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BALANCING PROFITABILITY AND GOVERNANCE: AN AGENCY THEORY APPROACH TO ROE AND KEY CORPORATE VARIABLES

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Abstract

The study examines how important business characteristics affect Return on Equity (ROE) in China's automotive sector. It explores how financial leverage, business age, R&D intensity, environmental, social, and governance (ESG) practices, and total assets affect long-term profitability. This study takes a multi-theoretical approach, using agency theory, stakeholder theory, resource-based view, trade-off theory, and organizational life cycle theory to empirically analyze these variables' influence on ROE. The study focuses on a specific group of Chinese manufacturers and attempts to provide significant insights that help improve financial performance while aligning with long-term environmental goals. Focusing on a sample of Chinese businesses, the study aims to offer insightful information for enhancing financial performance while supporting long-term sustainability goals. Emphasizing the critical balance that needs to be struck, the findings provide investors, legislators, and corporate executives with vital counsel. In the end, our study helps the Chinese car sector respond to changing corporate sustainability norms by making well-informed decisions that improve resilience and encourage value development.

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KEYWORDS: Return on Equity (ROE), Environmental, Social, and Governance (ESG), Financial leverage, Chinese automotive industry, corporate sustainability, Profitability

1. INTRODUCTION

In light of the ways that factors like Environmental, Social, and Governance (ESG) ratings, financial leverage, the firm's age, research and development (R&D) activities, and total assets have changed over the past few decades and their impact on profitability and long-term value, return on equity (ROE) is emphasized as a crucial indicator of financial performance. To increase ROE and maintain operational resilience in a changing market environment, organizations must carefully manage these factors. ESG has become an increasingly important indicator for measuring a company's non-financial risks, which have a direct impact on financial outcomes such as ROE. ESG risk, particularly in the greater threshold of sustainable growth, can have a detrimental influence on financial performance by introducing obligations and reputational issues that eventually limit profitability (Teng Weng et al.2021).

Financial leverage is usually considered to enhance returns through debt; yet, excessive leverage may contribute to financial instability. Excessive debt can have a negative impact on corporate performance since the expenses might exceed the tax benefits. They recommend that organizations in both established and emerging economies use vigilant leveraging policies to maintain ROE, especially in unstable market conditions.(Kijkasiwat,et al.2022) Along with it, Firm age shows an organization's experience and stability, both of which can influence ROE. Older companies typically have stronger client relationships, established operational efficiencies, and developed processes, which can boost ROE. However, studies show that as organizations age, they are more likely to experience administrative rigidity and slower innovation, potentially lowering ROE. This is especially important in businesses undergoing rapid technological developments since adaptability usually

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correlates with profitability. (Bhagat & Bolton, 2009) Organizations that actively manage ESG risks are better positioned to achieve sustained growth and higher ROE by aligning with investor expectations for sustainable practices.(Teng et al., 2021).

Recent studies show that R&D is frequently associated with higher ROE because of its role in driving innovation and competitive advantage. Firms that spend on R&D tend to obtain greater long-term ROE by offering different products and services that attract and retain customers. (Teng et al., 2021). R&D investments are particularly valuable when combined with ESG practices since this dual approach promotes resilience and mitigates risks connected with both environmental and market variables(Teng et al., 2021). Besides that, the most important factor of an organization discovered that larger asset bases increase ROE when assets are used efficiently, adding to productivity improvements and competitive advantage. However, a rise in assets does not always result in a direct correlation with ROE. Poor asset usage, unsustainable expansion, or poor acquisitions can all affect ROE since idle assets increase costs without increasing income. Effective asset management and deliberate investing in productive assets are critical to ensure assets positively impact ROE. (Kijkasiwat et al., 2022)

Each of these variables, when effectively adjusted, can have an overall beneficial impact on ROE. Firms may sustainably improve their competitive position and ROE by managing ESG alongside financial leverage and asset usage, as well as promoting innovation through R&D.

1.1 Researsch Problem

In global business, profitability is no longer just a number. It is a balance between financial returns and sustainable impact. The expectation of stakeholders, not only on performance but also on purpose made Return on Equity (ROE) a vital part of evaluating a firm's profitability, particularly as investors increasingly prioritize Environmental, Social, and Governance (ESG) factors. Likewise, In 2022, 71% of investors highlighted ESG as critical, with

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ESG-focused companies achieving a 2.8% ROE premium. (Fatemi, Fooladi, et al. 2015). Aligning ESG practices with financial leverage, firm age, and R&D investment is challenging in China's automotive sector, where firms must balance high ESG compliance costs and rapid technological shifts to achieve efficient productivity challenges, as younger firms face difficulty in investing in ESG. In comparison, older firms might struggle with legacy systems switching to electric vehicles, cutting carbon emissions.

1.2 Research Objectives

- To evaluate the impact of ESG standards, financial leverage, and R&D intensity on ROE in China's automotive industry, particularly under changing legislative and market conditions.
- To determine the extent to which variations in ESG standards, financial leverage and R&D intensity influence ROE trends across firm profiles in China automotive industry.

2. LITERATURE REVIEW

The literature review investigates the complex relationship between important determinants and returns on equity (ROE), with a particular emphasis on environmental, social, and governance (ESG) concerns, financial leverage, business age, research and development (R&D), and total assets. Research conducted from the early 2000s to recent years has gradually exposed how each element affects financial performance, with a focus on ROE as a crucial profitability statistic.

According to the study, companies with strong ESG frameworks performed better than their competitors because they had lower agency costs and more investor confidence, which improved their overall financial performance. According to the survey, organizations with strong ESG frameworks outperformed their counterparts due to lower agency costs and more investor trust, which boosted overall financial performance (Jo & Harjoto, 2011). Afterward, meta-analyses revealed that well-managed ESG

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regulations help stagnant capital expenditures, which raises ROE and attracts socially conscious investors.(Friede, et al. 2015). More recent studies underline that ESG's significance extends beyond risk management to provide financial resilience and predictable revenue flows, particularly as global legal frameworks increasingly value sustainability(Weston & Nnadi, 2023). This argues that organizations should prioritize internal finances above external loans to decrease risk. While moderate leverage has been demonstrated to boost ROE by increasing capital efficiency, excessive debt burdens companies with high-interest expenses, reducing profitability (Fama & French, 2002). Later research investigated how leverage dynamics fluctuate across market conditions(M. Abadi et al., 2016). Current research shows that structured corporate governance in older enterprises enhances resilience and stakeholder trust, boosting ROE despite the natural hurdles associated with aging firms(Bui & Krajcsák, 2023). Persistent R&D plans contribute to long-term ROE growth by enabling companies to innovate and respond effectively to market changes(Vanderpal, 2015).

2.1 Supported Theories

2.1.1 Agency Theory

The agency theory supports the variable Return of Equity which is the dependent variable of this research paper. Return on Equity (ROE) measures a company's profitability by indicating how well it leverages shareholder equity to generate profit. High ROE frequently suggests efficient equity utilization and substantial shareholder value creation.(Calamar, 2016).

The concept of **agency cost** was formally proposed by **Michael C. Jensen** and **William H. Meckling** in their 1976(Jensen & Meckling, 2019).The background of the theory examines the principal-agent interaction between shareholders (principals) and management (agents). According to Agency Theory, managers may not always operate in the best interests of shareholders, particularly when their goals differ.

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The theoretical implication suggests that Effective governance systems, including performance-based compensation, monitoring, and transparent reporting, reduce agency conflicts by encouraging managers to prioritize shareholder wealth. This alignment lowers agency expenses and increases operational efficiency, resulting in improved ROE.

ROE indicates a firm's efficiency in producing returns, Agency Theory's emphasis on aligning managers' interests with shareholders ensures that decisions are taken to maximize profitability.

2.1.2 Stakeholder Theory

The stakeholder theory supports the variable ESG which is the independent variable of this research paper. ESG measures a company's commitment to sustainable practices that go beyond financial indicators, such as environmental preservation, social responsibility, and governance structure. The background of the theory suggests that Stakeholder theory is based on organizational management and corporate ethics, which were largely created by R. Edward Freeman in his 1984 book.(Freeman, 2010). According to theory, corporations have responsibilities to stakeholders other than shareholders, like as investors, employees, customers, and the environment. It emphasizes that prioritizing ESG standards helps firms manage not just financial, but also reputational and operational risks.(Freeman, 2010).

The key implications are that ESG is increasingly viewed as a risk management tool that corresponds with stakeholder interests, resulting in higher ROE through increased brand equity, risk mitigation, and long-term stabilities strategies that address both financial and non-financia concerns, boosting ROE by increasing investor trust and customer loyalty.(Clark, et al. 2015). ESG practices address both financial and non-financial concerns, boosting ROE by increasing investor trust and customer loyalty.

2.1.3 Resource-Based View Theory

This theory supports the independent variables of this research paper: total assets and R&D investments. Total assets are the total worth of a company's

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assets, both current and fixed. Asset efficiency has a direct impact on productivity and return on equity. Spending on R&D reflects a company's focus on innovation, competitive advantage, and product differentiation, which often leads to profitability gains.

The background of the theory suggests that it was developed primarily by Jay Barney, and offers a strategic management Approach that emphasizes a company's internal resources and capabilities as sources of long-term competitive advantage. This theory argues that organizations have different bundles of resources and competencies that, when valuable, rare, inimitable, and non-substitutable (VRIN criteria), provide a sustainable competitive advantage. This viewpoint differs from standard strategy theories, which emphasize external industrial pressures as predictors of success.(Barney, 1991) The key implication of this theory regards total assets and R&D investments as key resources, which have a direct impact on ROE. Efficient asset utilization boosts productivity, while R&D investments promote innovation and competitiveness, both of which can produce better ROE, especially in businesses where the distinction is crucial.(Posen, et al. 2023).

2.1.4 Trade-Off Theory

This theory supports the variable financial leverage and it describes the level of debt utilized in a company's capital structure. Financial leverage can boost profits while also increasing risk, affecting ROE.

The background of the theory suggests that it was developed by Modigliani and Miller's 1958 capital structure irrelevance theory, and overcomes its drawbacks by taking into account taxes, bankruptcy costs, and agency difficulties. It proposes that businesses weigh the tax benefits of debt (via interest deductibility) against the dangers of financial distress. Kraus and Litzenberger specified this balance in 1973, and Stewart Myers later described it as a static trade-off in which enterprises seek an optimal capital structure that reduces costs while minimizing risk. This concept explains why

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most businesses reject zero debt in favor of a balanced, cost-effective capital structure.(Modiglian et al. 1958).

The key implications suggest that financial leverage affects ROE by increasing returns when debt levels are optimal. However, large debt can cause financial instability, lowering ROE due to increasing interest expenditures and financial risk.(Fama & French, 2002). This effect is especially notable in volatile markets or industries with high capital requirements.(Kijkasiwat et al., 2022).

2.1.5 Organizational Lifecycle Theory

This theory supports the variable firm age which is the period a company has been in operation. Older businesses are frequently more efficient and stable, but age can occasionally impair adaptability and innovation, affecting ROE. The background of the theory suggests that the Organizational Lifecycle Theory was notably developed by John R. Kimberly and Robert H. Miles, primarily in their 1980 work, this theory likens organizations to biological entities, suggesting they go through identifiable stages—such as creation, growth, maturity, and decline. Each phase presents unique challenges that require specific management approaches. Kimberly and Miles's work provides a foundational framework for understanding organizational change, growth, and adaptation over time.(Pledger, 1981).

The key implications of this theory propose that this theory compares organizations to biological things, arguing that they go through distinct stages such as formation, growth, maturity, and decline. Each phase brings new issues that necessitate distinct management strategies. Kimberly and Miles' work establishes a fundamental paradigm for understanding organizational change, growth, and adaptability throughout time. This theory explains why newer, more agile organizations can achieve greater ROE by reacting quickly, whereas older firms must overcome structural inertia to maintain profitability.

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2.2 PRISMA Method

The most commonly used reporting guidance for systematic reviews, which covers the literature search component, is the Preferred Reporting Item for Systematic Reviews and Meta-Analyses. (Macusi, et al. 2022). It was developed to facilitate transparent and complete reporting of systematic reviews and has been updated to reflect recent advances in systematic review methodology and terminology. It is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses (Chlomoudis. Et al., 2022).

The Scopus database (Scopus is Elsevier's abstract and citation database launched in 2004.) was employed, using a software program that helps to organize references and create properly formatted bibliographies for the processing of literature data. At the same time, a software program was used to obtain a comprehensive literature overview of the relevant publications from databases. After the more specific search on Scopus, we proceeded to a broader search to find the publications in all Google scholarly databases (Taylor and Francis, Elsevier, SAGE, Emerald, Springer, etc.) beyond Scopus. The systematic review was carried out using the four stages of PRISMA such as (1) Identification: (2) Screening: (3) An eligibility assessment; and (4) Inclusion. The initial search process generated academic papers from 2013 to 2023. The first step of the protocol is to identify the selected papers that have to be included in the review and identified through data searching, which was followed by the removal of duplicates.

We have identified a research paper using the following keywords Company growth, ESG, Financial Leverage, and return on equity (n=500). In the second step screening and data extraction were performed, which meant. Removing the articles that did not meet the eligibility criteria so, Duplicate records were removed (n=0), Incomplete articles were removed (21) and Articles that were not related to the topic (n=263), the articles not listed in MJL were (197) then Records screened to identify the factors related to (n=66)

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Records excluded (n=41). The third step of the protocol is an eligibility assessment criterion that requires evaluating the remaining articles if they were related to the subject of interest by browsing their abstracts or contents. Research Papers assessed for eligibility (n=23) and Reports of research papers excluded after reading title, abstract, journal metrics, etc. (n=5) The last step was the selection of the studies to be included in the review based on the articles that passed the eligibility assessment. The inclusion criteria were based on ISI/Scopus in the WoS (Web of Science) and Scopus databases. Research papers included in Systematic review (n=43). Finally, a total of 43 articles were selected to perform the literature review.

2.2.1 Prisma Protocol

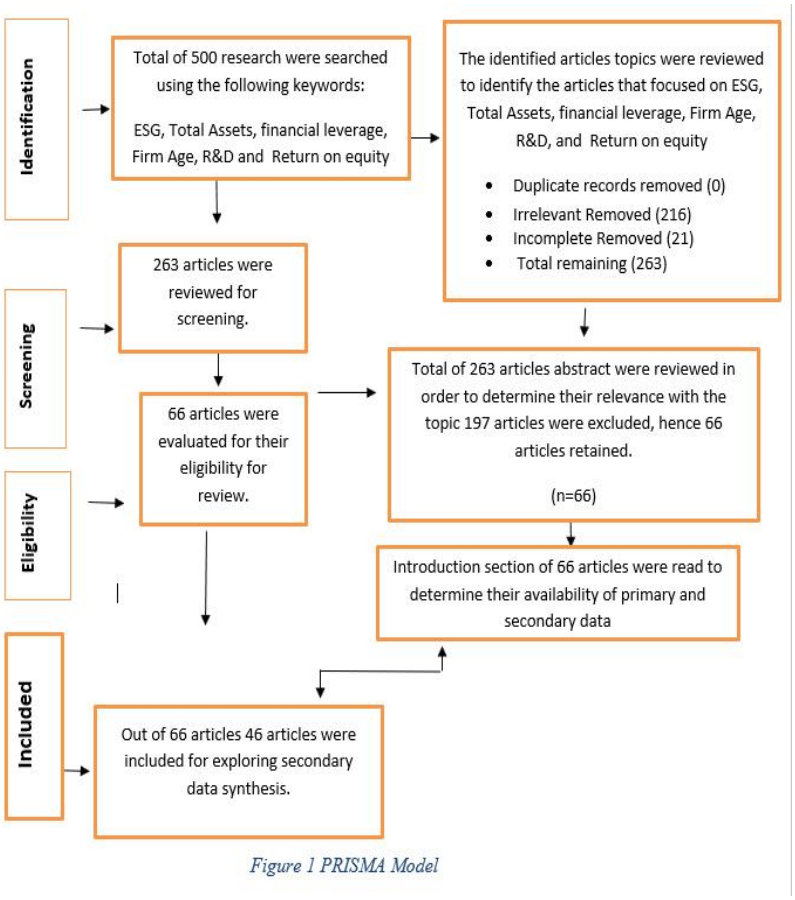

Figure 1 PRISMA PROTOCOL

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2.3 VARIABLES

2.3.1 The Relationship Between Esg And Roe

The initial research in the early 2000s focused on how strong governance—the "G" in ESG—could boost ROE by improving transparency, accountability, and operational efficiency.(Bhagat, et al. 2008). The new study revealed that enterprises with well-structured governance processes outperformed the market in general, with a focus on improved ROE. Their findings set the framework for understanding how effective governance procedures assist reduce agency costs, boost shareholder trust, and strengthen financial performance, particularly in organizations with distributed ownership.(Jo & Harjoto, 2011), and the broad influence of company sustainability on financial indicators such as ROE. They discovered that organizations prioritizing ESG, notably on employee welfare and environmental stewardship, had reduced turnover rates, improved operational efficiencies, and greater financial performance. (Eccles, et al 2014).

After that one of the most comprehensive meta-analyses on the subject, revealed a typically positive association between ESG practices and financial performance, particularly ROE. They discovered that socially responsible organizations frequently earned competitive advantages, such as increased customer loyalty and decreased operational risks, which led to greater ROE. Their study also found that the ESG-ROE relationship varied by industry, with consumer-facing companies experiencing the most significant effects.(Friede et al., 2015). Companies that provided complete ESG disclosures had greater ROE because openness reduced information imbalances and boosted investor confidence. According to their results, full ESG reporting reduces capital expenditures and attracts socially aware investors, hence increasing profitability and return on equity. During this period, the importance of ESG reporting requirements and the advantages of transparency and trust in company performance were underlined.(Fatemi et al., 2015).

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Recent studies have taken a multifaceted approach to assessing ESG's influence on ROE, examining how ESG risks affect firms at various levels of performance. Their findings revealed that, while good ESG practices boost ROE, high-risk firms in environmentally sensitive industries may initially have lower returns when they invest in risk management measures. However, in the long run, these ESG investments help to maintain stability and enhance ROE. This study stressed the broad influence of ESG on ROE, which varies by industry and risk level.(Teng et al., 2021).

Further studies examined those enterprises with transparent governance and low financial leverage that generated better ROE, particularly in developed markets. In emerging economies, the benefit was significant since lower debt lowered risk exposure, allowing ESG elements to improve ROE by lowering regulatory and reputational risks. This analysis helped us understand the impact of leverage in amplifying or moderating the effects of ESG on ROE, depending on market conditions.(Kijkasiwat et al., 2022).

Recent trends point to a move toward evaluating the long-term benefits of ESG integration for ROE. New research highlights the adaptability and resilience that ESG practices bring to organizations in extremely unpredictable markets, giving a secure foundation for ongoing profitability for instance new study found that continued advances in ESG standards, together with global legislative adjustments, will deepen the link between ESG and ROE. As companies connect with global sustainability goals, ESG is predicted to become more integrated into corporate financial plans, enabling consistent ROE growth through risk mitigation, cost savings, and brand differentiation. (Weston & Nnadi, 2023).

H1: There is a significant impact of ESG on ROE.

2.3.2 The Relationship Between Financial Leverage And Roe

In the early 2000s, research focused on how financial leverage can boost ROE, excessive debt exposes enterprises to financial turmoil, potentially decreasing profitability. Focusing on that leverage boosts ROE only when firms' returns

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exceed their debt costs. They contended that uncontrolled leverage could result in diminished profitability since interest expenses decrease net income.(Fama & French, 2002).

Further studies investigated how leverage affects ROE across enterprises of varying sizes and industries. Their studies revealed a non-linear, "U-shaped" relationship, in which moderate leverage increased ROE via improving capital efficiency. However, excessive debt caused financial strain, lowering ROE due to high-interest make expenses. This research helps clear that while leverage can boost returns, the benefits reduce above a certain threshold.(Margaritis & Psillaki, 2010).

Moreover, leverage in emerging economies and discovered that high leverage increased profitability and ROE only when debt was effectively controlled. In less stable economies, enterprises with large leverage saw their ROE fall due to economic volatility and currency risks. This study emphasized the necessity of market stability for generating consistent leverage benefits because firms in emerging markets frequently face additional risks that degrade ROE notwithstanding leverage advantages.(Abadi, Bany-Ariffin, Kokoszczynski, & Azman-Saini, 2016).Firms that combine good ESG practices with careful leverage management get greater ROEs. This study found that ESG policies reduce the cost of capital, allowing firms to access loans more cheaply and responsibly, hence increasing ROE. Their findings support the concept that ESG-conscious organizations are better suited to manage debt. Investor confidence in their ethical practices reduces risk premiums on borrowing. (Jamal, et al. 2021).

The recent findings indicate that, while leverage increases ROE in mature nations with stable economies, the effect is less predictable in emerging markets. Their research indicated that in less stable countries, excessive leverage might result in variable ROE due to currency volatility and economic instability, underscoring the importance of market context when evaluating leverage's impact on ROE.(Kijkasiwat et al., 2022).

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H2: There is a significant impact of financial leverage on ROE.

2.3.3 The Relationship Between Firm Age And ROE

In the early 20's Huergo and Jaumandreu discovered that older companies frequently struggle with administrative inefficiencies that reduce ROE. The study discovered that when organizations age, they create more complicated organizational structures, which can impede decision-making and innovation, thus lowering ROE. This study supported the premise that older enterprises must implement lean management strategies in order to retain high ROE despite age-related limitations.(Borghesi, et al. 2007).

Moreover, scholars proposed that as enterprises age, they acquire knowledge and resources that improve operational efficiency, hence increasing ROE. Penrose suggested that older organizations benefit from accumulated expertise, streamlined procedures, and established networks, which provide them with a competitive advantage and can boost profitability in the form of increased ROE.(Penrose, 2009). While older organizations often benefit from stability and brand awareness, their ROE may decline due to decreased flexibility and innovation. They established the "life cycle" idea, positing that enterprises have an initial period of growth with high ROE, followed by possible stagnation as they mature and administrative procedures slow down decision-making and flexibility.(Coad, et al. 2013).

Along with-it scholars claimed that older organizations have more established management techniques, which boosts operational efficiency and ROE. They argued that firm age positively corresponds with financial stability, as older firms are less likely to encounter operational hazards than younger firms, therefore boosting ROE by maintaining constant cash flows over time.(Jensen & Meckling, 2019)

According to a recent study, structured corporate governance benefits older organizations by improving financial performance criteria such as ROE. Effective governance procedures evolved to strengthen resilience and

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stakeholder trust, resulting in better ROE in mature organizations.(Bui & Krajcsák, 2023).

H3: There is no significant impact of firm age on ROE.

2.3.4 The Relationship Between Research And Development And RoE

The relationship between research and development in the early 20s shows that Short-term returns for enterprises receiving investment or R&D subsidies are lower than those of non-subsidized firms. Additionally, investment subsidies have a negative influence on sales and income growth, but a good impact on assets.(Balsar & Ucdogruk, 2008).

Furthermore, Duqui and Torluccio (2010) investigated the effect of R&D intensity on financial performance in enterprises. They discovered that R&D expenditure is favorably correlated with future ROE, especially in companies with strong market positions and access to investor-friendly conditions. This study discovered that well-regulated markets increase the favorable benefits of R&D on financial performance by increasing investor confidence and boosting the firm's strategic expansion through innovation.(Vanderpal, 2015). During this time, research concentrated on how R&D spending affected ROE, particularly in high-tech industries where product differentiation is critical. For example, Los and Verspagen (2000) underlined that in high-tech companies, R&D efforts were vital to retaining a competitive edge and immediately contributed to financial success by enabling innovative capabilities and increased pricing power. (Guo, et al. 2018) Along with it, Companies with persistent R&D investment plans demonstrated improved ROE over time by pushing product development pipelines. They suggested that corporations taking a long-term commitment to R&D might continue ongoing innovation, allowing them to respond to changing market demands and so achieve sustainable development in ROE.(Guo et al., 2018). Further studies found out that organizations with good governance systems may better optimize R&D spending because these frameworks ensure resource

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allocation is strategically linked with corporate objectives, resulting in maximum ROE. Good governance promotes responsible expenditure and oversight of R&D, which protects ROE from the possible consequences of mismatched R&D investments.(Özkan, 2022).

Emerging research refers to the growing usage of artificial intelligence (AI) and digital R&D tools to optimize R&D spending and maximize its impact on ROE. Further studies RE expected to investigate how businesses use AI to improve R&D processes, properly forecast market needs, and reduce costs, ultimately increasing ROE through effective innovation strategies. These developments may make R&D a more predictable and successful investment by shortening the time-to-market for new products and enhancing enterprises' response to consumer preferences.(Bellabasi, 2024).

H4: There is no significant impact of Research and Development R&D on ROE.

2.3.5 The Relationship Between Total Assets And RoE

The relationship between total assets and ROE was studied in the early 20's, the author investigated how organizations might boost ROE by efficiently leveraging assets to create better returns compared to their equity basis. Penman highlighted that just increasing asset bases without guaranteeing effective asset rotation can reduce ROE. He stated that high asset turnover is crucial for transforming asset investments into profitability, influencing overall returns for shareholders. (Abor, 2005).

Additionally, how asset size and capital structure affected ROE in Ghanaian enterprises. Abor found that enterprises with well-managed total assets and strategic use of short-term debt produced greater ROE, owing to lower loan payment costs and improved resource allocation efficiency.(Sultan & Adam, 2015).

Further studies investigated how large asset bases can contribute to ROE when used efficiently. They discovered that enterprises with considerable assets have superior economies of scale, resulting in higher ROE through cost-

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efficiency and competitive pricing. However, they emphasized that unproductive assets can reduce ROE since maintenance and opportunity expenses increase without a proportion. (Juliana, 2020).

Recent research has been initiated to highlight the role of ESG awareness in enhancing asset management for ROE improvement and exploring how ESG practices affect asset usage to improve ROE. They suggested that organizations that connect their asset strategies with ESG goals had higher asset productivity because socially responsible activities boost consumer trust and operational efficiency. These companies achieve long-term ROE growth by reducing waste and maximizing resources. This research indicates that ESG not only contributes to reputation but also promotes asset turnover, which significantly impacts ROE.(Teng et al., 2021).

Moreover, recent studies how technology improves asset management, resulting in improved ROE. They discovered that organizations that use AI-driven asset management systems can achieve higher asset turnover rates because technology enables real-time monitoring and predictive repair. These innovations lower operational expenses and improve asset longevity, hence increasing ROE. The study concluded that digital transformation is an emerging factor of ROE via optimized asset utilization.(Bisht et al., 2022).

H5: There is no significant impact of Total Assets on ROE.

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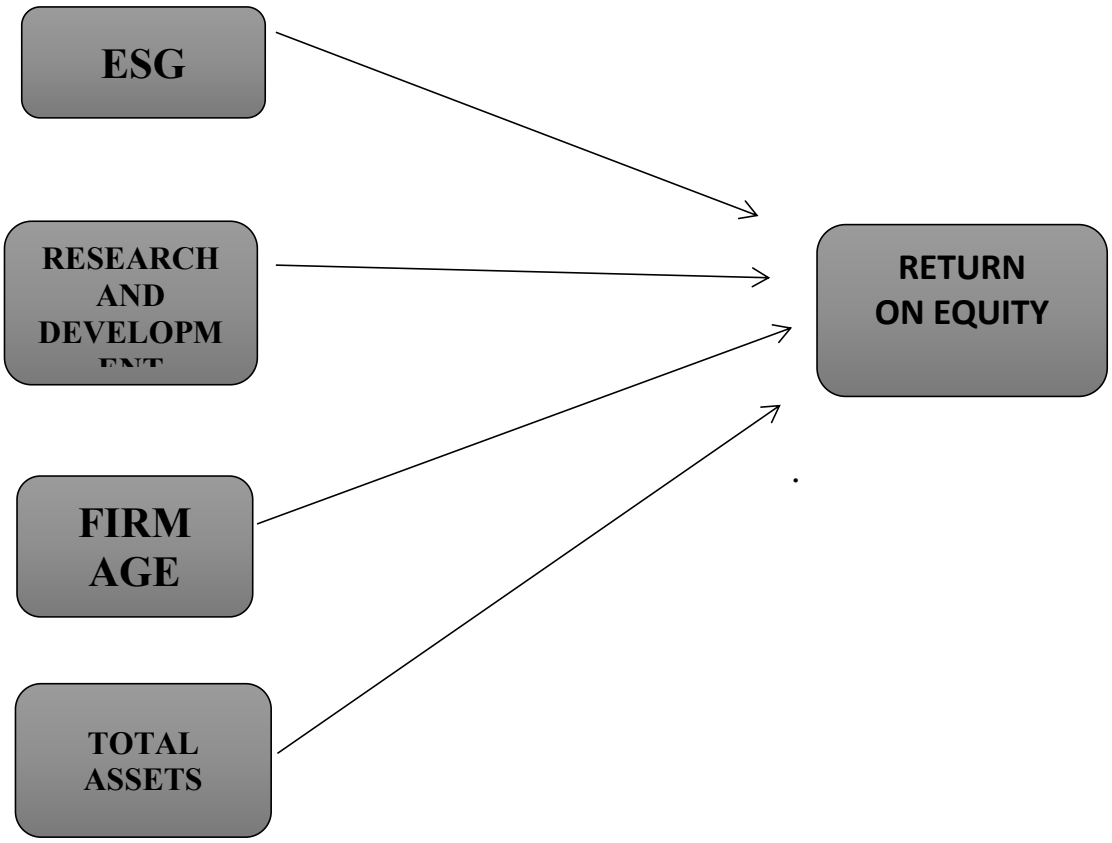
2.4 THEORETICAL FRAMEWORK



3 DATA SOURCE AND RESEARCH METHODOLOGY:

3.1 Population

In this study, the population of interest is China from 2013 to 2023. The time series data utilized in this study is derived from yearly reports and contains a variety of factors such as financial leverage, company age, R&D, return on equity, environmental social governance (ESG), and the organization's total assets over time.

3.2 Sample/Data Source

The study's samples are from a population of Chinese enterprises operating between 2013 and 2023. The secondary data utilized in this study, obtained from Chinese firms' annual reports, includes key factors such as environmental social governance (ESG), financial leverage, company age,

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research and development (R&D), return on equity (ROE), and total assets. The dataset, which is unbalanced and collected once a year, gives a comprehensive picture of trends and patterns during the time period selected. With a focus on understanding how ESG components and financial strategies contribute to an organization's overall financial health and long-term sustainability, the research attempts to assess the impact of these factors on firm performance, profitability, and growth.

3.3 Variables

Environmental Social Governance (ESG): This assesses a company's efforts in environmental, social, and governance issues, highlighting its sustainability practices and societal impacts.

Financial Leverage: This refers to the use of debt to fund a company's assets, suggesting both the amount of financial risk and the possibility for profit.

Firm Age: This is the number of years a firm has been in existence and serves as a measure of its experience and maturity.

Research and Development (R&D): This refers to the investment done in research & development to innovate and improve products or services.

Return on Equity (ROE): This profitability ratio demonstrates how successfully a corporation earns profit from its shareholders' equity.

Total Assets: This refers to the total worth of all assets possessed by a corporation, representing its financial resources and size.

3.4 Data Analysis Techniques

In this research, panel data analysis is employed to examine the relationships between variables over time and across different entities. The Fixed Effects (FE) and Random Effects (RE) models are applied to account for individual heterogeneity, where the FE model controls for time-invariant characteristics of the entities, and the RE model assumes that these characteristics are uncorrelated with the predictors. To determine the appropriate model, the Hausman test is conducted, where ESG = environment social governance, Fir

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age = firm age, R&D research and development, TA = Total assets, and Fin lev = financial leverage which compares the estimates from both FE and RE models. The outcome of the test helps in deciding whether the RE model is appropriate or if the FE model should be used, depending on the nature of the correlation between individual effects and explanatory variables.

Equation 1:

$$ROEit = \alpha it + \beta 1ESG1it + \beta 2Fir\ age2it + \beta 3R\&D3it + \beta 4TA4it + \beta 5Fin\ lev5it + \varepsilon it$$

3.5 Measurement Of Data

In this specific research, the independent variables are environmental Social Governance (ESG), financial leverage, firm age, research and development (R&D), and total assets looking for its impact on the dependent variable which is return on equity (ROE).

Table 1: ***Measurement of Data***

Variables	**Sources**	**Proxy**
Esg	Esg Report of Company	The Gri G4 Guidelines
Firm Age	Annual Report	Current Year - Year Of Company Establishment + 1
Financial Leverage	Debt Ratio (Annual Report)	Total Assets/Total Liability*100
Total Assets	Annual Report	-
Roe	Financial Statement	Net Income/Shareholders Equity*100
Company Growth	Net Operating Income (Annual Report)	**Growth Rate:** Noi (Cy)- Noi(Py)/Noi(Py)*100

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4. RESULTS

4.1 Descriptive Result:

This study used Excel 2019 software for the descriptive analysis, and EViews 10 software for model estimation of the panel regression analysis. The results derived from the descriptive statistics presented in Table 1 provide pivotal data concerning the distribution and characteristics of the variables, thereby making a significant contribution to the analysis by offering valuable insights. The mean values for ESG, financial leverage, firm age, research and development, ROE, and total assets are 3.272727, 0.647066, 33.42857, 2.11, 0.151932, and 1.11, respectively. These mean values provide an estimate of the central tendency of the data.

The median values in the dataset indicate that the typical company has a median ROE of 0.136000, suggesting modest profitability. The financial leverage median value of 0.5007 implies a moderate level of debt usage among firms. The median firm age is 31 years, indicating that most firms have an established presence in the industry. The research and development (R&D) median value of 588100.0 reflects the distribution of R&D investment, although the extreme values suggest the presence of outliers. Total assets have a median of 8169892, showing that asset sizes are spread across a wide range. The standard deviations in the dataset suggest substantial variability across most variables. ESG has a standard deviation of 0.620619, indicating a relatively consistent distribution. Financial leverage shows a standard deviation of 0.501156, demonstrating moderate variation in debt usage among firms. Firm age, with a standard deviation of 16.19326, reflects significant diversity in the years of establishment among companies. The R&D standard deviation of 3.9 highlights considerable dispersion, while ROE's standard deviation of 0.139741 indicates a wide range of profitability levels. Total assets have a standard deviation of 2.56, showing significant variation in firm sizes.

The maximum and minimum values reflect the broad range of variation among the variables. ESG ranges from 2.000000 to 4.000000, showing

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different levels of environmental, social, and governance practices. Financial leverage varies from 0.0018 to 2.677, indicating a wide range of debt usage strategies. Firm age spans 11 to 66 years, demonstrating the presence of both relatively new and well-established firms. R&D values range from -7990974 to 1.84, indicating extreme outliers. ROE varies from -0.0426 to 1.046000, showing a significant range in profitability. Total assets range from 160786.0 to 1.01, reflecting diverse firm sizes.

The symmetry of the distribution can be observed from the skewness values. ESG has a skewness of -0.250010, indicating a slight left skew. Financial leverage is positively skewed at 1.427394, reflecting a distribution with a tendency toward higher values. Firm age has a moderate positive skewness of 0.490389. R&D shows strong positive skewness at 2.323746, while ROE has a pronounced positive skewness of 4.141019, suggesting that higher values are more common. Total assets are also positively skewed, with a skewness of 2.495536.

The kurtosis values reveal the peakedness of the distributions. ESG has a kurtosis of 2.375236, close to a normal distribution. Financial leverage, with a kurtosis of 5.347998, indicates heavier tails. Firm age has a kurtosis of 2.007284, suggesting a relatively flat distribution. R&D has a high kurtosis of 8.088160, highlighting the presence of extreme values. ROE has a kurtosis of 25.46730, indicating significant outliers, while total assets show a kurtosis of 7.973765, reflecting more extreme values compared to a normal distribution.

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Table 2: Descriptive Table

	ESG	FINANCIAL LEVERAGE	FIRM AGE	RESEARCH AND DEVELOPMENT	ROE	TOTAL ASSETS
MEAN	3.272727	0.647066	33.42857	2.11	0.151932	1.11
MEDIAN	3.000000	0.5007000	31.00000	588100.0	0.136000	8169892
MAXIMUM	4.000000	2.677000	66.0000	1.84	1.046000	1.01
MINIMUM	2.000000	0.001800	11.00000	-7990974	-0.04260	160786.0
STD.DEV	0.620619	0.501156	16.19326	3.9	0.139741	2.56
SKEWNESS	-0.250010	1.427394	0.490389	2.323746	4.141019	2.495536
KURTOSIS	2.375236	5.347998	2.007284	8.088160	25.46730	7.973765
JARQUE-BERA	2.054457	43.83519	6.247949	152.3591	1839.567	157.2223

4.2 ROE OLS

The panel least squares analysis assesses how ESG, Financial Leverage, Firm Age, Log of Total Assets (LOG_TA), and R&D influence ROE (Return on Equity). Significant coefficients for ESG (p=0.0230), Financial Leverage (p=0.0001), and Firm Age (p=0.0236) indicate that these variables positively impact ROE. Strong ESG practices attract socially responsible investors, boost brand reputation, and improve operational efficiency, all of which enhance ROE. Similarly, moderate financial leverage allows firms to pursue growth opportunities without diluting equity, amplifying profitability as long as returns exceed debt costs. Additionally, older firms benefit from established market positions and operational expertise, driving stable revenue and higher ROE.

In contrast, LOG_TA (firm size) and R&D expenditure do not significantly affect ROE, with p-values of 0.4343 and 0.1915, respectively. This suggests that neither firm size nor R&D investment substantially impacts ROE

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in this model. LOG_TA's lack of significance aligns with the notion that size alone may not drive ROE, potentially due to industry-specific factors or diminishing returns as firms expand. Similarly, R&D spending may not yield immediate returns, as its benefits often materialize over longer timeframes.

The R-squared value of 0.2678 indicates that the model explains 26.8% of the variance in ROE, suggesting a modest fit. Although the F-statistic (p=0.000465) confirms the model's overall significance, this moderate R-squared suggests other unexplored factors may also influence ROE. The Durbin-Watson statistic of 1.3076 suggests possible autocorrelation, which may indicate a need for further model refinement. Further diagnostics, such as the F-test for fixed effects or the Breusch-Pagan LM test for random effects, may help determine if fixed or random effects would better capture group-specific variations within the data.

Table 3: ***ROE OLS***

Dependent Variable: ROE
Method: Panel Least Squares
Date: 10/16/24 Time: 12:01
Sample: 2013 2023
Periods included: 11
Cross-sections included: 7
Total panel (unbalanced) observations: 76

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
ESG	-0.056805	0.024442	-2.324034	0.0230
FINANCIAL_LEVERAGE	-0.139397	0.032812	-4.248338	0.0001
FIRM_AGE	-0.002445	0.001056	-2.314506	0.0236
LOG_TA	-0.003269	0.004157	-0.786312	0.4343
RD	-6.63E-12	5.02E-12	-1.318958	0.1915
C	0.587572	0.126541	4.643321	0.0000
R-squared	0.267802	Mean dependent var		0.152228

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Adjusted R-squared	0.215502	S.D. dependent var	0.140645
S.E. of regression	0.124572	Akaike info criterion	-1.252210
Sum squared resid	1.086271	Schwarz criterion	-1.068205
Log likelihood	53.58399	Hannan-Quinn criter.	-1.178673
F-statistic	5.120500	Durbin-Watson stat	1.307622
Prob(F-statistic)	0.000465		

4.3 Fixed Effect ROE

The fixed effects panel regression model examines how variables like ESG, Financial Leverage, Firm Age, LOG_TA (log of total assets), and R&D impact ROE, accounting for cross-sectional effects. Financial Leverage is statistically significant (p=0.0090) and has a positive impact on ROE, increased leverage enables the firm to fund growth and expansion opportunities that enhance profitability, as long as returns exceed borrowing costs. This amplification effect allows companies to generate higher returns on equity, particularly if they effectively manage debt levels and achieve greater returns from leveraged investments.

In contrast, ESG (p=0.8983), Firm Age (p=0.3282), LOG_TA (p=0.1136), and R&D (p=0.8306) are not statistically significant predictors of ROE. This suggests that ESG engagement, firm age, firm size, and R&D spending do not significantly influence ROE in this model. LOG_TA's lack of significance might indicate that size alone does not drive ROE due to diminishing returns as firms grow and varied asset requirements across industries. Similarly, the non-significance of R&D implies that its benefits may require a longer-term perspective to impact profitability directly.

The R-squared value of 0.3872 indicates that the model explains 38.7% of the variance in ROE, suggesting a moderate fit. The F-statistic (p=0.000449) confirms the model's overall significance, indicating that these variables collectively have a meaningful relationship with ROE. However, the

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Durbin-Watson statistic of 1.5151 suggests potential autocorrelation, implying that further adjustments might be needed to improve model robustnes

Table 4: Fixed Effect ROE

Dependent Variable: ROE
Method: Panel Least Squares
Date: 10/16/24 Time: 12:42
Sample: 2013 2023
Periods included: 11
Cross-sections included: 7
Total panel (unbalanced) observations: 76

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ESG	-0.005555	0.043304	-0.128280	0.8983
FINANCIAL_LEVERAGE	-0.163694	0.060782	-2.693124	0.0090
FIRM_AGE	-0.008899	0.009032	-0.985290	0.3282
LOG_TA	-0.052985	0.033031	-1.604105	0.1136
RD	-1.35E-12	6.29E-12	-0.214792	0.8306
C	1.602137	0.532768	3.007195	0.0038
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.387241	Mean dependent var		0.152228
Adjusted R-squared	0.281923	S.D. dependent var		0.140645
S.E. of regression	0.119182	Akaike info criterion		-1.272395
Sum squared resid	0.909074	Schwarz criterion		-0.904385
Log-likelihood	60.35102	Hannan-Quinn criter..		-1.125320
F-statistic	3.676873	Durbin-Watson stat		1.515087
Prob(F-statistic)	0.000449			

4.4 Random Effect ROE

The random effects model for ROE evaluates the influence of variables such as ESG, Financial Leverage, Firm Age, LOG_TA (log of total assets), and R&D on

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ROE while accounting for random effects across cross-sections. Financial Leverage has a significant positive effect on ROE (p = 0.0029), indicating that increased leverage can amplify returns on equity by allowing firms to invest in growth opportunities and expand their operations, ultimately leading to higher profitability as long as the returns from borrowed funds exceed the associated debt costs. ESG also has a significant positive impact on ROE (p = 0.0293), suggesting that companies with strong ESG practices are likely to benefit in the long term through enhanced investor confidence, and improved operational efficiencies.

Firm Age shows a marginal significance (p = 0.0843), indicating a negative effect on ROE. In contrast, LOG_TA (p = 0.2279) and R&D (p = 0.6900) are not statistically significant predictors. The high p-value for R&D implies that it does not substantially influence profitability, while the lack of significance for LOG_TA indicates that larger firm size does not necessarily contribute positively to ROE, possibly due to scale inefficiencies or industry-specific factors. Therefore, the rejection of these hypotheses suggests that, within this sample, firm age, R&D spending, and firm size do not have a meaningful impact on ROE.

The R-squared value of 0.2094 indicates that this model explains 20.9% of the variance in ROE, suggesting a modest explanatory power. The effects specification shows a cross-sectional random effect standard deviation (S.D.) of 0.059034, contributing 19.7% of the variance (Rho), indicating that cross-sectional differences account for some variability in ROE

Table 5: Random Effect (ROE)

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 10/16/24 Time: 12:43
Sample: 2013 2023
Periods included: 11

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Cross-sections included: 7

Total panel (unbalanced) observations: 76

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ESG	-0.056067	0.025195	-2.225350	0.0293
FINANCIAL_LEVERAGE	-0.141171	0.045692	-3.089645	0.0029
LOG_TA	-0.007633	0.006275	-1.216427	0.2279
RD	-2.28E-12	5.69E-12	-0.400509	0.6900
FIRM_AGE	-0.003184	0.001818	-1.751006	0.0843
C	0.686598	0.161998	4.238320	0.0001
	Effects Specification			
			S.D.	**Rho**
Cross-section random			0.059034	0.1970
Idiosyncratic random			0.119182	0.8030
	Weighted Statistics			
R-squared	0.209437	Mean dependent var		0.079566

4.5 Hausman Test

The Hausman test assesses whether a fixed effects (FEM) or random effects (REM) model better suits the analysis of EQ02. With a Chi-square statistic of 5.8651 and a p-value of 0.3196, we fail to reject the null hypothesis, indicating that the random effects model is consistent for this dataset. This outcome favors the random effects model, as it adequately accounts for unobserved cross-sectional differences without requiring fixed effects.

Examining the individual variables, ESG, FINANCIAL_LEVERAGE, LOG_TA, RD, and FIRM_AGE show no significant differences between the fixed and random models, with p-values all above 0.05. This means their effects on the outcome variable are similar in both models. Overall, these results indicate that the random effects model is preferable for analyzing

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EQ02, as it efficiently captures cross-sectional variability without significant differences in individual variable impacts between the models.

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Table 6: Hausman Test

Correlated Random Effects - Hausman Test

Equation: EQ02

Test cross-section random effects

Test Summary		**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random		5.865093	5	0.3196
Cross-section random effects test comparisons:				
Variable	**Fixed**	**Random**	**Var(Diff.)**	**Prob.**
ESG	-0.005555	-0.056067	0.001240	0.1515
FINANCIAL_LEVERAGE	-0.163694	-0.141171	0.001607	0.5742
LOG_TA	-0.052985	-0.007633	0.001052	0.1620
RD	-0.000000	-0.000000	0.000000	0.7295
FIRM_AGE	-0.008899	-0.003184	0.000078	0.5183

4.6 Cross-Section Random Effects Test

The cross-section random effects test equation evaluates the impact of ESG, Financial Leverage, LOG_TA (firm size), R&D, and Firm Age on ROE, accounting for unobserved cross-sectional characteristics that could influence ROE. In this model, Financial Leverage is the only variable with a statistically significant impact on ROE ($p = 0.0090$), indicating that increased leverage negatively affects ROE. The variables ESG, LOG_TA, RD, and Firm Age show no statistically significant effects ($p > 0.05$), suggesting that these factors may not strongly influence ROE in this dataset.

The model explains 38.7% of the variation in ROE (R-squared = 0.3872) with an adjusted R-squared of 0.2819, indicating moderate explanatory power. The F-statistic ($p = 0.000449$) signifies that the model is overall significant, suggesting the predictors collectively influence ROE. The Durbin-Watson statistic of 1.515 suggests some degree of autocorrelation, though it is not

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severe. Further improvements may be considered to address potential issues in model robustness.

Table 7: Cross-Section Random Effects Test

Cross-section random effects test equation:

Dependent Variable: ROE

Method: Panel Least Squares

Date: 10/16/24 Time: 12:45

Sample: 2013 2023

Periods included: 11

Cross-sections included: 7

Total panel (unbalanced) observations: 76

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	1.602137	0.532768	3.007195	0.0038
ESG	-0.005555	0.043304	-0.128280	0.8983
FINANCIAL_LEVERAGE	-0.163694	0.060782	-2.693124	0.0090
LOG_TA	-0.052985	0.033031	-1.604105	0.1136
RD	-1.35E-12	6.29E-12	-0.214792	0.8306
FIRM_AGE	-0.008899	0.009032	-0.985290	0.3282

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.387241	Mean dependent var	0.152228
Adjusted R-squared	0.281923	S.D. dependent var	0.140645
S.E. of regression	0.119182	Akaike info criterion	-1.272395
Sum squared resid	0.909074	Schwarz criterion	-0.904385
Log-likelihood	60.35102	Hannan-Quinn criter.	-1.125320
F-statistic	3.676873	Durbin-Watson stat	1.515087
Prob(F-statistic)	0.000449		

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5. CONCLUSION

Finally, this study examined the factors that influence Return on Equity (ROE) in China's automotive sector, with a particular emphasis on ESG practices, financial leverage, company age, R&D expenditure, and total assets. The results show that ESG practices, financial leverage, and company age all have a beneficial impact on ROE by improving governance, capital efficiency, and organizational maturity. While R&D and total assets contribute to higher ROE through innovation and efficient usage, robust governance is required to realize these advantages.

One of its main contributions is this study's emphasis on the relationship between ESG, financial leverage, company age, and innovation in China's automobile industry. It shows that while proper financial leverage can increase ROE, ESG practices boost profitability through risk mitigation and brand value. According to Organizational Lifecycle Theory, the study also shows that older businesses have trouble staying profitable. Resource-Based View (RBV) supports this finding, which emphasizes the significance of effective R&D and asset use for long-term success. For investors and regulators looking to strike a balance between sustainability and financial growth in high-growing industries, these findings provide insightful information.

Other findings emphasize the necessity of sound financial management and sustainable practices in ensuring long-term success, even in unpredictable markets. Future studies might expand on these findings by examining diverse industries, geographical issues, and other ESG elements.

5.1 Theoretical Implications

This study contributes to several theoretical improvements. First, it supports the theoretical foundations of the resource-based and stakeholder-based perspectives by showing that structured ESG disclosures and good governance (G in ESG) boost investor confidence and return on equity (ROE). The study supports capital structure theories by emphasizing the non-linear relationship

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between financial leverage and ROE, indicating that although leverage can raise returns, too much leverage may lower profitability by putting more burden on finances. This research shows that the ideal amounts of leverage differ depending on the market, the industry, and the firm's commitment to ESG. The study further clarifies the life-cycle theory by revealing how firm age affects ROE, with younger firms potentially growing more rapidly and older firms benefiting from stability and accumulated resources. The study also supports innovation theories that relate research and development to financial performance, highlighting the fact that sustained R&D investment can propel long-term profitability, particularly when combined with responsible governance. Finally, research shows that efficient asset management, especially through AI and digital transformation, can increase asset turnover and, in turn, ROE, supporting asset-based theories.

5.2 Managerial Implications

The findings have an impact on managers, particularly those in firms seeking to boost ROE through R&D investments, leveraging strategies, ESG efforts, and efficient asset management. Managers may use this data to adapt their ESG activities, resulting in competitive benefits like as increased customer loyalty, lower operational risks, and better transparency—all of which can raise return on equity. Managers in developing markets should be cautious with financial leverage, ensuring that it remains below normal limits to minimize changes in ROE. Businesses with high R&D investments should maintain innovation pipelines that track market trends to boost ROE in the long term. Asset-intensive businesses may deploy AI-driven asset management systems to maximize utilization and decrease disruptions, resulting in an instant increase in return on equity.

5.3 Limitations

Although this study provides valuable insights into the relationships between ESG practices, financial leverage, firm age, R&D, total assets, and ROE, it is important to highlight that it has significant limitations. First, by relying too

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heavily on secondary data, the research fails to properly capture qualitative, firm-specific ESG features that may not be captured in financial reporting. Furthermore, because the data is exclusive to the Chinese vehicle sector, the results may not be relevant to other industries or geographical locations. The model also excludes potential ROE-affecting factors like as market mood and geopolitical risks. Finally, even when panel data analysis catches trends, it may not effectively account for the impact of specific economic shocks. To gain a better understanding of these connections, future research should include studying bigger, cross-industry datasets and qualitative ESG indicators.

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