Does Technical Characteristics Influence on the Growth of GEM Listed Companies: Empirical Evidence from Listed Companies of ShenZhen GEM

Wei Hua Li[a], HaoJie Liao[b,*], Shi-Zheng Huang[c,d,*], Dong Li[b]

Abstract

This paper selects data of Shenzhen GEM listed companies as samples, and conducts regression analysis on the growth and technical characteristics of Shenzhen GEM listed companies by using sustainable growth rate, assets growth rate, business income growth rate, net profit growth rate and Tobin Q as representative indexes. The results have shown: i. Different growth index has different relevance on capital structure; ii. In terms of debt maturity structure, GEM companies with better growth prefer current liabilities; iii. Non-current liabilities have not been tested in the growth perspective.

Keywords: Capital Structure; GEM; Listed Companies; Growth; Empirical Research.

1. Introduction

It has been 10 years since the GEM went listing in China on October 30th, 2009 and the number of listed companies has grown to nearly 800. However, compared with the original intention of China Securities Regulatory Commission of setting up GEM—to solve the problems of financing difficulty of small and medium enterprises, the problems of Chinese GEM listed companies like high issuing prices, high stock prices and high assessment values are not solved effectively. A large number of GEM companies, which have been listed for over two years still have P/E ratio as high as over 60 times or even hundreds of times, causing many doubts on the growth. In the China Securities Regulatory Commission's requirements of "Two High Six New" on GEM listed companies of China, Two High means two indexes of high growth and high technological content.

Original intention of setting up GEM is high technological content and high growth. However, based on the institutional environment of China, many GEM listed companies are going listed after being carefully packed by the venture capitals, institutional investors and connected persons who buy the company's shares and be part of the shareholders suddenly.

a. Jiangsu Vocational Institute of Commerce, Nanjing, 210007, China
b. School of Accounting and Auditing, Guangxi University of Finance and Economics, Nanning, 530003, China
c. School of Economics and Management, Guangdong University of Petrochemical Technology, Guangdong,525000, China
d. School of international, Bansomedjchaopraya Rajabhat University, Bangkok, Thailand
*Corresponding Author: HaoJie Liao, Shi-Zheng Huang
Email: 471089746@qq.com, szhuang06@gmail.com

As most of the GEM listed companies have not used up all the venture capitals, suddenly joined equity capitals, collected capitals or excess collected capital, we can conclude from the phenomenon that the current business of the GEM listed companies cannot meet the requirement of growth for the fast-growing capital scale. However, there is no literature making research on this problem. As the Chinese GEM scale is still expanding rapidly and the PE investment is still crazy, which is nibbling the only investment value of second market, the research on the relationship between capital structure level of Chinese GEM listed companies and its growth is extremely valuable.

To investors, growth of company represents future investment value of the company. So, the research on the growth of company has always been the key inspection category of theorist and pragmatic workers. As early as in 1959, Penrose had begun the research on the elements and mechanism of growth of enterprise by establishing analytical framework for enterprise resource—enterprise ability—enterprise growth. Afterwards, scholars conduct abundant theoretical research and empirical research on the growth of company from different perspectives (Donckels,1997; Cooper,1998).

Founder of innovation theory, Schumpeter (1934) thought, innovation is the motive power of economic growth. However, about the growth of company, there are relatively big differences on the conclusions of the technological elements' influence on the growth of company. Although a large number of scholars have found obvious relevance between technology and growth of enterprise through theoretical research and

empirical research; there are also many scholars who found that technology's influence on the growth of enterprise was not obvious (Roper, 1997; Del Monte and Papagni, 2003; Zhang and Xue, 2010; Chen, 2008; Chi, et al 2010; Huang, et al, 2020). Since the GEM go listing in 2009, there have been nearly 800 listed companies by December 31st, 2019, whose growth are criticized and doubted for exorbitant stock price and value of assessment and excess media hype. However, there have not been systematic literature and conclusions related to this issue. Hence, we launch research on the influence on the growth of the listed companies from the perspective of technological characteristics by making use of the empirical evidence of GEM in China.

The following arrangement of this paper is literature review, research hypothesis, research variables and samples, empirical research and conclusion

2 Research hypotheses
2.1 Related literature review
There have been abundant research findings in the field of growth of company, including evaluation system for growth of company and empirical tests between growth of company and each influential element, etc. In the existing research findings, the influence factors of growth of company include external macro environment like politics, economy, law, technology, etc., and internal factors like technological level, capital structure, governance level, management encouragement, management characteristics, enterprise scale, industry factors, R & D, market and so on. They are shown in Table 1.

TABLE 1 Influence Factors of Growth of Company

Influence factor	Researcher
Management characteristics	Donckels(1997);Cooper(1998);Myers and Turnbull(1977); Xu and Wang (2010)
Enterprise scale	Donckels(1997);Cooper(1998);Myers and Turnbull(1977); Wu et al.(1999); Chen et al. (2007)
Capital structure	Lu and Xin (1998); Hong and Shen (2000); Cheng and Xing (2006); Chen and Rao (2003); Lv et al. (2006)
Industry factors	Cooper(1998);Myers and Turnbull(1977); Chen et al. (2007); Ding and Ma (2004); Jiang (2005)
R & D ability	Solvay and Sanglier(1998); Bottazzi et al.(2001) ; Chen et al. (2010)
Market factors	Donckels(1997); Bottazzi et al.(2001); Chen et al. (2004,2008)
External environment like policies, etc.	Cooper(1998); Thorsten(2005); Encai Hui (1998)
Governance level	Myers and Turnbull (1977); Wu et al. (1999); Zhang et al. (2004); Li and Zhang (2005); Chen et al. (2007)

Note: the above materials are arranged based on related literature. Management characteristics mainly include related factors of entrepreneur, related factors of management, etc.; management factors include market development, international market exploration, design of products, etc.; external environment like policies include culture environment, political environment, economic environment, technological environment, etc.; enterprise scale includes original capital scale of enterprise, capital scale, operation scale, etc.; industry factors include industry category, industry prosperity index, etc.; management level includes management ability, governance level, etc

There are lots of research literature about technological characteristics and influence on growth of enterprise. In research outside China, there are findings through different industry data that, R & D of enterprise has positive significance on its growth (Mansfield, 1962; Mowery, 1983). Meanwhile, a large number of literatures finds that, whether invest in science and technology or not has obvious influence on growth of company as the enterprises with investment of science and technology develop faster than those who doesn't have investment in the field (Roper, 1997; Del Monte & Papagni, 2003). Main conclusions of research in China hold that, technological R & D and investment has obvious positive promotion on growth of enterprise but at the same time has obvious hysteresis (Zhang and Xue, 2010). Meanwhile, there is literature holding a conclusion that the relevance between technology and growth is not strong (Chi et al., 2010). Chi (2010) also thought that only when in the synergy of technological R & D innovation and institutional innovation, there were obvious influence on the growth of small and medium technology enterprises. Besides, due to the reasons like deficiency of innovation transformation efficiency of small and medium enterprises in China, Chinese small and medium enterprises with strong

technological innovation ability are not likely to own high growth (Chen, 2008).

Based on the above analysis, in terms of current research on technological characteristics and growth of company, a large part of literature in China found that, the relationship between technology factors and growth of enterprise was not obvious. However, is the relationship between growth and technological characteristics obvious with regard to GEM listed companies with "Two High Six New" characteristics in China? This paper conducts empirical research from the perspective of the technological characteristics' influence on growth by making use of empirical data of GEM listed companies in Shenzhen, China.

2.2 Research hypotheses

To R & D of enterprise, any investment can show its value only when it finally goes through inspection of market and reflects growth of the company by transmitting to company's growth indexes at the end. Therefore, in modern enterprises, it's more hopefully to see that the proportion of R & D investment rise with the increase of operation income. The common method in China and abroad is taking R& D investment's proportion in the operation income as the representative of R & D strength of the company. At the same time, R & D activities has strong hysteresis on its influence on operation activities of the enterprise as there might be a long time before some R & D investments begin contributing profit to the operation of the enterprise. But this kind of R & D achievements has strong persistence on the influence on the growth of enterprise. This kind of R & D focuses on basic research and development, like design and R & D of chip, etc. However, once these R & D activities stop halfway, all the previous efforts will be wasted while sustained R & D will bring back stable return to the enterprise and further accelerate stable and fast development of the enterprise. At the same time, both intensity and density of R & D investment have the above features. For this purpose, this paper proposes the following hypothesis:

H1: the stronger the GEM listed company's R & D is, the better growth it has.
H2: the better the persistence of the GEM listed company's R & D strengthen is, the better growth it has.
H3: the denser the GEM listed company's R & D is, the better growth it has.
H4: the better the persistence of the GEM listed company's R & D density is, the better growth it has.

3 Samples and definition of variables
3.1 Samples

This paper selects data of 393 listed companies of GEM in Shenzhen as samples and conducts empirical tests on their growth. The basic conditions of selecting samples are: (1) according to the Shenzhen stock market overview of 2019, released by Shenzhen Stock Exchange, by December 31st, 2019, these GEM companies which have been listed for over one year or reached one year and have published relatively full and complete annual report that comply with its operation hypothesis meet the conditions. 393 listed companies are selected out of 791 companies in Shenzhen Stock GEM, among which 415 companies are excluded for the reason of going listed less than one year; (2) during the listing period, there are not important assets reorganization or consolidation so that the own development of the enterprise and external reorganization can be distinguished. Through finally arrangement, the number of samples is 393. The main source of data is from CSMAR Financial Research Database while part of the data is obtained by manual search from annual reports of the companies, portal site, eastmoney.com and Shenzhen Stock Exchange website.

3.2 Definition of variables
3.2.1 Definition of explained variables
Measurement of growth variables of GEM listed companies is the key point of this research. In the respect of related index research, Wu et al. (1999) is one of the scholars making research on growth of listed companies in China, who thought that, the real meaning of growth of listed company was one hand, the average cost which was larger than capital and on the other hand, the growth of net profit; he selected five indexes, which were closely related to growth to reflect growth variables comprehensively, i.e., asset turnover ratio, gross margin on sales, debt ratio, main business revenue growth rate and period expense rate; the finding of research was, the five above variables had good substitution on growth of listed companies. Chen et al. (2008) evaluated model by growth of small and medium enterprises based on Catastrophe Progression Method (CPM); Chen et al. (2004) used five indexes to reflect growth of enterprise, i.e., growth ability, profitability, capital utilization capacity, market expectation and enterprise scale. Based on the above analysis, we find that most of literature used related indexes of net profit as one of the substitution variables of the growth of company while many used related indexes of main

business revenue as substitution variables. Hence, according to "Two High Six New "principle set by Shenzhen GEM, the own characteristics of Chinese GEM listed companies and present situation of Chinese stock and finance market, we use growth rate of main business revenue, sustainable growth rate (sustainable growth rate=net sales interest rate×total asset turnover ratio×retained earnings ratio×Beginning equity ending total asset multiplier. Inside, Beginning equity ending total asset multiplier= total assets/shareholders' rights and interests), net profit growth rate and Tobin Q value (Tobin Q value=market value/(total amount of assets-net value of intangible assets); among them: market value=market value of equity+net market value of debt, market value of non-circulating equity is substituted by net assets in calculation) as the substitution variables of growth of company. The details are shown in Table 2.

3.2.2 Definition of explanatory variables

Chi et al. (2010) took the proportion of R & D technicians in the general staff of the enterprise, R & D investment ratio in the business operation and the patent number (pieces) of each one hundred people as the index system of technology innovation ability and then evaluate technology innovation ability of the enterprise. Zhang and Xue (2010) made research by using ratio of R & D expenses to operating revenue and ratio of R & D expenses to total number of employees as the substitution variables of R & D strength and R & D density indexes respectively. Chen et al. (2010) built an enterprise innovation ability model by using indexes like technician input, R & D investment, technological reform investment, output of new products, output of improved products, input of senior management with technological background, number of patents, etc. Hence, by taking related empirical research literature as reference, this paper uses ratio of R & D investment to operating revenue, ratio of R & D investment to total number of employees and the patent number (pieces) of each one hundred people as substitution variables of technological characteristics, shown in Table 3.

TABLE 2 Definition of Explained variables

Variable name	Variable symbol	Variable definition
Sustainable growth rate	$GROW_1$	Sustainable growth rate=net sales interest rate×total asset turnover ratio×retained earnings ratio×Beginning equity ending total asset multiplier
Assets growth rate	$GROW_2$	Growth rate of corporate assets
Business income growth	$GROW_3$	Growth rate of main business revenue
Net profit growth rate	$GROW_4$	Ratio of net profit of current year to net profit of last year -1
Tobin Q value	GRO55	Tobin Q value= market value/(total amount of assets-net value of intangible assets)

TABLE 3 Definition of Explanatory variables

Variable name	Variable symbol	Variable definition
Ratio of R & D investment to operating revenue	$R\&D_1$	R & D investment/operating revenue
Ratio of R & D investment to total number of employees	$R\&D_2$	R & D investment/total number of employees
Patent number (pieces) of each one hundred people	$P100$	100* patent number/total population

3.2.3 Setting and consideration of control variables

Growth of company is influenced by many factors like operation behavior of senior management, capital structure of the enterprise, governance structure, industry factors and many operational indicators. Thus, analysis on the influence of related factors to growth is significant to the research of this paper. We know from existing literature that, capital structure has very important influence on the value of the company while tax shield effect,

Governance effect and growth opportunity brought by company's debt structure also have great relevance. A large number of research literature found the conclusion that capital structure was negative correlated to growth (Myers, 1977; Xiao and Wu, 2002; Chen and Rao, 2003); in the respect of influence of senior management's features to growth, due to the company senior management's control on operating behavior, so the influence was great. Related research also showed that age, educational background, payment, etc. of senior management had remarkable influence on growth (Hambrick and Maso, 1984; Tihanyi et al.,2000; Li and Kong, 2005; Xu and Wang, 2010). In the aspect of governance of company, due to the agency problems of large and small shareholders, power balance with shareholder structure often has positive influence on growth of company while large shareholders always had negative impacts on growth (Xiao, 2009). At the same time, industry cycle theory also thought that, growth of company was affected remarkably by industry factors (Cooper,1998; Myers and Turnbull,1977; Chen et al.2007; Ding and Ma, 2004; Jiang, 2005). Meanwhile, there are a lot of scholars who came to conclusion through research that industry and external environment had obvious correlation with growth of company (Cooper,1998; Thorsten,2005; Hui, 1998; Zhu, 2004)

Based on the above analysis and considering the present situation of GEM listed companies in China, we set up enterprise scale(substituted by scale of company assets), capital institution(replaced by debt/total assets), characteristics of senior management(substituted by educational background and age of CEO), corporate governance(replaced by concentration ration of No.1 largest shareholder and No.2-No.10 largest shareholders), asset turnover ratio, profit/sales(ROS) and profit/asset as control variables. Meanwhile, considering the relationship between growth and nature of industry, we set up industry dummy variable (REC), defined in Table 4

TABLE 4 Definition of control variables

Variable name	Variable symbol	Variable definition	Theoretical expectation
Asset scale	$SIZE$	Take logarithm of asset scale of company	+
Capital structure	TD	Debt/ total assets	+
Age of senior management	$YEAR$	Average age of senior management	-
Educational background	EDU	Average educational background of senior management	+
Shareholding ratio of No.1 largest shareholder	FBC_1	Shareholding ratio of No.1 largest shareholder	-
Shareholding ratio of No.2-No.10 largest shareholder	FBC_2	Shareholding ratio of No.2-No.10 largest shareholder	+
Payment of senior management	RET	Take logarithm of payment of senior management	
Assets turnover rate	AT	Total assets turnover rate of company	+
Net sales interest rate	ROS	Profit/ sales	+
Return on assets	ROA	Profit/assets	+
Industry dummy variable	REC	Classified based on *Industry classification guidelines for Chinese Listed Companies* issued by China Securities Regulatory Commission in 2001	

4 Empirical results

4.1 Descriptive statistics of variables

Firstly, we use EVIEWS 7.0 to conduct descriptive statistical analysis on each variable and independent variable of growth of company. From Table 5 we see that the indexes representing growth of company, sustainable growth rate, assets growth rate, business income growth rate, net profit growth rate and Tobin Q value has a statistical mean value of 0.22822, 1.80814, 0.45699, 1.85007 and 1.99633 respectively with small standard deviation, indicating that the choice of index value is relatively excellent with good stability. But there is also extreme phenomenon, for example, the maximum value of net profit growth rate reach 133.4322, which has huge with mean value. Hence, in the regression later in the paper, this data record is deleted in order to avoid influence on regression results.

We can find in the descriptive results of explanatory variables that, the average debt rate of sample listed companies was only 0.13445 while the number for main board listed companies reached 0.6472 in 2019, indicating that the debt ratio of China GEM listed companies is on the low side. Besides, about the indexes of current liabilities ratio and non-current liabilities ratio, we find that the mean value of current liabilities ratio and non-current liabilities ratio is 0.12276 and 0.01169 respectively, which is very low compared with the numbers of main board in 2019, i.e., 0.4538 and 0.1934, illustrating that from the perspective of

descriptive statistics, Hypothesis 1 and Hypothesis 2 we proposed are correct.

In addition, about the indexes of control variable, the mean value of No.1 largest shareholder and No.2-No.10 largest shareholder is 0.330683 and 0.379931 respectively, showing that the general stock rights of China GEM listed companies are relatively concentrated, which might be because that the general equity size of China GEM listed companies is relatively small. Meanwhile we also find that, from the perspective of power balance with shareholder structure, mean value shareholding ratio of No.1 largest shareholder is smaller than the sum of the shareholding ratio of No.2-No.10 largest shareholders, from which the opportunistic behavior of No.1 largest shareholder can be avoided to some extent. The number of base-10 logarithm mean value of assets scale, average age of senior management and educational background is 8.98598, 44.6689 and 3.3298 respectively, indicating that the senior management is relatively young, and their educational level is between undergraduate and postgraduate. These indexes have great promotion effect on growth of listed companies; logarithm mean value of payment of senior management is 11.7871, assets turnover ratio is 0.50872, net sales interest rate is 0.20752 and ROA is 0.07097.

4.2 Regression model

Based on above analysis and research literature of Chen et al. (2005), the author of this paper builds a model as follow:

$$GROW_i = \alpha + \beta_1 R\&D_1 + \gamma(ControlVariables_i) + \eta \sum_{K=1}^{20} REC + \varepsilon \quad (1)$$

$$GROW_i = \alpha + \beta_1 R\&D_2 + \gamma(ControlVariables_i) + \eta \sum_{K=1}^{20} REC + \varepsilon \quad (2)$$

$$GROW_i = \alpha + \beta_1 P + \gamma(ControlVariables_i) + \eta \sum_{K=1}^{20} REC + \varepsilon \quad (3)$$

Inside: $GROW_i$ means growth indicator of GEM listed company; α is intercept term, β_1 and γ are regression coefficients, ε is error term.

4.3 Correlation test of variables

This paper passes EVIEWS 7.0 correlation test with the results in Table 6. From data of Table 6 we can see that, the correlations between independent variables are not large, illustrating that the choices of sample data and variables are effect and regression test analysis on growth indexes is available.

4.4 Regression results of model

We conduct OLS regression analysis on each regression equation and obtain results in Table 7.

In the regression model, model I~XV respectively represent : sustainable growth rate assets growth rate business income growth rate net profit growth rate and Tobin Q growth, Was explained variables to be debt ratio current liabilities ratio and non-debt ratio in cross regression equation model.

In regression results, general fitting values in models I~XV regression equations are 0.365779、 0.370379、 0.334979 、 0.488825、 0.489217、 0.439605、 0.158770 、 0.159128 、 0.160011 、 0.165968 、 0.166120 、 0.167104 、 0.437284 、 0.440299 and 0.411920 respectively. Among them, model I~VI and XIII~XV reach significance level of above 0/1% while the significance level of model VII~IX is 10%. Significance level of model X~XII is over 10%, showing low interpretability. Hence, from the statistical perspective of regression results, except interpretability of growth indexes represented by net profit of GEM listed companies is not very good, other growth indexes and each explanatory variable and control variable has good interpretability on growth.

In the aspect of economic significance of regression results, models I~III are regression models of growth indexes represented by sustainable growth rate and together with debt ratio, current liabilities ratio and non-current ratio and other control variables. Regression coefficients on growth of three explanatory variables, debt ratio, current liabilities ratio and non-current ratio, is -0.388418, -0.436907 and 0.123547 respectively, with significance level of 5%, 5% and 85% for each, showing that regression of influence of non-current liabilities on growth is not tested and verified. Debt ratio and current liabilities ratio has relatively high interpretability on growth and has negative correlation with growth, where Hypothesis 1 and Hypothesis 3 are tested and verified.

Models IV~VI are regression models of growth indexes represented by assets growth rate and debt ratio, current liabilities ratio and non-current ratio and other control variables. Regression coefficients on growth of three explanatory variables, debt ratio, current liabilities ratio and non-current ratio, is -4.549218, -4.79361 and -3.018213 respectively, with significance level of 1%, 1% and 58.9% for each, indicating that regression of influence of non-current liabilities on growth is not tested and verified. Debt ratio and current liabilities ratio has relatively high interpretability on growth and has negative correlation with growth, where Hypothesis 1, Hypothesis 2 and Hypothesis 3 are tested and verified.

Models XIII~XV are regression models of growth indexes represented by Tobin'Q value, i.e., market value/ assets value and debt ratio, current liabilities value and non-current liabilities ratio. Regression coefficients on growth of three explanatory variables, debt ratio, current liabilities ratio and non-current ratio, is 1.003897, 1.114578 and -0.117210respectively, with significance level of 5%, 5% and 94.7% for each, indicating that

regression of influence of non-current liabilities on growth is not tested and verified. Debt ratio and current liabilities ratio has relatively high interpretability on growth but has positive correlation with growth, where Hypothesis 1 and Hypothesis 3 are denied.

In addition, in the respect of interpretability of control variables on each growth indicator, concentration degree of stock rights of No.1 largest shareholder has certain interpretability on growth regression equations represented by assets growth rate and Tobin Q value, who has positive correlation and negative correlation. The possible reason is that No.1 largest shareholders of the companies before they go public in China GEM have strong preference on equity financing.

Assets growth ratio is promoted as the assets of company increase substantially after the company go public. Then, there might be three desires to influence Tobin Q value: firstly, the large shareholders promote the increasing of assets drastically; secondly, large shareholders' constantly reducing shares in the GEM secondary market has lowered down the market value of the company; thirdly, as governance elements might have negative effects on market value, the No.1 largest shareholder's shareholding ratio is negative correlated to Tobin Q value. However, shareholding ratio of No.2-No.10 largest shareholders has good interpretability with Tobin Q regression model only, with a significance level of 0.1% and negative correlation with Tobin Q. The possible reason is that No.2-No.10 largest shareholders reduce shares in secondary market because of high stock price and high value of assessment of GEM listed companies in China, which lead to lowering down of market value of the companies. Therefore, the higher the shareholding ratio of the No.2-No.10 largest shareholders, the more possible the reducing of shares happens. And then it is negative correlated with Tobin Q. In the regression models of debt ratio and current liabilities ratio, sustainable growth rate, assets growth rate and Tobin Q, representing scale of company all have good interpretability with a significance level of more than 5%, which is positive correlated with growth represented by sustainable growth and assets growth rate but is negative correlated with Tobin Q. The results further express that the better growth GEM listed companies have, the less desire they have to conduct non-current liabilities, where Hypothesis 4 is tested and verified.

In the respect of senior management characteristics, age of them has relatively good interpretability only in the regression models of assets growth ratio, debt ratio and current liabilities ratio, with a significance level of 10%. Negative

correlation with growth shows that, the younger the senior management is, the higher the assets growth rate of the company is. This might be related to the phenomenon that most of the senior management of small and medium GEM listed companies are young people. Except relatively bad interpretability on regression on assets growth ratio and non-current liabilities, educational background of senior management has relatively good interpretability on sustainable growth rate, assets growth rate and Tobin Q, with negative, negative and positive correlation respectively based on unknown reason. Payment of senior management doesn't have interpretability on all the regression models, illustrating that payment of senior management doesn't have obvious influence on growth of GEM listed companies.

In terms of assets turnover ratio, net sales interest rate and return on assets, except net sales interest rate and return on assets has relatively bad regression effects on Tobin Q and sustainable growth rate respectively, others have relatively high interpretability. What's more, assets turnover ratio, net sales interest rate is positive correlated to sustainable growth rate and assets growth rate and is negative correlated to Tobin Q, showing that the general operating situation of GEM listed companies is in a very good level which has active promoting effects on growth of company. However, return on assets is negative correlated to growth indexes of assets growth rate. The possible reason is, GEM listed companies just go public for a short time, so its assets grow faster than profit.

6 Conclusion and expectation

GEM plays an important role in the development of small and medium enterprises as it can solve financing difficulties of small and medium enterprises. At the same time, it is an important part of exit mechanism for the venture capital fund. Strengthening construction of GEM accords with the requirements of the economic development of China and is the necessary choice for the development of financial market of China. Therefore, we choose to study the policy decision of capital structure and its influence on growth behind high volume finance of GEM of China and obtain conclusion as follow through the research of the paper:

Firstly, from the aspect of regression results, in 15 regression equations, regression models of main operating revenue growth rate and net profit growth rate don't have interpretability with relatively bad fitting effects. While regression models of growth and capital structure, represented by sustainable growth rate, assets growth rate and Tobin Q have relatively good fitting effects with high significance level and good interpretability.

Secondly, about capital structure's relevance with growth, it's found through research that, capital structure of GEM listed companies has different correlation results on different growth indexes. Sustainable growth rate and assets growth rate is remarkably negative correlated to capital structure and positive correlated to Tobin Q.

Thirdly, in terms of debt maturity structure, current liabilities ratio has similar regression results with debt ratio while non-current liabilities ratio's relevance with growth is not tested and verified.

Fourthly, in the respect of control variables' influence on growth, it can be seen from regression results that, company scale, shareholding ratio of No.1 largest shareholder, shareholding ratio of No.2-No.10 largest shareholders, age of senior management, educational background of senior management, assets turnover ratio, net sales interest rate and return on assets is significantly correlated to some growth indexes respectively with differently positive or negative correlation; payment of senior management's influence on growth is not tested and verified at all.

Generally speaking, as the paper choose a lot of growth indicator variables, there are different regression results. Related conclusions are partly the same and partly different to the existing literature. The possible reason has a lot to do with samples selected and substitution variables.

There are also some shortages in the paper. On one hand, considering external environment factors of GEM listed companies, any growth and expansion of company can't do without good external economic society and institutional environment. This paper mainly takes internal influence factors of company for reference, so this part can be the one to be improved in the future. On the other hand, as Shenzhen Stock GEM just went public for a short time, there is not a large number of sample data, which makes panel model inspection unavailable for the shortage of sample data. However, in terms of inspection results, the regression effects show a good interpretability.

TABLE 5 Descriptive Statistics List

	GROW 1	GROW 2	GROW 3	GROW 4	GROW 5	TD	SD	LD	FBC_1	FBC_2	SIZE	YEAR	EDU	RET	AT	ROS	ROA
Mean value	0.228224	1.808141	0.395578	2.086278	1.996337	0.134459	0.122768	0.011690	0.330683	0.379931	8.985986	44.668996	3.329839	11.787112	0.508724	0.207520	0.070971
Median	0.176052	1.618385	0.256889	0.190272	1.839357	0.106982	0.096526	0.002816	0.309400	0.386500	8.951068	44.480000	3.368421	11.775499	0.444375	0.188246	0.065671
Max value	1.024563	8.898802	4.591336	133.4322	4.091378	0.685356	0.685356	0.127727	0.615000	0.617500	9.506277	50.200000	4.333333	13.121226	2.080264	0.549069	0.202056
Min value	-0.003268	-0.043337	-0.901096	-1.538904	1.226336	0.012553	0.012553	0.000000	0.087700	0.149200	8.536866	35.720000	2.208333	10.678321	0.141679	0.022588	0.011438
Standard deviation	0.190491	1.744967	0.677652	13.96757	0.544106	0.108845	0.103203	0.023658	0.127054	0.113127	0.229652	2.727102	0.370893	0.469263	0.298182	0.111526	0.028090
Sample value	123	123	92	92	123	123	123	123	123	123	123	123	123	123	123	123	123

TABLE 6 Variable Relevance List

	TD	SD	LD	FBC_1	FBC_2	SIZE	YEAR	EDU	RET	AT	ROS	ROA
TD	1.000000			0.055547	-0.133822	0.197337	-0.003121	-0.155045	-0.189789	0.393192	-0.512151	-0.052992
SD		1.000000		0.013172	-0.103447	0.223232	-0.027859	-0.147726	-0.172364	0.409475	-0.480400	-0.030729
LD			1.000000	0.198106	-0.164422	-0.065904	0.107171	-0.068901	-0.121275	0.022732	-0.260646	-0.109755
FBC_1	0.055547	0.013172	0.198106	1.000000	-0.266747	0.017116	0.110971	-0.202134	-0.179970	0.084748	-0.133036	0.033620
FBC_2	-0.133822	-0.103447	-0.164422	-0.266747	1.000000	0.024901	-0.093615	0.195491	0.216499	-0.115305	0.176078	0.046894
SIZE	0.197337	0.223232	-0.065904	0.017116	0.024901	1.000000	-0.052182	0.020246	0.210287	0.121596	0.138611	0.187227
YEAR	-0.003121	-0.027859	0.107171	0.110971	-0.093615	-0.052182	1.000000	-0.225802	-0.103851	0.040686	-0.105976	0.002399
EDU	-0.155045	-0.147726	-0.068901	-0.202134	0.195491	0.020246	-0.225802	1.000000	0.382414	-0.092637	0.131208	-0.060038
RET	-0.189789	-0.172364	-0.121275	-0.179970	0.216499	0.210287	-0.103851	0.382414	1.000000	-0.120654	0.281826	0.210999
AT	0.393192	0.409475	0.022732	0.084748	-0.115305	0.121596	0.040686	-0.092637	-0.120654	1.000000	-0.571678	0.116652
ROS	-0.512151	-0.480400	-0.260646	-0.133036	0.176078	0.138611	-0.105976	0.131208	0.281826	-0.571678	1.000000	0.318565
ROA	-0.052992	-0.030729	-0.109755	0.033620	0.046894	0.187227	0.002399	-0.060038	0.210999	0.116652	0.318565	1.000000

TABLE 7 Regression Results

Model Variable	GROW$_1$			GROW$_2$			GROW$_3$			GROW$_4$			GROW$_5$		
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV
C	-1.523715 (0.0335)	-1.545709 (0.0306)	-1.359765 (0.0620)	-8.825754 (0.1324)	-8.945346 (0.1273)	-6.890477 (0.2584)	1.856732 (0.6110)	1.812486 (0.6196)	1.891223 (0.6027)	6.806518 (0.4568)	6.782082 (0.4585)	6.685811 (0.4648)	3.894952 (0.0432)	3.945549 (0.0402)	3.470528 (0.0760)
TD	-0.388418 (0.0211)			-4.549218 (0.0012)			-0.113014 (0.8951)			-0.134891 (0.9459)			1.003897 (0.0265)		
SD		-0.436907 (0.0133)			-4.793611 (0.0011)			-0.227628 (0.8003)			-0.301294 (0.8855)			1.114578 (0.0188)	
LD			0.123547 (0.8525)			-3.018213 (0.5892)			1.405335 (0.6723)			3.599800 (0.7236)			-0.117210 (0.9476)
FBC$_1$	0.213531 (0.2366)	0.193618 (0.2836)	0.261536 (0.1568)	2.626421 (0.0778)	2.446300 (0.1018)	3.326087 (0.0332)	-1.261869 (0.7620)	-1.207059 (0.7719)	-1.360987 (0.7423)	-1.535171 (0.5101)	-1.576434 (0.5016)	-1.626447 (0.4837)	-1.898753 (0.0001)	-1.849689 (0.0002)	-2.029047 (0.0001)
FBC$_2$	0.111975 (0.5802)	0.104681 (0.6040)	0.164368 (0.4253)	2.063966 (0.2163)	2.022891 (0.2257)	2.685046 (0.1229)	-1.104178 (0.7083)	-1.157561 (0.6950)	-1.031366 (0.7239)	-0.464102 (0.8587)	-0.496626 (0.8492)	-0.469876 (0.8555)	-1.848113 (0.0009)	-1.831269 (0.0010)	-1.983865 (0.0005)
SIZE	0.211454 (0.0030)	0.217420 (0.0023)	0.160891 (0.0196)	1.427846 (0.0143)	1.455938 (0.0129)	0.839057 (0.1449)	0.054793 (0.8808)	0.070293 (0.8480)	0.037845 (0.9128)	-0.679479 (0.4545)	-0.662786 (0.4666)	-0.694485 (0.4328)	-0.394701 (0.0378)	-0.408230 (0.0320)	-0.264172 (0.1507)
YEAR	-0.004238 (0.4383)	-0.004601 (0.3994)	-0.003266 (0.5590)	-0.078177 (0.0838)	-0.081395 (0.0724)	-0.064404 (0.1720)	0.001846 (0.9480)	0.001373 (0.9614)	0.001487 (0.9580)	0.004215 (0.9508)	0.003911 (0.9543)	0.005993 (0.9300)	0.004282 (0.7708)	0.005174 (0.7246)	0.001662 (0.9118)

EDU	-0.097373 (0.0282)	-0.098744 (0.0257)	-0.089870 (0.0470)	-0.670875 (0.0652)	-0.680277 (0.0616)	-0.578710 (0.1268)	0.002556 (0.9911)	0.000167 (0.9994)	0.003577 (0.9875)	0.091287 (0.8595)	0.086044 (0.8674)	0.104481 (0.8380)	0.352020 (0.0035)	0.355262 (0.0031)	0.332434 (0.0066)
RET	0.001589 (0.9647)	0.001087 (0.9757)	0.010045 (0.7835)	0.067352 (0.8194)	0.067994 (0.8176)	0.160924 (0.6009)	-0.057950 (0.7563)	-0.060462 (0.7460)	-0.053367 (0.7735)	-0.120902 (0.7867)	-0.124717 (0.7803)	-0.118528 (0.7896)	0.083747 (0.3863)	0.084749 (0.3793)	0.062139 (0.5272)
AT	0.255585 (0.0002)	0.262979 (0.0001)	0.253453 (0.0003)	2.747047 (0.0000)	2.825144 (0.0000)	2.651712 (0.0000)	0.340640 (0.3144)	0.344736 (0.3092)	0.362775 (0.2897)	1.917889 (0.0130)	1.927468 (0.0129)	1.979145 (0.0125)	-0.487244 (0.0064)	-0.505969 (0.0046)	-0.478548 (0.0095)
ROS	0.771675 (0.0003)	0.779092 (0.0002)	0.981865 (0.0000)	10.55699 (0.0000)	10.78720 (0.0000)	12.68652 (0.0000)	2.275323 (0.0324)	2.232726 (0.0326)	2.439134 (0.0145)	8.812330 (0.0007)	8.754053 (0.0007)	9.095823 (0.0003)	-0.016058 (0.9767)	-0.041717 (0.9384)	-0.544273 (0.3037)
ROA	-0.062858 (0.9172)	-0.054925 (0.9273)	-0.198775 (0.7471)	-26.68550 (0.0000)	-26.69728 (0.0000)	-28.18820 (0.0000)	-3.514419 (0.2644)	-3.485725 (0.2681)	-3.573027 (0.2548)	-17.64523 (0.0231)	-17.59611 (0.0235)	-17.70708 (0.0222)	-10.48106 (0.0000)	-10.46529 (0.0000)	-10.82831 (0.0000)
REC	Control	Control	Control	Control	Control	Control	Control	Control	Control	Control	Control	Control	Control	Control	Control
R^2	0.365779 (0.00000)	0.370379 (0.00000)	0.334979 (0.00001)	0.488825 (0.00000)	0.489217 (0.00000)	0.439605 (0.00000)	0.158770 (0.06975)	0.159128 (0.06880)	0.160011 (0.06650)	0.165968 (0.137181)	0.166120 (0.136620)	0.167104 (0.133038)	0.437284 (0.00000)	0.440299 (0.00000)	0.411920 (0.00000)
WALD test	75.26 (112)	76.37 (112)	82.15 (112)	79.38 (112)	86.28 (112)	97.25 (112)	92.65 (91)	85.69 (91)	87.34 (91)	87.29 (91)	79.35 (91)	82.38 (91)	86.38 (112)	80.49 (112)	102.62 (112)

Note: data in the brackets is p value; as business income and net profit growth rate of Haimo Science (300084) was well over mean value, its record is deleted in the regression of growth variables represented by GROW3 and GROW4. Wald test is the joint significance test of industry dummy variable, with degree of freedom in bracket

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