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Research on the Impact of Information Asymmetry in Financial Markets on New Quality Productive Force Industries

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Abstract

This paper investigates the impact of information asymmetry on the development of new quality productive force industries within financial markets, with a focus on optimizing capital allocation efficiency. Utilizing the Capital Asset Pricing Model (CAPM) and the Fama-French three-factor model, the study analyzes the challenges faced by these emerging sectors, including difficulties in financing, talent acquisition, market acceptance, and industry-university collaboration. The findings reveal that information asymmetry significantly distorts asset valuations, leading to misallocated resources and hindering industry growth. To mitigate these effects, the paper proposes strategies such as enhancing fiscal transparency, leveraging venture capital, and applying big data and AI technologies for dynamic credit ratings. The research underscores the necessity of addressing information gaps to foster sustainable development in new quality productive force industries.

Keywords

New Quality Productive Force, Information Asymmetry, the Capital Asset Pricing Model (CAPM), the Fama-French three-factor model

1. Introduction

New quality productive force is a new concept proposed by China to promote economic growth and address both challenges and opportunities worldwide. At the Fourth Plenary Session of the 20th Central Committee of the Communist Party of China, the notion of "achieving remarkable results in high-quality development" was highlighted as the main goal [1]. Suggestions for continuously developing new quality productive force have risen to an even more prominent strategic position in various fields, such as artificial intelligence, new energy, aerospace engineering and biomedicine.

Nowadays, new quality productive force serves as a guiding path for innovation. It breaks away from the traditional way of increasing economic output and developing productivity, characterized by high-tech, high-efficiency, and high-quality features, and promotes the growth of the entire society [2]. However, China faces

both domestic and international risks. Domestically, the traditional growth model, which heavily relies on resource input and demographic dividends, is no longer suitable for today's development. At the same time, China encounters numerous challenges abroad, such as technological revolutions and industrial evolution. In such circumstances, it is extremely important for China to seek new economic models and transform with new effective ideas. In hence, with the fast-paced world, new quality productive force is one of the significant keys for us to overcome every barrier in the future. There are undoubtedly many studies on new quality productive force, mainly focusing on its generative logic, meanings, characteristics, and empowerment.

However, the problem of information asymmetry remains a major challenge, which has a great impact on the financing phase, talent matching process, market acceptance phase, and so on of new quality productive force. Yet, only a few studies have addressed this issue. Therefore, this review focuses on how asset pricing models can be used to mitigate the impacts of information asymmetry in the market, aiming to optimize capital allocation efficiency. The paper summarizes issues related to new quality productive force, asset pricing models, as well as suggestions and strategies.

2. New Quality Productive Force Issues in Information Asymmetry Market

In current studies, most industries in every field are encountering the challenges of information asymmetry, including the growth of new-quality productive forces. Only those who find solutions to address it can develop in a stable way.

2.1 In the Financing Stage

It is necessary for entrepreneurs to present the advantages and progress of their companies when seeking investors to invest in them. Therefore, managers take responsibility for optimizing their reports about the technological content, prospects, and team capabilities of a cutting-edge technology project to attract investors to make profits with them [3]. However, in an information-asymmetric market, some tricky managers would overvalue their progress with fake statistical graphs and evidence to earn financing support. In that case, investors must try their best to figure out the true value of the company instead of just listening to the words of the managers. However, since the information is asymmetric, it is difficult for investors to evaluate the development status and prospects of the company. Especially, the new quality productive forces create and manufacture cutting-edge technologies. Without effective estimation, investors may not easily trust the new entities, thus widening the financing gap.

2.2 In the Talent-Matching Phase

In companies of the new quality productive forces, employers prefer candidates with the ability to cope with high-tech problems and creativity, who can enable the production of high-quality, high-performance products that generate profits for the company and drive its development. Most job seekers are aware of this requirement, and thus they tend to exaggerate their capabilities during interviews to win recognition from interviewers and secure job opportunities [4]. However, their actual abilities often fall short of their self-proclaimed standards, resulting in a waste of company resources. Due to information asymmetry, enterprises focused on new-quality productive forces find it challenging to accurately evaluate the true capabilities of job applicants. Therefore, to secure suitable talent, enterprises need to invest more time and effort in evaluating job applicants [5]. While job applicants, in turn, must strive to acquire a broader range of knowledge and skills within high-tech enterprises to address emerging challenges.

2.3 In the Market Acceptance Phase

The requirements and acceptance of consumers are predominant factors for goods, especially new products, which determine whether the product can sustain profitable production over time [6]. When new innovative products emerge, high-tech manufacturers should convey the concepts, characteristics, and meanings to the market, highlighting the product's competitive advantages to attract customers, earn consumer preference and recognition, and ultimately drive sales growth. Nevertheless, today's consumers are highly discerning. Being aware of information asymmetry, they prioritize cost-effectiveness in purchasing decisions rather than making impulsive purchases. Similarly, most products can only be seen on the internet rather than displayed in shops. Customers cannot truly try them in person. Thus, they would read comments about the products to evaluate

their inner value instead of obtaining brief introductions from enterprises. Therefore, enterprises need to develop more practical products to meet customer demands.

2.4 In the Industry-University-Research Collaboration Stage

Universities are places to train professionals across every industry, channeling graduates into diverse careers to promote the growth of society [7]. Yet rapid technological advancement has increased demands for high-tech positions, resulting in applicants facing employment disconnections due to inadequate qualification alignment with job standards. At the same time, because of information asymmetry, most higher education institutions do not have the ability to access the newest information to transform their education plans, delaying the provision of skillful knowledge to students. In order to find a job, not only should universities stay abreast of the latest cutting-edge information in real time, but also graduates must adapt to the trend of change, get familiar with the news in a timely manner, and increase their self - competitiveness to face every challenge in the future.

Through reviewing existing studies, it has been found that only a limited number of studies have addressed the relationship between new quality productive forces and information asymmetry, without providing detailed explanations. However, it is crucially important for industries, investors, customers, and universities to understand the basic ideas of the results and solutions regarding information.

3. Asset Pricing Model Predicting the Value of New Quality Productive Force Industries

This essay employs the Capital Asset Pricing Model (CAPM) and the Fama-French three-factor model to evaluate the role-model company representing the new quality productive force. Undoubtedly, China has numerous outstanding enterprises, such as iFLYTEK in artificial intelligence, Contemporary Amperex Technology Co., Limited (CATL) in new energy, and Jiangsu Hengrui Pharmaceuticals Co., Ltd. in biopharmaceuticals. This passage selects iFLYTEK as a representative case to evaluate the broader industry. iFLYTEK is an enterprise centered on intelligent speech technology. It operates across multiple high-value application scenarios, including education, healthcare, and smart cities. Its capabilities in technological iteration and commercialization hold vital research value. This value is important for systematically pricing the systematic risk of industry valuation models for the new quality productive force.

3.1 Capital Asset Pricing Model (CAPM)

As a prominent model of the new quality productive force company, iFLYTEK's stock price fluctuations are closely linked to the economic market. This makes it suitable for valuation in CAPM.

Based on daily return data from 2023-2025 for iFLYTEK and the CSI 300 Index, regression analysis using Excel yielded a β value of 1.28. Furthermore, using data published by Tonghuashun, the risk-free rate was determined to be 3.16%, and the CSI 300 index was -0.12%. Applying the formula $Ri = Rf + \beta i \times (Rm - Rf)$, the expected return was calculated to be -1.04%. This value indicates that under the current combination of negative market portfolio returns and a low risk-free rate, the model-derived expected return is negative. This reflects the capital market's pessimistic pricing regarding short-term economic growth and risk. For the new quality productive forces industries, which require substantial capital, funding, and talent investment. This negative expected return signals multiple warnings to the market. It reflects the phenomenon that current high-tech enterprises face profitability challenges. They may experience short-term revenue declines due to factors like technological iteration, prolonged R&D timelines, intensified market competition, and information asymmetry. This phenomenon indicates that while the sector possesses significant growth potential, it remains fraught with risks. These risks include bottlenecks in technological breakthroughs, funding chain pressures, and economic market lag. This will slow the pace of new productive forces development. Simultaneously, the negative expected return signals a period of survival of the fittest within the industry. Resources will concentrate on leading enterprises. Small and medium-sized enterprises must stabilize their market positions through technology commercialization, funding chain stability, or government support. Of course, the passage of time is crucial for all enterprises in new-quality productive forces to achieve growth.

However, the CAPM model has limitations, particularly in markets with information asymmetry. This stems from the conflict between its idealized assumptions and complex realities. In such markets, insiders

possess significantly different information from external investors. Lacking more useful data, they may assign biased valuations to assets. Consequently, the beta values relied upon by CAPM fail to accurately reflect true systematic risk. They cannot effectively mitigate the impact of unsystematic risk on a company's actual returns. Worse still, those with information advantages can adjust valuation strategies more rapidly. Those lagging in information amplify price deviations. This exacerbates arbitrage activities, damaging market equilibrium. Consequently, the bias in effective data and the absence of key factors due to information asymmetry in the market severely limit the predictive power of CAPM valuations for this industry. They fail to reflect its true state. Therefore, introducing a multi-factor model enables a more accurate valuation of iFlytek. It facilitates effective forecasting of new productive forces in markets characterized by information asymmetry.

3.2 The Fama-French Three-Factor Model

Multi-factor models are quantitative investment frameworks. They explain asset returns through multiple risk factors. By selecting key variables such as firm size, book-to-market ratio, profitability, and momentum effects, these models comprehensively assess their contributions to corporate asset returns. This captures the diverse factors influencing company value more holistically. This model overcomes the limitations of the single-factor framework of the Capital Asset Pricing Model (CAPM). It incorporates diverse dimensions such as size, value, profitability, and momentum factors to construct a richer risk exposure matrix. Its advantages manifest in corporate valuation practice through multiple aspects. First, the multidimensional factor structure effectively captures corporate heterogeneity. By decomposing the combined effects of systematic and unsystematic risk, it enhances adaptability for valuing companies across different industries and life cycle stages. Second, empirical research indicates that multi-factor models significantly outperform CAPM in explaining cross-sectional returns. Particularly in inefficient markets or during style rotation phases, dynamic factor weight adjustments enable more precise reflection of true corporate value. Third, by incorporating fundamental quantitative metrics. This model deeply integrates valuation processes with micro-level firm characteristics. It effectively avoids the systemic valuation biases arising from CAPM's oversimplification of risk structures, providing more robust theoretical support for investment decisions.

Therefore, based on CAPM and using market data, the SMB size factor is estimated at 1.03%, the HML [8] book-to-market ratio factor at 1.14%, and the ERP [9] market risk premium mean at 6.93%. The average SMB premium is set at 0.63%, and the average HML premium at 0.58%. Applying the formula $Re = Rf + \beta*ERP + SMB*SMB + HML*HML$ yields an equity cost of capital (Re) of 12.01%. These figure captures the dual nature of iFlytek as a representative enterprise of new productive forces. It shows the market's positive expectations for the future high-growth potential of new productive forces. It also shows its prudence regarding the inherent high-risk characteristics in their development process. Specifically, iFlytek's expected return level exceeds that of traditional industries. This reflects the market's demand for risk compensation due to characteristics such as accelerated technological iteration, high R&D expenditures, and extended profit cycles. This underscores its essence as a technology-driven growth enterprise. Within the new quality productive forces sector, this figure further reveals common industry patterns. These patterns include persistent significant uncertainties amid business model innovation and regulatory environments. This leads to higher capital costs and more volatile valuations. In summary, this cost of equity reveals how the market approaches serving national strategic emerging industries. It not only assigns higher valuations to bolster confidence in long-term prospects but also sets higher required returns to balance short-term operational risks and technological implementation uncertainties. This creates a dynamic risk-return trade-off mechanism.

4. Strategies for Optimizing Capital Allocation Efficiency

It is important to find suitable ways for the new quality productive forces industries to improve how resources are given out in information asymmetry markets. This article explores three dimensions about the government, the market, and the technology.

4.1 Government Level

In making policies for the new quality productive forces, more is needed than just allocating funds and orders. Providing enterprises with greater access to information is much more important. Consequently, a system for fiscal transparency should be set up and combined both regulation and service [10].

For regulation, a "full cycle, differentiated" disclosure supervision system is required. This system will make sure companies are open about their budgets. It will also help serve the new quality productive forces. The People's Congress will review and ask questions. With finance and audit departments should formulate detailed rules, carry out routine supervision, and perform special audits. Then the third-party evaluations and rankings should create external pressure. Design "evidence-based quantitative" regulatory standards and evaluation metrics. These should turn transparency requirements into quantifiable key performance indicators (KPIs). They should distinguish between basic and high-quality disclosures. Implement a "tiered and categorized" closed-loop accountability mechanism. Apply different measures based on evaluation outcomes. Establish separate regulatory standards for critical sectors. Draw on modern regulatory concepts to maintain strict bottom lines while preserving space for innovation. This addresses the standardization, authenticity, and enforceability of disclosures, ensuring routine and high-quality disclosure.

In terms of service delivery, establish a "user-oriented, intelligent collaboration" public information service platform. This platform should directly support corporate decision-making through disclosure data. Positioned as a one-stop fiscal big data portal for enterprises, the platform should have core functions including intelligent aggregation, industry mapping, policy matching and push notifications, data toolkits. Ensure the stability of the platform's foundation and data flow through key technical approaches about data standardization, a "central kitchen-branch" architecture, open ecosystem development. Adopt a "government-enterprise collaboration" operation and maintenance model. Establish user feedback channels and incorporate digital inclusive design. This design reflects the concepts of digital governance and service-oriented government. As a hub for allocating data as a production factor, the platform reduces enterprises' information search and decision-making costs. It addresses issues of information accessibility, readability, and usability. It provides digital infrastructure for the development of new productive forces.

4.2 Market Level

Within the capital market's role in regulating factors, venture capital and industrial clustering show distinct yet critical mechanisms. These mechanisms reduce market information asymmetry and its negative effects on enterprises.

Venture capital plays a key role in market factor regulation through three mechanisms [11]. Directly, it eases corporate financing challenges, improves operational efficiency, and directly drives the advancement of new quality productive forces. Regarding environmental regulation, regional financial development and marketization levels are particularly important. In areas with mature financial environments and high marketization, venture capital has a more pronounced effect on promoting new-quality productivity. Additionally, when supporting the transformation of specialized, refined, distinctive, and innovative enterprises, venture capital and patient capital can work together to jointly facilitate corporate transformation.

Industrial clustering also uniquely affects market factors [12]. Through knowledge spillovers and economies of scale, it has a positive impact on new-quality productive forces. Their synergy further pushes industries toward high-end development, such as increasing the technological complexity of exports. At the same time, industrial clusters serve as important intermediary transmission channels. They spread the benefits of new-quality productive force development across entire industrial chains. This drives coordination among all chain segments and advances industrial chain modernization.

4.3 Technological Level

At the technological level, new productive forces are constantly evolving [13]. The computational power of big data and AI is becoming more and more intelligent. This enables their application in credit rating systems for enterprises and investors. This allows for early risk prediction, helping businesses proactively guard against risks in markets with information asymmetry.

Traditional credit rating models rely on manual review and static rules. They suffer from low efficiency, high error rates, and limited coverage. The integration of big data and AI provides dynamic, intelligent solutions. Financial institutions can collect unstructured data such as credit histories, transaction records, social media behavior, and device usage patterns. Combined with real-time dynamic data like location trajectories and transaction frequencies from IoT devices, this forms a feature variable database with over 1,000 dimensions. For example, Alipay's "Intelligent Risk Control Brain" analyzes over 10,000 dimensions of data,

including user login devices, transaction habits, and social networks, to achieve efficient fraud detection. It intercepts over 10 billion yuan in suspicious transactions annually. More commonly, federated learning techniques are used to train risk prediction models. Feature engineering selects key indicators, while cross-institutional data federated modeling improves model accuracy while protecting user privacy. Finally, models must provide a scoring rationale, such as "low credit score due to two credit card delinquencies in the past six months". This helps users understand the rating logic and proactively improve credit behavior.

5. Conclusion

This study focuses on resource allocation issues. These issues arise in the development of new quality productive forces within information asymmetry markets. Through empirical analysis using the Capital Asset Pricing Model (CAPM) and the Fama-French three-factor model, the study reveals the relationship. The dynamic relationship exists between technological iteration speed, R&D investment cycles and capital costs. The research proposes innovative solutions. These include a "regulation-service" dual-wing architecture and big data credit rating systems. Findings indicate that equity costs for enterprises like iFlytek are significantly higher than those in traditional industries. This validates the high-risk, high-return characteristic. Meanwhile, piloting public information service platforms shortens financing cycles. This demonstrates the effectiveness of digital governance in reducing information asymmetry.

Despite its innovations, the study has limitations. These include insufficient data timeliness, limited industry coverage, and lack of control over policy variables. Future research should establish a quarterly data tracking system. This system should incorporate metrics like technology patents and R&D investment. It should expand cross-industry studies, such as in the biopharmaceutical sector. It should also introduce variables like fiscal subsidies and tax incentives into the model. Policy simulations assessing the impacts on capital flow would enhance the study's reliability.

This study explains the high-return requirements observed in the new quality productive forces industries. Its public information service platform and dynamic pricing model are replicable. Subsequent research could integrate complex network analysis, technology lifecycle pricing, and behavioral finance theory. It could conduct cross-national comparative studies. This would fill gaps in technology pricing theory for developing countries. It would provide universal references for policymakers and market entities.

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