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Research on the Relationship between IPO Information Disclosure Quality and Investment Efficiency from the ESG Perspective

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ABSTRACT
With the popularization of the concept of sustainable development and the continuous improvement of capital market supervision, Environmental, Social and Governance (ESG) information disclosure has gradually become an important indicator for measuring the long-term value and sustainable development of enterprises. As a key link for enterprises to enter the capital market, the quality of IPO information disclosure not only affects investors' decisions, but also has a profound impact on financing costs, market pricing and subsequent investment efficiency. However, IPO enterprises in China still have problems of low quality and inconsistent standards in ESG information disclosure. This paper takes three IPO enterprises, namely Contemporary Amperex Technology Co., Limited (CATL), XPeng Inc. and China Three Gorges Renewables (Group) Co., Ltd., as cases, constructs an ESG information disclosure quality evaluation system, and conducts horizontal comparison and vertical analysis combined with investment efficiency indicators. The study finds that high-quality ESG information disclosure can effectively alleviate information asymmetry and reduce financing constraints, thereby significantly improving the investment efficiency of IPO enterprises; the governance dimension is particularly critical in restraining inefficient investment behaviors. At the same time, there are differences in disclosure effects between state-owned and private enterprises and under different industrial backgrounds, indicating that the institutional environment and industry characteristics play a regulatory role in this process. The innovation of this paper lies in combining ESG research with the context of IPO enterprises, and using a multi-case method to reveal the mechanism and heterogeneity of how disclosure quality affects investment efficiency. The research conclusions not only provide references for regulators to improve the IPO disclosure system, but also offer useful insights for enterprises to enhance ESG practices and achieve sustainable development, as well as for investors to optimize investment decisions.

KEYWORDS
IPO; ESG information disclosure; Investment efficiency; Governance mechanism; Institutional environment

1 Introduction

In recent years, with the popularization of the concept of sustainable development and the increasing improvement of capital market supervision, Environmental, Social, and Governance (ESG) information disclosure has become an important indicator for measuring enterprises' sustainable development capabilities and long-term value. As a crucial starting point for enterprises to enter the capital market, the quality of Initial Public Offering (IPO) information disclosure not only relates to investors' investment decisions, but also directly affects enterprises' financing costs, market pricing, and subsequent investment efficiency. However, IPO enterprises in China still face issues such as inconsistent standards and uneven quality in ESG information disclosure, which may lead to information asymmetry and reduced resource allocation efficiency [1-2].

Against this backdrop, exploring the relationship between information disclosure quality and investment efficiency of IPO enterprises from the ESG perspective is not only conducive to regulatory authorities improving the IPO information disclosure system, but also helps enterprises understand and enhance their own ESG practice levels to achieve sustainable development; at the same time, it is of great significance for investors to identify high-quality IPO projects and optimize investment decisions [3-5].

This study aims to analyze the relationship between information disclosure quality and subsequent investment efficiency of IPO enterprises from the ESG perspective, and explore the underlying mechanism. The specific research questions include: (1) What differences exist in the quality of ESG information disclosure among IPO enterprises? (2) Can high-quality ESG information disclosure alleviate information asymmetry and improve the investment efficiency of IPO enterprises? (3) Are there differences in the impact of ESG disclosure quality on investment efficiency under different governance backgrounds (e.g., state-owned vs. private enterprises) and industry characteristics?

This paper takes recent IPO enterprises such as Contemporary Amperex Technology Co., Limited (CATL), XPeng Inc., and China Three Gorges Renewables (Group) Co., Ltd. as research objects, collects their IPO prospectuses, ESG reports, and financial data, constructs an ESG information disclosure quality evaluation system, and combines investment efficiency indicators to conduct horizontal comparison and vertical tracking analysis of enterprises, so as to explore the mechanism of ESG information disclosure quality on investment efficiency [6-7]. Compared with existing studies, the innovations of this paper are mainly reflected in: (1) Taking IPO enterprises as the entry point, it examines the relationship between information disclosure quality and investment efficiency from the ESG perspective, expanding the application scenarios of ESG research; (2) Adopting a multi-case analysis method, combining quantitative scoring and qualitative analysis, it not only reveals the mechanism but also improves the interpretability of conclusions; (3) By comparing state-owned/private enterprise backgrounds and industry differences, it explores the heterogeneity in the relationship between ESG disclosure quality and investment efficiency of IPO enterprises, enriching policy recommendations for practical departments [8].

2 Literature review

With the continuous development of capital markets, the impact of enterprise information disclosure quality on resource allocation efficiency, market pricing, and investment decisions has attracted widespread attention. A large number of studies have shown that high-quality information disclosure can effectively alleviate information asymmetry and agency conflicts, reduce enterprises' financing costs and internal control costs, thereby significantly improving investment efficiency [1-2]. Biddle et al [3]. pointed out that high-quality financial reporting can optimize investment decisions and avoid under-investment or over-investment. In the Chinese context, studies by Li Zengquan [4], Xue Yuting [5], and others also show that financial disclosure improves the investment efficiency of A-share enterprises by alleviating financing constraints and enhancing market signaling functions.

On this basis, with the popularization of the concept of sustainable development, non-financial information (especially ESG information disclosure) has gradually become an emerging variable affecting enterprise resource allocation. ESG disclosure is regarded as an important means to improve corporate governance, enhance risk control capabilities, and clarify long-term strategies [6]. Studies have found that ESG information disclosure and financial information have a significant synergy effect, which can further optimize enterprises' capital allocation efficiency, especially in enterprises with financing constraints or weak information environments [7]. You Yi [8] and other scholars pointed out that the governance dimension in ESG (such as board structure and compliance mechanisms) can make up for the shortcomings of traditional financial indicators in measuring corporate governance capabilities, thereby improving the overall effectiveness of disclosure.

Chinese scholars have also carried out multi-dimensional explorations on ESG information disclosure and investment efficiency. Based on a natural experiment of rating changes, Li Zehao [9] found that ESG disclosure helps reduce managerial myopia and environmental uncertainty, thereby improving investment efficiency. Dong Xiao [10] emphasized the amplifying effect of analyst supervision in the ESG impact mechanism, while Liao Guoping and Wang Wenhua [11] pointed out that green innovation plays an intermediary role in the path of environmental information disclosure affecting investment efficiency, and the degree of marketization has a regulatory impact on this mechanism.

However, most existing literatures focus on cross-sectional statistical analysis of regular financial or ESG disclosure of listed companies, with insufficient attention to disclosure behaviors during the IPO stage. As a crucial turning point for enterprises from private to public ownership, IPO information disclosure has higher uncertainty and regulatory sensitivity. High-quality IPO information disclosure not only affects investor confidence and market pricing, but also may have a profound impact on enterprises' post-listing capital utilization efficiency and capital allocation paths [12-13]. Especially in China's special governance and regulatory environment (such as the high proportion of state-owned enterprises and the participation of party organizations in governance), the effects and mechanisms of information disclosure may vary significantly.

Therefore, it is urgent to conduct in-depth research on the relationship between IPO information disclosure quality and investment efficiency from the ESG perspective, combined with China's characteristic institutional factors. Although existing large-sample quantitative studies have provided a solid theoretical foundation for this research topic, they are insufficient to reveal the underlying logic and actual operation mechanisms behind disclosure behaviors.

Chapter 3 Theoretical Foundation and Analytical Framework

3.1 Information Asymmetry and Agency Theory

Agency theory holds that information asymmetry between managers and investors can lead to moral hazard and adverse selection, thereby resulting in the loss of investment efficiency [1]. High-quality information disclosure can alleviate information asymmetry, reduce agency costs, and improve resource allocation efficiency [2-3]. This study focuses on the role of ESG information disclosure during the IPO stage in this mechanism.

3.2 ESG information disclosure and resource allocation theory

From the perspective of signal transmission, enterprises that disclose high-quality ESG information can send signals of stable operation and controllable risks, attract long-term investors, and reduce financing costs [6, 7]. At the same time, the governance dimension of ESG can make up for the limitations of financial information and improve the overall quality of disclosure [8]. Based on this, this paper explores the connection between ESG disclosure and investment efficiency.

3.3 Institutional embedding and China's characteristic governance environment

Different from mature markets, China's capital market has significant institutional embedding characteristics. Factors such as the high proportion of state-owned enterprises, the participation of party organizations in governance, and frequent adjustments to regulatory policies all affect the content, form of information disclosure, and its interpretation in the market [12]. This institutional environment not only influences the incentive mechanism of IPO information disclosure, but also affects its functional path on corporate investment efficiency [13]. Therefore, when analyzing the relationship between IPO information disclosure quality and investment efficiency, governance heterogeneity and institutional environment must be taken as important considerations.

3.4 Construction of the analytical framework

Based on the above theoretical foundation, this paper constructs an integrated analytical framework of "ESG Information Disclosure Quality—Functional Path—Institutional Regulation—Investment Efficiency" to systematically reveal the internal logic of how ESG information disclosure during the IPO stage affects investment efficiency. In this framework, ESG information disclosure quality, as the core independent variable, directly affects investment efficiency through two paths: First, the information asymmetry alleviation path—high-quality disclosure reduces the information gap between investors and enterprises, eases financing constraints, and provides financial support for high-quality investment projects [2-3]; second, the governance mechanism optimization path—the governance dimension in ESG improves enterprises' internal decision-making mechanisms and restrains inefficient investment behaviors [8]. Meanwhile, the institutional environment (ownership nature, participation of party organizations in governance) and industry characteristics act as moderating variables, exerting heterogeneous impacts on the above paths: state-owned enterprises may strengthen the disclosure effect due to stricter compliance constraints, and energy-related enterprises may see a more significant impact of environmental dimension disclosure due to high environmental attention [12-13]. By conducting a cross-case comparison of Contemporary Amperex Technology Co., Limited (private manufacturing enterprise), China Three Gorges Renewables (Group) Co., Ltd. (state-owned energy enterprise), and XPeng Inc. (private technology enterprise), this paper will verify the applicability of the above framework and reveal the contextual dependence and dynamic mechanism of how ESG information disclosure affects investment efficiency.

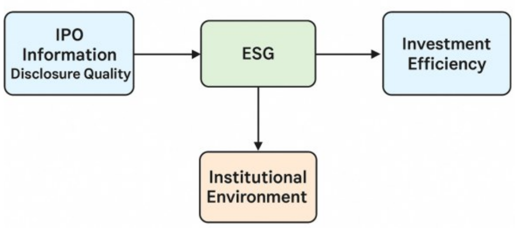

Figure 1 Analytical framework of the impact of IPO information disclosure quality on investment efficiency from the ESG perspective

4 Case analysis

4.1 Basis for case selection

Following the principles of "typicality, heterogeneity, and data availability", this paper selects three enterprises, namely Contemporary Amperex Technology Co., Limited (hereinafter referred to as "CATL"), China Three Gorges Renewables (Group) Co., Ltd. (hereinafter referred to as "China Three Gorges Renewables"), and XPeng Inc.-W (hereinafter referred to as "XPeng Motors"), as the case study objects [12-13]. The specific selection basis is as follows:

Typicality: All three enterprises are industry leaders that completed their IPOs after 2018, enjoying high market attention. Their ESG disclosure and investment behaviors have demonstration effects in the industry [6-7].

Heterogeneity: In terms of ownership, China Three Gorges Renewables is a state-owned enterprise, while CATL and XPeng Motors are private enterprises; in terms of industry, they cover three key fields of ESG disclosure, namely manufacturing, energy, and technology; in terms of ESG disclosure quality, the three enterprises show obvious gradient differences, providing a natural scenario for comparative analysis [8].

4.2 Basic overview of case enterprises

To facilitate an intuitive comparison of the basic conditions and ESG information disclosure characteristics of different types of enterprises during the IPO stage, this paper selects CATL, China Three Gorges Renewables, and XPeng Motors as case study objects, and sorts out their main business, IPO time and location, ESG disclosure focus, and use of raised funds (see Table 1).

Table 1

Company	Main Business	IPO Time & Exchange	ESG Disclosure Focus	Use of Proceeds
CATL (Contemporary Amperex Technology Ltd.)	R&D and manufacturing of power batteries and energy storage batteries	June 2018, ChiNext, Shenzhen Stock Exchange	Environment: carbon reduction, green supply chain management; Governance: R&D compliance	Expansion of power battery production and technology R&D projects
CTG New Energy (China Three Gorges New Energy)	Development and operation of clean energy (wind, solar, etc.)	May 2021, Main Board, Shanghai Stock Exchange	Environment: installed capacity, carbon reduction; Social: rural revitalization, employment security	Construction of wind and photovoltaic power stations
XPeng Motors	R&D and manufacturing of smart electric vehicles	Aug 2020, NYSE; Jul 2021, HKEX (dual listing)	Governance: data security, autonomous driving safety; Social: user rights protection; Environment disclosure relatively weak	R&D of autonomous driving technology and construction of production bases

4.3 Data sources and processing

This paper adopts the multi-source data triangulation method to ensure the authenticity and complementarity of the data. The specific data sources are as follows:

Public Disclosure Documents: The IPO prospectuses (focusing on extracting chapters such as "Risk Factors", "Use of Raised Funds", and "Environmental Protection and Social Responsibility"), annual ESG reports, and annual financial reports of the three enterprises, all obtained from official channels such as stock exchange websites and enterprise official websites.

· Third-Party Rating Data: ESG rating reports and scoring guidelines of the three enterprises released by SynTao Green Finance and MSCI, which are used to cross-verify the self-constructed disclosure quality scores.

· Authoritative Databases: Financial indicator data (such as capital expenditure, R&D investment, return on assets, etc.) from the CSMAR Database and Wind Database, which are used to calculate investment efficiency indicators.

· Media and Industry Reports: Reports on the IPO and investment behaviors of the three enterprises by mainstream financial media, and new energy industry development reports released by industry analysis institutions, which are used to supplement qualitative analysis materials.

In the process of data processing, coding analysis is conducted on text data (prospectuses, ESG reports), and standardization processing is performed on numerical data (financial indicators, rating scores) to ensure the comparability of the data and the scientificity of the analysis.

4.4 Construction of indicator system

With reference to the disclosure framework of the International Sustainability Standards Board (ISSB) and the domestic *Guidelines on ESG Information Disclosure of Listed Companies*, the ESG information disclosure quality evaluation system constructed in this study includes four first-level dimensions: disclosure breadth, disclosure depth, disclosure accuracy, and disclosure timeliness.

· Disclosure Breadth (30 points)

It mainly examines the coverage of enterprises in the three dimensions of environment, society, and governance. For example, the environmental dimension includes carbon emissions and energy consumption, the social dimension involves employee rights and supply chain responsibility, and the governance dimension covers board structure and compliance mechanisms. The more comprehensive the coverage of dimensions, the higher the score; if only part of the content is involved, the score will be reduced accordingly.

· Disclosure Depth (30 points)

It evaluates whether enterprises quantify and elaborate on the disclosed indicators. For instance, whether specific carbon emission reduction data, installed capacity, or detailed improvement plans are provided. If more than 80% of the indicators have quantitative data, the highest score is given; if general descriptions are used instead, the score is lower.

· Disclosure Accuracy (20 points)

It measures the source and reliability of the disclosed data. This includes whether the data source is clearly indicated, whether the data has been verified by third-party institutions, and whether there is independent audit certification. The more transparent the data and the more sufficient the verification, the higher the accuracy score.

· Disclosure Timeliness (20 points)

It examines the timeliness and update frequency of enterprise disclosure. For example, whether a special ESG report is disclosed simultaneously during the IPO stage, and whether annual ESG reports are released on time after listing. If reports are only released occasionally or irregularly, the score will be lower [6-8].

5 Case analysis

5.1 Comparison of ESG information disclosure quality among case enterprises

Based on the aforementioned evaluation system, quantitative scoring and qualitative analysis were conducted on the ESG information disclosure quality of the three enterprises during the IPO stage, and the results are as follows:

China Three Gorges Renewables achieved balanced coverage across the three dimensions. Its environmental indicators were detailed to the project level (e. g., installed capacity of wind power and photovoltaics, and carbon emission reduction volume). Meanwhile, it disclosed information on Party building and social responsibility, and maintained the continuity and standardization of report updates. Its disclosure was comprehensive with detailed data, and some contents were verified, resulting in a total score of 95, the highest among the three enterprises.

CATL performed outstandingly in the environmental and governance dimensions. It provided detailed quantitative data on carbon emission reduction, green supply chain management, and R&D compliance, and obtained third-party green certification, which enhanced the credibility of its disclosure [6-7]. However, its disclosure in the social dimension was relatively limited, with a total score of 89, ranking second after China Three Gorges Renewables.

XPeng Motors' ESG disclosure mainly focused on the governance dimension, emphasizing data security and intelligent driving safety. Nevertheless, its disclosure in the environmental and social dimensions was mostly qualitative descriptions, lacking quantitative data and external verification, which led to insufficient transparency and reliability. With a total score of only 73, it remained at a relatively low level.

In summary, China Three Gorges Renewables obtained the highest score, reflecting the systematic nature of ESG disclosure by state-owned enterprises under policy pressure and compliance constraints; CATL showed balanced performance in governance and environmental dimensions but still had room for improvement in the social dimension; although XPeng Motors had certain characteristics in governance, its overall ESG disclosure was not comprehensive enough, with obvious shortcomings especially in the environmental and social dimensions [11-13].

5.2 Analysis of the relationship between ESG information disclosure quality and investment efficiency

5.2.1 Comparison of investment decision rationality

In terms of the completion rate of raised funds utilization, China Three Gorges Renewables and CATL performed excellently [12-13]: China Three Gorges Renewables planned to invest 15 billion yuan in clean energy projects through IPO, and actually completed an investment of 14.8 billion yuan within two years after listing, with a completion rate of 98.7%; CATL planned to invest 5.4 billion yuan in power battery projects, and actually completed 5.28 billion yuan, with a completion rate of 97.8%. Both enterprises strictly used funds in the directions disclosed in the prospectus, demonstrating clear investment planning and strong execution.

XPeng Motors planned to invest 10 billion yuan in technology R&D and production base construction, but only completed 7.8 billion yuan within two years after listing, with a completion rate of 78%. Additionally, 1.5 billion yuan was reallocated to the marketing field, deviating from the originally disclosed purpose [9]. In terms of R&D investment ratio, CATL and XPeng Motors showed a technology-oriented tendency with ratios of 10.5% and 15.2% respectively. However, only 30% of XPeng Motors' R&D investment was allocated to green technology fields, showing insufficient alignment with the ESG positioning of new energy enterprises; although China Three Gorges Renewables had a low R&D investment ratio of only 3.8%, 100% of it was invested in clean energy technology upgrading, which was highly consistent with the disclosed environmental strategy [6-7].

5.2.2 Comparison of investment effectiveness

In terms of operating performance within two years after listing, significant differences emerged among the three enterprises: China Three Gorges Renewables' return on assets (ROA) increased from 8.2% before listing to 10.5%, with a stable revenue growth rate of around 25%. High-quality environmental information disclosure attracted a large amount of green investment, reducing financing costs by approximately 1.2 percentage points, and the cash flow return of investment projects exceeded expectations. CATL's ROA rose from 12.8% to 15.3%, with a revenue growth rate of 60%. The disclosed green supply chain management information enhanced the cooperation confidence of downstream vehicle manufacturers, and the investment in capacity expansion projects quickly formed capacity advantages. XPeng Motors' ROA improved from -5.2% before listing to -2.1%, but its revenue growth rate dropped from 45% to 28%. Insufficient environmental information disclosure hindered its application for green financing tools, and market doubts about its long-term sustainability affected investor confidence, restricting the release of investment effects [9-10].

5.2.3 Analysis of mechanisms and contextual differences

Combined with the case analysis results, ESG information disclosure quality affects investment efficiency mainly through the following mechanisms:

Financing Constraint Alleviation Mechanism: High-quality ESG disclosure reduces information asymmetry, helping enterprises obtain funds at lower costs, and the use of funds is more focused on long-term projects [1-3, 6-7]. China Three Gorges Renewables obtained green bond issuance qualifications relying on detailed environmental disclosure, with financing costs 0.8 percentage points lower than the industry average; CATL gained international capital recognition through ESG ratings, resulting in smoother cross-border financing channels [7].

Governance Mechanism Optimization Mechanism: Disclosure of the ESG governance dimension promotes enterprises to improve internal decision-making processes and suppress short-termism tendencies [8]. The "R&D Decision Committee" system disclosed by CATL in its prospectus ensures the sustainability of R&D investment; the "Party Organization Participation in Major Investment Decisions" mechanism disclosed by China Three Gorges Renewables reduces investment risks [12-13].

At the same time, the moderating role of ownership and industry characteristics is significant: state-owned enterprises (China Three Gorges Renewables) have a stronger signaling effect of ESG disclosure due to stricter compliance constraints and credibility endorsement [12]; the correlation between environmental dimension disclosure and investment efficiency is closer in energy and manufacturing enterprises (China Three Gorges Renewables, CATL), while the impact of governance dimension disclosure is more prominent in technology enterprises (XPeng Motors). However, the lack of environmental dimension will weaken the overall effect [9-11].

6 Research limitations and prospects

6.1 Research limitations

6.1.1 Limited case samples

This study only selects three enterprises (CATL, XPeng Motors, and China Three Gorges Renewables) for case analysis. Although they cover different industries, the limited number of samples makes it difficult to fully represent the ESG disclosure characteristics and investment efficiency of all IPO enterprises, and the extrapolation of conclusions requires caution.

6.1.2 Short data time window

Due to the relatively recent IPO timing, this study mainly tracks and observes the investment efficiency of enterprises within 2–3 years after listing, lacking long-term dynamic testing. It cannot fully reflect the long-term role of high-quality information disclosure in improving investment efficiency.

6.1.3 Subjectivity in disclosure quality measurement

Currently, there is no unified and quantitative IPO ESG information disclosure standard in China. This study mainly conducts evaluations based on public information and self-constructed indicators, which involves certain subjective judgments. In the future, it is necessary to introduce more third-party quantitative rating data to improve objectivity.

6.1.4 Complex impact of institutional and industry differences

China's capital market system and governance environment are complex, with significant differences in ESG disclosure requirements and market reactions among enterprises in different industries and with different ownership types. This study fails to fully analyze the interaction of various institutional variables in the cases, which may affect the detailed characterization of mechanism paths.

6.2 Research prospects

6.2.1 Expanding samples and diversifying methods

Future research can combine large-sample empirical methods on the basis of case studies to conduct multi-dimensional cross-validation of the relationship between ESG disclosure quality and investment efficiency of IPO enterprises, thereby improving the universality and statistical robustness of conclusions.

6.2.2 Extending the time window and conducting dynamic tracking

The observation period can be extended to 5 – 10 years after listing to dynamically evaluate the impact of ESG information disclosure during the IPO stage on enterprises' long-term investment and financing efficiency, capital market performance, and sustainable development.

6.2.3 Refining the disclosure evaluation system

In the future, based on existing studies, text mining and quantitative scoring can be conducted on IPO prospectuses and ESG reports with the help of third-party rating agency data or natural language processing technologies, improving the scientificity and objectivity of disclosure quality evaluation.

6.2.4 In-depth exploration of the moderating role of institutional environment

In the future, comparisons can be made between samples of state-owned and private enterprises, and under different regulatory systems to explore the moderating mechanisms of unique variables such as institutional embedded factors and Party organization governance participation on the relationship between IPO information disclosure and investment efficiency, enriching the theoretical connotation in the Chinese context.

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