

# *Bond Financing, Information Disclosure Quality and Corporate Investment Efficiency*

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**Abstract:** The registration-based issuance system of enterprise bonds and corporate bonds has promoted the development of the bond market, and bond financing has become an increasingly important financing method for Chinese enterprises. Based on the analytical framework of ex-ante and in-event governance, and taking into account that the quality of information disclosure may be endogenous to the bond financing behavior, we have controlled the possible impact of the ex-ante governance effect of the new bond issue, focusing on the impact of bond financing during the duration of the bond. Bond financing enlarges the creditor supervision mechanism into the corporate stakeholder supervision mechanism by improving the quality of corporate information disclosure. We construct a mediation effect model based on the quality of information disclosure, and control the short-term impact of new bond issuance, and use sample data of listed companies in China for empirical analysis. Regarding the governance effect during the bond duration, the improvement of the quality of information disclosure can strengthen the role of bond financing in alleviating underinvestment, and has a mediation effect. On the other hand, it can alleviate the aggravating effect of bond financing on overinvestment, and there is a suppressing effect.

## **1. Introduction**

The registration system of corporate bonds and corporate bonds promotes the development of the bond market, and bond financing has become an increasingly important financing tool for Chinese enterprises. In 2020, when the new "Securities Law of the People's Republic of China" was officially implemented, the exchange issued 3,681 corporate bonds, amounting to 3.37 trillion yuan, up 32% year-on-year. A total of 337 corporate bonds were issued, amounting to 385.11 billion yuan, up 13.9% year-to-year. Bond financing is not only a way to raise funds for enterprises, but also a way of corporate governance (Williamson, 2008) [1]. Bond financing can affect the efficiency of enterprises in terms of both financial support and governance constraints. It is widely recognized that both equity financing and credit financing do not have the desired governance effects in Chinese enterprises (Liu and Cao, 2017) [2]. So, does bond financing have a unique governance function and is beneficial to improve the operating efficiency of Chinese enterprises? What are the mechanisms through which such governance effects are generated? Are there key factors that are

synergistic with equity and credit financing in terms of corporate governance?

In terms of the corporate governance effect, bond financing includes not only the governance mechanism of debt financing, but also the governance mechanism based on the open market similar to equity financing. In this regard, this paper pays particular attention to the public information disclosure factors. Public disclosure of enterprise information is a characteristic of bond financing, which is different from credit financing and the same as equity financing. However, due to the maturity characteristics of bonds, the disclosure of information in the bond market has significant limitations in terms of timing and period. This makes the regular and continuous information disclosure required by the non-term equity market for listed companies become an important source for the bond market to obtain prior information and a supplementary source for obtaining in-process information, and then become a key mechanism factor for the synergy and complementarity of bond debt governance and equity governance.

For bond financing, two points need to be pointed out in particular. First, the information disclosure of enterprises is endogenous to their financing behavior, the information disclosure quality of bond issuers is endogenous higher than that of non-bond issuers, and the governance effect of bond issuers has more distinct characteristics of two stages before and during the event. On the one hand, information asymmetry causes adverse selection in advance. Managers are willing to win over potential investors in advance (before issuing bonds) to improve business performance and actively disclose information to them to alleviate the adverse selection caused by information asymmetry and reach an ideal financing contract. On the other hand, in the event stage (during the duration after issuing bonds), because the financing contract has been reached, the management efforts and public information disclosure have changed from the active behavior of managers to the passive behavior under the supervision of creditors and market supervision. Information disclosure may be slack and quality decline due to the lack of an effective mechanisms, resulting in moral hazard. Second, debt financing is maturity-based, that is, the "in-event" stage has a duration that can be very short compared to the perpetuity of equity, and since bond financing is not subject to renegotiation as is often the case with credit financing, the difference between the ex-ante and in-event stages of bond financing may be even more pronounced.

Existing studies in the analysis of the corporate governance impact of bond financing neglect bond financing, prior governance, and governance in the event of a phased governance characteristic. There is no clear distinction between the two, and studies of the governance mechanisms of bond financing are not exhaustive enough. Based on the framework of ex-ante governance and in-event governance, this paper focuses on whether bond financing exerts corporate governance effects through the intermediary of public information disclosure during its existence based on controlling the possible influence of ex-ante governance effects of new bond issuance.

## **2. Theoretical Analysis and Hypotheses**

### **2.1. Bond Financing and Enterprise Investment Efficiency**

Bond financing can effectively alleviate corporate financing constraints and reduce underinvestment due to lack of funds. In providing financial support to enterprises, creditors acquire the power conferred by law and debt covenants to require enterprises to make debt repayments on time and to supervise and control enterprises, thereby generating governance effects and affecting the efficiency of enterprises' investments.

Firstly, the hard financial constraint of regular principal and interest repayments in debt covenants directly reduces the free cash flow available to the management, which in turn reduces overinvestment. Secondly, the hard financial constraints in debt contracts threaten the bankruptcy of enterprises. Grossman and Hart (1982) argued that once an enterprise goes bankrupt due to

unfavorable investment, managers will face the consequences of income reduction and reputation damage [3]. Managers will make investment decisions that are beneficial to increase the value of the enterprise by weighing personal income and bankruptcy risk. Debt financing has become a guarantee mechanism to restrain excessive investment. The compulsory repayment of debt financing and the threat of bankruptcy can restrain the tendency of management to build a "business empire" and make it more cautious in investment decisions. As a market-oriented debt instrument, bonds have stronger supervision and binding force than bank loans, which can better play the role of debt governance and reduce the ineffective investment of enterprises (Bai and Gong, 2017) [4]. Finally, under the supervision of creditors, in order to meet the requirements of debt contracts and laws and regulations, enterprises will make many restrictions on investment decisions. Once enterprises take too risky actions to increase the creditor's rights risk, they will face the threat of creditors demanding higher interest or shortening the repayment periods, and will increase the difficulty of refinancing. Therefore, the management of bond-issuing enterprises will look at investment opportunities more rationally. Based on this, hypothesis 1 is proposed.

Hypothesis 1: During the duration of bonds, bond financing can effectively improve the investment efficiency of enterprises. Specifically, after reining in new bond issuance, corporate bond financing reduced over- and under-investment.

## **2.2. Intermediary Mechanism of Bond Financing Affects Investment Efficiency through Information Disclosure**

Public information disclosure is an open market signal for enterprises to show their stable management environment and good business performance to the public, and it is the primary way to transmit their business information to investors (Wu et al., 2017) [5]. After an enterprise issues bonds, the market has the opportunity to evaluate the company, the management, and its proposed investment projects, the relevant stakeholders continue to pay attention to the issuing enterprises, and the regulatory authorities strictly regulate the information disclosure behavior of the issuing enterprises, which can strengthen the information disclosure of enterprises and alleviate the information asymmetry (Gomariz and Ballesta, 2014) [6]. The lower the supervision cost, the more motivated the stakeholders are to supervise the enterprise, and then improve corporate governance and investment efficiency. The cost of supervision is related to the cost of information collection. In the capital market, the source of information transmission is the original information disclosed by the management of the company through notice or announcement (Li, 2017) [7]. Improving the quality of enterprise information disclosure can alleviate the information asymmetry between investors and enterprises, reduce supervision costs, and improve investment efficiency by restraining the adverse selection of enterprises during financing and the moral hazard of management after obtaining financing (Biddle et al., 2009, Lu et al., 2021) [8, 9]. Among them, the investors here are no longer limited to bond investors, but involve all relevant stakeholders such as investors of various securities issued by enterprises, that is, public information disclosure enlarges "creditor supervision" into "enterprise stakeholder supervision", so compared with a single debt governance mechanism, it will produce incremental supervision and restraint effect. Through a dynamic adverse selection model, Chang et al. (2009) proved that the quality of financial reports can reduce the cost of adverse selection, which can not only reduce underinvestment by reducing the external financing cost, but also reduce the possibility of enterprises obtaining excess funds due to temporary pricing errors [10]. Bushman et al. (2004) proved that shareholders can use regular information disclosure to supervise management and reduce the motivation of management to deviate from the goal of maximizing shareholders' profits from the perspective of restraining moral hazard [11]. Moreover, under a more detailed information disclosure policy, shareholders can

regularly observe the projects being invested by enterprises, eliminate the bad and keep the good, and improve corporate performance.

In addition, high-quality information disclosure can also improve the investment efficiency of enterprises by improving the function of the capital market. Information disclosure can not only indirectly help managers to choose the best investment projects through the capital market, but also play the supervisory function of the capital market, so that managers can work harder to create value. Choi et al. (2020) also believed that the information disclosed by enterprises can convey useful information about the company's growth opportunities to managers and investors after being predicted by analysts, thus promoting effective investment [12]. Positive growth signals are more effective in reducing underinvestment, while negative growth signals are more effective in reducing overinvestment. Based on this, hypothesis 2 is proposed.

Hypothesis 2: During the duration of bonds, bond financing can improve the investment efficiency of enterprises by improving the quality of information disclosure. Specifically, after controlling the impact of new debt issuance, bond financing improves the probability that the quality of information disclosure of enterprises is higher than that of enterprises without bond financing, and the improvement of information disclosure quality can improve underinvestment and overinvestment.

### 3. Data and Empirical Methods

#### 3.1. Data

Considering the continuity and availability of disclosure quality data, we select A-share listed companies on the Shenzhen Stock Exchange as the research object, with the sample period of 2012-2019, the required financial data and bond issuance data are from the CSMAR and Wind databases, and the disclosure quality data are from the website of the Shenzhen Stock Exchange. The data are processed as follows: (1) Remove the samples of companies in the financial industry. (2) Remove the samples of ST \*ST, and delist companies; (3) Remove the samples with industry annual data less than 15; (4) Remove the missing data of key variables. A total of 8,480 annual corporate sample observations of the A-shares of the Shenzhen Stock Exchange from 2012 to 2019 are obtained, but because of the existence of lagged one-period explanatory variables in the model, the actual sample interval is 2013-2019, and the continuous variables are subjected to tailing at the 1% and 99% quantiles to avoid the possible influence of extreme values.

#### 3.2. Model of Bond Financing Affecting the Investment Efficiency of Firms

Construe model (1) to examine the influence of bond financing on enterprise investment efficiency during the duration of bonds.

$$\text{Inve}_{i,t}/\text{Logit}(\text{INVE}_{i,t}) = c_0 + c\text{Bond}_{i,t-1} + \beta\text{Issue}_{i,t} + \sum \beta_i X_{i,t} + \mu_t + v_k + \varepsilon_{i,t} \quad (1)$$

Where  $\text{Inve}_t$  is the variable of investment efficiency, which is measured by the absolute value of the residual term of Richardson (2006) model [13]. The larger the value of  $\text{Inve}_t$ , the lower the investment efficiency.  $\text{INVE}_t$  is a classified variable of investment efficiency, which is constructed by referring to Zhang and Liu (2015) [14]. When the residual term of Richardson (2006) model is positive and greater than the annual industry average,  $\text{INVE}_t$  is overinvestment, when the residual term is negative and less than the annual industry average,  $\text{INVE}_t$  is under-investment, otherwise,  $\text{INVE}_t$  is a reasonable investment.  $\text{Bond}_t$  is bond financing, with firms' bonds payable as a proxy variable. If there are no bonds payable in the current year,  $\text{Bond}_t$  is assigned 0. If there are bonds payable in the current year, it means that corporate bonds are still in existence, and  $\text{Bond}_t$  is

assigned 1. Because the investment behavior of enterprises in the current year is generally affected by the financing decision of the previous year,  $Bond_{t-1}$ , a dummy variable of bond financing that lags behind one period, is used as an explanatory variable, which can also avoid the endogenous problems caused by the mutual causality between bond financing and information disclosure quality.  $Issue_t$  is a dummy variable representing new debt issuance. Both year and industry effects are controlled in the model. If the explained variable is the classified variable,  $INVE_t$  model (1) is a multivariate logit model. The control variables are shown in Table 1.

If the coefficient  $c$  of  $Bond_{t-1}$  in model (1) is significantly negative, and the coefficients and average marginal effects (AME) of  $Bond_{t-1}$  on under-investment and over-investment are significantly negative, it shows that bond financing can improve the investment efficiency of bond issuers and reduce under-investment and over-investment compared with non-bond issuers during the duration of bonds. Hypothesis 1 holds.

### 3.3. Information Disclosure Quality Mediation Mechanism Model

Constructing model (2) to test the mediating role of disclosure quality in the "ex-post governance" of bond financing (Hypothesis 2). Referring to Wen et al. (2014) [15], the mediation effect model (2) is as follows:

$$\text{Logit}(Qid_{i,t}) = a_0 + aBond_{i,t-1} + \beta'Issue_{i,t} + \sum \gamma_i X_{i,t} + \mu_t + \nu_k + \varepsilon_{i,t} \quad (2)$$

$$\text{Inve}_{i,t}/\text{Logit}(INVE_{i,t}) = b_0 + c'Bond_{i,t-1} + bQid_{i,t} + \beta''Issue_{i,t} + \sum \varphi_i X_{i,t} + \mu_t + \nu_k + \varepsilon_{i,t} \quad (3)$$

Where  $Qid_t$  is the quality of information disclosure.  $Qid_t$  is a categorical variable, categorized into four grades, A, B, C, and D. The data come from the disclosure assessment results of listed companies published by the SZSE.

If the coefficient  $a$  and AME of  $Bond_{t-1}$  in model (2) are significantly positive, while the coefficient  $b$  and AME of  $Qid_t$  in model (3) are significantly negative, then hypothesis 2 is verified. That is, the quality of information disclosure plays an intermediary role in the impact of bond financing on enterprise investment efficiency. Referring to Fang et al. (2017), the asymmetric confidence interval of the product distribution statistic  $Z_a \times Z_b$  is used to test the mediation effect [16]. If the confidence interval does not include 0, it indicates that the mediation effect is significant.

Table 1: Definition of variables

Variable	Variable Definition
$Inve_t$	Investment efficiency, the absolute value of residual of Richardson (2006) model
$INVE_t$	Classified variable, include overinvestment, underinvestment, and rational investment
$Qid_t$	Intermediary variables, information disclosure assessment results of listed companies released by SZSE
$Bond_{t-1}$	Whether the enterprise has bonds payable in t-1 period, 1 if yes, 0 if no
$Issue_t$	Whether the enterprise issued new bonds in the current year, 1 if yes, 0 if no
$FCF_{t-1}$	Cash flows from operating activities/end-of-period balance of assets of period t-1
$ROA_{t-1}$	The rate of return on assets of the enterprise in period t-1
$Salesg_t$	Growth rate of enterprise sales revenue
$Fixedr_t$	Net fixed assets/total assets
$Jgholder_t$	Institutional investor shareholding
$CEO_t$	Whether the chairman and the general manager are the same person, 1 if yes, 0 if no
$Top5_t$	The shareholding ratio of the top 5 shareholders of the enterprise
$Big4_t$	Whether the auditor is from one of the Big Four domestic accounting firms 1 if yes, 0 if no

## 4. Empirical Results

### 4.1. Benchmark Regression Results

The regression results of model (1) show (Table 2) that bond financing ( $Bond_{t-1}$ ) is negatively correlated with investment efficiency ( $Inve_t$ ), that is, compared with unissued enterprises, bond-issuing enterprises have higher investment efficiency. The regression results of the logit model (1) further show that bond financing only reduces the probability of under-investment, and the AME is -6.32%, which increases the probability of overinvestment (0.06%). However, compared with the reasonable investment group, bond financing only significantly alleviates underinvestment, but does not significantly aggravate overinvestment.

Table 2: Regression results of model (1)

Variables	(1)	(2)	(3)
	$Inve_t$	$INVE_t$ (Under investment)	$INVE_t$ (Over investment)
$Bond_{t-1}$	-0.0065*** (-4.211)	-0.3730*** (-4.481)	-0.0945 (-0.928)
$Issue_t$	-0.0050*** (-2.887)	-0.6694*** (-5.827)	0.2325* (1.954)
$FCF_{t-1}$	0.0348*** (2.805)	1.5453*** (3.119)	2.0539*** (3.457)
$ROA_{t-1}$	-0.0267 (-1.623)	-1.3547** (-2.239)	1.9746*** (2.610)
$Salesg_t$	0.0380*** (11.111)	-0.1668* (-1.864)	1.0151*** (14.506)
$Fixedr_t$	-0.0254*** (-3.965)	-2.6496*** (-9.750)	0.6523** (2.007)
$JGholder_t$	-0.0001 (-1.581)	-0.0011 (-0.776)	-0.0006 (-0.300)
$CEO_t$	0.0029* (1.933)	0.1070* (1.659)	0.2315*** (2.831)
$Top5_t$	0.0154*** (2.847)	0.5231** (2.239)	0.3363 (1.194)
$Big4_t$	0.0041 (1.171)	-0.1198 (-0.690)	-0.0206 (-0.106)
Constant	Yes	Yes	Yes
Year/Industry	Yes	Yes	Yes
Observations	7420	7420	7420
R <sup>2</sup> /P-R <sup>2</sup>	0.1310	0.044	0.044

Notes: (1) Significance \* .10, \*\* .05, \*\*\* .01.

(2) Column 1 is a robust T value in parentheses, and column 3 is a robust Z value in parentheses.

### 4.2. Empirical Results of Intermediary Mechanism

In the sample data, the ratio of information disclosure quality of bond issuers (25.1%) is clearly higher than that of non-bond issuers (19.9%), and the average information disclosure quality is higher. However, if A and B ratings are classified into one category, there is no obvious difference between bond issuers and non-bond issuers, and ratings C and D are also almost the same. It can be preliminarily judged that the information disclosure quality of bond issuers and non-bond issuers is



mainly reflected in rating A.

Because there are few samples with a D rating, we first classify information disclosure quality according to A, B, and CD ( $Qid_t$ ), and regress the relationship between information disclosure quality ( $Qid_t$ ) and investment efficiency ( $Inve_t$ ). The results are shown in the first column of Table 3. Compared with the samples with CD information disclosure quality, information disclosure quality A can significantly improve investment efficiency. We might as well infer that information disclosure quality can only have an impact on investment efficiency after reaching a certain level. Construct two binary variables of information disclosure quality: "AB" and "CD" ( $Qid_2$ ), "A" and "non-A" ( $QID_t$ ). We can find that when information disclosure quality is A and non-A, A rating of information disclosure quality significantly reduces the degree of investment inefficiency. This confirms our inference that only when the quality of information disclosure reaches Grade A can the investment efficiency be improved. Therefore, in the following analysis of the information disclosure quality intermediary mechanism, the intermediary variable  $QID_t$  adopts "0-1" variable. When the information disclosure quality is A,  $QID_t$  is assigned 1, and when the information disclosure quality is B, C, and D,  $QID_t$  is assigned 0.

Table 3: The regression result of the relationship between Information Disclosure quality and investment efficiency

Variables	$Inve_t$		
	(1)	(2)	(3)
$Bond_{t-1}$	-0.0063*** (-4.090)	-0.0065*** (-4.216)	-0.0063*** (-4.084)
B. $Qid_t$	-0.0013 (-0.692)		
A. $Qid_t$	-0.0056** (-2.483)		
$Qid_2_t$		-0.0020 (-1.072)	
$QID_t$			-0.0045*** (-2.884)
Controls	Yes	Yes	Yes
Year/Industry	Yes	Yes	Yes
Observations	7420	7420	7420
$R^2$	0.132	0.131	0.132

Notes: (1) Significance \*.10, \*\*.05, \*\*\*.01. (2) Robust z-statistics are in brackets.

The regression results of intermediary effect model (2) show that bond financing significantly improves the quality of enterprise information disclosure during the duration, but model (2-1) is a logit model, and the coefficient of related variables cannot represent the marginal effect. The AME of  $Bond_{-1}$  on information disclosure quality is 0.052, that is, compared with unissued enterprises, the probability that bond financing makes enterprise information disclosure quality A is increased by 5.2%. The coefficient of  $QID_t$  in the model (2) is significantly negative, which shows that the improvement of information disclosure quality improves the investment efficiency of enterprises. The 95% confidence interval of  $Za \times Zb$  does not contain 0, and the mediating effect is significant. The quality of information disclosure is an important intermediary mechanism for bond financing to affect the investment efficiency of enterprises.

In the model (2), the regression coefficient of  $QID_t$  of information disclosure quality is significantly negative (see columns 4 and 5 of Table 4). Combined with the average marginal effect of information disclosure quality on under-investment and overinvestment, it is found that compared with the sample group with "non-A" information disclosure quality, "A" information

disclosure quality significantly reduces the probability of under-investment (-2.96%) and over-investment (-1.3%). The 95% confidence interval of  $Z_a \times Z_b$  in the under-investment group does not include 0, which shows that bond financing can alleviate underinvestment by improving the quality of information disclosure, and the intermediary effect is significant. In the overinvestment group, the influence coefficient C and AME of bond financing on enterprise investment efficiency in the benchmark regression model (1) show that bond financing has no significant aggravation effect on enterprise overinvestment. However, to avoid missing the mediating effect, we still calculate the 95% confidence interval of the statistic  $Z_a \times Z_b$  of the over-investment group, and the result is [-0.127 -0.007], which shows that the mediating effect is also significant. But at this time, information disclosure shows a covering effect in the aggravation of overinvestment caused by bond financing, that is, bond financing can improve the quality of information disclosure and play a "supervision mechanism of enterprise stakeholders", which alleviates the aggravation of overinvestment.

Table 4: Regression results of mediating effect model (2)

Variables	Model (1)	Model (2)	Logit Model (2)	
	$QID_t$	$Inve_t$	$INVE_t$ (Under investment)	$INVE_t$ (Over investment)
$Bond_{t-1}$	0.3575*** (4.445)	-0.0063*** (-4.084)	-0.3647*** (-4.380)	-0.0866 (-0.851)
$QID_t$		-0.0045*** (-2.884)	-0.1959*** (-2.654)	-0.1744* (-1.864)
Controls	Yes	Yes	Yes	Yes
Year/Industry	Yes	Yes	Yes	Yes
Observations	7371	7420	7371	7371
P-R <sup>2</sup>	0.131	0.132	0.131	0.131

Notes: (1) Significance \* .10, \*\* .05, \*\*\* .01. (2) Robust z-statistics are in brackets.

### 4.3. Robustness

#### 4.3.1. PSM with Control Sample Self-selection

Considering that the issuing enterprise itself may be an enterprise with high information disclosure quality and high investment efficiency, we use the PSM method to control sample selection errors. After matching, the difference between the treatment group and the control group narrowed. Under different matching methods, there are significant processing effects, that is, compared with unissued enterprises, bond financing improves enterprise investment efficiency, alleviates underinvestment and overinvestment, and significantly improves information disclosure quality. Compared with enterprises with low information disclosure quality, high-quality information disclosure improves investment efficiency and alleviates underinvestment and overinvestment, which verifies the benchmark regression results.

#### 4.3.2. Replacing the Key Variable

To avoid the analysis of the mediating effect of the measurement error of investment efficiency on the quality of information disclosure, the variable investment efficiency ( $Inve_t$ ) is recalculated concerning the models of Biddle et al. (2009) and Chen et al. (2011) [8],[17]. Then regress the model (1) and model (2) again, and the results show that the 90% confidence interval of the statistic  $Z_a \times Z_b$  is negative and does not include 0. Bond financing can significantly improve investment



efficiency, which has both a direct effect and a significant intermediary effect [18].

### 4.3.3. Reset the Grouping Standard of Investment Efficiency

The variable  $INVE_t$  is reconstructed using the annual average and the annual median of the sector as the criteria for dividing under and over-investment. Test regression results of Logit model (1) and model (2). The regression results and the confidence interval of the statistic  $Z_a \times Z_b$  all verify the intermediary effect and masking effect in benchmark regression [19].

## 5. Conclusions

This paper divides the debt governance mechanism of bonds into pre-governance and in-process governance from the perspective of debt contracts. After controlling the "creditor screening" governance mechanism before issuing bonds, the "creditor supervision mechanism" produced by bond financing can directly affect the investment efficiency of bond-issuing enterprises through the financial hard constraints that require enterprises to pay principal and interest on the schedule and supervision and control of enterprises, and can also enlarge the "creditor supervision mechanism" into a wider "enterprise stakeholder supervision mechanism" by improving the quality of enterprise information disclosure, resulting in information spillover intermediary effect. Empirical results show that: First, bond financing can improve the quality of disclosure, and only when the quality of disclosure reaches a certain level can investment efficiency improve. Corporate and related stakeholders need more perfect and accurate information to better supervise and restrain their investment decisions. Second, during the duration of bonds, bond financing can not only directly improve the investment efficiency of enterprises, but also indirectly improve the investment efficiency by improving the quality of information disclosure. Specifically, bond financing significantly reduces underinvestment, and the intermediary effect of information disclosure is significant. High-quality information disclosure is also conducive to refinancing and discovering investment opportunities, and bond financing directly and indirectly alleviates underinvestment. In terms of overinvestment, AME analysis shows that bond financing aggravates overinvestment, but this negative impact is alleviated because of the improvement of information disclosure quality, and there is a significant covering effect. This shows that bond financing needs to improve the quality of information disclosure to play the role of debt governance, and it also shows that the information disclosure quality of listed companies issuing bonds is still not ideal, and it cannot provide complete information to the outside world to improve the level of external supervision and governance.

## References

- [1] Williamson, O. E. (2008) *Corporate Boards of Directors: In Principle and in Practice*, *Journal of Law, Economics, & Organization*, 24(2): 247-272.
- [2] Liu, H. M. and Cao, T. Q. (2017) *Impact of Credit Supply Cycle on Investment Efficiency and Heterogeneous Effect from Macroeconomic Uncertainty*, *Journal of Financial Research*, 12, 80-94.
- [3] Grossman, S. J. and Hart, O. D. (1982) *Corporate Financial Structure and Managerial Incentives*, *The Economics of Information and Uncertainty*, Chicago: University of Chicago Press, 107-140.
- [4] Bai, J. and Gong, X. Y. (2017) *Corporate Bonds and Value Creation: Financing Effects or Governance Effects?* *Journal of Financial Development Research*, 10, 69-75.
- [5] Wu, H. J., Liu, Q. R. and Wu, S. N. (2017) *Corporate Environmental Disclosure and Financing Constraints*, *The Journal of World Economy*, 5, 124-147.
- [6] Gomariz, M. F. and Ballesta, J. P. (2014) *Financial Reporting Quality, Debt Maturity and Investment Efficiency*, *Journal of Banking & Finance*, 40, 494-506.
- [7] Li, Z. S., Li, H., Ma, W. L. and Lin, B. X. (2017) *Information Governance Effects of Short Selling and Margin Trading*, *Economic Research Journal*, 11, 150-164.
- [8] Biddle, G. C., Hilary, G. and Verdi, R. S. (2009) *How does Financial Reporting Quality Relate to Investment*

Efficiency? *Journal of Accounting & Economics*, 48(2), 112-131.

[9] Lu, S., Wu, P., Jiang, Y. and Du, R. X. (2021) Can Social Media Information Disclosure of Companies Reduce Information Asymmetry? Comparative Study of GEM Market and Main Board Market, *On Economic Problems*, 10, 121-129.

[10] Chang, X., Dasgupta, S. and Hilary, G. (2009) The Effect of Auditor Quality on Financing Decisions, *The Accounting Review*, 84(4), 1085-1117.

[11] Bushman, R. M., Piotroski, J. D. and Smith, A. J. (2004) What Determines Corporate Transparency? *Journal of Accounting Research*, 42(2), 207-252.

[12] Choi, J. K., Hann, R. N., Subasi, M. and Zheng, Y. (2020) An Empirical Analysis of Analysts' Capital Expenditure Forecasts: Evidence from Corporate Investment Efficiency, *Contemporary Accounting Research*, 37(4), 2615-2648.

[13] Richardson, S. (2006) Over-investment of Free Cash Flow, *Review of Accounting Studies*, 11(2-3), 159-189.

[14] Zhang, C. and Liu, X. (2015) Disclosure of Internal Control Weakness Information and Corporate Investment Efficiency: An Empirical Research based on Chinese Listed Companies, *Nankai Business Review*, 5, 136-150.

[15] Wen, Z. L. and Ye, B. J. (2014) Analyses of Mediating Effects: The Development of Methods and Models, *Advances in Psychological Science*, 5, 731-745.

[16] Fang, Jie, Wen, Z. L. and Zhang, M. Q. (2017) Mediation Analysis of Categorical Variables, *Journal of Psychological Science*, 2, 471-477.

[17] Chen, F., He, O., Li, Q. Y. and Wang, X. (2011) Financial Reporting Quality and Investment Efficiency of Private Firms in Emerging Markets, *The Accounting Review*, 86(4), 1255-1288.

[18] Wang, P., & Han, W. (2021). Construction of a New Financial E-Commerce Model for Small and Medium-Sized Enterprise Financing Based on Multiple Linear Logistic Regression. *Journal of Organizational and End User Computing*, 33(6), 1-18.

[19] Drake, J. R., & Furner, C. P. (2020). Screening Job Candidates With Social Media: A Manipulation of Disclosure Requests. *Journal of Organizational and End User Computing*, 32(4), 63-84.