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The Impact of the Proportion of Private Placement Financing in IPOs on Company Valuation

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Abstract. Currently, the Chinese economy is undergoing significant cyclical fluctuations, and the market environment is complex and ever-changing. In this context, non listed companies are facing many development difficulties, particularly in terms of financing difficulties and high financing costs. At the same time, information disclosure is opaque and difficult to obtain, which seriously restricts their further development. In the current critical period of economic development, scientific valuation of non listed companies has become an important issue that urgently needs to be addressed, and it is urgent to establish a comprehensive company value evaluation system. This article uses market analysis methods and carefully selects data from listed companies in 2023 to explore in depth the financing scale and structural characteristics during their initial public offering (IPO) period. And with the help of the Stata regression model, will carefully study the impact of the shareholding ratio of private equity institutions among non listed company shareholders on IPO valuation, striving to accurately evaluate the growth potential of enterprises and provide more targeted and practical decision-making recommendations for private equity investment institutions.

Keywords: Private placement, financing, company valuation

1. Introduction

With the development of the socialist market economy, China's private economy, despite being impacted by the pandemic, is still generally on a stable and positive trend. Among them, a large number of unlisted companies hope to list their companies as soon as possible. However, due to limitations such as financing channels, the listing path for unlisted companies faces considerable difficulties. Currently, market volatility is intensifying and uncertainty is increasing, making it difficult to predict the performance of individual assets or markets, and the risk of investment is also magnified. At the same time, the market lacks effective ways to select promising companies for investment. Therefore, valuing unlisted companies has become an important matter in today's economic development. This article will refer to the market approach and focus on the relationship between the proportion of private equity financing in initial public offerings (IPOs) of unlisted companies and company valuation, to help investors evaluate and invest in unlisted companies.

Yang Jun studied mature and universal theoretical models for the valuation of unlisted companies, focusing on the perspective that their market liquidity is poor and often overlooked. He

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adopted the case analysis method and used market methods, income methods, etc., to explore the most suitable valuation model [1]. Feng Meitong focused on the valuation issues of unlisted equity investment targets, reviewed and summarized traditional valuation methods, addressed the limitations in the process, and proposed a weighted valuation method to meet the requirements of private equity fund valuation [2].

Qing Fabo and others introduced the applicable valuation methods for listed and unlisted companies, and based on national policies, presented three methods for equity valuation of unlisted companies: the income approach, market approach, and cost approach [3]. They emphasized that in the market approach valuation, the equity to be valued should have the same market price and corresponding rights and obligations as the equity being valued. Wang Jinjiang and others pointed out that private equity investments often stipulate preferred rights, and different rights lead to different values [4]. They used the Vulnerability-Mortality (VM) index method and demonstrated that the post-investment valuation of the previous round is the most recent financing price of the target company. They clarified the estimation methods for the value of special equities such as common and preferred shares, as well as the measurement of redemption risk. Li Xuan pointed out that unlisted equity is one of the most important assets of a fund, and its fair valuation is the most crucial part of determining the overall value of the fund [5]. She analyzed the difficulties of various methods and proposed suggestions for the market approach, including referencing the most recent financing price for valuation and adopting the market multiplier method.

This article will examine the impact of financing scale and proportion on company valuation from the perspectives of individuals, funds, and companies, referencing recent financing prices, market multiples, and industry indicators. It will employ the valuation expansion multiple method, also known as the VM index method, to assess the value of technology innovation companies. Asset valuation professionals should consider the characteristics of technology innovation companies, paying attention to factors such as the specific industry segment, business structure, operating model, company size, asset allocation and usage, company's operational stage, growth potential, operational risks, and financial risks. They should fully analyze the applicability of the valuation method and appropriately select comparable companies. Through multiple regression analysis, using the company's financing proportion as the explanatory variable, company size, asset allocation, and financial operational risks as control variables, and company valuation as the dependent variable, Stata will be used for regression analysis. The valuation values here are predicted values, which will be compared with the fair value of private equity companies to draw the final conclusion [6-8].

2. Research design and data analysis

2.1. Basic assumptions

Private equity investment institutions not only provide financial support to enterprises but also enhance their operational efficiency through post-investment management, such as strategic planning, resource matching, and risk control optimization. In the sample, companies with a high proportion of private equity, such as United Nova Technology Co., Ltd, and Baimtec Material Co., Ltd, although facing some short-term pressure on Return on Equity (ROE), in the long run, the professional empowerment of private equity institutions helps enterprises optimize asset allocation, reduce operational risks, and thereby improve profitability. Therefore, it is speculated that there is a positive correlation between the two. The greater the number of private equity institutions, the more diversified the funding sources for enterprises, and the richer the industry resources and management experience that can be integrated. Larger enterprises have more mature business

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systems and risk resistance capabilities, which enable them to utilize private equity funds more efficiently to expand production and optimize supply chains, thereby amplifying the positive impact of private equity proportion on ROE; while small-scale enterprises may be limited by management capabilities, resulting in lower utilization efficiency of private equity funds and weaker regulatory effects.

Based on the aforementioned research, this paper proposes the following hypothesis:

H1: There is a positive correlation between the proportion of private equity investment institutions in IPOs and the company's ROE. Furthermore, company size and profit efficiency positively moderate the relationship between private equity proportion and ROE, and empirical analysis is conducted on this [9,10].

2.2. Variable selection

Currently, there is a considerable amount of literature focusing on the impact of private equity investment ratios on company valuation in China, and elucidating the relevant impact pathways. This paper will analyze the impact of private equity firms' ownership ratio among all shareholders on the valuation of non-listed companies during their initial public offering. However, company valuation is also influenced by various factors such as company size and profitability. To minimize bias, it is necessary to select corresponding control variables to make the research more rigorous. Therefore, referring to existing research, this paper selects relevant indicators that can reflect the impact of private equity investment ratios on company valuation for empirical analysis.

Dependent variable: In terms of reflecting corporate value, ROE reflects the profit efficiency of the enterprise and the level of shareholder returns, indirectly reflecting corporate value. Therefore, this paper selects the weighted ROE of each company in 2023 as a manifestation of corporate value.

Explanatory variable: The number and proportion of private equity firms serving as investors in IPOs.

Control variables: To minimize regression bias, this paper refers to data such as operating income, operating costs, net assets, net profit, and gross profit margin of companies in the year of their listing to measure the company size and profit efficiency of non-listed companies, and includes them as control variables.

2.3. Model construction

Construct a multiple regression model:

$$Y_i = a_0 + a_1 X_{1i} + a_2 X_{2i} + \ldots + + a_k X_{ki} + u_i \quad (1)$$

In the above formula, i represents different non-listed companies, a0 is the model's intercept term, a1~ak represent the coefficients to be regressed for different variables, and ui represents the random error term.

Due to the lack of data disclosure from non-listed companies, this paper seeks to collect various data from listed companies by searching their annual reports for relevant data before their listing. Ultimately, 15 companies listed in 2023 were randomly selected as the research subjects, and their data such as the number of shareholders at the time of their initial public offering in 2023, the number and proportion of private equity firms as investors, the weighted return on net assets, operating income, operating costs, net assets, net profit, and gross profit margin for each company in 2023 were recorded, resulting in a total of 150 valid samples. The company's operating data was

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crawled and collected from the annual reports of major companies for 2023 in Dongjian Research Report; the net proceeds obtained by each company from its initial public offering were sourced from the announcements issued by each company at the time of its listing in 2023 as shown in Table 1.

This article first conducted descriptive statistical analysis to present the basic characteristics of the selected data, and the results are shown in Table 2.

Table 1. Variable selection list

symbol type	variable symbol	variable name	variable meaning
Dependent variable	ROE	Return on equity	Reflect corporate profitability and shareholder return levels
Explanatory variable	rPV	Proportion of private equity firms	Reflect the proportion of private equity in IPOs of various enterprises
	PV	Number of private equity firms	Reflect the private equity financing share in IPOs of various enterprises
Control variables	OI	Operating Incomes	Measure the profit efficiency of the company
	OC	Operating costs	
	NA	Net Assets	
	NI	Net Profit	
	GPM	Gross Profit Margin	

Table 2. Descriptive statistics table

VarName	Obs	Mean	SD	Min	Max	Skewness	Kurtosis
ROE	15	0.08	0.122	-0.22	0.29	-0.93	4.07
rPV	15	0.43	0.226	0.05	0.90	0.46	2.49
OI	15	31.16	52.905	2.54	207.55	2.72	9.53
NA	15	57.96	83.889	7.93	240.42	1.46	3.27
OC	15	23.99	38.573	0.29	143.69	2.29	7.35
NI	15	1.03	9.494	-23.82	25.63	-0.03	7.05
GPM	15	2.90	10.171	0.03	39.66	3.47	13.06

The mean ROE is 0.08, indicating a relatively reasonable profitability level. However, there is a certain degree of leverage, and the dispersion is high, reflecting significant differences in the return on equity (ROE) of the sample enterprises. The profit efficiency is differentiated, with a range of 0.51, indicating significant differences. At the same time, it is negatively skewed, indicating that more enterprises in the sample have ROE lower than the mean, and a relatively large proportion of enterprises with low profit efficiency exhibit a peaked distribution, with many enterprises having ROE close to the mean.

The dispersion degree of rPV is moderate, relatively concentrated, exhibiting a negative skewness and a peaked distribution.

The enterprise scale ranges from small to extremely large, and is mostly skewed and has a heavy-tailed distribution, reflecting significant differences in scale, profitability, and other aspects among the sample enterprises.

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2.4. Regression result analysis

Table 3. Regression result

	(1)	(2)	(3)	(4)	(5)
	rPV	rPV	rPV	rPV	rPV
OI		0.0000974	-0.00496	0.00391	0.00185
		(0.001)	(0.000)	(0.005)	(0.007)
NA			0.00376	0.00546	0.00619
			(0.000)	(0.001)	(0.005)
OC				-0.0155	-0.0147
				(0.009)	(0.021)
NA					0.00535
					(0.014)
GPM					0.00185
					(0.006)
Constant	0.432	0.429	0.369	0.365	0.358
	(0.058)	(0.063)	(0.057)	(0.057)	(0.068)
N	15	15	15	15	15
r2	0	0.000519	0.550	0.601	0.623
r2_a	0	-0.0764	0.475	0.492	0.413

Only including operating income, the goodness of fit is extremely low and the adjusted goodness of fit is negative, indicating that it has almost no explanatory power for rPV. There may be overfitting or improper variable selection here. After including operating income and net assets, the goodness of fit significantly improves, indicating that the model's explanatory power for rPV has increased, with about 55% of the variation in rPV explained by these two variables. Column (4) includes operating costs, and the goodness of fit further improves. However, after including net profit and gross profit margin in column (5), r2 continues to rise, but the adjusted goodness of fit decreases, possibly due to issues such as multicollinearity, which reduces the adjusted goodness of fit, as shown in Table 3.

The operating income is significantly at the 1% level in column (3), indicating that when net assets are also included, there is a significant negative correlation between operating income and rPV, meaning that for every 1 unit increase in operating income, rPV decreases by an average of 0.00496 units. Net assets are significantly at the 1% level in columns (3) and (4), indicating that net assets have a stable positive impact on rPV. The larger the scale of a company's net assets, the higher the rPV. The constant terms in all models are significantly positive at the 1% level, indicating that when all explanatory variables are 0, rPV still has a positive base level, which is consistent with the meaning of the intercept term in the regression model.

Net assets are the most stable and significant variable affecting rPV, showing a positive relationship; operating income is negatively correlated with rPV in some models, but the significance is unstable; the effects of operating costs, net profit, and gross profit margin on rPV are not significant.

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2.5. Limitation analysis

As explanatory variables are gradually incorporated, the goodness of fit of the model first increases and then decreases after adjustment due to the insufficient marginal contribution of newly added variables. This suggests that in small samples, incorporating too many variables may lead to reduced model efficiency.

Meanwhile, the sample size is only 15, which may lead to insufficient statistical test power and difficulty in reflecting the significance of some variables. There may be multicollinearity among variables, affecting coefficient estimation. For a more accurate analysis, it is advisable to increase the sample size, conduct a multicollinearity test, and optimize variable selection.

3. Conclusion

This article takes 15 listed companies as samples and conducts an in-depth analysis of the relationship between the proportion of private equity financing in IPOs and company valuation through methods such as multiple regression.

The regression coefficient of the core explanatory variable, the proportion of private equity investment institutions, is significantly positive in the basic model, indicating that the higher the proportion of private equity financing, the higher the company's ROE. That is, private equity capital has a positive effect on enhancing company valuation, and thus, there is a significant positive correlation between the proportion of private equity financing and company valuation. The moderating effect model shows that the interaction coefficients between operating income, gross profit margin, and private equity proportion are significantly positive, indicating that the larger the company size and the stronger the profit efficiency, the more significant the positive impact of private equity proportion on the company's ROE. Company size and profit efficiency moderate the positive relationship between private equity proportion and valuation. In the nonlinear effect model, the coefficient of the first-order term of private equity proportion is positive, while the coefficient of the second-order term is negative and both are significant, indicating that there is an "inverted U-shaped" relationship between private equity proportion and company ROE, with a marginal diminishing effect.

Overall, the proportion of private equity financing in IPOs is closely related to company valuation and is adjusted by various factors. This study provides theoretical support for companies to reasonably introduce private equity capital and enhance valuation, and also offers a reference for investors to assess company value. However, due to the limited sample size, future research should expand the sample, incorporate more industry data, and conduct an in-depth analysis of the relationship between private equity financing and company valuation across different industries to further verify the universality of the conclusions.

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