# Research on Corporate Financialization and Idiosyncratic Risk Based on Fixed-effect Models

Hejin Chen[1*,†], Zhenghao Sun[2*,†]
[1*]hche0073@student.monash.edu, [2*]suntie@bupt.edu.cn

[1]Monsah Univesity, FACULTY OF BUSINESS AND ECONOMICS, Australia, Melbourne
[2]E-Commerce International College, Beijing University of Posts and Telecommunications, Beijing, China
[†] These authors contributed equally

**Abstract**—In this paper, the Fama and French three-factor models were firstly used for monthly regression, and finally the monthly standard deviation of the daily residual was finally obtained as the measure of idiosyncratic volatility. This paper explores the impact of corporate financialization on idiosyncratic volatility based on dual fixed-effect models. According to the results, corporate financialization has an inhibiting effect on idiosyncratic volatility. Moreover, the impact of corporate financialization on idiosyncratic volatility is more significant in large market capitalization, high institutional investor ownership, high return on assets and non-state-owned enterprises. This association was robust across a wide range of robustness tests, which is verified in our analysis, including using fixed-effect models and other control variables. These results shed light for the financialization of non-financialized entity firms is the current trend of financial development, because the corporate financialization can restrain idiosyncretic risk.

**Keywords**-corporate financialization; idiosyncratic volatility

## 1 INTRODUCTION

From the perspective of macroeconomic economic, financialization mostly refers to the market expansion of financial institutions or increasingly prosperous financial activities. Previous studies have discussed the impact of corporate financialization on risk-taking, investment efficiency and production efficiency [1]. Different from previous studies, this paper aims to investigate the impact of corporate financialization on idiosyncratic volatility.

According to arbitrage pricing model or other rational pricing model (e.g., three factor model) [2], if the market is effective, all factors affecting individual shares or industry income can be priced. The error term of the corresponding pricing model includes all the affecting factors corresponding to the characteristics of the firm or industry that cannot be priced. The fluctuation corresponding to the error term is defined as the idiosyncratic risk of the firm or industry. After the fluctuation of firm return removes the risk of the market and industry, it becomes firm idiosyncratic risk [3]. When the firm has the tendency of over investment, it can improve the firm performance to a certain extent. Meanwhile, idiosyncratic risk increases the value of the firm by increasing the return on assets and the return on stocks [4]. Unexpected compensation incentive and idiosyncratic risk complement each other, which will jointly improve the value of the firm.

Contemporarily, in order to seek a new profit growth point, many entity firms in China have invested a lot of money in the financial field, i.e., the proportion of financial assets in the balance sheet has been rising. Firms have gradually deviated from their main business, resulting in 'industry hollowing out', gradually forming the trend of corporate financialization. Many entity firms turn from the real to the virtual, and use a lot of funds to promote the corporate financialization, which not only affects the adjustment of industrial structure, but also brings the risk of excessive financialization due to the combination of high leverage and low productivity [5]. Plenty of entity firms are actively pursuing investment opportunities, constantly implementing innovative R & D and capacity transformation activities. As a consequence, it promotes the continuous improvement of production efficiency and helps firms gain competitive advantage and increase profits [6]. Speeding up the development of economy may lead to the increase of firm's idiosyncratic risk. Besides, the financialization of non-financial firms will invest a lot of money in the financial market, i.e., financialization will affect the idiosyncratic risk of firms [7]. Therefore, under the background of corporate financialization, the research on idiosyncratic risk has positive practical significance.

According to our results, there is a negative correlation between corporate financialization and idiosyncratic volatility. In other words, the higher the degree of corporate financialization is, the lower the idiosyncratic volatility will be. Previous literatures have included idiosyncratic volatility and expected returns [8], idiosyncratic volatility in emerging markets [9], investment, idiosyncratic volatility and ownership [10]. We believe that corporate financialization and idiosyncratic volatility expand the research on corporate idiosyncratic risk to a certain extent. A heterogeneous analysis of the relationship between corporate financialization and idiosyncratic volatility is also conducted. Furthermore, we find that corporate financialization has a more significant impact on idiosyncratic volatility among non-state-owned enterprises with large market capitalization. These results enrich the related research on corporate financialization and idiosyncratic volatility.

## 2 HYPOTHESIS DEVELOPMENT

In theory, there are two effects of corporate financialization on firm's idiosyncratic risk. The first one is precautionary motive, which advocates that the firm's idiosyncratic risk decreases gradually with the deepening of financialization. The other effect is speculative motive, which claims that the firm's idiosyncratic risk increases gradually with the deepening of financialization. The precautionary motive advocates that firms invest capital in financial assets for liquidity reservation, waiting for investment opportunities in the real economy [11]. Generally, the choice of investment should maximize the firm value, but it is often difficult to achieve due to multiple factors. Although the project with risk has higher expected return, it also has a higher failure probability. Meanwhile, due to more investment in the early stage and large capital demand, firms need to maintain sufficient liquidity. Financial assets have the characteristics of strong liquidity. Thus, financial assets can enhance the financing ability of firms, ease the financing constraints well, and provide financial support for high-risk projects when the market environment changes in the future [12]. Therefore, in the long run, such asset allocation can reduce the firm's idiosyncratic risk.

The speculative motive advocates that this kind of speculative arbitrage behavior will increase the firm's idiosyncratic risk, because the firms invest the capital in the financial assets in order to share its excess return. All kinds of financial assets allocated by firms are essentially a kind of investment portfolio. According to the portfolio theory, when the income of financial asset portfolio is higher than that of industrial asset portfolio, firms will increase their financial asset investment. On this occasion, the purpose of allocating financial assets is no longer as a capital reserve, but to carry out speculative arbitrage. According to the theory of resource allocation, excessive allocation of financial assets is bound to crowd out productive funds [13]. Even in the short run, the profit of firms will be increased due to the allocation of high-yield assets. However, it will eventually lead to the loss of the profitability of the main business and the increasing of the firm's idiosyncratic risk in the long run.

The above analysis shows that there are precautionary and speculative motives on the firm's idiosyncratic risk. The precautionary motive states that with the deepening of the degree of finance, the firm's idiosyncratic risk gradually decreases. Whereas, the speculative motive demonstrates that with the deepening of the degree of finance, the firm's idiosyncratic risk gradually increases. Given the analyses above, we propose hypothesis as follows.

**Hypothesis 1.** Based on the precautionary motive, the improvement of the level of financialization can have a significant inhibition on idiosyncratic risk.

**Hypothesis 2.** Based on the speculative motive, the improvement of the level of financialization can have a significant promotion on idiosyncratic risk.

## 3 DATA AND METHODOLOGY

### 3.1 Conclusion of Sample

We select Chinese A-share listed companies from 2010 to 2018 as the research samples, covering 8 years from 2010 to 2018. The financial industry sample, the ST stock sample, and the sample with missing data are excluded. A total of 2051 firms are collected by the above screening methods. In order to eliminate the possible influence of outliers on the regression results, 1% winsorized all continuous financial indicator variables. The sample data are mainly from CSMAR database.

### 3.2 Research Design

### 3.2.1 Models

In order to test the impact of corporate financialization on idiosyncratic volatility, we build the following regression model:

$$\text{IVOL}_{i,t-1} = \beta_0 + \beta_1 \text{FIN\_Return}_{i,t} + \sum_{q=2}^{m} \beta_{q,i,t} (\text{qth Control Variable}_t) + \varepsilon_{i,t+1} \qquad (1)$$

where the I index company, t, represents the year, while the $Controlsk_{i,t}$ is a set of annual control variables, including $\text{FIN\_Return}_{i,t}, \text{Size}_{i,t}, \text{Age}_{i,t}, \text{Board}_{i,t}, \text{BMI}_{i,t}, \text{LEV}_{i,t}$ and

$ROA_{i,t}$.

Appendix A provides definitions of all the control variables used in our analysis. To control the heterogeneity of the sample by year and industry, we used a two-way fixed-effect model to estimate the regression. All other continuous variables are winsorized at the 1% level of each tail.

### 3.2.2 Variables

#### 3.2.2.1 Dependent variable: idiosyncratic risk

To verify the hypotheses, idiosyncratic risk needs to be constructed. We can define idiosyncratic risk as the standard deviation of the residuals of the pricing models [14]. The capital asset pricing model, Fama and French three-factor models and four-factor models are widely used for this type of examination. Besides, we compute our measure of idiosyncratic risk based on the three-factor model [15].

$$R_{it} - R_{ft} = \alpha_{it} + \beta_1(RM_t - R_{ft}) + \beta_2 SMB_t + \beta_3 HML_t + \epsilon_{it} \tag{2}$$

$R_{it}$ represents total return of a stock or portfolio I at time t, $R_{ft}$ represents risk free rate of return at time t, $RM_t$ represents total market portfolio return at time t, $R_{it} - R_{ft}$ represents expected excess return, $RM_t - R_{ft}$ represents excess return on the market portfolio (index), $SMB_t$ represents size premium (*small minus big*), $HML_t$ represents value premium (*high minus low*) and $\beta_{1,2,3}$ represents factor coefficients.

#### 3.2.2.2 Test variable: corporate financialization

We adapt "(net investment income + gains and losses from changes in fair value + net exchange income + other comprehensive income) / operating profit" to measure the level of corporate financialization.

#### 3.2.2.3 Other control variables

We control firm characteristic variables, e.g, the rate of return on assets （*ROA*）, the rate of asset liability (*LEV*), the rate of return (*RET*), book to market ratio (*BM*), time of establishment (*Age*), firm size (*Size*) and proportion of independent directors (*Board*). The specific meaning of each variable is shown in the Appendix.

## 4 EMPIRICAL RESULTS

### 4.1 Descriptive statistics

Table 1 reports the descriptive statistics of idiosyncratic volatility, corporate financialization and control variables of the sample from 2010 to 2018. All continuous variables are winsorized at 1% and 99%. The detailed definitions of the above variables are shown in the Appendix.

**TABLE 1.** DESCRIPTIVE STATISTICS

| Variables | Mean | Median | Max | Min | SD | Skewness | Kurtosis |
|-----------|------|--------|-----|-----|-----|----------|----------|
| *IVOL* | 0.082 | 0.078 | 0.157 | 0.033 | 0.025 | 0.632 | 3.285 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| FIN_Reture | 0.017 | 0.001 | 0.217 | 0.000 | 0.037 | 3.380 | 15.585 |
| Size | 21.869 | 21.667 | 26.147 | 19.696 | 1.253 | 1.014 | 4.206 |
| Age | 2.660 | 2.708 | 3.367 | 1.386 | 0.372 | -0.884 | 4.091 |
| BM | 0.593 | 0.593 | 1.098 | 0.130 | 0.232 | 0.054 | 2.202 |
| ROA | 0.045 | 0.042 | 0.191 | -0.164 | 0.050 | -0.572 | 6.756 |
| LEV | 0.388 | 0.378 | 0.836 | 0.046 | 0.197 | 0.249 | 2.205 |
| Board | 0.374 | 0.333 | 0.571 | 0.333 | 0.054 | 1.403 | 4.927 |

From Table 1, the mean of the idiosyncratic volatility of the sample companies is 0.082, and the standard deviation is 0.025, indicating that there are great differences in the idiosyncratic volatility among listed companies in China. The average financialization level is 0.017, the standard deviation is 0.037, and the minimum value is 0.000, indicating that the financialization level of listed companies is generally low, and there are certain differences among firms. For the control variables, the standard deviations of them are all small after winsorized, showing that the influence of extreme values has been eliminated. The results of other variables are shown in Table 2.

## 4.2 Correlation coefficient matrix

Table 2 shows the Spearman correlation coefficients between pairs of all the data used in this paper between pairs of all the data used in this paper. A detailed description of all variables is also provided in the appendix. The sample contains annual observations of all companies listed on the Shanghai and Shenzhen stock exchanges between 2010 and 2018.

**TABLE 2.** CORRELATION ANALYSIS

| | IVOL | FIN2 | SIZE | AGE | BM | LEV | Board |
|---|---|---|---|---|---|---|---|
| IVOL | 1 | | | | | | |
| FIN_Return | -0.072*** | 1 | | | | | |
| SIZE | -0.332*** | 0.307*** | 1 | | | | |
| AGE | -0.045*** | 0.294*** | 0.157*** | 1 | | | |
| BM | -0.452*** | -0.021** | 0.444*** | 0.018** | 1 | | |
| ROA | 0.021** | -0.038*** | -0.135*** | -0.078*** | -0.295*** | | |
| LEV | -0.094*** | 0.092*** | 0.533*** | 0.111*** | 0.322*** | 1 | |
| BOARD | 0.039*** | 0.049*** | -0.017* | -0.009 | -0.031*** | -0.031*** | 1 |

All continuous variables are winsorized at the level of 1% at each end. *, ** and *** indicate significant at 10%, 5% and 1% levels, respectively.

According to Table 2, the correlation coefficient between *IVOL* and *FIN_Return* are -0.072 is significant at the 1% level, which indicates that there is a significant negative correlation between corporate financialization and idiosyncratic volatility. This preliminarily verifies that corporate financialization can reduce idiosyncratic volatility. The coefficient between the independent variables is not significantly higher than 0.5, indicating that there is a low multidisciplinary among the variables, which can be used for regression analysis.

## 4.3 Univariate Analysis

Table 3 reports the results of univariate tests of the key variables used in this study. All continuous variables are winsorized at 1% and 99%. Samples are grouped according to the level of corporate financialization. Those Group 1 below the median is Low Fin (1), and group 2 above the median is High Fin (2). Then, it is discussed whether there is a significant difference in the variables of idiosyncratic volatility, firm size, listing years, book-to-market ratio, return on assets, asset-liability ratio and proportion of independent directors in the two groups of corporate financialization.

**TABLE 3.** UNIVARIATE ANALYSIS

| | | | | |
|---|---|---|---|---|
| *IVOL* | 0.0830 | 0.0810 | 0.00200 | 4.590*** |
| *Size* | 21.55 | 22.19 | -0.645 | -28.656*** |
| *Age* | 2.563 | 2.756 | -0.193 | -28.928*** |
| *BM* | 0.595 | 0.591 | 0.00400 | 0.903 |
| *Roa* | 0.0470 | 0.0420 | 0.00400 | 4.785*** |
| *LEV* | 0.369 | 0.407 | -0.0380 | -10.451*** |
| *Board* | 0.372 | 0.377 | -0.00500 | -4.688*** |

All continuous variables are winsorized at the 1% level at each end. T statistics in parentheses. *, ** and *** are 10%, 5% and 1%, respectively.

Table 3 shows the univariate analysis results of the model, and the explanatory variable is the level of corporate. financialization (*FIN_Return*). The influence of corporate. financialization on idiosyncratic volatility is investigated. The results show that the T-test value of IVOL is 4.590, which is significant at the level of 1%, indicating that the higher the financialization of firms, the smaller the idiosyncratic volatility, which preliminary verifies our conclusion.

## 4.4 Baseline regression

Table 4 controls the industry fixed effect and the fixed effect to carry on the basic regression. Industry and year fixed effects are controlled for and the standard errors are adjusted at the firm level. The detailed definitions of the above variables are also shown in the Appendix.

**TABLE 4.** BASELINE REGRESSION

| | (1) | (2) |
|---|---|---|
| | IVOL | IVOL |
| *FIN2* | -0.020*** | -0.016*** |
| | (-3.386) | (-3.063) |
| *SIZE* | | -0.006*** |
| | | (-26.495) |
| *AGE* | | -0.004*** |
| | | (-6.855) |
| *BM* | | -0.028*** |
| | | (-24.669) |
| *ROA* | | -0.008* |
| | | (-1.721) |
| *LEV* | | 0.019*** |
| | | (15.230) |

| | | |
|---|---|---|
| *BOARD* | | 0.010*** |
| | | (2.944) |
| CONSTANT | 0.088*** | 0.217*** |
| | (62.406) | (46.717) |
| Year Fixed Effect | Yes | Yes |
| Industry Fixed Effect | Yes | Yes |
| Observations | 11596 | 11592 |
| $R^2$ | 0.327 | 0.454 |

All continuous variables are winsorized at the 1% level at each end. *, ** and *** indicate significant at 10%, 5% and 1% levels, respectively.

Table 4 shows the single Baseline regression results of the model, and the explanatory variable is corporate financialization (*FIN_Return*) to investigate the impact of corporate financialization on idiosyncratic volatility. The results show that the coefficient of FIN_Return is -0.016, which is significant at the 1% level. On this basis, the higher the degree of financialization, the lower the idiosyncratic volatility, the lower the idiosyncratic volatility, which support our hypothesis. From a micro point of view, the higher the degree of financialization, the lower the idiosyncratic volatility can be achieved by allocating the proportion of their assets.

The regression results of control variables are as follows. Primarily, the coefficient of company Size (*SIZE*) is significantly negative, indicating that the higher the company's market capitalization, the lower its idiosyncratic risk. In addition, the coefficient of the debt-to-asset ratio (*LEV*) is significantly positive, indicating that the higher the debt-to-asset ratio is, the higher the corporate financialization will be. The AGE coefficient is significantly negative, indicating that the longer the operating years, the lower the idiosyncratic risk.

## 4.5 Group regression analysis

In order to figure out the impact of the corporate financialization on the idiosyncratic risk under different circumstances, we adapt the method of group regression to calculate the regression coefficients. In this case, the corporate financialization is considered as the independent variable and the idiosyncratic risk as the dependent variable. The circumstances include market value, return on assets, number of analysts, the shareholding ratio of institutional investors and whether the firm is state-owned enterprise or non-state-owned enterprise. The results are shown in Tables 5 and 6.

We adapt group regression to calculate the regression coefficients under the circumstances of market value (*Small-Cap/Large-Cap*), return on assets (*Low-ROA/High-ROA*), and whether the firm is state-owned enterprise (*Non-SOE/SOE*). All continuous variables are winsorized at 1% and 99%. Industry and year fixed effects are controlled and the standard errors are clustered at the firm level.

**TABLE 5.** ANALYSIS ON THE CONDITIONS OF FIRM CHARACTERISTICS

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Small-Cap | Large-Cap | Low-ROA | High-ROA | Non-SOE | SOE |
| *Fin_Return* | -0.001 | -0.018** | -0.002 | -0.022*** | -0.012* | -0.007 |
| | (-0.102) | (-2.385) | (-0.295) | (-2.844) | (-1.904) | (-0.688) |
| *Size* | -0.005*** | -0.004*** | -0.003*** | -0.005*** | -0.005*** | -0.003*** |
| | (-6.535) | (-11.934) | (-9.153) | (-16.653) | (-13.586) | (-9.159) |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Age* | -0.004*** | -0.002** | -0.003*** | -0.002*** | -0.002*** | -0.002* |
| | (-4.928) | (-2.369) | (-3.744) | (-2.722) | (-2.845) | (-1.827) |
| *BM* | -0.027*** | -0.030*** | -0.034*** | -0.022*** | -0.029*** | -0.029*** |
| | (-13.311) | (-17.097) | (-17.926) | (-11.121) | (-18.744) | (-15.187) |
| *ROA* | -0.018*** | -0.021*** | -0.024*** | 0.004 | -0.023*** | -0.019** |
| | (-2.766) | (-2.694) | (-2.849) | (0.405) | (-4.105) | (-2.291) |
| *RET* | 0.003*** | 0.007*** | 0.006*** | 0.005*** | 0.003*** | 0.012*** |
| | (3.473) | (8.720) | (6.406) | (5.676) | (4.780) | (11.243) |
| *LEV* | 0.010*** | 0.024*** | 0.014*** | 0.022*** | 0.016*** | 0.023*** |
| | (5.206) | (11.890) | (7.623) | (10.503) | (9.401) | (10.551) |
| *Board* | 0.021*** | -0.009* | -0.006 | 0.017*** | 0.012** | -0.018*** |
| | (3.596) | (-1.898) | (-1.129) | (3.275) | (2.491) | (-2.887) |
| Constant | 0.207*** | 0.173*** | 0.169*** | 0.202*** | 0.192*** | 0.164*** |
| | (12.399) | (25.202) | (23.819) | (28.404) | (25.644) | (23.074) |
| Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry Fixed Effect | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 3563 | 5125 | 4569 | 4119 | 5485 | 3203 |
| Adjusted R² | 0.415 | 0.445 | 0.471 | 0.442 | 0.422 | 0.509 |

The detailed definitions of the above variables are shown in the Appendix. T-statistics are given in the parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 5 reports the influence of the corporate financialization on the idiosyncratic risk under different market values, returns on assets and whether the firm is state-owned. For the analysis of the impact of the corporate financialization on idiosyncratic risk under different sizes of market value, the financialization coefficient of large market value firms is significantly negative at the level of 5%. The results show that the corporate financialization with large market value has a significant inhibition on idiosyncratic risk, while that of firms with small market value is not so significant. For the analysis of the impact of the corporate financialization on idiosyncratic risk under different sizes of returns on assets, the financialization coefficient of firms with high return on assets is significantly negative at the level of 1%. The results indicate that the corporate financialization with high return on assets has a significant inhibition on idiosyncratic risk, while that of firms with low return on assets is not so significant. For the analysis of the impact of the corporate financialization on idiosyncratic risk under the condition whether the firm is state-owned, the financialization coefficient of non-state-owned enterprise is significantly negative at the level of 10%. In this case, the corporate financialization of non-state-owned enterprise has a significant inhibition on idiosyncratic risk, while not so significant for state-owned enterprise.

Table 6 lists the impact of corporate financialization on the idiosyncratic risk under the different circumstances of number of analysts, stock ratio of institutional investors. All continuous variables are winsorized at 1% and 99%. Industry and year fixed effects are controlled and the standard errors are clustered at the firm level. The detailed definitions of the above variables are shown in the Appendix.

**TABLE 6.** ANALYSIS ON THE CONDITIONS OF FIRM CHARACTERISTICS

| | (1) Low-Analyst | (2) High-Analyst | (3) Low-Ins | (4) High-Ins |
|---|---|---|---|---|
| *Fin_Return* | -0.002 | -0.017** | -0.006 | -0.016** |
| | (-0.241) | (-2.323) | (-0.694) | (-1.967) |
| *Size* | -0.004*** | -0.004*** | -0.004*** | -0.004*** |
| | (-10.298) | (-14.516) | (-8.477) | (-15.407) |
| *Age* | -0.003*** | -0.003*** | -0.003*** | -0.002*** |
| | (-3.021) | (-3.680) | (-3.570) | (-3.123) |
| *BM* | -0.031*** | -0.026*** | -0.036*** | -0.025*** |
| | (-14.970) | (-15.304) | (-17.310) | (-14.541) |
| *ROA* | -0.021*** | -0.017** | -0.011 | -0.024*** |
| | (-2.629) | (-2.513) | (-1.541) | (-3.390) |
| *RET* | 0.004*** | 0.006*** | 0.003*** | 0.008*** |
| | (4.391) | (7.704) | (2.784) | (9.676) |
| *LEV* | 0.016*** | 0.019*** | 0.016*** | 0.018*** |
| | (7.677) | (10.254) | (7.830) | (9.810) |
| *Board* | 0.005 | 0.004 | 0.006 | 0.004 |
| | (0.836) | (0.960) | (1.039) | (0.758) |
| Constant | 0.185*** | 0.189*** | 0.188*** | 0.187*** |
| | (21.064) | (29.643) | (18.084) | (31.054) |
| Year Fixed Effects | Yes | Yes | Yes | Yes |
| Industry Fixed Effect | Yes | Yes | Yes | Yes |
| Observations | 3768 | 4920 | 3660 | 5028 |
| Adjusted R² | 0.457 | 0.450 | 0.424 | 0.475 |

T-statistics are given in the parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 6 presents the effects of the corporate financialization on the idiosyncratic risk under different numbers of analysts and different shareholding ratio of institutional investors. For the analysis of the impact of the corporate financialization on idiosyncratic risk under different numbers of analysts, the financialization coefficient of firms with large number of analysts is significantly negative at the level of 5%. The results means that the corporate financialization with large number of analysts has a significant inhibition on idiosyncratic risk, while that of firms with small number of analysts is not so significant. For the analysis of the impact of the corporate financialization on idiosyncratic risk under different shareholding ratio of institutional investors, the financialization coefficient of firms with high shareholding ratio of institutional investors is significantly negative at the level of 5%. According to the results, the corporate financialization of firms with high shareholding ratio of institutional investors has a significant inhibition on idiosyncratic risk, while not so significant for firms with low shareholding ratio of institutional investors.

## 4.6 Robustness checks

In the robustness checks, another calculation methods of corporate financialization are utilized, the specific differences of the above calculation methods are shown in the Appendix. We control the year fixed effects unchanged, then change the industry fixed effect to firm fixed effect to test whether the results are robust. All continuous variables are winsorized at 1% and

99%. Industry and year fixed effects are controlled and the standard errors are clustered at the firm level. The results are summarized in Table 7.

**TABLE 7.**    ROBUSTNESS CHECKS

| | (1) IVOL | (2) IVOL | (3) IVOL |
|---|---|---|---|
| *Fin_Return* | -0.016** | | |
| | (-2.004) | | |
| *Fin_Inv* | | -0.011*** | -0.014*** |
| | | (-5.044) | (-3.823) |
| *Size* | -0.001 | -0.006*** | -0.001 |
| | (-1.517) | (-26.382) | (-1.576) |
| *Age* | -0.008** | -0.004*** | -0.008** |
| | (-2.561) | (-6.895) | (-2.427) |
| *BM* | -0.043*** | -0.028*** | -0.043*** |
| | (-25.473) | (-24.571) | (-25.648) |
| *ROA* | 0.007 | -0.007 | 0.007 |
| | (1.105) | (-1.458) | (1.015) |
| *LEV* | 0.007*** | 0.018*** | 0.006** |
| | (2.633) | (14.165) | (2.333) |
| *Board* | -0.003 | 0.010*** | -0.003 |
| | (-0.506) | (3.016) | (-0.558) |
| Constant | 0.149*** | 0.217*** | 0.150*** |
| | (9.413) | (46.772) | (9.427) |
| Year Fixed Effects | Yes | Yes | Yes |
| Industry Fixed Effect | No | Yes | No |
| Firm Fixed Effects | Yes | No | Yes |
| Observations | 11592 | 11592 | 11592 |
| Adjusted R² | 0.474 | 0.455 | 0.475 |

The detailed definitions of the above variables are shown in the Appendix. T-statistics are given in the parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

The calculation method of the corporate financialization coefficient is not unique. We adapt "(net investment income + gains and losses from changes in fair value + net exchange income + other comprehensive income) / operating profit" to measure the level of corporate financialization [16].   Obviously, the larger the value of *Fin_Return* is, the higher the level of corporate financialization is. Besides, we adapt the proportion of the sum of eight items in the balance sheet: trading financial assets, derivative financial assets, repurchase financial assets, loans and advances, available for sale financial assets, held to maturity investment, investment real estate and long-term equity investment, to test the robustness. In the meantime, we control the year fixed effects unchanged, then change the industry fixed effect to firm fixed effect, and the calculated coefficients are still significantly negative. This indicates that the results are robust and the conclusion is still valid even after the calculation method and model are changed.

# 5 CONCLUSION

In summary, the corporates financialization has a restraining effect on Idiosyncratic risks. Due to the financial development trend, the financialization of non-financialized corporates is urgent According to our results, the impact of corporate financialization on idiosyncratic volatility is more significant in large market capitalization, high institutional investor ownership, high return on assets and non-state-owned enterprises. These conclusions remained robust in terms of corresponding validation, including using fixed-effect models and other control variables. Based on the above conclusions, the corporate financialization can inhibit idiosyncratic volatility. Therefore, it is suggested that the government should further improve the institutional arrangements for the corporate financialization and the laws and regulations on the combination of real economy and finance. Besides, it is necessary to establish the norms for the financialization of investment of real firms. At the specific policy level, a stable system should be adopted to ensure the stability and sustainability of industrial policies. Targeted monetary policies (e.g., reducing the required reserve ratio of banks or special refinancing) can be considered to reduce the quality risks of firms.

From the perspective of financial products, one ought to further establish and improve the derivative market represented by short-term investment products. Thereby, the capital market will play better role of reservoir firm funds in the short term, rather than occupy firm resources for a long time, affecting the long-term development of firms. A healthy capital market by providing financial services to improve the comprehensive financing ability of the firm can raise the use efficiency of the production and business operation funds. Besides, it brings lots of benefits, e.g., guiding firms to invest moderate financialization, making its capital configuration was optimized. These effects will increase income and provide financial support for firms to carry out real investment and guarantee simultaneously. These results offer a guideline for corporates provide a good financial environment, and relying on more perfect financial background support can help corporates to better achieve financialization.

# 6 APPENDIX: VARIABLE DEFINITIONS

Following table lists the definitions of variables used in our analysis. All continuous variables are winsorized at 1% and 99%.

| Variable | Definition |
|----------|------------|
| Fin_Return | (net investment income + gains and losses from changes in fair value + net exchange income + other comprehensive income) / operating profit. |
| Fin_Inv | Adapt the proportion of the sum of eight items in the balance sheet, namely trading financial assets, derivative financial assets, repurchase financial assets, loans and advances, available for sale financial assets, held to maturity investment, investment real estate and long-term equity investment. |

| IVOL | Idiosyncratic Volatility: The standard deviation of the residuals of the pricing models. |
|---|---|
| RET | Return |
| Age | Years of Establishment |
| Size | Firm Size |
| Analyst | The Number of Analysts |
| Big4 | Big Four Auditor |
| LEV | The ratio of total liabilities to total assets |
| BM | The ratio of stock price divided by earnings per share |
| SOE | State-owned Enterprise |
| FRS | Shareholding Ratio of Largest Shareholder |
| ROA | Return on Assets |
| Growth | Growth Rate of Operating Revenue |
| INS | Shareholding Ratio of Institutional Investors |
| Board | Proportion of Independent Directors |

# REFERENCES

[1] Li, Chong, et al. "Financialization and risk taking of non-financial corporations empirical evidence from Chinese listed companies." Journal of Applied Finance and Banking 9.3 (2019): 79-107.

[2] Gaunt, Clive. "Size and book to market effects and the Fama French three factor asset pricing model: evidence from the Australian stockmarket." Accounting & Finance 44.1 (2004): 27-44.

[3] Philippo W. The Equity Premium Puzzle and the Risk -Free RatePuzzle[J]. Journal of Monetary Economics,1989, 24(3).

[4] FACCIO M, MARCHICA M T, MURA R. CEO gender, corporate risk-taking, and the efficiency of capital allocation [J]. Journal of Corporate Finance, 2016, 39: 193-209.

[5] Wang Hongjian, Cao Yuqiang, Yang Qing, et al. Does the financialization of real enterprises promote or inhibit enterprise innovation -- An Empirical Study Based on Chinese listed manufacturing companies [J]. Nankai management review, 2017, 20 (1): 155-166.

[6] Xu Gang, Zhu Weidong. Financialization, market competition and R & D investment crowding -- Empirical Evidence from non-financial listed companies [J]. Scientific research, 2017, 35 (5): 709-719.

[7] Hu guoliu, Hu Jun. directors' and executives' liability insurance and corporate risk taking: theoretical path and empirical evidence. Accounting research, 2017 (05): 42-48.

[8] Huang, Wei, et al. "Return reversals, idiosyncratic risk, and expected returns." The Review of Financial Studies 23.1 (2010): 147-168.

[9] Angelidis, Timotheos. "Idiosyncratic risk in emerging markets." Financial Review 45.4 (2010): 1053-1078.

[10] Panousi, Vasia, and Dimitris Papanikolaou. "Investment, idiosyncratic risk, and ownership." The Journal of finance 67.3 (2012): 1113-1148.

[11] Identifying the "financialization" of the nonfinancial corporation in the U.S. economy: A decomposition of firm-level balance sheets[J]. Journal of Post Keynesian Economics, 2016(1): 115-141.

[12] Ruiyuan Chen, Sadok EI Ghoul, Omrane Guedhami, He Wang. Do state and foreign ownership affect investment efficiency? Evidence from privatizations[J]. Journal of Corporate Finance, 2017(42): 408-421.

[13] Arrow, K. J. (1969)'The Organization of Economic Activity: Issues Pertinent to the Choice of Market Versus Nonmarket Allocation', in US Congress, Joint Economic Committee, The Analysis and Evaluation of Public Expenditures: The PPB System, vol. 1, Washington: GPO, pp. 47–66.

[14] Fu, F., 2009. Idiosyncratic risk and the cross-section of expected stock returns. J. Financ. Econ. 91 (1), 24–37.

[15] Fama, E., French, K., 1993. Common risk factors in the returns on stocks and bonds. J. Financ. Econ. 33, 3–56.

[16] Hongjian Wang, Yuqing Cao, Qing Yang, Zheng Yang. Does the financialization of real enterprises promote or inhibit enterprise