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OLS Model Based Research on Influential Factors of Financial Performance for Chinese Technology Companies

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ABSTRACT
Based on 459 Chinese listed technology companies from the RESSET Finance Database, this paper explores the influential factors of the financial performance of Chinese technology companies. With the application of statistics software, the data are processed through Person correlation and OLS regression analysis. The research results demonstrate that financial leverage, operating leverage, and firm size are correlated with both long-term and short-term financial performance. Growth opportunity is only associated with short-term financial performance (ROA), and government ownership has a significant correlation with long-term financial performance (R&D). Contrary to the results of previous studies, a company's liquidity is not correlated with financial performance. The study findings highlight the importance of company-specific characteristics to Chinese technology companies and conclude the following implications. First, companies should be vigilant on the use of debt to form a healthier financing structure. Second, for large companies, the importance of R&D investment should be stressed to maintain its competitiveness. Last, policymakers should better refine the subsidy policies to incentivize R&D investment in the private sector.

Keywords: *OLS Model，Influential Factors，Financial Performance，Chinese Technology Company*

1. INTRODUCTION

In the information era, technological innovation is the primary driving force of economic development. The development of technology companies in various countries has become a decisive factor in improving the competition of comprehensive national strength. How to improve the financial performance of technology companies has attracted the attention of governments and academia all over the world.

In recent years, China has reached a lot of achievements in technology innovation while facing some new challenges. According to the data of China's National Bureau of Statistics, in 2019, China's total R&D funding input was 2214.36 billion yuan, ranking second in the world for seven consecutive years.[1] Although the gap with the United States is gradually narrowing, R&D investment made by Chinese enterprises in 2019 is only one-third of that of the United States.[2] Externally, with the competition between China and the United States escalating, the US's technology blockade against China has become a long-term strategy. It is necessary for China to make up for the shortcomings of the supply chain and key areas that are severely constrained by others. Internally, China's high-tech manufacturing industry, represented by chip manufacturing, faces serious supply shortages, which have affected the production and operation activities of related industries. China's 14th Five-Year Plan (2021-2025) has also pointed out the urgency and importance of solving the technology bottleneck. [3]

In these circumstances, which factors would influence Chinese technology companies' financial performance? How to improve Chinese technology companies' financial performance in terms of company-specific characteristics? By using data of 459 Chinese listed technology companies from the Resset Finance Database, this study explores the factors affecting Chinese technology companies' financial performance. The results from the OLS regression model would assist Chinese technology companies in improving their competitiveness, as well as provide policymakers with reference to refine the incentive system for R&D.

2. LITERATURE REVIEW

2.1. Financial Performance

The concept of performance is controversial and continuously evolving. Nicu argues that due to the type of activities a certain organization is involved in and the different interests of the one involved, it is challenging to reach a consensus regarding the definition of performance at the organization level.[4] In high-technology sectors, numerous studies have proved that the existence of a positive relationship between the R&D investment and the company's long-run performance.[5] Therefore, to measure the financial performance of technology companies, in addition to short-term profitability indicators like ROE and ROA used in most studies,[6] it is essential to take into account their R&D investment for a long-run evaluation.

Existing research on influential factors on companies' financial performance can be classified into two categories external factors and internal factors. Internal factors can be further classified into company-specific characteristics, management characteristics, and corporate governance factors. Research on external factors mainly focuses on influential elements that are not in direct control of the company, such as media reports and inflation.[7][8] Internally, many scholars have investigated the relationship between company-specific characteristics and financial performance. For example, factors like liquidity, financial leverage, operating leverage, firm size, growth opportunity, and ownership structure are all popular explored factors. In general, the influence of these factors on financial performance has been studied so many years for companies in various regions, yet only limited study has been found on the listed technology cooperatives in China.

2.2. Liquidity

Liquidity measures the company's ability to fulfill its debt obligations coming due in the next 12 months using cash or assets that will be turned into cash. It's usually measured by the ratio of cash and cash equivalents to current liabilities. In cases where external finance is not available or too costly, a company can use liquid assets to finance its activities and investments. Also, higher liquidity would allow a company to deal with unexpected contingencies. [9] Therefore, liquidity is especially essential for R&D-intensive corporations. He and Wintoki [10] find that R&D intensive firms have strong incentives to maintain a liquidity buffer to smooth R&D, thereby preventing the potential high adjustment costs and funding shortages.

Hypothesis I: Liquidity is correlated with the financial performance of Chinese listed technology companies.

2.3. Financial Leverage

Financial leverage is the ratio of total liabilities to total assets. Previous work has discovered its influence on company performance from two perspectives that financial distress caused by debt is costly and that company performance can be improved due to the disciplinary role of debt.[11] Lee & Shim [12] show that financial leverage is significant but negatively associated with an R&D-intensive company's market performance. High debts could prevent companies from raising additional funds for productive R&D projects, and the company could be less competitive in the long run.

Hypothesis II: Financial leverage is correlated with the financial performance of Chinese listed technology companies.

2.4. Operating Leverage

Capital intensity, a representative of a company's operating leverage, is measured by total assets scaled by total operating revenue. Some researchers [13] argued that operating leverage and tends to increase a company's risk. The reason is a large portion of the cost is fixed for capital-intensive organizations, which does not change according to the sales volume and thus leads to volatile profitability. On the contrary, according to Hurdle, [14] capital intensity decreases a company's risk. A capital-intensive company may avoid further capital investment or additional expenditures during economic downturns or uncertainties due to its previously committed or invested fixed structure.

Hypothesis III: Operating leverage is correlated with the financial performance of Chinese listed technology companies.

2.5. Firm Size

Firm size is measured by the natural log of the firm's sales. The effect of this variable on performance is likely to be positive as larger firms benefit from more advanced technology, diversification, and management. Larger firms may also enjoy economies of scale in monitoring top management and have greater resources to finance innovation.[15] However, larger firms may suffer from deficiencies like hierarchical managerial inefficiencies and greater monitoring costs.[16] In terms of R&D investment, Cohen et al. [17] found that firm size has a very small, statistically insignificant effect on business R&D intensity.

Hypothesis IV: Firm size is correlated with the financial performance of Chinese listed technology companies.

2.6. Growth Opportunity

Sales growth is considered an indicator of future growth opportunities. Schmookler's [18] demand-pull hypothesis posits that market demand plays an important role in the magnitude of R&D investment. Mowery and Rosenberg [19] further explain that growth opportunities, by creating potential demand for a product, incentivize companies to invest in R&D to develop and refine those products. Hence, R&D intensity can be expected to be higher in companies with more growth opportunities.

Hypothesis V: Growth opportunity is correlated with the financial performance of Chinese listed technology companies.

2.7. Ownership Structure

Ownership structure may affect company financial performance, and various ownership structures may have different influences on company performance. The ownership structure is related to the existence of certain owners such as family, government, and foreign shareholders who can influence company performance.[20] In the scenario of technology companies, the existence of government ownership seems especially crucial. Government subsidies are considered fundamental for alleviating market failure and stimulating R&D activities.[21] Chinese state-owned enterprises (SOEs) have easier access to government subsidies due to their close political connections and channel function to achieve government sociopolitical objectives such as creating job opportunities and stabilizing local economies.[22]

Hypothesis VI: Government ownership is correlated with the financial performance of Chinese listed technology companies.

However, these company-specific characteristics are insufficient to interpret the disparities in company performance. Therefore, literature regarding the impact of management characteristics and corporate governance factors on financial performance is also abundant. According to Hambrick and Mason's [23] upper-echelons theory, decisions at the organizational level are affected by decision-makers' characteristics, so company performance is to some extent predicted by managerial background characteristics. Bertrand & Schoar [24] argue that manager fixed effects affect corporate behavior and performance. Researchers in China have found that management's education background will affect the quality of investment, which further sways company performance.[25] Corporate governance, as a system of structures and processes to direct and control the functions of an organization,[26] is also the focus of extensive analysis in the majority of the previous studies. According to the studies of Black et al. [27], Drobetz et al. [28], Ong et al. [29], there is a significant positive relationship between corporate governance practices and company performance in various countries.

Is there any relationship between company-specific characteristics and Chinese A-share tech companies' financial performance? The discussion of such issue will be based on the assumption that there is not much variation in external factors for the technology industry in China, and the influence of management characteristics and corporate governance factors will be addressed by introducing control variables. This will not only supplements the quantitative analysis of company specific characteristics, management characteristics, and corporate governance of Chinese listed technology companies but also enriches the research results on the financial performance of Chinese listed technology companies, which is conducive to a more comprehensive understanding of the development of listed technology companies in China.

Table 1. Variable description

Classification	Variable Name	Abbreviation	Definition
Explained Variables			
Short Run	ROA	ROA	EBITDA / total assets
	ROE	ROE	EBITDA / shareholder's equity
Long Run	R&D intensity	RD	R&D expenditure / total operating revenue
Explanatory Variables			
Company-Specific Characteristics	Liquidity	Cash	Cash and cash equivalents / current liability
	Financial Leverage	FinLev	Total liabilities / total assets
	Operating Leverage	OprLev	Total assets / total operating revenue
	Firm size	FSize	Log of operating revenue
	Growth Opportunity	Growth	Annual percentage change of operating revenue
	Government Ownership	SOE	A binary variable which equals 1 if state owned enterprises (SOE) and 0 otherwise
Control Variables			
Management Characteristics	CEO Education Background	Edu	A categorical variable: Academic secondary education, specialized secondary education and equivalents = 1; College diploma = 2; Bachelor's

and Corporate Governance			degree = 3; Master's degree = 4; Doctor's degree and postdoctor = 5
	Executive Compensation	ExeCom	Log of the sum of top3 executives' compensation
	Board Size	BSize	Number of directors serving on the board
	Percentage of independent board members	IndBoD	Percentage of independent board members

Data source: Reset Finance Database (www.resset.com)

3. RESEARCH DESIGN

3.1. Data Description

The preliminary samples are selected from the RESSET Finance Database technology sector. Data is framed from Jan 1, 2019, to Dec 31, 2019. Screening is based on Central People's Government of PRC's eight recognition standards of high-tech companies, which bars areas like registration time, ownership of intellectual properties, R&D employee percentage, annual R&D expense, percentage of the income from high-tech products and services, and the industry it operates in. There are eight recognized high-tech industries, which are electronic information, aerospace, medical and biotechnology, new material, high-tech service, new and saving energy, resources, and environment, and reconstructing traditional industries by high-tech. [30] RESSET Finance Database is a financial research database that provides support to universities, financial research institutions, and research departments of financial enterprises for activities like empirical research and model testing. It is attended by experts from Tsinghua University, Peking University, and the London School of Economics and Political Science. As the representative professional database in China that is in line with the world's leading standards, RESSET Finance Database draws on the research and development concepts of internationally renowned databases and is carefully designed in accordance with China's national conditions. After merging, de-duplicating data, and dropping missing values, a sample of 459 Chinese technology companies was obtained.

The explained variables are ROA, ROE, and R&D intensity. Earnings before interest, taxes, depreciation and amortization (EBITDA) are used as a numerator to eliminate differences in tax rates and separate the impact of capital structure and capital expenditures. Explanatory variables consist of company-specific characteristics like liquidity, financial leverage, operating leverage, firm size, growth opportunity, and government ownership. Management characteristics and corporate governance include CEO education background, executive compensation, board size, and percentage of independent BoD members are included as control variables.

3.2. Empirical Model

By using the software STATA, this paper mainly studies the influencing factors of financial performance in the context of listed technology companies in China by Person correlation analysis and Ordinary Least Squares regression (OLS).

The Pearson correlation statistically computes the strength of a linear association between two variables (X and Y). It is derived by dividing the product of two variables' standard deviations from their covariance. The formula is illustrated as below:

$$r_{xy} = \frac{\sum x_i y_i - n\bar{x}\bar{y}}{\sqrt{\sum x_i^2 - n\bar{x}^2}\sqrt{\sum y_i^2 - n\bar{y}^2}}$$

OLS regression uses the linear least squares method to estimate the unknown parameters. It is applicable to single or multiple explanatory variables and coded categorical explanatory variables. OLS chooses the parameters of a linear function of a group of explanatory variables corresponding to the principle of least squares: minimizing the sum of the squares of the differences between the dependent variable that is observed in the value and the estimated value of the sample regression function. With p explanatory variables, the model writes as:

$$Y = \beta_0 + \sum_{j=1\ldots p} \beta_j X_j + \varepsilon$$

where Y is the dependent variable, β_0 is the intercept of the model, X_j corresponds to the jth explanatory variable of the model (j= 1 to p), and ε is the random error with expectation 0 and variance σ^2. For n observations, the estimation of the predicted value of the explained variable Y for the i^{th} observation is given by:

$$y_i = \beta_0 + \sum_{j=1\ldots p} \beta_j X_{ij} + \varepsilon$$

In this paper, taking into account that financial performance may also be affected by management characteristics and corporate governance factors, step regression is used to test the robustness of the relationship between company-specific characteristics and financial performance. The model is indicated as follows：

$$ROA_i = \beta_0 + \beta_1 Cash_i + \beta_2 FinLev_i + \beta_3 OprLev_i + \beta_4 FSize_i + \beta_5 Growth_i + \beta_6 SOE_i + \varepsilon_{i1} \quad (1)$$

$$ROA_i = \beta_0 + \beta_1 Cash_i + \beta_2 FinLev_i + \beta_3 OprLev_i + \beta_4 FSize_i + \beta_5 Growth_i + \beta_6 SOE_i + \beta_7 Edu_i + \beta_8 ExeCom_i + \beta_9 Bsize_i + \beta_{10} IndBoD_i + \varepsilon_{i2} \quad (2)$$

$$ROE_i = \beta_0 + \beta_1 Cash_i + \beta_2 FinLev_i + \beta_3 OprLev_i + \beta_4 FSize_i + \beta_5 Growth_i + \beta_6 SOE_i + \varepsilon_{i3} \quad (3)$$

$$ROE_i = \beta_0 + \beta_1 Cash_i + \beta_2 FinLev_i + \beta_3 OprLev_i + \beta_4 FSize_i + \beta_5 Growth_i + \beta_6 SOE_i + \beta_7 Edu_i + \beta_8 ExeCom_i + \beta_9 Bsize_i + \beta_{10} IndBoD_i + \varepsilon_{i4} \quad (4)$$

$$RD_i = \beta_0 + \beta_1 Cash_i + \beta_2 FinLev_i + \beta_3 OprLev_i + \beta_4 FSize_i + \beta_5 Growth_i + \beta_6 SOE_i + \varepsilon_{i5} \quad (5)$$

$$RD_i = \beta_0 + \beta_1 Cash_i + \beta_2 FinLev_i + \beta_3 OprLev_i + \beta_4 FSize_i + \beta_5 Growth_i + \beta_6 SOE_i + \beta_7 Edu_i + \beta_8 ExeCom_i + \beta_9 Bsize_i + \beta_{10} IndBoD_i + \varepsilon_{i6} \quad (6)$$

4. DATA ANALYSIS

4.1. Descriptive Analysis

The descriptive statistics are presented in Table 2. Short-term financial performance measures, ROA and ROE, have mean values of 0.0674 and 0.0557 and standard deviation of 0.1663 and 0.1648, respectively. Their coefficient of variation (CV) is greater than 1 (2.4674 and 2.9618), meaning the variation between companies is relatively high. Long-term financial performance measure, R&D intensity, with a mean of 0.0516 and standard deviation of 0.0477, has an even smaller CV of 0.9244. It indicates that R&D intensity does not vary much across the companies.

The mean cash ratio is 1.2373, which reveals that, on average, technology companies maintain a cash account that is more than enough to cover their short-term debts. The debt ratio mean of 0.4027 indicates that Chinese A-share technology companies finance 40% from debt. Operating leverage, measured by dividing total assets by total revenues, ranges from 0.2355 to 42.4847, with a mean value of 2.2214. Firm size shows a mean value of 21.2620 with a minimum (maximum) value of 16.6597 (26.5441). Growth opportunity with a CV of 3.2482, derived by dividing mean of 10.4796 from the standard deviation of 34.0400, shows that high variation exists in technology companies' growth opportunity. Government ownership demonstrates a mean value of 0.1002, which means that a large portion of the sample companies is not state-owned. Board size has a mean of 9.9935, ranging from 4 to 26. The percentage of independent board members displays a mean of 38.5%, which indicates that, on average, Chinese listed technology companies hire independent board members upon the requirement of the China Securities Regulatory Commission that the board of a listed company shall include at least one-third of the independent directors. CEO education background with a mean of 3.4183, demonstrating that on average Chinese listed technology companies' CEO on average holds a Bachelor's degree or above. Executive compensation shows a mean value of 14.6455 with a minimum (maximum) value of 12.8397 (17.3954).

Table 2. Descriptive statistics

Variable Name	Abbreviation	Mean	Std. Dev.	Min	Max
ROA	ROA	0.0674	0.1663	-1.0754	0.4829
ROE	ROE	0.0556	0.1648	-14.3862	1.4080
R&D intensity	RD	0.0515	0.0476	0.0000	0.5150
Liquidity	Cash	1.2373	2.0652	0.0039	16.0227
Financial Leverage	FinLev	0.4027	0.1913	0.0438	0.9471
Operating Leverage	OprLev	2.2213	2.4366	0.2355	42.4847
Firm size	FSize	21.2620	1.3107	16.6597	26.5441
Growth Opportunity	Growth	0.1048	0.3404	-0.6737	4.4564
Government Ownership	SOE	0.1002	0.3006	0	1
Board Size	BSize	9.9935	3.1474	4	26
Percentage of independent board members	IndBoD	0.3850	0.0817	0.1765	0.6667
CEO Education Background	Edu	3.4183	1.0018	1	5
Executive Compensation	ExeCom	14.6455	0.6337	12.8397	17.3954

4.2. Pearson Correlation Analysis

In this research, the Pearson correlation analysis (Table 3) illustrated that financial leverage is negatively correlated with company performance (ROA, ROE, and R&D intensity) at $p<0.01$ level. Liquidity demonstrates a positive correlation with ROA and R&D intensity at $p<0.01$ level. While firm size is positively correlated

with ROE at 10% significance level and negatively correlated with R&D intensity at p<0.01 level, operating leverage illustrates the opposite: negative association with ROA and positive association with R&D intensity at 1% significance level. Growth opportunity indicates a positive correlation with both ROA and ROE, meaning companies with good growth opportunity expect better financial performance in the short run. Government ownership is significantly correlated with R&D intensity, which implies that compared with non-SOEs, SOEs gain stronger government supports on R&D investment. All hypotheses are preliminarily supported.

Table 3. Pearson correlation matrix

	ROA	ROE	RD	Cash	FinLev	FSize	Growth	SOE	OprLev	BSize	IndBoD	Edu	ExeCom
ROA	1.00												
ROE	0.71***	1.00											
RD	-0.03	-0.01	1.00										
Cash	0.17***	0.05	0.21***	1.00									
FinLev	-0.35***	-0.21***	-0.27***	-0.57***	1.00								
FSize	0.07	0.09*	-0.33***	-0.31***	0.47***	1.00							
Growth	0.22***	0.10**	-0.04	-0.02	-0.01	0.06	1.00						
SOE	-0.02	0.02	0.09*	0.02	0.04	0.12**	-0.02	1.00					
OprLev	-0.18***	-0.08	0.22***	0.10**	-0.10**	-0.33***	-0.12**	0.01	1.00				
BSize	-0.14***	-0.07	-0.05	-0.02	0.12**	0.25***	-0.19***	0.17***	0.08*	1.00			
IndBoD	-0.06	-0.07	0.11**	-0.01	-0.02	-0.09*	0.06	-0.10**	0.06	-0.24***	1.00		
Edu	-0.09**	-0.07	0.12**	0.03	0.05	0.09*	-0.05	0.11**	0.07	0.20***	-0.06	1.00	
ExeCom	0.15***	0.11**	0.00	-0.08*	0.13***	0.47***	0.01	0.10**	-0.14***	0.17***	-0.13***	0.03	1.00

Note：* p<0.10,** p<0.05,*** p<0.01

4.3. Regression Analysis

The results of the OLS regression analysis (Table 4) demonstrate that, in the model (1)(2)(3)(4)(5)(6), the prob(F-statistic) < 0.01, thus the regression analysis effect is significant. The Variance Inflation Factor (VIF) is a measure of collinearity among predictor variables within a multiple regression. In this research, the VIF value in the two types of presented models is 1.31 and 1.32, respectively. A VIF in a range of 1 to 10 indicates no existence of the multicollinearity problem.

R^2 is the coefficient of determination, which characterizes the goodness of fit through changes in data. Adjusted R^2 is the degree-of-freedom adjusted coefficient of determination. The value of R^2 ranges from 0 to 1. The closer to 1, the stronger the interpretation ability of the explanatory variables to the dependent variable of the equation, and the better the model fits the data. In model (1), R^2=0.246, Adjusted R^2=0.236. Financial leverage, operating leverage, firm size, and growth opportunity are correlated with ROA with coefficients of -0.339, -0.007, 0.025, and 0.074, respectively, at 1% significance level. This means that both financial and operating leverage exert downward pressure on tech companies' short-run financial performance, but the larger firm size and greater growth opportunity are beneficial.

In model (2), R^2=0.273, Adjusted R^2=0.257. Its goodness of fit is much better than model (1). Explanatory variables that were significant in model (1) remain significant in model (2), proving the robustness of the model. However, both correlation coefficient and significant level of operating leverage have decreased when management characteristics and corporate governance are introduced in model (2) as control variables. Executive compensation is positively correlated with ROA (β=0.023, p <0.05), implying the effectiveness of compensation motivation. Nevertheless, board size (β=-0.005, p <0.01) and percentage of independent board members (β=-0.116, p <0.10) illustrate a negative correlation.

In model (3), R^2=0.102, Adjusted R^2=0.119. Similar to Model (1), financial leverage, firm size, and growth opportunity are correlated in the same direction with ROE with coefficients of -1.619 (1%), 0.140 (1%), and 0.192 (10%), respectively. Unlike ROA, operating leverage has no significant correlation with ROE.

In model (4), R^2=0.119, Adjusted R^2=0.099. Its goodness of fit improves than model (3). Financial leverage and firm size remain significant in model (4). However, after introducing control variables, growth opportunity became insignificant, indicating this variable is not robust. In control variables, board size (β=-0.025, p <0.10) is negatively correlated with ROE.

In model (5), R^2=0.158, Adjusted R^2=0.147. Financial leverage, operating leverage, and firm size are correlated with R&D intensity with coefficients of -0.030 (5%), 0.002(1%), and -0.008 (1%), respectively.

Financial leverage also exerts downward pressure on R&D investment. However, unlike short-term performance measures, R&D intensity is positively correlated with operating leverage and negatively correlated with firm size. Government ownership (β=0.019, p <0.01) has a positive correlation with R&D intensity, which indicates that government ownership promotes investment in R&D.

In model (6), R^2=0.210, Adjusted R^2=0.192. Its goodness of fit is better than model (5). Explanatory variables that were significant in model (5) remain significant in model (6), proving the robustness of the model. However, variables like financial leverage, operating leverage, and government ownership's correlation coefficients and significant level have decreased when control variables are added in model (6). Control variables like percentage of independent board members, CEO education background, and executive compensation are positively correlated with R&D intensity at 1% significance level, which is consistent with upper-echelons theory.

In conclusion, the OLS regression highlights that company-specific characteristics like financial leverage, operating leverage, firm size, growth opportunity, and government ownership are correlated with the financial performance of listed technology companies in China. When control variables are introduced, the relationship still maintains robust. The research hypothesis is supported.

Table 4. OLS regression results

	(1)	(2)	(3)	(4)	(5)	(6)
	ROA	ROA	ROE	ROE	RD	RD
Explanatory Variables						
Cash	-0.001 (-0.20)	-0.000 (-0.04)	-0.037 (-1.65)	-0.034 (-1.52)	0.001 (1.15)	0.001 (0.98)
FinLev	-0.339*** (-8.89)	-0.326*** (-8.65)	-1.619*** (-6.27)	-1.570*** (-6.07)	-0.030** (-2.10)	-0.027* (-1.92)
OprLev	-0.007*** (-2.80)	-0.005** (-2.20)	-0.008 (-0.47)	0.000 (-0.01)	0.002*** (2.69)	0.002** (2.28)
FSize	0.025*** (4.85)	0.023*** (3.94)	0.140*** (4.04)	0.139*** (3.51)	-0.008*** (-4.35)	-0.012*** (-5.63)
Growth	0.074*** (4.52)	0.067*** (4.08)	0.192* (1.73)	0.161 (1.42)	-0.002 (-0.25)	-0.002 (-0.28)
SOE	-0.011 (-0.60)	-0.007 (-0.36)	0.034 (0.27)	0.056 (0.44)	0.019*** (2.70)	0.017** (2.54)
Control Variables						
BSize		-0.005*** (-2.68)		-0.025* (-1.84)		0.000 (-0.32)
IndBoD		-0.116* (-1.67)		-0.774 (-1.63)		0.068*** (2.69)
Edu		-0.007 (-1.28)		-0.044 (-1.15)		0.006*** (3.10)
ExeCom		0.023** (2.32)		0.073 (1.08)		0.014*** (3.93)
_cons	-0.313*** (-2.95)	-0.495*** (-3.38)	-2.221*** (-3.09)	-2.622*** (-2.62)	0.230*** (5.83)	0.054 (1.00)
R^2	0.246	0.273	0.102	0.119	0.158	0.210
Adjusted R^2	0.236	0.257	0.090	0.099	0.147	0.192
F	24.514***	16.824***	8.583***	6.031***	14.109***	11.912***
Mean VIF	1.31	1.32	1.31	1.32	1.31	1.32

Note：t statistics in parentheses (* p<0.10,** p<0.05,*** p<0.01)

5. DISCUSSION

The objective of this study was to investigate the company-specific characteristics' impact on Chinese A-share technology companies' financial performance. Consistent with the results of previous studies, factors like financial leverage, operating leverage, and firm size are correlated with both long-term and short-term financial performance, supporting hypotheses II, III, and IV. Growth opportunity is only associated with short-term performance (ROA), and government ownership has a significant correlation with R&D intensity, which partly validates hypotheses V and VI. However, liquidity is insignificant in all six regression models; thus, hypothesis I is rejected. In addition to these results, it's valuable to investigate the rationales behind some of the proven relationships.

First, financial leverage is found to be negatively correlated with all three performance measurements, ROA, ROE, and R&D intensity. The most explicit cause would be the financial distress brought by the heavy debt.

The liquidity issue caused by the payment of interests and principal will affect the daily operation and thus harm the short-run performance. The higher cost of capital due to existing high leverage would hinder further funding for R&D investment, which is unbeneficial to long-term performance. In addition, the above issues alter the management's risk preference. A stressful management group would not take further risks to invest in R&D projects that are uncertain in nature. Even so, the average debt ratio among Chinese listed technology companies is over 40%, and the maximum is even above 90%. The main reason presumed is that the shareholders tend to use debt as a disciplinary tool to resolve agency issues so as to belittle the cost of debt. Therefore, companies should be vigilant on the use of debt and careful in monitoring its long-term influence on performance.

Second, firm size is negatively correlated with R&D intensity. Although Williamson (1967) reasons that larger firms may suffer from deficiencies like hierarchical managerial inefficiencies and greater monitoring costs, other reasons are supposed in this paper's research context. Over the years, R&D investment in China still shows an inclination to traditional industries where large companies concentrated. Their innovation activities are few original but are dominated by integrated innovation and re-innovation of introduced technology, which are generally experimental development activities. [31] Also, Liu and Li [32] argue that when the enterprise scale is too large, due to the substitution effect, the R&D investment intensity of large enterprises may be less than that of relatively small competitors. Consequently, with the growth of the entity, management should pay more attention to the development of the core competitiveness as a technology company.

Third, government ownership is positively correlated with R&D intensity. This is consistent with previous research that SOEs have easier access to government subsidies compared with non-SOEs.[22] Moreover, SOEs are almost impossible to bankrupt due to support from the government, so they are more risk-taking in investing in R&D. However, an important thing to notice is that R&D intensity with a coefficient of variation of 0.9244, does not vary much across the companies. Considering in recent years, the Chinese government has upgraded its support for the technology industry, and many subsidies are granted to non-SOEs, the homogeneous level of R&D investment across the industry brings up the question of the effectiveness of the motivation function of government subsidy. Yu et al[33]. pointed out that government subsidies have a significant crowding-out influence on enterprises' R&D. This may, to some extent, explain the low R^2 for all six models, as a major influential factor, government subsidy is not included due to collectability of data.

Overall, to improve the financial performance and competitiveness of list technology companies in China, the company and government should work together. While companies better plan their financing sources and contribute more to R&D, the government should also construct a more efficient incentive system to support R&D.

6. CONCLUSION

Many company-specific characteristics like financial leverage, operating leverage, firm size, growth opportunity, and government ownership are found to be correlated to Chinese listed technology companies' financial performance. Monitoring, adjusting, and controlling those factors at an optimal level is an important measure for companies to improve their performance. One of the main contributions of this research is to clarify the influence of company-specific factors on Chinese listed technology companies' performance. It provides a theoretical and empirical reference for how to promote Chinese listed technology companies' performance. However, the sample size it is still limited given the overall number of all targeted population. Also, the time window of one year covered is relatively short. Therefore, future study needs to be improved by including a larger sample and longer time window. In addition, it is worth exploring the mechanism of how Chinese listed technology companies' performance is affected by other variables and whether the assumption holds that external factors like government subsidies are constant for the technology sector. There is still space to test if there is mediating or moderating variable in the relationship between company-specific characteristics and Chinese listed technology companies' performance.

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