

Venture capital reputation: certification in the Dutch
IPO market



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Abstract

This research investigates the differences in underpricing and long-term underperformance between venture capital backed and non-venture capital backed IPOs on the Amsterdam Stock Exchange. In literature there exists some evidence of a lower underpricing and no underperformance for venture capital backed IPOs. The datasample for this research consists of 76 IPOs issued between 1994 and 2008, of which 19 were backed by venture capitalists. The level of underpricing for venture capital backed IPOs is 10,2% lower than non-venture capital backed IPOs, which is consistent with the certification theory. The the long-term performance of venture capital backed and non-venture capital backed IPOs does however not show significant different result.

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1. Introduction

1.1 Context

In the last decades the influence and performance of venture capitalists (VCs) has been somewhat controversial. The venture capital industry claims it stimulates innovation and economic growth. Companies such as Apple and Google are only the best known examples of the success of venture capital involvement in the information technology industry. VCs have also been very active in areas such as biochemicals and medical equipment and recently they are focusing on the market for renewable energy. To support the claim of stimulating innovation VCs argue that they provide start-up and growth companies with their knowledge and experience on how to professionalize their activities. The positive effects posed by the venture capital industry are however confronted by the criticism of politicians and media. They argue that VCs focus on a short term return on their investments. Also VCs are supposed not to be concerned with possible adverse effects for the companies and ventures after they have sold their stakes.

The answer to this dispute is difficult, because these kinds of investors are not obligated to report financial information. Therefore information about the performance of venture capital funds and the returns on their investments is not publicly available. Although there exist certain performance measures of VCs involvement such as firm survival, financial performance and company growth a large body of literature investigates the performance of venture capital companies when they are taken public in an initial public offering (IPO). At this moment financial information becomes available about the company supported by a VC. Such introductions are known as venture capital backed IPOs.

The research on the performance of venture backed IPOs focuses on the existence of initial returns (IRs) when a company goes public. The IR is measured as the difference between the introduction price of an IPO and the price established at the end of the first trading day. Two interpretations of the IRs are documented in the literature on IPOs. One interpretation of the IRs is that during the IPO process the shares are underpriced to create demand for the introduction. Another view on the IRs is that the price reaction on the first day is an overreaction. This assumption implies that IPOs should underperform in the long-term.

In Megginson and Weiss (1991) the involvement of VCs is associated with a certification function in the IPO process because of the value adding activities they deliver. This certification function of VCs should result in a difference between the underpricing and/or long-term underperformance of venture backed and nonventure backed IPOs. More recently Gompers (1996) has presented the grandstanding theory about the involvement of VCs claiming that young

VCS bring their portfolio companies to the market earlier in order to affirm their reputation and raise new funds more successfully.

1.2 Research question

In this thesis the following research question will be investigated

Do venture capitalists perform a certification function for initial public offerings?

To answer this research question two subquestions are formulated:

- Is there a difference in the initial returns of IPOs backed by VCs (venture capital backed) and IPOs not backed by VCs (non-venture capital backed)?
- Is the long-term performance of venture capital backed (VCB) IPOs different from non-venture capital-backed IPOs?

1.3 Research methods

The research- and subquestions stated above will be investigated through an empirical research on a datasample of the IPOs on the Amsterdam Stock Exchange from 1994 till 2007. In this empirical research the IPOs will be tested for the influence of venture capital involvement. The short-term effect of venture capital involvement is tested through the difference in IRs and the long-term effect through the difference in buy-and-hold abnormal returns over a three year period. Possible differences will be further investigated through a set Ordinary Least Squares (OLS) regressions.

1.4 Findings and contribution

Although the certification role of VCs has been investigated extensively in the US and the UK, the research for the Netherlands is small. Therefore this thesis intends to contribute to the research on the certification function of VCs and provide further evidence for the investigation of the contradicting certification and grandstanding theory.

In a research by Klaasen and von Eijse (2007) no significant differences are presented between the IRs of VCB and non-venture capital backed IPOs in the Netherlands. The findings of this thesis, however provide evidence of significant lower IRs for VCB IPOs compared to non-venture capital backed IPO, which support the results of Megginson and Weiss (1991) on the certification of VCs in the US. These results are partially opposite to the results of Klaassen and von Eijse (2007).

The long-term performance of VCB IPOs and non-venture capital backed IPOs in this thesis shows no significant differences and therefore does not provide support for the certification function of VCs.

1.5 Structure

The research will be structured as follows. Chapter two will provide background on the existing literature concerning underpricing, long-term performance and the measurement of VC involvement in the IPO process. Chapter three will introduce the data sample and the methodology employed for the empirical tests. Chapter four presents the results on VCs involvement. In chapter five conclusions will be presented together with possible improvements for future research.

2. Literature review

In this chapter the relevant literature and research will be presented concerning the topics that are of interest for this thesis. In the first section the reasons for an IPO and the costs involved in an IPO process will be described. In the second section the international evidence on the IRs will be presented. The third section will address the underpricing anomaly associated with IPOs and the explanations presented in research. In the fourth section the underperformance anomaly will be discussed also with possible explanations. The final section will focus on venture capital, providing an overview of the activities of VCs and the effect of their activities.

2.1 IPOs

Start-up companies are usually financed by a small number of investors. When a company prospers it can at some point be attractive to go public. In the literature various reasons exist for companies to go public, for which Roell (1996) provides an overview.

The first and obvious reason to go public is to raise equity capital. The raised capital can be used for growth prospects through acquisitions or organic growth and the delevering of the balance sheet. In the long term the raised capital has some other benefits as well. As suggested by Amihud and Mendelson (1988) a company entering the capital market increases the liquidity of its stock. Current and future investors take into account the transaction costs they will face when they want to liquidate their investment. Therefore the value of a firm increases if the liquidity of a stock is high and investors can easily sell at low costs. Another advantage of the increased liquidity provided by Ransley (1984) is the competition for a bank loan, which results in lower rates on bank credits for public companies.

The second advantage is the motivation and monitoring of the management and employees of a company. Publicly traded stocks facilitate the possibility of stock compensation schemes, which can reduce agency costs and motivate management. Management is also controlled by the danger of hostile takeovers and the evaluation of the market's assessment of management decisions as suggested by Bolten and von Thaden (1998).

The third advantage is the increase in a company's publicity and a public image mentioned in surveys of Ransley (1984) as an important factor in the decision to go public. Linked to this phenomenon is the increased analyst coverage a company experiences after an IPO, which increases its visibility amongst investors.

Fourth, the management and/or other shareholders can have incentives to cash-in a part of their stake in the company. This is usually de-emphasized before an IPO, but large parts of the proceeds goes to the original owners as mentioned by Ransley (1984) and Jenkinson and Espenlaub (1991).

Fifth, a large amount of research such as Ibbotson and Ritter (1995) and Bergström et al. (1995) present results indicating that companies use temporarily overvaluation of a certain industry, called windows of opportunity, to enter into an IPO. These companies collect a high price for the shares they issue.

Sixth, some other advantages result from an IPO-process such as a clear defined growth strategy and an improved organizational, managerial and financial structure.

For the decision to go public a trade-off exists between the benefits mentioned above and the associated costs. From the moment the company is publicly traded it is obligated to report periodically to its shareholders. Besides these recurring costs the company faces one-time costs in an IPO process. The direct costs consist of several fees such as legal, auditing and underwriting fees, which in some cases can be considerable.

2.2 Initial return

In this section the international evidence of IRs will be presented. The section will start with an overview of the research results on IRs followed by a short introduction of the two explanations for this phenomenon.

2.2.1 International evidence

All around the world companies are taken public in IPOs. Since the late 70s the IPO market has been investigated due to the existence of IRs. The IRs exist for almost all stocks on every financial market. An extensive research by Ritter and Welch (2002) provides an overview of the IRs in the United States for the period from 1980 until 2002. In their sample 6249 IPOs are investigated resulting in an average IR of 18.8%. Table 1 provides an overview of the average IRs for relevant European countries, which is different for each country.

Table 1
Initial returns for European countries¹

Country	Sample Size	Time period	Avg. IR
Austria	96,00	1971-2006	0,07
Belgium	114,00	1984-2006	0,14
Denmark	145,00	1984-2006	0,08
France	686,00	1983-2006	0,11
Germany	652,00	1978-2006	0,27
Greece	363,00	1976-2005	0,25
Italy	233,00	1985-2006	0,18
Netherlands	181,00	1982-2006	0,10
Poland	224,00	1991-2006	0,23
Spain	128,00	1986-2006	0,11
Switzerland	147,00	1983-2006	0,29
UK	3.986,00	1959-2006	0,17

Not presented in Table 1 are the IRs in countries with emerging markets, which are on average higher than these in the developed countries stated above². For example, the IRs in China of 267% and in India of 93% presented by respectively Tian and Megginson (2005) and Marisetty and Subrahmanyam (2005). There are several factors causing the difference in IRs between countries with developed and emerging markets, such as political and bureaucratic interference.

Another factor influencing the IRs on both developing and emerging markets is the use of different offering mechanisms as mentioned by Jenkinson and Ljungqvist (2001). Internationally fixed price and book-building are the most commonly used methods. In a fixed price offering the issues are offered at a predetermined price. Book-building is the preferred method of the last decade, where a book is created on the demand of potential investors and a price range for the offering price. Other methods have the characteristics of an auction, for example tender offers are used in the Netherlands, Belgium and the UK or the *offer à prix minimal* in France. In tender offers investors can indicate the number of shares they are willing to acquire at a certain price. The shares are rationed so that all shares will be issued.

In the US there is a difference in the IRs for firm-commitment and best effort offerings. In a firm-commitment offering the underwriter takes the shares onto its books before distributing the shares. Whereas in a best effort offering the underwriter tries his best to place the shares, but if less than a certain proportion of the shares are not sold, the offering can be withdrawn. Only high risk firms have difficulties finding and affording underwriting coverage and turn to best-effort offerings.

¹ The average IRs are presented on the personal website of J.R. Ritter. <http://bear.cba.ufl.edu/ritter/Int2008.pdf>

² In the updated Table 1 of Loughran, Ritter and Rydqvist (1994) the level of underpricing for several countries with emerging markets is presented

2.2.2 Explanations

One explanation for the IRs of IPOs is underpricing suggesting that the introduction price is set at a lower price than the market value of the company. The existence of underpricing can be a compensation for possible private information possessed by some or all of the current shareholders. The presence of shareholders with private information does not have to be disadvantageous for new shareholders. For example if the existing shareholders have incentives, which are aligned with the new shareholders their presence can provide a positive signal. VCs who have invested in the company are able to provide such signals, because of their value adding activities they perform for companies. The company can also hire reputable advisers such as underwriters and auditors to reduce such problems.

The other explanation of the IRs is the long-term underperformance of IPOs relative to the market, which could be the result of the overoptimism of some investors on the first trading day. The after-market performance of the company should be disappointing for the most optimistic investors, who will downgrade their expectations resulting in long-term underperformance of IPOs. VCs are specialized in assisting companies with their business development and preparing them for the next stage of the life cycle. These activities add value to a company and could increase the long-term performance of the company after an IPO.

In the academic literature there are abundant reasons and theories for the existence of underpricing and long-term underperformance of IPOs, which will be presented in the following two paragraphs.

2.3 Underpricing

It seems curious that in the presence of perfect and efficient markets companies are willing to leave money on the table when they go public. The underpricing anomaly has created a large quantity of theories and empirical research to find an explanation for this phenomenon. The theories can be divided into three main categories, the first relying on the existence of asymmetric information, the second relying on institutional incentives and the third focusing on the shift in ownership and control. For this thesis the most interesting theories are based on the existence of asymmetric information and will be covered accordingly. For the other two categories broad outlines will be presented.

2.3.1 Asymmetric information

Theories based on the existence of asymmetric information assume that one agent is better informed than another in the IPO process resulting in an IR. The following theories will be presented respectively: Adverse selection, signaling of firm quality, principal agent models and information revelation.

Adverse Selection

Rock (1986) provides a theory with an explanation for underpricing based on the availability of information for different investors. In his model he distinguishes between two kinds of investors, the perfectly informed and the uninformed. Most of the times private investors are perceived as the uninformed. Private investors are assumed to subscribe for all offerings, because they cannot distinguish between the different offerings. The allocation of shares provided to the uninformed can differ. The allocation is affected by the interest of institutional investors, who are assumed to have gathered superior information on future offerings and therefore are better informed. If institutional investors show little interest in newly issued shares uninformed investors will receive a large allocation. The offering is “overpriced” according to the institutional investors. In general an uninformed investor receives a large allocation of its subscribed number of shares when the informed investor perceives an offering “overpriced”. This disadvantageous position is known as the winner’s curse. Due to the inability of the uninformed investor to distinguish between over- and underpriced offerings, he will show little interest in new offerings unless he is compensated for his disadvantageous allocation by a comfortable level of underpricing.

An individual company will only go public one time in its life cycle and therefore may be tempted to let other companies attract uninformed investors by underpricing. This introduces a free-rider problem where companies have a sub-optimal incentive to underprice, but individually overprice their offering. This once in a life time event does not apply for underwriters involved in the offering as shown by Beatty and Ritter (1986), who propose that underwriters will ensure the underpricing of an offering or lose future commissions. The level of underpricing of the IPOs supported by underwriters has to be balanced between the interests of the issuing company on one side and the investors on the other. To get the underpricing right is very important for underwriters, because mispricing will hurt their own market value as evidence by Nanda and Yun (1997) suggests.

Direct empirical support for the theory of Rock (1986) is only possible if information is available on the allocation of shares to uninformed and informed investors. Koh and Walter (1989), Levis (1990) and Keloharju (1993) find evidence supporting the winner’s curse hypothesis in respectively Singapore, the UK and Finland. However in many countries underwriters are not willing to provide such information. A reason could be that the underwriters are sensitive to the question of allocation fairness. They are generally hostile to the suggestion that shares are rationed in a preferential way, or, indeed, rationed at all.

An important insight is provided by Beatty and Ritter (1986) who formalize the idea that underpricing is influenced by the ex-ante uncertainty surrounding an offering. The ex ante uncertainty exists due to asymmetric information between the different parties involved in an IPO. The market value of the company is very uncertain for investors prior to an IPO; however the insiders of the company have expert knowledge. The uncertainty leads to strategic behavior by both parties resulting in underpricing to compensate for the uncertainty.

Generally the research on IPOs is conducted through indirect empirical evidence. This type of research relies on attributes to determine a relationship between the degree of ex ante uncertainty and the level of underpricing. The different attributes provide a signal about the a priori uncertainty surrounding the market value of the offering. The proxy variables are available prior to the offering. For example, as mentioned above, Beatty and Ritter (1986) suggest that the reputation of the leading underwriter can be interpreted as an attribute for the level of ex-ante uncertainty. In Table 2 a range of proxy variables is presented which have been investigated for their impact on the level of underpricing.

Table 2
Proxy variables with an impact on the level of underpricing and corresponding research³

Proxy	Study	Country
<i>Company characteristics</i>		
Size	Ritter (1984)	USA
<i>Offering characteristics</i>		
Inverse gross proceeds	Beatty and Ritter (1986)	USA
	Prabhala and Puri (1998)	USA
Offer price	Tinic (1988)	USA
	Prabhala and Puri (1998)	USA
	Brennan and Hughes (1991)	USA
<i>Disclosure</i>		
Log(1+number of uses of proceeds)	Beatty and Ritter (1986)	USA
<i>Certification</i>		
Venture-backing	Meggison and Weiss (1991)	USA
	Barry <i>et al.</i> (1990)	USA
	Lin and Smith(1998)	USA
Reputation of underwriter	Meggison and Weiss (1991)	USA
	Carter and Manaster (1990)	USA
	Habib and Ljungqvist (2001)	USA

³ Source: Table 3.2 from Going Public by Jenkinson, T.J. and Ljungqvist, A.P.

These proxies can be divided into four groups: Company characteristics, offering characteristics, disclosure and certification. Some of the proxies that are of interest for the remainder of this thesis will be covered more extensively in chapter three on data and methodology.

Signalling firm quality

The origin of IPO signaling models is found in Ibbotson (1975) who suggested the underpricing was a favor from the issuers to “leave a good taste in the mouths of investors”. In Grinblatt and Hwang (1989), Welch (1989) and Allen and Faulhaber (1989) asymmetric information is assumed to exist between IPO companies and investors, because the companies have a better understanding about the present value of their future cash flows. If this is the case companies may want to signal their quality to investors by underpricing in an IPO. The actions undertaken to signal the high quality of a company have to be costly otherwise low quality companies can provide the same signals.

A second very important assumption in the IPO signaling models is that all shares are ultimately sold to new shareholders. This is performed in a two stage sale with one moment during the introduction and another in a later open market transaction. A company will use the IPO to sell a fraction of the shares for a low price to signal high quality. Before the post-IPO financing round the company hopes the true value of a company is revealed. So low quality firms run the risk of being detected as low quality. This makes it possible for the two types of companies to be separated and therefore interesting for high quality companies to signal.

Several studies have tried to find support for the signaling theories mentioned above, but no conclusive answer was found. Keloharju (1993a) and Mcguinness (1992) provided positive results for respectively Finland and Hong Kong, but Jenkinson (1990) and e.g. Spiess and Pettway (1997) did not find support for respectively the UK and the US.

Another stream of research trying to provide support for the signaling theories focuses on the number of companies that actually entered into a second financing round. Here the results of Helwege and Liang (1996a) show that only four percent of a one year IPO cohort returns to the capital market for a seasoned equity offering (SEO).

The relationship between underpricing and firm quality suggests that companies with higher levels of underpricing should have higher post-IPO operating performance. Jain and Kini (1994) have tested this relation and found none. They use post-IPO operating performance measures as a proxy for the quality of a firm, which creates the problem of testing for the joint hypothesis of underpricing as a signal for firm quality and the operating performance being the correct measure for firm quality.

To overcome the problem of testing for a joint hypothesis Cai et al. (2007) employ success or failure of an IPO to test for the quality of a firm. This was possible due to the large amount of failures of dotcom IPO. They found that high quality firms were able to signal their quality through underpricing.

The question remains when companies chose to signal their quality to investors if they will prefer underpricing as a signal. Other signals proposed in the literature are retained equity by Leland and Pyle (1977) and the choice of a reputable agent such as an underwriter, auditor or venture capitalist.

Principal-Agents Models

In the previous theories the activities of the underwriters are assumed not to be of any influence. In practice however investment banks are highly skilled. Most of the times they possess better information about the capital markets and the demand for IPOs than the issuing company. In a semi-competitive market for underwriters the performed activities result in a sub-optimal outcome for the issuing companies. In this situation the underwriter faces conflicting incentives about the underpricing of an IPO. On one side underpricing lowers the risk of undersubscription and decreases the costs and efforts put into the marketing of an IPO. On the other side underpricing lowers the fee the underwriter receives over the gross proceeds of an IPO. In Baron (1982) a model is presented, which determines the underwriting activities required by an issuing company when the underwriter possesses superior information. The activities performed by the underwriter are advice on the offering price and the distribution of shares to investors. If asymmetric information exists between the underwriter and the issuing company, it is in the interest of the issuer to use the distribution activities of the underwriter due to the superior information of the underwriter. However, the issuer is not able to observe the effort the underwriter puts into the distribution of the shares, which may cause the effort of the underwriter to be suboptimal. To increase the efforts of the underwriter the issuer can compensate the underwriter by delegating him the offer price decision and letting the underwriter share in the gains. In this case the optimal offer price is still below the first-best offer price resulting in the underpricing of IPOs.

The superior information of underwriters would not result in underpricing if the underwriter is also the issuer. In a study by Muscarella and Vetsuypens (1989a) on self-underwritten IPO by banks underpricing was not significantly lower, which was perceived as a falsification of the principal-agent model.

Information Revelation

In the signaling models the issuer had an information advantage on investors. This may be true with respect to company specific information, but institutional investors may possess superior information about market developments, other forthcoming IPOs and certainly their demand for the IPO. Here an important function is reserved for the underwriter to retrieve as much information as possible from the company but more important from the investors before setting an offer price.

The underwriter has to create incentives for investors to provide the required information. Beneviste and Spindt (1989) show that the book-building mechanism has the characteristics to deliver these incentives. In the book-building process investors provide information about the quantity they demand at different prices. The underwriter has to make sure that the information about the demand of investors is truthful. This is arranged through punishing the investors with unfavorable information and subsequently allocating them little or no shares. Investors with favorable information about the IPO will however be rewarded with a large allocation. Underpricing ensures the underwriter that investors will be truthful in their information revelation.

Underwriters and institutional investors face each other not on one occasion, but will be involved in future IPOs. So the investors have to bare in mind the consequences for future IPOs if they decide to misrepresent their information. Underwriters involved in many IPOs therefore have a strong position to receive the truthful information at a low cost. This is in line with the evidence about the certification role of underwriters.

Cornelli and Goldreich (2001) have direct information about the allocations of one investment bank. They examine 39 IPOs and find that the investment banker awards a favorable allocation to investors who provide information in their bids. Investors who regularly invest in offerings are also provided with favorable allocations in highly oversubscribed IPOs.

In Ljungqvist and Wilhelm (2002) similar evidence is provided for 1032 IPOs in 37 countries between 1990 and 2000. They show that the share allocations to institutions are almost double to those received by retail investors.

2.3.2 Institutional incentives

Besides the possible interference of political institutions two theories will be discussed, in which institutional parties can create underpricing. The first is the threat to underwriters, auditors and the issuers to be sued by the new shareholders about poor performance. Second, in some countries the underwriters enter into a contract, where the underwriter is obligated to support the price when it falls below a certain level say the introduction price.

Legal liability

All over the world but certainly in the US there exists a plausible possibility that the issuer and the involved agents of a highly overpriced IPO can face future litigation. Hughes and Thakor (1992) indicate that this risk could be a reason for the underwriter to underprice its issues to protect for future litigation. A lawsuit will harm the reputation of the issuer, the underwriter and other agents involved. Also the cost of capital of the issuer for future capital issues can increase.

Lowry and Shu (2000) provide evidence that in the US almost 6 % of the companies going public between 1988 and 1995 were sued for violations regarding the IPO. Drake and Vetsuypens (1993) claim that underpricing does not effect the probability of future litigation. Also Alexander (1993) expresses criticism on the litigation theory concluding that underpricing would be an ineffective way to insure against legal liability.

Another problem for the litigation theory is that where the possibility of future lawsuits is very real in the US for other countries this may not be the case. However the IPOs in other countries also experience underpricing.

Price support

The first theory on price support as an explanation of underpricing was presented by Ruud (1991,1993), who investigated the distribution of IRs. The distribution had a peak around 0% and was highly positive skewed with a small portion of negative observations. The explanation for this distribution could be that the negative returns were eliminated through price support and therefore automatically and incidently introduced underpricing.

Schultz and Zaman (1994) indicate that because investors who place a non-binding order in an IPO have the right to renege, they automatically 'buy' a put option to sell back the stock. Underwriters want to be compensated for this obligated service, but by law have a maximum of 10% to 15% commissions. To minimize the value of the put option the underwriter wants to lower the exercise price of the option, which can be achieved by the promise to support the price in the after market and underprice the issue.

Asquith et al. (1998) and Prabhala and Puri (1999) did not concur with the explanation and evidence of Ruud (1991, 1993) and provided evidence that the supporting activities of an underwriter can only account for some part of the underpricing.

2.3.3 Ownership and Control

After an IPO the ownership and control of a company dramatically changes, which alters and possibly increases agency problems described by Jensen and Meckling (1976). These agency costs

are certainly relevant in the case of a small company raising a large amount of capital. There are two opposing theories on the influence of agency costs on underpricing: a reduction in agency costs and a way to keep control

Reducing agency costs

The starting point of this theory is that agency costs are ultimately borne by the managers, because by not being transparent the value of shares is lower and therefore the value of the company. To increase transparency Stoughton and Zechner (1998) suggest that a large shareholder can add value through performed monitoring. For the institutional investor the monitoring activities are costly, so investors have to be seduced to perform them. An incentive for an investor to become a large shareholder and perform monitoring can be the underpricing of the issue.

Keep control

Brennan and Franks (1997) suggest that managers and directors of a company that enter into an IPO want to keep control by ensuring a diverse shareholder base. This decreases the possibility of an investor acquiring a significant stake and start monitoring the activities of management. Shareholder dispersion can be accomplished by underpricing the IPO, which ensures a large oversubscription of the IPO. The oversubscription necessitates a rationing process where the shares need to be allocated. The allocation of the shares creates the opportunity to discriminate between investors of different sizes. Besides the advantage for management of low monitoring activities it also reduces the chance of a possible hostile takeover.

To support their explanation Brennan and Franks (1997) provide evidence of smaller block holdings after IPO with high levels of underpricing. Habib and Ljungqvist (2001) however find that companies do not underprice beyond what would be optimal. This rules out the possibility of underpricing as a mechanism to safeguard private benefits of control.

2.4 Long-term underperformance

As mentioned above on the first trading day of an IPO there exists an IR. If we assume that markets are efficient, the price established at the end of the first trading day should contain all available information of an IPO company. The stockprice development after the first trading day should therefore show no abnormal returns, positive or negative.

However in long-term studies on performance of IPOs there occurs a poor result in the years after the first trading day of the IPO. The stock performance of IPOs on average is lower than

the performance of a relevant index or a portfolio of comparable companies. The number of years the underperformance persists can differ depending on the sample period and country.

In this section the literature on the underperformance anomaly will be presented starting with the international evidence on the long-term performance of IPOs followed by the possible explanations.

2.4.1 International evidence

Ritter (1991) provided the first documentation on the long-run underperformance of IPOs. The study provides evidence of the underperformance of 1,526 companies going public in the US from 1975 to 1984. These companies returned 34.7% over a 3 year holding period, which is significantly lower than 61.9% return on a portfolio consisting of companies matched by size and industry. The studies of Levis (1993), Arosio, Giudici, and Pealri (2001) provide evidence of similar underperformance for respectively the UK and Italy. In studies of Stehle, Egbert and Przyborovsky (2000) and Drobetz, Kammerman, Walchi (2005) the German and Swiss underperformance respectively seems to be less profound. In Germany the underperformance is only 6.0% and in Switzerland 7.5% over a period of 3 years.

In Gompers and Lerner (2003) evidence is presented on the underperformance of IPOs in a large out-of-sample test period from 1935 to 1972. The results are not conclusive, because they vary when different methodologies are applied. The measurement problem is one of the difficulties surrounding long term performance studies and will be discussed below.

Louhgran and Ritter (1995) provide evidence that also SEOs show long-term underperformance in both three and five year periods. The evidence is supported by Levis (1995) for SEOs in the UK showing similar underperformance. This evidence is remarkable at least, because the stock is not unknown as in the case of an IPO.

2.4.2. Explanations

The explanations for the underperformance anomaly are far from conclusive. The existing research can be divided into three main categories trying to explain the phenomenon. The first is to link the underperformance to the underpricing anomaly with the purpose to create an equilibrium model, which explains both at the same time. The second relies on the irrational behavior of investors and suggests an explanation based on behavioural finance. The third as mentioned above is the problem how to measure the long-run performance in general and specifically for IPOs. The problem of correctly measuring risk and return remains until now a challenge.

Existing underpricing theories

The theories discussed in the section on underpricing have been trying to come up with an answer for the existence of long-term underperformance. From the signaling theories of Grinblatt and Hwang (1989), Welch (1989) and Allen and Faulhaber (1989) long-term outperformance should be expected, because IPOs underprice to signal their quality and redeem these costs when they return for following financing rounds. As documented by Ritter (1991) for stockprices and by Jain and Kini (1994) for operating performance, companies that underprice do not show superior long-term underperformance. It could be that only high quality companies outperform in the long-term, this is however hard to test and until now there has been little supportive evidence in this direction.

Other theories that have a hard time to include the existence of long-term underperformance are the information revelation, legal liability and agency theories.

The theory on price support by Ruud (1991, 1993) could be an explanation for both underpricing and long-term underperformance. If the price of companies is supported in the direct after-market we start off from the wrong point when measuring the performance of IPOs. The price is artificially high, which can result in long-term underperformance if this is the case for a reasonable amount of companies. Once the support is withdrawn a price reaction will adjust to the real market price.

Direct evidence is difficult because information on which companies have been supported does not exist when price support was terminated. Procedures used by Ellis *et al.* (2000), Beneviste *et al.* (1998) and Asquith *et al.* (1998) could provide a proper identification of supported issues and may shed light on the connection between long-term performance and price support.

The existing theories do not provide good explanations besides maybe the price support theory.

Behavioural science

One of the behavioural explanations for the underperformance of IPOs is proposed in a model by Miller (1977). The uncertainty about a stock price, which Miller calls the divergence of opinion, is the greatest when a new stock is issued. His model assumes that the prevailing market price for an IPO will be higher than the mean estimation of potential investors. The most optimistic investors with higher than average estimations will purchase the available number of shares in the direct aftermarket. Due to the lack of short selling possibilities, no strategy can be employed to profit from this situation. If in the years after an IPO the uncertainty decreases, the stock price will also fall even without a change in the average estimation.

An empirical implication of Miller's model is that the long-term performance should be negatively related to the divergence of opinion. This implication is tested by Krigman *et al.* (1999), Aggarwal and Conroy (2000) and Hogue *et al.* (2000), who all find support for Miller's divergence of opinion model.

Measurement problems

The last explanation of underperformance is that the excess return is not measured properly. The underperformance of IPOs is examined over a long horizon, which introduces the statistical difficulties of non-normality and cross-sectional dependence of abnormal returns as presented by Barber and Lyon (1997) and Kothari and Warner (1997). To overcome these problems Lyon, Barber and Tsai (1999) suggest the use of carefully selected benchmark portfolios and a skewness adjusted t-statistic. Brav (2000) addresses these difficulties with specific attention for the long run performance measurement of IPOs, because IPO events are not uncorrelated across firms as assumed by Lyon, Barber, and Tsai (1999).

2.5 Venture capital

In this section the activities and the certification function of VCs will be investigated. In the first part the activities of VCs will be described with attention for their investment strategy. The second part the evidence from the literature will be presented for the certification theory.

2.5.1 Venture capital activities

Venture capital and private equity are frequently used interchangeably. This thesis focuses on VCs, who are predominantly involved in the financing of start up and growth companies. Private equity firms focus on (leveraged) buyout transactions. In these transactions private equity firms invest in more mature companies and try to increase their profitability with the intention to resell the company.

Gompers and Lerner (1999) describe that VCs raise funds from institutional investors with the purpose to invest in companies with high growth potential. Institutional investors lack the industry knowledge and time needed for such small and specific investments. For all investments in a company there are four important factors that determine the decision to invest: uncertainty, asymmetric information, nature of the assets of a company and the market conditions.

The problem of uncertainty arises due to the dispersion of future cash flows generated by the companies, which makes predictions harder for investors. Second, asymmetric information exists because the entrepreneur is active in the daily management of the company and therefore possesses inside information not available to outside investors. The entrepreneur may take

adverse actions in his own best interest, but harmful for the company and investors. Third, the assets of a company can be used as collateral in case of financial distress. Tangible assets can be sold in cases of financial distress; however intangible assets are much harder to value and are of limited use as collateral. Finally market conditions are different for most industries and even for comparable companies. In developing markets conditions can very rapidly shift and innovations can cause dramatic changes in competitive advantages.

For companies with high uncertainty, asymmetric information, a large portion of intangible assets and active in developing and dynamic markets raising capital can be very challenging and costly. These companies are of interest for VCs, because despite the risks they can deliver extreme returns if circumstances turn out favorable.

VCs have been able to select from the large amount of investment propositions the most promising ones. In this selection process VCs analyze the business model and review the capabilities of the entrepreneurs to take the venture into the next life cycle. When the VCs have invested they face the problems considered in the agency theory of Jensen and Meckling (1976) demonstrating that conflicts of interest can arise between entrepreneurs and the other stakeholders. To mitigate these agency problems VCs employ several mechanisms as described by Gompers and Lerner (1999): active monitoring, the staging of the investment and proper syndication of the investment.

First, VCs will use their specific industry and sector knowledge to monitor the management activities and provide advice on strategic decisions. Most of the times the VCs demand a member on the board of directors for the monitoring and strategic activities. Also several times a year the VCs will visit the management of their investment for an update on the current situation.

Second, investments are typically executed in several stages as a way to control the management of the company. The use of staged financing creates the opportunity for venture capitalists to reevaluate the company's viability and abandon the investment if the net present value becomes negative. Through staged financing agency conflicts are avoided because the entrepreneurs have a stronger incentive to create value than if all the capital was provided at once. The frequency and number of investment stages depend on the level of agency problems a VC will encounter. Third, a VC who is lead investor will try to syndicate the investment among other VCs for several reasons. The business proposition is analysed by the VCs or a specialist hired by the lead investor. The advantage of other co-investors is that they or their specialists act as a kind of second opinion. The co-investment of other VCs will assure the rationale of the deal. Another reason is the limited amount of funds a VC can invest in one venture.

Since the 90s most venture capital funds are structured as limited partnerships. In this form the investors are limited partners and cannot participate in day-to-day management if they want to

retain limited liability. Another feature of a limited partnership is its life span of ten to twelve years. After this period the fund by contract will be liquidated assuring that underperforming portfolio companies are abandoned. Therefore VCs will use the first years to make the investments and in the following years support the ventures in their growth, but the most important moment in the venture capital cycle is the exit of portfolio companies. The exit is the moment when the return on the investment is realized. So successful exits are required for the attractive returns of VCs and their investors. In Gladstone (1989) six ways to exit an investment are described for VC. First, the sale of the company's shares through an IPO. Second, sell the company to a strategic buyer. Third, sell the company to a financial buyer. Fourth, repurchase of the shares by the company. Fifth, reorganization of the company. Sixth, liquidation of the company. In this thesis the first exit option, the IPO, is of interest.

One theory in the literature considering the effects of venture capital involvement in IPOs is the certification theory, which will be discussed below. VCs are perceived to certify that their portfolio companies are the most promising ones.

2.5.1 Certification theory

Several advantages are associated with the involvement of VCs during IPOs. First, venture capitalists can smoothly access top-tier investment banks and possess more experience with the IPO process. Second, venture capitalists frequently remain actively involved in the board of directors after an IPO. These monitoring activities are valuable to reduce the agency problems known to negatively affect public companies. Third, before VCs decide to enter into an IPO with one of their portfolio companies they will ensure that the current management is qualified for the next phase in its life cycle. The management should possess the capabilities to control the expansion of the company, which in turn should secure a good performance in the years to come.

If venture-backed IPOs have indeed advantages over nonventure-backed companies, the market should include such expectations in a less underpriced offering price. Barry, Muscarella, Peavy, and Vetsuypens (1990) recognize the advantages of VCs in an IPO and provide evidence on which roles fulfilled by VCs have an impact on the level of underpricing. Megginson and Weiss (1991) present evidence of the certifying role of venture capital resulting in lower underpricing of venture-backed IPOs in the US market. Lin (1996) provides further evidence on the intuition that a larger shareholding by a VCs results in a lower level of underpricing.

Asymmetric information between the insiders of the issuing company and outside investors provides a valuable position for VCs involved in the company. Through their involvement the VCs can certify that the offering price reflects all relevant private information. However for third

party certification to be credible three checks should be met as described by Sahlman (1990). First, the reputation of the certifying agent should be harmed if a certified fair issue proved to be overvalued. Second, the largest possible one-time gain by certifying falsely should be smaller than the reputational capital of the agent. Third, the certifying agent's reputational capital should be costly for the issuing firm to acquire. Sahlman shows that the above checks are met for VCs, because firstly they often use the capital markets for issuing shares and therefore have a strong incentive to retain access to the capital markets on favorable terms. Secondly, assuring themselves of a favorable access to the capital markets makes them attractive for entrepreneurs and provides a continuing deal flow. Finally, a solid reputation is of essence for their relation with institutional investors and pension funds, who are vitally important as investors in their funds and as purchasers of issued shares.

The active involvement of VCs shows similarities with large stockholders, however VCs try to add value through ongoing longer-term activities with continuing business development. The activities of VCs vary from management participation and recruitment of key employees to production assistance, lining up suppliers and develop customer relations. The involvement of venture capitalists expertise can send an important signal at the time of an IPO.

Besides the evidence for the certification role of VCs on the level of underpricing there also exists evidence for superior long-term performance of venture-backed IPOs. Brav and Gompers (1997) find that venture-backed IPOs outperform nonventure-backed IPOs from 1972 until 1992, however the result exists only if the IPOs are equally weighted. An explanation for the underperformance could be that individuals hold a larger fraction of the shares after an IPO for nonventure-backed companies. Other explanations for a better long run performance of venture-backed IPOs are a greater availability of information and higher institutional shareholdings.

3. Data and Methodology

In this chapter the data and methodology for the empirical research will be discussed. In the first section the data sample will be presented which starts with the sample selection and then some descriptive statistics. The second section will elaborate on the applied methodology for both the short- and the long-term research. The final section will present some background information on the various variables used in the research.

3.1 Data sample

To provide a proper understanding of the data sample this section will first explain the selection process of the IPOs and the determination of the venture capital-backed (VCB) IPOs. Second, the descriptive statistics of the data sample will be presented providing insights for the empirical research.

3.1.1 Sample selection

The sample of IPOs for this thesis is hand collected from several data sources. The first set of IPOs is retrieved from several financial databases: Thomson One Banker, Datastream and Dealogic. This selection is compared to a list of IPOs provided by the Nederlandse Vereniging voor Participatiemaatschappijen (NVP), which is a member of the European Private Equity & Venture Capital Association (EVCA). Another check for missing IPOs is performed on basis of the sample of 55 IPOs used in Klaassen & von Eije (2007). The sample resulting from these sources contains 101 IPOs on the Amsterdam Stock Exchange for the period from 1994 until 2007.

For these 101 IPOs the prospectuses filed before the IPOs are collected through Thomson Research, Company Info and the website of Euronext. A prospectus is a document provided by the underwriter to inform investors about the company and the offering. If the prospectus of an IPO was not available on Thomson Research, Company Info or Euronext the company was contacted for a copy of the prospectus.

To be sure the sample consists only of regular IPOs three selection criteria are employed:

1. The offering should not contain concurrent debt or attached warrants to avoid complex valuations and problems measuring the IR correctly.
2. The offering should be the first issue of common shares of a company. This excludes companies which are prior to the issue listed on another stock exchange. Also companies that offer shares on two or more exchanges simultaneously, with the Amsterdam Stock Exchange not being their primary market, are excluded.
3. Financial institutions and real estate holding companies are excluded, because they have deviating balance sheets and income statements.
4. Only IPOs using the book-building or fixed price method are included. In the Netherlands claim and tender introduction methods have been used besides the book-building and fixed price. In such introductions there exists a pre market, which influences the IR on the first trading day. Therefore these introductions are excluded from the data sample.

After imposing the selection criteria 24 IPOs are excluded, which resulted in a final sample of 77 IPOs for the empirical research.

To determine if an issue is VCB the prospectus is checked for the presence of one or more VCs among the shareholders. For 32 companies a capital partner existed among the shareholder prior to the IPO. However not all the capital partners can be defined as start up and growth investors as the VCs investigated in this research. Further research of the specific investment strategies of the capital partners excluded 13 IPOs for several reasons. Some of the capital partners proved to be buyout specialists and others were later stage VCs who differ from the start-up VCs intended in this thesis. The final selection of VCB IPOs consists of 19 IPOs.

Besides the participation of VCs, information on the offering and the company is collected from the prospectuses. The offering data consists of the introduction price, lead underwriter, introduction method, number of shares issued and the gross proceeds. The information on the company consists of the following financials: revenue, earnings before interest and taxes (EBIT), net profit, assets and depreciation and amortization (DA). These financials are filed in the fiscal year before the offering. Some of the financials and introduction prices are stated in guilders or local currencies. These figures are converted into euros with the corresponding exchange rates⁴. Stock prices for all IPO companies as well as the benchmark return of the AEX index are retrieved from Datastream for the tests on the long-term performance.

3.1.2 Descriptive Statistics

In this part the statistics of the data sample are described providing an overview of the differences that are of interest to this thesis. First we will examine the statistics of the three subsamples consisting of the 19 IPOs with venture capital backing (VCB), the 13 IPOs where a capital partner (CP) participated and the 44 IPOs with no involvement of a capital partner (NCP), which are presented in Table 3.

The average introduction price of VCB IPOs is €12,56, which is €4,66 lower than the average for CP IPOs and €3,28 lower than NCP IPOs. The medians show a smaller difference for all three subsamples.

The average and median amount offered in VCB IPOs is smaller compared to and CP IPOs and NCP IPOs. Also the net proceeds, which is the number of new shares offered by the company multiplied by the introduction price, of VCB IPOs are smaller compared to the other two samples.

⁴ www.oanda.com is used to retrieve the corresponding exchange rates

Table 3
Means of the characteristics of venture capital backed, capital partner and no capital partner IPOs⁵

	Venture Capital	Capital Partner	No Capital Partner
Number of IPOs	19	13	44
<i>Offering Statistics</i>			
Introduction Price	€ 12,56 (12,71)	€ 17,22 (14,07)	€ 15,84 (14,07)
Amount offered (mln)	€ 74,7 (39,2)	€ 339,6 (65,1)	€ 286,2 (104,1)
Net proceeds (mln)	€ 30,0 (0,6)	€ 210,7 (43,1)	€ 38,8 (5,7)
Companies issuing new shares	15 78,9%	13 100,0%	28 63,6%
Abn Amro	5 26,3%	7 53,8%	15 34,1%
Bookbuilding	12 63,2%	9 69,2%	31 70,5%
<i>Company Statistics</i>			
Sales	€ 32,6 (19,7)	€ 411,7 (179,0)	€ 552,4 (67,6)
Net profit	-€ 2,1 (0,9)	€ 2,1 (6,7)	€ 30,4 (2,9)
Assets	€ 57,3 (21,1)	€ 297,8 (150,4)	€ 540,2 (76,7)

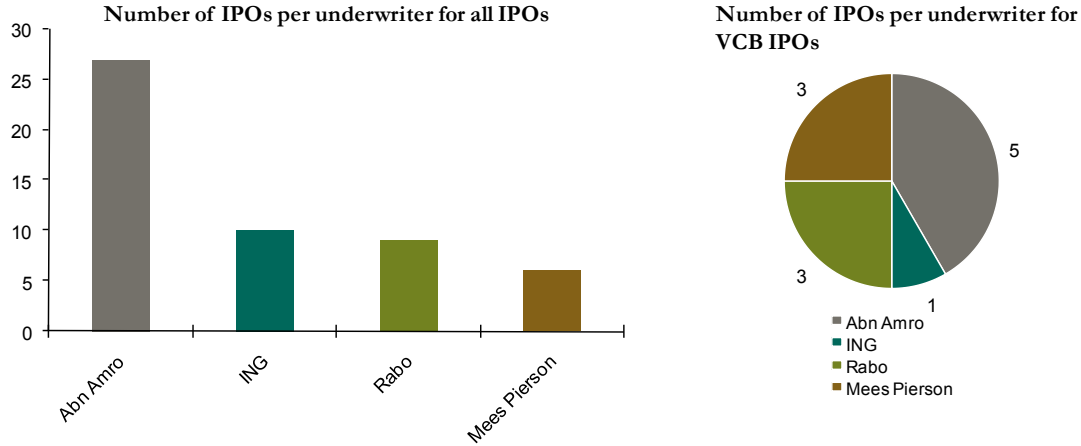
Table 3 also shows that not all companies issue new shares in an IPO. 15 out of 19 VCB companies issue new shares, which is less than CP IPOs where all 13 companies issue new shares.

Figure 1 provides an overview of the number of offerings supported by the 4 largest underwriters for the whole sample. Abn Amro has been involved in 27 of all 76 IPOs over the sample period, which is considerably more than the other underwriters. In the attached pie chart the number of offerings for the same underwriters is provided for the VCB subsample. ING has not been very active in VCB IPOs, where still the largest percentage is supported by Abn Amro. For the CP and NCP IPOs this percentage is even higher with respectively 53,8% and 34,1%.

⁵ Medians in brackets

Figure 1

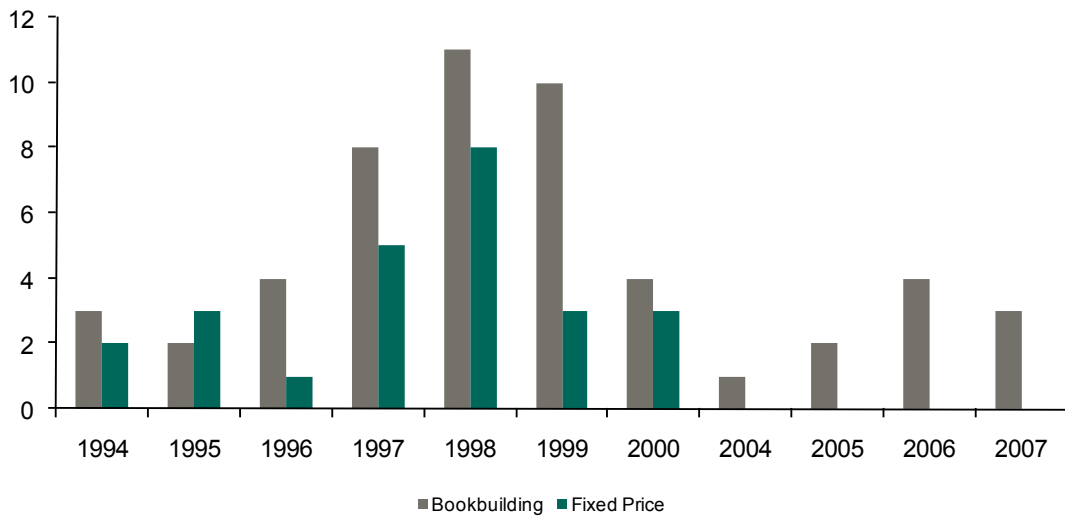
Number of IPOs supported by largest underwriters for all IPOs and venture capital backed IPOs



The book-building method has become the preferred introduction method in the recent years and as shown in Table 3 is used in 52 out of the total 76 IPOs. In Figure 2 the evolution of the introduction methods is shown, which indicates the decrease of fixed price introductions over the sample period.

Figure 2

Book building and fixed price IPOs per year



The average sales and total assets show smaller figures for the VCB companies and the average net income even is negative, which is characteristic for start up and growth companies. The sales and total assets figures for the CP IPOs are higher and more in line with the NCP IPOs, only the net income is substantially lower for the CP IPOs.

The averages of Table 3 are tested for differences in means between VCB and CP, VCB and NCP, and CP and NCP using a z-test for difference in means with a known variance. Table 4 reports the t-statistics showing that the introduction price of VCB IPOs is significantly lower than the introduction price of NCP IPOs. In the US low introduction prices have been associated with the introduction of small companies.

The amount offered by NCP companies is significantly larger than for the VCB companies indicating that the VCB companies are smaller than the NCP companies.

All 13 CP IPOs issue new shares, which is significantly more than the VCB and NCP IPOs.

The sales and assets of the VCB IPOs are significantly lower than both the CP and NCP IPOs supporting the evidence that the VCB companies are smaller. Also there are no significant differences between the financials of the CP and the NCP companies.

Table 4

Test of differences in the characteristics for venture capital backed, capital partner and no capital partner IPOs

Difference in means	VCB-CP	VCB-NCP	CP-NCP
<i>Offering Statistics</i>			
Introduction Price	T-stat -1,605	T-stat -2,245**	T-stat 0,460
Amount offered (mln)	-1,208	-2,473**	0,230
Net proceeds (mln)	-1,187	-0,523	1,130
Companies issuing new shares	2,191**	-1,266	-4,957**
Abn Amro	-1,552	-0,615	1,227
Bookbuilding	-0,347	-0,547	-0,081
<i>Company Statistics</i>			
Sales	-2,406**	-2,582**	-0,551
Net profit	-0,484	-1,584	-1,283
Assets	-1,939**	-2,128**	-0,946

3.2 Methodology

In this section the methodology for the empirical research will be presented. From the applied methodology the hypotheses are formulated for testing of the research questions of this thesis. First, the short-term effect will be covered in the part on underpricing and second, the long-term performance methodology is presented.

3.2.1 Underpricing

For the first set of tests the level of underpricing will be used to determine the influence of VCs. In most research the level of underpricing is measured by the initial return on the first trading day as used by Ritter (1991). The initial return is calculated as the percentage point movement from the introduction price to the first day closing price.

$$IR = \frac{(P_{Closing} - P_{Intro})}{P_{Intro}}$$

To determine the influence of VCs the IR of VCB IPOs will be compared to the NVCB IPOs. The average IR of both groups can be compared to each other as in Barry et al (1990) or the VCB IPOs can be matched to an IPO from the NVCB IPO sample as in Megginson and Weiss (1991). They match the companies by the offering amount, which is calculated by multiplying the introduction price with the number of shares issued.

Megginson and Weiss (1991) present lower IRs for VCB IPOs in line with the certification theory. However in Gompers (1996) opposing results are presented, which introduces the theory of grandstanding by VCs. To test whether the results support the certification or grandstanding theory the first hypotheses are constructed as follows: The level of underpricing is the same for VCB IPOs and NVCB IPOs. If this hypothesis is rejected the IRs differ indicating that there exists an influence of venture capital backing. This can be both a positive or negative influence depending on the difference between the two IRs.

$$H_0: IR_{VCB} = IR_{NVCB}$$

$$H_1: IR_{VCB} \neq IR_{NVCB}$$

3.2.2 Long-term underperformance

Ritter (1991) employs two methods to test the long-term performance of IPO companies, the cumulative abnormal return (CAR) and the buy-and-hold abnormal returns (BHAR). Barber and Lyon (1997) suggest the use of BHAR, because the CAR is a biased predictor of long-run BHAR.

The raw buy-and-hold return (BHR) is calculated as a geometrically compounded return on the stock as presented in the following formula:

$$BHR_{i,T} = \left[\prod_{i=2}^{\min[T, delist]} (1 + r_{it}) \right] - 1$$

Where r_{it} is the return of company i on day t and $BHR_{i,T}$ is the raw buy-and-hold return from day i till T days after the offering date. Similar to Doukas and Gonenc (2005) a three year buy-and-hold period is employed of 760 trading days. If a delisting occurs the buy-and-hold periods ends on the delisting date.

For the BHAR the BHR is adjusted with a market portfolio benchmark in this thesis the AEX total return index or small cap total return index. The benchmark returns from Datastream are subtracted from the BHRs for the BHAR as follows:

$$BHAR_{i,T} = \left[\prod_{i=2}^{\min[T, delist]} (1 + r_{it}) - \prod_{i=2}^{\min[T, delist]} (1 + r_{benchmark,t}) \right]$$

In Brav and Gompers (1997) and Doukas and Gonenc (2005) VCB IPOs outperform non-VCB IPOs in all periods based on BHR and BHAR. To test if the same holds for the IPOs listed on the Amsterdam Stock Exchange the following hypotheses are tested:

$$H_0: BHAR_{VCB} = BHAR_{non-VCB}$$

$$H_1: BHAR_{VCB} > BHAR_{non-VCB}$$

3.3 Variables

The dependent variables, IR and BHAR, described above in the methodology are tested for the influence of venture capital backing by a dummy variable. This dummy variable has a value 1 for VCB IPOs and 0 for non-VCB IPOs.

To check whether the results of venture capital involvement do not depend on other factors the following control variables are used: the underwriter (UW), the amount offered (AMOUNT), the issuing of new shares (NEWSHR), the introduction method (METHOD), the size of the company (SIZE) and activity in the technology sector (TECH).

Carter and Manaster (1990) present a model to test the association of underwriter prestige with the marketing of low risk IPOs. The underwriters have reputation capital at stake, because an underwriter will forfeit the value of its reputational capital if it underprices too much or too little. The underwriter involved in an IPO can therefore perform a signaling function similar to VCs about the level of underpricing.. Loughran and Ritter (2004) presented opposing results for the period of the internet bubble in the late '90s, where prestigious underwriters had high underpricing. An explanation for the reversed conditions can be that more speculative companies choose prestigious underwriters using their reputational capital to enter the capital markets on favorable terms. In the Dutch IPO market Abn Amro is the most reputable underwriter. The dummy variable has a value of 1 for Abn Amro and a value 0 for other underwriters.

For the size of the offering the natural log of the amount offered is used, which is calculated by multiplication of the number of shares offered with the introduction price. Ritter (1984) has provided evidence for the empirical relationship between smaller offerings and more speculative issuers. The descriptive statistics showed that the offering amount is smaller for VCB companies. When a company issues no new shares in an offering the amount of capital raised flows to the existing shareholders. Gladstone (1989) claims that VCs use the IPO as an immediate exit strategy. This will increase the level of uncertainty of an offering and subsequent the IR. A dummy variable tests for the issue of new shares, returning a value 1 if new shares are issued and 0 if only existing shares are replaced.

A characteristic for the Dutch IPO market is its variety of offering methods. The level of ex ante uncertainty can differ per introduction method and therefore different levels of underpricing can be expected as presented in evidence on firm commitment and best effort offerings by Chalk and Peavy (1987). The introduction methods in the Netherlands are different from those in the U.S., but there also exists a difference in ex-ante uncertainty. Fixed price offerings experience the most uncertainty about the market value of a company, because the shares are offered at a predetermined price without the information from investors. In book-building information is provided by investors on the amount of shares they are interested in. A lower uncertainty is expected for book-building introductions. A dummy variable is constructed returning a value 1 for bookbuilding introduction and 0 for fixed price.

The size of a company is connected to the maturity and reputation of a specific company. Most of the times large corporations operate in mature markets in contrast to small companies with high growth possibilities, which are accompanied with more uncertainty. The size effect was originally documented by Banz (1981) and Reinganum (1981), which presented evidence of abnormal returns for small companies. The size of a company is measured by the natural log of its assets in the year prior to the IPO. A negative effect on the level of uncertainty is expected for the size of a company.

The IPOs of riskier companies can be underpriced more than less-risky companies as suggested in the changing risk composition hypothesis by Ritter (1984). Risk can be reflected in technological uncertainty, because the technology sector is a very innovative and rapidly evolving industry. For companies active in the technology sector the dummy variable has a value 1 and for the other sectors a value 0.

4. Empirical results

In this chapter the results of the empirical research are presented. The chapter is divided into three sections, the first section is devoted to the results on the underpricing of the VCB, CP and NCP companies. In the second section the results are presented for the difference in long-term performance of the VCB, CP and NCP companies. In the two sections first the means and difference in means are presented followed by the results of a univariate and multivariate OLS-regression.

4.1 Underpricing

In Table 5 the mean IRs are presented for the three subsamples and the t-statistics from a test for differences between the means of the three subsamples. The mean IR of VCB IPOs is on average 10,2 % lower than the mean IR of NCP IPOs and 14,6% lower than the mean IR of CP IPOs. This difference between the mean IR of VCB IPOs and NCP IPOs is significant and supports the certification hypothesis of lower IRs for VCB IPOs. The mean IR of CP IPOs is on average 4,4 % higher than the mean IR of NCP IPOs, but this difference in mean is not significant. On average 68,4% of the VCB companies experience positive returns on the first trading day, which is lower than the CP and NCP companies with respectively 76,9% and 79,5%.

Table 5

Test of difference in mean initial returns for venture capital backed, capital partner and non-capital partner IPOs⁶

	Venture Capital	Capital Partner	No Capital Partner
Number of companies	19	13	44
Mean initial return	8,3% (3,5%)	22,9% (4,5%)	18,5% (5,5%)
% of IPOs with positive IR	68,4%	76,9%	79,5%
Difference in means	VCB-CP	VCB-NCP	CP-NCP
T-stat	-1,218	-1,679**	0,356

** Significant at 5% level

These results are opposite to the results for the IRs presented by Klaassen and von Eije (2007). They reported a higher level of underpricing for VCB IPOs, however these results were insignificant and for a different period. Another explanation for the difference could be that they implemented other criteria for venture capital involvement.

⁶ Medians in brackets

The significant difference between VCB and NCP IPOs is further analyzed through several OLS-regressions. Table 6 presents an overview of the coefficients for all control variables from univariate OLS-regressions.

Table 6

Univariate OLS-regressions of the initial returns against the control variables

	Coefficient	T-stat	R²
Venture Capital (dummy)	-0,113	-1,405	0,026
Capital Partner (dummy)	0,096	1,005	0,013
Underwriter (dummy)	-0,145	-2,023 **	0,052
Amount offered	-0,048	-2,055 **	0,054
New shares issued (dummy)	0,117	1,487	0,029
Introduction method (dummy)	-0,222	-3,109 **	0,116
Company size	-0,043	-2,577 **	0,082
Technology (dummy)	0,076	1,090	0,016

** Significant at 5% level

The coefficient of venture capital involvement is equal to the difference in means presented in Table 5, but is no longer significant at the 5% level. The involvement of Abn Amro in an IPO significantly reduces the level of underpricing. This is in line with the findings of Carter and Manaster (1990) mentioned above. The negative coefficient for the amount offered shows that large offerings are significantly less underpriced. IPOs introduced with the book-building method have a significant lower underpricing. As expected small companies experience a significant higher level of underpricing represented by the negative coefficient for the company size.

In Table 7 the results are presented for the multivariate OLS-regression on all significant control variables and the VC dummy. The formula for the multivariate OLS-regression is defined as:

$$IR = c_1 + c_2 VC + c_3 UW + c_4 AMOUNT + c_5 METHOD + c_6 SIZE$$

Table 7

Multivariate OLS-regression of initial returns against control variables⁷

Regression	c₂	c₃	c₄	c₅	c₆	R²adj
(1)	-0,13	-0,16				0,063
	-(1,680)**	-(2,222)**				
(2)	-0,17	-0,13	-0,05			0,109
	-(2,151)**	-(1,900)**	-(2,200)**			
(3)	-0,16	-0,13	-0,03	-0,18		0,167
	-(2,148)**	-(1,908)**	-(1,135)	-(2,453)**		
(4)	-0,20	-0,11	0,02	-0,19	-0,05	0,205
	-(2,612)**	-(1,668)**	(0,655)	-(2,596)**	-(2,083)**	

** Significant at 5% level

⁷ T-statistics in brackets

This shows that the coefficient of venture capital involvement is negative and significant indicating that the activities of VCs lowers the IRs. Besides the effect of venture capital involvement the reputation of the underwriter, the introduction method and the size of the company are negative and significant. The negative coefficient for the reputation of the underwriter indicates that IPOs supported by the most reputable underwriter, Abn Amro, have significant lower underpricing, which is consistent with the results of Carter and Manaster (1990). The IPOs issued using the book-building experience significant lower underpricing than fixed price IPOs confirming the lower level of uncertainty of book-building introductions. Larger companies experience significant lower underpricing consistent with the expectation of a lower uncertainty for larger companies. In regression (1) the combined effect of the involvement of VCs and reputable underwriters both show negative and significant coefficients. Chemmanur and Loutskina (2006) indicate that this can be caused by the market power of repeated market players in the IPO process.

4.2 Long-term underperformance

For further investigation of the certification function of VCs the long-term performance of all IPOs is tested. Table 8 provides the results of the raw BHR and the BHAR for the three subsamples.

Table 8

Test of difference in mean buy-and-hold abnormal returns for venture capital, capital partner and no capital partner IPOs⁸

	Venture Capital	Capital Partner	No Capital Partner
Number of companies	19	13	44
Mean raw BHR	19,6%	-18,1%	14,5%
	-(31,1%)	-(11,8%)	-(40,6%)
Mean BHAR	6,3%	-31,8%	-25,5%
	-(25,8%)	-(24,5%)	-(58,4%)
% IPOs with BHR>0	26,3%	38,5%	36,4%
% IPOs with BHAR>0	31,6%	23,1%	31,8%
Difference in means	VCB-CP	VCB-NCP	CP-NCP
BHR T-stat	0,682	0,092	-1,126
BHAR T-stat	0,795	0,658	-0,237

** Significant at 5% level

Over the three year holding period the VCB and NCP IPOs show a positive BHR of respectively 19,6% and 14,5%. The BHR of the CP IPOs shows a negative performance of -18,1%. However, the median BHR of the three subsamples are all negative.

⁸ Medians in brackets

The mean BHAR of the VCB companies is 6,3% and the only positive of the three subsamples. The BHAR for the CP and NCP companies are respectively -31,8% and 25,5% supporting the results presented by Ritter (1991) on the underperformance of IPOs. The positive BHAR of the VCB companies may indicate an outperformance of the other IPOs. A z-test for differences in means of the three subsamples, however, shows no significant difference between the BHAR of the VCB and NCP IPOs. The median BHAR are, similar to the median BHR, all negative. For further analysis of the long-term performance the BHARs are tested in OLS-regressions for possible significant differences between the subsamples. In Table 9 the results are presented of the univariate OLS-regressions.

Table 9

Univariate OLS-regressions of buy-and-hold abnormal returns against controls variables

	Coefficient	T-stat	R²
Venture Capital (dummy)	0,3313	0,901	0,011
Capital Partner (dummy)	-0,1803	-0,410	0,002
Underwriter (dummy)	0,4151	1,251	0,021
Amount offered	-0,0128	-0,118	0,000
New shares issued (dummy)	0,1698	0,467	0,003
Introduction method (dummy)	-0,3394	-0,990	0,013
Company size	-0,0535	-0,684	0,006
Technology (dummy)	0,5622	1,787**	0,041

** Significant at 5% level

The coefficient of the venture capital dummy is positive as expected, but this result is not significant. Only the positive coefficient of the technology dummy is significant suggesting that the performance of companies active in the technology sector is higher. In a multivariate regression on the control variables the significant result of the technology dummy disappears.

5. Conclusions

The results presented in this thesis support the evidence for significant lower underpricing of VCB IPOs suggested in the certification theory of Megginson and Weiss (1991). The IR of VCB IPOs is 8,3% and the IR for NCP IPOs is 18,5%, a significant difference of 10,2%.

These results are partly opposite to the 2% higher underpricing for VCB IPOs presented in the research of Klaassen and von Eije (2007). In my opinion these opposite results can be explained by a difference in the datasamples. Klaassen and von Eije (2007) included several IPOs, which do not meet the selection criteria of this research. Also another definition of venture capital backing is applied in their research resulting in a different sample of VCB IPOs.

No significant results are found for VCB IPOs outperforming NCP IPOs in this research to further support the certification of VCs. A possible explanation can be the large amount of VCB IPOs from 1997 till 1999, for which the long term performance is affected by the dotcom bubble. As mentioned in section 4.1 the significant results in the regression on the combined effect of the involvement of VCs and the reputable underwriter could be a sign of potential abuse of their market power. The research of Chemmanur and Loutskina (2006) presents possible research methods to test for the market power of VCs and other reputable market participants. Although this is beyond the scope of this thesis it is an interesting topic for further research.

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