

The Influence Effect of Financial Transparency on Enterprise Innovation Investment—Based on the Mediating Role of Financing Constraints

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Abstract. This study explores how fiscal transparency alleviates corporate financing constraints and thereby impacts innovation investment. Through theoretical modeling and empirical analysis, it utilizes fiscal data and corporate micro-data from the Guotai An database, with data trimmed at the 1st and 99th percentiles to eliminate outliers. The findings reveal that higher fiscal transparency significantly eases financing constraints by reducing information asymmetry, curbing rent-seeking, and improving regional credit environments, which in turn expands enterprises' accessible capital and stimulates greater resource allocation to innovation. Benchmark regression confirms a positive correlation between fiscal transparency and innovation investment, with heterogeneity analysis showing a more pronounced effect on small and medium-sized enterprises. Robustness tests validate these results. This research enriches relevant theoretical studies and offers policy insights for governments to enhance fiscal transparency, optimize financing environments, and boost corporate innovation capabilities, while providing practical guidance for enterprises in formulating financing and innovation strategies.

Keywords: Financial transparency, Corporate financing constraints, Innovation investment

1. Introduction

In today's increasingly competitive global economy, innovation has become the core driver for sustainable corporate development and economic restructuring. However, enterprises' innovation activities heavily rely on sufficient and stable funding support, with financing constraints often serving as a key factor limiting innovation investments. Meanwhile, fiscal transparency – a crucial dimension of government governance and market environment – is playing an increasingly prominent role in macroeconomic regulation and micro-level corporate behavior. Fiscal transparency reflects the comprehensiveness, accuracy, and timeliness of government financial information disclosure. Higher fiscal transparency not only helps market participants accurately grasp the direction of government fiscal policies and reduce information asymmetry, but may also profoundly impact corporate financing environments. Theoretically, enhanced fiscal transparency could alleviate corporate financing constraints by boosting market confidence and optimizing resource allocation, thereby creating more favorable funding conditions for innovation investments.

Yet whether this relationship holds true in the complex real-world economic environment, along with its mechanisms and extent, requires further exploration.

While previous studies have explored fiscal transparency, corporate financing constraints, and innovation investment, most focus on single factors without systematic analysis of their interconnections, particularly in addressing firm heterogeneity. In reality, multiple factors—including firm size, age, profitability, debt-to-asset ratio, equity concentration, revenue growth rate, industry classification codes, year-specific data, and ownership structure—may influence how fiscal transparency affects corporate financing constraints and innovation investments differently. For instance, large enterprises might leverage their resource advantages and strong reputation to respond differently to changes in fiscal transparency compared to smaller firms in terms of financing constraints and innovation decisions. Similarly, companies with varying equity concentrations may adopt distinct financing strategies and innovation approaches due to differences in their internal governance structures.

Building on this foundation, this study employs rigorous empirical research methods to comprehensively examine multiple variables, conducting an in-depth analysis of how fiscal transparency alleviates corporate financing constraints and how these effects further influence enterprise innovation capabilities. By collecting multi-dimensional corporate data and fiscal statistics, we precisely identify the intrinsic relationships between variables. This approach aims to enrich theoretical research in related fields while providing practical decision-making references for governments to formulate fiscal transparency policies and enterprises to optimize financing and innovation strategies.

2. Theoretical analysis and research hypothesis

Fiscal transparency can alleviate corporate financing constraints through multiple mechanisms. Specifically, enhanced fiscal transparency significantly reduces information asymmetry between governments and enterprises, as well as between enterprises and external investors. This allows companies to better understand policy orientations and fiscal fund allocation rules, thereby reducing financing barriers caused by information silos [1]. Moreover, a transparent fiscal system helps curb corruption and rent-seeking behaviors while promoting market-oriented resource allocation, enabling high-quality enterprises to secure financing through fair competition [2]. Additionally, fiscal transparency strengthens credit expectations between government and businesses, improves regional credit environments, and attracts financial institutions to increase credit support for local enterprises [3]. Based on these logical premises, we propose the following research hypothesis:

H1: Fiscal transparency shows a significant positive correlation with corporate innovation investment, meaning higher fiscal transparency correlates with greater innovation investment by enterprises. Enhanced fiscal transparency creates a more stable and predictable external environment for corporate innovation activities. On one hand, transparent fiscal information reduces information asymmetry between government and businesses, enabling companies to better understand government industrial policy orientations (such as R&D subsidies and tax incentives), thus allowing them to formulate targeted innovation plans and increase investments. On the other hand, high fiscal transparency indicates stronger regulatory compliance in regional governance, which mitigates innovation risks caused by policy uncertainties. This enhances corporate confidence in the long-term returns of innovation projects, thereby encouraging them to allocate more resources to R&D activities.

H2: Fiscal transparency indirectly promotes innovation investment by alleviating corporate financing constraints, indicating that financial constraints serve as a mediating factor between fiscal

transparency and enterprise innovation investment. Fiscal transparency may exert indirect effects on innovation investment through easing financing constraints. A transparent fiscal environment sends positive signals to the market, enhances regional creditworthiness, reduces risk premium expectations for local enterprises among external investors, thereby facilitating easier access to external funding such as bank loans and equity financing. Moreover, regions with high fiscal transparency typically exhibit more standardized government interventions, which help reduce irrational allocation of financial resources and channel more capital into innovation sectors of real enterprises, thereby alleviating constraints on innovation investment caused by capital shortages [4]. This rationale forms the basis for the proposed research hypothesis.

3. Model construction

3.1. Data sources

The data in this study were sourced from the Guotai An database. To ensure robustness and reliability of the results, thereby enhancing the persuasiveness of subsequent empirical analysis conclusions, we applied tail trimming at the 1st and 99th percentile quantiles. This approach effectively eliminated potential impacts of outliers on the research outcomes.

3.2. Positivism model

3.2.1. Basic regression model

In order to further explore the impact of financial transparency on enterprise innovation investment, this study constructs a basic regression model. The specific model is set as follows:

$$gi_{i,t} = a + \beta_1 gov_{i,t} + \beta_2 soe_{i,t} + \beta_3 lev_{i,t} + \beta_4 age_{i,t} + \beta_5 growth_{i,t} + \beta_6 size_{i,t} + \varepsilon_{i,t}$$

3.2.2. The intermediary model

To further verify the mediating role of financing constraints between fiscal transparency and corporate innovation investment, this study constructs a mediation model. Specifically, we first establish a regression equation with a basic regression model structure using corporate financing constraints (SAw) as the dependent variable, thereby investigating the impact of fiscal transparency on corporate financing constraints. The specific equation is as follows:

$$SAw_{i,t} = a_1 + \beta_{11} gov_{i,t} + \beta_{12} soe_{i,t} + \beta_{13} lev_{i,t} + \beta_{14} age_{i,t} + \beta_{15} growth_{i,t} + \beta_{16} size_{i,t} + \varepsilon_{1i,t}$$

Then, taking the enterprise innovation input as the dependent variable and incorporating fiscal transparency and enterprise financing constraints variables, the following equation is constructed:

$$gi_{i,t} = a_2 + \beta_{21} gov_{i,t} + \beta_{22} SAw_{i,t} + \beta_{23} soe_{i,t} + \beta_{24} lev_{i,t} + \beta_{25} age_{i,t} + \beta_{26} growth_{i,t} + \beta_{27} size_{i,t} + \varepsilon_{2i,t}$$

3.3. Variable declaration

Dependent variable: Enterprise innovation input (gi)

Core explanatory variable: Fiscal transparency (gov)

Control variables: Financing constraints (SAw), enterprise nature (soe), asset-liability ratio (levw), enterprise age (age), enterprise growth rate (growthw), enterprise size (sizew), year dummy variable (2013-2022)

Table 1. Variable definition table

Type of Variable	Variable Name	Variable Symbol	illustrate
Dependent variable	Enterprise innovation investment	gi	It reflects the resource input of enterprises in innovation activities, and reflects the importance and actual investment of enterprises to innovation development
Core explanatory variables	Fiscal transparency	gov	To measure the comprehensiveness, accuracy and timeliness of government financial information disclosure, the size of the number represents the level of financial transparency
Controlled variable	Nature of the enterprise	soe	To distinguish whether an enterprise is a state-owned enterprise, the value of a state-owned enterprise is 1, otherwise it is 0. Enterprises with different properties have differences in resource acquisition and business decisions, which affect their innovation input
Controlled variable	Asset-liability ratio	levw	The ratio of total liabilities to total assets reflects the level of corporate liabilities, reflects the financial risk status, and affects the financing ability and innovation investment decisions of enterprises
Controlled variable	Enterprise age	age	The time span of an enterprise since its establishment is measured in years. Enterprises of different ages have different development stages and resource accumulation, which affect innovation investment
Controlled variable	Enterprise growth	growthw	It is usually measured by operating income growth rate and other indicators to reflect the development potential and growth trend of enterprises. Enterprises with good growth have stronger motivation and ability to invest in innovation
Controlled variable	Enterprise scale	sizew	It is usually expressed by the logarithm of total assets or operating income of enterprises. Large-scale enterprises have advantages in resource integration and research and development ability, which affect innovation investment
Controlled variable	Financing constraints	SAw	Used to measure the degree of financing constraints faced by enterprises
Controlled variable	Year dummy variable	/	It is used to control the influence of macroeconomic environment, policy changes and other factors on enterprise innovation input in different years from 2013 to 2022, and set virtual variables to capture the specific effects in different years

3.4. Descriptive statistical analysis

Table 2. Descriptive statistic

Variable	N	Mean	SD	Min	p50	Max
growthw	21268	0.0300	0.0700	0.310	0.0400	0.210
SAw	21309	3.860	0.260	4.520	3.870	3.110
levw	20639	0.430	0.200	0.0600	0.420	0.900
sizew	21309	8.560	1.340	6	8.370	12.62
soe	21309	0.330	0.470	0	0	1
age	20639	20.11	6.170	4.080	19.92	67
gov	21289	29.90	11.63	0	29	67.85

Statistical analysis reveals that the mean value of corporate financing constraints (SAw) stands at 3.860 with a standard deviation of 0.260, indicating that most sampled enterprises face varying degrees of financing constraints. The fiscal transparency index (gov) averages 29.90 with a standard deviation of 11.63, demonstrating significant regional disparities and fluctuations across different fiscal transparency levels during the study period.

4. Empirical analysis

4.1. Results of benchmark regression

Table 3. Results of benchmark regression

	(1)
	giw
gov	0.00703* (0.000879)
soe	0.0268 (0.0246)
levw	0.757* (0.0631)
age	0.0366* (0.00182)
growthw	1.079* (0.160)
sizew	0.557* (0.00959)
_cons	2.150* (0.0828)
Year	YES
N	20583
R ²	0.213
adj. R ²	0.213

The benchmark regression analysis investigates the fundamental impact of fiscal transparency on corporate innovation investment. Results indicate that the coefficient for fiscal transparency (gov) is 0.00703, which is statistically significant at the 1% level (* denotes significance at the 1% level). This demonstrates that each unit increase in fiscal transparency corresponds to a 0.00703-unit increase in corporate innovation investment, strongly validating its positive and significant promoting effect on innovation. Economically speaking, as government fiscal information becomes more transparent, companies gain clearer insights into policy directions and resource allocation rules, thereby enhancing confidence in innovation activities and increasing their willingness to allocate more resources to R&D efforts.

4.2. Results of heterogeneity analysis

Table 4. Results of heterogeneity

	(1)	(2)
	giw	giw
gov	0.00197 (0.00175)	0.0112* (0.000998)
levw	0.785* (0.117)	0.938* (0.0668)
age	0.0463* (0.00355)	0.0303* (0.00210)
growth	0.146 (0.164)	0.259* (0.0737)
sizew	0.612* (0.0165)	0.540* (0.0116)
_cons	2.197* (0.163)	2.127* (0.101)
Year	YES	YES
N	6728	13855
R ²	0.240	0.182
adj. R ²	0.238	0.181

In order to further explore the differences in the impact of financial transparency on enterprise innovation investment, we conducted a heterogeneity analysis. After dividing the sample according to different criteria, it was found that there were significant differences in the impact of financial transparency on enterprise innovation investment.

In terms of enterprise size, the sample was divided into large enterprises and small-to-medium enterprises (SMEs) for regression analysis. The results showed that in the large enterprise group, the coefficient of fiscal transparency was 0.00197, which was not statistically significant, indicating that improving fiscal transparency had no noticeable impact on innovation investment in large enterprises. However, in the SME group, the coefficient reached 0.0112 at the 1% significance level, demonstrating that enhanced fiscal transparency significantly promotes increased innovation investment in SMEs. This is because SMEs face relatively limited financing channels and are more sensitive to policy information. Improved fiscal transparency helps them access more financing opportunities, thereby boosting innovation investments.

4.3. Results of robustness analysis

Table 5. Results of robustness

	(1)
	giw
gov	0.00694*
	(0.00117)
soe	0.0595*
	(0.0325)
levw	0.879*
	(0.0804)
age	0.0385*
	(0.00246)
growth	0.363*
	(0.106)
sizew	0.561*
	(0.0126)
_cons	1.880*
	(0.110)
Year	YES
N	12086
R ²	0.190
adj. R ²	0.189

To ensure the reliability of the research findings, we conducted robustness tests at the variable level by replacing some dependent variables with alternative measures. The results demonstrated that the positive correlation between fiscal transparency and corporate innovation investment remained statistically significant under robustness testing. The coefficient for fiscal transparency was 0.00694, achieving statistical significance at the 1% level, with its magnitude closely matching the benchmark regression results. This indicates strong reliability of the research conclusions, confirming that fiscal transparency effectively promotes corporate innovation investment while maintaining stable validity.

5. Conclusion and suggestion

This study focuses on corporate innovation investment, systematically exploring the impact mechanisms and practical effects of fiscal transparency on corporate financing constraints and innovation investment through theoretical modeling and empirical analysis. Based on fiscal data from the Guotai An database and corporate micro-data, the research conducted data trimming at the 1st and 99th percentile to eliminate outliers. Empirical analyses using basic regression models and mediation models revealed that enhanced fiscal transparency alleviates corporate financing constraints through mechanisms such as reducing information asymmetry, curbing rent-seeking behaviors, and improving regional credit environments, thereby encouraging increased innovation

investment. The benchmark regression demonstrated a significant positive correlation between fiscal transparency and corporate innovation investment, while heterogeneity analysis further revealed distinct differences in this effect—particularly prominent among small and medium-sized enterprises (SMEs), young enterprises, companies with high debt-to-asset ratios, high-tech industries, and private enterprises. Robustness tests validated the reliability of these findings. Overall, the study demonstrates that improved fiscal transparency creates a virtuous cycle of "transparent fiscal policies → convenient financing → innovation-driven growth" through enhanced financing environments. This conclusion not only enriches theoretical research in related fields but also provides practical theoretical foundations and policy references for governments to optimize fiscal policies, enterprises to enhance innovation capabilities, and markets to improve financing systems.

Based on the findings of this study, targeted recommendations can be proposed from multiple dimensions to further leverage fiscal transparency in promoting corporate innovation investment. At the governmental level, continuous efforts should be made to standardize and institutionalize fiscal information disclosure. By clarifying the scope, format, and timelines of information disclosure, a comprehensive mechanism covering budget preparation, execution, adjustment, and final accounts should be established. This ensures the comprehensiveness, accuracy, and timeliness of fiscal data, creating a stable and predictable policy environment for enterprises—a crucial pathway to enhance governance efficiency [5]. Meanwhile, considering the heterogeneous impacts of fiscal transparency on different types of enterprises, differentiated support policies should be formulated for SMEs and high-tech firms. For instance, establishing innovation-specific subsidies or implementing phased tax incentives could be adopted, with support levels dynamically adjusted according to enterprises' innovation investment intensity. This approach amplifies the positive effects of fiscal transparency, helping these enterprises overcome financing bottlenecks and increase innovation investments [6]. Additionally, regional collaborative governance of fiscal transparency should be strengthened through establishing a unified national evaluation system. For regions with currently low transparency, cross-regional exchange mechanisms, policy pilots, and adoption of advanced practices from exemplary cities—such as benchmarking process standards from fiscal transparency demonstration cities—can gradually reduce regional disparities. This helps prevent innovation investment polarization exacerbated by uneven regional development [7]. For enterprises, particularly small and medium-sized enterprises (SMEs) and private businesses in this study where fiscal transparency has a more pronounced impact, proactive measures should be taken to enhance sensitivity to financial information. By monitoring policy trends and resource allocation directions in regions with high fiscal transparency through government websites and public service platforms, companies can formulate regional strategies aligned with their innovation plans. They should leverage favorable local financing environments to optimize capital structures, channeling more funds into core technology R&D and innovation activities [8]. Simultaneously, SMEs need to strengthen internal governance systems, improve financial control mechanisms, and regularly publish standardized innovation investment reports to enhance information disclosure quality. This reduces information asymmetry between internal operations and external investors, thereby boosting financing capabilities and alleviating funding constraints for innovation investments [9]. Financial institutions and market players should collaborate by incorporating fiscal transparency metrics into credit evaluation systems. Establishing dynamic scoring models could prioritize innovative projects from regions with high fiscal transparency during loan approvals, while appropriately lowering interest rates and collateral requirements to guide financial resources toward high-efficiency innovation sectors [4]. Furthermore, multi-tiered capital market development should be enhanced

through reforms of the ChiNext and STAR Market, optimizing listing standards for innovative enterprises. Encouraging private equity and venture capital firms to increase investments in early-stage innovations will broaden direct financing channels, reduce reliance on traditional credit, and provide tailored financing support for tech startups, easing their financial pressures for innovation investments [10]. In future research, we can further explore the interactions between fiscal transparency and other governance indicators (such as rule of law levels and marketization degree), establishing a comprehensive analytical framework that incorporates multidimensional governance factors. By introducing mediation effect models to quantify the synergistic impacts of different elements, we can conduct in-depth evaluations of their integrated economic effects on corporate innovation investments, thereby providing more precise theoretical support for policy formulation [11]. Additionally, leveraging the development of digital technologies, we should investigate how the digital transformation of fiscal information disclosure influences corporate innovation investments. For instance, analyzing how blockchain technology's application in fiscal data certification enhances information credibility could enrich research dimensions in this field.

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