Research on the Impact of Private Equity Investment Heterogeneity on Corporate IPO Underpricing

Jin Zijia[a], An Zhiyu

School of Economic & Management, Nanjing University of Science and Technology, Nanjing, China

[a]17805856922@163.com

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Abstract: This paper studies the impact of the shareholding ratio of private equity investment on the IPO underpricing rate of invested enterprises from July 1,2014 to June 30,2020 in China's A stock market. The study found that the shareholding ratio of private equity investment is negatively related to the underpricing rate IPO invested enterprises. That is, the larger the shareholding ratio of private equity investment, the lower the IPO underpricing rate of enterprises, and the empirical research in this paper also provides some new theoretical ideas and basis for the study of private equity investment in Chinese stock market.

1. Introduction

With the gradual development of China's capital market, the establishment of small and medium-sized boards in 2004 and the establishment of gem in 2009, China's multi-level capital market system has been realized. At the same time, with the improvement of multi-level capital market system, a large amount of capital flowing into private equity market brings a rapid development opportunity to private equity investment in China. On April 28,2012, China's Securities Regulatory Commission issued the "Guidance on Further Deepening the Reform of the New Stock Issuance System ", which is the basic system for public companies to issue and trade in stocks. After 2015, the country's expected introduction of a company listing registration system will greatly reduce the number of companies listed, so the probability of private equity investment IPO exit will be significantly increased. Certainly, under the private equity investment support enterprise IPO market performance also will change. The emergence of private equity investment is mainly to solve the problem of corporate financing difficulties, and the increasingly loose listing system has brought a wider exit path for private equity investment.

Private equity investment fund is to withdraw as the direction, realize the capital appreciation as the goal to carry on the equity investment to the non-listed enterprise; in our country, the private equity investment main exit way has the following four kinds :(i) IPO exit ;(ii) M & A exit ;() share repurchase ;(iv) bankruptcy liquidation; and IPO exit is the most commonly used exit way in our country, and is more inclined to short-term investment, and this phenomenon is also related to our capital market environment; The high returns of China's capital market make PE salivate, and IPO is the best way to share the capital market. When they are found by the fast-growing PE, they can be listed quickly with the help of PE.

Because of the rapid development of private equity investment in our country, more and more companies with private equity investment background, private equity investment funds mainly withdraw by pushing the companies they invest into the market. That is, exit in a IPO way. Does private equity investment in this case affect the value of these companies and the issue price of new shares, and whether it will convey a signal that will affect the closing price and IPO underpricing level of stocks on the first day of listing? These are the problems that need attention at present, and make the research of this paper have important practical significance. This paper mainly studies the influencing factors of IPO underpricing rate of enterprises supported by private equity investment, and the results of the study hope to provide help and further ideas for future scholars.

2. Literature reveiw

2.1 Overview of research on private equity investments

Private equity investment funds are equity investments in non-listed enterprises for the purpose of capital appreciation. In recent years, the research on private equity investment at home and abroad mainly focuses on business performance and technological innovation.And enterprise earnings management and other aspects, and reached different conclusions. Lu Xiaowei et al .(2012) studied the impact of private equity investment on the performance of high-tech companies. The results show that the participation of private equity investment has a certain role in improving the performance of such companies. Cao and Lemer(2008),Wilson,Wright(2011) the study found that the stock performance of companies with private equity investment background was significantly higher than that of other listed companies with selfless equity investment background, and the financial and operating performance of the company would be significantly improved. The value of the company rose rapidly. However, Yu Jinsong and Luo Xuezhu (2016) found that private equity investment can not significantly promote the growth of invested companies, but it can accelerate the growth of private equity investment funds when they are state-owned and foreign-funded.

About the technological innovation of enterprises, Anna Kovner(2011) found that in the NASDAQ market of the United States, companies with private equity investment background are more able to grow, and have greater advantages in the speed of obtaining funds, management and technology, and easier to obtain technological innovation. Puri and Hdlmami(2012) focus on the analysis of venture capital in private equity investment, and find that venture capital and technological innovation are mutually reinforcing. The broad development space of innovative companies in the future is easier to attract private equity investment, and the help of private equity investment in capital, daily governance, market can also effectively promote the company's technological innovation.

2.2 Overview of IPO undepricng studies

IPO underpricing rate is the most commonly used index to study the problems of venture capital, When the company issues new shares, its value can not be fully assessed, So it gives investors a risk discount, Form IPO underpricing. Currently, A few scholars at home and abroad have discussed the influence of lead underwriter on IPO underpricing rate. Most scholars believe that the higher the lead underwriter's reputation, The lower the underpricing level. For example, Ansley Chua(2014) found that reputable lead underwriters can communicate better with outside investors, Reduce the asymmetry of information, Inhibit blind emotional trading behavior and alleviate the secondary market fever phenomenon. Chen Pengcheng and Zhou Xiaohua (2015) studied the data of 1121 companies listed on the main board from 2005 to 2012, Having studied the effect of lead underwriter reputation on IPO first day earnings, The results show that, Whether in periods of high or low market sentiment, The underwriter's reputation is negatively correlated with underpricing. Berna Kirkulak and Colin Davis(2005) taking a sample of companies listed in the Japanese stock market from 1998 to 2002, The study found that the relationship between the underwriter's reputation and underpricing would change because of the level of demand in the secondary market, When demand is high, Principal underwriter's reputation is positively correlated with underpricing, When demand is low, The underwriter's reputation is negatively correlated with underpricing rate. Besides, A few scholars also discussed the reputation and underpricing level of accounting firms. Wang Bing, Xin Qingquan and Yang Deming (2009) will study 233 companies listed between 2005 and 2008, Discusses the difference of underpricing rate between domestic high and low reputation accounting firms, Turns out, Accounting firm reputation and underpricing level significantly negative correlation. Liu Yang, Tan Yiqun and Li Zhenwei (2012) discussed the relationship between intermediary reputation and underpricing in domestic capital markets, And they don't think the lead underwriter's reputation has a significant impact on IPO underpricing, Accounting firm reputation can significantly reduce IPO underpricing, Both combined reputations can also significantly reduce IPO underpricing.

2.3 The degree of influence of private equity holding on IPO underpricing

A study on the impact of private equity holding on IPO underpricing, Wang et al .(2003) selected 82 venture capital holding and 82 non-risk investment holding companies listed in Singapore from 1987 to 2001 as the research samples. The results show that, IPO underpricing of venture capital holding companies is significantly lower, Underwriters also have a higher reputation. From the level of venture capital participation, Meggisnson, Weiss, A 1991 study concluded that venture capital firms would reduce IPO underpricing because of their large holdings of invested units; In terms of information asymmetry, Xu Hao, Wan Di Yang, Xu Jin (2016) think venture capital institutions are more involved, Enterprise IPO underpricing rate is low, The participation of venture capital reduces the uncertainty of enterprises and the information asymmetry between enterprises and investors. Contrary to the above, The high percentage of VC holdings is bound to attract the attention of capital markets, It also sends a strong signal to investors, The high attention paid by the invested unit raises the stock price, Therefore, The high level of attention and positive signs of rising share prices from venture capital firms, That led to a high rate of reprioritization (Zhang Man, 2017).

3. Theoretical analysis and research hypotheses

As to the effect of private equity holding on IPO underpricing, there are two main viewpoints, one is name-by-name theory, the other is certification theory. The name-by-name theory holds that inexperienced young venture capitalists will be more motivated to be listed quickly in order to gain reputation and gain proof of investment income. Usually, the fastest way to go public is to — a discount issue, which makes immature enterprises enter the market prematurely, so the lower issue price increases the IPO underpricing level. Compared with the European and American countries, the venture capital of Chinese venture capital mainly comes from non-financial companies, which have weak capital strength and insufficient funds to invest in private equity investment institutions. Because of the lack of sufficient funds, private equity investment institutions can only start investing in the next invested unit after recovering the principal and income from the last invested unit, so that venture capital may urgently promote the listing of the invested project regardless of the actual situation of the project and obtain high returns.

Based on the "screening supervision effect" and "certification effect ", it is considered that the shareholding of private equity investment institutions can supervise the operation of enterprises and play the role of" certification "to the outside world when enterprises IPO. Ease the degree of information asymmetry between enterprises and investors, play a positive role in the issue price, thus reducing the underpricing rate. Private equity investment institutions screen companies with good development potential and provide them with effective value-added services and certification monitoring measures, which transmit signals to the market of the enterprise's excellent qualifications and reduce the degree of information asymmetry. The quality of IPO is better than that of venture capital-free companies and the IPO underpricing rate is relatively low.

At the same time, private equity investment institutions can bring good development prospects through professional investment management level and keen market insight, among which high reputation and mature private equity investment institutions can provide more abundant financing methods. Private equity institutions participate in business management, the better the long-term market performance IPO their companies. And private equity investment institutions participate in the management of funded enterprises, the enthusiasm, voice, the degree of influence depends on the proportion of shares held in the funded enterprises, the higher the proportion of venture capital institutions holding shares, the greater the good impact on the enterprises, can supervise and inspect the invested units at any time, do not do the hands-off, avoid the investment units to take a detour, so that the IPO underpricing rate of the invested units will decline. Based on the above analysis, the following assumptions are put forward:

The higher the shareholding ratio of H1: Private equity investment, the lower the IPO underpricing rate of enterprises.

4. Research design

4.1 Sample selection and data sources

From July 1,2014 to June 30,2020, a total of 1316 data of Chinese A stock listed companies are taken as research samples, Excluding suspended listed companies and financial-related companies and some of the listed companies that do not have access to data, There are 935 private equity-backed companies; All the data in this article are from the CSMAR database, For some of the data on private equity firms, Manual download of listed enterprises by the prospectus manual search.

4.2 Index Selection and Model Construction

(a) Explained variable—IPO underpricing rate of explanatory variables

Based on the "first day stock return rate of listed companies" in the CSMAR database, this paper uses the closing price of listed companies minus the issuing price to divide by the issuing price. The formula is as follows:

$$UP = \frac{P_1 - P_0}{P_0}$$

One is the Up initial price suppression rate, the P 0 is the IPO issue price, the P 1 is the first day of listing closing price.

(b) Explanatory variables — proportion and quantity of private equity holdings

PEhold is used to express the sum of the shareholding ratio of venture capital institutions. It indicates that the total number of shareholders of private equity investment institutions in the top ten shareholders of the listed companies accounts for the ratio of the total number of shares.

(c) Control variables

The control variables include the turnover rate on the first day of listing tnovfstd, the ratio of price-earnings ratio on the first day of listing Pefstd, the ratio of outstanding shares trade, the logarithm of registered capital lnregiscap, the winning rate at the time of listing plotonlo, the logarithm of the establishment life of the enterprise.

According to the theoretical analysis and research hypothesis, the following models are constructed to test the influence of the proportion and quantity of private equity investment on the underpricing rate of IPO:

$$UP = \alpha + \beta_1 PEhold + \beta_2 control + \varepsilon$$

The α is a constant term, the ε is a residual term, and the β,γ is a regression coefficient.

5. Empirical analysis

5.1 Descriptive statistics

1Table 1 Descriptive statistical analysis of variables

Sample period: 2014.7.1-2020.6.30

	Median	Max	Min	Std.Dev.
UP	0.440000	2.723636	0.064187	0.187170
PEhold	15.13500	88.23400	0.310000	19.23886
AGE	17	40	5	5.251094
LNNUM	8.006368	12.87159	6.097755	0.636155
LNREGCAP	18.603	23.70365	17.50439	0.802152
PEFSTD	30.355	208.61	9.22	14.58987
PLOTONLN	0.035332	1.700846	0.011574	0.213394
TNOVFSTD	0.00049	0.85721	4.00E-05	0.17187
TRADE	0.25	0.492192	0.056759	0.050932

Table 1 shows that in 2014-2020, the average IPO underpricing rate of enterprises supported by private equity investment is 46.99, the lowest underpricing rate is 6.42, and the highest value is 272.36. It shows that the IPO underpricing degree of enterprises is still quite different. As the average shareholding ratio of private equity to enterprises is 22.14, the highest shareholding is 88.23, and the lowest shareholding is 0.31. It can be clearly seen that the shareholding ratio of private equity investment between enterprises is very different, which will inevitably affect the IPO underpricing. From the years of establishment of the invested enterprises, private equity investment institutions are more inclined to invest in young enterprises, but they will also invest in mature enterprises.

5.2 Analysis of regression results

Table 2 Regression results

Variable	Coefficient	T value	Std.Error
C	0.440634***	90.79798	0.004853
P Ehold	-0.00039*	-1.73239	0.00025
LNAGE	0.000497**	1.989751	0.00025
TNOVFSTD	0.25648***	6.274242	0.040878
PEFSTD	0.006895***	14.37994	0.000479
TRADE_	0.024623	0.166888	0.147543
LN REG IS CAP	0.014763	0.639807	0.023073
LNNUM	-0.0058	-0.233852	0.024801
PLOTONLN	0.000408	0.019762	0.02064

*, ** and*** denote rejection of the null hypothesis at 10%, 5% and 1% significance levels, respectively.

As can be seen from Table 2 above, the regression coefficient of the shareholding ratio of venture capital institutions is negative and significant at the level of 10%(the T value is -1.1 This shows that the deeper the participation of venture capital institutions, the lower the underpricing rate of IPO, the less uncertainty of venture capital participation, and the hypothesis is verified: the larger the shareholding ratio of private equity investment institutions, the greater the investor's trust in the invested enterprise, and the smaller the underpricing degree of the enterprise. As the institutional shareholding ratio increases, private equity investment is more likely to participate in the operation management of the invested unit, provide corresponding technical and human support, and provide corresponding supervision throughout the process, so that the invested unit can be listed at a lower IPO underpricing rate at the right time.

Moreover, we also conclude that the lower the time of establishment, the lower the underpricing rate IPO the enterprise, because the descriptive statistics in Table 1 show that private equity institutions are more willing to invest in young companies, and investors are more confident in the choice of private equity and more willing to invest in young companies because of asymmetric information. So that young companies can be listed at a more appropriate issue price, the lower the IPO underpricing rate.

6. Conclusion

Taking the IPO listed companies from 7.1 to 2020.6.30 in 2014 as the research sample, this paper investigates the relationship between private equity heterogeneity and underpricing IPO enterprises, mainly from the perspective of the shareholding ratio of private equity investment. The shareholding ratio of private equity investment has a significant negative impact on IPO underpricing, that is, the larger the shareholding ratio of private equity investment institutions, the lower the underpricing rate IPO enterprises;

Of course, this paper still has some limitations, the research on the heterogeneity of private equity investment is too single. Later, we can study the underpricing IPO enterprises from different angles. For enterprises, IPO underpricing calculation method can eliminate market interference, and the conclusions drawn under different methods can be compared and compared. Add more research materials for the impact of private equity investment on IPO underpricing.

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