Revisit to Venture Capitalist Certification in Initial Public Offerings

Junyoup Lee

Department of Accounting and Finance, Ulsan National Institute of Science and Technology

Abstract

I examine the relation between venture capitalists and IPO underpricing based on the study by Megginson and Weiss (1991). Unlike Megginson and Weiss, I find no significant relation between venture capital backing and IPO underpricing in the 1980s. I attribute this result to the underreporting problem in the SDC database. However, I find evidence that firms supported by VCs are more underpriced during the 1990's sample period. This finding confirms the grandstanding theory suggested by Gompers (1996).

Keyword : IPO, underpricing, Venture capital, Grandstanding theory

1. Introduction

In studies of initial public offerings (IPOs), one of the most puzzling phenomena is the dramatic run-up from the offer price to the first day trading price, termed IPO underpricing. In recent decades, numerous studies have attempted to find and explore what causes IPO underpricing and what influenced the amount of underpricing. While there is no general consensus about causes of skyrocketing first day prices, there are ongoing discussions over them. Yet within the vast territory of studies of IPO underpricing there remains a large piece of uncharted terrain.

The degree of underpricing had been substantial in recent decades to the extent that most of investors were likely to make a large profit by buying at the offer price and selling at the closing price of first trading day. Investors that bought IPOs earned 7% on average during the 1980's and more than 20% during the 1990s. This phenomenon has been well documented in the prior literature. For instance, Ibboston and Jaffe (1975) report a 16.8% excess return on average relative to the market. Ritter (1984) finds that the

return on the first day trading price was on average 18.8% higher than the offering price in his sample of 5,000 U.S. IPOs during 1960-82. Using 8,668 common stocks during the 1960-87, Ibbotson, Sindelar, and Ritter (1988) report 16.37% average return.

The study of underpricing is interesting in several aspects. First, the notion of IPO underpricing contradicts the idea of market efficiency. If markets are efficient, underpricing should be temporal because the investors who participated in IPO market should not be able to purchase the issues at a discount to its market value and issuers also receive the market value for the shares issued. However, because systematic underpricing has been observed over time, financial researchers regard it as an anomaly that produces evidence against market efficiency. Second, leaving a great amount of money on the table is large loss to the issuing firms. Knowing this fact, why do issuing firms let the underwriter set the offer price significantly below the market price? Are issuing firms compensated for this loss in other forms of profits? Third, many anomalies that are known to financial researchers as something that is not explained by market efficiency have disappeared since researchers found them. For instance, one does not see the January effect as often as it was before, and it may not be exploitable any more by typical investors (Bhardwaj and Brooks 1992).

Then, why does IPO underpricing still persist in spite of the fact that a large body of research has studied the issue?

Theoretical papers attempting to explain IPO underpricing mainly focus on the different interest of parties who are involved in the IPO process. Rock (1986) divides parties who participate in IPOs into two groups: informed investors and uninformed investors. Uninformed investors at best break even on average by participating in IPO markets because informed investors only participate in undervalued IPOs with their superior information. This circumstance is called "winner's curse." At the extreme, winner's curse results in market failure. To prevent this situation from occurring, the underwriter sets the offer price below the market value so that it gives incentives to the uninformed to participate in the IPO market.

Following theoretical papers explaining the IPO underpricing, empiricists have searched for determinants that influence the degree of underpricing. One determinant explored by empiricists is the role of certifying agents in reducing IPO underpricing. The literature focuses broadly on three parties; underwriters, auditors, and venture capitalists. The purpose of this paper is to estimate the magnitude of the underpricing provided by the venture capitalists' (VCs) certification role. First, I replicate Megginson and Weiss (1991). Megginson and Weiss match a sample of 320 VC backed firms with 320 non-VC backed firms by industry and offering amount (principal) during the period from 1983 to 1987. They find a significant negative relation between the IPO initial

return and VC backing as the evidence of venture capitalists' certification role. My results differ from M&W. One possible reason for the difference in results is that I use the SDC database to find firms which are supported by venture capitalist while Megginson and Weiss use the Venture Capital Journal. My conjecture is that my result deviates from theirs since the SDC database does not provide accurate information about venture-backed IPO firms.

My results show that the firms backed by venture capitalists do not play a certification role in reducing the degree of the underpricing using the sample period from 1983 to 1987. This result differs from what M&W find (1991). I also estimate the degree of gross spread associated with venture-backed firms. Gross spread, which is the fee paid to the underwriter by firms going public for arranging and underwriting an offering of securities, is also another good indicator that measures the certification role by venture capitalists. My prediction is that the gross spread should be lowered associated with venture capitalists backing role. M&W find that gross spread of VC-backed firms is smaller than for non-VC backed firms. Yet, my estimate shows that venture capitalists do not play a role in lessening the gross spread. I attribute this different result to the use of SDC database in this paper.

To mitigate the influence of outliers, I winsorize all variables at 5% and 95% levels. The univariate analysis after winsorization shows that venture capitalists play a certification role in reducing the underpricing at 10% level. After controlling for other variables that influence the initial return, however, the relation becomes insignificant. This result confirms that my result is not driven by outliers.

Since my data are from 1981 to 2007, I test the relation between the underpricing and venture capital backing to extended sub-periods. I split the periods into three; 1981-1990, 1991-2000, and 2000-2007. The estimate of underpricing is consistent with Gompers and Lerner (1997) argument. They question the certification hypothesis and show that the estimated underpricing is sensitive to both estimation periods and methodologies. Using the period of 1981-1990, I find no relation between the underpricing and VC-backing firms, even though the sign of the estimate is consistent with the result of M&W (1991). Results from 1991 to 2000 indicate that VC backed firms increase underpricing by almost 6%. This estimate is statistically and economically significant and is consistent with Gompers (1996) who contends that young venture capital firms take firms public early to earn reputation for the purpose of future fundraising in the IPO market. This theory stands in sharp opposition to the certification role theory. Certification role theory assumes that firms supported by VCs will have more reputation than those that are not whereas grandstanding theory posits that young venture capital firms are willing to bear large losses by accepting more underpricing as long as they could

establish their reputation as early as possible. To further determine if these effects are present in our data following Gompers (1996), I select young VC backed firms whose age is less than 6 years old. As the grandstanding theory predicts, young VC backed firms increase the degree of underpricing by almost 8%. This result implies again that young venture capital firms are willing to bear the underpricing cost to establish their reputation to facilitate future fundraising.

Finally, I do not find evidence consistent with certification role during the period from 2001 to 2007. In this period, the estimate for VC-backing becomes negative after controlling for age. Thus, firm age appear to overwhelm the effect of whether the firms are VC-backed or not.

Taken together, the evidence suggests there is no certification role for VCs as documented by M&W (1991). However, that does not mean that VC provide no certification for IPO firms. Rather, I ascribe the insignificant result to my use of the SDC database. In contrast, my results support the grandstanding hypothesis documented by Gompers (1996). The young venture capitalists willingly endure losses through high underpricing to raise their prestige in IPO market.

The remainder of the paper proceeds as follows. Section 2 reviews the prior literature related to our study. Section 3 describes our data and methodology. Section 4 provides the basic underpricing results using various time periods. Section 5 summarizes and concludes.

2. Literature Review

Financial researchers observed a good number of idiosyncratic patterns in primary equity markets (IPOs). No other these patterns puzzled the profession more than dramatic price run-up on the first trading day of IPO (underpricing). A great majority of theoretical work in the area builds on the premise that market participants are rational and utility maximizer subject to several market frictions. An asymmetric information argument among the market frictions drew a great deal of consensus on IPO underpricing from the profession.

Rock (1986) classified investors into two groups: the informed and the uninformed. He assumes that the informed investors know the true value of the stock and the uninformed investors invest randomly without the knowledge of the issuing firm. Thus, the informed withdraw from the tender offers when the premium is low whereas the informed crowd out the uninformed out of the tender offers when the premium is high because they are able to use the information advantage. Namely, the informed would only invest in the "good IPO", crowding out the uninformed investors, and be the only

ones turning profits. Knowing this happening, the uninformed do not have any incentives to participate in the IPOs market. To induce a sufficient number of uninformed investors to tender, the issuer intentionally underprices the issuing shares as a premium for the uninformed.

Benveniste and Spindt (1989) shed light on the role of underwriters in IPO process in addition to Rock's two groups of investors. An underwriter has difficulty in pricing new issues because the informed investors do not have incentive to share positive information before the first trading date. Their model, however, induce the informed to reveal their information by assuming the premarket as an auction which is controlled by the underwriter. The underwriter has a capability to do so by suitably selecting the offer price and allocation of new issues to investors' signaling of interest.

Another line of theory with regard to the undepricing phenomenon focuses on the effects of signaling on the IPO's price. In a study of Leland and Pyle in 1977, they contend that a firm signals its values to outsiders by retaining its own shares. If a firm retains large shares at IPOs, it signals that it would sell them later at seasoned equity offerings at a higher price. Conversely, the firm would sell as many shares as possible at IPO when firm's value is low.

Grinblatt and Hwang (1989) and Allen and Faulharber (1989) object to Rock's argument squarely that a group of investors are more well-informed than the firm itself and to Leland and Pyle's argument (1977) that the issuer's factional holding is not sufficient to signal the value of the issuer at IPO. They argue that the firm is indeed better informed than anybody else and it also needs the variance of a project implemented by the firm on top of the fractional holding of the firm. However, since the variance of the project is unobservable, the offering price plays a role as the second signal in conveying the firm's value to the market at IPO. In equilibrium of the model, the degree of underpricing is positively related to a firm's intrinsic value.

Other researchers base the idiosyncratic pattern of IPOs market on the behavioral paradigm. This theory forms a striking contrast to the theories based on the information asymmetry. Loughran and Ritter (2002) argue that the issuers do not get upset about the fact that leaving lots of money on the table because they sum the loss from the underpricing with the gain on the shares that they hold as the price run up in the after-market.

Following a slew of theoretical research on how and why the phenomenon of underpricing are observed in IPO market, financial researchers begin to ask a question "What entities of interest can reduce the underpricing?" Several researchers find the role of three entities concerning this question. They are auditors, underwriters, and venture capitalists. The common stories in these literatures are that financial specialists such as

auditor, underwriters, and venture capitalists are able to lower the costs of going public by reducing the information asymmetry between the offering firm and investors.

Beatty (1989) argues that auditor firm reputation increase the offering price (less underpricing) because more prestigious auditors play a significant role in reducing the uncertainty faced by the IPO investor.

In the similar vein, the underwriters are also ones that can reduce information asymmetry between the investors and the issuer by buying all of the issued shares from the issuer for a set price and then making the offering to investors at the IPO price that is made public under the underwriting contract. While Benveniste and Spindt (1989) show that underwriter can reduce required underpricing by controlling the auction premarket on theoretical basis, Carter and Manaster (1991) shows the evidence that underwriter reputation does play a significant role in reducing the underpricing empirically. Using the tombstone announcement as a measure of underwriter reputation, they argue that a firm with low risk prefers going IPO with an underwriter that is located in top in the tombstone announcement because the firm has an incentive to signal to the market that they are low risk firm. By going IPO with more prestigious underwriters, it can distinguish itself from high risk firm. This type of pattern by issuing firms leads to decreasing the information asymmetry, thus reducing the degree of underpricing.

The last entity that reduces a risk involved in the IPO process is known as venture capital (VC) firms. Barry, Muscarella, Peavy and Vetsuypens (1990) document that VC backed IPO has less of a positive return on their first trading day. This implies that investors need less of a discount to purchase these shares (less underpricing) because the VCs have monitored the quality of the offering. Our paper is based on the replication of Megginson and Weiss' paper (1991). Using the matched sample of VC backed and Non-VC backed IPOs by industry and the offering size, they find that firms that are supported by VCs exhibit decreased underpricing compared to Non-VC counterpart. They attribute it to the certification role by the VCs. In other words, the presence of venture capitalist in the issuers certifies the quality of the issues with their help in financial and reputational capital.

On the other hand, some financial economists find the opposite story to certification role of VC backing. Namely, VC backing firms show more underpricing pattern than Non-VC backing firms. One explanation is that underwriters take priority on allocating shares of other underpriced IPOs to venture capital firms in return for greater underpricing in the VC's own portfolio firm. Loughran and Ritter (2002) show that VC firms were allocated hot IPOs that were sold immediately for quick profit.

More plausible explanation is that some venture capital firms might want to take their portfolio firms public earlier than other firms in their portfolio in an attempt to

send a signal of their more capability to the investors at the expense of more underpricing. Among the exit strategies most profitable exit strategy to venture capital firms is known as IPOs. Because of this, establishing a reputation as a venture capital firm that is capable of taking portfolio firms public soon is consequential for future fundraising. Using 433 VC backed initial public offerings from 1987 to 1987 Gompers (1996) argues that young venture capital firms have incentive to grandstand. That is, young venture capital firms bring firms public earlier than older venture capital firms to build a reputation at the expense of high underpricing and raise capital for new funds. Because older venture capital firms already hold reputation to some extent relative to young venture capital firms, fundraising for them is not a big deal of issue. In contrast, young venture capital firms need to signal quality by taking portfolio firms public. Lee and Wahal (2004) also support grandstanding hypothesis evidenced by the finding that higher underpricing leads to larger future flows of capital into venture capital firms, particularly after 1996. This finding explains that venture capital firms are willing to bear the cost of underpricing in taking their portfolio companies public.

One of the interesting research topics related to venture capital in recent years is an attempt to rank the reputation of venture capitalist just like the auditors and the underwriters. The role of underwriter reputation is known to be so important in IPO studies that Jay Ritter maintains and updates the ranking of underwriter at regular time of interval. However, the conventional studies in VC with regard to IPO performance pool VC firms into a single group. This practice of the research does not seem to be reasonable because the leading VCs such as Kleiner Perkins Caufield & Byers (KPCB) will apparently play much more significant role than small and unknown VCs that just started their business.

In the same vein of studies in the auditors and the underwriters, Nahata (2008) comes up with a consistent measure of VC reputation measured by the cumulative dollar capitalization of IPOs backed by a VC until a certain calendar year divided by the aggregate market capitalization of all VC-backed companies that went public until the same calendar year. Nahata argue that companies led by more reputable VCs based on the cumulative market capitalization of IPOs backed by the VC firm are more likely to exit successfully, access public markets faster, and have higher asset productivity at IPOs. This measure sounds reasonable because the most profitable exit opportunity to the VC firms is IPO. Krishnan, Masulis, and Singh (2006) also investigate the relation between several VC reputation measures and subsequent IPO performance. Consistent with the finding by Nahata, they also find that market share of VC-backed IPOs dominates the other reputation measures with respect to its relation to IPO firms' long term performance measures.

Another line of research that I think is interesting is i) the role of angel investors in private firms in IPO underpricing, ii) the role of private equity firm in IPO underpricing, and iii) how the different characteristics of VC firms can explain the variation in IPO underpricing. Specifically, venture capital reputation is one characteristic that distinguish one venture capital firm from another. Or young venture capital also was another characteristic of venture capital firms.

3. Hypothesis Development

Since the purpose of our study is to replicate the Megginson and Weiss (1991) using different database, I simply restate their hypothesis.

Hypothesis 1: The ability of venture capitalists to reduce the information asymmetry associated with a firm involved in the offering process should result in a reduction of both the underpricing (initial return) associated with the issue as well as the cost of underwriter, legal, auditor, and other miscellaneous challenge (gross spread).

Hypothesis 2: Young venture capital firms incur the costs of signaling (more underpricing) because the company goes public earlier than if it had been finance by a more established venture capitalists.

4. Data and Methodology

I consider all common stock IPOs that are not limited partnership, REITs, closed-end funds, spinoffs, previous leverage buyouts, units, and ADRs on SDC from 1981 to 2007. I do this because I want to have IPOs that have as much less information asymmetry as possible.

I also delete observations in which the offering is not underwritten. IPOs with an offer price of less than $5.00 and offering amount of less than $3 million are not included following Megginson and Weiss (1991). This process reduces the number of observations from 11,483 to 7,852 over the 27-year period. This database includes offering dates, offering prices, principal, issuer's name, gross spread, cusip9, cusip6, SIC code, ticker name, and underwriter. M&W employ SIC code to classify IPOs by industries. However, I use Fama-French 49 industry classification because it provides a finer industry classification.

I obtain two databases from Jay Ritter's website. The first one is the rankings of underwriters during the period from 1980 to 2007. This information is updated every year

so that it shows the changes in the rankings of underwriters. The rankings range in value from 1 to 9, with higher values indicating higher quality rankings. The second database is the age of IPO firms. It includes variables such as permno, offering date, the year in which the firms were found, and IPO's firm names. The age is calculated from the difference between the year of offering date and the firm's founding year. I also use CRSP to obtain information about initial return. The initial return is calculated from dividing the difference between the closing price on the first trading day and the offering price by offering price.

I use the resulting sample of 7,852 IPOs on SDC to be merged with the underwriter ranking data by the underwriter name. Because the names of the underwriter on SDC are not exactly the same as those on Jay Ritter's underwriter rankings, I employed SAS function called SPEDIS that determines the likelihood of two words matching, expressed as the asymmetric spelling distance between the two words. This process left us with 7,243 IPOs.

I merge the IPOs including the data of underwriter's rankings with CRSP data by cusip, date, and ticker. If a IPOs on CRSP, I require that the stock start to trade no more than 10 days after the IPO date or if it appeared before the IPO date, then with non-missing trading prices no more than two days before the IPO. After this, I am left with 6,547 IPOs.

Finally, I merge our data set with the age table provided by Jay Ritter by permno. For some reason, the age table shows a great number of missing permno. Our final data contain 5,393 IPOs between 1981 and 2007. To test the certification role of venture capitalists in the IPO market, I match a sample of 320 VC backed firms with 320 non-VC backed firms in the same industry as closely as possible by the offering amount (principal) during the period from 1983 to 1987. I have different number of matched sample when I use different periods. For example, I have 1,062 VC backed and 1,062 Non-VC backed IPOs using the period from 1991 to 2000 whereas there are only 77 matched samples from 2001 to 2007.

5. Empirical Results

5.1. Descriptive Statistics of Matched Sample by VC Backed vs Non-VC Backed

I describe the industry classification of final matched sample over the period from 1983 to 1987 in Table 1 and Figure 1. For expositional purposes I include only ten largest % of industries that are supported by Venture Capitalists in the figure. VC backed IPOs clustered in certain industries. Specifically, venture capitalists heavily invested in high technology sectors including hardware, software, chips, and drugs.

Figure 1 The percentage of IPOs in selected 10 industries

Sample include 320 VC backed IPOs and 320 Non-VC backed IPOs during the period January 1983 and December 1987.
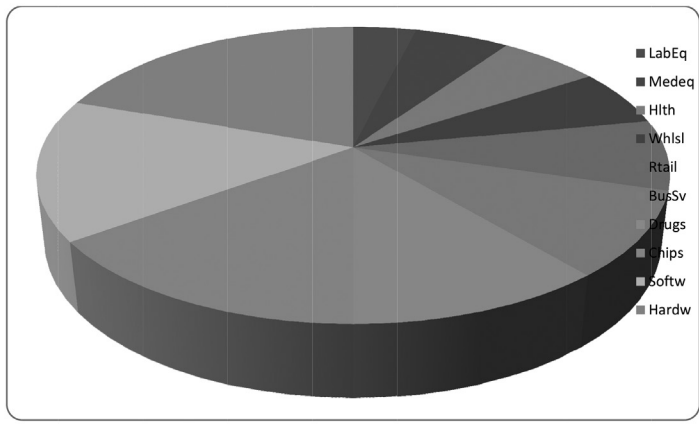

Table 1 Fama-French 49 industry classification for VC backed and Non-VC backed IPOs

This table exhibit the number of IPOs and percentage of IPOs in each industry for the 320 VC backed and 320 Non-VC backed IPOs during the period January 1983 and December 1987.

Classification	Number of IPOS	Percentage of IPOs	Classification	Number of IPOS	Percentage of IPOs
Agriculture	4	0.6%	Insur	10	1.6%
Autos	2	0.3%	LabEq	20	3.1%
Banks	2	0.3%	Mach	8	1.3%
Bldmt	6	0.9%	Meals	6	0.9%
Books	6	0.9%	Medeq	30	4.7%
BusSv	48	7.5%	Other	8	1.3%
Chems	2	0.3%	Paper	2	0.3%
Chips	78	12.2%	PerSv	10	1.6%
Clths	2	0.3%	Rtail	40	6.3%
Drugs	58	9.1%	Rubbr	6	0.9%
ElcEq	2	0.3%	Softw	80	12.5%
Fin	2	0.3%	Steel	2	0.3%
Food	2	0.3%	Telcm	14	2.2%
Fun	6	0.9%	Toys	4	0.6%
Hardw	102	15.9%	Trans	10	1.6%
Hlth	32	5.0%	Whlsl	32	5.0%
Hshld	4	0.6%	Total	640	100.0%

Table 1 completes the picture of this figure. As shown in the Table 1, our matched sample IPOs consists of 33 industries. Some of industries have more IPOs than others in relative terms. Chips, hardware, and software industry are major IPO issuers in our matched sample. Consistent with prior research on industry clustering of IPOs being positively related to industry growth (Bharat and Omesh (2006)), the three industries account for more than 40% of IPOs.

Figure 2 Total sample description.
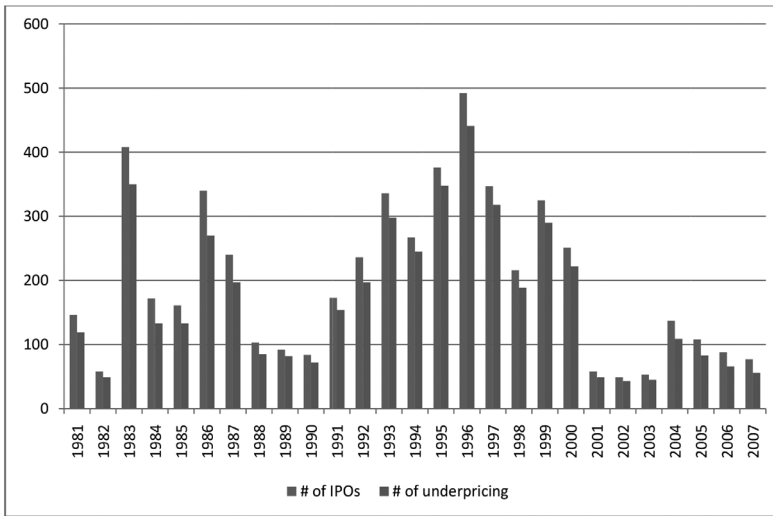
The total sample contains 5393 IPOs and 4643 underpricing during 1981-2007. Figure 2 contains the total number of IPOs and underpricing during 1981-2007 in our total sample. Gompers (1994) shows that the supply of money dramatically increased to the venture capital in 1980s. He puts it, "In 1987, $4.9 billion was committed to new venture capital funds. The trends in venture capital commitments appear to be highly correlated with the initial public offering market". The increase in money flow into the venture capital sector was attributable to the ERISA's "prudent man" rule. The employment Retirement Income Security Act prohibited pension funds from investing in venture capital and other risk assets. However, after the change of the act, enormous amount of money rushed into the venture capital industry partly because of the bad performance of bond and stock market in 1970's and partly because of the skyrocketing excess return over 25% per year at the same periods. Consistent with tech boom, the number of IPOs in 1990s was phenomenal. However, after the bust of the tech boom, the IPO market shrinked more than one third of size of 1990s in terms of the number of IPOs. The graph of the number of underpricing consistently indicates that the IPO market is attractive to investors. The money "left on the table" continued to be substantial regardless of the period in our total sample.

Table 2 shows the matched number of VC backed and Non-VC backed IPOs by year from 1983 to 1987. There does not seem to differ in Venture capital backed and Non-Venture capital backed by year except for 1983. The distinct difference in 1983 comes from

Table 2 The number of VC backed and Non-VC backed IPOs by year

Year	Venture capital backed	Non-Venture Capital backed
1983	105 (32.8%)	156 (48.8%)
1984	48 (15%)	34 (10.6%)
1985	32 (10%)	30 (9.4%)
1986	74 (23.1%)	61 (19.1%)
1987	61 (19.1%)	39 (12.2%)
Total	320	320

the fact that high technology industry including chips, hardware, and software was not backed by Venture capitalist as many as it was in other years. Those firms who were not backed by Venture capitalist account for 33% ((156-105)/156) in 1983.

Table 3 shows our univariate analysis. This t-test compare means of same variable between VC backed group and Non-VC backed group. This table is the starting point that makes a striking contrast between my result and Meggison and Weiss (1991). Their sample shows that VC backed IPOs, on average, have higher offering amounts ($19.7 million versus $13.2 million) and offer prices ($11.18 versus $10.16) than non-VC backed IPOs even though firms within the same industry are matched as closely as possible on the offering amounts while my sample indicates that there is not statistically different from 0 in principal offering price between two groups. The t-test of age is consistent with that of Megginson and Weiss (1991). However, the unreported result of our total sample without match indicates that IPOs with VC backing are significantly different from IPOs without VC backing in terms of all variables. That is, offering amount, underwriter reputation, age, and offer price differ depending on whether the sample are VC backed or not.

Age is the age of company in years measured from the incorporation year to offering year. There is significant difference in age between two groups. According to Muscarella and Vetsuypens (1989), the older firms show less initial return in IPOs. They argue that this is the case because there is less information asymmetry to older firms. In my sample VC backed IPOs is 7.8 years on average while Non-VC backed IPOs is 11.9 years. The significant difference in age suggests the possibility of venture capitalists certification role in reducing asymmetric information between VC backed group and Non-VC backed group. Rank is scaled from 1 to 9, representing underwriter's reputation. Carter and Manaster (1990) demonstrate that IPOs with more prestigious underwriter shows

Table 3 Tests of Differences in Sample Descriptive Statistics for VC Backed and Non-VC Backed IPOs

Variable	Venture Capital backed	Non-Venture Capital backed	Difference in means t-stat
Principal	17.8 [14.9]	17.0 [13.2]	-0.78
Offering price	11.0 [10.5]	11.5 [11.3]	1.68*
Age(years from incorporation)	7.8 [5.0]	11.9 [7.5]	4.57*
rank	7.2 [8.0]	6.9 [8.0]	-1.84***
average market share of lead underwriter	2.6 [2.7]	2.6 [2.6]	-0.79
Initial return	0.1 [0.04]	0.1 [0.02]	1.54

Medians in brackets
* indicates two-tailed statistical significance at 1% level.
** indicates two-tailed statistical significance at 5% level.
***indicates two-tailed statistical significance at 10% level.

less initial return due to the fact that more prestigious underwriter play a substantial role in reducing information asymmetry in IPO process. The average rank is 7.2 for VC backed sample and 6.9 for Non-VC backed sample. They are statistically different at 10% level.

5.2. Regression Analysis

Table 4 presents our main findings which are inconsistent with well-known Venture Capitalist's certification role. In this table I attempt to replicate the relationship between initial return and venture capitalists' certification role demonstrated by Megginson and Weiss (1991). In IPOs market there is asymmetric information between investors and issuers. Issuers would not reveal adverse information to investors because it would reduce initial price issuers could obtain. However, investors would not pay high price at which issuers suggests since they recognize this incentive of issuers not revealing adverse information. At extreme this can cause IPOs market failure because both parties can never reach proper price agreement as Akerlof (1970) demonstrated used car market failure in his seminal paper regarding the theory of lemon. Rock (1986) contend that the degree of information asymmetry between investors and issuers reflect the degree of underpricing. In other words, issuers need to give incentives to investors for them to participate in IPO market that characterized as asymmetric information market. The incentive, itself, is underpricing.

Since the observation of IPO underpricing a majority of researchers attempted to examine how the issue of underpricing can be appeased. In this line of researches, re-

searchers attempt to find what third parties that are involved in the process of IPOs can play a role in the change in initial return. Underwriter reputation signals to the IPO market that it can lower IPO risk because the more prestigious underwriters will play a role in mitigating information asymmetry between issuers and investors (Carter and Manaster 1990). In the same vein, Beatty (1989) argues that the investors are more trustworthy with IPOs that go with more reputable auditors. Thus, the reputation will mitigate the information asymmetry that exists between issuers and investors, leading to less underprcing to issuers. Megginson and Weiss (1991) also came up with another player who can take a leading role in IPO market just like underwriters and auditors. Venture capitalists also play a significant role in reducing asymmetric information. They named their role as certification role. They argue that if there is certification role by VCs, there should be less initial return for VC backed group. In their regression model they examine whether the initial return decrease by the presence of venture capitalists controlling for auditor reputation (Beatty 1989) and underwriter reputation (Carter and Manaster 1990). The other two control variables are size of the offering amount and age.

Ritter (1984) argue that the size of the offering amount is associated with the degree of underpricing. Even though there is not a significant difference in the offering size between VC backed IPOs and Non-VC backed IPOs, VC backed IPO tend to be larger than Non-VC backed with respect to the offering size. Muscarella and Vetsuypens (1989) argue that age also affect IPO underpricing. Table 4 present the link how VC backed IPOs are related to the initial return (underpricing).

Unlike the argument by Megginson and Weiss (1991) my result shows that there is not statistically significant certification role by venture capitalists in IPOs process. The regression (1) is exactly same as the t-test in Table 3. The t-value in regression corresponds to that in difference in means t-stat. The negative sign corroborate the hypothesis that there is less underpricing for IPOs backed by venture capitalists. However, the role does not seem to be large enough to differ in two groups. Regression (2), (3) and (4) are multiple regression controlled for other variables that suggested by other literatures. Regression (2) is controlled for log of offering amounts. Both venture capital role and size of IPOs are not statistically significant. In regression (3) size of IPOs changes to statistically significant after controlling for rank. Rank is also statistically negatively related to initial return. However, VC's certification role does not still show up. The larger the size of IPOs is, the more the initial return is. Consistent with Carter and Manaster (1991) argument, there is statistically significant less underpricing for more reputable underwriters. On average, the IPOs with more prestigious underwriters show 3.1% less initial return. Regression (4) also shows the same result as regression (3). Consistent with Muscarella and Vetsuypens (1989), the older firms mitigate the degree of

Table 4 The result of regression

This table presents OLS regression of initial return ( ) on type, log of the amount offered, IPO underwriter reputation ranking, and the age of the firm for the matched sample of 320 VC backed and 320 Non-VC backed IPO during the period 1983-1987. The model for this table is as follows.

$$\text{Initial return} = \alpha_0 + \alpha_1 + \alpha_2 + \alpha_3 + \alpha_4 + \varepsilon_t$$

Initial return is percentage return from the offer price to the first trading day price (= 100*(first trading day price – offer price/offerprice)). TYPE is dummy variable for the IPOs that are either VC-backed or Non-VC backed. VC-backed is 1, otherwise 0. Logamt is log of offering amount in millions. Rank is IPO underwriter reputation ranking downloaded from Jay Ritter website. Its scales range from 1 to 9 (Highest ranking). Age is age of the firm in years from incorporation date to offer date. This data is also downloaded from Jay Ritter website.

Regression	α_0	α_1	α_2	α_3	α_4	R^2	F-statistic	Significance F-test
(1)	0.110* (11.74)	-0.0205 (-1.54)				0.0037	2.37	0.1244
(2)	0.11505* (4.45)	-0.0204 (-1.53)	-0.002 (-0.19)			0.0038	1.2	0.3019
(3)	0.199* (7.29)	-0.0140 (-1.09)	0.047* (4.23)	-0.031* (-7.40)		0.0828	19.13	<.0001
(4)	0.2013* (7.38)	-0.0189 (-1.45)	0.05* (4.47)	-0.03* (-7.30)	-0.0011** (-1.93)	0.0881	15.34	<.0001

*, **, *** denote significance at the 0.01, 0.05, and 0.10 levels, respectively.
t-statistics are given in parenthesis.

underpricing. In other words, younger firms have more uncertainty and hence greater underpricing. However, the most important dimension in this model specification is that VC backed IPOs do not still play a leading role in leaving the less money on the table (Loughran and Ritter 2002) which is inconsistent with the findings by Megginson and Weiss (1991). In other words, I reject the hypothesis 1 implying that the ability of venture capitalist to reduce the information asymmetry associated with a firm involved in the offering process does not reduce the degree of underpricing. I have two explanations for this. First, I argue that actual role of VC backed firms as certifier in IPO market is not as paramount as literatures emphasized. In 1980's, underwriter's reputation and auditor's reputation were found as important. In an attempt to find another certification party with eager this might be a result of data mining. Second, several literatures contend that there is some underreporting problems with SDC. This problem is especially salient in merger and acquisition data in SDC. For example, SDC reports three acquisitions with total value of $89 million for First Data Corporation in 1997. First Data's

Table 5 The result of OLS regression of gross spread

This table presents OLS regression of gross spread (GRSPD) on type, log of the amount offered, IPO underwriter reputation ranking, and the age of the firm for the matched sample of 320 VC backed and 320 Non-VC backed IPO during the period 1983-1987. The model for this table is as follows.

$$\text{Gross spread} = \alpha_0 + \alpha_1 \text{TYPE} + \alpha_2 \text{Logamt} + \alpha_3 \text{Rank} + \alpha_4 \text{Age} + \varepsilon_t$$

Gross spread is cost paid to the underwriter as a percentage of offer price. TYPE is dummy variable for the IPOs that are either VC-backed or Non-VC backed. VC-backed is 1, otherwise 0. Logamt is log of offering amount in millions. Rank is IPO underwriter reputation ranking downloaded from Jay Ritter website. Age is age of the firm in years from incorporation date to offer date. This data is also downloaded from Jay Ritter website.

Regression	α_0	α_1	α_2	α_3	α_4	R^2	F-statistic	
(1)	0.0758* (145.3)	-0.0011 (-1.47)				0.0034	2.16	0.1418
(2)	0.0995* (98.08)	-0.0007 (-1.28)	-0.0092* (-25.16)			0.5002	318.72	<.0001
(3)	0.1058* (112.08)	-0.0002 (-0.45)	-0.0056* (-14.5)	-0.0023* (-15.94)		0.6428	381.58	<.0001
(4)	0.1059* (112.2)	-0.0003 (-0.75)	-0.0055* (-14.15)	-0.0023* (-15.84)	-0.00003 (-1.64)	0.6444	287.63	<.0001

*, **, *** denote significance at the 0.01, 0.05, and 0.10 levels, respectively.
t-statistics are given in parenthesis.

Table 6 The result of winsorized OLS regression of initial return

This table presents winsorizedOLS regression of initial return at the 5% and 95% level on type, log of the amount offered, IPO underwriter reputation ranking, and the age of the firm for the matched sample of 320 VC backed and 320 Non-VC backed IPO during the period 1983-1987. The model for this table is as follows. Initial return = $\alpha_0 + \alpha_1 TYPE + \alpha_2 Logamt + \alpha_3 Rank + \alpha_4 Age + \varepsilon_t$

Initial return is percentage return from the offer price to the first trading day price (= 100*(first trading day price – offer price/offerprice)).TYPE is dummy variable for the IPOs that are either VC-backed or Non-VC backed. VC-backed is 1, otherwise 0.Logamt is log of offering amount in millions.Rank is IPO underwriter reputation ranking downloaded from Jay Ritter website. Its scales range from 1 to 9 (Highest ranking). Age is age of the firm in years from incorporation date to offer date. This data is also downloaded from Jay Ritter website.

Regression	α_0	α_1	α_2	α_3	α_4	R^2	F-statistic	Significance F-test
(1)	0.102* (11.74)	-0.019*** (-1.88)				0.0055	3.54	0.0604
(2)	0.1127* (5.65)	-0.019*** (-1.86)	-0.004 (-0.57)			0.006	1.93	0.146
(3)	0.186* (8.94)	-0.01358 (-1.39)	0.038* (4.54)	-0.027* (-8.48)		0.107	25.4	<.0001
(4)	0.187* (9.02)	-0.0166*** (-1.67)	0.041* (4.73)	-0.026* (-8.39)	-0.0006 (-1.61)	0.1106	19.74	<.0001

*, **, *** denote significance at the 0.01, 0.05, and 0.10 levels, respectively.
t-statistics are given in parenthesis.

1997 10-K reports 14 transactions with total value of $338 million, including "11 other acquisitions" involving total consideration of $249 million.

A group of researchers also questioned the data quality issues in SDC. Ljungqvist (2002) reported on his website the main problems for shares outstanding, venture backing, and syndicate size. He identified VC backed IPOs based on the reading of the principal shareholder's and recent transactions' sections contained in the IPO prospectuses. After comparing the VC backed IPOs of his with those of SDC's, he found three sources of errors. First, SDC occasionally misses offerings that are backed by well-known VC funds. Second, SDC occasionally identifies as venture capitalists limited partnerships that are in fact owned by an executive director or his/her family. Third, SDC's flag identifying venture-backed IPOs is inconsistent with respect to firms backed by private equity funds, such as buy-out funds managed by Warburg Pincus, KKR, Blackstone, or Hicks Muse. Ellis, Michaely, and O' Hara (2000) find problems with SDC's over allotment exercise data. Jay Ritter on his website (http://bear.cba.ufl.edu/ritter) also posted corrections to SDC's classification of unit offerings and some accounting numbers.

Table 5 also test the hypothesis 1. The dependent variable in this table is gross spread instead of initial return. Gross spread is defined as the cost paid to the underwriter by firms going public for arranging and underwriting an offering of securities. If VC backed firms do certification role, I predict that the gross spread should be lower for those firms per hypothesis 1. However, I do not find the relation between gross spread and VC backed firms. Other variables are consistent with findings of prior literatures, though. As in Ritter (1987), I see the economies of scale in IPOs. The larger the offering amounts are, the less the gross spread incur to the firms. Consistent with Carter and Manaster (1990) again the firms that do IPO with underwriters with higher reputation seem to pay less underwriting cost. The older firms seem to pay less underwriting fee as expected. However, the age is not strong enough in this regression. Overall, Table 5 also reject the first hypothesis 1 that the ability of venture capitalist to reduce the information asymmetry associated with a firm involved in the offering process should reduce the cost of underwriting, legal, auditor, and other miscellaneous challenge.

In Table 6, I truncate initial returns at the 5% and 95% levels to mitigate the influence of outliers. Specifically, I identify value of the initial return at the 5 and 99 percentile observations in our sample. For all initial return greater than(less than) the 99 (1) percentile, I replace the initial return with the 99 (1) percentile observation. The first regression (univariate test) indicates the certification role by VC backed firms. (less underpricing). However, the certification role disappears after controlling for other control variables. In summary, the absence of certification role is not driven by the outliers in my sample.

5.3. The Use of Different Sample Period and Grandstanding Hypothesis

For brevity, the results of our regression table using different periods present the degree of underpricing. However, the results remain the same as our use of dependent variable as the gross spread.

I first started with the period from 1981-1987. The sign of the coefficient on TYPE implies that VC backed firms appear to bear less underprcing. However, the result is not statistically significant. Thus, I do not find the certification role by VCs in the Table 7.

Using the period from 1988 to 1998, Table 8 exhibits that VC backed firms are more underpriced which is against the certification role theory. I attribute this opposite result to the grandstanding theory. Gompers (1996), and Lee and Wahal (2004) contend that young VCs typically hold board seats and might push a company to go public early or seek to price an IPO aggressively, looking to impress their limited partner investors with their IPO records and post-offering gains. In other words, higher underpricing leads to larger future cash flows of capital into the young venture capital funds because taking firms public early signals to the market that the VCs are capable. As a result, young venture capital firms allow the firms in their portfolio to go with more underpricing (higher initial return) in their IPOs for the purpose of future fundraising.

To test the theory empirically I created dummy variable taking value 1 when age is less than 6 years old among VC backed firms following Gompers. I called this variable as young VC backed firms (yvc). As the theory predicted, younger VC backed firms incur more cost (more underpricing) to take companies public earlier than old venture capital firms. One thing to be careful about this regression is that I give date restriction to the use of matched pairs methodology where a sample of venture capital backed IPOs is matched by industry and offering size with a qualitatively equivalent set of non-VC backed IPOs. Loughran and Ritter (2004) show the evidence that IPO underpricing almost doubled in 1990 -1998 because issuers changed their attitude toward the proceeds of IPOs. Issuers focus on more analyst coverage and side payments. Therefore, matching samples by only industry and size of offering amount might lead to serious mismatch. To mitigate the problem I force the IPO date of VC backed samples to be located 90 days before and after of the IPO date of NON-VC backed samples. Consistent with grandstanding theory, the coefficients on yvc and type are positive and statistically significant. Younger VC backed firms appear to bear the cost of more underpricing in an expectation to get more cash flow that will come in the future.

Table 10 shows the result using the 2000's sample period. Even though the negative sign on TYPE in regression (4) seem to support the certification role by VCs, it is not statistically significant. Thus, I do not find the relation between the return of the first day

Table 7 The results of OLS regression of initial return with the matched sample of 358 VC backed and 358 non-VC backed IPOs

This table presents OLS regression of initial return on type, log of the amount offered, IPO underwriter reputation ranking, and the age of the firm for the matched sample of 358 VC backed and 358 Non-VC backed IPO during the period 1981-1987. The model for this table is as follows.

$$\text{Initial return} = \alpha 0 + \alpha_1 TYPE + \alpha_2 Logamt + \alpha_3 Rank + \alpha_4 Age + \varepsilon_t$$

Initial return is percentage return from the offer price to the first trading day price (= 100*(first trading day price – offer price/offerprice)). TYPE is dummy variable for the IPOs that are either VC-backed or Non-VC backed. VC-backed is 1, otherwise 0. Logamt is log of offering amount in millions. Rank is IPO underwriter reputation ranking downloaded from Jay Ritter website. Its scales range from 1 to 9 (Highest ranking). Age is age of the firm in years from incorporation date to offer date. This data is also downloaded from Jay Ritter website.

Regression	α_0	α_1	α_2	α_3	α_4	R^2	F-statistic	Significance F-test
(1)	0.1248* (13.70)	-0.0214 (-1.66)				0.0038	2.74	<.098
(2)	0.1260* (5.77)	-0.0212 (-1.60)	-0.00056* (-0.06)			0.0038	1.37	<.2541
(3)	0.2005* (8.66)	-0.0043* (-0.34)	0.0491* (4.64)	-0.031* (-7.65)		0.079	20.52	<.0001
(4)	0.2014* (8.69)	-0.0073 (-0.55)	0.05* (4.69)	-0.030 (-7.36)	-0.0007* (-1.22)	0.082	15.77	<.0001

*, **, *** denote significance at the 0.01, 0.05, and 0.10 levels, respectively.
t-statistics are given in parenthesis.

Table 8 The results of OLS regression of initial return with the matched sample of 1062 VC backed and 1062 non-VC backed IPOs
This table presents OLS regression of initial return ( ) on type, log of the amount offered, IPO underwriter reputation ranking, and the age of the firm for the matched sample of 1062 VC backed and 1062 Non-VC backed IPO during the period 1988-1998.The model for this table is as follows.

$$\text{Initial return} = \alpha_0 + \alpha_1 TYPE + \alpha_2 Logamt + \alpha_3 Rank + \alpha_4 Age + \varepsilon_t$$

Initial return is percentage return from the offer price to the first trading day price (= 100*(first trading day price – offer price/offerprice)).TYPE is dummy variable for the IPOs that are either VC-backed or Non-VC backed. VC-backed is 1, otherwise 0.Logamt is log of offering amount in millions.Rank is IPO underwriter reputation ranking downloaded from Jay Ritter website. Its scales range from 1 to 9 (Highest ranking). Age is age of the firm in years from incorporation date to offer date. This data is also downloaded from Jay Ritter website.

	α_0	α_1	α_2	α_3	α_4	R^2	F-statistic	Significance F- test
(1)	0.2836* (17.52)	0.0992* (4.33)				0.008	18.77	<.0001
(2)	-0.6173* (-10.73)	0.0759* (3.51)	0.2602* (16.24)			0.1184	142.39	<.0001
(3)	-0.5918* (-10.16)	0.0873* (3.96)	0.295* (14.25)	-0.0207* (-2.66)		0.1213	97.56	<.0001
(4)	-0.5496* (-9.47)	0.0599* (2.70)	0.2943* (14.36)	-0.0158** (-2.05)	-0.0061* (-6.61)	0.1390	85.55	<.0001

*, **, *** denote significance at the 0.01, 0.05, and 0.10 levels, respectively.
t-statistics are given in parenthesis.

Table 9 Grandstanding theory following Gompers (1996)

This table presents OLS regression of initial return on type, log of the amount offered, IPO underwriter reputation ranking, and the age of the firm for the matched sample of 1062 VC backed and 1062 Non-VC backed IPO during the period 1988-1998.The model for this table is as follows.

$$\text{Initial return} = \alpha_0 + \alpha_1 \text{YVC} + \alpha_2 \text{TYPE} + \alpha_3 \text{Logamt} + \alpha_4 \text{Rank} + \alpha_4 \text{Age} + \varepsilon_t$$

Initial return is percentage return from the offer price to the first trading day price (= 100*(first trading day price – offer price/offerprice)). YVC is dummy variable that equals one if IPO firm is less than six years old. (Gompers(1996)). TYPE is dummy variable for the IPOs that are either VC-backed or Non-VC backed. VC-backed is 1, otherwise 0.Logamt is log of offering amount in millions.Rank is IPO underwriter reputation ranking downloaded from Jay Ritter website. Its scales range from 1 to 9 (Highest ranking). Age is age of the firm in years from incorporation date to offer date. This data is also downloaded from Jay Ritter website.

Regression	α_0	α_1	α_2	α_3	α_4	α_5	R^2	F-statistic	Significance F-test
(1)	-0.44*	0.0787*	0.0334	0.2807*	-0.0130***	-0.0753*	0.1307	5.34	0.0005
	(-6.88)	(2.22)	(1.28)	(13.39)	(-1.64)	(-5.17)			

*, **, *** denote significance at the 0.01, 0.05, and 0.10 levels, respectively.
t-statistics are given in parenthesis.

Table 10 The results of OLS regression of initial return with 77 VC backed and 77 non-VC backed IPOs

This table presents OLS regression of initial return on type, log of the amount offered, IPO underwriter reputation ranking, and the age of the firm for the matched sample of 77 VC backed and 77 Non-VC backed IPO during the period 1999-2007.The model for this table is as follows.

$$\text{Initial return} = \alpha_0 + \alpha_1 \text{TYPE} + \alpha_2 \text{Logamt} + \alpha_3 \text{Rank} + \alpha_4 \text{Age} + \varepsilon_t$$

Initial return is percentage return from the offer price to the first trading day price (= 100*(first trading day price – offer price/offerprice)).TYPE is dummy variable for the IPOs that are either VC-backed or Non-VC backed. VC-backed is 1, otherwise 0.Logamt is log of offering amount in millions.Rank is IPO underwriter reputation ranking downloaded from Jay Ritter website. Its scales range from 1 to 9 (Highest ranking). Age is age of the firm in years from incorporation date to offer date. This data is also downloaded from Jay Ritter website

Regression	α_0	α_1	α_2	α_3	α_4	R^2	F-statistic	Significance F-test
(1)		0.0122 (0.38)				0.001	0.14	0.7060
(2)	-0.2961* (-2.32)	0.0172 (0.55)	0.1047* (3.47)			0.078	6.09	.0029
(3)	-0.3408* (-2.64)	0.010* (0.33)	0.0753* (2.2)	0.0221 (1.76)		0.098	5.16	0020
(4)	-0.3458* (-2.72)	-0.0138 (-0.43)	0.089* (2.59)	0.0217 (1.77)	-0.0028* (-2.32)	0.1307	5.34	0.0005

*, **, *** denote significance at the 0.01, 0.05, and 0.10 levels, respectively.
t-statistics are given in parenthesis.

Table 11 The result of OLS regression with 2,996 VC backed and 2,996 non-VC backed IPOs
This table presents OLS regression of initial return on type, log of the amount offered, IPO underwriter reputation ranking, and the age of the firm for the matched sample of 2996 VC backed and 2996 Non-VC backed IPO during the period 1981-2007.The model for this table is as follows.

$$\text{Initial return} = \alpha_0 + \alpha_1 \text{TYPE} + \alpha_2 \text{Logamt} + \alpha_3 \text{Rank} + \alpha_4 \text{Age} + \varepsilon_t$$

Initial return is percentage return from the offer price to the first trading day price (= 100*(first trading day price – offer price/offerprice)).TYPE is dummy variable for the IPOs that are either VC-backed or Non-VC backed. VC-backed is 1, otherwise 0.Logamt is log of offering amount in millions.Rank is IPO underwriter reputation ranking downloaded from Jay Ritter website. Its scales range from 1 to 9 (Highest ranking). Age is age of the firm in years from in-corporation date to offer date. This data is also downloaded from Jay Ritter website.

Regression	α_0	α_1	α_2	α_3	α_4	R^2	F-statistic	Significance F-test
(1)	0.2373* (19.76)	0.0666* (3.92)				0.0051	15.39	<.0001
(2)	-0.3066* (-9.29)	0.0417* (2.56)	0.1693* (17.56)			0.0981	162.75	<.0001
(3)	-0.2667* (-7.45)	0.051* (3.08)	0.19* (15.68)	-0.0158 (-2.86)		0.1005	111.49	<.0001
(4)	-0.2419* (-6.77)	0.0268 (1.61)	0.193* (16.01)	-0.01** (-2.05)	-0.0053* (-7.62)	0.1177	99.73	<.0001

*, **, *** denote significance at the 0.01, 0.05, and 0.10 levels, respectively.
t-statistics are given in parenthesis.

trading and firms backed by VCs in this sample period.

In Table 11, I use whole sample period. The number of matched sample is 2,996 VC backed and 2,996 Non-VC backed IPOs. The univariate result is consistent with the grandstanding theory again. In regression (2) and (3), the result continues to support the grandstanding theory, stating that young VCs are willing to take the cost of underpricing in their portfolio firms by taking them to public early. Early IPOs help young VCs to establish their reputation quickly, thus helping them to get more fundraising in the future. There seem to be more money left on the table as the size of IPO becomes larger. Underwriter reputation does a marginal role in decreasing the underpricing. However, the relation between initial return and type becomes insignificant after controlling for the age variable. I cannot find this puzzling result. Consistent with the literature, the older firms result in less underpricing because they are more established than young firms.

6. Summary and Conclusion

I examine the relation between IPO underpricing and the role of Venture Capitalists based on the study of Megginson and Weiss (1991). I use the same period and matched sample, but different source for VC flag variable from that of M&W. Using SDC, I do not find the Venture Capitalists' certification role using the sample period from 1983 to 1987 as Megginson and Weiss argue that firms supported by VCs should be more underpriced and lower the cost of going public because they reduce the uncertainty in IPO process that exists between the investors and the issuers. As several researchers (Ljungqvist 2002), Ellis, Michaely, and O' Hara (2000) reported underreporting problem by SDC database, I argue that our deviated result from M&W is attributable to SDC database error. Using 90's period, however, I find the evidence that VC backed firms grandstand. Gompers (1996) find that young VCs allows the firms in their portfolios to exit early through the IPOs to build their reputations quickly because the established reputation will help them to raise funds from limited partners in future.

Finally, I conclude my paper by suggesting possible extension on this work. I am interested in another party who seems to occupy important portion in private firms. Angel investor provides risky capital to small, private, and start-up firms. I will examine the relation between angel investors and the IPO underpricing. The challenging aspect of this work is how to identify them in a firm's prospectus and how I define this party.

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