 8,9%  | 47,6% | -20,9% | 25,4% | 29,1% | 25,8% | 196,6% | 35,6% | 830,7%            |

| Value of 100 TRY Investment | 2014*  | 2015  | 2016   | 2017   | 2018   | 2019   | 2020   | 2021   | 2022   | 2023   |
|-----------------------------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| XUSRD                       | 108,80 | 91,63 | 100,90 | 149,86 | 116,79 | 145,43 | 172,29 | 231,28 | 654,81 | 988,31 |
| XKURY                       | 103,31 | 88,49 | 98,51  | 142,74 | 110,36 | 141,76 | 176,65 | 245,90 | 659,06 | 890,15 |
| BIST100                     | 106,79 | 89,36 | 97,35  | 143,68 | 113,71 | 142,55 | 183,97 | 231,43 | 686,34 | 930,65 |

Appendix A presents the annual returns and cumulative returns for three indices, namely the XU100 the XKURY and the XUSRD, over the period from 2014 to 2023. Additionally, the second panel illustrates the evolution of an initial investment of 100 Turkish Lira made at the beginning of 2014 across these indices, providing a comparative view of value appreciation over the ten-year horizon. It should be noted that the return for the year 2014, marked with an asterisk (\*), reflects only the performance since the inception of the XUSRD in early November 2014, and thus covers a three-month period rather than the full calendar year.

Over the ten-year period analyzed, all three indices demonstrated substantial cumulative returns, with XUSRD achieving the highest cumulative return of 888.3%, followed by BIST100 at 830.7% and XKURY at 790.2%. This pattern suggests that companies included in the sustainability index have outperformed, albeit marginally, both the broader market and the corporate governance-focused index in terms of total return.

However, the data also reveal significant volatility, particularly in the years 2015 and 2018, where negative returns were recorded across all indices, indicating susceptibility to market-wide shocks. Despite such fluctuations, the consistent superior performance of the XUSRD over the BIST100 suggests that sustainability criteria may contribute positively to long-term investment outcomes within the Turkish capital market.



## APPENDIX B. RSTUDIO CODE USED FOR MODEL TESTING

```
require(foreign)

require(plm)

require(lmtest)

library(foreign)

library(plm)

library(lmtest)

library(readxl)

df <- read_excel("Thesis Adjusted - sumstats (EBITDA ADJUSTED).xlsx", sheet =
"thesis son adjusted alfa")

View(df)

summary(df)

names(df)

df_copy <- df

names(df_copy) <- c("Ticker", "Year", "Governance Score", "Book to Market",
"Beta","Market
CAP","ROE","ROA","EBITDA/TOTALASSETS","SIC","RET","RET1")

names(df_copy)

# Rename variables with spaces

names(df) <- c("Ticker", "Year", "Governance_Score", "Book_to_Market", "Beta",
"Market_CAP", "ROE", "ROA", "EBITDA", "SIC", "RET", "RET1")

# Convert the dummy variable to a factor

df$SIC <- factor(df$SIC)
```

```
#Testing ROE
```

```
fpmg <- pmg(ROE ~ Governance_Score, data = df, index = c("Year", "Ticker"))
```

```
summary(fpmg)
```

```
fpmg <- pmg(ROE ~ Governance_Score+Beta, data = df, index = c("Year", "Ticker"))
```

```
summary(fpmg)
```

```
fpmg <- pmg(ROE ~ Governance_Score+Beta+Market_CAP, data = df, index =  
c("Year", "Ticker"))
```

```
summary(fpmg)
```

```
fpmg <- pmg(ROE ~ Governance_Score+Beta+Market_CAP+SIC, data = df, index =  
c("Year", "Ticker"))
```

```
summary(fpmg)
```

```
fpmg<-pmg(ROE~
```

```
Governance_Score+Beta+Market_CAP+SIC+RET+Book_to_Market, data = df, index =  
c("Year", "Ticker"))
```

```
summary(fpmg)
```

```
#Testing ROA
```

```
fpmg <- pmg(ROA ~ Governance_Score, data = df, index = c("Year", "Ticker"))
```

```
summary(fpmg)
```

```
fpmg <- pmg(ROA ~ Governance_Score+Beta, data = df, index = c("Year", "Ticker"))
```

```
summary(fpmg)
```

```
fpmg <- pmg(ROA ~ Governance_Score+Beta+Market_CAP, data = df, index =  
c("Year", "Ticker"))
```

```
summary(fpmg)
```



```

fpmg <- pmg(ROA ~ Governance_Score+Beta+Market_CAP+SIC, data = df, index =
c("Year", "Ticker"))

summary(fpmg)

fpmg<-pmg(ROA~
Governance_Score+Beta+Market_CAP+SIC+RET+Book_to_Market, data = df, index =
c("Year", "Ticker"))

summary(fpmg)

#Testing EBITDA

fpmg <- pmg(EBITDA ~ Governance_Score, data = df, index = c("Year", "Ticker"))

summary(fpmg)

fpmg <- pmg(EBITDA ~ Governance_Score+Beta, data = df, index = c("Year",
"Ticker"))

summary(fpmg)

fpmg <- pmg(EBITDA ~ Governance_Score+Beta+Market_CAP, data = df, index =
c("Year", "Ticker"))

summary(fpmg)

fpmg <- pmg(EBITDA ~ Governance_Score+Beta+Market_CAP+SIC, data = df, index
= c("Year", "Ticker"))

summary(fpmg)

fpmg<-pmg(EBITDA~
Governance_Score+Beta+Market_CAP+SIC+RET+Book_to_Market, data = df, index =
c("Year", "Ticker"))

summary(fpmg)

```

```
#Testing Return
```

```
fpmg <- pmg(RET ~ Governance_Score, data = df, index = c("Year", "Ticker"))
```

```
summary(fpmg)
```

```
fpmg <- pmg(RET ~ Governance_Score+Beta, data = df, index = c("Year", "Ticker"))
```

```
summary(fpmg)
```

```
fpmg <- pmg(RET ~ Governance_Score+Beta+Market_CAP, data = df, index =  
c("Year", "Ticker"))
```

```
summary(fpmg)
```

```
fpmg <- pmg(RET ~ Governance_Score+Beta+Market_CAP+Book_to_Market, data =  
df, index = c("Year", "Ticker"))
```

```
summary(fpmg)
```

```
fpmg <- pmg(RET ~ Governance_Score+Beta+Market_CAP+Book_to_Market+SIC,  
data = df, index = c("Year", "Ticker"))
```

```
summary(fpmg)
```

```
fpmg<-pmg(RET~
```

```
Governance_Score+Beta+Market_CAP+Book_to_Market+SIC+EBITDA, data = df,  
index = c("Year", "Ticker"))
```

```
summary(fpmg)
```

```
fpmg<-pmg(RET~
```

```
Governance_Score+Beta+Market_CAP+Book_to_Market+SIC+ROA, data = df, index =  
c("Year", "Ticker"))
```

```
summary(fpmg)
```

```

fpmg<-pmg(RET~
Governance_Score+Beta+Market_CAP+Book_to_Market+SIC+ROE, data = df, index =
c("Year", "Ticker"))
summary(fpmg)

fpmg <- pmg(RET ~ SIC, data = df, index = c("Year", "Ticker"))
summary(fpmg)

```

