

Research on the Influencing Factors of the P/E Ratio of Listed Companies

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Abstract: Quantitative investment is a necessary tool for scientific investment. In this research, it focuses on the issue of influencing factors of P/E ratio (short as P/E ratio) in the stock market. Profitability, growth ability, solvency, cash flow, capital structure, circulation scale, and turnover rate are selected as the influencing factors, respectively. Panel data of listed companies in Shanghai and Shenzhen A-share markets from 2009 to 2020 are selected. Through this empirical research, the following have been concluded. First, the profitability and growth ability of listed companies have a negative impact on the P/E ratio. Second, both circulation scale and turnover rate promote the P/E ratio. Third, executive compensation and executive shareholding ratio have significant negative impact on financial market performance. Fourth, company size and listed years have negative effects on P/E ratio. Fifth, there are discrepancies among the analysis results of Shenzhen Stock Exchange (short as SZSE), ChiNext stock market and Shanghai Stock Exchange(short as SSE).

1. Introduction

With the rapid development of the capital market, stock investment has become an important channel for financial risk investment. However, the stock prices of listed companies vary widely, and the volatility of stock prices is high, which makes it difficult to choose suitable investment targets. Generally speaking, stock value investment evaluation can be performed from financial data, operating information, technical indicators, etc. The P/E ratio is a market-based evaluation indicator. Its calculation principle is the ratio of the share price per share divided by the earnings per share, which reflects the level of premium the market pays for earnings per share. It is a common stock valuation metric that combines market expectations and financial data.

In recent years, P/E ratio has also become one of the hot spots in quantitative investment research. Therefore, this study attempts to examine the influencing factors of P/E ratio of listed companies. On one hand, it can provide guidance to investors on how to choose investment targets according to the influencing factors. On the other, it can be used to evaluate the difference between the theoretical P/E ratio and the actual P/E ratio to help investors to be able to invest rationally instead of choosing stocks blindly.

2. Literature Review

2.1 A Review of Relevant International Literature

In previous studies, macro and micro factors seem to be the main factors affecting the P/E ratio of listed companies, as discussed in the results of Ramcharran (2002) [1]. Regarding macro factors, Kane et al. (1996) [2] argued that stock market index volatility and market interest rates have a negative impact on P/E ratios. Amoako-Adu and Smith(2002) [3] also found that interest rates have a negative impact on P/E ratios. In terms of micro-factors, Banz (1981) [4] obtained that the smaller the scale of listed companies, the higher the P/E ratio. Lam and Keith (2002) found that the stock circulation and leverage ratio significantly affected the P/E ratio [5].

2.2 A Review of Relevant Literature in China

Liu Zhixin et al. (2000) conducted a cross-sectional regression analysis using a multi-factor

CAPM model for companies listed in Shanghai and Shenzhen from 1995 to 1999 [6]. The authors found a linear effect of company size and P/E ratio. Fan Longzhen (2003) [7] selected the actual data of China's stock market from 1995 to 2000, and found that market value and P/E ratios provide great explicative value to prices. Zhang Qiang and Yang Shu'e (2007) found through empirical research that the main reason for the impact of company size on stock returns is the excessive speculation of investors, which usually lasts for three years. Zhou Fang et al. (2011) developed a CAPM model based on liquidity risk to elucidate the formation of expected asset returns of equity investors in the stock market [8]. Wang Bo (2014) adopted a CAPM model to study the influencing factors of investor sentiment. Through his research, he found that investor sentiment is the main cause of stock price bubbles. Zhang Chunmei et al (2021) adopted Lasso quantile for empirical study on the P/E ratio of insurance companies, and it was found that factors such as net assets per share, net asset interest rate, revenue growth rate, and equity multiplier have significant effects [9]. Chen Bimei (2021) [10] also discussed the influencing factors of the P/E ratio of listed companies. An empirical study conducted by Yang Hao (2020) on electric power companies found that market value and profitability significantly affect P/E ratios [11].

2.3 Literature Review

From previous research, many scholars have studied the factors affecting the P/E ratio or stock returns, including macro and micro factors, such as interest rates, market returns, net asset interest rates, asset-liability ratios, investor sentiment, etc. However, in recent years, there is a lack of comparative analysis of different sectors in China. This paper attempts to contribute at this level by controlling for the external factors of macroeconomics, the industry to which they belong and the securities section through a fixed effects model, i.e., comparing the variability of micro-constructs of the P/E ratios of listed companies in SSE, SZSE and ChiNext.

3. Theories and Hypotheses

3.1 Financial Factors

3.1.1 Profitability

Profitability reflects the income level of the listed companies. The stronger the profitability, the lower the dependence on working capital and asset scale, the larger the profit scale per unit of investment, and the higher the conservative profit level, which means higher return to the investors.

Research hypothesis 1: The net asset margin of listed companies promotes the P/E ratio.

3.1.2 Growth Ability

This indicator represents the performance growth level of listed companies, as investors expect listed companies to have good development prospects and contribute more returns to shareholders in the future. High-growth enterprises also bring performance growth expectations, making investors expect better free cash flow in the future, which also promotes company value.

Research hypothesis 2: The growth rate of main business revenue of listed companies promotes the P/E ratio.

3.1.3 Solvency

Solvency represents the debt repayment pressure of a listed company. When a company have insufficient current assets to cover short-term liabilities, the company is more likely to have financial risks and shortage of cash flow, so the market may not be optimistic about such companies, causing a decline in P/E ratios.

Research hypothesis 3: The current ratio of listed companies promotes the P/E ratio.

3.1.4 Quality of Earnings

From the perspective of financial statements, a low ratio of cash flow to net profit may reflect the poor quality of earnings of a company. Only when the company's sales can be better converted into

cash can it prove that the company's benefit trend is stable and predictable.

Research hypothesis 4: The ratio of sales cash flow to main business revenue promotes the P/E ratio.

3.1.5 Capital Structure

The asset-liability ratio shows whether the capital structure of a listed company depends on debt funding. High debt may impose a huge debt burden to the company, but it may also ensure the stability of the company's control.

Research hypothesis 5: The asset-liability ratio has a significant impact on the P/E ratio.

3.2 Technical Factors

3.2.1 Circulation Scale

The scale of market capitalization in circulation reflects the scale of capital of listed companies to a certain extent. Companies with a large market capitalization in circulation often attract more funds, so the P/E ratio may also be higher than that of small-cap stocks. However, small-cap stocks are also more vulnerable to abnormal trading due to their small capital volume.

Research Hypothesis 6: The scale of the market value of the circulating stock has a significant impact on the P/E ratio.

3.2.2 Turnover Rate

The calculation of the turnover rate is the ratio of the number of traded shares to the total number of shares. The turnover rate represents the frequency of stock changing hands and reflects the level of stock liquidity. A higher turnover ratio indicates more active trading, then the possibility of a market bubble is higher, so it promotes the P/E ratio.

Research Hypothesis 7: The stock turnover ratio promotes the P/E ratio.

3.3 Company Operation

3.3.1 Asset Size

The larger the company scale, the higher the market influence of products and services, the higher the social recognition of the brand, the greater the dominance over pricing, the better the financial situation, and the greater the space for internal integration of resources. What's more, large companies tend to be more mature in management and business models, with better economies of scale.

Research Hypothesis 8: Company size promotes the P/E ratio.

3.3.2 Shareholder Structure

The ownership and management rights of modern enterprises are separated from each other, so there is information asymmetry and moral hazard between owners and managers, and the supervision of shareholders is likely to be the key to mitigate the principal-agent problem. From the perspective of corporate governance, when the concentration of shareholders' shareholding is higher, it can prevent the "free-rider" behavior of shareholder supervision, and the strong demand for supervision by major shareholders can better alleviate the opportunistic behavior of management. Meanwhile, the more concentrated the shareholding is, the more efficient the corporate decision making can be, which enhances the valuation level.

Research hypothesis 9: The shareholding ratio of the first majority shareholder promotes the P/E ratio.

3.3.3 Listed Years

The listed years represent the survival time of listed companies in the market, and also reflect whether the listed companies have accumulated long-term experience in the market and have more historical stock price data for longitudinal analysis. Generally speaking, investors are more willing to make value investments in listed companies with longer listed history. These companies are less

likely to have instability and investors do not have to bear the risk of high premiums on IPOs.

Research Hypothesis 10: Longer listed years of the company promotes the P/E ratio.

4. Research Design

4.1 Variable Settings and Data Sources

Due to the outbreak of the global financial crisis in 2008, the data selected in this paper come from the panel data of listed companies in Shanghai and Shenzhen stock markets from 2009 to 2020. The listed company data selected in this paper comes from the Wind database. The sample excludes ST, *ST and delisted listed companies, as well as listed companies in the financial industry. The dependent variable of this paper is the P/E ratio (PE) of the listed company, and the detailed variables settings of the model are shown in the table 1.

Table 1: Variable Settings

Type	Name	Calculation	Abbreviation
Dependent Variable	P/E ratio	The ratio of stock price to net profit of listed companies	PE
Financial Factors	Profitability	The ratio of net profit to the average balance of total assets	ROA
	Growth Ability	Year-on-year growth rate of main business income	GROW
	Solvency	The ratio of current assets to current liabilities	CR
	Cash Flow	Sales cash flow to total assets ratio	CASH
	Capital Structure	The ratio of total liabilities to total assets	LR
Technical Factors	Circulation Scale	Natural logarithm of float market capitalization	MV
	Turnover Rate	The ratio of annual turnover to circulation	TO
Company	Company Size	Natural logarithm of total assets at the end of the year	SIZE
	Shareholding Structure	Shareholding ratio of the largest shareholder	FIRST
	Listed Period	The natural logarithm of the listed company's listed year	AGE
Fixed Effect Factors	Individual	Individual dummy variables	ID
	Industry	Primary industry code dummy variable	Industry
	Years	Annual dummy variable	year

4.2 Model Design

In this paper, a multiple fixed effects model will be used to fit the relationship of each coefficient on the dependent variable (Y). To test the research hypothesis, the model uses continuous variables and the codes in the model are all from the variable setting table. Among them, β is the relationship coefficient of the independent variable, X represents all variables, and ID represents the dummy variable of the listed company's security code, Year represents the annual dummy variable, Industry represents the Primary industry code dummy variable of the China Securities Regulatory Commission in 2012, ε represents the random error, i represents the sample number of the listed company, and t represents the sample observation year of 2010-2020.

$$Y_{it} = \beta_0 + \beta X_{it} + ID_i + Industry_i + Year_t + \varepsilon_{it} \quad (1)$$

5. Empirical Research

5.1 Descriptive Statistical Analysis

The table 2 shows the statistical results of a sample of A-share listed companies in Shanghai and Shenzhen, China. In this paper, all data have been processed with a 1% upper and lower Winsorizing. According to the descriptive statistics of each indicator, it is observed that the mean, median, maximum and minimum values of P/E ratio, profitability, growth capacity and solvency are

all different, which meet the continuity requirement of linear regression. A linear model would be used later to verify the influencing factors of P/E ratio.

Table 2: Descriptive statistical analysis

	count	mean	sd	min	p50	max
PE	28221	78.260	134.834	5.297	38.166	960.956
ROA	32077	4.076	6.030	-24.501	3.892	20.849
GROW	29413	18.155	46.556	-57.926	10.537	314.218
CR	31445	2.606	2.855	0.284	1.678	18.424
CASH	32097	4.716	7.311	-18.626	4.677	25.369
LR	32077	43.049	21.708	4.846	41.920	94.079
MV	31517	15.261	1.142	13.024	15.161	18.773
TO	31102	3.589	2.621	0.247	2.897	12.956
SIZE	32097	22.169	1.448	19.554	21.929	27.250
FIRST	32080	34.872	15.018	8.526	32.852	74.965
AGE	31631	2.018	0.937	0.000	2.197	3.296

5.2 Correlation Coefficient Analysis

In the correlation test, it can be obtained that the correlations of financial factors, technical factors and company operating factors are lower than 0.6 or 0.7, which means that there is no excessive correlation between independent variables, and the model is suitable for multiple regression analysis to verify the factors influencing P/E ratio. The correlation coefficient analysis is shown in Table 3.

Table 3: Correlation Coefficient Analysis

	ROA	GROW	CR	CASH	LR	MV	TO	SIZE	FIRST
ROA	1.000								
GROW	0.200*** (0.000)	1.000							
CR	0.224*** (0.000)	-0.036*** (0.000)	1.000						
CASH	0.369*** (0.000)	0.018*** (0.002)	0.016*** (0.004)	1.000					
LR	-0.371*** (0.000)	0.046*** (0.000)	-0.639*** (0.000)	-0.165*** (0.000)	1.000				
MV	0.082*** (0.000)	0.019*** (0.001)	-0.242*** (0.000)	0.135*** (0.000)	0.295*** (0.000)	1.000			
TO	-0.157*** (0.000)	-0.071*** (0.000)	-0.052*** (0.000)	-0.036*** (0.000)	-0.012** (0.038)	-0.089*** (0.000)	1.000		
SIZE	-0.069*** (0.000)	0.034*** (0.000)	-0.332*** (0.000)	0.013** (0.021)	0.525*** (0.000)	0.771*** (0.000)	-0.288*** (0.000)	1.000	
FIRST	0.122*** (0.000)	0.010 (0.102)	-0.030*** (0.000)	0.086*** (0.000)	0.037*** (0.000)	0.068*** (0.000)	-0.260*** (0.000)	0.162*** (0.000)	1.000
AGE	-0.229*** (0.000)	-0.040*** (0.000)	-0.375*** (0.000)	-0.007 (0.197)	0.388*** (0.000)	0.459*** (0.000)	0.096*** (0.000)	0.349*** (0.000)	-0.069*** (0.000)

p-values in parentheses
* *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01

5.3 Test of Regression Results

The regression results of each model are presented in the table 4. The adjusted R² of Model 1 is 0.416. Multiple models are used in this paper to test the stability of the model. Among them, it can be found that the coefficients of net asset margin (PE) and growth ability (PE) are both negative, the circulation scale (MV) is significantly positive, the turnover rate (TO) is significantly positive, and the company size (SIZE) is significantly negative. The shareholding ratio of major shareholders is significantly positive, and listed year(AGE) is significantly negative.

5.4 Regression Results

The table 5 presents the comparative analysis results of different sectors. It can be concluded that the profitability of the ChiNext stock market has a more obvious negative impact on the P/E ratio, but cash flow can promote the P/E ratio. The circulation scale has a greater impact on the P/E ratio, and the company size and the listed history also have a greater negative impact on P/E ratio. The

asset-liability ratio of SSE-listed companies weakens the P/E ratio, but the influence of the circulation scale and company size on the P/E ratio is weaker. In contrast, only the shareholding ratio of the first largest shareholder of the SZSE-listed companies can boost the P/E ratio.

Table 4: Analysis of regression results

	(1) PE	(2) PE	(3) PE	(4) PE
ROA	-17.427*** (0.30)	-16.227*** (0.30)	-15.143*** (0.29)	
GROW	-0.072*** (0.02)	-0.150*** (0.02)	-0.163*** (0.02)	
CR	0.143 (0.51)	-0.932* (0.51)	-2.025*** (0.51)	
CASH	0.015 (0.13)	0.151 (0.13)	0.288** (0.13)	
LR	-0.012 (0.09)	-0.860*** (0.09)	-0.675*** (0.09)	
MV	53.616*** (1.91)	27.789** (1.60)		8.978*** (1.46)
TO	1.729*** (0.41)	3.883*** (0.41)		5.005*** (0.40)
SIZE	-67.372*** (2.15)			
FIRST	0.312** (0.13)			
AGE	-8.168** (3.72)			
_cons	845.890*** (42.96)	-236.164*** (24.43)	192.839*** (5.00)	-76.407*** (22.24)
R^2	0.493	0.470	0.458	0.378
adj. R^2	0.416	0.389	0.377	0.286
AIC	302628.309	303727.207	307102.532	335940.329
BIC	302717.749	303792.255	307151.374	335965.004
F	486.243	530.750	651.363	112.119
N	25108	25108	25346	27579

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Analysis of regression results

	(5) SZSE	(6) ChiNext	(7) SSZ
ROA	-17.647*** (0.45)	-20.595*** (0.75)	-16.149*** (0.47)
GROW	-0.072*** (0.03)	-0.056 (0.04)	-0.080*** (0.03)
CR	0.324 (0.81)	0.754 (0.88)	1.049 (1.14)
CASH	-0.125 (0.20)	0.626* (0.35)	-0.002 (0.20)
LR	0.171 (0.14)	0.268 (0.25)	-0.363** (0.15)
MV	57.535*** (3.00)	78.068*** (5.08)	40.035*** (2.90)
TO	2.220*** (0.64)	0.052 (0.96)	1.739*** (0.67)
SIZE	-75.827*** (3.22)	-96.584*** (6.45)	-48.849*** (3.36)
FIRST	0.567*** (0.19)	-0.019 (0.42)	0.026 (0.20)
AGE	3.364 (5.85)	-38.606*** (11.48)	-18.103*** (6.74)
_cons	934.160*** (64.67)	1159.386*** (125.70)	684.551*** (68.58)
R^2	0.502	0.518	0.479
adj. R^2	0.434	0.414	0.399
AIC	131539.078	50253.630	120538.043
BIC	131619.271	50323.456	120617.417
F	236.108	99.769	153.930
N	10832	4221	10055

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.5 Empirical Conclusions

In this paper, panel data of A-share listed companies in SSE and SZSE from 2009 to 2020 are selected. Through the analysis of the results of the multiple fixed effects model, the following conclusions can be drawn.

First, the profitability and growth ability of listed companies have a negative impact on the P/E ratio. The solvency, cash flow and capital structure have no uniform impact on the P/E ratio, which may indicate that China's stock market is relatively imperfect. The high expectations make small and medium shareholders mistakenly believe that there would be a performance reversal, resulting in a bubble in the stock price.

Second, both the circulation scale and the turnover rate have promoted the P/E ratio, which shows that the market trading activity can lead to a higher valuation level of listed companies. The reason is that most of the participants in China's stock market are retail investors, and the herding effect of retail investors causes the popular stocks to rise in the short term, while some unpopular stocks can not get the attention of investors.

Third, executive compensation and executive shareholding ratio have a significant negative impact on financial market performance.

Fourth, the company size and listed history have a negative impact on the P/E ratio. This may be due to the long history or the fact that large companies do not have the "imagination" of performance, which leads to a lower P/E level for such companies. The shareholding ratio of the largest shareholder plays a significant role in promoting the P/E ratio, which may be because investors are optimistic about the personal characteristics of the major shareholder, and the major shareholder can replace the small and medium shareholders to supervise the company.

Fifth, the analysis results of listed companies in SZSE, ChiNext and SSE are somewhat different from each other. The profitability, company size and listed years of companies in ChiNext stock market have a stronger weakening effect on the P/E ratio, while the circulation scale has a stronger promoting effect on the P/E ratio. However, the profitability and company size of SSE-listed companies have less significant effects on P/E ratio. Only the turnover rate and the shareholding ratio of the first largest shareholder of SZSE-listed companies have a significant impact on the P/E ratio.

6. Conclusions

In the above investment analysis, listed companies with better profitability, solvency, growth ability and cash flow do not seem to contribute significantly to the P/E ratio, which also shows that the financial situation of some high-bubble listed companies may not be good. This requires investors to choose stocks carefully, and to use scientific tools in quantitative investment to analyze the factors associated with stock price returns. After all, China's stock market is a market structure dominated by retail investors. Main traders may speculate on stocks through investor sentiment, and may create more low-performance, thematic and conceptual hits at a stroke.

In addition, the study found that when the listed company has smaller scale of assets, shorter listed years, higher stock turnover, and higher transaction size, the P/E ratio will be higher, which also shows that the stock market bubble is more likely to be concentrated in small-cap stocks with high trading activity. There is a phenomenon of "speculation on new and rotten". These companies do not have sufficient capital, and stakeholders are more likely to use the stock market to gain revenue, rather than to support the company's actual business operations. In this regard, investors need to improve their professionalism and carefully screen out such companies with little investment value. Relatively speaking, the negative correlation between the financial capability, company size and P/E ratio of companies listed on SSE is weak, and the influence of circulating market factors on the P/E ratio is also weaker. It may be because that the capital is larger in SSE-listed companies, and there is not much room for speculation. Therefore, the volatility of stock prices and P/E ratios is lower, and it is more suitable for ordinary investors to choose.

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