IPO determinants of European VC funded companies

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Department of Finance

School of Economics and Management

Tilburg University

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Author: A.R. Lamé (s886363)

Supervisor: Dr. M. Da Rin

Title page

Title   : IPO determinants of European VC funded companies

Name   : A.R. Lamé

ANR   : s886363

Year of graduation   : February 2012

Department   : Department of Finance

Supervisor   : Dr. M. Da Rin

Faculty   : School of Economics and Management

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1 Introduction

In today's economy, innovation is a key factor to differentiate and gain market value. Venture capital, defined as equity or equity-linked investments in young, privately held companies, where the investor is a financial intermediary who is typically active as a director, an advisor, or even a manager of the firm (Kortum and Lerner, 2000), is closely linked to supporting innovation.

Young technology companies, supported by venture capital, are particularly interesting in a macro-economic context as they develop radical technologies which may be the trigger for the development of new (economic) clusters (Porter, 1998). Because the ability to make a profitable exit lies at the heart of venture capital investing (Sahlman, 1990; Gompers and Lerner, 1999), this thesis will look at the exit strategy. In particular, this thesis will focus on IPO's, also because this is the most preferred exit since it provides the highest return to the investors (Gompers and Lerner, 2001).

First of all, there will be looked at IPO's made by companies that have received venture capital (VC) funding. When looking at these IPO's, there a many different factors to consider. This thesis will therefore only focus on a couple of these factors, and attempts to give clear results concerning these factors.

One factor that will be studied, is the relationship between syndication and an IPO exit. A venture capital investment is considered to be syndication if the funds for one company in one round are provided by two or more investors.

However, the main focus of this thesis will be on the difference between the Anglo-Saxon countries (the UK and Ireland) and Continental Europe, and also on the impact of the dotcom bubble.

Concerning the difference between the Anglo-Saxon and the Continental countries, there are several differences that affect the IPO market; for example a difference in ownership and control, legal system (common law vs civil law) and law enforcement.

For the dotcom bubble, that took place in the late 90s and ended in 2002, there are also several interesting features. Here, the main interest is to find evidence of an IPO explosion of internet and technology-related firms, especially in the 1999-2001 period. Also, there will be looked at the European country that experienced the largest increase in IPO's in this period, namely Germany. This is specifically interesting because Germany experienced the largest change in its venture capital market of all the European countries with the introduction of its Neuer Markt.

This thesis uses data collected from 3516 companies that received venture capital funding in either the year 1999, 2001 or 2003 and are in the following 17 European countries; Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. The data contains detailed information on the VC funded company as well as the VC itself and the exit that was made (if any took place).

This thesis is organized as follows. The next chapter will describe the different theoretical aspects that are related to the research topic. Based on these theories, the hypotheses that could give an answer to the research questions are defined in chapter 3. In chapter 4, the data collection and the data itself is explained. The statistical tests of the empirical data and their interpretations are included in Chapters 5 and 6. Finally, the last chapter contains the conclusions and implications of the results as well as limitations on the current study and recommendations for further research.

2 Theoretical framework

This section will cover the theory behind the data. To give an understanding of the specific subjects, first venture capital itself and its aspects will be described. Secondly, the importance of the exit methods will be discussed. Lastly, the theory behind different factors that have an influence in the empirical models will be described

2.1 The Concept of Venture Capital

Young firms often require substantial capital investments in order for them to initiate new projects. The firm's founder might not have access to sufficient funds in order to finance these projects and will look for outside investors to finance his projects (Gompers and Lerner, 1998; Engel and Keilbach, 2007).

These entrepreneurial firms, which can be high-technology firms, will typically be small and young with a high uncertainty level and also large difference in knowledge between the entrepreneur and the investor. Besides this, these entrepreneurial firms will have few tangible assets and will be active in very rapidly change markets. These firms will have high financial needs and high-risks involved, but will also at the same time have a high potential for growth, thus having a large profit potential (Gompers and Lerner, 1998; Engel and Keilbach, 2007).

Venture capital, which can be defined as equity or equity-linked investments in young, privately held companies, where the investor is a financial intermediary who is typically active as a director, an advisor, or even a manager of the firm (Kortum and Lerner, 2000), can be an outcome in this case. Venture capital provides capital to firms that have difficulties in attracting financing. Venture capital organizations finance firms that are characterized by having significant intangible assets, expecting years of negative earnings, and having uncertain prospects which causes them to be unlikely to receive bank loans or other debt financing (Gompers and Lerner, 1998). These venture capital organizations will finance these high-risk entrepreneurial which have possible high-profit projects by buying equity stakes in the company but the company continues to be a privately held firm. Venture capitalist will invest in these firms because they assume that innovative firms will have a great growth potential and therefore often large potential profit (Engel and Keilbach, 2007).

Venture capitalists therefore, are active investors that will monitor the progress of the firm and take seats on the boards of directors. In many cases, venture capitalist will hold an important decision

and control right which allows them to make changes in the firm's operations when they find it necessary. In addition, venture capitalist will also give management advices in order to overcome the gap in managing shortcoming in non-technical areas and they will provide access to consultants, investment bankers and lawyers.

In order to overcome the problems that emerge at each stage of the investment process, the venture capital industry has developed a variety of mechanisms like the investment process that will be discussed in the section considering the investment process (Gompers and Lerner, 1998).

2.1.1 The Investment Process of Venture Capital

In order to understand the effects of venture capital on innovation, one must look at the process in which venture capital investments take place. This process is referred to as the investment process.

Figure 1: The investment process for venture capital investors (From Dobloug, 2008)
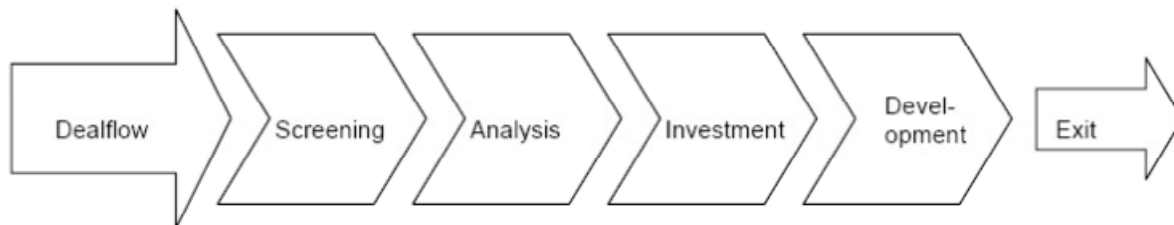
In the first section, the screening process, the first selection of possible investments occurs. This is done by looking and selecting for several criteria, of which the most important ones are: Does the business concept consist of a permanent, competitive advantage? Does it have a unique advantage? Does it have a global market and a big profit potential? (Lerner et al., 2005). In the case of high-technology firms, a competitive advantage refers to the possession of intellectual property rights and innovative abilities, which can contribute to innovation. Obviously, if the venture capitalist does not see a future potential for these competitive advantages the investment process will come to a stop at this point. In this aspect, venture capitalists differ from large and mature multinationals, which mostly look at the current business segments in their screening stage. Therefore, multinationals usually do not do financial investments in technologies that are not part of the core operations of a firm, nor to ideas which are regarded as limited, peripheral and being in direct conflict with internal, cultural opinions

(Lerner et al., 2005). A great many successful venture capital- backed start-ups have in fact been initiated by managers in large companies who have failed to get internal backing for their ideas (Lerner et al., 2005).

2.1.2 The capital demand cycle

The capital demand cycle links the particular state of development of a company to the potential private investors for that stage. There are many different stages indentified by different authors (for example Bottazzi and Da Rin, 2002 and Christofidis and Debande, 2001). These different stages can be summarized as follows;

- Seed stage: at this stage, the entrepreneur uses a limited amount of funds to prove the concept and assess the economic viability and performance of the business idea.

- Start-up stage: at this stage, the company is preparing itself to conduct business by creating an organization, exploring the market and finishing the product development.

- Early stage: at this stage, the new venture becomes operational, by producing and shipping its first products, but is not profitable yet.

- Expansion stage: at this stage, the company is fully productive and is expanding its operations to generate higher revenues.

- Later stage: at this stage, the company has a strong position in the market and generates positive cash flows but its growth may be slightly declining.

In the first stage, entrepreneurs can often finance their company with their own resources or they can gain theses from family or friends while in the later stages they rely on capital and they need private capital providers for the stages in between. To generate enough resources to finance the company is these stages, the entrepreneur can turn to either business angles, venture capitalist or banks. Business angels are private individuals who make direct investments in unlisted companies in which they have no previous connection (Mason and Harrison, 2000). However, since their capital is limited, they can only finance the early stages. Banks on the other hand do have the resources to provide capital. However, they are averse to financing innovative start-ups because of the limited liquidity and diversification of these investments (Bottazzi and Da Rin, 2002; Hellmann, 2000; Ueda, 2004).

2.1.3 Characteristics of venture capital firms

Venture capital firms are financial intermediaries who invest the funds they receive in start-ups (Bottazzi and Da Rin, 2002). Venture capital firms receive capital from a variety of sources: other financial intermediaries (banks, insurers, pension funds), corporations, governments and individuals (Christofidis and Debande, 2001). The capital that VC's receive are put in a fund that in its turn invests in the portfolio companies. These funds have a predetermined lifespan (usually ten years).

Another characteristic is that venture capitalists only invest in private companies. Other forms of private equity, such as hedge funds, also invest in public equity, whereas venture capital limits itself to less liquid, unlisted companies (Metrick, 2007). In order to safeguard their investments, venture capitalists maximize the returns on their investments by mentoring and monitoring the companies that they have invested in (Bottazzi et al., 2007).

2.2 Method of exit

An important feature of the venture capital investment is the exit. In an exit, the VC can sell its shares in the company and thereby realizing a return on its investment. The ability to make a profitable exit lies at the heart of venture capital investing (Sahlman, 1990; Gompers and Lerner, 1999). There are five principle types of VC exits (MacIntosh, 1997):

- An public offerings (IPO), where a significant portion of the firm is sold into the public market
- An Acquisition, where the entire firm is bought by a third party
- A secondary sale, in which only the VCs shares are sold to a third party
- A buyback, in which the VCs shares are repurchased by the entrepreneurial firm
- A write-off, in which the VC walks away from the investment

In an IPO, the company sells shares to members of the public for the first time. This allows the VC to sell its shares in the company. However, the VC will typically hold its shares at the IPO date, and gradually sell its shares in the period following the IPO. Another option here is that the VC may dispose of its investment by making a dividend of shares of the company to the funds owners. Despite the fact that the VC will not usually sell more than a small fraction of its shares at the time of the IPO (if any at all), exits effected by sales subsequent to the IPO are (following common usage) classified as IPO exits (Cumming & MacIntosh, 2003).

In an acquisition, the entire firm is sold to a third party. Usually the buyer is a strategic acquirer, which is a larger entity in a similar industry to the acquired firm that want to use the firm's product or technology to combine it with its own. This can be either vertically or horizontally. Strategic acquisitions often involve the merger of two corporations with some prior contractual relationship, such as in the supply of inputs or the licensing of a particular technology (MacIntosh, 1994).

The exit through an acquisition can take place in several ways. It can take place as a sale of all the shares in return for cash. Another option is that it is a sale of shares in return for shares of the acquirer. Also, it could take place in return of other assets. Alternatively, it may take the form of a merger in which the firms' assets are merged with the buying firm.

In a secondary sale, the VC will sell its shares to a third party. This could either be a strategic buyer, as in the case of an acquisition, or another VC that wants to invest in the company. The secondary sale is different from an acquisition because only the shares of the VC are sold, the shares of the entrepreneur and other investors are not affected. In the case where the purchaser is a strategic acquirer, it will often be seeking a window on the firm's technology, with a view to possibly effecting out a complete acquisition of the firm sometime in the future (Cumming & MacIntosh, 2003).

In case of a buyback exit, the VC will sell its shares to the entrepreneur and/or the company. This is usually done in the form of a buy-out.

Lastly, a write-off occurs when the VC walks away from the investment. This would typically involve the failure or bankruptcy of the entrepreneurial firm, although the VC may continue to hold shares in a non-viable or barely profitable parts of the enterprise.

The decision on which exit to take is affected by different factors. One factor is the venture capital contracts. These provide characteristics in the selected securities, control rights, veto rights, provisions for different contingencies, among other things, depending on the characteristics of the transacting parties (Cumming, 2002). The decision on the exit is also typically specified in these contracts and dictates which party has control over the exit decision.

2.2.1 Importance of IPO

Another factor is that there are incentives for the entrepreneur to allow the venture capitalist to exit as soon as possible (Schwienbacher, 2002). One incentive is the control benefits that the entrepreneur enjoys after the exit. It is argued that a well developed stock market that permits venture capitalists to exit through an IPO is critical to the existence of an active and well-performing venture capital market (Black and Gilson, 1998). The most preferred is an initial public offering because it provides the highest return to the investors (Gompers and Lerner, 2001).

As described by Schwienbacher (2002), the possibility for a VC to exit through an IPO allows him to enter into "implicit contracts" with the entrepreneur on future control of the firm, which is not possible to this extent under a trade sale. This will result in a call option for the entrepreneur on the control of the company; going public allows him to exercise this call option, while under a trade sale this control option would be transferred to the acquirer.

In addition, it is advantageous for the entrepreneur to let the venture capitalist exit in order to reduce the extensive monitoring. On the other hand, the exit of the VC also bears risks for entrepreneurs, like possibly losing control, major changes in board composition, or changes in the firm's legal status. These risks may make the entrepreneur reluctant to let the venture capitalist exit and thus affects the degree of liquidity of the investment (Schwienbacher, 2002)..

2.2.2 Syndication

In determining the likelihood of an IPO exit, there a different factors that play a role, like market conditions, that significantly increase the likelihood of an IPO exit (Cumming, 2002). IPOs are also more likely when there are a greater number of syndicated VC investors (Cumming, 2002). A venture capital investment is considered to be syndication if the funds for one company in one round are provided by two or more investors. Gompers and Lerner (1999) have shown that US VCs are particularly skilled at timing the IPO market, and VC syndicates facilitate certification of entrepreneurial firm quality upon an IPO.

There are different reasons for which syndication may take place (Schwienbacher, 2002);
- To diversify risks
- To improve screening by investing in a company only if a second venture capitalist ends with a positive due diligence process (Sah and Stiglitz, 1986)

- To have the commitment of a corporate investor (this can be important to avoid hold-up problems (Hellmann, 2001 and Riyanto and Schwienbacher, 2001), to secure a distribution channel or a potentially important customer pool, e.g., in order to speed up the introduction of his technology as market standard
- To benefit from certification and reputation effects through syndication with more experienced venture capitalists

Of these different reasons to undertake syndication, the first two reasons apply to first-round syndication and the latter two provide rationales for later-round syndication. In addition, venture capitalists might want to syndicate their deals is to add value by sharing information and pooling contacts in order to better find strategic buyers. In the latter case, syndication would lead to a lower duration of exit stages; the increase in the pool of contacts is expected to be greater for trans-national syndications (Schwienbacher, 2002).

2.2.3 Difference between Anglo-Saxon countries and Continental Europe

In Europe, there are also many cultural differences. This can be related to the VC industry and in particular an IPO exit. One of the most observable difference is the difference in ownership structure. Here, there are two main sides; the Anglo-Saxon side (UK and Ireland) and Continental Europe. In the Anglo-Saxon culture, ownership is usually largely dispersed (Meolia, Palearib, Vismarac, 2008). In Continental Europe however, there are often two different structures (Franks and Mayer, 2001),: the government control of companies in regulated industries which are going to be liberalized, and a private control, by means of pyramids, in the other cases (La Porta et al., 1999). In Anglo-Saxon countries, public companies operate alongside family companies. This the separation of ownership and control can be achieved by adopting a dual-class structure, with limited or no-voting rights for a group of shareholders. In continental Europe, the situation is quite different (Becht and Röell, 1999, La Porta et al., 1999). In Continental Europe this dual-class structure is often working in conjunction with pyramids, where the controlling shareholder just controls the quoted company with the highest position in the group (Bebchuck et al., 2000, Faccio and Lang, 2002). This allows the group to conduct relevant financial investments with minimal financial resource from the majority shareholders (Slovin and Sushka, 1997), with no chance for minorities to affect/dismiss the operation.

There a different concerns about the pyramidal ownership structure in continental Europe, as described by Meolia, Palearib, Vismarac (2008). First, high managerial agency cost may arise when the

separation between ownership and control is obtained via groups, and private control benefits are larger. Secondly, pyramids adversely affect the protection of minority shareholders. Third, a pyramid structure determines an underdeveloped market for corporate control and this point is commonly investigated in the literature by analyzing how markets award voting rights.

Another difference between the Anglo-Saxon and the Continental Europe countries is their legal system. As described La Porta et al. (1998), countries whose legal rules originate in the common law (which is the case for the Anlgo-Saxon countries) tradition tend to protect investors considerably better than do the countries whose laws originate in the civil law (as in the case of the Continental Europe countries), and especially the French civil law, tradition. In addition, the German civil law and the Scandinavian countries take an intermediate stance toward investor protections. La Porta et al. (1997) shows that countries that protect shareholders have more valuable stock markets, larger numbers of listed securities per capita, and a higher rate of IPO activity than the unprotective countries. However, countries that protect creditors better have larger credit markets. The reason for this difference can be explained because shareholders or creditors are entitled to very different bundles of rights in different legal jurisdictions (La Porta et al., 1998).These rights are determined by laws; they are not inherent in securities themselves.

Next to the legal system, the law enforcement is an important factor. Better law enforcement, as measured by rule of law, is associated with more domestic firms and IPOs per capita, as well as a greater ratio of private sector debt to GNP (La Porta et al., 1997). Again, the common law countries generally have the better law enforcement (La Porta et al., 1998).

In addition, economic country factors play a role as well. As described by Reöll (1996), there is a striking negative relationship between the size of the stock market and the proportion of GDP devoted to public pensions. This is mainly the case for Continental Europe since these countries have a great involvement in the provision of pensions compared to Anglo-Saxon countries.

2.2.4 Dot com bubble and Germany

In the late 90s, there was an IPO explosion of internet and technology-related firms, especially in the 1999-2000 period (Ritter, 2003). Of all the European countries, Germany experienced the largest change in its venture capital market with the introduction of its Neuer Markt. Aussenegg, Pichler, and Stomper (2003) report that there were 158 IPOs in 1999 and 147 IPOs in 2000 on Frankfurt's Neuer Markt and Amtlicher Handel. By contrast, in 1961-1982, Germany saw only 19 IPOs, an average of less than one firm each year, according to Stehle, Ehrhart, and Przyborowsky (2000).

As described by Franzke (2003), the Neuer Markt was Germany's trading segment for innovative growth companies. It was launched on March 10 in 1997 as a subsidiary of the Deutsche Börse AG, with the objective to attract small- to medium-sized, young technology firms. The number of companies that have gone public in Germany, or rather on the Neuer Market, increased dramatically during the IPO boom period. From March 1997 through March 2000, over 200 companies went public on the Neuer Markt, while at the same time new listings at the first and second segment stayed close to their previous levels. In total about 320 new listings were recorded at Frankfurt Stock Exchange for that period. However, as a consequence of the down turn of shares listed at the Neuer Markt since March 2000, the going public of companies became much more difficult and finally almost impossible, which is particularly reflected in the numbers for the period March 10, 2001 to March 10, 2002. Finally in 2003 the Neuer Markt has been dissolved.

Other NM markets were established as well in Italy (the Nuovo Mercato), the Netherlands (Nieuwe Markt), Belgium (Euro.NM Belgium), and France (the Nouveau Marché). In 1999, these NM markets linked under the Euro NM name, but the link dissolved at the end of 2000 with the realization that, for small companies, investor interest remains local (Ritter, 2003).

An important aspect about the Neuer Market was that it offered a different exit mechanism for venture capitalists. This therefore stimulated the German venture capital industry because compared to other strategies, exiting a VC investment by means of an IPO became a truly attractive proposition, not only as it lead to high valuations of the portfolio companies but also opened venture capitalists the opportunity to attract attention and credit within a still relatively young VC market (Franzke, 2003).

3. Hypotheses

The previous part addressed the concept of venture capital, the importance of IPO's and its influential factors. This part will focus on the relationship between these factors and IPO's. In the following sections, the hypotheses will be drafted and discussed.

3.1 IPO and Syndication

As discussed in the previous chapter, IPOs are also more likely when there are a greater number of syndicated VC investors (Cumming, 2002). Therefore, the expectation is that that a syndication will lead to a higher probability of an IPO occurring. This results in the following hypothesis;

H 0:   There is no significant difference in the likelihood of an IPO occurring when VC deals are syndicated compared when they are not syndicated.

H1:   There is an increased likelihood of an IPO occurring when VC deals are syndicated compared when they are not syndicated.

3.2 IPO and the Anglo-Saxon countries

As addressed in the previous chapter, it can be expected that there is a difference in the number of IPO's in the Anglo-Saxon countries (which are the UK and Ireland in this dataset) than in Continental Europe due to their Anglo-Saxon culture. As described La Porta et al. (1998), Anlgo-Saxon countries tend to protect investors considerably better than do the countries whose laws originate in the civil law (as in the case of the Continental Europe countries). This relates into Anglo-Saxon countries having more valuable stock markets, larger numbers of listed securities per capita, and a higher rate of IPO activity than the Continental European countries. This difference is expected to be positive, thus the relative amount of IPO's in Anglo-Saxon countries is expected to be higher than in other regions. This results in the following hypothesis;

H 0:   There is no significant difference in the likelihood of an IPO occurring in the Anglo-Saxon countries compared to Continental Europe.

H2:   There is an increased likelihood of an IPO occurring in the Anglo-Saxon countries compared to Continental Europe.

3.3 IPO and the dotcom bubble

As mentioned before, there has been an IPO explosion of internet and technology-related firms, especially in the 1999-2000 period (Ritter, 2003). This bubble was ended in 2002. Therefore, it can be argued that companies that received investment in 1999 and 2001 were able to benefit from this bubble, whereas companies that received investment in 2003 did not. Therefore, it is expected that companies that received investment in 2003 have a decreased probability of having an IPO opposed to those who received funding in 1999 and 2001.

Since the dotcom bubble took place mainly in the Internet sector, effects of this should be most visible in this sector. It can be expected that this sector has a higher probability of having an IPO in the sample period then other sectors.

Because Germany experienced the largest IPO boom of all the European countries in the sample period, it can be expected that the probability of having an IPO is also affected by this. This results in the expectation that German companies had a higher probability of having an IPO in the sample period. Therefore, the hypotheses are;

H 0: There is no significant difference in the likelihood of an IPO occurring with companies in the Internet Specific sector compared to companies in other sectors.

H3: There is an increased likelihood of an IPO occurring with companies in the Internet Specific sector compared to companies in other sectors.

H 0: There is no significant difference in the likelihood of an IPO occurring with the investment year 2003 compared the investment years 1999 and 2001.

H4: There is a decreased likelihood of an IPO occurring with the investment year 2003 compared the investment years 1999 and 2001.

H 0: There is no significant difference in the likelihood of an IPO occurring with German companies compared to companies from other countries.

H5: There is an increased likelihood of an IPO occurring with German companies compared to companies from other countries.

4. Data

4.1 Data Collection

Professor Da Rin has set up a project to gather data on VC financed companies. In a group of students I was given the opportunity to participate in this process from March till November 2011. The goal was to update and complete existing files with data about companies which got their first VC funding in 1999, 2001 and 2003 and their VC's. The dataset covers the following 17 European countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. The goal was to obtain data on the first exit made by these VC funded company and to get accounting data on the companies. The exits were classified as IPO, acquisition, other exit (for example a merger) and bankruptcy.

Most data is obtained from VentureXpert (VX) and Amadeus, for completeness The Amadeus data is from both the current online version and older versions on CD-rom. From Zephyr we got deal data about the exits. Although Amadeus and Zephyr are both owned by Bureau Van Dijk and their data is supposed to be linked we found a disappointing number of exits in Zephyr. To increase the number of found exits we added the exits recorded in the Thomson One database.

However, many VCs are reluctant to provide information about their investments to large databases for example for privacy reasons or reputation among companies and Limited Partners. Subsequently for many companies for which we had reason to believe they had not gone bankrupt but were not recorded in Zephyr or ThomsonOne either, we looked up their current shareholders or the VC's exit online, by using Google. We would look for information on the company websites, VC websites, press releases, etc. to determine if they were still in portfolio or if they had been acquired or had made an IPO. This way we found another significant amount of exits. Due to miscommunication not all doubtful companies were looked up, however for most companies we can give a reliable exit. This thesis is focused on the IPO's, and for this we were able to reliably obtain information on these, since all IPO information is made public opposed to other exits that may have not released any information.

My thesis is based on part of the data collected in this project, namely the IPO's. The dataset contains 961 companies that received VC funding in 1999, 1330 in 2001 and 1225 in 2003, totaling 3516 VC funded companies. Of these companies, 63 companies made an IPO as a first exit.

4.2 Variables

This section will cover the different variables used in the econometric models.

4.2.1 Dependent Variable

As mentioned before, this thesis is focused on the IPO's. Therefore, this is the dependent variable. This variable is a binary variable, with the value 1 for when the first exit is an IPO and the value 0 for all other cases. The information comes from the dataset as discussed in the previous section and consists of data for 1999, 2001 and 2003.

4.2.2 Independent Variables

Same nationality

This variable has the value 1 if the company that receives VC funding and the VC are located in the same country and 0 if not.

Syndication

This variable indicates whether there is a syndication (value=1) or not (value=0). A venture capital investment is considered to be syndication if the funds for one company in one round are provided by two or more investors.

Capital raised

This variable looks at the influence of the amount of capital raised by the VC on the probability of an IPO. The amount of capital raised is the total amount raised by the VC up until the year before the investment in the company and was originally denoted in millions of dollars in the dataset. However, a variable with a wide spread consisting of large monetary values do not fit in the model. Therefore, the natural logarithm is taken to smooth this variable and provide a better fit. Since the original values were in millions of dollars however, values less than 1 became negative in the logarithm. To solve this, the original values were put in as hundreds of thousands of dollars and then the natural logarithm was taken.

This variable also influences the model on account of the number of observations. Since not all VC firms give information on this variable, the number of observations is reduced by over one third of the original dataset.

Company Age

This variable gives the age of the company in years at the time of the VC investment. This variable is somewhat suggestive since it is given by the difference between the year of investment and the date of birth of the company, which can be interpreted in different ways. For example, the date of birth might be given as the day of incorporation while the company itself already existed for a longer period. Also, changes in the legal structure of the company might change the birth date of the new entity.

A*nglo Saxon*

As mentioned in the hypotheses section, this thesis will research on whether being in an Anglo Saxon culture has an effect on the probability of an IPO. Therefore, a binary variable will be used to indicate whether a company is in an Anglo Saxon country (value=1) or not (value=0)

Stage dummies

This variable represents the different stages for the companies that received VC funding in the dataset and comes from the VentureXpert database. The different stages are; Startup/Seed, Early Stage, Expansion, Later Stage, Venture Capital and Other. [See appendix table 1 for descriptive statistics]. For this thesis, the most interesting stages are the Startup/Seed stage and the Early stage to see how they relate towards older companies.

VC Type

VC's can be classified into VC types. The VC type classifications from VentureXpert (as seen in the appendix) can be narrowed down to the following 4 VC types (Hirsch & Walz, 2011):

- Bank/Insurance type – All financial companies which may have another motive (such as providing advisory services) for investing in a company besides getting maximum return on their investment given the risk profile of the company.
- Corporate – All investors owned by or affiliated with another corporation.
- Government – Any investor investing funding through a government program or with another social goal.
- Independent – Any investor not tied to any other organization.

Combined, the Bank/Insurance type, the Corporate type and the Government type can be described as Captive VC's; meaning that they are not Independent. For this thesis, the only VC types that are considered are Captive and Independent because the main interest is to see which type gives a better probability of having an IPO. Therefore, the variable for VC type is a dummy variable for Independent VC with the value is 1 if the VC is independent and the value 0 if not. Of the VC's, 74,8% of them are independent and 25,2% are captive VC's.

Another item of interest concerning the VC type is to compare which sectors each type invests in. As can be seen in table 2 in the Appendix, there are no large differences between independent and captive VC's concerning the sectors they invest in. The percentages are on the same level for each sector. It can be observed that both independent and captive VC's invest mostly in the Computer Software sector (19% for independent VC's and 17% for captive VC's) and Internet Specific sector (16.9% for independent VC's and 15.6% for captive VC's).

Year dummy

Due to the different years in the dataset, a dummy is included to reflect the difference between the period before the dotcom bubble, which took place around 2002, and the period after the bubble. Therefore, the dummy for 2003 indicates the probability of an IPO after the bubble relative to before the bubble.

Sector dummies

There are many different sectors in which VC firms invest in. [See the appendix for table 3 with the specifics]. The sector in which a company is active in is those defined by the VentureXpert database. In this thesis, one objective is to see how technology companies experienced rapid growth, also in relation with the dotcom bubble. Therefore, there is a special interest in the Internet Specific sector in which most the effects of the bubble would be visible. To illustrate this effect, two other variables are also included in the model, namely the dummies for the Biotechnology and the Computer Hardware sector. These variables are all binary variables, with the value 1 if the company that receives VC funding is in this sector and value 0 if not.

Dummy Germany

An interesting country to examine with respects to IPO's in the sample period is Germany because they had opened a new stock exchange just before the start of the sample period. This would

likely result in a positive coefficient in the models meaning that Germany had more IPO's in the sample period relative to other countries.

4.3 Descriptive Statistics

4.3.1 Correlation

As can be seen in the correlation matrix (Table 4), there are no high levels of correlation between the different variables.

One observable correlation however is the negative one between Same Nationality and Capital Raised. Although this is not a very high correlation, there is some relationship. The coefficient would indicate that VC's from another county than the one of the funded company raise more capital relative to VC's from the same country. This can be explained because larger VC firm are more inclined to invest in foreign firm than small VC firms that don't have the resources to invest abroad.

Furthermore, the 2003 dummy has some correlation with the Same Nationality and the Syndication variable. However, this only says something about these variables in this particular year, it only indicates that there were relatively more companies with the same nationality in 2003 and relatively less Syndications.

Obviously, the dummy variables for the different sectors have little correlation since they never both have the same positive value. This is also the case for the two stage dummies.

Table 3. Correlation matrix

	Same Nationality	Syndication	Log Capraised	Company Age	Anglo Saxon	Early Stage	Startup/Seed	VC Independent	2003	Biotech-nology	Computer Hardware	Internet Specific	Germany
Same Nationality	1												
Syndication	-0.147**	1											
Log Capraised	-0.394***	0.078***	1										
Company Age	-0.007	-0.095***	0.073**	1									
Anglo Saxon	-0.022	0.076***	0.120**	-0.083***	1								
Early Stage	-0.036*	0.103***	-0.025	-0.133***	0.055***	1							
Startup/Seed	0.089***	-0.010	-0.157***	-0.164***	-0.025	-0.244***	1						
VC Independent	-0.094***	0.051***	0.227**	0.035*	0.035*	0.006	-0.079***	1					
2003	0.174***	-0.201***	-0.084	0.125***	-0.169***	-0.031*	-0.067***	-0.049***	1				
Biotechnology	-0.006	0.061***	-0.081	-0.070***	-0.030*	0.050***	0.105***	-0.029*	-0.015	1			
Computer Hardware	0.031*	-0.029	-0.042*	-0.024	-0.013	0.007	0.004	0.004	0.009	-0.055***	1		
Internet Specific	-0.050***	0.116***	0.011	-0.128***	0.014	0.059***	0.041*	0.016	-0.244***	-0.122***	-0.089***	1	
Germany	-0.033*	-0.033*	0.030	-0.047***	-0.230***	0.007	0.035*	0.048***	-0.214***	0.113***	0.051***	0.039*	1

* Significant at the 0.1 level (two-tailed)
** Significant at the 0.01 level (two-tailed)

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4.3.2 Dependent Variable

Table 5 shows the descriptive statistics for the dependent variable, namely IPO. Of the 3516 companies that received VC funding, 63 made an IPO. This results in the low mean.

Table 5. Descriptive Statistics for IPO

Variable	N	Mean	Std. Dev.	Min	Max
IPO	3516	.0179181	.1326727	0	1

4.3.3 Independent Variables

As shown in table 6, almost 25% of the companies in the dataset is in an Anglo Saxon country. Also, the majority of the companies has VC from the same country, namely 77,9%.

The age of a company ranges from 0 (just founded) to 327 for the oldest company. However, the average age of the companies is nearly 8 years. This shows that VC's don't only invest in startup companies, but also in companies that have already established themselves. This is also supported by the Startup/Seed and Early Stage variables, which combined make up for almost 40% of the dataset. This indicates that the majority of the companies that receive VC funding, are not in their early years.

Table 6. Descriptive Statistics for independent Variables

Variable	N	Mean	Std. Dev.	Min	Max
Same Nationality	3260	.7791	.4149	0	1
Syndication	3007	.3219	.4673	0	1
Log Capraised	2132	7.4419	2.0941	1.386	12.291
Company Age	3000	7.8437	1.7659	0	327
Anglo Saxon	3516	.2435	.4292	0	1
Early Stage	3516	.2005	.4004	0	1
Startup/Seed	3516	.1917	.3937	0	1
VC Independent	3516	.7480	.4342	0	1
2003	3516	.3484	.4765	0	1
Biotechnology	3516	.0697	.2546	0	1
Computer Hardware	3516	.0384	.1922	0	1
Internet Specific	3516	.1658	.3720	0	1
Germany	3516	.1414	.3484	0	1

5 Empirical Analysis

5.1 Econometric Model

There are three main econometric models that can be used. The simplest method to causal relationships between one (or more) variables is via OLS regression. The ordinary least square regression assumes a linear relationship between the independent variables and the dependent variable. It estimates the coefficients for all input variables by equaling the sum of the errors, which is the difference between the predicted value and the actual value that makes up the part that is not explained by the model, to zero and minimizing the sum of the squared errors. A standard OLS regression has the following form:

$$E(y_i) = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \cdots + \beta_n X_{in} + \varepsilon_i$$

or in short: $\quad E(y_i) = \beta' X_i + \varepsilon_i$

In this regression, β is a vector with the coefficients of the independent variables and X is a vector with the measured values preceded by a 1 to correct for the constant term which is β_0.
One of the assumptions of OLS regression is that the dependent variable is a ratio scale factor, or at least an interval scale factor. Because of that, this type of regression model is not applicable for this thesis since the dependent variable, IPO, is a binary variable. With an OLS regression, the predicted values of the could be smaller than 0 or larger than 1, which is not feasible since the IPO variable can only be 0 or 1.

Another model is the logit model. A logit model is used when the regression model has a binary response variable and ratio scale independent variables. By using a logistic function in the regression formula, the values are always between 0 and 1. To check the reliability of the model, a cut-off value between 0 and 1 is used to classify each predicted value as either 0 or 1, which allows for a comparison between predicted and actual outcomes.
A logistic regression has the form:

$$P(z) = \frac{e^z}{1 + e^z} = \frac{1}{1 + e^{-z}}$$

$$\text{with } z = \hat{\beta}'X_i$$

In this regression, β is a vector with the estimated coefficients and X is a vector starting with 1 followed by the values of the independent variables. As can be seen from the model, with any value of z the regression will produce a probability between 0 and 1, it can never take other values.

The third model is the probit model. A probit model is similar to a logistic regression because it allows to test the relations between ratio or interval scale variables and a binary variable. The difference however between logit and probit regressions is that the probit model assumes that the dependent variable to be normally distributed. Therefore the basic form of a probit regression gives an expected probability:

$$P(y_i = 1|X_i = x) = \Phi(\beta'X_i)$$

For this thesis, the probit model will be used.

5.2 Testing the Hypotheses

This section covers the results of the probit regressions. All regressions used to are produced with STATA, a comprehensive data analysis and statistical software application with a 95% confidence level. To test the hypotheses, four models are used. The four models are all similar in nature, however they vary in their purpose by including or excluding certain variables.

The first model (model 1 in table 7) shows the results for the model that looks at all of the independent variables except Germany. Germany is excluded because the objective in this model is to look for the general results, whereas Germany is a special case because of the opening of their new stock exchange which could affect the overall results.

The second model (model 2 in table 7) shows the results for the model with all the variables included. This model looks at the case when Germany is included to see if the results are affected.

The third model (model 3 in table 7) gives the results for the model without the only two significant variables from model 2, namely Internet Specific and Germany. Since these variables both are significant it is interesting to see if there is something left to explain without them.

The fourth model (model 4 in table 7) shows the results when Log Capraised is excluded from model 3. Log Capraised shows to have no significant values in the previous models. Because this variable also reduces the number of observations by 610, it is left out in this regression to see the results with these observations added to model 3.

Table 7. Regression Models

Independent Variables	(1)	(2)	(3)	(4)
Same Nationality	-.1823	-.1588	-.1910	-.0903
	0.381	*0.457*	0.357	*0.587*
Syndication	-.1278	-.0589	-.0948	-.0558
	0.495	*0.759*	0.606	*0.719*
Log Capraised	.0004	-.0105	-.00089	-
	0.993	*0.823*	0.984	
Company Age	.0043	.0042	.0034	.0031
	0.274	*0.306*	0.395	*0.306*
Anglo Saxon	.0775	.2541	.0375	.0093
	0.683	*0.232*	0.842	*0.954*
Early Stage	.0149	-.0304	.0505	.04109
	0.945	*0.892*	0.812	*0.819*
Startup/Seed	.0240	.0202	.0442	.0048
	0.919	*0.932*	0.849	*0.980*
VC Independent	.1229	.1038	.1448	.0068
	0.600	*0.665*	0.537	*0.968*
2003	-.1466	-.0344	-.2170	-.3806*
	0.515	*0.883*	0.318	*0.056*
Biotechnology	-.0003	-.0753	-.1244	-.2224
	0.999	*0.841*	0.734	*0.526*
Computer Hardware	.2758	.2954	.1740	-.01466
	0.510	*0.477*	*0.672*	*0.969*
Internet Specific	.3976*	.4096**	-	-
	0.052	*0.049*		
Germany	-	.5320**	-	-
		0.019		
Constant	-2.2379	-2.5066	-2.2578	-2.1356
	0.000	*0.000*	*0.000*	*0.000*
Number of Observations	1919	1919	1919	2529
Pseudo-R2	0.0339	0.0577	0.0177	0.0195
Prob > Chi2	0.8203	0.4614	0.9719	0.7996

Probit regression with 'IPO' as dependent variable

* Significant at the 0.1 level (two-tailed)
** Significant at the 0.05 level (two-tailed)
** *Significant at the 0.01 level (two-tailed)

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Same nationality

As can be observed in table 4, the coefficient for the same nationality variable is negative in all the models. This would indicate that a foreign VC would increase the probability of an IPO. However, these coefficients are never significant. Since they are never significant, it cannot be concluded that the coefficient is different from zero.

Syndication

Similar to the same nationality variable, the coefficient for the syndication variable is also negative in all the models. This would lead to the conclusion that more than one VC would have a negative effect on the probability of an IPO occurring. Nevertheless, they are never significant, as was the case with the same nationality variable. Therefore, it cannot be concluded that the coefficient for the syndication variable is different from zero.

Capital raised

As shown in table 4, the capital raised variable never has a significant coefficient. Even if they would have been significant, the values of the coefficients indicate that this variable has little predicting power, since the coefficients are all around zero.

Company Age

Although the coefficients for this variable all positive in all models, they are never significantly different from zero. Therefore, there is no evidence that younger or older firms have a higher probability of having an IPO.

A*nglo Saxon*

The Anglo Saxon variable is positive in all models. This would indicate that a company in an Anglo Saxon country would have a higher probability of going public then in other countries. Since none of the coefficients is significant however, there is no evidence that the coefficients are different from zero, although the coefficient in model 2 has a much higher significance level than in the other models. This higher significance level can be attributed to the addition of the German country dummy, which would cause the Anglo Saxon dummy to increase in significance since the German country dummy is significant.

Stage dummies

There is no evidence that any of the stage variables has a higher probability of having an IPO. Although the coefficients are positive, except for the early stage coefficient in model 2, these are never significantly different from zero.

VC Type

Since the coefficient of the VC independent variable is positive in all of the models, there would be evidence that companies that have received investment from independent VC's have a higher probability of having an IPO than companies that have received investment from captive VC's (this would be the case since all the non-independent VC's are classified as captive). However, none of these coefficients are significantly different from zero. Therefore, there is no evidence that there is a difference in the probability of a company going public caused by the VC being independent or captive.

Year dummy

The 2003 year dummy is negative in all the models. This would give evidence to state that companies that received VC investment in 2003 have a lower probability to have an IPO than companies that received funding in 1999 and 2001. Since only the coefficient in the fourth model is significant, this statement holds only partly.

Sector dummies

The variables for the different sectors have mixed values in the models. For biotechnology, the coefficients are negative but not significant. For computer hardware, they are positive except for the one in model 4 where the coefficient is negative. However, these are all also not significant thus it can be concluded that neither of these sectors have a coefficient that is different from zero.

The internet specific variable on the other hand, does have a positive and significant variable. This would indicate that a company in the internet specific sector would have an increased probability of going public compared to companies in other sectors.

Germany

The country dummy for Germany shows that the coefficient is positive and relatively large compared to other coefficients. Since this coefficient is also highly significant, there is strong evidence that German companies have a higher probability of having an IPO then companies from other countries in the sample period.

6 Interpretation

This section will address the interpretation of the results of the statistical analysis of the dataset. This chapter will discuss the outcomes of the analysis and their interpretation before the final conclusions are drawn.

6.1 Results of Syndication

The first hypothesis discussed the relationship between syndication and the probability of an IPO occurring. From the theory, it was expected that IPO's are also more likely when there are syndicated VC investors (Cumming, 2002). Therefore, the expectation was that that a syndication will lead to a higher probability of an IPO occurring. The data however, does not provide evidence that this is the case. As discussed in the previous chapter, the coefficient is negative but not significant. This results in the interpretation that there is no evidence to support that a syndicated deal leads to an increase in the probability of an IPO. Therefore, there is no evidence to support hypothesis 1.

6.2 Results of Anglo Saxon countries

For the Anglo Saxon countries, there is no evidence that they have an increased probability of an IPO. From the data, it cannot be concluded that a firm being in an Anglo Saxon culture, has a larger likelihood of doing an IPO than had it been located in a different culture and thereby there is no indication that Anglo-Saxon countries and a higher rate of IPO activity than the Continental European countries, as shown by La Porta et al. (1997). Although the coefficient for the Anglo Saxon culture dummy was positive throughout the models, this coefficient is never significantly different from zero. Therefore, there is no evidence to support hypothesis 2.

6.3 Result of presence Dotcom bubble

Considering the Dotcom bubble, the data provides evidence that there were effects of this. From the data, it has been shown that the Internet Specific sector has had an increase in probability of having IPO in sample period relative to the other sectors. This can be addressed to the dotcom bubble. It indicates the upcoming Internet companies are getting more IPO's relative to companies in other sectors. This is the case because the coefficient is positive and significant in the models. Also, the Internet Specific sector represents a relatively large share of the companies in the data, namely 16.58 % of the companies are in this sector; making it the second largest sector in the data. From this, there is evidence to support hypothesis 3 and the null hypotheses can be rejected.

Next to this, the year 2003 shows a decrease in the IPO likelihood. Since the dotcom bubble took place just before 2003, it was expected that 2003 would have a negative coefficient relative to 1999 and 2001, since IPO's decreased after this period. This is the case because there has been an IPO explosion of internet and technology-related firms, especially in the 1999-2000 period, that ended in 2002 (Ritter, 2003). Therefore, it was argued that companies that received investment in 1999 and 2001 were able to benefit from this bubble, whereas companies that received investment in 2003 did not. Although it is not significant in all models, the coefficient is negative which is in line with the expectations. Therefore, this also shows the existence of the dotcom bubble, which had a higher rate of IPO's in the 1999 and 2001 companies compared to the 2003 companies. Although there is evidence to support hypothesis 4, it is circumstantial and it is not supported by all models. Therefore, hypothesis 4 cannot be supported.

6.4 Results of new stock market in Germany

It can be concluded that German companies benefitted the from their new stock market. This is the case because it has been shown that Germany had an higher probability of companies going public than in other countries in sample period. Of all the individual countries, Germany has the only coefficient that is significantly different from zero. Also, its coefficient is relatively high compared to the other variables, indicating that it has a relatively high effect. Therefore, hypothesis 5 is supported and the null hypothesis can be rejected. This results in the interpretation that Germany experienced the largest IPO boom of all the European countries in the sample period.

6.5 Results of VC Type

Concerning the role of the type of the VC, there is no evidence that there is a difference between independent and captive VC's regarding the probability of an IPO occurring since the coefficient to test this has been insignificant in all the models.

7 Conclusion and Discussion

In the final part of this thesis, the results and interpretations of the empirical analysis are shortly repeated and their implications for the venture capital industry are derived. Finally, the limitations of this study are discussed.

7.1 Conclusions

As seen from the results, there is no evidence found that syndicated deals lead to an increase in the probability of an IPO. This is in contrast to what theory would suggest, since from theory it was expected that IPO's are also more likely when there are syndicated VC investors (Cumming, 2002). It is remarkable then that the data would suggest a slightly negative relationship, although it is insignificant. There is no obvious reason for this, other than that the data used might not be optimally suitable and comparable to the data used in the theory. It could be the case that the data on this subject does not give a true indication of the overall picture. This could be due to the period that is used in this thesis. Since the data only consists of three years of investments, it is not entirely representative to make general conclusions for every year. Also, this period marked a large change in the VC industry and IPO's in particular, which might have lead to different outcomes.

This argument could also be valid for the Anglo Saxon countries. From the data, it cannot be concluded that a firm being in an Anglo Saxon culture, has a larger likelihood of doing an IPO than had it been located in a different culture and thereby there is no indication that Anglo-Saxon countries and a higher rate of IPO activity than the Continental European countries, as shown by La Porta et al. (1997). This also might be related to the up rise of the VC industry in the Continental European countries, especially Germany. Because of the dotcom bubble, there could have been temporal changes that would indicate that there is no significant difference in the probability of an IPO between Anglo-Saxon and Continental European countries. Therefore, no conclusions can be drawn concerning the long run differences, it can only be concluded that there is no evidence found in this particular period.

Consequently, there is evidence found on the dotcom bubble. It has been shown that the Internet Specific sector has had an increase in probability of having IPO in sample period relative to the other sectors. This is in accordance with the theory, where it was indicated that was an IPO explosion of internet firms that took place during the period that has been examined in this thesis (Ritter, 2003). Also, some evidence was found on the decline of the IPO market after the bubble collapsed, which was in 2002. Although it was not significant in each model, there were indications that firms that received

funding in 2003 have undertaken less IPO's than those in 1999 and 2001. This again is in line with the expectations from the theory.

In addition to this, it can be concluded that German companies benefitted the most from the dotcom bubble when it comes to going public, relative to all the other European countries. An explanation for this can be the introduction of Germany's Neuer Markt. As mentioned in the theory, it can be concluded that this Neuer Markt therefore stimulated the German venture capital industry because compared to other strategies, exiting a VC investment by means of an IPO became a truly attractive proposition, not only as it lead to high valuations of the portfolio companies but also opened venture capitalists the opportunity to attract attention and credit within a still relatively young VC market (Franzke, 2003).

7.2 Limitations

One of the limitations of this thesis is that is has been focused on only a couple of factors. There are many other interesting factors that have not been covered in this thesis. One item here is that this thesis has only looked at the difference between the Anlgo-Saxon countries and Continental Europe as a whole, where it is also possible to look at the other different legal systems within Continental Europe such as the French, Germanic or Scandinavian legal systems and look for evidence in differences between them. Also, it would be possible to look at individual countries instead of clusters of countries.

Another aspect is the sample period. Although the sample period used in this thesis covers the time frame of the dotcom bubble, a larger sample period might give more conclusive results. This would also allow to find evidence for the increase in IPO's during the 90s and the collapse of the bubble in 2002 an the impact thereafter. That being said, the sample period does offer a good indication of all the exits that VC backed companies make. Since VC's usually like to make an exit within 10 years, nearly all of the VC's have made an exit from the funded companies. Extending the sample period into the years later then 2003, will only decrease this number since there would still be many companies in the VC's portfolio. Therefore, the most logical extension would be on the years before the period used in this thesis. This however has the disadvantage that it is less relevant concerning current developments.

Next to this, this thesis has been more focused on the VC's and the time and country characteristics then on the individual company characteristics of the companies that had received funding. It would also be possible to look at IPO's from the point of view of the company. Here, there could be more focus on company specific aspects such as size, growth, amount of assets, etc. This would allow companies to create better conditions for them in order to public, whereas this thesis has looked at factors that are difficult for companies to change, such as the stage or the sector a company is in.

Lastly, several factors could be studied more deeply. In the case of syndication for example, one could also look at the number of VC's that invested in the company instead. Another factor that could be investigated more closely, is the VC type. This thesis has looked at the differences between Independent and Captive VC's, but it is also possible to split the Captive VC's into Bank/Insurance, Corporate and Government VC types and look at the differences between these types.

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Appendix

Table 1. Descriptive Stages

	Freq.	Percent
Startup/Seed	674	19.17
Early Stage	705	20.05
Expansion	1,573	44.74
Later Stage	55	1.56
Other	1	0.03
Startup/Seed	674	19.17
Venture Capital	508	14.45

Table 2. VC Independent vs VC Captive Sectors

	VC Independent		VC Captive	
	Freq.	Percent	Freq.	Percent
Agr/Forestr/Fish	14	0.53	9	1.02
Biotechnology	172	6.54	73	8.24
Business Serv.	122	4.64	56	6.32
Communications	206	7.83	63	7.11
Computer Hardware	102	3.88	33	3.72
Computer Other	11	0.42	5	0.56
Computer Software	500	19.01	151	17.04
Construction	49	1.86	12	1.35
Consumer Related	227	8.63	73	8.24
Financial Services	57	2.17	17	1.92
Industrial/Energy	181	6.88	73	8.24
Internet Specific	445	16.92	138	15.58
Manufact.	65	2.47	23	2.60
Medical/Health	190	7.22	70	7.90
Other	80	3.04	36	4.06
Semiconductor/Electr	151	5.74	40	4.51
Transportation	52	1.98	13	1.47
Utilities	6	0.23	1	0.11
Total	2,630	100.00	1,127	100.00

Table 3. Companies by sector

	Freq.	Percent
Agr/Forestr/Fish	23	0.65
Biotechnology	245	6.97
Business Serv.	178	5.06
Communications	269	7.65
Computer Hardware	135	3.84
Computer Other	16	0.46
Computer Software	651	18.52
Construction	61	1.73
Consumer Related	300	8.53
Financial Services	74	2.10
Industrial/Energy	254	7.22
Internet Specific	583	16.58
Manufact.	88	2.50
Medical/Health	260	7.39
Other	116	3.30
Semiconductor/Electr	191	5.43
Transportation	65	1.85
Utilities	7	0.20
Total	3,516	100.00