

IPO PERFORMANCES OF VC-BACKED & NON-VC-BACKED COMPANIES:
A CROSS COUNTRY COMPARISON OF GERMANY & THE UK

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Comparison of Germany & the UK

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ABSTRACT

The significance of the venture capitalist's existence in the shareholders' structure of an issuing company has attracted several academic researchers' attention. Presuming that the Certification Theory holds, it is expected that underpricing of VC backed companies are significantly lower than that of non-VC backed companies. In order to investigate this phenomenon we use 374 German and 274 British IPO data for the period of 1998-2005. The OLS results of the study exhibit that, although the dynamics of the markets are quite different from each other, the Certification Theory holds in both of these financial markets. Another important outcome of the study is as companies approached to their lock up expiration date, price performances of VC backed companies are statistically significantly lower than the price performances of non-VC backed companies. This outcome is true for Germany but not statistically true for the UK. The study also shows that contrary to general belief, when there is an Agency Effect within an IPO (i.e. a relationship between the underwriter and the venture capitalist in the issued company), underpricing of such company is slightly (but not statistically significantly) lower than an issue with no agency effect. This result may be considered the indication of the strength of the certification effects of venture capitalists and underwriters in these markets.

KISA ÖZET

Halka arz edilecek şirketlerin ortaklık yapılarının içinde girim sermayedarları bulundurmaları akademik çevrelerin dikkatle üzerinde durduğu konulardan birisi konumundadır. Kredibilite Teorisinin geçerli olduğu varsayımı altında girişim sermayesi yatırımı yapılmış şirketlerin halka arz ıskontolarının içerisinde her hangi bir girişim sermayesi yatırımı bulunmayan şirketlere göre daha düşük olmaları beklenmektedir. Bu durumun araştırılması için 1998-2005 yılları arasında Almanya’da halka arz edilmiş 374 şirket ile aynı dönemde İngiltere’de halka arz edilmiş olan 274 şirket incelemeye alınmıştır. OLS modelinin sonuçları her iki ülkede de bu teorinin, dinamikleri farklı olsa da, geçerli olduğunu göstermiştir. Çalışmada elde edilen bir diğer önemli bulgu da hisse satış yasağı süresinin sonuna yaklaşan şirketlerden içinde girişim sermayesi yatırımın olanların fiyat hareketlerinin içinde girişim sermayesi yatırımı bulunmayan şirketlerin fiyat hareketlerine göre daha kötü olduğudur. Bu sonuç Almanya’da istatistiksel olarak anlamlı bir şekilde doğru iken İngiltere’de istatistiksel bir farklılıktan bahsedebilecek sonuçlar elde edilememiştir. Çalışma aynı zamanda genel beklentinin aksine halka arza aracılık eden yatırım bankası ile şirkete yatırım yapmış olan girişim sermayedarı arasında bir ilişki olması durumunda halka arz ıskontosunun böyle bir ilişki olmayan halka arazlara göre, istatistiksel olarak anlamlı olmamasına rağmen, daha düşük olduğunu göstermiştir. Bu durum her iki ülkede de gerek girişim sermayesi şirketlerinin gerekse de halka arza aracılık eden yatırım bankalarının güçlü kredibilite etkilerinin bir sonucu olarak yorumlanabilir.

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LIST OF SYMBOLS

AG	Aktiengesellschaft (German stock corporation)
AIM	Alternative Investment Market
ARD	American Research and Development
BVK	German Venture Capital Association
CMB	Capital Markets Board of Turkey
CV	The Corporate Venturing
DAX	Deutscher Aktien Index (German Stock Index)
DM	German Mark
DVCA	Deutscher Venture Capital Verband
EBITDA	Earnings Before Interest Tax Depreciation and Amortization
EIS	Enterprise Investment Scheme
ERISA	Employment Retirement Income Security Act's
EU	European Union
EUR/€	Euro
EVCA	The European Private Equity and Venture Capital Association
FSA	Financial Services Authority
FTSE	Financial Times Stock Exchange
GAAP	Generally Accepted Accounting Principles
GBR/£	British Pound
GDP	Gross Domestic Product
GSYO	Venture Capital Investment Trust in Turkey
HGB	German Commercial Code
IAS	International Accounting Standards

ICFC	Industrial and Commercial Finance Corporation
IFRS	International Financial Reporting Standards
IPO	Initial Public Offering
IRR	Internal Rate of Return
LLC	Limited Liability Company
LLP	Limited Liability Partnership
LSE	London Stock Exchange
MBI	Management Buy-in
MBO	Management Buy-out
MFR	Minimum Funding Requirement
MIT	Massachusetts Institute of Technology
NVCA	National Venture Capital Association
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Square
PLC	Public Limited Company
PMAC	Primary Markets Advisory Committee
R&D	Research and Development
SBICs	Small Business Investment Companies
SME	Small and Medium Sized Enterprises
TDA	Enterprise Support Agency
TSE	Turkish Standards Institute
TTGV	Turkish Technology Development Foundation
UK	United Kingdom
UKLA	The UK Listing Authority
UKX	FTSE (Financial Times Stock Exchange) 100 Index

US	United States
USD/\$	American Dollar
VC	Venture Capital
VCT	The Venture Capital Trust
WFG	Deutsche Gesellschaft für Wagniskapital (German Society for Venture Capital)
YTL	New Turkish Lira

1 Introduction

The significance of the venture capitalist's existence in the shareholders' structure of an issuing company at the time of an IPO has attracted several academic researchers' attention. The basic idea lying behind this notion is that venture capitalists do have certain screening and monitoring abilities that enable them to value the issuing company more effectively and set the timing of the IPO more accurately compare to other IPOs. In other words venture capitalists are in a position to reduce the adverse selection for IPOs by signaling the quality of the issuing firm. Therefore from outside investors' point of view existence of venture capitalists in the shareholders' structure of an issuing company signals the fair pricing, correct timing and good quality of that company. However, positive impact of venture capitalist to the IPO performance of an issuing company can be reduced in some cases. For example, a relationship between the underwriter bank and the venture capitalist can give a negative signal to outside investors as a potential conflict of interest or adverse selection problem.

2 Venture Capital Concept

2.1 Introduction to Venture Capital

Entrepreneurs often develop ideas that require substantial capital to implement. Most entrepreneurs do not have sufficient funds to bring these ideas into life by themselves and therefore look for outside financing. While many entrepreneurs have used bank loans or other sources of debt financing, start-up companies that lack substantial tangible assets, expect several years of negative earnings and have uncertain prospects are unlikely to receive bank loans or other debt financing. In such

circumstances these companies are usually forced to struggle to find financing alternatives.

In general, bankers are only able to finance companies which can provide hard assets against the credit to secure the debt the bank provides. However, most of the start-up companies have little and some times no such hard asset to provide to banks. Therefore it is quite impossible for new established companies to meet its financial needs through accessing bank loans.

From a banker's point of view, the risks inherent to start-up companies are usually justify higher rates than allowed by law (Zider (1998)). Venture capitalists finance these high-risk and potentially high-return companies by purchasing equity stakes while these firms are still privately held. The nature of these young firms, the tremendous uncertainty and potential information asymmetry linked to them may make venture capital (VC) the only potential source of financing for such companies.

Venture capital investments can be defined as equity or equity-linked investments in young, rapidly growing, high-risk and potentially high-return companies that otherwise has no or limited access to money and that have the potential to develop significant economic contributions and where the investor is a financial intermediary who is typically active as a director, advisor or even manager of the firm¹. The

¹ In the US, the term "venture capital" is usually used for the early stage investments whereas the term "private equity" is generally used for late stage investments. In Europe however, venture capital is used for both early and late stage investments. For the simplicity, we will follow the European terminology and use the term venture capital as a

concept of venture capital addresses the funding needs of entrepreneurial companies that generally do not have the size, assets and operating histories necessary to obtain capital from more traditional sources such as public markets or banks.

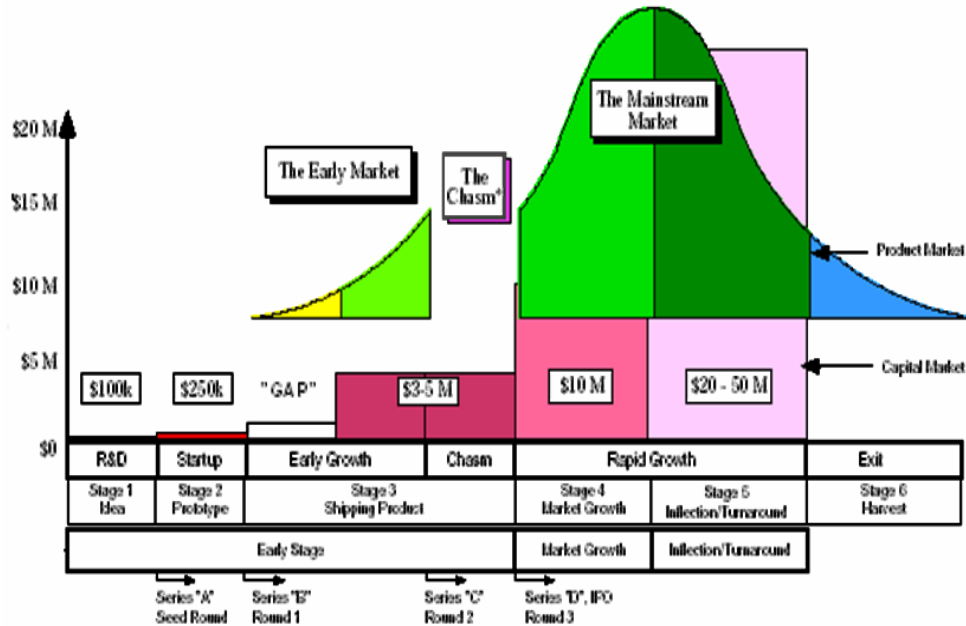


Figure 1: Company Growth and Venture Capital Investment

Venture capitalists are often investors, monitoring the progress of the invested firms, sitting on the board of directors and meeting out financing based on the attainment of the milestones. While banks monitor the financial health of the firms that they lend to, venture capitalists monitor strategy and investment decisions as well as take an active role in advising the firm (Gompers and Lerner (1999a)).

Venture capitalists are active, value-added investors for the investee company. They usually bring not only capital to the investee company but also knowledge, skill and network of legal, accounting, investment banking, marketing and other contacts that

reference of early as well as late stage investments throughout the study.

may be useful to a fledgling enterprise. In other words, far from being simply passive financiers, venture capitalists foster growth through hands-on involvement in the management, strategic marketing and planning of their portfolio companies.

Venture capitalists generally;

- i. Finance new and rapidly growing companies,
- ii. Purchase equity securities,
- iii. Assist in the development of new products or services,
- iv. Add value to the company through active participation,
- v. Take higher risk with the expectation of higher rewards,
- vi. Have a long term orientation.

When considering an investment, venture capitalists carefully screen the technical and business merits of the proposed company. Venture capitalists only invest in a small percentage of the business they review² and have a long term perspective.

Venture capital companies have backed many high-tech companies including Cisco Systems, Digital Equipment, Memorex, Scientific Data Systems, Genentech, Apple, Compaq, Sun Microsystems, Intel, Microsoft, eBay and Netscape as well as number of service firms like Starbucks, Federal Express and Staples.

Whether the firm is in technology or in service industry venture capitalists are always active investors. Venture capitalists usually monitor the progress of the firms, sit on

² The general perception about the venture capital investments is that almost one out of hundred proposed investment opportunities is able to obtain venture capital money.

the boards of directors and meet out financing needs of the firms. They retain the right to appoint key managers and remove members of the entrepreneurial team. Venture capitalists also provide entrepreneurs with access to consultants, lawyers and investment bankers.

There are several types of venture capital firms, but most of the fund providers invest their money through funds organized as limited partnerships in which the venture capital company serves as the general partner. Along side the independent venture capital companies, which is the most common form of venture capital entities, there are venture capital firms affiliates or subsidiaries of a commercial bank, investment bank or an insurance company, subsidiary of non-financial industrial corporations³ and finally government affiliated investment organizations.

Starting from mid 1900s in the United States VC investments have played crucial role in developing the companies and industries all around the world. Nowadays, VC investments have become an increasingly important source of funding for a significant number of innovative firms. Over the last two decades, there has been a tremendous boom in the venture capital industry. Especially in the US the pool of private equity funds grew from \$5 billion in 1980 to \$175 billion in 1999. This growth of venture capital industry has outstripped of almost every class of financial products (Lerner (2000)).

³ Unlike other types of venture capital companies the primary goal of these investment vehicles is to seek and to find qualified investment opportunities that are congruent with the parent company's strategic technology or that provide synergy or cost savings.

VC investment opportunity gives entrepreneurs freedom to bet on new markets often well before they form, which is not possible with other types of investments instruments.

When we look at the global economy we can basically monitor that the amount of funds channeled into the venture capital industry has increased dramatically since late 1970s and early 1980s all around the world but especially in the US. The success of venture capital activities in the US has drawn lots of attentions from both scholars and the policy makers. Scholars try to find out what are the dynamics behind this market so that they can explain the behaviors and developments in academic sense whereas policy makes are try to find out what really encourages people to invest into venture capital funds so that they can replicate this success at any time and anywhere.

2.2 How Venture Capital Works?

Contrary to general perception, venture capital plays only a minor role in funding basic innovations. For example in the US, venture capitalist invested more than \$10 billion in 1997 but only 6% or \$600 million went to start-up companies. Venture money mostly plays an important role in the next stage of the innovation life cycle⁴. According to a study conducted by Zider (1998) it is estimated that more than 80% of the money invested by the venture capitalists goes into building the infrastructure required to grow the business (in expense investments and the balance sheet⁵).

⁴ This period can also be defined as the period in company's life cycle when the company begins to commercialize its own innovation(s).

⁵ Expense investments are like manufacturing, marketing and sales expenses whereas the

Venture capitalists may be generalist or specialist investors depending on their investment strategy. Venture capitalists can be generalists, investing in various industry sectors, or various geographic locations, or various stages of a company's life. Alternatively, they may be specialists in one or two industry sectors, or may seek to invest in only a localized geographic area (Sahlman and Gorman (1989)).

There are simply five different stages of venture capital investments.

- Seed
- Expansion
- Start Up
- Later Stage
- Early Stage

Not all venture capitalists invest in “start ups”. While venture firms will invest in companies that are in their initial start up modes, venture capitalists will also invest in companies at various stages of the business life cycle. A venture capitalist may invest before there is a real product or company organized (so called “seed investing”), or may provide capital to start up a company in its first or second stages of development known as “early stage investing”.

Also, the venture capitalist may provide needed financing to help a company grow beyond a critical mass to become more successful (“expansion stage financing”).

balance sheet channeling is providing fixed assets and working capital.

The venture capitalist may invest in a company throughout the company's life cycle and therefore some funds focus on later stage investing by providing financing to help the company grow to a critical mass to attract public financing through a stock offering. Alternatively, the venture capitalist may help the company attract a merger or acquisition with another company by providing liquidity and exit for the company's founders.

At the other end of the spectrum, some venture funds specialize in the acquisition, turnaround or re-capitalization of public and private companies that represent favorable investment opportunities.

Venture firms come in various sizes from small seed specialist firms of only a few million dollars under management to firms with over a billion dollars in invested capital around the world. The common denominator in all of these types of venture investing is that the venture capitalist is not a passive investor, but has an active and vested interest in guiding, leading and growing the companies they have invested in. They seek to add value through their experience in investing in tens and hundreds of companies.

Some venture firms are successful in creating synergies between the various companies they have invested in. For example one company that has a great software product, but does not have adequate distribution technology may be paired with another company or its management in the venture portfolio that has better distribution technology (Sahlman and Gorman (1989)).

There has to be four major and active players in financial markets in order to talk about an effective venture capital industry. Entrepreneurs are the ones who have the idea or the company and need financing. Investors or fund sources of venture capital companies are the ones who are looking for high returns for their invested money. Investment bankers need good and well shaped companies to sell and finally the venture capitalists to make money for themselves by being a hub among these other three parties. In order to be able to talk about a well-developed and efficient venture capital industry all of these four players and their industries have to be well-shaped and effectively working. Deficiency of any of these four players may result a weak venture capital industry.

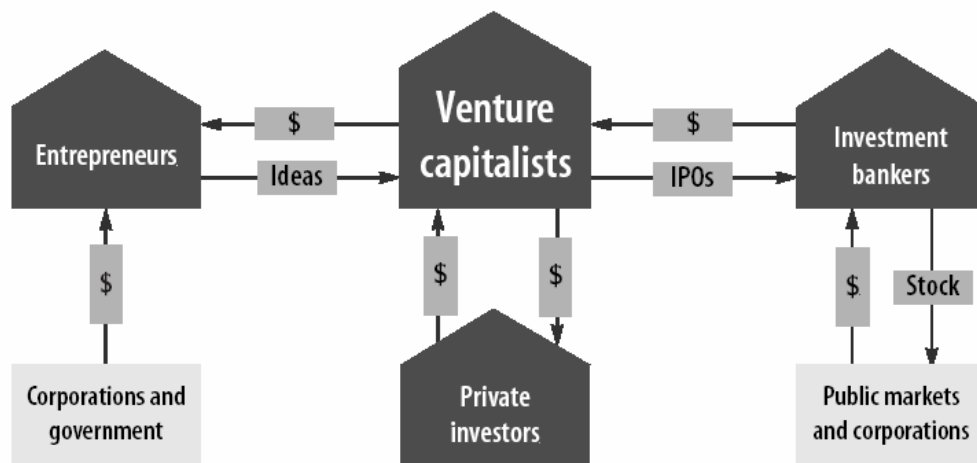


Figure 2: Players in the Venture Capital Industry

Venture capital money is not long-term money. The general idea in venture capital business is to invest into a company's balance sheet and infrastructure until it reaches to the sufficient size and credibility so that it can be sold to a corporation or so that the institutional public markets can step in and provide liquidity. The gist of the

concept is the venture capitalist buys a stake in an entrepreneur's idea, nurtures it for a short period of time and then exits with the help of an investment banker.

According to Bascha and Walz (2001) the typical VC company is characterized by a number of attributes. First, VC companies furnish a company with "active" capital, i.e. besides searching for attractive investments and providing with funding they get involved into the management of the portfolio. Hence, venture capital is often called "smart money". Second, VC company usually provides the capital stage-wise over various financing rounds. Third, for the most part, VC companies are usually organized as closed-end funds (usually in the US and in the UK). This structure generally magnifies VC companies' desire to invest for only a rather limited period of time and search for exit channels.

Unlike typical bank credits venture capital investments are being actively monitored by the VC company that invests into the company. According to Bascha and Walz (2001) the most important mechanisms that VC companies use to monitor their portfolio firms are screening mechanism, control rights e.g. the right to fire the founder and the staging of the investment.

Several steps have to be taken before a successful VC investment is booked in venture capitalists' deal list. These steps and their features can be listed as follow:

i. Identifying and Attracting New Deals. Before making an investment into a company a typical venture capitalist monitors the company and the industry that the company is operating in it and the potential competitors. By monitoring all these and

other factors (general economic conditions, future expectations etc.) a VC company tries to figure out whether the company is a good candidate to invest or not.

ii. Reviewing the Business Plans. After deciding that the company can be a good candidate to invest, venture capitalist starts to review the business plan of the company and tests whether the plan is applicable and realistic or not.

iii. Preparing the Investment Report. If the venture capitalist finds the business plan of the company attractive and applicable then it prepares an investment report to present its decision organs in order to convince them that the company is worth to invest in.

iv. Due Diligence Process. Right after the decision organs approve the investment decision, the venture capitalist starts immediately the due diligence process in order to double check the information provided by the company and to find out if there is any missing information that the company did not mention and valuable in the investment decision process.

v. Preparing Shareholders Agreement. At the same time of the due diligence process, venture capitalist and the company assign lawyers to prepare a shareholders agreement⁶ to be signed before the transfer of the money (or the first tranche of the agreed amount).

⁶ A typical shareholders agreement contains all the details about the investment, the role of the venture capitalist, the proceeds of the invested money etc.

vi. Monitoring. After signing the shareholders agreement and transferring the agreed amount of money to the company, venture capitalist becomes the shareholder of the company and starts monitoring the developments of the company. Venture capitalist assigns some board members after the signing of the shareholders agreement in order to become active in critical the decision making process and monitor the development of the company closely.

vii. Exit. The main focus of any venture capital company is to monitor both the invested company and the market and try to determine the most suitable timing in order to be able to exit from the company. Exit channels and the variety of them is a very crucial point for a venture capitalist even before investing into a company. If a venture capitalist cannot clearly determine the potential exit channels of an investment before investing the company, he may not invest at all.

2.3 Types of Venture Capital Firms

There are several types of venture capital firms, but most mainstream firms invest their capital through funds organized as limited partnerships in which the venture capital firm serves as the general partner. The most common type of venture firm is an independent venture firm that has no affiliations with any other financial institution. These are called “private independent firms”.

Venture firms may also be affiliates or subsidiaries of a commercial bank, investment bank or insurance company and make investments on behalf of outside investors or the parent firm’s clients. Still other firms may be subsidiaries of non-financial,

industrial corporations making investments on behalf of the parent itself. These latter firms are typically called “direct investors” or “corporate venture investors”.

Other organizations may include government affiliated investment programs that help start up companies either through state, local or federal programs. One common vehicle is the Small Business Investment Company or SBIC program administered by the Small Business Administration, in which a venture capital firm may augment its own funds with federal funds and leverage its investment in qualified investee companies (Sahlman and Gorman (1989)).

While the predominant form of organization is the limited partnership, in recent years the tax code has allowed the formation of either Limited Liability Partnerships, (“LLPs”), or Limited Liability Companies (“LLCs”), as alternative forms of organization. However, the limited partnership is still the predominant organizational form. The advantages and disadvantages of each have to do with liability, taxation issues and management responsibility.

The venture capital firm will organize its partnership as a pooled fund; that is, a fund made up of the general partner and the investors or limited partners. These funds are typically organized as fixed life partnerships, usually having a life of ten years. Each fund is capitalized by commitments of capital from the limited partners.

The partnership has two classes of partners;

- i. General,
- ii. Limited.

The general partners act as organizers of the fund shouldering the challenge of raising capital, accepting full responsibility and legal liability for fund management and participating in any gains their investments produce. The suppliers of capital - institutional investors, pension funds and wealthy families- are limited partners. They play a passive role, enjoy limited liability for the activities of the fund and for the tax and regulatory reasons and stand at arm's length from day-to-day fund management. They cannot become directly involved in the management and investing decisions of the venture capital funds in which they placed money-to do so would jeopardize their limited liability and in the case of pension funds, their nontaxable status.

2.4 Historical Development of Global Venture Capital Industry

The concept of venture capital is not new. Venture capitalists often relate to the story of Christopher Columbus. In the fifteenth century, he sought to travel westwards instead of eastwards from Europe planning to reach India. His far-fetched idea did not find favor with the King of Portugal, who refused to finance him. Finally, King Ferdinand and Queen Isabella of Spain, decided to fund him. The voyages of Christopher Columbus are now empanelled in history.

The decision by Spain's Ferdinand and Isabella to finance Christopher Columbus's voyage of exploration can be considered one of the history's most profitable and a very early example of venture capital investments. However, institutional development of venture capital concept had to wait for centuries to take place in the history of financial markets.

The modern venture capital industry began taking shape in the post - World War II years. It is often said that people decide to become entrepreneurs because they see role models in other people who have become successful entrepreneurs. Much the same thing can be said about venture capitalists. The earliest members of the organized venture capital industry had several role models (Gompers (1992)).

The ancestors of modern venture capital in the United States developed in the late 19th and early 20th century. Wealthy families began to look for ways to invest in potentially high-return, high-tech undertakings. David Lample writes in his history of the Route 128 venture capital region.

In the 1920's and 1930's wealthy families and individual investors began providing the startup money for companies that would later become famous: Eastern Airlines, Xerox and others.

Most industry followers agree that the landmark event in venture capital occurred in 1946 with the formation of the American Research and Development Corporation, the first firm, as opposed to an individual, to provide risk capital for new and rapidly growing firms, most of which were manufacturing and technology oriented. The idea stemmed from Ralph E. Flanders, then president of the Federal Reserve Bank of Boston who was concerned about the lack of new company formation and the inability to tap institutional capital locked up in fiduciary funds by corporations, insurance companies and other institutions. Flanders argued in favor of freeing fiduciary funds from the restrictive requirements of the Investment Act of 1940,

thereby enabling them to invest up to 5% of their assets in the equity of new enterprises (Bygrave and Timmons (1992)).

In 1946, MIT (Massachusetts Institute of Technology) president Karl Compton, Harvard Business School Professor Georges F. Doriot and local business leaders formed the first modern venture capital firm, American Research and Development (ARD). A small group of venture capitalists made high-risk investments into emerging companies that were based on technology developed for World War II. The main driving force behind the idea of establishing ARD was the absence of the newly established companies at the time and the lack of financing that could be channeled to such establishments. Almost half of the ARD's profits during its 26-year existence as an independent entity came from its \$70,000 investment in Digital Equipment Company (DEC) in 1957, which grew in value to \$355 million. Since institutional investors were reluctant to invest, ARD was structured as a publicly traded close-end fund and marketed mostly to individuals.

The first venture capital limited partnership, Drapper, Gaither and Anderson was formed in 1958. A few other establishments followed these companies but limited partnership accounted for a minority of the venture capital organizations pool during the 1960s and 1970s. Although Small Business Investment Companies (SBICs) and federally guaranteed risk-capital pools followed the limited partnerships the annual flow of money into the venture capital during its first three decades never exceeded a few hundred million dollars.

After the clarification of the Employment Retirement Income Security Act's (ERISA) prudent man rule by the US Department of Labor in 1979, the amount of investment increased substantially. Prior to this year, the legislation prohibited pension funds from investing substantial amounts of money in venture capital or other high-risk asset classes. This rule change opened the door to pension funds' tremendous capital resources and allowed pension managers to invest in high-risk assets including venture capital (Gompers and Lerner (1999b)).

PricewaterhouseCoopers reports⁷ that private equity fund-raising grew from roughly \$10 billion worldwide in 1989 to a peak of \$262 billion in 2000. The figure was around \$115⁸ billion in 2003, 33% higher than of 2002 figure (\$86 billion).

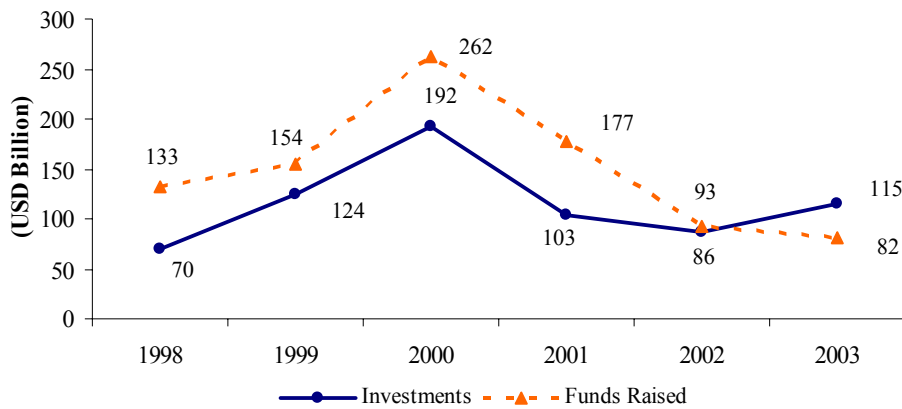


Figure 3: Global Investment and Fund Raising Trends

⁷ Several issues of PricewaterhouseCoopers' Global Private Equity reports.

⁸ According to PricewaterhouseCoopers' Global Private Equity report this figure represents 0.36% of the world's gross domestic product (based on 2002 GDP (\$32,300 billion), from World Bank Development Indicators)

Figure 4 shows the regional and country specific ranking of the VC investments as of 2003. As can be seen from the figure with its 52% global market share North America (the driving country is the US) is the center of attraction for the VC investments.

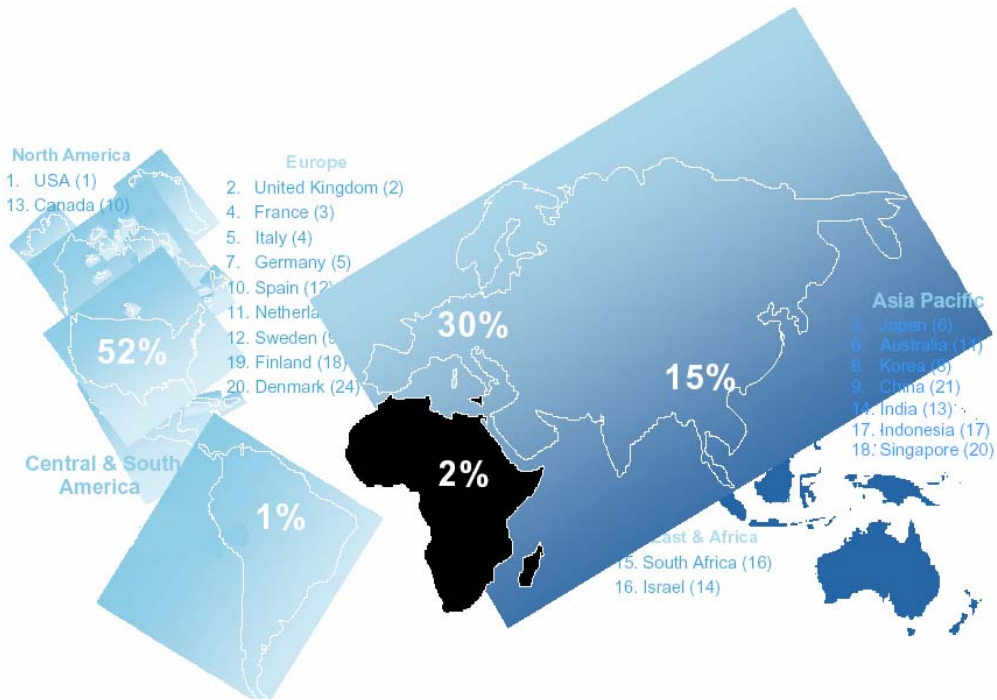


Figure 4: Top 20 Countries Based on Venture Capital Investments (as of 2003)

The US is by far the leader in the venture capital investments. A big portion of the global VC investments are made in the US. The UK is a consistent follower of the US. Japan, France, Germany and Italy are competing among themselves for the 3rd position and as can be seen from Figure 4 the ranking for the position can change from one year to another. Figures in the brackets show the rankings of the countries in the previous year (i.e.2002).

For the period of 1998 – 2003 the regional distribution of cumulative funds raised and the investments made are listed in Table 1.

(USD Billion)

<i>Region</i>	<i>Funds Raised</i>	<i>Investment Value</i>
North America	600.32	411.93
Europe	221.62	182.96
Asia Pacific	58.15	64.23
Middle East & Africa	11.86	13.25
Central & South America	9.50	18.26
Global Total	901.45	690.63

Table 1: Cumulative Regional Venture Capital Investments and Funds Raised (1998 – 2003)

After the devastating negative effect of dot.com bubble burst in 2000, the portion of the venture capital investments are channeled to high-technology companies gets smaller. Figure 5 is formed by the data provided by PricewaterhouseCoopers. The figure shows that high-technology companies constituted 60% of the overall venture capital investments in 2000, whereas this figure has dropped down to 33% in 2003.

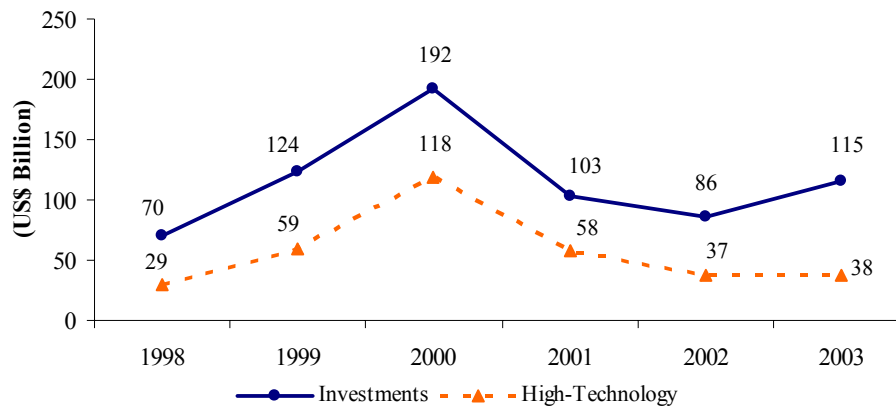


Figure 5: Total and High Technology Investment Trend (1998 – 2003)

Contrary to general beliefs early stage investments constitutes a small fraction of total VC investments. The lion share of the venture capital investments goes to

expansion and buyout investments. Figure 6 shows the breakdown of the global venture capital investments according to their stages.

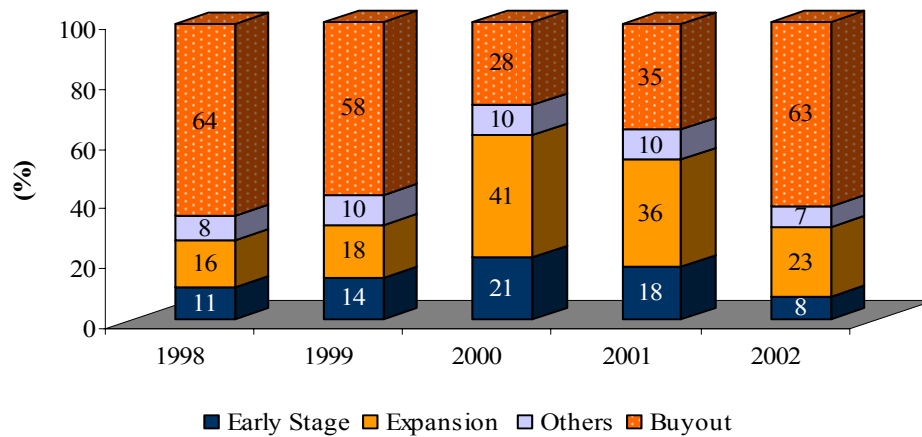


Figure 6: Global Venture Capital Investments by Stage of Investments

Figure 6 indicates that although buyout investments constituted 64% of the total venture capital investments in 1998, as a result of the growing global economy and higher expectations among the investors the figure dropped down dramatically to 28% in 2000. During the same period early stage investments climbed to 21% from 11%. However, slowed down in the global economy after March 2000 and the problems in IT and telecommunication sectors (which constitutes the bulk of the early stage VC investments) have changed the investment trends in favor of buyout and late stage financings.

2.5 US Venture Capital Industry

The United States maintains the oldest and most dominant position worldwide in venture capital industry. A study conducted by National Venture Capital Association (NVCA) indicates that the US is still by far has the lion share in global venture capital business with an estimated 72%. Since venture capital is predominantly an

American financial innovation and the US venture capital market accounts for about 2/3 of total global venture capital market, the US venture capital industry is held up as a role model for most of the countries, aiming to increase venture capital's stake in their financial systems.

Historical development of the US venture capital industry is very similar to that of global venture capital industry since the first steps of establishing such a market was taken in the US. After the establishment and operational activity of ARD, VC companies were institutionalized but the real boom in the market was experienced in late 1960s and the beginning of the 1970s. With the help of the newly established offering markets the pace of the venture capital industry was accelerated. The big boom in the industry was experienced following some legal adjustments in the markets⁹. Following these legal adjustments the amount of money raised for venture capital investments climbed dramatically. For example the amount of fund poured to venture capital funds was around \$3.5 billion between 1980 – 1982 periods. This figure is almost 2.5 times of the total amount raised in 1970s. The amount of fund raised is increased to \$17.8 billion in 1987, to \$19.4 billion in 1994 and finally to \$153.9 billion in 2000. For 2002 and 2003 the amount of money raised and the total amount of VC investments can be seen in Figure 7. In 2003 total amount of VC investments accounts for 0.57% of the US GDP figure¹⁰.

⁹ The most important legal adjustment of the time was the clarification of the Employment Retirement Income Security Act's (ERISA) "prudent man" rule by the US Department of Labor in 1979.

¹⁰ This figure is 0.60% of GDP for 2002.

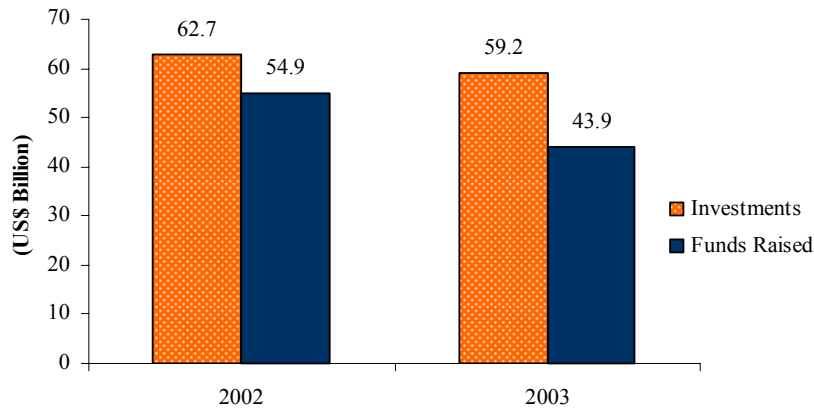


Figure 7: Venture Capital Investments and the Funds Raised in the US

A study conducted by NVCA documents the scale of the VC investments in the US. Over the period 1970 – 2000 venture capitalists in the US invested \$273.3 billion in 16,278 companies. VC backed companies employ around 9.5 million people and generated around \$1.6 trillion sales during 2000 representing 5.9% of nation’s job and 13.1% of America’s GDP of that year. In 2003 these figures hiked up to 10.1 million jobs¹¹ and \$1.8 trillion in sales which corresponds to 9.4% of US private sector employment and 9.6% of total company sales. In both employment and sales terms VC backed companies outperform their national private sector counterparts. For example for the period of 2000 – 2003 VC backed employment increased 6.5% whereas overall private sector employment dropped 2.3% for the same period. For sales figures numbers show that VC backing adds value to companies as well. Between 2000 and 2003 sales at VC baked firms grew by 11.6% whereas nationwide sales grew was limited to 6.5% for the same period.

¹¹ Venture backed companies added around 600,000 net jobs to the US economy between 2000 and 2003.

The study also found that, “venture capital financed companies had approximately twice the sales, paid almost three times the federal taxes, generated almost twice the exports, and invested almost three times as much in R&D per \$1,000 in assets as did the average non-VC backed companies for the same period.

Following the general perception of diminishing investment opportunities in developed countries and after the dot.com bubble burst in 2000, most of the US venture capital companies had lots of difficulties to find “home run¹²” investment alternatives. Therefore in order to make their fund providers happy and meet their return expectations, US venture capital companies turned their focus to abroad opportunities. Similarly US fund providers allocate less amount of money to US venture capital companies and channeled their money to foreign opportunities.

The US venture capital industry has been investigated by other nations in order to be able to duplicate its structure (and hopefully its success) in their own countries.

2.6 European Venture Capital Industry

Although, Europe is the second biggest venture capital market in the world after the US, the development and structural formation of European venture capital industry is far later than that of American venture capital industry. As Table 1 indicates, both in

¹² As a nature of venture capital business some of the venture capital investments go bankrupt and some of them have average return at the end of the investment period. A venture capital investment with high IRR (Internal Rate of Return), usually higher than expected at the beginning of the investment period, can be defined as a home run venture capital investment.

terms of fund raised and investments made Europe accounts for around $\frac{1}{4}$ of the respective figures of global venture capital markets for the last decade.

As of 2004, the amount of venture capital investment in Europe is around €37 billion, which represents a 27% increase with respect to previous year's figure.

Venture capital investments account for 0.30% - 0.40% of Europe's total GDP¹³.

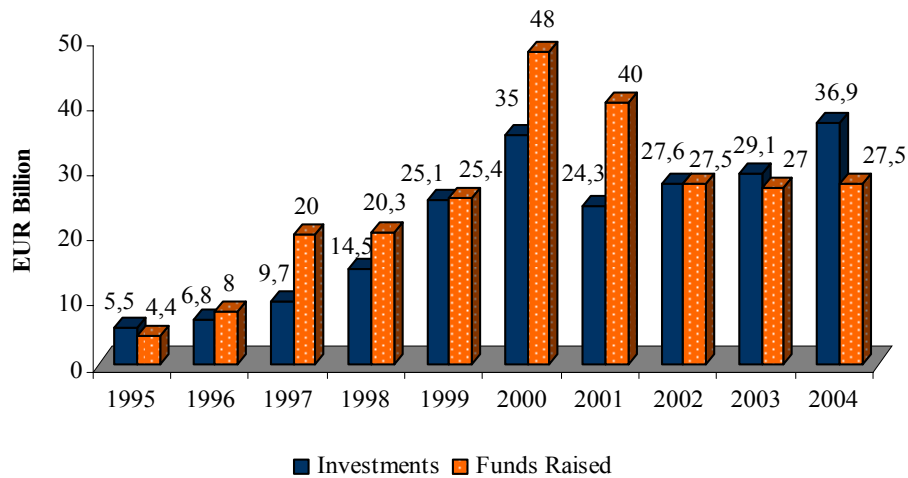


Figure 8: European Investment and Fund Raising Trends

When the breakdown of the venture capital investments by stage is demonstrated one can easily figure out that buyout investments get the bulk of total venture capital investments in Europe.

¹³ In 2003 the amount of venture capital investment accounts for 0.36% of Europe's GDP (Based on 2002 GDP for Europe as calculated using The World Bank Development Indicators (\$9,568 billion)).

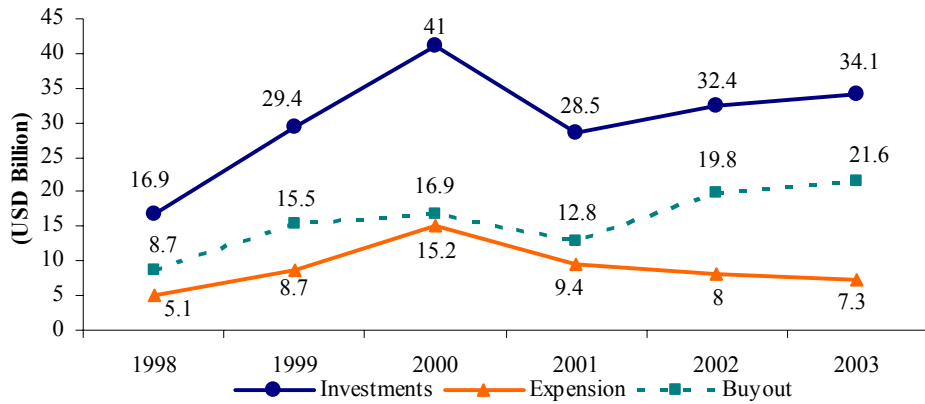


Figure 9: European Investment Trend by Stage

As Figure 9 indicates buyout investments constitute 40% - 60% of the total venture capital investments for the last six years. Similarly expansion investments take another 20% - 35% of total venture capital investments for the same period. All these figures indicate that European venture capital companies channel their funds to later stage investments. For 2002 and 2003 the pie charts show the breakdown of the venture capital investments by their stages.

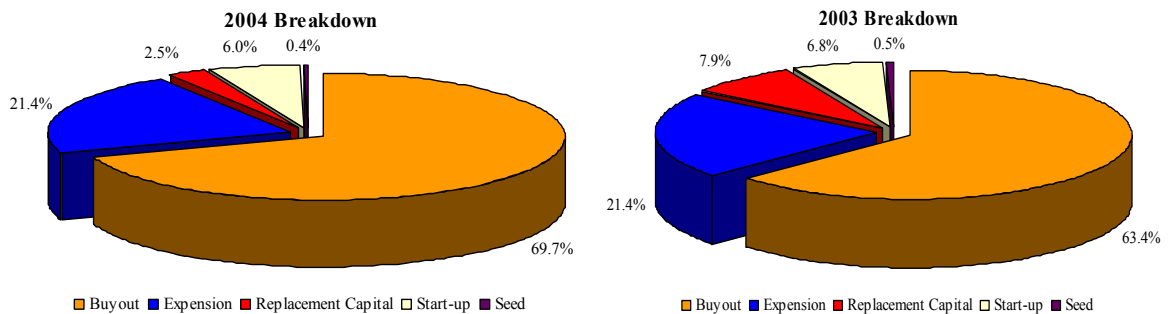


Figure 10: Stage Breakdown of 2003 – 2004 European Venture Capital Investments

The sources of funds are another important issue for European venture capital industry. Unlike American venture capital industry (in which pension funds, individuals and corporations are the main sources of the venture capital funds) banks are the main sources of European venture capital industry.

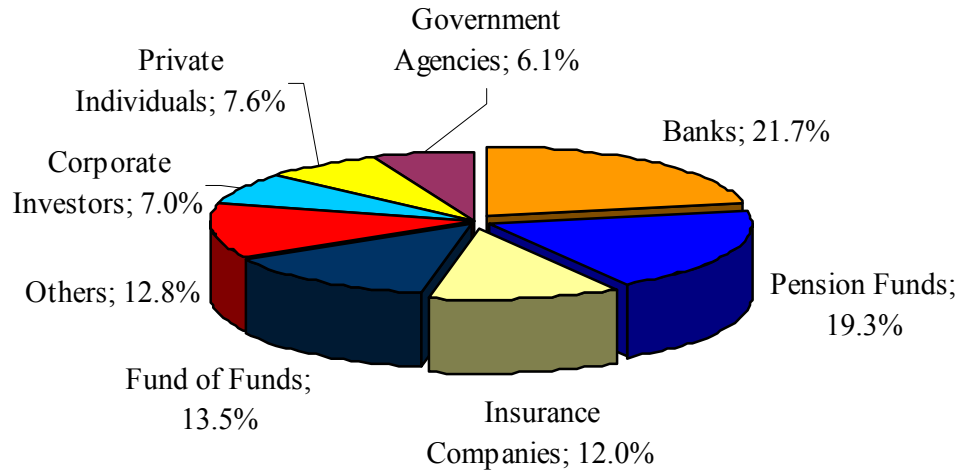


Figure 11: Sources of New Funds Raised in 2004 in European Venture Capital Industry

As Figure 11 indicates, in 2004, banks have 21.7% market share in venture capital funds sources. Pension funds, fund of funds and insurance companies are the followers with 19.3%, 13.5% and 12% respectively¹⁴.

Since IPO is one of the most viable exits for the venture capitalists it is very important to show that how active stock markets and how possible for a venture capitalists to disinvest through an IPO. Figure 12 shows that the technology bubble burst in the US affected the European stock market deeply and IPO window is almost closed. For 2002 and 2003 the numbers of IPOs throughout Europe were 13 and 9 respectively. After the economic recovery and changing investment trends this figure climbed to 34 in 2004.

¹⁴ For 2003, these figures are 21.5%, 19.4%, 16.4% and 8.7% for banks, pension funds, fund of funds and insurance companies respectively.

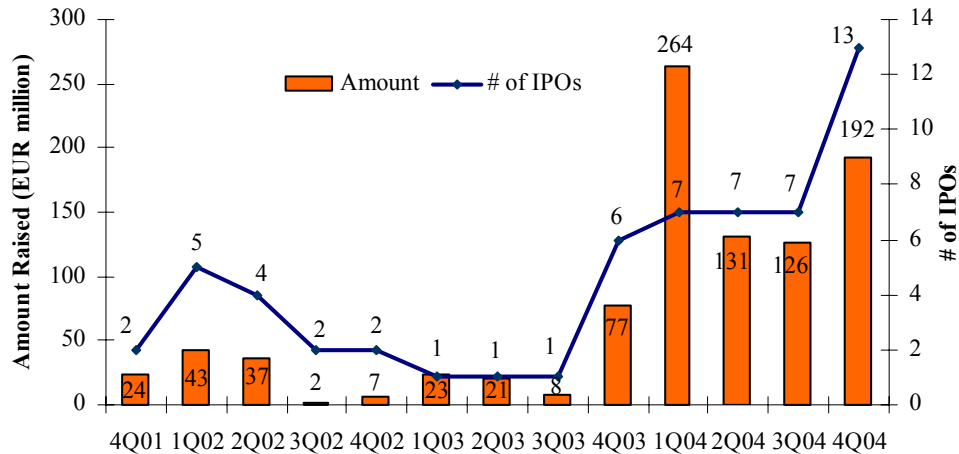


Figure 12: The Number of IPOs & Amount Raised Through IPOs by European VC Backed Companies

2.7 Comparison of the US and European Venture Capital Industries

There are similarities as well as differences between American and European venture capital industries.

Both in the US and in Europe the structure of the most of the venture capital organizations is limited partnership. Although there are some practice differences among the countries, the main reason of establishing the venture capital firms in limited partnership for is the tax and legal considerations. European venture capital market players use sophisticated monitoring devices as their US colleagues do. In their study Bottazzi et.al. (2004) stated that European venture capital industry is much more integrated than previously believed and has significant links to the US. They also reported that the European venture capital industry is increasingly emulating US venture capital industry's investment practices.

As Schwienbacher (2002) mentioned in his study, along with the similarities between the US and Europe venture capital industries, there are also some important differences among these industries. Megginson (2004) states that the main differences between American and European venture capital markets are related to the organization and the foundation of the investment vehicles in these two regions. The differences between the two venture capital industries can be classified as mainly in the use of convertible securities, deal syndication (co-investment), sources of VC funds, duration of the exit stage and replacement of the former management.

Use of convertible securities, which are by far less often used in Europe as compared to the US, can be defined as one of the most important difference between European and the US venture capital industries. It is usually believed that use of convertible securities often solves the moral hazard and adverse selection problems. Bascha and Walz (2001) stated that the superiority of the convertible securities is all the more justified the fiercer the effort problem and the higher the desired return of the venture capitalist relative to the return of the entire project. Furthermore it provides for the holders of convertible securities a protection against downside risk of investments by providing seniority rights over ordinary shares. This implies for entrepreneur to take more risk since it shifts his distributions of payoffs as compared to ordinary shares. Also use of convertible bonds allows entrepreneur retain more shares since after the conversion venture capitalist requires no more common shares compared to financing without convertible bonds.

It is usually expected a more frequent use of convertible securities if the capital contributions are staged¹⁵. Among European venture capitalists usually private and young VC companies are the ones which are most likely to follow the model of the typical relationship between a US VC company and its investments, namely refinancing of the investments by closed-end funds and use of convertible securities. It is also expected more convertible securities to be used if the VC company takes into account the possibility of an IPO as a viable exit. However, in that case most convertible securities converted into common stock prior to an IPO to present an uncluttered balance sheet to prospective investors.

Deal syndication (or co-investment) is another important tool used frequently in the venture capital industry. It is, generally the exception not the rule for one VC company to finance an individual firm entirely. Rather venture capital companies prefer two or more venture capital companies involved in most stages of the financing.

There are different reasons for a VC firm to have syndication(s) with other VC firm(s). These reasons can be classified as follows;

1. Risk diversification,
2. Improving the screening ability by investing into the company only after the second VC firm's positive due diligence process,

¹⁵ Staged financing usually takes place in start up situations in which the company has no past track record. In this case the venture capitalist puts some criteria (like revenue increase, EBITDA increase, increase in the number of clients etc) to be met by the company in order to release the second tranche of the financing and so on.

3. Decreasing the workload of the venture capitalists by getting involved in assessing the risks during the due diligence period and in managing the deal.
4. To have the commitment of a corporate investor to secure a distribution channel or a potentially important customer pool,
5. Certification and reputation increase by having syndication with a more reputable VC firm.

After analyzing the questionnaire answers from European and US venture capital companies, Schwienbacher (2002) finds out that syndication is used more often by US venture capital companies than their European colleagues. Schwienbacher (2002) also noted that the average size of the syndication used in the US is larger than that of Europe. On the other hand, syndication with regional colleagues occurs significantly more often in Europe. All these findings are in line with the idea that venture capital markets are less developed in Europe.

Sources of venture capital companies is another difference between the US and European venture capital industries. Bottazzi et.al. (2004) mentioned that prominence of bank and corporations as investors in European venture capital markets differs from US venture capital industry in which pension funds, individuals and corporations are the main fund sources of the venture capital funds. Similarly Megginson (2004) stated that European VC industry members rely far more on funds from financial institutions (which tend to be very powerful in Europe) and much less on pension funds, foundations and wealthy individuals¹⁶.

¹⁶ The European Private Equity and Venture Capital Association (EVCA) reports that banks, insurance companies, and government agencies accounted for over half (52.2%) of the €27.5

Duration of exit stage and the replacement of former management are the other important differences between the venture capital industries on both sides of the Atlantic.

Much of these differences can be brought to a common denominator, namely that European venture capitalists face a less liquid market for the human resources that go into the ventures as well as for the exit opportunities.

This relative illiquidity of European markets forces European venture capitalist to shop around for longer periods when trying to sell their shares and it makes replacement of key employees more difficult. For example Schwienbacher (2002) stated that on average only 22% of former entrepreneurs were replaced in Europe prior to the venture capitalist's exit as compared to 34% in the US.

It is often claimed that European venture capitalists are less active and limit their value-adding to making deals (financial engineering). Their American colleagues are told to add further value by monitoring more actively their portfolio companies.

billion raised by European venture capital funds in 2002, while pension fund money represented only 16.3% of total fund-raising. Individuals accounted for only 6.0%.

2.8 Venture Capital Financing Stages

The stages of the venture capital investments can be described as it can be seen from the below figure.

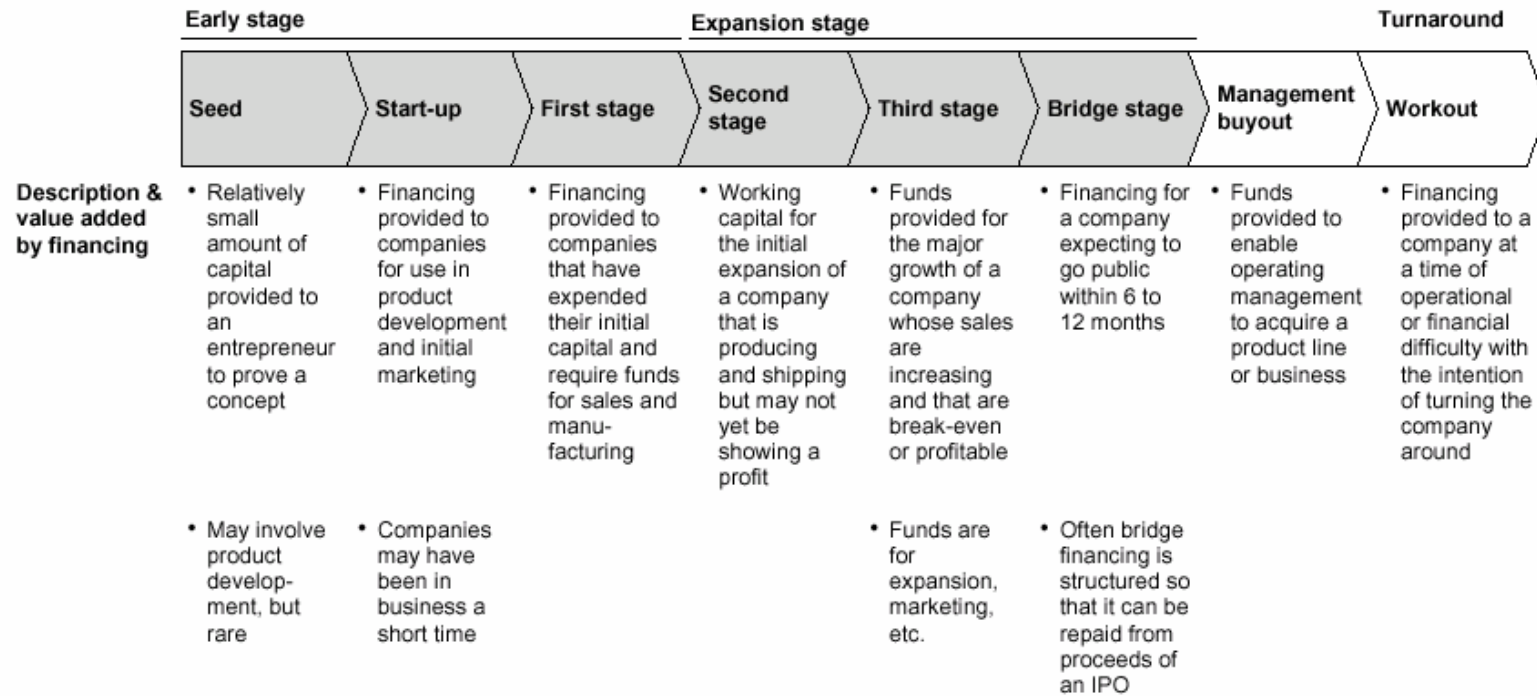


Figure 13: Stages of Venture Capital Investments

3 Venture Capital Industry in the UK

Venture capital industry of the UK is by far the most prominent and most developed venture capital industry among European countries.

The history of British venture capital industry goes back to 1929 where market failures in small firm financing were first recognized and reported by the Committee on Finance and Industry (the Macmillan Committee). In 1945, clearing banks and Scottish Banks were combined to finance the creation of the Industrial and Commercial Finance Corporation (ICFC). The Bank of England supported this formation from the beginning. In time the ICFC evolved to 3i, which became one of the UK's top venture capital funds.

Despite the fact that the initial steps had been taken by the government in 1940s, British venture capital industry was fragmented and immature until the late 1980s. Market size and depth were limited and the industry was in its early stages of development. The amount of venture capital investments started to hike up in late 1980s but this movement was short lived since the overall economy is negatively affected by the global economic recession of the early 1990s. With the help of the governmental actions taken to boost the development of the venture capital industry, the British venture capital industry developed to a respectable size and depth in the late 1990s and became European most developed and largest venture capital industry both in terms of funds raised and investments. In the second half of the 1990s the venture capital investments were almost tripled in value and reached to £6 billion in 2000.

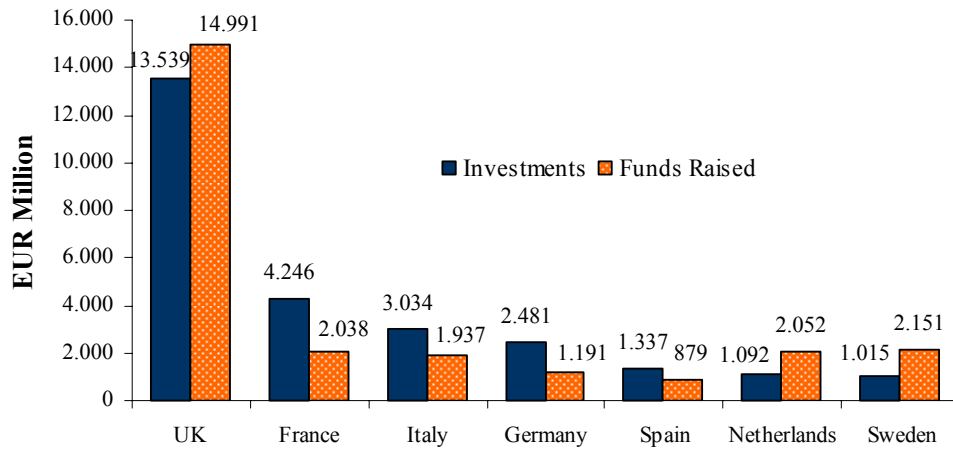


Figure 14: Venture Capital Investments and Funds Raised (2003)

As can be seen from Figure 14 both the size of investments and funds raised in the UK are well above the rest of the European countries. Figure 14 indicates that, the size of the venture capital investments in the UK is three times greater than second biggest venture capital market of Europe (i.e. France). This figure is much more dramatic for the funds raised. UK can raise 7 times more funds from her successor for venture capital investments.

British venture capital industry is by far the leader in Europe in terms of funds raised and there are some important points to be mentioned on the issue. The sources of venture capital funds are diversified in the UK. Institutional investors, banks, corporations, individuals and government are the main sources of funds of British venture capital industry. Pension funds are the largest sources of venture capital followed by insurance funds and banks. Although the pension funds are the major sources of British venture capital industry, their role is small compared to the US. In the US pension funds account for 50% of the total venture capital sources whereas this figure is around 25% for the UK. Slow capital flow from institutional investors

to venture capital investments in the UK is partly due to weak governmental regulations. Less than 1% of institutional assets (pension funds and insurance funds) are allocated to venture capital investments in the UK whereas this figure is 7% in the US. The 1986 Financial Service Act excluded the majority of UK pension funds from investing directly in venture capital funds. Additionally, Minimum Funding Requirement (MFR), designed to increase the protection of defined benefit scheme members and requires holding a minimum level of assets to meet liabilities, was introduced by the 1995 UK Pensions Act and came into force in April 1997. Governmental authorities are working on some new acts that may relieve these constraints for the institutional investors to channel their funds to venture capital industry.

Contrary to weak institutional capital flow to venture capital investments, international capital flow is a very important source of British venture capital market. For example in 2001 more than 70% of funds raised came from overseas investors, among which North America is the leader with its 46% share.

Venture capital investments in the UK are by far largest in Europe in terms of nominal value and as a percentage of GDP. Figure 15 shows the venture capital investments of major European countries as percentage of their GDPs.

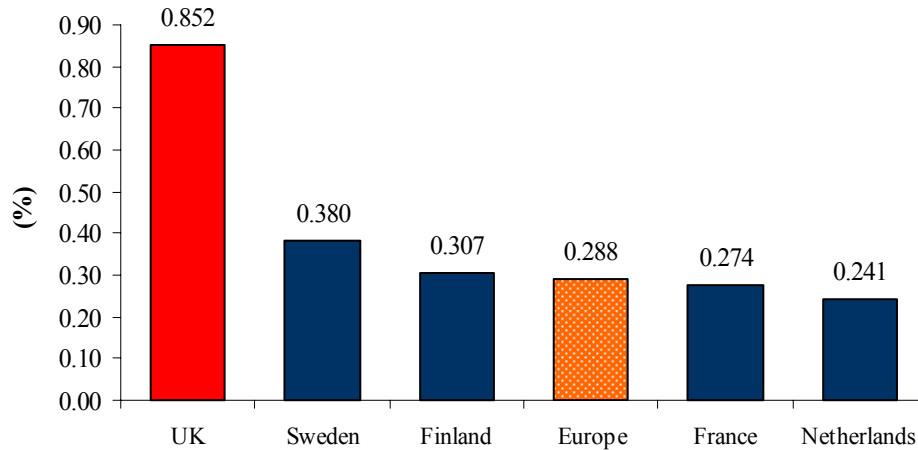


Figure 15: European Venture Capital Investments in 2003 (as % of GDP)

The UK is by far the leader among the European countries in venture capital investments as a percentage of their respective GDPs. Baygan (2003) stated that the UK is also the leader among OECD (Organization for Economic Co-operation and Development) countries in terms of venture capital investments as a percentage of their GDPs in the period 1998 - 2001.

The focus of the venture capital investments in the UK is mainly later stage companies. Increasing competitive environment for the companies force them to restructure themselves and dispose unprofitable and/or non-core business arms of their businesses. This trend created an opportunity for venture capital companies to finance management buy-in and management buy-out (MBI and MBO respectively) activities. Today later stage investments, especially MBIs and MBOs, receive the bulk of the venture capital investments in the UK.

High relative transaction costs for early stage investments such as financial due diligence and lawyer costs, make early stage venture capital investments unattractive and relatively small compared to later stage investments.

British government has taken some important actions to channel more venture capital funds to start-up and early stage companies. Enterprise Investment Scheme (EIS) introduced in 1994, was designed to help overcome the problems faced by small companies in raising small amount of capital. The EIS is available for both small companies and established companies and provides a range of tax relieves for investors.

The Venture Capital Trust (VCT) scheme came into force in April 1995. VCTs are quoted companies to attract investments from individuals and invest into qualified companies. VCTs are tax exempt institutions and individuals who invest in VCTs are entitled to tax incentives.

The Corporate Venturing (CV) scheme, introduced in 2000, is intended to encourage corporations to make venture capital investments. Tax relieves and exemptions are major incentives of VC scheme. The corporations are eligible to tax incentives given by the CV scheme if and only if they hold more than 30% of the issuing company's ordinary share capitals and the gross assets of the issuing company does not exceed £15 million.

Along with these actions several tax incentive schemes were implemented to make small firms to be able to access capital sources.

The UK government realized that one of the most important reasons of small amount of money channeling to start-up companies was the exit route problem. Since the major consideration of any venture capitalist is to exit from his investment after a certain period of time, the difficulty to find such a path could be a major drawback for a venture capitalist to invest into a promising company. In order to establish an exit mechanism for venture capitalist to exit from his relatively small investments, the London Stock Exchange introduced the Alternative Investment market (AIM) in 1995 as a second tier stock market with less stringent admission requirements and lower initial and continuing costs. The AIM is expected to better suit the IPOs of young and high growth companies.

The UK government and responsible institutions dealing with venture capital business are expecting that these rules and regulations will be beneficial for small companies seeking for capital.

4 Venture Capital Industry in Germany

The development of VC industry in Europe was started far later than that of in the US. Until the early 1970s, there was no institutional structure available for the support of more risky start-up ventures in Germany. In the 1970s, Germany's economic growth started to slow down and consideration was given to how more growth could be generated in the small business sector. This led to the following of Germany's first VC company, the Deutsche Gesellschaft für Wagniskapital (German Society for Venture Capital, WFG). The founding of WFG marked the beginning of modern venture capital industry in Germany.

While it initially focused on start-up enterprises, the WFG shifted emphasis somewhat in the early 1980s, when its funds were divided equally among start-ups (companies earning between DM 1 to 10 million) and companies earning between DM 20 to 50 million. In 1984, the WFG was restructured and the emphasis shifted toward later stage investments. In 1988, the WFG underwent another organizational change and Deutsche Bank, one of the partners in WFG, bought out other partners and integrated WFG its own subsidiary.

The second VC company entered into the market was Hannover Finanz GmbH, in 1979. In 1982 the third VC company, Landesfonds des Landes Berlin, entered into the market and in 1983 eight new VC companies joined their colleagues. On 29 January 1988 German Venture Capital Association e.V. (BVK)¹⁷ was formed and on 8 December 1989, BVK and DVCA (Deutscher Venture Capital Verband) merged into BVK. BVK is the organization of German venture capital companies and representatives of foreign venture capitalists operating in Germany. As of today BVK has 275 members under its roof.

In March 1997 Neuer Markt, Germany's trading stock market for innovative growth companies, was established as a means to provide an exit mechanism for VC companies from start-up companies and to offer young and fast-growing companies a way to raise capital. The establishment of the Neuer Markt opened an alternative exit mechanism for venture capital companies and helped German venture capital

¹⁷ Bundesverband deutscher Kapitalbeteiligungsgesellschaften

industry to enter an unprecedented period. Between 1996 – 2000 around €10.8 billion were invested which account for 68% of total venture capital investments over the last 30 years to date.

With the effect of developments in the industry, German venture capital market becomes one of the largest VC markets in Continental Europe. The main reasons for the growth of venture capital industry in Germany are twofold. Firstly, the emergence of the Neuer Markt, a stock market for young and fast growing corporations, has formed an attractive exit channel for VC companies. Secondly, the rapid development of the industry has been promoted by public assistance for young firms and investments in such firms either directly or indirectly via stated-owned agencies.

Although the VC market in the US, the advocate of the venture capital industry all around the world, is stock market-oriented, the VC companies in Germany are usually bank-backed. Also German venture capital companies are not as actively involved in managing their investments as their US or UK counterparts. They have traditionally not held board representation, nor have they been involved in day-to-day management issues.

Banks are by far the most important source of finance for the VC industry in Germany. They are nearly twice as popular as the second largest source of finance, individual investors. Bank finance is between three and four times more popular in Germany than finance from industrial corporations or insurance companies. Another important feature of German venture capital industry is most of the VC companies in

German rely exclusively on bank finance as the source of the capital. Over 60% of the VC funds that raise money from banks use this source exclusively. The equivalent figure for example for the UK is about one third. Pension funds are conspicuously absent as a source of venture capital funds in Germany¹⁸.

Advocates of bank-centered capital markets claim that this structure fosters patient capital markets and long term planning, while a stock market-centered capital market is said to encourage short-term expectations by investors and short-term strategies by managers. Advocates of stock market-centered systems stress the adaptive features of a market for corporate control which are lacking in bank-centered systems, and the lack of empirical evidence of short-term (Gilson and Black (1999)).

Mayers et.al. (2002) stated that there is a significant relationship between the sources of finance of VC companies and their investment activities within countries. In particular banks, insurance and pension funds backed VC companies invest in later stage activities whereas VC companies relying on individual investors and corporations favor earlier stage activities. In line with Mayers et.al.(2002) the bulk of the investment of German VC industry channeled to later stage investment opportunities.

¹⁸ As a result of on-going reforms in the German pension system, pension funds have become a much more important source of funds for the VC industry. It is expected that the weight of the pension funds as an important source of funds for the venture capital industry increase in the near future and the differences between Germany and the UK in this respect may therefore diminish over the next few years.

Labor market rigidity forms a large barrier to the success of VC investing in Germany. This is quite important especially for early stage companies because the probability of an early stage investment going bankrupt is higher which increases the probability that the employees of the venture will have to find other jobs. All things being equal this will be more difficult in a country with higher labor market rigidity.

Unlike in the US and in the UK, tax system in Germany does not favor VC investments by corporations. They cannot obtain a capital gains tax rate reduction. Corporate investments are taxed at the 56% corporate tax rate. Trade taxes and capital transaction taxes provided an additional burden.

Despite the fact that the German Government intends to encourage the industry, the weight of venture capital in German financial system is still relatively small. New and early stage investments as a percentage of GDP were only 0.0063 in 1995. Part of the problem in Germany appears to be both cultural and institutional aversion of risk taking. While some recent success stories on the German VC market indicate that this might be changing.

5 The Exit Strategies

The ultimate goal of a VC company is to exit from its investments with a substantial return. To achieve this goal a VC company monitors both its investments and financial markets to be able to exit in the right time. Successful exits are critical to ensuring attractive returns for investors and in return, to raising additional capital in the long run for venture capitalists.

In the context of venture capital financing an efficient solution of exit problem is vital both for the development of the whole capital market and for the success of single investment (Bascha and Walz (2001)). The exit process is of central interest because venture capital investments typically do not pay dividends; rather returns are derived from capital gains upon exit. In fact a VC company's decision to invest in to a company typically depends on exit potential (Cumming and Fleming (2002)).

The timing of exit of VC company from any of its investment is of most importance. Venture capitalist usually wants to exit from his investments at the time where the valuation of the company is the highest.

Exit responds to three contracting problems in the venture capitalist-capital provider relationship. First, capital providers need a way to evaluate venture capitalists' skills, in order to decide which managers to commit new funds. The venture capitalist can provide a good signal to his or her fund providers by exiting from a successful investment in case fund providers cannot directly evaluate the ventures due to adverse selection problem. Second, capital providers need to evaluate the risks and returns on VC investments in order to decide whether and how to invest in venture capital companies. Third, capital providers need to be able to withdraw funds from less successful managers (Gilson and Black (1999)).

As Cumming and MacIntosh (2002) stated in their study, it is generally believed that a VC company exits from an investment when the projected marginal value added as a result of the VC company's efforts, at given measurement interval, is less than the projected cost of these efforts. Therefore an exit will take place when the

maintenance cost of the investment increase unexpectedly or when the VC company's potential value added diminishes sharply. If there is no chance that the shares may become liquid after some years, venture capitalists usually not invest.

As mentioned in Schwienbacher (2002), there are several reasons for the entrepreneur to allow the venture capitalist to exit from the company as soon as possible. One is the controlling benefits that he enjoys after the exit. Another reason to let the venture capitalist exit from the company is the possibility of to refinance the company at a lower cost of capital once the venture capitalist is no longer needed¹⁹. Last but not least, as far as the entrepreneur does not need any advice and services from the venture capitalist anymore, it is in his advantage to let the venture capitalist exit to reduce the extensive monitoring he is often facing. Schwienbacher (2002) found that the possibility of going public provides additional incentives for entrepreneurs to work harder since it creates so called "implicit contracts" for control in form of private benefits.

However, there are some risks of venture capital exits for the entrepreneur like possibly losing control, changing the board composition or changing the legal status of the company. These risks may make the entrepreneur reluctant to let the venture capitalist exit and thus affects the degree of liquidity of the investment.

For a typical investment, venture capitalists exit their investments by one of the following five methods²⁰:

¹⁹ i.e. when informational asymmetry with the outside investors is significantly reduced.

²⁰ Sometimes, due to economic conditions and the availability of the exit channels venture

i. Initial Public Offering (IPO): This exit method seems to be the primary avenue for VC companies from their successful investments²¹. In such an exit, venture capitalist sells his shares to public through an offering. This selling procedure can be in different aspects. Venture capitalists sometimes sell their shares to public along with the other shareholders or alone or sell their shares at once or at stakes in different time periods. Black and Gilson (1998) studied the link between venture capital market and the stock market and argue 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. The possibility of an exit through an IPO allows the venture capitalist 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. There seems to be a general belief in the academic literature that going public is the most profitable and prestigious exit route for venture capitalists. Gompers (1995) reports that the annual rate of return for venture capital is 60% when exit occurs through an IPO and only 15% in case of a trade sale. Among all the alternative exit channels, IPO is considered to be the most likely one to carry the greatest information asymmetry between the firm and its new owners. Cumming and MacIntosh (2003) argued that while all but small IPOs are sold mainly to institutional investors, institutional money managers will not possess the same

capitalists can use more than one of these exit strategies together in order to have a successful exit from their investments. The channel and the methodology totally depend on the market conditions, the return expectations and the time constraint of the venture capitalists.

²¹ According to National Venture Capital Association (NVCA) over the last twenty five years, almost 3,000 companies financed by venture funds have gone public.

degree of expertise in any particular technology as the strategic acquirers nor will they be as knowledgeable as entrepreneur herself in the case of buyback. Thus public buyers will be the least sophisticated purchasers.

ii. Acquisition: Acquisition is the case in which the entire firm is bought by a third party and so the VC company exits from the investment. This form of exit may be affected in a number of different ways. For example, the transaction may be structured as a sale of all the shares in return for cash, in return for the shares of the acquirer firm or other assets. Alternatively, the transaction may be structured as a sale of the firm's assets or as a merger between the investee firm and the purchasing firm. Taking into consideration that the VC investments are made mostly to technology companies, acquisition exits can be mostly subject to the share exchanges of the acquirer and the invested company. Because technology investments are riskier than non-technology investments they are more difficult to value. Giving the share of the acquirer company to the investee company's shareholders splits the risk between purchaser and the seller.

iii. Secondary Sale: In secondary sale case, the venture capitalist sells his shares to a third party, usually a strategic acquirer and in some rare cases to another venture capital company. A secondary sale differs from an acquisition exit in that only the shares of the venture capital company are sold to the third party. Other shareholders of the investee company retain their shareholdings. This kind of exit can be considered as an inferior exit to an acquisition exit from venture capitalist's point of view. There are some basic reasons for this inferiority. First of all a strategic acquirer will prefer to purchase 100% of the firm, since it then has much greater freedom to

use the firm's assets and technology unhindered by legal obligations to other owners. Second of all since in a secondary sale the buyer will purchase less than 100% of the firm, the incentive and ability to monitor post-exit will be less than in connection with a strategic acquisition (lowering the value of the purchase to the acquirer). Finally, a secondary sale will typically involve a sale of the venture capitalist's shares but not the entrepreneur's. This may be indicative of a breakdown in the relationship between the entrepreneur and the venture capitalist²². This is frequently associated with a lack of clear direction, purpose and hence an investment that is floundering.

iv. Buyback: In buy backs, the shares of the investee company owned by the venture capitalist are repurchased by one or more of the shareholders of the firm. Cumming and MacIntosh (2003) argued that this form of exits are inferior form of exits and reserved for cases in which the investment is a "living dead" or "lifestyle" company that satisfies the entrepreneur's desire profit but has virtually no home run potential from the venture capitalist's point of view. In buybacks, the venture capital company usually prefers to exit from the investee company at once. But in some cases, although the investment is a living dead some partial exits can be experienced since the entrepreneur has not enough resources to finance a full exit. Although in buybacks none of the parties suffer from information asymmetry, such exits put a large strain on the firm's and/or the entrepreneur's cash resources and thus almost by definition does not involve companies with high valuations.

²² This kind of sale can be considered from the outsiders that these two parties (i.e. the entrepreneur and the venture capitalist) do not want to work on the same team anymore.

v. **Write-off:** The least likely option for a VC company to exit from the investee firm is the write-off. An investment will be fully written-off if the VC company determines that there is little or no chance of recovering even the initial investment. In such cases the VC company walks away from the investment with no return. Sometimes VC company does not write-off the all investment at once but instead write down the book value of the invested company (i.e. partial write-off)²³.

Information asymmetry is one of the most important problems between the seller and the buyer of any goods or services. This is of special importance for VC companies since they try to sell their investments to third parties with a considerable return prospect. Venture capitalist's aim is to maximize capital gains upon the sale of the shares of the entrepreneurial firm. All else being equal, the new investor will pay the most when information asymmetries are lowest. Therefore, in order to maximize the capital gain upon exit, a VC company will choose the exit vehicle for which the new owners are best able to resolve information asymmetry.

In order to avoid asymmetry problem, VC companies usually try to give the best and most clear signals to the third parties for their selling of any investments. According

²³ Although theoretically a partial write-off for a VC company is possible, in practice this is not a kind of exit mechanism that a VC company plans to execute. There are some main reasons for that. Firstly, as long as the company is in his portfolio, venture capitalist will put some effort and spend some time (although it would be very limited) to bring the investment back to fruition. This would cause the allocation of qualified staff to a "living dead" investment. Secondly, partial write-off signals outside that the VC company is carrying a poor quality firm in its portfolio. Hence partial write-off is not a preferred way of exit for a VC company.

to Cumming and Fleming (2002) it is predicted that VC companies will only take public the best quality firms for which informational asymmetry is least pronounced.

Among the above-given five exit alternatives for a VC company, IPO exit seems to be accompanied by the greatest information asymmetry. Given that a common exit strategy for venture capitalist is an IPO, the share performance of VC-backed IPO is of considerable interest.

It is believed that there are two main ways for a VC company to avoid information asymmetry problem. One is underpricing the shares more than the market average so that the information asymmetry can be compensated by lower price. The second way is convincing the public that if a VC company invests into a firm, the information asymmetry problem can be minimized since VC company usually require systematic information from the investee company. Also reputation is of most priority for a VC company since it repeatedly brings firms from its portfolio to public. If a VC company's name is associated with failures and/or any kind of misconduct in the market, this may tarnish the reputation of the VC company and ability to bring firms public in the future. Therefore the supporters of the latter argument believe that VC companies do not need to underprice their offerings more than the market average. They even believe that VC backed company's shares should be less underpriced than that of non-VC backed company. Megginson and Weiss (1991) found evidence that market reacts favorably to the presence of VC financing at the time of an IPO. However, they stated that this favorable reaction is also related with the percentage of shares that the venture capitalist holds in the company. When this percentage decreases so does the impact of the favorable reaction of the public to the company.

The purpose of this study is to investigate which of the above arguments is true for the German and British venture capital markets and also look for the conflict of interest issue if the underwriter of the issuing firm and the VC company are related. In other words what are the consequences of the IPO performance of the firm if the underwriter bank holds equity in the firm through a VC subsidiary?

Before conducting such a study we first have to check out the academic researches that have been conducted on the topic.

6 Literature Review

The attention of academics about the IPOs are mainly focus on some important issues like underpricing, venture capitalist and underwriter certification and their effect on the pricing of the IPOs. Extensive studies have been conducted by the academics in order to determine the most important facts, sources and the consequences of the IPOs.

The shareholders of the issuing firm sell securities infrequently and if they intentionally increase the offer price above what it should be and misconduct the offer somehow they will be punished far in the future if at all. Their gain, however, would be immediate and possibly very large. Therefore at the time of an IPO they are assumed to have a tendency of signaling the outside investors falsely. In the absence of effective signaling mechanism in IPOs, outside investors are likely to be convinced that the accurate information disclosure has occurred only if a third party, with reputational capital at stake, has asserted such and will be adversely and

materially affected if that assertion proves false. The other way of convincing the third party is to reduce the offering price (“underpricing”).

6.1 Underpricing

Underpricing can be defined as the percentage difference between the closing market price on the first day of trading and the initial offer price. Rock (1986) posits that underpricing occurs to compensate the uninformed outside investors for the risks they will end up with the less successful IPOs. Muscarella and Vetsuypens (1989) view underpricing as a cost that companies should bear when they go public because of the uncertainty surrounding the true value of the offering.

Underpricing is a real loss for the venture capitalist and other shareholders of the issuing company because it transfers wealth from the existing shareholders to new shareholders. Underpricing is directly correlated with “money left on the table” concept. Money left on the table can be calculated by multiplying the total number of shares issued at the time of IPO with the first trading day (initial) return or in other words underpricing.

6.2 Certification Effect

In theory, asymmetric information can be encountered in four different ways:

- Among the investors,
- Between issuer and investors,
- Between issuer and underwriter,
- Between underwriter and investors.

The basic principle lying behind the certification effect mechanism is that when outside investors believe information advantage of a third party (i.e. venture

capitalists and/or underwriters), this party is able to certify the quality of an issuing company if it has reputational capital which is greater than the largest possible one time wealth transfer of certifying falsely. Moreover both parties (venture capitalists and underwriters) have reputational concerns for their future as underwriters regularly deal with institutional investors and have to attract new issuing companies and venture capitalists have to raise new funds in the future. Considering these reputational concerns, one should easily come up with the conclusion that involvement of prestigious venture capitalists and/or underwriters in an IPO signal the quality of the issuing company to the outside investors.

Asymmetric information is likely to be more common for small firms since individuals spent considerably less time tracking returns than institutional investors do. Among the all alternative exit channels IPO is considered to be the most likely one to carry the greatest information asymmetry to the new owners. Cumming and MacIntosh (2003) argued that while all but small IPOs are sold to mainly to institutional investors, institutional money managers will not possess the same degree of expertise in any particular technology as the strategic acquirers. Nor will they be as knowledgeable as entrepreneur herself in the case of buyback. Thus public buyers will be the least sophisticated purchasers.

It is generally believed that venture capitalists have several mechanisms to ensure that the firms go public at times that they perceive as optimal. Successful timing of the IPO market provides significant benefits to venture capitalists since they generate

the bulk of their profits from firms that go public²⁴. Taking companies to public when equity values are high, minimizes the dilution of the venture investors' ownership stake (Gompers and Lerner (1999b)). The deliberate underpricing of a new issue, which may be easier to accomplish in a hot market "leaves a good taste" in investors mouth. These investors are then more willing to purchase shares in follow-on offerings.

6.2.1 Venture Capital Certification

In literature the significance of venture capitalist among the shareholder structure of an issuing firm at the time of an IPO has been investigated extensively for a very long time.

The supporters of Certification Hypothesis²⁵ believe that VC backed companies should be less underpriced than non-VC backed companies when they go public. The supporters of this hypothesis claim that presence of a venture capital company as an investor in a firm going public, can certify that the offering price of the issue reflects all available and relevant inside information and thus underpricing should be less than the market average. The basic argument lying behind this idea is that as

²⁴ This is true even though the venture capital companies usually sell little or no shares at the time of the IPO.

²⁵ The Certification Hypothesis simply states that having a venture capital company among the shareholders' structure at the time of IPO and/or the IPO is underwritten by a reputable investment banking has a positive effect on outside investors' perception about the IPO. Having venture capital company and/or reputable investment bank involved in the IPO, signals the quality and financial strength of the issuing company and signals that there will be potentially less asymmetric information at the IPO process. Therefore investors would demand less underpricing compared to market average.

shareholders, venture capitalists possess certain screening and monitoring abilities that positively impact initial and long-run performance of the IPOs and consequently the market value of the firm. It is assumed that the venture capital companies are in a position to reduce the adverse selection problems for the IPOs by signaling the quality of the firm. Similarly since the venture capital companies have to raise new funds repeatedly they are faced a very major reputational risk. Hence, one would easily predict that in order to keep his reputation venture capitalist would always bring good quality companies to public.

Meggison and Weiss (1991) employ a matched pairs methodology where a sample of VC backed IPOs is matched by industry and offering size with a qualitatively equivalent set of non-VC backed IPOs, to answer the question of whether having a VC company among the shareholders can reduce the underpricing of a firm's shares during the public offering. They come up with the conclusion that "VC backed IPOs experience less underpricing because of the quality certification function performed by VC backing." They argue that because venture capitalists repeatedly bring firms to public market, they credibly stake their reputation on the quality of the issuing firm. In other words venture capitalists can certify to investors that the firms they bring to market are not overvalued. Certification requires that venture capitalists possess reputational capital, that the acquisition of such reputation is costly and that the present value of lost reputational capital by cheating is greater than the one-time gain from behaving in a duplicitous manner.

Meggison and Weiss (1991) documented that VC backing reduces the mean and the median degree of IPO underpricing and that such backing significantly reduces the

underwriting spread charged by the investment banker handling the issue. They stated that the certification provided by the venture capitalist will be both a partial substitute and a complement to the certification provided by prestigious auditors and investment bankers.

Gompers (1996) mentioned about his “Grandstanding Theory” and reported higher initial returns for venture capital backed IPOs. According to the theory young venture capital companies take actions that send signals about their ability to potential outside investors. As a result, young venture capital companies bring firms public earlier than their older colleagues in an effort to establish a reputation and successfully raise capital for new funds. Gompers (1996) demonstrates that young venture capital companies are willing to incur costs by taking companies public earlier than would maximize the return on those individual companies and earlier than would an established venture capital company.

Gompers and Lerner (1999b) stated that the rush of young venture capital companies drag their young and premature portfolio firms into public markets, known as “grandstanding”, may have a harmful effect on the long-run prospects of these firms. They support Grandstanding Theory with the data they provided that the young venture capital companies have been on the IPO company’s board of directors fourteen months less and hold smaller percentage equity stakes at the time of IPO than the more established venture capital companies. The IPO companies that they finance are nearly two years younger and more underpriced when they go public than companies backed by older venture capital companies. Much of the difference in underpricing and the venture capitalists’ percentage equity stake are associated with

a shorter duration of board representation, indicating that rushing companies to the IPO market imposes costs on the venture capital company. Grandstanding Theory holds as Sirri and Tufano (1998) demonstrates that past performance is a strong indicator of the ability to attract investors. The venture capital industry is well suited for examining reputation and capital raising because most venture capital organizations raise money in limited partnership. Since these partnerships have limited lifetime they have to show some success stories to their investors in order to raise second, third round capital to continue venture capital business. A venture capital organization (i.e. a limited partnership) would cease its operations without raising new capital. This puts pressure on young venture capital companies since they do not have any historical success or past performance that convince their fund providers to raise another round of capital²⁶.

Lerner (1999) and Gompers and Lerner (1998) report that VC backed IPOs significantly outperform before the exit and significantly under perform after the exit of the venture capitalist. These results may suggest some exceptional insights or abilities by venture capitalist with respect to valuation and exit behavior. In contrast, such a result may be an outcome of private information or specific price influencing measures, indicating that certain conflicts of interest may arise when VC firms are involved.

²⁶ Most limited partners in venture capital funds are institutional investors. Their role in the day-to-day operations of the fund is restricted by law. These limited partners receive periodic reports about the status of the fund but they do not participate in policy decisions. Therefore evaluating a venture capital company's performance is difficult for its limited partners.

Da Silva Rosa et.al. (2002) conducted a study to measure the market performance of VC backed IPOs in Australia. They stated that VC backed companies are more underpriced although the difference is statistically insignificant. And they come up with the conclusion that the experiment is inconclusive, about whether venture capitalists can certify firms and thereby reduce underpricing of those firms or not.

Venture capital companies usually have a very strong incentive to establish a trustworthy reputation in order to retain access to the IPO market on favorable terms. Also having a good reputation for competency and honesty will allow VC companies to establish long lasting relationships with pension fund managers and other institutional investors who are vitally important as investors in VC funds and as the purchasers of shares from IPOs. Similarly since venture capital companies repeatedly bring firms to public, they build strong and long lasting relationships with underwriters and auditors. These relationships may lead to average VC backed IPOs having higher quality underwriters and auditors than their non-VC backed counterparts. Gompers and Lerner (1999b) argue that the existence of such relationships and reputations should lead to greater institutional holdings of the VC backed firms after IPO. They also claim that the retention of large stakes of equity both before and after the IPO is a “bonding mechanism” that increases the effectiveness of the venture capitalist’s certification.

Brav and Gompers (1997) look for the long-run performance of VC backed and non-VC backed companies. They state that the underperformance is usually the case for small non-VC backed companies. They found out that over a five-year period, the returns on non-VC backed IPOs are significantly below than those of VC backed

IPOs but only when the returns are weighted equally. By using different benchmarks to gauge the robustness of IPO performances they found out that the underperformance in the non-VC backed companies is driven primarily by the small issuers. They pointed out that the underperformance of small firms may have various explanations. First, unexpected shocks may have hit small growth companies in the regression period. Another possible explanation for the underperformance of the small companies can be investor sentiment to these firms. Institutional investors usually do not want to invest into small companies because they generally invest such large amount of money that they become one of the major shareholders of the company, which they do not want because of the regulatory reasons. Therefore usually the individual investors are the main shareholders of such small companies.

Meggison and Weiss (1991) showed that institutional holdings of equity after an IPO are substantially higher for VC backed IPOs than they are for non-VC backed IPOs. Relatively higher institutional holdings may occur because institutions have greater information on small VC backed firms through their investments in VC funds. And the long-run IPO performance of a company is positively related with institutional holdings.

6.2.2 Underwriter Certification

When considering underwriters' involvement in the IPOs one should be aware of the fact that there is a dilemma for the underwriting banks' role in the IPOs. An investment bank, acting as an agent for the firm issuing securities in the public offering, has an incentive to declare a high price and raise as much money for the company for as little equity as possible. In addition, its fee is based on the size of the

offering. On the other hand, the investment bank is concerned about losing its ability to place shares in future offerings if it develops a reputation for pricing offerings too high. The investment bank also has long-term clients on the purchasing side (e.g., large mutual and pension funds) which provide substantial amounts of business for the bank. The investment bank does not want these clients to be hurt by offering the issue at too high of a price. These concerns will limit how high the investment banker will set the price of any particular offering. In other words, the investment bank maximizes the offering price subject to the possibility that selling overpriced shares will tarnish its reputation.

Brav and Gompers (1997) found that the quality of the underwriter is related to the long-run performance of IPOs, consistent with greater asymmetric information being associated with lower returns.

6.2.3 Conflict of Interest

Although venture capitalist and underwriter certifications are important on their own, if there exists a relationship between these two parties the positive certification effect is replaced by the negative effect of potential conflict of interest issue. Therefore one should be aware of the fact that the general perception of the investors may change significantly if there is a relationship between the underwriter(s) of the IPO and the venture capitalist(s) being shareholder(s) of the issuing firm at the time of IPO. If there exist such a direct or indirect (belonging to the same group of companies) relationship between the underwriter(s) and the venture capitalist(s), this relationship signals a potential of an asymmetric information problem from the outside investors' point of view. It is generally believed that when such a relationship exists, investors

ask more than the market average underpricing at the time of IPO in order to be able to protect themselves from the potential effects of such asymmetric information.

The relationship between the underwriter banks and the going public firm and the potential of conflict of interest has been discussed for over a very long time. After the stock market crash of 1929, it was argued that banks had an incentive to take advantage of investors by issuing securities in companies with outstanding loan balances at times when the firms' future prospects were not as positive as the public believed. Issuing overpriced securities allowed the firms to liquidate the outstanding balances owed to the banks.

In their study, Gompers and Lerner (1998) provide evidence that investment bank-affiliated VC companies address the potential conflict of interest by investing in and subsequently underwriting less information-sensitive issues or selling small fraction of their holding in the company. By selling small fraction, the VC company tries not to give false signals like cashing out from the company.

When there is a relationship between the issuer and the underwriter, the inherent information advantage might lead to a better certification and/or conflict of interest problem, all of which may have different effects on underpricing. Reputational concerns play a pivotal role in determining which effect will dominate (Ertuna et.al. (2002).

There are different views about the conflict of interest issue. On one hand some authors like Puri (1996) argues that the public is willing to pay a premium for issues

underwritten by universal banks, no matter the bank has affiliates or holds debt obligation within the company, suggesting that the banks, with their greater access to information, were able to more effectively certify the quality of the new issues. Fields et.al. (2003) also report lower under-pricing and superior long-run performance for commercial bank underwritten IPOs. In other words commercial banks as underwriters seem to fairly price IPOs in the United States. Schenone (2004) also suggest that underwriters were able to certify the quality of the IPOs in which they had provided loans several years before the IPOs.

Gompers and Lerner (1998) on the other hand investigate potential conflict of interest in the issuance of public securities and stated that when the underwriter and the VC company has any relation investors do require a greater discount (“underpriced”) as the offering to compensate for potential adverse selection problem. In other words investors do require a greater discount at the offering to compensate for potential adverse selection. However, they also note that when such a potential conflict of interest exists, the reputation of the underwriting bank seems to mitigate some of the negative impact. Similarly Ertuna et. al. (2002) found in their study on Turkish IPO market that IPOs by related underwrites exhibit higher level of underpricing and the empirical evidence does not lend support for the certification effect. They further stated that the outcome of higher underpricing may be due to deliberate underpricing by the related underwriter in order to make subsequent IPOs by the same group more attractive or may have to do with the market recognition of potential conflict of interest.

There are reasons for the investors to be suspicious about the potential conflict of interest when there is a relationship between the underwriter and the venture capital company. For example, an investment bank that is underwriting the IPO of a company in which it holds equity stakes as a venture capital investment will have substantial private information on the company since venture capitalists sit on the board of directors of the company and advice managers. If the investment bank has such private information about the firm then it may attempt to time security market issues that increase the value of its existing investments. If it is selling a large fraction of its stake at the time of IPO, the venture group will receive cash for its shares at a very attractive price. Furthermore, investment banks suffer less dilution of their equity holdings when the IPO is priced at a premium.

6.3 Lock Up Period

Some features of the financial institutions and financial markets evolve in order to improve the efficiency of the markets and the institutions' operation within these markets. Likewise some of the features have evolved to improve the efficiency of the venture capital investment process, while others have sprung up to shift more of the economic benefits to particular parties (Gompers and Lerner (1999b)). Many of the features of the exiting of venture capital investments can be considered as responses to environmental uncertainties.

Lock up provision can be considered one of these responses to environmental uncertainties. Lock up can basically be defined as the prohibition of institutional and venture capital investors from selling the shares of the issued company in the secondary markets for a certain period of time. This lock up practice helps avoid

situations in which the shareholders of the issued company exploit their inside knowledge that a newly listed company is overvalued by rapidly liquidating their shareholdings. After an initial public offering takes place all of the existing shareholders are generally subject to lock up period. Lock up expiration is particularly interesting event to study because it is a known and potentially meaningful economically considering the supply shocks.

Although a typical venture capital company usually does not sell any stakes at the time of an IPO in order to not to give a negative signal²⁷ to outside investors, once the lock up period is over, venture capitalists can return money to their investors in one of two ways. Their either liquidate their position in a portfolio company by selling shares on the open market after it has gone public and then paying those proceeds to investors in cash or, more frequently, make distributions of issued company's shares to investors of the venture capital fund. However, share selling of the existing shareholders is not just related to venture capitalist but also related with other shareholders of the issuing company. Outside investors may consider the lock up expiration as a potential selling out opportunity of the existing shareholders of the company. In order to avoid such over supply situation of the issuing shares right after the lock up expiration, outside investors have a tendency to sell their withholding shares before the lock up expiration day has come. Recent evidence from the U.S. has shown that there are predictable share price movements at the time of expiration of these lockup periods. Field and Hanka (2000) and Bradley et.al. (2000) have

²⁷ Share selling of venture capital company at the time of an IPO can be considered as “cashing out” of venture capital company by outside investors and hence negatively affect the IPO performance of the issuing firm.

studied a sample of US common stock IPOs to determine the effects on stock return and volume at the time of lock up expirations and find negative share price movements at and around the lock up expiration date. Additionally, Bradley et.al. (2000) find that the losses are concentrated in firms with venture capital backing. Ofek and Richardson (2000) finds the evidence from the US data base that there is a 1% - 3% drop in the stock price, and a 40% increase in volume, when the lock up expires. Chen et.al. (2004) examine the performance of Taiwanese IPOs surrounding lock up expiration. They find some evidence that investors in IT companies could suffer significant wealth losses, in the days just prior to the lock up expiration whereas non-IT company investors are not similarly affected. Finally they observe that the trading volumes are abnormally high after the lock up expiration dates.

6.4 Disclosure Requirements

Disclosure requirements can basically be defined as compulsory information sharing of the issuing company, at certain calendar days or when it is necessary, with its shareholders so that these shareholders may have an idea about the company and its financial and legal position. Disclosure requirements take place even before the admission of the company to the exchange. Stock exchanges may ask potential issuing companies to disclose certain information before the public offering takes place so that outside investors may have an idea about the company and decide to participate to such a public offering or not. Each stock exchange around the world has its own disclosure requirement standards that a potential listing company should obey. Stock exchanges develop and change their disclosure requirements from time to time in light with their experiences and to adapt themselves to technological and industrial changes. In general the disclosure requirements which exchanges place on

all listed and potentially listed companies have two main purposes: to ensure the timely disclosure of all potentially price-sensitive information and the equal treatment of all shareholders.

Frankfurt and London Stock Exchanges and their related markets (Neur Markt in Germany and AIM in the UK) have their own disclosure requirements. Although these two markets are in the European Union and are converging to a certain and unique disclosure standard for the Union, for the time being each has its own requirements that have to be fulfilled by the potential and/or listing companies.

When we look at the London Stock Exchange (LSE) we can see that the disclosure requirements in LSE are determined and controlled by UKLA²⁸ (the UK Listing Authority). Companies trying to admit to LSE have to obey the rules and regulations set by UKLA before their shares are being traded. The UKLA's Listing Rules set the specific regulatory requirements which the companies have to meet to be allowed to list on a market. The principal requirements that companies have to meet can be listed as follows.

- i. ***Incorporation:*** The company must be incorporated under the relevant laws, which for UK companies means being a public limited company (plc).

²⁸ UKLA is a division of the Financial Services Authority (FSA).

- ii. **Accounts:** The company must normally have published or filed audited accounts covering a three-year period, such a period ending no more than six months before the planned flotation.

- iii. **Track Record:** The company should have an independent trading and revenue-earning record covering the same period. Also, if the company has made a number of significant acquisitions in the three years running up to the flotation, then it must show that these have a suitable track record as well.

- iv. **Directors:** The company's directors and senior management must show they have appropriate collective experience and expertise to run all areas of the business and must be free of conflicts of interest which might hamper their ability to do this.

- v. **Working Capital:** The company must be able to show it has enough working capital for its current needs and for at least the next 12 months.

- vi. **Independent Operations:** The company must be able to carry on its business independently and at arm's length from any shareholders with a controlling interest – which generally means anyone with control of more than 30% of the shares, or who can influence the appointment of directors.

- vii. **Shares in Public Hands:** Once the company is listed, at least 25% of its shares should be in public hands.

viii. *Market Capitalization:* A company listing its shares on the market must have a total market capitalization of not less than £700,000 and would normally be expected to be much larger.

Additionally, a company planning to go public in the LSE has to prepare a prospectus that complies with the UKLA's Listing Rules. The prospectus provides potential investors with the information they need to make an informed decision on the company and its shares. The prospectus must include information such as independently-audited financial figures (for the last three years), details of the directors' salaries and contracts and information on major shareholders (i.e. shareholders who have more than 3% or more of the company's shares).

In Germany, disclosure requirements are ruled by German Securities Trading Act. Companies that are planning to go public have to obey the rules and regulation set by German Securities Trading Act. Additionally Deutsche Börse and Primary Markets Advisory Committee (PMAC) set non-compulsory disclosure requirements (i.e. Going Public Principles). The objective of the Principles is to increase the transparency of information relevant to making an investment decision and to create equality of information for all investors. The main purpose of the Principles is to reinforce the role of the prospectus as the central source of information and the central basis for an investment decision, in particular by providing guidance on the form and content of prospectuses as well as by imposing restrictions on deal-related documents that are published in addition to the prospectus.

When a company applied to Deutsche Börse to have its shares being traded in the stock exchange, there are some rules and regulations that such candidate company has to obey. These rules and the regulations can be listed as follows.

- i. *Incorporation:*** The company must be incorporated under the relevant laws and must be registered as Aktiengesellschaft (AG – German stock corporation) or an equivalent international legal form.
- ii. *Legal Issues:*** All legal risks assessed by the lawyers must be disclosed and documented in the prospectus.
- iii. *Financial Information:*** The company must present audited and certified annual financial statements for an IPO and auditor's opinion provided by a certified public auditor. At the time of the admission a company must present its annual financial statements and management reports for the past three years. The financial reporting standards most commonly used by listed companies are IFRSs (formerly: IASs) and US GAAP. Section 292a of the HGB (German Commercial Code) allows German companies to prepare consolidated financial statements in accordance with IFRSs or US GAAP instead of consolidated financial statements under HGB under certain circumstances.
- iv. *Track Record:*** The company should disclose information about its general principles, issuer's capital, recent business performance of the company and description of the issuer's business activities.

v. **Directors:** The company must give information about the executive and supervisory bodies of it and show that directors and senior management have appropriate collective experience and expertise to run all areas of the business.

vi. **Articles of Association:** The articles of association are prepared when an Aktiengesellschaft is formed. The company has to present its latest articles of association at the time of IPO. A typical articles of association has to include the name, the domicile and the purpose of the company, the amount of the shares capital, the amount of authorized and contingent capital, the par value and the class of the shares and finally the number of members of the executive and supervisory board.

vii. **Black Out Period:** After the application has made and necessary information is disclosed by the company, the company and its advisors will go into a black out period. In this period no information may be disseminated about the company's business or its earnings and financial situation - essential in the assessment of the stock - which is not otherwise contained in the prospectus. This will prevent the selective release of information and will provide for more level treatment of private and institutional investors. Banks of the consortium involved in an IPO are also subject to a black out period, during which time they are not allowed to publish any deal-related research about the respective issuer's business, earnings or financial situation. Banks not involved in the IPO consortium is not subject to black out period and can publish research report about the issuing company.

Both in the UK and in Germany some of the above mentioned required information is presented stand alone whereas some others are presented within the IPO prospectus of the issuing company.

Once the company's shares have been listed and admitted to trading, the company must fulfill a number of obligations on a continuing basis. These include producing half-year and independently-audited full-year financial reports within a set timeframe and notifying the market of any new price-sensitive information. Such post offering disclosure requirements are quite same for both countries.

7 Why Such a Study is Needed?

With the help of industrial development, German venture capital market represents one of the most important venture capital markets in Europe. Despite its size and importance there are little empirical research conducted to understand the insight of the industry. Also due to its different institutional settings (bank vs. market-oriented systems; relative dominance vs. relative absence of public venture capitalists), it is not possible to transfer the knowledge about the mechanisms gained from the US experience to German venture capital market.

UK venture capital industry, on the other hand, is the biggest venture capital market in Europe and can be considered as a European representative of US venture capital industry. The formation and the practices of UK venture capital companies are very similar to that of their counterparts across the Atlantic.

Therefore a comparison of these two biggest venture capital industries of Europe can also be considered as the comparison of two main venture capital schools of thoughts of the world.

Some works have to be conducted in order to understand the structure of the UK and German VC industries and find out the main characteristics of these industries as well as the differences among them. By studying the post IPO performance of VC backed companies we can find out whether such companies perform better than non-VC backed companies both within the subject matter countries as well as across these two countries.

The duration of the lock up period and the price performances of issued shares around the lock up date will also be subject to examination. It is assumed that the duration of the lock up period may have positive signaling effect to outside investors and has influence on the underpricing of the issued company. The price performances of VC backed and non-VC backed companies right before the expiration of the lock up period will also be examined in detail.

8 Data Set

Our sample was selected among 1998 - 2005 IPO data base of Germany and the UK. IPO characteristics of the companies were collected from their issuing prospectuses, Deutsche Börse, London Stock Exchange and from companies' web sites. Some issues were excluded from the study because of either their IPO prospectuses were not available or some of the information was missing. After studying the prospectuses and reviewing the web sites of the companies, we came up with 374

companies in Germany and 274 companies in the UK. 149 companies were identified as VC backed within German data base and 86 companies in the UK IPOs.

A company was defined as VC backed if at least one of the following criteria is met:

- i. The shareholder in question was either a member of a recognized venture capital organization or listed on Venture Economics,
- ii. In the IPO prospectus, the shareholder in question was clearly defined as a venture capitalist and its shareholding in the company was defined as venture capital investment,
- iii. The web site of the shareholder in question defined the core business of the company as venture capital activity,
- iv. The cumulative shareholding of the financial investors in the company right before the IPO was greater or equal to 3%.

Some companies that give advisory services to issuing companies and paid in equity are excluded in the study. Angel investors were not taken into consideration in the study since they do not have any corporate identity and structured venture capital exercises.

All of the IPO prospectuses, the daily closing prices and index figures²⁹ were obtained from Bloomberg.

²⁹ For Germany Deutscher Aktien Index (DAX) and for the UK FTSE (Financial Times Stock Exchange) 100 Index (UKX) were used as market benchmarks for German and British IPOs respectively.

9 Hypothesis, Variables and the Model

The main hypothesis of this study is that there exists a statistically significant difference between the underpricing of VC backed and non-VC backed IPOs. In other words the initial returns of VC backed and non-VC backed IPOs should be statistically different from each other. It is expected that the presence of venture capitalists among the shareholders of the issuing company certifies the issue and lowers the cost of due diligence and over all going public process. Assuming that the Certification Theory holds, we expect that the outside investors consider the existence of venture capitalists among the shareholders of the issuing company as an indicator of the quality of the company and hence they will agree to pay more at the time of IPO (i.e. agree to purchase the share of the issuing company with a less amount of underpricing). In accordance with this assumption, we hypothesize that the underpricing of VC backed IPOs are less than that of non-VC backed IPOs. We expect that this will hold both in Germany and in the UK.

H1: Initial returns (underpricing) of VC backed IPOs are less than initial returns of non-VC backed IPOs.

Along with the above stated hypothesis we try to explain the dynamics of underpricing and the factors that have explanatory power on the underpricing of the issues.

Age of the issuing company is expected to be one of the explanatory factors of the underpricing issue. In theory, age can be considered as a proxy for the quality of the companies. After the initial establishment, most of the companies go through

difficulties and problems throughout their operational lives. Thus, as a company ages it gives a signal to outsiders that it has somehow managed to survive the difficulties that it faced during its business life and hence has certain level of quality and financial strength. If a company gets older and survives for a certain period of time, then it has grater records reducing asymmetric information so that the uncertainty about the company gets lesser. Theoretically it is assumed that the greater the uncertainty surrounding a going public company the grater the underpricing it is expected. Therefore we expect that the age has a negative effect on the underpricing of the company. Muscarella and Vetsuypens (1989) show that the older the firm at the time of IPO the lower the underpricing. Similarly, in Rock's (1986) IPO model, older firms have longer track records, reducing asymmetric information and underpricing.

The age of the company is calculated as the difference between the IPO date and the establishment date of the company. For some companies, which had some restructuring, merger and/or acquisition before its IPO, the original establishment date is used³⁰ in order to be able to reflect the corporate equity effect of the company into the model. The sign of coefficient is expected to be negative since the older the firm the lower the degree of information asymmetry and thus the lower the initial return.

H2: There is a negative relationship between the age of the company and the underpricing.

³⁰ If after the merger and/or acquisition the line of business of the company was changed then merger and/or acquisition date was taken into consideration.

IPO size of the company can be considered to be an important factor in explaining the initial returns of the IPOs³¹. In line with the main rule of the basic economics, one can expect that as the size of the IPO increases so should the underpricing of the issue in order to be able to attract the outside investors. As the quantity of the issued shares increases underwriters and the owners of the company should decrease the public offering price (i.e. increase the underpricing of the issue) in order to be able to do a successful IPO. Therefore, one may expect a positive relationship between the size of the IPO and the underpricing. We calculate the natural logarithms of IPO volumes as a proxy for the IPO size. IPO volumes of the companies are calculated by multiplying the number of shares issued by the company (excluding the over allotment option) and the IPO price of one share. For companies that went public in German in 1998 an adjustment has to be made since the currency of the country was DM then. The DM issue price of the share were converted to EUR by simply dividing them to 1.95583, which is the official conversion rate of DM to EUR fixed by the Council of the European Union in accordance with article 109/1 (4) indent 1 of the EC Treaty. There was no need for such an adjustment for the UK companies since the UK continues to use GBP as her currency.

H3: There is a positive relationship between the size of the IPO and the underpricing.

³¹ In some studies size of the company was taken into consideration as an explanatory variable in underpricing. For example, Brav and Gompers (1997) stated in their study that investors usually hesitant to invest into small companies and hence may asked for higher underpricing to invest into such issues at the time of their IPO.

Among other factors, the age of the venture capital company in the issuing firm at the time of the IPO is expected to be another important explanatory variable. Gompers and Lerner (1998) characterize that the age of the VC company (as a measurement of quality) is an important factor in the IPO performance of the firms. They find out that older VC companies are likely to perform better than the younger VC companies, because poorly performing VC companies will be unable to raise new funds. As grandstanding hypothesis of Gompers indicates, young venture capital firms usually force their portfolio companies to go public than it would be if the venture capital company was older. The cost incurred by the young venture capital firm doing early IPO is greater underpricing. In short, it is expected that as the venture capital company ages the underpricing of the portfolio company at the time of the IPO gets smaller.

Although, the age of the VC companies within the invested companies is of primal importance³², we could not be able to find that information for the VC companies subject to the study. Hence, instead of the age of the venture capital companies we used the length of the investments of the venture capital companies in the issuing firms. It is assumed that these variables serves for the same purpose, since Gompers and Lerner (1999b) states that as VC companies get younger, the time they spent within the investee firms before these firms go public get shorter. The duration of VC investments within the company before going public is calculated from the date of first round VC investments (if there are more then one round of investments) to the

³² The age of the venture capital company is not always a perfect measure of reputation of the VC company because sometimes very well known, reputable and experienced partners leave their companies to start new venture capital companies.

IPO date of the company. It is rather preferred to use the length of the period in terms of months but since the data did not allow running such a test we used it as years.

H4: There is a negative relationship between the length of the venture capital investments in the issuing company and the underpricing.

Lock up is the period during which neither of the shareholders of the issuing company can sell any shares to third parties. Lock up periods are usually set to remove the supply side pressure on the price performance of the issuing company. Therefore knowing that there is a certain lock up period of the issuing company after the IPO, outside investors will be sure that there is not going to be a supply side pressure on the price performance of the issue and would be more confident to participate into such offering. Hence, we can say that the duration of lock up period has positive effect on the outside investors' sentiments about the issue and negative effect on the underpricing.

H5: There is a negative relationship between the duration of the lock up period and underpricing of the issuing company.

Shareholding of venture capitalist before the IPO can be considered as a positive signal to outside investors. Since venture capitalists only invest in good quality companies it is assumed that outside investors believe that the quality of the company increases as the share holding of the venture capitalist increases within that company. Megginson and Weiss (1991) found evidence that market reacts favorably to the presence of VC financing at the time of an IPO. However, they stated that this favorable reaction is also related with the percentage of shares that the venture capitalist holds in the company. When this percentage decreases so does the impact

of the favorable reaction of the public to the company. Therefore it is expected that underpricing will decrease as the shareholding stake of the venture capitalist increases within the issuing company.

H6: It is expected that the underpricing decreases as the shareholding stake of the venture capitalist(s) within the issuing company increases.

Although the shareholding of the venture capitalist in the issuing company is a signal of the quality of the company, the difference of the venture capitalist's shareholding stakes before and right after the IPO can be considered as a negative signal by the outside investors. Selling large amount of shares or being diluted at the time of IPO can be considered as a negative signal sent by the VC company to outside investors. The urge of the venture capitalist to sell his shares at the time of IPO can be interpreted by the outside investors that venture capitalist tries to exit the issuing company as soon as possible. Similarly if the VC company gets diluted after the IPO, this will give same kind of signal to potential investors. In either cases outside investors will ask higher underpricing to compensate the potential risks of the IPO. Therefore a positive relationship is expected between the underpricing and difference of the venture capitalist's shareholding of the issuing company before and right after the IPO.

H7: A positive relationship is expected between the underpricing of the issuing firm and the difference between the shareholding of the venture capitalist(s) before and right after the IPO.

Underwriter reputation is another important factor in the underpricing phenomenon. The general perception about the underwriters is that investors are willing to

participate into the IPOs with a less amount of underpricing if such IPOs are led by reputable underwriters. Hiring a reputable underwriter has positive signal for the issuing company since higher quality underwriters try to select good firms to protect their own reputation. Gompers and Lerner (1998) considered the reputation effect for their study and come up with the conclusion that reputation of the underwriter does play an important role in the post-IPO price performances of the issued companies. They conclude that firms taken public with higher quality underwriters perform better in the long-run. Gompers and Lerner (1999b) states that higher quality underwriters tend to take larger, more promising companies to public. If underwriter rank is related to the quality of the issuing company, the investors should consider these IPOs differently since taking high quality of companies to public is a strong signal of ability. High quality underwriters appear to be concerned about the negative consequences to their reputation of overpricing issues. This result seems to hold independent of whether the underwriter is also a venture investor.

H8: It is expected that as the underwriter reputation increases the underpricing of the issuing company underwritten by that underwriter decreases.

In our study the underwriter reputation is calculated in two different ways. First of all the classical Carter-Manaster³³ underwriter ranking is used. From their very first study of underwriter reputational rankings, Carter and Manaster have published several versions of updated rankings. The latest available updated version of this underwriting reputation study is for the periods from 1980 to 2004. Lead underwriter rankings were driven from this study for German as well as British investment banks.

³³ See Carter and Manaster (1990).

The scale is between 1 and 9.1, 1 being the lowest and 9.1 being the highest score that an underwriter can get. We draw the rankings of the underwriters from this study. For the underwriters whose name does not appear on the study we assign “1”, since the absence of their name in the study may indicate that these underwriters were not as active in the IPO markets as their colleagues whose names were in the list.

In the second methodology we use Bloomberg IPO underwriter lists to evaluate the underwriters' reputational ranking. Bloomberg has prepared a ranking of underwriters for each year from 1999 to 2005 according to the total amount of underwriting by each investment bank in respective years. These lists also provide the number of IPO that each investment bank participated but we think that the amount of underwriting for each investment bank may give a better signal about the qualification and reputations of the investment banks in the IPO markets. Bloomberg data base has a ranking of the underwriters usually from 1 to 100, in which 1 is assigned to the highest-ranked investment bank of that year according to the amounts underwritten. In line with the same logical behavior that we conducted in Carter and Manaster underwriter reputational ranking study, we assign “101” to the underwriters whose names do not appear on the top 100 IPO underwriter lists of Bloomberg. Unlike Carter and Manaster study, in which underwriters were ranked for a period of time, different rankings were assigned to underwriters in the Bloomberg list depending on the year of the IPO that they were actively involved in. Because of the lack of the lists for 1998, underwriters involved in any 1998 IPOs were assigned their 1999 ranking, since this is the closest date.

Along with the testing the initial returns of the issuing companies, we test the post-IPO price performances of these issues. We specifically focus on the price performances of the issues around the lock up date. Lock up period can be defined as a certain time period in which the current shareholders of the issuing company agree not to sell any of issuing company's shares. Such commitment can give a positive signal to outside investors at the time of the IPO, because these investors will realize that during that lock up period there will be no supply side pressure³⁴ on the price performance of the company.

However, as time gets closer to lock up expiration date there may be a tendency to change in the market sentiment about the price performance of the issued company. Market players would think that after the expiration of lock up date the existing shareholders may have a tendency to sell their shares in the market and thus put some pressure on the price. Therefore, investors who think that way might sell their shares before the expiration of the lock up date. If there exist a venture capitalist in the shareholders' structure of the issuing company this tendency may accelerate, since the main objective of the venture capitalist is to exit from his investments timely and a possibility of selling the withholding share in the secondary market will give a venture capitalist to realize the potential gains of his investment. Therefore we think that price performance of an issuing company gets worse as lock up date comes

³⁴ In case of no lock up period, the existing shareholders of the issuing company may sell their withholding shares at any time so that they may increase the supply of the shares. As a basic rule of the economy if supply of any good is increased above the market equilibrium demand level then there will be a downside pressure on the price of that good.

closer and this negative price movement is even stronger if there is a venture capitalist in the shareholders' structure of the company.

H9a: The price performance of any shares gets worse as the lock up date gets closer.

H9b: The price performance of an issuing firm with venture capitalist in its shareholders' structure around the lock up date is worse than a similar company with no venture capitalist in its shareholders' structure for the same period.

Although an IPO underwritten by a reputable underwriter and/or has an involvement of a reputable venture capital company gives a positive signal to outside investors, any kind of relationship of these two reputable parties in the same IPO would have a reverse effect. As we discussed in section 6.2.3. a relationship between the underwriter of an issuing company and the venture capitalist as a shareholder of that company may give a signal of conflict of interest issue to outside investors. In such circumstances, it is assumed that outside investors will ask higher underpricing in order to compensate to the potential risks of participating such an IPO. Hence, we may expect that if there is a potential conflict of interest in any IPO, the underpricing should be higher than the underpricing of an issue with no conflict of interest.

H10: Underpricing of an IPO with a conflict of interest issue is expected to be higher than that of an IPO with no conflict of interest issue.

10 Empirical Results

10.1 Descriptive Statistics

Before reviewing the results of the regression analysis, we believe that it would be beneficial to give some descriptive statistics about the issuing companies both in

Germany and in the UK. Understanding of these statistics might be helpful to interpret the results of the regression analysis.

In Germany, 374 issuing companies were included into the analysis, 149 (39.84%) of which has at least one venture capitalist among their shareholders. In the UK, the number of companies reviewed is 274 and 86 (31.39%) of these companies have at least one venture capitalist among their shareholders' structure at the time of the IPO. Although we were not be able to review all of the companies went public during the study period, we can say that the ratio of venture capital invested companies going public during the examination period are close to each other in the UK and in Germany.

When the initial returns of the IPOs (including both VC backed and non-VC backed IPOs) are examined, we can see that there is no statistical difference between the mean returns of the IPOs across the countries. As can be seen from Table 5 mean returns were 34.49% and 27.54% for Germany and the UK respectively. Although average German IPO returns seem higher than that of UK in actual terms, Table 5 shows that there is no statistically significant difference between these two figures.

Table 6 states the average ages of the companies at the time of their IPOs. The average age (in years) of the issuing company at the time of IPO is 10.77 in Germany and 9.2 in the UK. As t statistics in Table 6 indicates that there is no statistically significant difference between the average ages of the companies at the time of their IPOs for both countries. Table 7 and Table 8 present the comparison of the average age of VC backed and non-VC backed companies in Germany and in the UK. As

Table 7 presents there is a statistical difference between the mean age of the VC backed and non-VC backed companies in Germany. The average age of the VC backed companies in Germany is 8.1 years whereas average age of the non-VC backed companies is 12.5 years for the same period. In the UK on the other hand, there is no statistically significant difference between the average ages of VC backed and non-VC backed IPOs for the study period. Average age of VC backed companies is 8.3 years whereas non-VC backed companies are 9.6 years old on average at the time of their IPO.

Table 9 shows that the average age of the venture capital investments within the issuing companies before they go public is 3.33 in Germany and 3.28 in the UK and there is no significant difference between these two figures.

Table 10 exhibits the average lock up periods (months) for the issuing companies of German and British equity markets. As table indicates, there is a statistically significant difference between the lock up periods of German and British companies. The average lock up period for companies going public in Germany is around 7.41 months whereas in Britain this figure is 11.45 months. By looking at these figures we can say that existing shareholders of a company being issued in the UK have to wait to sell their shares in the market on average twice as much as their counterparts in Germany. This finding can also be interpreted as the issuing companies in the UK use lock up period as a signaling device to outside investors more importantly than German companies do. When we look at the lock up period differences of the VC backed and non-VC backed companies in Germany and in the UK, Table 11 and Table 12 present that lock up periods of VC backed companies are lower than that of

non-VC companies. As tables indicate this difference is not statistically significant in Germany whereas in the UK lock up periods of VC backed and non-VC backed companies are statistically significantly different from each other at 95% confidence interval.

When we look at Table 13, the average percentage holding of venture capitalist(s) (if any) before the IPO is 31.66% in Germany and 35.74% in the UK. These figures are quite in line with the assumption that venture capitalists usually retain their shareholdings within the companies before the IPO. For example Megginson and Weiss (1991) report in their study that the average venture capital holding within the portfolio companies before the IPO is 36.6%. Table 13 shows that the difference between the average percentage venture capital holdings before the IPO is statistically insignificant across the countries.

The comparison of the average differences of the venture capital holdings before and after the IPO gives similar results. Table 14 shows that average share holding differences of the venture capitalists before and after the IPO are 13.53% and 17.13% in Germany and in the UK respectively. Table 14 indicates that the difference between these two figures is statistically insignificant in 95% confidence interval but when the confidence level is drawn back to 90% the difference between the mean values of venture capital holding differences becomes significant.

By looking at Table 13 and Table 14, we can say that venture capital companies in the UK hold greater amount of shares of their portfolio companies and sell greater amount of shares at the time of the IPO. This urge of selling the withholding shares

at the time of IPO can be explained by the structure of the venture capital industry of the UK. Since venture capital companies in the UK are market oriented and mostly financed by pension funds, insurance funds and corporations when they find a chance to realize the potential gain of their investments, they try to take advantage of this opportunity as much as possible. Because of the structure of the venture capital industry in the UK, most of the venture capital companies need to show some success stories to their fund providers in order to raise next round venture capital funds when time comes. German venture capital companies on the other hand, given the advantage of financed mostly by the banks, hold less shares of their portfolio companies and do not rush to sell shares at the time of IPO compare to their British colleagues.

Finally, when the relationships between the underwriters and the venture capitalists within the shareholders' structure of the issuing companies are examined, it can be figured out that 59 out of 149 VC backed IPOs, have experienced agency effect (39.60%) in Germany. The number of IPOs experiencing agency effect in the UK is 11 which accounts for 12.79% of total VC backed IPOs. By looking at Table 17, one can basically say that there is a significant difference in terms of agency effects between Germany and the UK. This result is not surprising since banks are the main source of funds for German venture capital companies. In the UK, on the other hand, bank financing of venture capital companies is very limited.

10.2 Regression Analysis

In line with the previous academic studies³⁵, we use basic OLS (Ordinary Least Square) method in order to test the above given hypothesis.

Underpricing (UNDERPR) is calculated as the percentage difference between the IPO price and first day closing price of the issuing company.

$$\text{Underpricing} = \frac{1^{\text{st}} \text{ DayClosingprice} - \text{IPOprice}}{\text{IPOprice}} * 100$$

Before examining the results of the regressions, it would be beneficial to discuss the logic behind the usage of first day return as an indicator of the underpricing of the issuing company.

In the literature, authors use different time periods to understand the nature and the dynamics of the venture capital backed IPOs. Lerner (1999) for example uses long-run performances of venture capital companies supported by the governmental applications. To test the underpricing on the other hand it is generally used short-term price performances and mostly the first day return of the issuing companies. Authors like Peggy and Whal (2004), Sapienza et.al. (1996) and Schenone (2004) use the first day return of an issuing company as an indicator of underpricing. Following the general tendency in the literature we use the same measurement to test the underpricing phenomenon of the issuing companies in the UK and in Germany.

³⁵ See Megginson and Weiss (1991) and Schenone (2004).

However, one may ask to use different time periods to evaluate the underpricing of an issuing company. In order to answer such questions and to relieve the possible doubts about the selection of first day closing price to calculate the underpricing of the issuing companies, we alternatively calculate one-week returns (RET_IPO_1WEEK) of the companies after their IPOs.

Table 20 exhibits that there are no statistical differences between the average first day returns and average one-week returns of the issuing companies both in the UK and in Germany. The table shows that, most of the one-week returns of the issuing companies are obtained at the end of the first trading day. This is true for both German and British equity markets. Another result that the Table 20 states is average returns in German market for the first trading day and for one-week period are (34.5% and 35.3% respectively) higher than their counterparts in the UK markets (27.5% and 29.2% respectively).

Since the results of Table 20 indicates that there is no statistical difference to use either first day return or one-week return of the issuing companies, we use first trading day closing price to calculate the underpricing of an issuing firms.

The usage of first day return of an issuing company as an indicator of underpricing presumes that the semi-strong form of market efficiency³⁶ assumption holds both in German and British public offering markets. Semi-strong form of market efficiency

³⁶ See Fama (1970) and Fama (1991).

theory simply assumes that the share price of any company reflects all publicly available information about the company, including the information such as published accounting statements as well as historical share price information.

The first hypothesis we set is that the initial returns (underpricing) of VC backed and non-VC backed companies³⁷ are statistically significantly different from each other. Here, we assume that the credibility and the positive signaling effects of the venture capitalists within the shareholders structure of the issuing companies are important for the outside investors and outside investors do value such information and ask lower underpricing in such circumstances. Therefore, we hypothesized that initial returns of VC backed companies are smaller than that of non-VC backed companies and we expect that this assumption will hold for both countries. Table 19 indicates that the assumption of underpricing of VC backed companies are less than that of non-VC backed companies is true for both Germany and the UK. The assumption holds when we combine German and the UK companies and run an independent test for the overall data base. By looking at the results of Table 19 one can say that VC certification is important for outside investors both in the UK and in Germany. When there is (are) venture capitalist(s) within the shareholders structure of the issuing company, outside investors consider this as a good signal about the company and ask less underpricing than market average. Therefore, we accept our first hypothesis.

³⁷ Throughout the study and in the tables presented in appendix, venture capital dummy (VC_DUMMY) of “0” indicates a company with no venture capital investment in it and “1” indicates a company in which there is at least one venture capitalist among the shareholders structure of the company at the time of IPO.

VC backed companies are less underpriced than non-VC backed companies at the time of IPO.

This finding is quite important in number of ways. First of all, from the issuing companies' point of view, having a venture capitalist among the shareholders will have a positive effect on the valuation of the company at the time of IPO. A better valuation of the company at the time of IPO will be beneficial for the existing shareholders, since it will reduce the "money on the table". Second of all, such underpricing can have a signaling effect to third parties planning to go public in the future. Showing that VC backed companies are less underpriced than non-VC backed companies implies that it would be for the benefit of the existing shareholders to have a venture capital investment in their companies before going public. Finally, such finding can be a good indicator for the outside investors about the valuations of the issuing companies. When there is a new issue in the market, outside investors can evaluate this IPO by simply looking at its shareholders structure. If there is at least one venture capitalist as an outside investor within the issuing company this could be a signal about the valuation and underpricing of the company to outside investors.

By looking at the above given results one may argue that the differences among the returns may be a result of the timing of the IPOs. It has been discussed by the academics³⁸ that since they are professionals and have great experiences in the IPO markets, venture capitalists usually time their portfolio companies' IPOs better than other companies with no venture capitalists in their shareholders structure. Therefore,

³⁸ See Megginson and Weiss (1991), Schwienbacher (2002) and Cumming and MacIntosh (2000).

the differences between the initial returns of VC backed and non-VC backed IPOs may be due to better timing abilities of the venture capitalist. In order to test this assumption we standardized the initial returns of the issuing companies in compare to market indices. For German shares DAX Index and for the UK shares UKX Index are used as market benchmarks. We divided each shares' initial return by the daily return of the corresponding index at the IPO date. By doing so we try to eliminate the effects of market timings and general market tendencies at the time of IPO. Table 21 shows the index relative returns (RET_INDEXRELATIVE) of the issued companies in the UK and in Germany. The figures in the table indicates that after removing the general tendency effect of the market on the pricing of the issuing companies, VC backed companies still experience significantly lower underpricing in comparison with the non-VC backed companies. This conclusion is true at 1% significance level in Germany and 5% significance level in the UK. Therefore by looking at the results of the tests presented in Table 19 and Table 21 we can confidently say that having a venture capitalist among the shareholders structure at the time of IPO has a positive signal to the outside investors and has positive effect on the underpricing of the issuing companies.

The second hypothesis of the study was about the age of the issuing company. It is expected that the age and the underpricing of the issuing company at the time of IPO has a negative correlation. We argue that as the company gets older its corporate figure in the eyes of the outside investors gets stronger and hence the underpricing becomes lower. To test this hypothesis we regressed the age of the companies (COMP_AGE) as an independent variable to corresponding initial returns (underpricing) of these companies (UNDERPR) at the time of IPO.

Equations 1 of Table 22 and Table 23 demonstrate the effect of company age on the underpricing. For both Germany and the UK, company age is a significant explanatory variable of underpricing. One important point has to be mentioned that company age is more important for German investors than for the UK investors (the variable is significant at 1% significance level in Germany but significant at 5% significance level in the UK). Additionally, although both have small adjusted R^2 's, the German equation has more explaining power than that of UK. All in all the findings support the above stated hypothesis 2.

As the issuing company gets older the underpricing of the company at the time of IPO gets lesser.

IPO size is another explanatory variable that we investigate the power of which on the underpricing of an issue. We expected that the underpricing of the issue gets bigger as the size of the issue gets bigger. We take the natural logarithm of the issue size (LN_IPOVOL) as a proxy for the size of the IPO. Empirical analysis, stated in equations 3 of Table 22 and Table 23 show that this assumption is statistically true for the UK but not for Germany. The conclusion for hypothesis 3 is different for the UK and for Germany. We can say that the hypothesis is true for the UK whereas in Germany we cannot say that size of the IPO has a significant effect on the underpricing.

We first hypothesized and then showed that venture capital certification is an important explanatory variable of the underpricing phenomenon. Similarly, the duration of the venture capital investment within the company at IPO date should be

important for the underpricing of the companies. The underlying assumption about the venture capital certification is that the venture capitalists change the corporate structure of the company positively and they add value to the company in terms of transparency and efficiency. However, logic implies that it takes time to achieve these goals. Therefore as the length of the time of the venture capital investment increases, the likelihood of the venture capitalist to do the necessary adjustments within the company and hence to augment the quality of the firm also increases. Equations 2 in Table 22 and Table 23 show that the length of venture capital investment within the company (VC_INVPER) does indeed important for the underpricing. In line with the expectations underpricing and the length of the venture capital investment have negative relationship. As we will discuss later, the length of the venture capital investment period is actually the most important explanatory variable in underpricing phenomenon. The adjusted R^2 's and the F_{stats} of the equations show the explanatory power and the strength of the equations. In light with these findings we accept out fourth hypothesis.

There is a negative relationship between the duration of the venture capital investment within the company and the underpricing.

Lock up period is defined as the period during which none of the existing shareholders can sell any of their withholding shares. It is believed that the duration of the lock up period can give a signal to outside investors about the share selling intention of the existing shareholders of the issuing company. As the length of the lock up period extended, outside investors consider this as a positive signal and value the issue accordingly. In other words a negative relationship is expected between the length of the lock up period and underpricing. However, empirical findings do not

support the hypothesis. In Germany although the sign of the coefficient of the lock up variable (LCUP) is correct it is not significant at 99%, 95% or 90% confidence interval (Table 22, equation 4). As we can see from equation 4 of Table 23, neither the sign of the coefficient correct nor is it significant in the UK. Therefore, we reject the fifth hypothesis. It is not statistically true that lock up period has a negative effect on the underpricing.

The amount of percentage shareholding of the venture capitalist before the IPO may have a signaling effect at the time of IPO. Venture capitalists usually take their positions within their portfolio companies before the IPO³⁹. Since the main objective of the venture capitalists is to make money out of their investments, the amount of the shareholdings of the venture capitalists may have a signaling effect to the outside investors about the quality of the issuing company. It is expected that as the percentage shareholding of the venture capitalist(s) within the issuing company increases the underpricing decreases. Empirical results of the data indicate that this assumption holds for both in the UK and in Germany. Shareholding of the venture capitalist before the IPO (VCH_BIPO) is a significant explanatory variable at 95% confidence interval in Germany and significant in 99% confidence interval in the UK. We can come up with the conclusion that hypothesis six is true for both of the countries.

³⁹ In some cases venture capital companies provide the capital stage-wise over various financing rounds to their portfolio companies. In such circumstances, it is possible that the IPO of the portfolio company may take place before the final round of the venture capital investment.

Underpricing of the issuing company decreases as the shareholding stake of the venture capitalist(s) within the company increases.

As we will discuss in detail later, the shareholding of the venture capitalist is more important and has more explanatory power on underpricing in British equity market. This situation can be explained in reference of the structure of the British venture capital industry. Since most of the players in the UK venture capital industry are independent and mostly financed by the pension and insurance funds, their shareholdings may mean a lot to British investors.

We showed that the existence of the venture capitalist among the shareholders of the issuing company and the percentage shareholding of the venture capitalist(s) within the company before the IPO are significantly important parameters that outside investors take into consideration at the time of IPO. By looking at these results, we can say that outside investors give importance to the signals sending by the venture capitalist(s). Another signal that a venture capitalist can send to the third parties is the amount of the shares that he sells at the time of IPO. Selling the shares of the issuing company at IPO may give a negative signal to outside investors that the venture capitalist is trying to exit from the issuing company as soon as possible. Agreeing to be diluted within the company at IPO may give similar signals to possible investors about the quality of the issuing firm. Both actions may imply that the venture capitalist(s) is (are) not happy with the portfolio company and if he finds a chance to exit from the company he uses it. Being diluted can be considered even worse than selling shares, implying that the venture capitalist is not expecting the company to make a “home-run” nor has hope about the future of the company (i.e. the company

is a “living-dead”). Therefore, the difference of the shareholdings of the venture capitalist before and right after the IPO may have a negative effect on underpricing. Empirical studies presented in the equations 6 of Table 22 and Table 23 show that such a difference in the shareholding of the venture capitalist will have a pressure on the underpricing of the issuing companies. This holds for Germany, as well as for the UK. This finding is in line with our hypothesis 7.

There is a positive relationship between the underpricing of the issuing firm and the difference between the shareholding of the venture capitalist(s) before and right after the IPO.

Like the certification effect of the venture capitalist, the quality of the underwriter bank of the IPO may give same kind of signal to outside investors. As the quality of the underwriter increases, general perception of the outside investors about the quality of the issuing company and the pricing of the issue gets better. To determine the quality of the underwriter, we use two different methodologies. The first methodology that we use is the common usage of underwriter ranking of the underwriters, i.e. Carter-Manaster Underwriter Ranking. The study of the Carter-Manaster gives general indication about the quality of the underwriters. Another methodology used in the study is the ranking prepared by Bloomberg. Bloomberg prepared an underwriter ranking for each year from 1999 to 2005 by collecting the IPO information of the underwriters. The study ranks the underwriters in terms of the volumes of the IPOs underwritten by them. Carter-Manaster study ranks the underwriters in a scale from 1 to 9.1 in which 1 is the lowest and 9.1 is the highest, whereas Bloomberg study ranks the underwriters in each year from 1 to 100, 1 being assigned to the highest scored underwriter. The advantage of the Bloomberg study is

it ranks underwriters for each year so that one can see the difference of the ranking of the underwriters for each year. Carter-Manaster study on the other hand ranks the underwriters for certain periods using the assumption that credibility is hard to get and hard to lose in a short period of time.

We rank lead underwriters of the analyzed IPOs in line with both Carter-Manaster and Bloomberg ranking scales. We expect that there is a negative relationship between the lead underwriters' quality and underpricing. Since the highest ranked underwriter in Carter-Manaster system is 9.1, a negative sign is expected for the variable (LUNDER_CM) whereas in Bloomberg ranking the highest score that can be assigned to an underwriter is 1 and hence a positive sign is expected for Bloomberg underwriter variable (LUNDER_BL). Equations of 7 and 8 of Table 22 show that the sign of the variables are as expected in Germany and they are statistically significant at 99% confidence interval. Adjusted R²'s of the regressions show that the explanatory power of LUNDER_CM on UNDERPR is slightly higher than that of LUNDER_BL. When we look at the case of the UK, equations of 7 and 8 of Table 23 show that the signs of the coefficients are as expected but only LUNDER_CM is statistically significant at 5% significance level. The explanatory power of the LUNDER_CM on underpricing in the UK is way below of the explanatory power of LUNDER_CM in Germany. In both countries, we can say that the above stated hypothesis 8 is true.

As the reputation of the lead underwriter of the IPO increases the underpricing of the IPO decreases.

By looking at the results one can say that in the UK venture capitalist certification is more important than underwriter certification for the outside investors. In Germany on the other hand, both underwriter certification and venture capitalist certification are equally (and very much) important in the eyes of outside investors.

After analyzing the effect of the individual variables on underpricing both in the UK and in Germany, we run several multiple-variable models in order to understand the dynamics of the underpricing phenomenon and the most important and powerful variables in explaining this phenomenon.

First of all, we regress all potential explanatory variables on underpricing in order to understand their overall effects. Equations 9 of Table 22 and Table 23 show the result of these regressions in German and British IPO markets. In these equations we use Carter-Manaster underwriter ranking variable in assessing the effect of the underwriter reputation on underpricing. Equations show that the effects of explanatory variables on underpricing are different across the countries. For Germany, the duration of the venture capital investment within the issuing company before the IPO date is of highest importance together with the rating of the lead underwriter. These findings suggest that the certification effect is of most importance for German IPO investors. The results show that if there is a venture capitalist among the shareholders of the issuing company and/or the IPO is underwritten by reputable investment bank, outside investors will value these institutions' certifications and ask lower underpricing to contribute the IPO in Germany. Although not as strong as venture capitalist investment period (VC_INVPER) and underwriter certification (LUNDER_CM), the age of the issuing company (COMP_AGE) and shareholding

difference of venture capitalist right before and after the IPO (VCHD) are important explanatory variables on underpricing of issuing companies in Germany. In equations 10 in Table 22 and Table 23 we change the underwriter variable. We omit Carter-Manaster variable and include Bloomberg underwriter ranking variable (LUNDER_BL). The results of equations 10 for both German and British public offering markets are no better than that of equations 9. We may say that Carter-Manaster has stronger explanatory power on underpricing of the issuing companies in both countries.

One important point has to be mentioned about the equations of 9 and 10 in Table 22. Although it has significant negative sign (as expected) when regressed alone, the share holding of the venture capitalist before the IPO (VCH_BIPO) has insignificant and positive (contrary to the expectations) sign in both equations 9 and 10. One can be suspicious about a possible multicollinearity⁴⁰ after such a sign change. If there exists multicollinearity among two or more of the explanatory variables, more coefficients tend to be statistically insignificant than they should be under normal circumstances (Gujarati (1995)). Additionally, although the variables are statistically insignificant, the R^2 and overall goodness of fit of the whole model is expected to be higher than it should be. Therefore to test and eliminate such a problem, if it exists at all, we check a possible multicollinearity among venture capital shareholding before the IPO (VCH_BIPO), shareholding difference of venture capitalist(s) before and

⁴⁰ In general, multicollinearity is used to refer more than one linear relationship among the explanatory variables and collinearity refers to existence of a single linear relationship. However, in practice this distinction is rarely used and multicollinearity is used to refer both cases.

right after the IPO (VCHD) and venture capitalist investment period within the issuing company before the IPO (VC_INVPER). Table 2 shows the results of the study.

GERMANY		VC_INVPER	VCH_BIPO	VCHD
VC_INVPER	Pearson Correlation	1	0.181**	-0.131
	Sig. (2-tailed)		0.028	0.111
	N	149	149	149
VCH_BIPO	Pearson Correlation	0.181**	1	-0.800*
	Sig. (2-tailed)	0.028		0.00
	N	149	149	149
VCHD	Pearson Correlation	-0.131	-0.800*	1
	Sig. (2-tailed)	0.111	0.00	
	N	149	149	149

* Correlation is significant at the 0.01 level (2-tailed).

** Correlation is significant at the 0.05 level (2-tailed).

Table 2: The Correlation Coefficients among Some Explanatory Variables in Germany

As can be seen from Table 2, there is a strong and statistically significant negative correlation (-0.800 correlation coefficient in 99% confidence interval) between venture capital shareholding before the IPO (VCH_BIPO) and shareholding difference of the venture capitalist before and right after the IPO (VCHD). In order to eliminate the effect of the multicollinearity between VCH_BIPO and VCHD we drop each of these variables from the equation in order and see the effects of omitting these variables on explaining the underpricing. The results are shown in equations 11 and 12 of Table 22. As can be seen from the table, omitting either of these two variables does not make any significant change on both the explanatory variables and the power of the models. However, one can notify the fact that omitting VCHD variable from the model has a positive effect on the sign of shareholding of the venture capitalist before the IPO variable (VCH_BIPO). Since there is no statistical change in the powers of the equations after omitting either of these two variables we

test whether omitting both of them will have a significant effect or not? Equation 13 of Table 22 shows the results. As we can see from the equation, although these two variables are important and statistically significant explanatory variables on underpricing in German public offering market on their own, they are not significant and their effect on underpricing is negligible among the other explanatory variables.

Equations in Table 22 show that COMP_AGE, VC_INVPER and LUNDER_CM variables are always significant for the German underpricing phenomenon. We take these variables and regress them on underpricing (UNDERPR) to understand their overall explanatory power and significance. Equation 14 of Table 22 shows the result of this regression. As we can see from the equation, these three variables are the most important explanatory variables in German underpricing markets. By looking at their significance and explanatory power one can basically say that the equation for the underpricing phenomenon in German financial markets would be as follows;

$$\text{UNDERPR} = 0.649 - 0.116\text{COMP_AGE} - 0.602\text{VC_INVPER} - 0.156\text{LUNDER_CM}$$

$$(12.58) \quad (-1.840) \quad (-9.472) \quad (-2.476)$$

(Adj. R²: 0.439, F_{stat}: 39.682)

When we look at the explanatory variables' effect on underpricing in the UK market, we can see that the general tendency in the UK is quite different than that of in Germany. Equation 9 of Table 23 shows that, when regressed all together, the significant explanatory variables on underpricing are VC_INVPER, VCH_BIPO and LUNDER_CM. Equation 10 shows that as in the study of German public offering market, Bloomberg lead underwriter variable has no significance on the underpricing in the UK. Unlike the German case, the age of the issuing company (COMP_AGE) and venture capital shareholding difference before and after the IPO (VCHD) has no

significant effect on underpricing. Another important point worth to mention is that the signs of VCH_BIPO and VCHD are in line with our pre-study expectations in the UK and the coefficient of VCH_BIPO is statistically significant at 95% confidence interval. However, in light with the German experience we test the possible multicollinearity between venture capital related variables as we did for the German market. The results of the multicollinearity test are shown in Table 3.

THE UK		VC_INVPER	VCH_BIPO	VCHD
VC_INVPER	Pearson Correlation	1	0.155	-0.223**
	Sig. (2-tailed)		0.155	0.039
	N	86	86	86
VCH_BIPO	Pearson Correlation	0.155	1	-0.755*
	Sig. (2-tailed)	0.155		0.00
	N	86	86	86
VCHD	Pearson Correlation	-0.223**	-0.755*	1
	Sig. (2-tailed)	0.039	0.00	
	N	86	86	86

* Correlation is significant at the 0.01 level (2-tailed).

** Correlation is significant at the 0.05 level (2-tailed).

Table 3: The Correlation Coefficients among Some Explanatory Variables in the UK

Table 3 indicates that, as it is the case in Germany, there is a high negative correlation between VCH_BIPO and VCHD variables. This high correlation is a sign of possible multicollinearity within the model. Therefore as we did in German study we omit each of these two variables in order to be able to get rid of possible multicollinearity problem in the model. One should be aware of the fact that equations 11 and 12 of Table 23 show that omitting either of these two variables do actually increases the significance level of the other one. Eliminating the insignificant explanatory variables stepwise, we come up with equations 14 and 15. In equation 14, the explanatory variables are statistically significant but the adjusted R^2 is quite low. In equation 15, on the other hand, some of the variables are

insignificant but the explanatory power of the overall model is higher than that of equation 14. In conclusion we can say that one can use equation 14 if the significance of the explanatory variables are the essence of the study, whereas equation 15 would be preferred if the purpose of the study is prediction or forecasting of the underpricing of an issue.

$$\text{UNDERPR} = -0.094 - 0.33\text{VC_INVPER} + 0.197\text{LN_IPO} - 0.43\text{VCHD} - 0.275\text{LUNDER_CM}$$

(-0.344)
(-3.58)
(1.898)
(-4.758)
(-2.604)

(Adj. R²: 0.37, F_{stat}: 13.466)

$$\text{UNDERPR} = 0.12 - 0.36\text{VC_INVPER} + 0.13\text{LN_IPO} - 0.49\text{VCH_BIPO} - 0.18\text{LUNDER_CM}$$

(0.466)
(-4.223)
(1.378)
(-5.90)
(-1.862)

(Adj. R²: 0.436, F_{stat}: 17.426)

The regression results exhibit that the dynamics of the underpricing in both countries have some common and some different features. By looking at the explanatory variables of the underpricing in both countries we can say that the venture capitalists' investment period within the issuing company before IPO and lead underwriters' certification (lead underwriter ranking) are significant and important explanatory variables of underpricing phenomenon both in Germany and in the UK. In addition to these two variables company age is an important factor in Germany whereas in the UK IPO volume and venture capitalist's shareholding difference before and right after the IPO within the issuing company play important role on underpricing.

In order to be able to confidently conclude that there is a significant difference between the underpricing of VC backed and non-VC backed companies we have to understand the major factors that differentiate underpricing of VC backed and non-VC backed companies in Germany and in the UK. To come up with a sound

conclusion we will investigate the underpricing phenomenon between VC backed and non-VC backed companies within these two countries individually.

In Germany the explanatory variables of the underpricing are company age, venture capital shareholding and lead underwriter certification. The latter two variables are the representatives of venture capitalist's and lead underwriter's certification effect. Company age is an important variable in explaining the underpricing of the issuing company in Germany. However, differences of company ages between VC backed and non-VC backed companies does not help to explain the significant difference of the underpricing of these two parties in Germany. We first hypothesized and then showed that as company ages the underpricing of the company at the time of IPO decreases. However, as it is shown in Table 7 average age of VC backed companies are statistically lower than that of non-VC backed companies in Germany. Therefore, age cannot be considered as an important variable in explaining the underpricing differences of VC backed and non-VC backed companies in Germany. When we look at Table 15 on the other hand we can see that there is a statistically significant difference between the lead underwriter ranking of VC backed and non-VC backed companies in Germany. Table 15 implies that VC backed companies are underwritten by high ranked underwriters compared to non-VC backed companies. We also showed that having a venture capitalist within the shareholders structure of the company before the IPO has negative effect on the underpricing of the issuing company. Therefore, when we combine these two findings, we can simply state that the main reasons of lower underpricing of VC backed companies compared to non-VC backed companies are venture capitalist and lead underwriter certification in Germany. Outside investors put value to the certification role of these two players a

lot .Other factors, although they are important, are put in the shades of these two variables.

The results for the UK are not very much different from that of Germany. Like in Germany we previously demonstrated that having a venture capitalist within the shareholders structure of the company at the time of IPO decreases the underpricing of the company. In other words as it is the case in Germany, venture capital certification plays an important role in the UK as well. Lead underwriter certification is another important explanatory variable of the underpricing phenomenon in the UK. Equations 7, 14 and 15 of Table 23 show that lead underwriter ranking is an important explanatory variable in the underpricing issue. Table 16 demonstrates that VC backed companies in the UK are underwritten by high ranked underwriters at the time of IPO. The underwriter ranking of non-VC backed companies is statistically lower than the underwriter ranking of VC backed companies at 99% confidence interval. Therefore we can confidently conclude that as it is the case in Germany, lead underwriter certification is an important variable in explaining the differences in the underpricing of VC backed and non-VC backed companies in the UK. Another important variable in explaining the underpricing phenomenon in the UK is IPO volume. Equation 14 of Table 23 shows that IPO volume is an important and statistically significant variable in explaining the underpricing in the UK. To investigate whether IPO volume can be considered as an important variable in clarifying the differences in the underpricing of VC backed and non-VC backed IPOs we look at the average IPO volumes of VC backed and non-VC backed companies in the UK. Table 18 shows that there is a statistically significant difference between the IPO volumes of VC backed and non-VC backed companies in the UK. IPO volume

of VC backed companies is statistically significantly greater than that of non-VC backed companies at 99% confidence interval. We hypothesized and showed that there is a positive relationship between the underpricing and the volume of the IPO. We also just showed that average IPO volume of VC backed companies is statistically greater than that of non-VC backed companies. Therefore we can say that significantly greater IPO volume of VC backed companies can be considered an important explanatory variable in clarifying the underpricing differences of VC backed and non-VC backed companies in the UK. All in all, by looking at the results, we can conclude that the main reasons of lower underpricing of VC backed companies compared to non-VC backed companies are venture capitalist certification, lead underwriter certification and the IPO volume of the issues in the UK. Before going any further one point worth to be mentioned in the underpricing dynamics of the UK. As a disclosure requirement, the size of the company going public and the amount of shares to be issued cannot be below certain levels (£700,000 for company size and 25% for the free float). By looking at these requirements we can say that disclosure requirements may have an effect on different underpricing dynamics of Germany and the UK. Setting a minimum company size and free float range (indirectly setting a minimum IPO size) may have a driving force of the underpricing phenomenon of the UK public offering market.

Our ninth hypothesis was about the price performances of issuing companies as they approach to lock up date. We hypothesized that the price performances of companies get worse as they come closer to lock up date, no matter their shareholding structure. We also added that if there is at least one venture capitalist among the shareholders of the company, the price performance of that company for the same period would be

worse than price performance of a company with no venture capitalist in it. To analyze these hypotheses, we take 2-week and 1-week price performances before the lock up dates of the issuing companies (RET_LCUP_2W and RET_LCUP_1W respectively). We also calculate the price performances of the companies starting from 2 weeks (1 week) before the lock up date and ends one day after the lock up date (RET_LCUP_2W_ONEDAY and RET_LCUP_1W_ONEDAY respectively). By analyzing the specifications of these variables, we expect to come up with a conclusion about the price performances of companies as they move toward the lock up expiration date. We also try to find out whether or not having a venture capitalist as an investor within the company has any effect on the price performances of such company.

Figures in Table 24 show that price performances of issuing companies both in Germany and in the UK are negative for all studied periods. By looking at these figures we can say that the price performances of any issue in Germany and in the UK are getting worse as these companies are approaching to their lock up date. This is also true for the consolidated data base. Main cause of this downturn in the price performances of the companies around their lock up period can be explained as follows. The shareholders of the company get worried about a likelihood of share selling of the existing shareholders right after the lock up period. The possibility of such selling would put pressure on the price performance of the company. In order to avoid such a price pressure, the shareholders of the company sell their withholding shares right before the expiration of the lock up period. Such behavior of shareholders negatively affects the price performance of the company. The figures in Table 24 show that although the logic and the behavior pattern of the investors are

alike in Germany and in the UK the statistical results of the findings are mixed. In Germany the average returns around the lock up period are negative for all calculated returns but only RET_LCUP_2W_ONEDAY and RET_LCUP_1W_ONEDAY are statistically significantly different from zero at 10% significance level. In the UK and overall data base however, the findings are much stronger than that of Germany. Every return around the lock up period is statistically significantly different from zero in the UK. This outcome is also true for the overall data base. These findings imply that British investors are more concerned about the expiration of the lock up date and accordingly they take action more sharply than German investors. Therefore we can say that hypothesis 9a holds for Britain and for the overall data base but not statistically true for Germany.

When we look at the price performances of issued companies for the 2-week period before the lock up expiration (RET_LCUP_2W), Table 25 shows that mean differences of VC backed and non-VC backed companies are statistically significantly different from each other in Germany but not in the UK. One interesting result is worth to be mentioned that average return for non-VC backed companies in Germany, contrary to the expectations, is positive. In other words, the shareholders of companies in which there is no venture capitalist among the shareholders structure, do not care too much about the expiration of the lock up. The average returns of VC backed companies for the studied period are -4.12% and -7.58% for Germany and for the UK respectively. By looking at these figures one can simply say that if there is a venture capitalist among the shareholders of the company investors are more sensitive to lock up expiration in the UK than investors in Germany. This outcome can be linked to the structure of British venture capital industry. Since most

of the venture capitalists are independent and market oriented, investors believe that they will sell the share of the company in their portfolio as soon as they have a chance to do so.

The results, presented in Table 26 show that the general tendency of the markets are quite similar when the price performances of the issuing companies 1-week before the lock up date (RET_LCUP_1W) are examined. The mean returns for VC backed companies are -3.84% for German companies and -4.54% for the companies in the UK. These results, together with the results presented in Table 25, show that the biggest downturn of the prices of the VC backed companies take place during the last week before the lock up date. These variables are statistically significantly different from zero for the UK and for Germany.

To understand the dynamics of the price movements around the lock up date, we take into consideration 2-week before and one day after the lock up date (RET_LCUP_2W_ONEDAY) and 1-week before and one day after the lock up period (RET_LCUP_1W_ONEDAY). Looking at the price movements at the first day after the lock up date, may give an idea about the general behavioral pattern of the investors in both countries.

As presented in Table 27 the price performances of the companies 2-week before and one day after the lock up date (RET_LCUP_2W_ONEDAY) show that the average returns of VC backed companies for that period are -6.62% in Germany and -7.73% in the UK. When the time period is shrunk to 1-week before and one day after the lock up date (RET_LCUP_1W_ONEDAY) the returns are -6.37% and -4.64% for

Germany and for the UK respectively. The results imply that the negative price performances of the issuing companies are accelerated right after the lock up date. The pace of the downturn movement is greater in Germany. The return is -4.12% for RET_LCUP_2W, when we take into consideration the first day after the lock up date the return goes to -6.62%. The return for RET_LCUP_1W is -3.84% and this figure jumps to -6.37% when the period is extended to first trading day after the lock up period.

The price performances of the companies around the lock up date in the UK are mixing though. Figures in Table 24 shows that price performances of issuing companies around the lock up date are statistically different from zero. However, when we look at the price performances of VC backed and non-VC backed companies around the lock up date, we cannot conclude that the price performances of these two groups are statistically different from each other. In other words we cannot say that price performances of VC backed companies are statistically lower than that of non-VC backed companies around the lock up date.

All in all we can conclude that the hypothesis of 9b holds for Germany and for the overall data base but it is not statistically true for the UK.

Price performance of a firm with at least one venture capitalist in its shareholders' structure is worse than a similar company with no venture capitalist in its shareholders' structure around the lock up date⁴¹.

⁴¹ This hypothesis is true for Germany and for the overall data base.

The last argument of this study was related with the price performance of an issue with an agency effect in it. In literature it has been argued that if there is a venture capitalist within the issuing company and if there is a relationship between the underwriters of the IPO and the venture capitalist, the underpricing of such issues is higher than market average. To analyze this argument we classify the issues with and without agency effect in it. Since there are only 12 offerings with an agency effect in the UK, it is not statistically possible to run a healthy analysis for the UK market. In Germany on the other hand, there are 65 offerings with agency effect in it. Table 29 shows the results of the German market analysis. By looking at Table 29 we can say that there is no statistically significant difference between the returns of issues with and without agency effect in them. Therefore, we reject the last but not the least of our hypothesis about the relationship between underpricing and agency effect.

However, the interesting point is, contrary to pre-study expectations offerings with agency effect have lower average returns (not statistically significant though) than offerings with non-agency effect (31.08% for the companies with agency effect in it and 35.21% for the companies with no agency effect). This result can be explained by the positive signaling of the venture capitalists and the underwriters in the eyes of the outside investors. As Schenone (2004) and Puri (1996) discussed in their studies, outside investors may ask lower underpricing when there is a relationship between the underwriter bank and the issuing company or the venture capitalist in the issuing company. In such cases outside investors may consider such a relationship as a signal of lowering the asymmetric information. In these circumstances however, the quality of the underwriter becomes very important. If the outside investors believe that the underwriter or the venture capitalist (if there is any) are reputable ones, then

relationship between the underwriter and the issuing firm and/or venture capitalist may even reduce the underpricing.

However, before to conclude that this is the situation in our case, we have to show that venture capital backed companies are underwritten by good quality underwriters. Since we just showed that the quality of the underwriter and the quality of the venture capitalist are important and statistically significant variables in explaining the underpricing in German markets, if we can show that venture capital invested companies are associated with good quality underwriters then we can say that the lower returns of agency effected issues are due to the certification effects of venture capitalists and underwriters.

In order to determine the relationship between existence of a venture capitalist among the shareholders' structure of the company and the quality of the underwriter we first classify the lead underwriters⁴² into three main categories. The methodology of the classification is shown in Table 4. A new variable (LUR_CM) is defined after the classification of the lead underwriter variable (LUNDER_CM).

LUNDER_CM	LUR_CM
1	3
2.1 - 6.1	2
7.1 - 9.1	1

Table 4: Classification of the Lead Underwriters

⁴² We use Carter-Manaster underwriter variable in the study since this variable has more explanatory power than Bloomberg underwriter variable in underpricing model in Germany.

As can be seen from Table 4, most inferior underwriters, ranked as 1 in LUNDER_CM variable are classified as 3 in new variable. Mid-class underwriters, ranked between 2.1 and 6.1 in LUNDER_CM variable are combined and classified as 2 in the new variable measurement. And finally, top-notch underwriters are classified as 3 in LUR_CM variable. By organizing the underwriter rankings under 3 main categories we expect that there is a positive relationship between the underwriter ranking and the existence of the venture capitalist within the issuing company.

Table 30 shows the relationship between the underwriter and the venture capitalist. As can be seen from the table, there is a positive relationship between the venture capitalist and the ranking of the underwriter. Top-notch banks underwrite 66 VC backed IPOs, more than the expected average amount of 56.67. This is true for the second-ranked underwriters. The chi-square table shows that, this relationship is significant at 95% of confidence interval. Therefore we can say that, if there is a venture capitalist within the issuing company then it is highly possible that the issue is underwritten by a quality, top-notch underwriter.

In light of these results, we can say that lower underpricing of the German IPOs with agency effect in it can be associated with the quality of the underwriters and the certification of the venture capitalist.

11 Implications of the Findings to Turkish Venture Capital Market

Although the economic conditions in Turkey is getting better of for the last couple of years, fundraising is still the most challenging fact for entrepreneurs and small

businesses. High interest rates and preference of giving credits mostly to well known companies and big conglomerates hindered the entrepreneurs to see the banks as a source of funding. Besides, foreign investors are reluctant to invest in Turkey because, for many years, Turkey has disappointed foreign investors through numerous crises.

As we look at the short history of Turkish venture capital industry we see some halfhearted attempts of the government to encourage venture capital funds, which ended up in nowhere. But as we came to the second half of 1990s, foreign and domestic venture capital funds began to enter the Turkish market one by one.

Since many years, it was a must for Turkey to encourage the development of science and technology in order to catch the desired civilization and growth level. As means of this goal, venture capital entered the Turkish financial markets in 1986 through the establishment of the Enterprise Support Agency (“TDA”) to brace small enterprises. TDA was thought to be a government owned venture capital firm that would finance private venture capital organizations, but the finance aspect of TDA could not be realized (Tuncel (1996)).

In 1990, Turkey engaged in a technology project with the World Bank. In 1991, Turkish Government established the Turkish Technology Development Foundation (“TTGV”) as a component of this project and extended a \$100 million worth credit to the Turkish Standards Institute (“TSE”).

In 1992, the government implied venture capital in its agenda as an “incentive policy”. The agenda mentioned venture capital as an alternative financing model for Small and Medium Sized Enterprises (“SME”). The main goal of the agenda was empowering entrepreneur and encouraging technological progress.

Following the agenda declaration, some foreign banks and institutions interested in establishing venture capital companies in Turkey and even some companies have offered venture capital to a few projects the lack of capital remained an important problem and the expected boom did not occur.

The need for venture capital became much more apparent after the customs union agreement with the European Union (“EU”), which has abolished customs and duties on most products starting from 1996. That fact intensified pressures on Turkish firms to either grow or go out of business. But even in that situation private equity became an option only for companies of a certain size which had international connections.

Direct investments in high-tech start ups and established companies have been extremely limited in Turkey. Capital and bank credits are very scarce and mostly available to large conglomerates and financially strong joint ventures. SME’s have to operate on short-term high interest rate credits or have to postpone their projects because of long-term financing problems.

The current and very limited Turkish venture capital industry is dominated by former bank credit managers. This being the case, it is not hard to see how the industry has gravitated toward established companies, rather than start-up and early-stage

investing. A banker is more accustomed to analyzing income statements and balance sheets from known, existing companies. There is also powerful motivation to avoid bad loans. Some of these bank-trained investors may develop into successful venture capitalists. Yet there is a significant mismatch of their skills and attitudes and those necessary for success in classic venture capital. After all, who ever heard of a bank making a loan to start-up entrepreneur with little or no collateral and no net worth? No bank, other institutional lender or any organization with such a legacy will agree to wait seven years for its first payment of interest or principal. In Turkey sources of capital are very limited and banks are the only institutional lenders, most of which have their own funds.

11.1 Legal Structure in Turkey

Every nation's institutes and legal arrangements differ from each other. Therefore it is natural to expect that methods for venture capital finance also differ from nation to nation. Since accessibility and the tax-free nature of venture capital funds remain the primary focus, tax effects are one of the first considerations before establishing a structure. For Turkish venture capital industry, just as its global counterparts, a move towards tax exemption was inevitable. In Turkey, a venture capital investment trust is the only type of establishment, which can execute such activity with the benefit of tax exemption. One of the only similarities between venture capital funds in industrialized countries and Turkey is the incentive dawning from tax-exemption.

The principles of venture capital activities⁴³ in Turkey are regulated by the Communiqué on Principles regarding Venture Capital Investment Companies (6.11.1998, Serial VI, Number10) within the framework of Article 22/0 and Article 36 of Law Number 2499 (Capital Markets Board Law) as amended by law number 3794 Venture Capital Investment Trust / Girişim Sermayesi Yatırım Ortaklığı (“GSYO”). The Capital Markets Board Law has been authorized on regulations regarding auditing and liquidations of Venture Capital Investment Companies.

A company which desires to act as a venture capital investment trust must first apply to the Capital Markets Board (“CMB”). They must have an initial capital of YTL 500,000 and all shares of the company must be named and the trust must endure a minimum of 10 years. Most of the partners must be Turkish citizen and if a partner is of foreign origin must comply with pre-requisites under law number 6224. Under the stipulations set forth by the Turkish Trade Law and CMB the trust can be founded instantaneously or incrementally.

The shares must be announced to the CMB within one year following the registration of the trust. This period is granted for the trust to find the necessary space, personnel and equipment to begin operations. At the same time the trust is expected to draft a trust portfolio with specifications regarding where the capital will be invested within one-year period. If the trust does not apply within the mentioned period, the registration for which the organization would be a venture capital investment trust will be amended accordingly. After such a period, although the trust may want to

⁴³ Establishment, operation, management, guideline and liquidation procedures for venture capital investment companies.

return to venture capital activity it will not be able to benefit from tax-exemption. The venture capital investment trust has to go public within the end of the third year after its establishment and 49% at the end of the fifth year must be offered to the public.

The trusts are restricted from lending to fund activities, cannot collect funds specified under the Turkish Banking Law, carry out commercial, industrial or agricultural activities among others. The trust can not invest more than 10% into companies where the founders, members of the board of directors and general director separately or collectively have more than 10% of the capital of the trust. The trust can only keep companies it invests inside its portfolio for a maximum of 10 years. The trust may join the management; give consulting services or management services in the companies in which they invest. However, they can only invest up to 10% in other venture capital funds. The trust can obtain consulting services from specialized individuals or institutions depending on their activities provided that the articles of association have a provision in line with out-sourced services and a resolution has been taken by the board of directors.

11.2 Advantages and Disadvantages of Venture Capital Structure in Turkey

Advantages	Disadvantages
<p>The GSYO is tax exempt.</p> <p>The fact that the GSYO's are under the control of the CMB offers investors a sense of security.</p>	<p>GSYO is always under strict control and monitoring by the CMB.</p> <p>Since the GSYO is committed to invest for at least 10 years it constricts the partners' flexibility.</p> <p>GSYO's are obliged to offer the public.</p> <p>Most of the board members of the GSYO must be citizens of Turkey, thence restricting valuable human resources.</p> <p>As a GSYO goes public it grows more dependent on market conditions.</p> <p>Since venture capital is not a short-term investment, when the GSYO goes public individual investors who are aware of this fact will remain reluctant to invest.</p> <p>The public offering process is rather costly.</p>

11.3 Recommendations for the Development of Venture Capital Industry in Turkey

It is unlikely that a country or area can be competitive in commercial exploitation of innovative processes, products, and services without a strong local venture capital community. Venture capital is a necessary ingredient in the mix of entrepreneurs, scientists, and financiers that build high-tech industries like the Silicon Valley. The

realization of venture capital investments stimulate and add value not only to the economy but also to the society at large by attracting international investors and ideas. The fact that venture capital investments maintain financial, management and scientific integration produces the high probability of success on any one venture. Worthy products or services arising from venture capital investments have a high export potential, hence an important source of revenue.

The Turkish venture capital market offers 3 different structural alternatives for venture capital companies:

- i. Establishment under the rules and regulations of CMB,
- ii. Establishment as an independent corporation,
- iii. Establishment as an off-shore limited partnership.

The most important pre-requisite for the development of venture capital in Turkey is a stable political and economic arena. Improvements in the economic indicators such as GDP, inflation, interest rates and currency exchange rates would stimulate both entrepreneurs and venture capitalists to invest in long-term risky businesses.

In order to supply funds, the venture capitalists have to see the demand. One of the problems faced in Turkey is the insufficient entrepreneurial spirit and the lack of the willingness to create new ideas. The government has to take the required measures to train people about entrepreneurship and innovations, encourage them through incentives like university-entrepreneur cooperation projects, new laws and regulations about patent, license and intellectual property. The prejudice against bankruptcy should also be eliminated. The laws should be revised in a way that the

first time failure of an entrepreneur should be rewarded and encouraged to go on rather than punishing him with strict bankruptcy laws. The failures should be viewed as experiences on the way toward success.

Venture capital should be run by entrepreneurs, risk takers and business developers. Turkey needs a successful, structured role model. Highly successful new ventures such as those in industrialized and emerging markets are inspirational role models for an entire generation of would-be entrepreneurs. Therefore a successful model fund will first and foremost introduce the venture capital notion into Turkish industry and financial markets. Financial institutions should initiate and be involved but not be the sole body or run it by themselves.

A suitable fund structure will organize marketing and public relations activities to increase the number of potential entrepreneurial candidates seeking funding for their new ideas, business plans and various projects. Due to the scarcity of long term financing tools for new, small and innovative entrepreneurial firms, and the nonexistence of competition on the supply side of venture capital industry in Turkey, results of research are expected to be more promising with a higher number of diversified projects for early selection. Public relations and marketing activities will also be useful for the reputation of a model fund. Since current structures are not inviting, and off-shore structure would also attract foreign investment.

Government policies can be a powerful promoter or inhibitor of venture capital backed entrepreneurship. The government can and should provide incentives for

venture capital that build new and innovative companies by promoting technology development and offering good quality education and training particularly technical.

Another requirement for development in Turkey's venture capital arena can be well working, liquid stock markets to enable a smooth exit for the investors. Conditions of the existing stock exchange market should be improved, the legal restrictions and unnecessary bureaucracy should be minimized and a "new companies market" similar to NASDAQ in USA or AIM in the UK should be established⁴⁴.

If a favorable investment climate is developed and fostered, private equity would increase dramatically as investors and the government cultivates venture capital fund management and private equity mechanisms. Venture capital can easily be marketed as an alternative tool for corporate credit banking.

In summary the basic pre-requisites for a successful venture capital industry in Turkey can be listed as follows;

- i. The appropriate legal structure,
- ii. Entrepreneurs with a drive and know-how,
- iii. Business environment fostering growth,
- iv. Exit mechanisms that function,

⁴⁴ Since Turkish venture capital market resembles to that of Germany, policy makers and decision takers should carefully examine the unsuccessful German Experience of Neur Mart. Germany established Neur Markt in 1997 in order to provide a exit channel to venture capitalists from their investments. However, inappropriate structure of Neur Mart caused most of the companies went delisted shortly after their stocks were traded in Neur Markt and finally Neur Markt was eventually closed down.

- v. Venture capitalists with business/industry experience who understand start-up challenges,
- vi. Patient and risk taking investors,
- vii. Technical education and R&D infrastructure.

By looking at its structure and source of funds, one can simply say that Turkish venture capital market resembles to that of Germany rather than that of the UK. Therefore findings of the study for German venture capital industry can be considered as a guideline for Turkish venture capital practitioners. The results of the empirical study show that having a venture capitalist among the shareholders structure of the issuing company reduces the underpricing of the issuing company at the time of IPO. This outcome is true for both German and British IPO samples. Hence, this results may give an idea to Turkish entrepreneurs that having a venture capital investment within their companies before going public-if they have any plans about that at all-may reduce the money left on the table at the time of IPO. One of the most crucial results of the empirical studies is certification effect plays a major role in German venture capital industry and IPO market. The empirical studies show that outside investors care about the credibility of the venture capitalist within the issuing company and the underwriter bank of the company at the time of IPO. The studies show that if a there is a venture capitalist within the shareholders structure of the issuing company and/or the IPO is underwritten by a credible underwriter the outside investors are willing to participate to such IPOs with less underpricing. The importance of this finding is three fold. Firstly by looking at this result, young and inexperienced Turkish venture capitalists have to put special effort to form credibility in the eyes of outside investors. Since credibility is hard to get and takes time,

Turkish venture capitalists have to be careful about the quality of the companies that they bring to public and the pricing of the IPO. If venture capitalists bring poor quality companies and/or valuations are too high and unrealistic, outside investors may think that venture capitalists are trying to fool them and hence they may ask higher underpricing to participate to the next IPO of the portfolio company or do not participate at all. Secondly, the results of the study show that if a company is brought to public by a reputable underwriter outside investors are willing to participate to such IPO at a lower underpricing. Such a reputational effect will enable an underwriter to price its services at higher levels and increase the demand to its services. Therefore, underwriters of Turkish IPO markets have to work hard to form credibility in the eyes of outside investors. Thirdly, empirical studies show that credibility is so important for the outside investors that they do not ask higher underpricing to participate IPOs in which venture capitalists and underwriters have direct and/or indirect relationship. Another important finding that can be important for Turkish venture capitalist is that they should not be in a rush to sell their withholding shares at the time of IPO. Empirical results show that if venture capitalists are in a hurry to sell their shares at the time of IPO, outside investors consider this as a negative signal of the quality of the issuing company and ask for higher underpricing accordingly.

12 Conclusion

The relationship between venture capital investment and the performances of public offerings is a rich area and in the literature several studies on the subject have been conducted so far.

In this study we try to analyze the dynamics of the underpricing of the VC backed and non-VC backed companies. We picked German and British companies to analyze this question in these markets. The choice of Germany and the UK was intentional for some certain reasons. First of all, German and British venture capital markets represent two different schools of thoughts of global venture capital industry. Following the US experience, the UK venture capital industry is composed of more independent and more market oriented companies. German venture capital companies on the other hand, are mostly bank-financed. Second of all, the UK venture capital market is the biggest venture capital market of Europe and second in the world after the US. As presented in Figure 4 German venture capital market is still on rise in the global venture capital industry and as can be seen in Figure 14 the sizes of the two markets are significantly different in terms of funds raised and investments. Finally, there are limited numbers of studies conducted to understand the dynamics of these two markets.

Descriptive statistics showed that there are no significant differences between German and British public offering and venture capital markets⁴⁵ except lock up periods and shareholding differences of the venture capitalists before and after IPO. High shareholding difference of the venture capitalists before and right after the IPO can be associated with the structure of British venture capital industry. Since most of the venture capital companies are independent and mostly financed by pension funds

⁴⁵ Descriptive statistics showed that there is no statistical difference between Germany and the UK in terms of initial returns of issued companies, average company age at the time of IPO, average duration of venture capital investments within the issuing company before IPO and average venture capital holdings at the issuing company before IPO.

and insurance funds, they prefer to realize their profit from their portfolio companies as soon as it is possible. German venture capitalists on the other hand, with the advantage of financed mostly by banks and corporations, do not rush to exit from their portfolio companies and realize their profits at the time of IPO.

The first and the main research topic of the study is to investigate and compare the underpricing of VC backed and non-VC backed companies in Germany and in the UK. Empirical studies showed that there really is a significant difference between the underpricing of VC backed and non-VC backed companies both in Germany and in the UK. After came up with this conclusion, we tried to investigate the main reasons of the differences in the underpricing of VC backed and non-VC backed companies. While we were studying the issue we see that some important explanatory variables came one step forward. By looking at the general and individual results of the explanatory variables on underpricing we can come up with the conclusion that main reasons for the underpricing difference of VC backed and non-VC backed companies in Germany are venture capitalist certification and lead underwriter certification. In the UK on the other hand, in addition to these two explanatory variables, IPO volume seems to be another important variable that may help to explain the differences of underpricing of VC backed and non-VC backed companies. Since the size of the issuing company and minimum floating shares are set by the local authorities as disclosure requirements in the UK (minimum £700,000 of company size and minimum 25% of free float) one may say that these requirements may have an effect on different underpricing dynamics of Germany and the UK. Setting a minimum company size and free float range (indirectly setting a minimum IPO size) may have a driving force of the underpricing phenomenon of the UK public offering market.

When we look at the results in both countries we can say that the findings support the idea that there are some differences between these two markets because of their structures and the rules and the regulations of these two markets.

The results of empirical studies provided that the dynamics of the venture capital industries have similarities as well as differences in both countries. In Germany age of the company, investment period of the venture capital company within the issuing company before the IPO and lead underwriter certification seem to be the most important explanatory variables in explaining the underpricing phenomenon of issuing companies. Contrary to pre-study expectations IPO volume, lock up period of IPO, shareholding of the venture capitalist before the IPO and the difference of the shareholding of the venture capitalist before and after the IPO do not have any explanatory power on underpricing.

When we look at the UK we see that investment period of the venture capital company within the issuing company before the IPO, IPO volume, the shareholding of venture capitalist before the IPO, the difference of the shareholding of the venture capitalist before and after the IPO and lead underwriter reputation are the most important explanatory variables of underpricing. Contrary to German results, age of the issuing company has no power on underpricing and the shareholding of the venture capitalist before the IPO has much more importance for the British investors than German investors. This situation can be explained by the structure of the venture capital industry and the venture capital companies in the UK. Since most of the venture capital companies in the UK are independent and market oriented, their

shareholding within the issuing company may carry more signaling effect to the outside investors that it does in Germany.

One important point has to be mentioned about the German and British venture capital markets is that there is a high multicollinearity between the shareholding of venture capitalist before the IPO and the difference of the shareholding of the venture capitalist before and after the IPO. To eliminate the effects of the multicollinearity we omit each of these two variables from the models and come up with a conclusion that these two variables do not have any power on underpricing issues.

The empirical studies exhibit that venture capital certification and lead underwriter certification are the most important explanatory variables of underpricing in both of the countries. By looking at these results we can say that in both countries outside investors give high importance to venture capitalist's and underwriter's credibility. They are willing to take part in IPOs with lower underpricing if there is a credible underwriter and/or venture capitalist involvement in it.

Another important result of the study is the price performance of the issuing companies around the lock up date. It is believed that the shareholders of the companies get worried about the expiration of the lock up date since there is a potential sell side price pressure on the issue. In order to avoid from such a price downturn the shareholders of the company sell their withholding shares before the expiration of the lock up date. The tendency of selling withholding shares results a negative return of the company in the period. The empirical studies support this idea in the UK but we come up with a mixing result in Germany. In the UK, the price

performances of the companies worsen as they approach to lock up date, no matter if there is a venture capitalist with in the shareholders structure of the company or not. In Germany, although the price performances of VC backed companies around the lock up date are negative, the average price performances of the companies with no venture capital investment, contrary to previous expectations, are slightly greater than zero. The comparison of the price performances of VC backed and non-VC backed companies around the lock up period is another issue that we analyzed deeply. The empirical findings show that in Germany price performances of VC backed companies around lock up date are statistically significantly worse than price performances of non-VC backed companies around lock up date. When the UK is taken in to consideration empirical findings do not support the hypothesis significantly. By looking at these findings one can say that in Germany having a venture capitalist within the company is an important issue for the investors while approaching to lock up expiration date, whereas in the UK lock up expiration is much more important for investor's behavior than the shareholder's structure of the company itself.

Finally, contrary to our previous expectations, underpricing of issues with agency effect are not statistically different from shares without agency effect in it and even less then theirs in nominal return basis. Although surprising, this result can be associated with the credibility of the underwriters and the venture capitalists and investors' perceptions towards them. We exhibit that in Germany there is a positive relationship between the underwriter ranking and the venture capitalist existence in the issuing company. In other words, empirical studies show that issues with venture capitalist in them are mostly underwritten by reputable underwriters. Since we show

that investors do care about the credibility of the underwriters and venture capitalists, when these two parties are associated in an IPO, outside investors consider this relationship as a potential collaboration of reducing the adverse selection problem.

Since the venture capital market structure of Turkey is quite similar to that of Germany, the findings may have some guidance role for the venture capital players in Turkey. First of all in order to be able to have an effective venture capital market policy makers ought to out some rules and regulations that fosters venture capital investments. Tax incentives and regulatory protection mechanisms may have positive effect on venture capital investments. Additionally patent and protection laws should be revised so that innovations may be under strict protection. Empirical findings showed that venture capitalist and underwriter certification are the most important factors from the outside investors' point of view. Therefore market players in Turkish venture capital and IPO markets have to put special effort to gain and keep good reputation. By doing so investment banks will have more deals in their pipelines at a higher price whereas venture capitalists will be able to bring their portfolio companies to public at a less amount of underpricing.

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14 Appendix

	Country Dummy*	N	Mean	Std. Deviation	Std. Error Mean
Initial Return	0	274	0.2754	0.7550	0.0456
	1	374	0.3449	0.5959	0.0308

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Initial Return	Equal variances assumed	2.267	0.133	-1.309	646.000	0.191
	Equal variances not assumed			-1.263	502.449	0.207

Table 5: The Mean Return Comparison of the UK and German IPOs.

	Country Dummy*	N	Mean	Std. Deviation	Std. Error Mean
Age of Company	0	274	9.2007	15.9817	0.9655
	1	374	10.7674	15.8396	0.8190

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Age of Company	Equal variances assumed	0.346	0.556	-1.239	646.000	0.216
	Equal variances not assumed			-1.237	585.414	0.216

Table 6: The Comparison of the Mean Age of the Issuing Companies in the UK and in Germany

Germany	VC Dummy	N	Mean	Std. Deviation	Std. Error Mean
Age of Company at IPO	0	225	12.5467	19.1269	1.2751
	1	149	8.0805	8.1568	0.6682

Germany		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Age of Company at IPO	Equal variances assumed	11.051	0.001	2.692	372.000	0.007
	Equal variances not assumed			3.102	326.642	0.002

Table 7: The Comparison of Mean Age of Issuing Companies between VC Backed and Non-VC Backed Companies in Germany

The UK	VC Dummy	N	Mean	Std. Deviation	Std. Error Mean
Age of Company at IPO	0	188	9.6117	18.7147	1.3649
	1	86	8.3023	6.9723	0.7518

The UK		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Age of Company at IPO	Equal variances assumed	5.007	0.026	0.629	272.000	0.530
	Equal variances not assumed			0.840	264.187	0.402

Table 8: The Comparison of Mean Age of Issuing Companies between VC Backed and Non-VC Backed Companies in the UK

	Country Dummy*	N	Mean	Std. Deviation	Std. Error Mean
Age of VC Investment	0	86	3.2791	2.9009	0.3128
	1	149	3.3289	2.6443	0.2166

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Age of VC Investment	Equal variances assumed	0.173	0.677	-0.134	233.000	0.893
	Equal variances not assumed			-0.131	164.368	0.896

Table 9: The Comparison of the Mean Age of the Venture Capital Investments within Issuing Companies in the UK and in Germany

	Country Dummy*	N	Mean	Std. Deviation	Std. Error Mean
Lock Up Period	0	215	11.4515	4.6179	0.3149
	1	350	7.4086	4.1209	0.2203

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Lock Up Period	Equal variances assumed	5.222	0.023	10.809	563.000	0.000
	Equal variances not assumed			10.519	413.848	0.000

Table 10: The Comparison of the Mean Lock up Periods between Germany and the UK

Germany	VC Dummy	N	Mean	Std. Deviation	Std. Error Mean
Lock Up period	0	205	7.6889	4.5521	0.3179
	1	145	7.0122	3.3957	0.2820

Germany		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Lock Up period	Equal variances assumed	6.140	0.014	1.516	348.000	0.130
	Equal variances not assumed			1.592	346.994	0.112

Table 11: The Comparison of the Mean Lock up Periods between VC Backed and Non-VC Backed Companies in Germany

The UK	VC Dummy	N	Mean	Std. Deviation	Std. Error Mean
Lock Up period	0	141	11.9059	4.2269	0.3560
	1	74	10.5856	5.2048	0.6050

The UK		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Lock Up period	Equal variances assumed	11.109	0.001	2.006	213.000	0.046
	Equal variances not assumed			1.881	124.504	0.062

Table 12: The Comparison of the Mean Lock up Periods between VC Backed and Non-VC Backed Companies in the UK

	Country Dummy*	N	Mean	Std. Deviation	Std. Error Mean
VCH_BIPO**	0	86	35.7393	23.8482	2.5716
	1	149	31.6565	21.6804	1.7761

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
VCH_BIPO**	Equal variances assumed	3.956	0.048	1.340	233.000	0.181
	Equal variances not assumed			1.306	164.002	0.193

Table 13: The Comparison of Average Venture Capital Holding Before the IPO between Germany and the UK

	Country Dummy*	N	Mean	Std. Deviation	Std. Error Mean
VCHD***	0	86	17.1332	16.2134	1.7483
	1	149	13.5261	11.5309	0.9446

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
VCHD***	Equal variances assumed	12.711	0.000	1.983	233.000	0.048
	Equal variances not assumed			1.815	135.253	0.072

Table 14: The Comparison of the Differences between Venture Capital Holdings within the Issuing Companies before and after the IPO in Germany and in the UK

Germany	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
LUNDER_CM****	0	225	4.3218	3.1774	0.2118
	1	149	5.3289	3.0132	0.2469

Germany		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
LUNDER_CM****	Equal variances assumed	5.478	0.020	-3.063	372.000	0.002
	Equal variances not assumed			-3.096	328.514	0.002

Table 15: The Comparison of Mean Lead Underwriter Ranking of VC Backed and Non-VC Backed Companies in Germany

The UK	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
LUNDER_CM****	0	188	4.0367	3.0022	0.2190
	1	86	5.6233	3.1392	0.3385

The UK		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
LUNDER_CM****	Equal variances assumed	0.192	0.662	-4.002	272.000	0.000
	Equal variances not assumed			-3.935	158.399	0.000

Table 16: The Comparison of Mean Lead Underwriter Ranking of VC Backed and Non-VC Backed Companies in the UK

	Country Dummy*	N	Mean	Std. Deviation	Std. Error Mean
AGENCY	0	86	0.1279	0.3359	0.0362
	1	149	0.3960	0.4907	0.0402

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
AGENCY	Equal variances assumed	120.759	0.000	-4.493	233.000	0.000
	Equal variances not assumed			-4.954	226.221	0.000

Table 17: The Average Agency Effects of the VC Backed IPOs in Germany and the UK

The UK	VC Dummy	N	Mean	Std. Deviation	Std. Error Mean
Ln IPO Volume	0	188	16.1420	1.4484	0.1056
	1	86	17.2288	1.4020	0.1512

The UK		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Ln IPO Volume	Equal variances assumed	0.144	0.705	-5.821	272.000	0.000
	Equal variances not assumed			-5.892	169.858	0.000

Table 18: The Comparison of Mean IPO Volume of VC Backed and Non-VC Backed Companies in the UK

*: The country dummy variable “0” represents the UK and “1” represents Germany.

** : Venture Capital Holdings before the IPO.

***: The Differences between Venture Capital Holdings before and after the IPO.

****: Lead Underwriter Ranking in Carter-Manaster Methodology.

Germany	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
UNDERPR	0	225	0.4023	0.7116	0.0474
	1	149	0.2582	0.3405	0.0279

Germany		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
UNDERPR	Equal variances assumed	19.893	0.000	2.302	372.000	0.022
	Equal variances not assumed			2.618	343.545	0.009

The UK	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
UNDERPR	0	188	0.3270	0.8940	0.0652
	1	86	0.1626	0.2315	0.0250

The UK		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
UNDERPR	Equal variances assumed	7.376	0.007	1.679	272.000	0.094
	Equal variances not assumed			2.356	234.752	0.019

Overall	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
UNDERPR	0	413	0.3680	0.7997	0.0393
	1	235	0.2232	0.3081	0.0201

Overall		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
UNDERPR	Equal variances assumed	21.301	0.000	2.665	646.000	0.008
	Equal variances not assumed			3.278	584.953	0.001

Table 19: Underpricing of VC and non-VC Backed Companies

Germany	Mean	N	Std. Deviation	Std. Error Mean
UNDERPR	0.345	374.000	0.596	0.031
RET_1WEEK	0.353	374.000	0.694	0.036

Germany	Paired Differences			t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean			
UNDERPR - RET_1WEEK	-0.008	0.342	0.018	-0.470	373	0.639

The UK	Mean	N	Std. Deviation	Std. Error Mean
UNDERPR	0.275	274.000	0.755	0.046
RET IPO_1WEEK	0.292	274.000	0.779	0.047

The UK	Paired Differences			t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean			
UNDERPR - RET_1WEEK	-0.016	0.251	0.015	-1.085	273	0.279

Table 20: Comparison of First Day and 1 Week Returns of Issued Companies

Germany	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
RET_INDEXRELATIVE	0	225	0.4048	0.7140	0.0476
	1	149	0.2592	0.3403	0.0279

Germany		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
RET_INDEXRELATIVE	Equal variances assumed	20.395	0.000	2.319	372.000	0.021
	Equal variances not assumed			2.639	342.951	0.009

The UK	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
RET_INDEXRELATIVE	0	188	0.3249	0.8914	0.0650
	1	86	0.1642	0.2321	0.0250

The UK		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
RET_INDEXRELATIVE	Equal variances assumed	7.404	0.007	1.644	272.000	0.101
	Equal variances not assumed			2.306	235.167	0.022

Overall	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
RET_INDEXRELATIVE	0	413	0.3685	0.7996	0.0393
	1	235	0.2244	0.3081	0.0201

Overall		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
RET_INDEXRELATIVE	Equal variances assumed	21.699	0.000	2.651	646.000	0.008
	Equal variances not assumed			3.261	584.913	0.001

Table 21: Index Relative Underpricing of Issued Companies in Germany and in the UK

	Constant	COMP_AGE	VC_INVPER	LN_IPOVOL	LCUP	VCH_BIPO	VCHD	LUNDER_CM	LUNDER_BL	Adj.R ²	Fstat	DW	
UNDERPR	1	0.420* (11.436)	-0.184* (-3.614)							0.031	13.064	2.03	
	2	0.536* (15.574)		-0.647* (-10.287)						0.415	105.817	2.12	
	3	-0.376 (-0.800)			0.079 (1.537)					0.004	2.362	2.02	
	4	0.426* (6.579)				-0.075 (-1.409)				0.006	1.985	2.05	
	5	0.389* (10.836)					-0.121** (-2.352)			0.012	5.531	2.00	
	6	0.385* (11.016)						0.122** (2.373)		0.012	5.632	1.99	
	7	0.591* (11.049)							-0.276* (-5.532)	0.074	30.598	2.07	
	8	0.243* (5.131)								0.018	7.961	2.02	
	9	0.229 (0.517)	-0.119*** (-1.843)	-0.569* (-8.048)	0.074 (1.030)	-0.018 (-0.288)	0.169 (1.503)	0.203*** (1.895)	-0.209* (-2.989)		0.439	17.069	2.12
	10	0.17 (0.304)	-0.091 (-1.386)	-0.596* (-8.023)	0.06 (0.705)	-0.023 (-0.355)	0.117 (1.027)	0.166 (1.520)		0.087 (1.065)	0.407	15.11	2.14
	11	0.13 (0.293)	-0.126*** (-1.940)	-0.560* (-7.864)	0.088 (1.226)	-0.014 (-0.224)	-0.003 (-0.039)		-0.191* (-2.734)		0.428	18.959	2.09
	12	0.114 (0.260)	-0.123*** (-1.894)	-0.550* (-7.872)	0.095 (1.343)	-0.019 (-0.302)		0.073 (1.150)	-0.189* (-2.738)		0.433	19.36	2.1
	13	0.133 (0.302)	-0.126*** (-1.947)	-0.560* (-8.065)	0.088 (1.245)	-0.014 (-0.223)			-0.192* (-2.779)		0.432	22.915	2.09
	14	0.649* (12.579)	-0.116*** (-1.840)	-0.602* (-9.472)							0.439	39.682	2.1

Table 22: The Regression Results of Germany IPO Data Base

	Constant	COMP_AGE	VC_INVPER	LN_IPOVOL	LCUP	VCH_BIPO	VCHD	LUNDER_CM	LUNDER_BL	Adj.R ²	Fstat	DW	
UNDERPR	1	0.335* (6.409)	-0.137** (-2.278)							0.015	5.19	2.06	
	2	0.281* (8.299)		-0.454* (-4.665)						0.196	21.758	2.18	
	3	1.491* (3.019)			0.148** (2.472)					0.018	6.11	2.01	
	4	0.168 (1.693)				0.044 (0.637)				-0.003	0.406	1.99	
	5	0.33* (6.45)					-0.137** (-2.289)			0.015	5.241	1.99	
	6	0.318* (6.408)						0.127** (2.11)		0.012	4.451	2.01	
	7	0.420* (5.264)							-0.132** (-2.204)	0.014	4.859	2.06	
	8	0.178** (2.19)							0.088 (1.462)	0.004	2.138	2.04	
	9	-0.036 (-0.125)	-0.0003 (-0.003)	-0.344* (-3.046)	0.182 (1.55)	0.102 (1.067)	-0.369** (-2.562)	0.142 (0.979)	-0.25** (-2.083)		0.435	9.017	2.07
	10	0.068 (0.189)	0.007 (0.062)	-0.366* (-3.131)	0.092 (0.74)	0.137 (1.405)	-0.413* (-2.785)	0.073 (0.506)		0.097 (0.768)	0.403	8.033	1.98
	11	0.042 (0.15)	0.007 (0.067)	-0.358* (-3.198)	0.149 (1.329)	0.1 (1.048)	-0.478* (-5.256)		-0.215*** (-1.88)		0.435	10.367	2.04
	12	-0.259 (-0.896)	-0.026 (-0.227)	-0.339* (-2.885)	0.251** (2.115)	0.131 (1.325)		0.431* (4.507)	-0.322* (-2.659)		0.388	8.703	2.17
	13	-0.164 (-0.501)	-0.025 (-0.191)	-0.435* (-3.318)	0.163 (1.23)	0.182 (1.637)			-0.226*** (-1.673)		0.214	4.97	2.28
	14	-0.094 (-0.344)		-0.326* (-3.58)	0.197*** (1.898)			0.427* (4.758)	-0.275** (-2.604)		0.37	13.466	1.97
	15	0.12 (0.466)		-0.357* (-4.223)	0.134 (1.378)		-0.487* (-5.90)		-0.184*** (-1.862)		0.436	17.426	2.06

Table 23: The Regression Results of the UK IPO Data Base

In Table 22 and Table 23 *, ** and *** indicate 1%, 5% and 10% significance levels respectively.

Germany	RET_LCUP_2W	RET_LCUP_1W	RET_LCUP_2W_ONEDAY	RET_LCUP_1W_ONEDAY
N Valid	348	348	348	348
Missing	26	26	26	26
Mean	-0.013	-0.006	-0.026	-0.020
Std. Deviation	0.241	0.169	0.267	0.197
tstat	-1.026	-0.608	-1.845	-1.871
Significance	0.306	0.543	0.066	0.062

The UK	RET_LCUP_2W	RET_LCUP_1W	RET_LCUP_2W_ONEDAY	RET_LCUP_1W_ONEDAY
N Valid	203	203	203	203
Missing	71	71	71	71
Mean	-0.059	-0.031	-0.064	-0.036
Std. Deviation	0.166	0.107	0.174	0.119
tstat	-5.069	-4.142	-5.213	-4.323
Significance	0.000	0.000	0.000	0.000

Overall	RET_LCUP_2W	RET_LCUP_1W	RET_LCUP_2W_ONEDAY	RET_LCUP_1W_ONEDAY
N Valid	551	551	551	551
Missing	97	97	97	97
Mean	-0.030	-0.015	-0.040	-0.026
Std. Deviation	0.217	0.150	0.238	0.172
tstat	-3.252	-2.347	-3.965	-3.509
Significance	0.001	0.019	0.000	0.000

Table 24: Basic Statistical Figures of Lock up Returns in Germany and in the UK.

Germany	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
RET_LCUP_2W	0	203	0.0067	0.2508	0.0176
	1	145	-0.0412	0.2246	0.0187

Germany		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
RET_LCUP_2W	Equal variances assumed	0.008	0.929	1.835	346.000	0.067
	Equal variances not assumed			1.869	328.826	0.063

The UK	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
RET_LCUP_2W	0	134	-0.0504	0.1610	0.0139
	1	69	-0.0758	0.1748	0.0210

The UK		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
RET_LCUP_2W	Equal variances assumed	0.931	0.336	1.036	201.000	0.302
	Equal variances not assumed			1.009	127.923	0.315

Overall	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
RET_LCUP_2W	0	337	-0.0160	0.2211	0.0120
	1	214	-0.0524	0.2100	0.0144

Overall		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
RET_LCUP_2W	Equal variances assumed	0.306	0.580	1.920	549.000	0.055
	Equal variances not assumed			1.942	470.477	0.053

Table 25: The Comparison of 2-Week Returns of Issued Companies before the Lock up Date between VC and Non-VC Backed Companies

Germany	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
RET_LCUP_1W	0	203	0.0180	0.1708	0.0120
	1	145	-0.0384	0.1619	0.0134

Germany		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
RET_LCUP_1W	Equal variances assumed	0.738	0.391	3.105	346.000	0.002
	Equal variances not assumed			3.133	319.823	0.002

The UK	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
RET_LCUP_1W	0	134	-0.0239	0.1076	0.0093
	1	69	-0.0454	0.1062	0.0128

The UK		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
RET_LCUP_1W	Equal variances assumed	0.312	0.577	1.352	201.000	0.178
	Equal variances not assumed			1.357	138.963	0.177

Overall	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
RET_LCUP_1W	0	337	0.0013	0.1501	0.0082
	1	214	-0.0407	0.1461	0.0100

Overall		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
RET_LCUP_1W	Equal variances assumed	0.000	0.998	3.234	549.000	0.001
	Equal variances not assumed			3.254	462.622	0.001

Table 26: The Comparison of 1-Week Returns of Issued Companies before the Lock up Date between VC and Non-VC Backed Companies

Germany	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
RET_LCUP_2W_ONEDAY	0	203	0.0020	0.2858	0.0201
	1	145	-0.0662	0.2334	0.0194

Germany		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
RET_LCUP_2W_ONEDAY	Equal variances assumed	0.143	0.705	2.362	346.000	0.019
	Equal variances not assumed			2.442	339.790	0.015

The UK	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
RET_LCUP_2W_ONEDAY	0	134	-0.0566	0.1722	0.0149
	1	69	-0.0773	0.1778	0.0214

The UK		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
RET_LCUP_2W_ONEDAY	Equal variances assumed	0.586	0.445	0.804	201.000	0.423
	Equal variances not assumed			0.795	133.589	0.428

Overall	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
RET_LCUP_2W_ONEDAY	0	337	-0.0213	0.2483	0.0135
	1	214	-0.0698	0.2167	0.0148

Overall		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
RET_LCUP_2W_ONEDAY	Equal variances assumed	0.068	0.794	2.343	549.000	0.019
	Equal variances not assumed			2.415	497.226	0.016

Table 27: The Comparison of the Returns of Issues for a Period of 2 Weeks before and 1 Day after the Lock up Date between VC and non-VC Backed Companies

Germany	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
RET_LCUP_1W_ONEDAY	0	203	0.0117	0.2038	0.0143
	1	145	-0.0637	0.1774	0.0147

Germany		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
RET_LCUP_1W_ONEDAY	Equal variances assumed	0.579	0.447	3.587	346.000	0.000
	Equal variances not assumed			3.671	332.741	0.000

The UK	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
RET_LCUP_1W_ONEDAY	0	134	-0.0307	0.1221	0.0106
	1	69	-0.0464	0.1121	0.0135

The UK		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
RET_LCUP_1W_ONEDAY	Equal variances assumed	0.030	0.862	0.891	201.000	0.374
	Equal variances not assumed			0.916	148.190	0.361

Overall	VC_DUMMY	N	Mean	Std. Deviation	Std. Error Mean
RET_LCUP_1W_ONEDAY	0	337	-0.0052	0.1770	0.0096
	1	214	-0.0581	0.1592	0.0109

Overall		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
RET_LCUP_1W_ONEDAY	Equal variances assumed	0.002	0.962	3.557	549.000	0.000
	Equal variances not assumed			3.641	487.925	0.000

Table 28: The Comparison of the Returns of Issues for a Period of 1 Week before and 1 Day after the Lock up Date between VC and non-VC Backed Companies

Germany	AGENCY	N	Mean	Std. Deviation	Std. Error Mean
UNDERPR	0	309	0.3521	0.6275	0.0357
	1	65	0.3108	0.4158	0.0516

Germany		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
UNDERPR	Equal variances assumed	1.447	0.230	0.506	372.000	0.613
	Equal variances not assumed			0.657	133.645	0.512

Table 29: Agency Effect and Associated Returns of German IPO Markets

		VC_DUMMY	
		0	1
LUR_CM	1 Count	76	66
	Expected Count	85.43	56.57
	2 Count	58	44
	Expected Count	61.36	40.64
	3 Count	91	39
	Expected Count	78.21	51.79
Total	Count	225	149
	Expected Count	225	149

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.33	2	0.0156
Likelihood Ratio	8.47	2	0.0145
Linear-by-Linear Association	7.56	1	0.0060
# of Valid Cases	374		

Table 30: The Relationship between the Venture Capitalist and Quality of Underwriter in Germany

In all above tables, venture capital dummy of “0” indicates a company with no venture capital investment in it and “1” indicates a company in which there is at least one venture capitalist at the time of IPO.