

LAPPEENRANTA UNIVERSITY OF TECHNOLOGY

School of Business

Finance



THE IMPACT OF PUBLIC INSTITUTIONS TO VENTURE CAPITAL MARKET: EMPIRICAL EVIDENCE FROM FINLAND

Bachelor's thesis

Author: Linda Suomalainen

Instructor: Eero Pätäri

17.4.2008

TABLE OF CONTENTS

| | |
|---|----|
| 1. INTRODUCTION | 1 |
| 1.1 Background of the study | 1 |
| 1.2 Objective | 2 |
| 1.3 Limitations | 3 |
| 1.4 Structure | 4 |
| 2. THE ROLE OF GOVERNMENT AND PUBLIC FUNDING IN VENTURE CAPITAL MARKET | 5 |
| 2.1. Justifications for government interventions | 6 |
| 2.1.1 Funding gap | 6 |
| 2.1.2 Information gap | 8 |
| 2.1.3 R&D spillovers, sale and employment contribution | 10 |
| 2.2 Government's role | 11 |
| 2.3 Instruments of investment and support | 15 |
| 2.3.1 Debt finance | 16 |
| 2.3.2 Equity finance | 17 |
| 2.3.3 Public support and incentives | 19 |
| 2.4 The effects of government interventions | 20 |
| 2.5 Criticism | 22 |
| 2.5.1 Justifications | 22 |
| 2.5.2 Roles | 23 |
| 2.5.3 Effects | 24 |
| 3. FINNISH VENTURE CAPITAL MARKET | 25 |
| 3.1 Public agencies in Finland | 25 |
| 3.1.1 The Finnish National Fund for Research and Development (Sitra) | 27 |
| 3.1.2 Finnish Industry Investment Ltd (FII) | 29 |
| 3.1.3 Finnvera Plc | 30 |
| 3.1.4 The Finnish agency for Technology and Innovation (Tekes) | 31 |

| | |
|---|----|
| 3.2 Development of Finnish venture capital market | 32 |
| 4. CONCLUSION..... | 38 |
| REFERENCES | 40 |
| APPENDICES | 46 |

1. INTRODUCTION

1.1 Background of the study

The Finnish venture capital markets are quite young even though its existence can be dated to late 1960s and 1970s when first investments in venture capital and private equity terms were made in Finland. (Luukkonen, 2006) The short history of the market is in many sense widely unexplored and offers exciting opportunities to examine and understand distinct national characteristics of the market. Especially studying the relationship between public and private investors' investments in early-stage companies can uncover nation's ability to meet the demand for funding high-technology start-ups.

The Finnish venture capital markets truly established in the early 1990s and experienced a seemingly rapid growth in the later part of the decade (Luukkonen, 2006). The amount of investments grew from both public and private sources until 2001 when overall market conditions started to slow down. Despite the deteriorating market conditions number of investments made at that time actually increased and highest level of exits was seen not until in 2003 (FVCA, 2007).

Like for many emerging markets the intervention of the national government for creating and maintaining of the market plays an important role but at the same time is a controversial subject faced with many debates. Finland is no exception as significant share of the early-stage investments are done by various public investor entities. Ideally in well functioning venture markets small and medium-sized enterprises (SMEs) would not face obstacles while seeking funding. Due to many features characteristic to SMEs exposes them to market failure.

Various studies concerning importance and efficiency of public investors have been conducted by the public investors themselves and by research institutes (Maula & Murray 2003; Luukkonen 2006). These publications have accounted for description of

venture markets in Finland and public actors. However academic research has concentrated on surveys made of USA and more developed venture markets due to more accessible data. Thus, Europe and Finland lack of surveys based on country's distinct data. Despite of the concentration on overseas data, valuable surveys on government direct and indirect measures such as different profit distribution structures can reveal information that can be beneficial when examining broadly the Finnish venture capital market. (Jääskeläinen et al., 2007)

To better discover the public investors' impact on developing the venture capital market it becomes a necessity to turn the focus on public agencies ability to correct market failures by filling the gap left by private investors. Additionally it is important to examine the relationship between public and private investors' actions and effects of public funding. Previous studies have not been able to fully define role of public agencies and efficiency of policy of public support. The differences between countries as well as public actors make their comparison and generalization seemingly difficult.

1.2 Objective

The objective for this thesis is to examine the theoretical framework of venture capital investing as well as public finance. Trough combining these two frameworks we examine reasons for government intervention and impact of public institutions to venture capital market. An empirical view is provided by examining the public agencies in Finland and their impact on Finnish venture capital market and the relationship to private venture capital investors (VCs). The purpose is to study annual investment done in early-stages and examine the development of public funding compared to private. This thesis studies the differentiating roles and strategies of public actors.

In this study we will use annual reports from the public investors and national research projects to discover the extents of their investments and financing commitments. We will examine the relation of annual private and public investing and development of public

investors' portfolio. To proportion the public financing the private venture capitalists actions are set against with amount of private investing acquired from Finnish Venture Capital Association's Yearbook. The thesis attempts to answer following questions:

- Q1 Why would the venture capital market need public investing?
- Q2 What are the effects of public support?
- Q3 What kind of development has Finnish venture capital market gone through?
- Q4 What is the relationship between the public and private early-stage investments?
- Q5 How has the volume of public funding changed?

1.3 Limitations

The venture capital markets as a whole has not been widely examined field of science but to be able to make simple and descriptive conclusion we have to make some limitations to the research. The focus is directed to examine impact of public institutions to the market as well as relationship between the private and public actors. Also the data of the development of the venture market is viewed.

The study does not cover any particular private venture capital fund's investment activity but considers the private investors as a one and data covers only the members of the FVCA. This limitation is due to the lack of public information and acquiring such would go beyond the scope of this thesis. Also this thesis will concentrate on examining early-stage venture capital investing and its features. Profound analysis on later-stage investing is not covered in this thesis (Appendix 1).

1.4 Structure

The remainder of this thesis is organized as follows. Chapter 2 presents previous academic literature concerning justifications for governmental intervention and factors influencing venture capital investing to SMEs. Also examination of different roles public investors is covered. The empirical part of this thesis is presented in Chapter 3 where description of public agencies in Finland and development of the market is viewed. And finally Chapter 4 concludes the findings of this thesis.

2. THE ROLE OF GOVERNMENT AND PUBLIC FUNDING IN VENTURE CAPITAL MARKET

The existence of small enterprises, innovative entrepreneurs has been widely acknowledged as an important contributor of economic growth, welfare as well as employment and renewal of modern economies (Parker 2001, Maula et al. 2007). Thus, governments have incentives to foster innovative small- and medium sized enterprises (SMEs) in early stages with growth ambition to become bigger and more profitable foundation of the economy. Ability to grow requires capital that is for some of companies in seed- and early stage hard to acquire and is affected by the fact that the innovative start-ups seeking for capital possess huge opportunities but also tremendous risks.

An existence of supporting business environment and access to finance is important to any company, especially to small businesses that cannot fund their operation on internal cash-flow (HM Treasury, 2003). The challenge of creating financing infrastructure that supports innovative SMEs is a complex process that requires enabling conditions and efficient allocation and recycling of capital (United Nations Economic Commission for Europe, 2007). Financial markets have said to operate reasonably effectively but in a case of small enterprises there is a lot of uncertainty and information asymmetry involved (Lerner, 2002) that creates challenges for seeking external finance.

If the financial markets are not working sufficiently and are not able to provide enough capital for small start-ups, it has been suggested that government should try to correct any occurring market failures (Lerner, 1999). Justification and variety of measures for public finance has gathered attention in academic surveys (Lerner, 1999) as well in governmental level. (European commission 2006a; Maula & Murray 2003; HM Treasury 2003) Well-targeted public interventions have played an important role in developing national venture capital markets which are crucial for providing early stage financing for SMEs (United Nations Economic Commission for Europe, 2007).

2.1. Justifications for government interventions

2.1.1 Funding gap

For already well established companies there exists various ways of collecting external funding in addition to opportunity to use internal funding to growing business. But start-up companies do not have track record of their performance therefore it is hard to evaluate their distinct risk-return characteristics. Even though main source of seed and early-stage funding comes from the principal owner of the company, when companies expand the need for external funding becomes immediate. (Berger & Udell, 1998) Berger & Udell (1998) found that particularly high-risk companies with growth opportunities and mainly intangible asset are those seeking for external funding and at the same time face difficulties in collecting it.

The channels to collect external funding are extremely limited while small companies do not have access to public finance markets and therefore have to resort to private equity and debt (Berger & Udell 1998). But debt financing can be out of reach for many start-ups because lenders cannot distinguish good borrowers from bad borrowers in markets with asymmetric information. In practice this means that lenders, most cases banks, are not able to judge borrowers' creditworthiness and probability of repayment, when there is neither record of past performance nor assets to be placed as collaterals. As a consequence some companies may end up not receiving debt funding at all even if they are willing to pay higher interest rate or place excess collaterals (Stiglitz & Weiss 1981; De Meza & Webb 1987 & 2005). This can result that some start-ups may face funding shortage (Cressy, 2002).

The uncertainty acquiring debt with typical characteristics of small start-up companies' being uncertain future cash-flows and demand for flexible financing that enables growth, makes debt financing seemingly unsuitable form of funding (European commission, 2005). The focus then turns to private equity organizations, that is, to venture capitalist (VCs) that provide early-stage finance to high-risk and potentially high-reward

companies (Lerner, 2000) To begin with, the existence of well-functioning venture markets is widely recognized as a vital condition for both demand and supply of venture capital (HM Treasury 2003; European commission 2005) as well as an important source of equity financing to SMEs (Stiglitz & Weiss 1981; Berger & Udell 1998; Cressy 2002; Lerner 2002; Free, 2007).

But the existence of equity gap is widely acknowledged consequence of lack of private VC investing in early-stage SMEs. It is defined as a number of small- and medium sized enterprises that do not have access to venture capital finance (Lahti, 2004). Reasons for equity gap are similar to debt gap characterized by insufficient supply of funds and inadequacies of demand side (European commission, 2005). Many private VCs are not willing to invest small amounts to due to high transaction costs, shortages of available exit options and greater risk involved in early stage companies. This has led to the situation where fewer VCs operate in early stage area and companies looking for finance under some limit are not able to acquire venture capital finance (Maula et al., 2007). (HM Treasury, 2003) Information gap between entrepreneurs and investors seems to be the reason causing problems in acquiring equity and debt funding (Lerner, 1999 & 2002). The figure 1 shows the sources of equity financing in different stages and the equity gap which some SMEs face in early-stage.

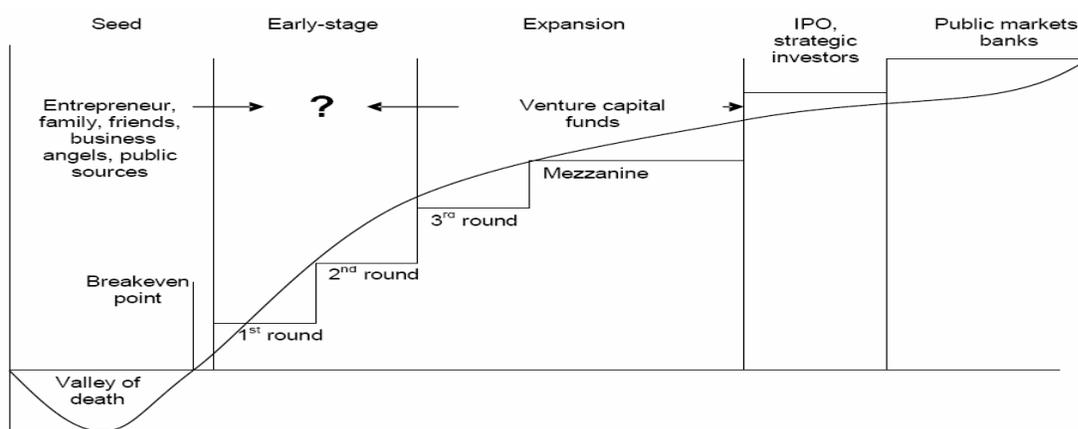


Figure 1. Stages of equity financing. The figure shows the funding gap that SMEs face and sources of finance in different development stages. (Source: European Commission, 2005)

The overall flow of funds, debt and equity, to small start-ups in their lifecycle is likely to be influenced by changes in macroeconomic conditions such as shift in financial markets and governmental policy (Berger & Udell, 1998). Bygrave and Timmons (1992) found that number of venture capital backed IPOs and changes in government regulations, that eased investment process, had a positive effect on inflow of new venture capital to independent venture capital funds. On the other hand a rise of open-market interest rate can exacerbate problems of adverse selection and moral hazard (Stiglitz & Weiss, 1981) and thus cause credit rationing disproportionately affecting small businesses (Berger & Udell, 1998).

2.1.2 Information gap

Information asymmetry or information gap between investors and entrepreneurs combined with uncertainty, cause agency problems than can affect to the willingness of both equity and debt holders to provide finance to SMEs. (Lerner, 1999, 2000 & 2002) In practice information asymmetry affects that the investors do not have sufficient information on SME management's abilities and actions and therefore are not able to judge sources of possible substandard venture performance (Sapienza et al. 2000) If information asymmetries could be eliminated problems of small companies forced to raise expensive external finance or even totally being neglected of finance would disappear (Lerner, 1999).

Berger and Udell (1998) define that small business' finance most important characteristic is informational opacity whose importance will decrease as the business grows. Information asymmetry in the market is one important cause, in addition to spillovers and externalities, why government intervention might be needed to produce more socially optimal balance of supply and demand (Maula et al., 2007). As firms grow they have to seek further funding after the investments done at seed and very early stage by principal owner and business angels. Along the growth cycle SMEs gain some

level of access to intermediate finance offered by VCs, banks, finance companies and other sources of funding. (Berger & Udell, 1998)

But since there exists controversial opinions what is the superior mean of finance, debt or equity, in different market conditions (Stiglitz & Weiss 1981; de Meza & Webb 1987), it is necessary to examine both means of funding. Debt funding is strained with information asymmetry in the same way as equity. Due to banking industry consolidations large banks may be more oriented towards transaction lending, where creditworthiness is evaluated by same type of financial analysis as in a case of large borrowers (Berger & Udell 1998; Berger et al. 2001). This leads to the situation where those banks are most likely to provide finance services mainly to large relatively low-risk and low-return borrowers (Berger et al. 2001; HM Treasury 2003).

On the equity side VCs play crucial role in removing information asymmetry as intermediaries, through activities of screening, contracting and monitoring and thus being able to assess the quality of small business (Berger & Udell, 1998; Kanniainen & Keuschigg, 2004). However one concern of venture capitalist is that the entrepreneur with private information and large private benefits is not willing to liquidate the project even having a negative present value for shareholders (Gompers, 1995). Therefore performing activities described above called the due diligence process VC are able to reduce information asymmetry, risks, as well as lower the costs of IPO in the future (Megginson & Weiss, 1991). But the costs of performing due diligence are relatively high to scale and it becomes more cost effective for VCs to concentrate their investing to later-stage companies where better information is available, bigger investments can be made and relative costs are lower. So it can be shown that scale economies have deteriorating effect on early stage ventures and their investors. (Maula et al., 2007) This is why syndication, VCs' joint investment, is often seen as one solution for information asymmetries in venture capital investing as well as way of optimizing and diversifying the investment (Leleux & Surlemont, 2003). Also staging the investment can be considered as a risk decreasing measure in an agency and monitoring framework (Gompers, 1995). As venture funds are concerned, the commonly used structure of VC

funds the limited partnership is designed to address problems of asymmetric information and align incentives of the general partners and the limited partners (Berger & Udell, 1998).

Nonetheless, venture capitalists cover only a small piece of the technology-oriented businesses begun each year (Lerner, 1999). When the investment focus of private VCs changes to later stage companies, early stage companies more probably experience the funding gap. The transition of investment to later stage companies is to a such degree likely been caused by not fully implemented information role and there is need for an institution that ensures that information about performance of ventures is available (Maula et al. 2007). The government addressing the problem would of course face the same constrains of information as private investors, but may be to able to ease constrains of SME finance by different measures and instruments such as credit guarantees and in the end make all people better off (Lacker, 1994).

2.1.3 R&D spillovers, sale and employment contribution

The theory of public finance emphasises that government subsidies are suitable measure in the case of activities that may generate positive externalities that will benefit other companies or society as a whole. This is based on theory that companies are unlikely to be able to capture the entire surplus what their investments create therefore public subsidies can be right response (Lerner, 2002). The existence of R&D spillovers has been documented (Griliches 1992; Jaffe, 1996) even though the different forms of it are various. The consequence of spillovers is that firms invest below the social optimum in R&D and due to knowledge spillovers the private rates of return to R&D are much lower than social returns (Lerner, 2002)

The assumptions behind the public subsidies are that the private sector provides insufficient finance to new companies and at the same time government is able to identify investments which ultimately will yield high social and/or private returns or is

able to encourage financial intermediaries to do so (Lerner, 2002). Public subsidies are used to encourage small companies to perform research activity due to spillovers involved. Small companies receiving subsidies should therefore expect to grow more rapidly and attract additional capital. And in fact, the subsidised companies have been documented to enjoy substantially greater employment and sales than matching companies in a framework of Small Business Innovation Research Program (SBIR) in USA. (Lerner, 1999) European Private Equity and Venture Capital Association has also reported employment contribution of private equity and venture capital investments in Europe (EVCA, 2005).

Addition to contributions to sales and employment, venture capital and R&D are associated having a positive impact on technological innovation and patenting. Small companies are expected to have better ability to exploit innovation opportunities in a burst. (Kortum & Lerner, 2000) The specific risk-return characteristic and substantial spillovers that high-tech ventures generate make high-risk ventures prime subjects to government incentive schemes (Galai & Wiener, 2003). Therefore is well justified from the spillover point of view that government subsidies in different forms are allocated to growing high-tech firms.

2.2 Government's role

Government has different roles when concerning SMEs as well as private VCs. Literature has suggested that government primary role is creating and maintaining favourable market conditions by ensuring that tax and legal frameworks do not hamper functioning of the market. This should be done by supporting improvements in important areas such as entrepreneurial culture and stock exchanges for growth companies in addition to the tax and legal environments (Jääskeläinen et al., 2007). Also creating networks that combine the entrepreneurs, VCs and informal investors in the venture capital market is an important role of government and public investor entities.

Government has also a vital role in enabling exit markets to VCs and assuring continuity of the investment process.

But since there exists supply side failures that cause funding gaps in the venture capital market, government's creating and maintaining role cannot fully account for correcting the market failures. This has led to government's more hands-on involvement. Government makes from this point justified interventions by investing directly or indirectly to small growing companies and this way tries to respond to lack of funding that SMEs face. (Jääskeläinen et al., 2007) Government investments can be made by specific programs like the SBIR program in USA (Lerner, 1999) or public agencies such as Sitra, Finnish Industry Investment and Finnvera in Finland. Direct investments are focused directly to individual portfolio companies whereas indirect investments are made to venture funds as a limited partner. The existing literature prefers the usage of indirect interventions relation to direct and direct or indirect support should be considered as a last resort. (Maula et al., 2007)

It has been suggested that the government intervention through any measure should be used as a temporary mean and allow evolution of informed and experienced market (Jääskeläinen et al., 2007). Used government interventions should be done keeping a long term perspective in developing simultaneously both supply and demand side by government interventions (Maula et al., 2007). Long term perspective and stable government policy is needed to create certainty since especially VCs make high-risk investments for longer periods (European Commission, 2005).

Therefore, to stimulate both supply and demand side in venture capital markets, a key factor of seed and early stage financial operations is an ability to create networks between entrepreneurs and VCs. Entrepreneurs have new ideas and technological knowledge, but lack of business skills and enough funds to grow. (European Commission, 2006a) Networks have an obvious contribution to deal flow. As important as it is to bring together entrepreneurs and VCs, is to support networking among VCs. Networks can be seen as intermediaries in credit markets and syndication with other

VCs as a mean to reduce risk (Abell & Nisar, 2007). As preconditions for VCs ability diversify risk through syndication are that there are enough skilled VCs acting in the market as well as flexible framework where private and public VCs can match their investment expertise (HM Treasury, 2003). Creating networking and encouraging collaborating between VCs and to pre-seed investors, business angels, is one key issue that enhances SMEs' access to capital (Lahti, 2004).

Like found earlier in this thesis, the overall capital flow is influenced by changes in the macroeconomic conditions, that is, changes in government interventions. If the flow of capital to funds could be increased by government interventions, the increase of supply would reduce the interest rate and make external capital more affordable for low collateral companies like SMEs. Also the lower interest rate would make expected return of investment higher, make high-collateral companies better candidates for arm's length finance and free funds for low-collateral companies. The government intervention would have an effect on both supply of funds and expected return and would then stimulate supply and demand in the venture capital markets. (Da Rin et al., 2006) Supply of funds could also be increased by reducing requirements for minimum amount of private capital needed for a viable fund (HM Treasury, 2003).

The ability to make an exit is a crucial aspect of successful venture capital investment process. VCs have a wide range of different types of exits such as IPO, trade sales and liquidation from which to choose. Above the type, VCs are interested in timing of the exit.(Giot & Schwienbacher, 2007) Giot and Schwienbacher (2007) found that these are main two dimensions that VCs are most concerned while making decision about an exit. They also expressed the most preferred type of exit being IPO before trade sale. Therefore liquid and not too volatile stock markets are precondition for VCs to be able to make dispositions in any form from typically large investments. Well-working stock markets enables planning and timing of exits at the same time (Yrkkö et al., 2001; United Nations Economic Commission for Europe, 2007). Making the exit trough stock markets is important for VCs from several of reasons. Exit is naturally a mean to realize the investment, but also it gives signals on VCs' abilities, enhances reputation and in the

long term affects to ability to attract funds for following ventures. Exit can contract against agency problems between VCs and the entrepreneur as well. (Yrkkö et al., 2001)

Though exit through IPO is preferred, trade sales are more frequent form of exit for VCs even not being as lucrative and visible as IPOs. For already established companies trade sales or acquisitions are important way of enhancing their own competitiveness and strategic renewal without developing innovations themselves. Acquisitions are important mechanism for the established companies to respond to technological and socioeconomic trends. (United Nations Economic Commission for Europe, 2007) As VCs have demand for acquisitions as a form of exit so have the established companies need for a mechanism of renewal that is facilitated by developed infrastructure including stock and bond markets, investment banking activity and project lending. (United Nations Economic Commission for Europe, 2007) Hence government interventions have a role developing more accessible and liquid stock markets and supporting activity of different type of intermediaries to guarantee continuing deal flow and improve SMEs' possibilities to acquire external funding.

Additionally government and public institutions can stimulate the demand of venture capital by supporting emerge of incubators and science parks that nurture new ventures and create deal flow VCs (Phan et al., 2005) as well as corporate and university spin-outs and technology transfer (Lahti, 2004). However there still remains some challenges how the incubators and science parks could be linked more closely to VC that provide early stage funding (FVCA, 2004). In addition, readiness to become a target of a venture capital investment can be improved by increasing knowledge of different financial instruments among entrepreneurs that would yield higher quality deals to VCs (HM Treasury, 2003) and providing mentoring and supporting services to SMEs that positively affects to the demand side.

2.3 Instruments of investment and support

The government interventions have been found to concentrate to five areas that cause the most problems for SMEs: 1) constraints in financing, 2) weakness in the management, 3) market imperfection, 4) access technology and 5) access to information (Maula & Murray, 2003). In this thesis we will concentrate on examining mainly the financial issues. Government can implement its intervention policy through different means that influence the venture capital market either directly by funding entrepreneurial companies or indirectly by encouraging and subsidising development of private investing. (Lerner, 2002; Maula & Murray, 2003) Means of indirect intervention are different tax and profit sharing structures that create incentives for private VCs. Direct interventions as support can be allocated directly by loans, direct equity investments to SMEs, grants and subsidies or indirectly through public-private funds, fund of funds (FoF) and loan guarantees (Maula & Murray, 2003).

Crucial point, when designing any public supporting programs is to make them streamlined and such that they make entrepreneurs focus on their customers. Also, programs should be focused in certain industries and customers rather than executing separate programs to avoid fragmentation, unnecessary delays, uncertainties and conflicts between agencies. (Maula et al., 2006) Lerner (2002) has defined issues that should be considered when public support is directed. Firstly, public funding should be pointed to areas that do not at the moment attract private investors, VCs' attention, and furthermore, that would otherwise be ignored even being very promising. Even the literature has emphasized that government interventions should be used as a temporary measure; the need for public follow-on investments should not be ignored when the private investors are not willing to make such investments. Public funding should also be flexible, commit in a long-term and avoid making investments to companies that are already recipients of some public subsidy. As VCs perform the due diligence process, so should the public agencies evaluate companies' past performance and management skills to identify the effects of past subsidies. It is also important to evaluate the possibility to commercialize the companies' technology. (Lerner, 2002; Cressy, 2002)

Public support should be made equally available for all the players in the market to allow healthy competition. The suggested criteria for public support in the literature above can be therefore seen as overwhelming and sometimes hard to match.

2.3.1 Debt finance

Like found earlier in this thesis, debt financing is not usually the ideal type of external financing for SMEs since debt financing from external sources is characterized by high information asymmetry that causes banks' inability to judge individual borrowers' probability of repaying the loan and adverse selection effect (Stiglitz & Weiss, 1981) Stiglitz and Weiss (1981) found there exists an optimal interest rate for a bank to lend and higher interest rate would actually decrease bank's expected return and induce moral hazard. To overcome problems of moral hazard would acquire close monitoring whose costs are however high relation to the size of the investment due to the lack of public information. (Deakins & Hussain, 1994; Cohn & Coleman, 1999)

In addition to the agency costs, acquiring debt through intermediaries such as banks is also complicated since SMEs usually do not have track record and can not offer any collaterals to reduce the risk of the lenders. Many banks assess SMEs through entrepreneur's own track record and place significant emphasis on information gained through past relationships (HM Treasury, 2003). The difficulties of lending process can also lead to redlining circumstance where some borrowers would not receive loans even they would pay a higher interest rate among borrowers that appear identical and result credit rationing (Stiglitz & Weiss, 1981; Deakins & Hussain, 1994; De Meza & Webb, 2005), or to that debt financing is only available at relatively high rates of interest (Cohn & Coleman, 1999).

But also from the SMEs' point of view, the expenses of debt, such as interest and principal payments, and the fixed payment schedule may become too much of an obstacle due to the highly uncertain future cash-flows. Even so, empirical studies have

found that debt financing and banks loans especially count for large part of external financing for SMEs (Berger & Udell, 1998; HM Treasury, 2003). The low interest rate in recent years has been found more affordable and enabled debt financing for SMEs (HM Treasury, 2003). Another reason for SMEs' eagerness to prefer debt financing to especially equity is that entrepreneurs are reluctant to share ownership and control of their companies (Berger & Udell, 1998).

The inaccessibility of debt through banks and the desire of debt as a one form of external financing for SMEs create a demand for public support and actions of public agencies. The mainly used debt instruments by public investors are subordinated loans and convertible bonds, which are not pure debt instruments and are more close to equity or even having an option to be converted to as equity. The use of these debt instrument enables entrepreneurs to enhance company's solvency and that way improves operate and compete. Taken into account some of the fixed features of debt financing, the use of mezzanine instruments can be bring flexibility in capital structure. The mezzanine instruments have features such as flexible payments or options to subscribe company's shares in the future. (FVCA, 2002)

2.3.2 Equity finance

Equity invested in SMEs by VCs has been proved to be an important contributor of their growth. For young and potentially risky SMEs that have high growth desires external financing in the form of equity is more suitable than debt (HM Treasury, 2003; Maula et al., 2007). SMEs prefer equity financing rather than debt since there is no fixed payments to be made and equity investors in this case the VCs receive great share of their returns in the time of the exit. Additionally VCs are more persistent while investing in a longer period still aiming to exit the investment profitably in planned timeframe. The VCs' desire to exit the investment in the future alleviates negative aspect of sharing the ownership in equity financing when the entrepreneur has the opportunity to buy the stakes of ownership back. By using equity financing entrepreneur can share the risk with

VCs that are less risk-averse investors (Berger & Udell, 1998). With the financial support VCs provide active management support, advice and mentoring that have found to have a positive impact on performance of venture-backed SMEs (HM Treasury, 2003).

The form of equity ranges from informal finance to publicly listed shares as so do the suitability of different forms in SMEs growth cycle (HM Treasury, 2003). VCs provide equity financing in the growth and expansion stage that has passed the stage of insider and business angel finance (European Commission, 2005). Insider and business angel finance has proven to be very important factor in reducing adverse selection and moral hazard problems acute in early stages and before infusion of external finance, such as venture capital. (Berger & Udell, 1998) Besides the problems caused by information asymmetry, in venture capital investments as in any equity investments agency problems are ever present. Agency problems emerge from separation of ownership and control and arise in the relationship between the entrepreneurs and VC that creates goal conflicts between them. The bigger the VCs' ownership in the company, the more they have incentives to monitor their investment. Correspondingly, the smaller is the VCs' ownership, the greater are the incentives for entrepreneur to act opportunistically. Equally, as the ownership has been found to have an impact on agent-principal relationship the board of directors in venture-backed firms have been found to act at the same way. As a consequence board of director purpose is to protect outside investors from opportunistic behaviour of entrepreneur. (Sapienza, 2002)

The lack VCs operating in early stage areas has created an equity gap on the supply side of venture capital market. The gap is limited to a certain amount of investment that is not covered by either business angels or VCs in early stage. The equity gap can be filled encouraging private VCs to invest in risky SMEs and allocating public investments to areas with insufficient finance. Maula et al. (2007) examined the public finance instruments in selection of countries. The most popular investments of equity finance in these countries where government sponsored venture capital funds, business angel co-investment fund and research commercialization funds (Maula et al., 2007). Further,

direct equity investments to SMEs with FoFs and public-private funds are commonly used as instruments in public investing by public agencies.

2.3.3 Public support and incentives

To support the development of the venture capital market, the use of indirect measures government intervention can be done by different structures and instruments. As found earlier the indirect measures aim to build a favourable infrastructure and motivate private investing improving their ability to act and encouraging them with different incentives. Since private VCs have found to bring considerable added value to SMEs through their activities, indirect intervention should be preferred. Therefore it is important to encourage private VCs' investing to SMEs rather than relying on public investment of agencies.

Loan guarantee schemes have been used to cover the losses of private VCs. Although loan guarantees through specified programs are expensive and can have an effect that VCs withdraw their investment from companies that do not match their criteria anymore there might be a need for loan guarantees when creating a venture capital markets. Loan guarantees have been found to be effective in increasing companies leverage. (European Commission, 2005)

Favourable tax environment is another factor that has impact on development of the market. Taxation has two effects to investment scope: it reduces the net present value (NPV) and reduces the optimal level of investment compared to tax free scenario. Tax incentives to corporations prepared to make venture capital investments to SMEs have been found to increase corporations' willingness to make venture capital investments (Lahti, 2004). Tax incentives that affect the profits of corporation can have an impact investment decisions they make and further lead to a socially more optimal level of investment. Taxation that affects investing have been found to reduce the amount of taxes collected by government and tax relieves being justified to be able to capture the

spillovers generated through investments. (Galai & Wiener, 2003) Taxation reduces provision of monitoring services by VCs. Therefore reducing taxation in this area can increase innovation ratios through growth of investment activity (Da Rin et al., 2006)

To further motivate VCs to supply funds to risky early stage companies, different profit sharing schemes with public agencies can be used as a way to create incentives to private investors. Jääskeläinen et al. (2007) examined four different methods of sharing profit and making investment more profitable to private investors in syndicated venture capital funds, where both public and private investors were involved. They found that differential timing of the investment drawdown of public and private investors, where public funds are drawn down first and as a consequence private investors' investment period is shorter, increased private investors' internal rate of return (IRR). Second viable method contained that public participation would be structured as a loan that creates a leverage effect increasing private returns when IRR of the fund exceeds the interest rate of the loan. (Jääskeläinen et al., 2007)

2.4 The effects of government interventions

It is hard to measure the real effects of government interventions, even though the justifications for interventions can be clearly stated. Effective government policy requires coordination between different actions since it is a function of public agencies and fundamental preconditions of entrepreneurial activity, such as taxation, regulation and education (Maula & Murray, 2003). Government and public agencies attempt to implement the roles discussed earlier by actions that directly or indirectly affect the venture capital market. Since all the government actions have impact on each other it would be ideal to examine the overall impact of these measures, but this has proven to be a difficult task to face. Also European Commission (2005) has addressed the complexity of measuring the effects of policies on SME financing. It has created criteria for effective public support programs, which can be used as guideline for structuring

national public support programs, and has placed developing tools and indicators evaluating the effect of policies as an objective (European Commission, 2005).

Maula and Murray (2003) found that direct government investments would have only a limited impact on growth-oriented SMEs if sufficient measures that improve incentives and preconditions of SMEs would not be taken. This also was found by Jääskeläinen et al. (2007) in their study, where profit distribution structures that create incentives for private investors were most effective compared to public loans or capped returns. Empirical evidence gathered from 15 European countries by Leleux and Surlemont (2003) over the period of 1990-1996 indicated that magnitude of public participation and size of venture capital industry had a negative correlation. The negative correlation would either indicate public participation having a decreasing effect on to the size of the industry or it being a response to development of market. The latter alternative received support from the data collected. (Leleux & Surlemont, 2003)

Some indications of effectiveness of different measures can be drawn from performance of individual programs. The public investment programs such as SBIR program (Lerner, 1999) have reputed to have had positive and significant impact on economic growth. The objectives of the SBIR program were to stimulate technological innovation and increase commercialization of innovations derived from public research and development. The companies that received support within this program demonstrated that objectives were reached. The commercial activity that would not otherwise have taken place was implemented and resulting spillovers generated substantial positive social benefits. (Audretsch et al., 2002) The subsidized companies enjoyed substantially greater employment and sales growth as well as their likelihood of receiving venture capital after the subsidy was bigger compared to companies that did not receive any public support (Lerner, 1999).

The effect of government interventions directed on investments that generate significant spillovers only ex post grants, such as tax incentives and guarantee programs, are able to maximize the welfare. This is true in a situation where spillover effect is dependent of

the effort level. But if the spillover effect is not dependent of effort, the ex ante grant, such as public support and public-private partnerships, can lead to first-best situation and interventions are welfare enhancing due to the large spillovers that may generate. (Hirsch, 2005) Thus, it is difficult to exactly define the generator of spillover through ex ante and ex post grants. Even so, Hirsch (2005) discovered that guarantee programs, ex ante grants and public-private partnerships when VCs have liquidation preference are dangerous since they destroy the contract mechanism in experienced venture capital markets and therefore ex post grants are more suitable instrument.

The government policies which are able to increase the expected return of innovative programs have been found to be the more successful in shifting the focus of venture capital investing to early stage SMEs compared to public policies that aim to increase the overall inflow of funds to venture capital market. A reduction in capital gains taxation, have been found to increase the share of early stage investments. The availability of stock markets targeted to entrepreneurial companies has removed barriers in front of entrepreneur and VC activity by providing a potentially lucrative exit channels. (Da Rin et al., 2006).

2.5 Criticism

2.5.1 Justifications

Government interventions on the ground for adverse selection have not been found to improve SMEs ability to acquire external debt finance. This applies when intermediaries in the market are able to communicate freely and propose alternative arrangements which in a certain sense generate a sustainable equilibrium in the market. Government interventions may not enhance welfare but may be used for more desirable redistribution. (Lacker, 1994)

Information asymmetry hinders private VCs' ability to judge characteristics of SMEs. Government interventions through public agencies justified with high information

asymmetry involved in SMEs, would mean that public agencies are better able to overcome the problems of information asymmetry and identify the financially neglected SMEs (Lerner, 2002). If there are not, the public support can be counterproductive and result more low-quality SMEs (De Meza, 2002).

2.5.2 Roles

Managerial expertise and knowledge of experienced VCs is important for the development of the venture capital industry but the specialized human capital that VCs possess is not easily acquired since it takes time to develop. By supporting VCs to invest in early stage SMEs increases the required managerial support and monitoring activities of VCs. The larger portfolio dilutes VCs' attention which increases risks of projects and lowers quality of investments made. (Kanniainen & Keuschigg, 2004) Therefore increasing the number of skilled and experienced VCs can -be seen more important than simply motivating to invest more. Additionally possibility VCs to make syndicated investment requires that there exists enough VCs in the market. (European Commission, 2005)

If government practices policy that excessively increases public financing to encourage innovativeness it can also have a crowd out effect to private investing. (Maula et al., 2007) The market determines the limits where private VCs are able to act and deregulation of public support activity can create unfair advantage to public agencies. This can lead to a situation where early-stage financing is heavily skewed towards public provision of risk capital what is the case in Europe (Maula et al., 2007) and public support programs have reduced the pool of venture capital. There would not be a problem if public support programs are able to generate returns superior to private but this is not a very likely scenario. Additionally the fact that private VCs operate on purely for-profit basis suggest that the performance of support programs should be evaluated by same criteria even though public agencies have simultaneously other motives such as

regional development (United Nations Economic Commission for Europe, 2007). (Cumming & MacIntosh, 2005)

2.5.3 Effects

Direct government interventions that aim to support SMEs that lack of financial support from VCs have not been found effective. Public investments have found to be beneficial to the development of the industry but not for seeding SMEs. (Leleux & Surlemont, 2003) Public support programs are often characterized by a considerable number of underachieving SMEs since the selection process has not been able to screen out companies with attributes found to correlate with company's ability to achieve its research and commercialization goals. (Lerner, 2002) By subsidising underachieving SMEs public support programs may attract poor managers to them, reduce the quality of the supporting activities to SMEs and prolong life of underachieving venture capital funds. (European Commission, 2005) Also indirect interventions such as shifts in capital gains tax that aim to increase venture fundraising can lead to more intense price competition for transactions within an existing set of technologies than to a greater variety in types of SMEs funded (Lerner, 2002).

Additionally earlier literature has found that intentions of different interest groups and politicians may influence in the focus of indirect and direct interventions made on companies. Public agencies that are influenced by politicians' goal make investments to politically connected companies and cause distortions in support allocation. It has also been suggested that public support is allocated to companies that are most likely to meet the needs of public agencies rather than emphasizing their contribution to technological innovation and long run sustainability of specified industry. Pressure to support companies that are likely to be successful may result that support is allocated to companies which would succeed without the support as well. (Lerner, 1999)

3. FINNISH VENTURE CAPITAL MARKET

3.1 Public agencies in Finland

Since joining the European Union Finnish public agencies have been guided and restricted by EU-directives. The regulations for instance allow public agencies to admit support to companies up to a limit that is called as de minimis and being amount of 200.000 euros. The regulations also restrict public agencies to make syndicated investment with each other. The regulations aim that public agencies act in defined areas of market failure. (Interview of Sitra, 2008; Appendix 2) Even though public investing is highly regulated the impact of public agencies has been significant in times of low private venture capital investing and Finnish venture capital market has been dependent of government intervention trough public agencies. Due to their notable influence on development of venture capital markets and establishment of private VC funds it is fundamental to examine development and actions of public agencies.

The first mainly public venture capital company Sponsor Plc was established in 1967 with a support of Bank of Finland. (Maula et al., 2007) First it focused to early stage investments but moved quickly to financially more attractive later stage investments. (Maula et al., 2007) Sponsor was established as a device to renew the national financial system addition to profit goals that it had. Despite of Sponsor's profit orientation and later transition to later-stage investments it has had important impact on Finnish venture capital market. (Luukkonen, 2006)

In 1971, government established Kehitysaluerahasto Oy that later became Kera and was attached to Finnvera in the end. Start Fund of Kera was established in 1990 as subsidiary of Kera to manage a new venture capital fund. By end of the decade there were several public VC companies (Start Fund of Kera, FII and Sitra) that performed several sometimes overlapping roles. Especially the closeness of Kera's and FII's operations was the reason to their merger in 1998. (Maula et al., 2007)

Currently Sitra, FII, Finnvera and Tekes are the key public agencies in acting in Finnish venture capital market and Tekes concentrates more on supporting SMEs' R&D. From the first three public agencies Sitra has the longest history of venture capital investing and had a dominant role public in the market until 2002. After the turmoil in 2002 the role of FII and Tekes was strengthened through their support programs and loan provision. Both Sitra and FII have invested to VC funds as well as directly to SMEs (Maula & Murray, 2003). Finnvera gained a role in the market after government passed a new law enabling venture capital activities to Finnvera. In 2002 it launched a Seed fund Vera (Avera) which makes investment to early-stage SMEs. (Maula et al., 2007) Due to the number of public agencies acting and them having several different support programs in Finnish venture capital market the division of labour between FII, Sitra and Finnvera was clarified by the Finnish government in 2003. The new division of labour defined that FII to concentrate on investing in regional funds which are largely organized as limited partnerships (Ky in Finland). Finnvera will concentrate on investing in regional funds operating as limited companies (Oy) and to early-stage investments. (Luukkonen, 2006)

Figure 2 shows the key public agencies in Finland and their relationship to government and Finnish parliament in 2006. (Maula et al., 2007) It should be noted that some changes in support programs and public agents' position in venture capital market have occurred after the situation indicated in the figure but it gives an overall view of relationships and financial instruments that are used in investments by public agencies. The figure 2 shows that FII, Finnvera and Tekes operate under Government and Sitra under Finnish parliament. Despite the clarification made in 2003 recent conversation has highlighted the still overlapping roles of public agencies in some of their support programs and in provision of funding to SMEs. (Maula et al., 2007)

Although the conversation of public agencies sometimes concentrates how public funding should be allocated the main role of Finnish public agencies Sitra, FII and Finnvera should be to support and fulfil operation of venture capital market in areas of market failure and lack of sufficient funding to SMEs. Investing in different venture capital and private equity funds has been suggested to be most natural form of public

support. One recent example of such funds is Enterprise Capital funds in Great Britain. (Interview of Maula, 2008; Appendix 2). Public support should not be an end in itself but rather a way to encourage private investing.

| | Finnish parliament | | | | Sitra | Nonprofits etc. | Private firms |
|---------------------------------------|--------------------------------|-----------------------------------|---|----------------------------|--------------------------------------|---------------------------|--------------------------------------|
| | Government | | | Ministry of Finance | | | |
| | Ministry of Trade and Industry | | | | | | |
| | Tekes | Finnvera | FII | | | | |
| Tax & legal environment | Tax and legal environment | | | | | | |
| Deal flow generation and match making | | TULI, LIKSA, VARA, KEPARA, KAUPPI | | | INTRO DIILI | Venture Cup, Connect etc. | Consultants, incubator programs etc. |
| Grants | | R&D grants | | | | | |
| Indirect equity (FoF) | | | Veraventure | FII fund-of-funds activity | Sitra VC fund investments | | |
| Direct equity (VC) | | | Avera | FII seed program | Sitra PreSeed & Sitra VC investments | | VC firms and business angels |
| Capital loans | | Startup loan | Avera & Finnvera (some variation between offices) | FII seed program | | | VC firms and business angels |
| Loans and loans guarantees | | | Finnvera loans and loan guarantees | | | | Banks |

Figure 2. The roles of key actors in financing SMEs in early-stages in 2006. (Source: Maula et al., 2007)

3.1.1 The Finnish National Fund for Research and Development (Sitra)

Sitra was founded in 1967 and operated under the Banks of Finland until 1991. Then its status changed to independent public foundation which now operates under the Finnish Parliament. Sitra has been active already in 1970s but it became more central actor in the end of 1980s and early 1990s when the market experienced a rapid growth. Sitra has contributed to establishment of Finnish Venture Capital Association in 1990 (Maula et al., 2007). It has also had an important role of establishing a network of regional VC companies which together with Sitra made the most investments in this area until 2001. Later the regional VC companies were privatized. (Luukkonen, 2006) Additionally many of current privately managed VC funds are spin-offs from Sitra (Maula et al., 2007)

Sitra first focused on financing product development projects but its focus changed to promoting venture capital investment and technology commercialization. (Luukkonen, 2006) Now Sitra's development and investing operations are organized as programs on selected industries. Sitra's development programs aim to increase corporate activity in targeted industry and operate in cooperation with private investors and encourage them to invest in early-stage SMEs. Currently, Sitra's ongoing programs are focused on health care, food and nutrition, energy, mechanical industry and India. Investments are used as one device in these programs and done market-based having clear profit focus (Sitra, 2008). The investment done through programs carry usually different financial instruments still always including equity stake and debt for its flexible nature in different situations. Syndicated investment with private investors are used when possible and needed. (Interview of Sitra, 2008) Despite Sitra's focus on program-based operations the number of its portfolio companies has remained large (Luukkonen, 2006).

Sitra also has an international focus while having investments in international venture capital and private equity funds and making operational investments to funds in Europe and Scandinavia within the program areas. Investments to international funds can be used as a way to build networks between companies as well as a way to syndicate investments. In these ways international public agencies are able to develop certain industry according to mutual interests. In addition, international status improves prospects of international funding to Finnish SMEs. (Interview of Sitra, 2008)

Sitra's activity is financed by the yield from its endowment capital and return on its venture capital investments (Luukkonen, 2006). The independency of Sitra makes its activities constrained by its defined status in Finnish law as well as adequacy of its funds. On the contrary independency enables it to act more flexibly.

3.1.2 Finnish Industry Investment Ltd (FII)

Finnish Industry Investment was established in 1995. FII is wholly government-owned investment company which was assigned to accelerate availability of risk capital for SMEs. Central role of FII is to assist in the formation and growth of innovative SMEs in Finland. The objective is to promote Finnish entrepreneurship, employment and economic growth through actions of venture capital and private equity investing. It makes equity investments in VC funds, private equity funds and directly to companies. Since it is owned by government and administrated by the Ministry of Trade and Industry it invests funds realized from sold government assets. (Maula & Murray, 2003; Luukkonen, 2006; Teollisuussijoitus, 2008)

Compared to Sitra the funding of FII's investments is heavily dependent government's actions. The different relationship to government and Finnish parliament makes FII's role, goals investment strategies quite different from independent public agency Sitra. FII's only financial limitation on investing is that its operations should be profitable but there can exceptions where lower return expectations and higher risk can be accepted. (Luukkonen, 2006) The government funding brings a lot of certainty and flexibility FII to operate but since the funding is dependent at the same time restricts FII's actions. The ownership of government has challenged FII with additional and often incompatible objectives that have affected FII's ability to respond market failures (Maula & Murray, 2003). Recently FII has withdrawn from early-stage investments and moved to later-stage investments (Interview of Sitra, 2008) that in part can make worse the problems of SMEs in early-stages. FII's investments to VC funds in equal terms with private investors have not been found effective to resolve the market failure either. (Maula & Murray, 2003)

3.1.3 Finnvera Plc

Finnvera is state-owned specialised financing company was founded in 1998 on the basis of an older government-owned public actor, Kera Plc. Kera was active in regional investing which actions were transferred to Finnvera. In 1999 also loan guarantee services from other public agencies were attached to Finnvera. Finnvera's role as a public utility was reinforced in the end of 2007 when it received exemption from income taxes. Its role was also clarified in government platform that defined that Finnvera concern takes control of all business angel activity and early-stage investing. Due to the tax exemption it announced to increase its risk-taking and benefit its customers through more favourable pricing terms. (Finnvera, 2008) Finnvera has a role of developing SMEs by promoting their operational preconditions, export activities and internationalization through different financing services. In supporting early-stage SMEs to get started it uses financial instruments such as loans, guarantees, equity investments and export financing services. Finnvera also acts as an intermediary between European Union financing programs and SMEs in Finland. (Luukkonen, 2006)

The Finnvera concern holds subsidiary companies that operate in areas of early-stage funding. Veraventure is Finnvera's venture capital investment company founded in 2003. Veraventure's operation is guided by goal of Finnvera and outlines of regional venture capital investing set by Ministry of Trade and Industry. It invests in regional funds organized as limited companies. Veraventure is therefore organized as a fund-of-funds meaning that it does not directly make investments to SMEs. Through its investments it aims to promote growth and development of SMEs by improving regional funds' activities. The profitability expectation for Veraventure's investments is not demanding while it should at least maintain real value of capital. The low profitability requirement in principal benefits Veraventure to better correct market failures in SME funding. (Luukkonen, 2006)

The Finnvera concern holds also Seed Fund Vera (Avera) which was founded in 2005 and is administrated by Veraventure. Avera's status is as well defined in government

platform. Avera is responsible for all the early-stage investing activity earlier done by all public agencies. It invests in areas that have been ignored by private investors but it enables private individual investors as well as VC fund to make syndicated investment with Avera. (Luukkonen, 2006; Maula et al., 2007; Veraventure, 2008) The clarification of public agencies' roles done in government platform of focusing business angel and early-stage investing activity to Finnvera will hopefully advance public agencies actions to become more effective and capable to correct the market failures.

3.1.4 The Finnish agency for Technology and Innovation (Tekes)

Tekes is a major funding organization for SMEs in early-stages. It provides funding primarily in area of R&D and many Finnish SMEs have received funding for their R&D operations. Tekes role in providing support for SMEs is important since it provides a type of funding that no other public agency does. Tekes has also contributed Finland's internationally recognized innovation status. Like FII, Tekes is funded by government and has a budget that enables it to act more flexible and make more diverse investments. (Maula et al., 2007)

The collapsed technology-boom limited Tekes's ability to act since to be able to acquire Tekes's funding required that also private funding would be matched. In 2004 Tekes started to admit start-up loans that could provide maximum of 80 % of start-up cost for companies. Addition Tekes has had other support programs such as TULI, which provided grants for SMEs to buy expert service to improve research commercialization and LIKSA program, which consisted of grant from Tekes and convertible loan from Sitra for SMEs to develop their business plans and this way improve SMEs investment readiness to attract private VCs' attention. (Maula et al., 2007) Tekes has also used equity-like loans and loans to product development to support SMEs in their early stages.

Tekes's portfolio is now in turmoil due to requirements to reduce its portfolio's fragmentation, to improve customer satisfaction and the need to further improve support for SMEs in early-stages. Also the EU-legislation creates a framework for Tekes's operations. (Maula et al., 2007) Currently TULI, LIKSA and start-loans have been downscaled from their previous forms and Tekes has started a new program that is aimed to new innovative companies that are under five years old, have innovative-, know-how- or technology-based business plan and real implementing plans (Tekes, 2008). The new program is mainly conducted by grants but loans are used as well. The program enables companies to acquire Tekes support in to the limit of one million euros. The role of Tekes in funding growth oriented and capable SMEs will strengthen due to the new program. (Interview of Sitra, 2008)

3.2 Development of Finnish venture capital market

The Finnish venture capital market's history traces back to 1960's and 1970's when the first private equity and venture capital investments were made. The amount of funds under management by first VCs was small compared to the amount of funds that VCs manage today. The companies were development companies structured as ordinary limited companies and were captive making their investments from their own balance sheet (Auer, 1989). Banks and large companies were the most important capital providers of funds then. (Luukkonen, 2006)

The market did not enjoy a rapid growth in the early years. From the establishment of the first public venture capital company Sponsor in 1967 only three public and two private equity companies were established before 1980. The real boom in numbers of established equity companies took place in 1980s. By 1988 there were 48 active equity companies operating in the market. From the 48 companies 16 were public, 3 were private and 29 were corporate venture capital and private equity companies. (Luukkonen, 2006)

The ordinary limited company structure was common to venture capital funds until 1987 when Industrialisation Fund established the first venture capital fund in Finland structured as similar limited partnership (LP). The Finnish LP-structure was based on the similar fund structure already used in USA. However the Finnish LP-fund differed by enabling stronger position in the decision making for the limited partners. This difference still remains in Finnish equity funds and in part degrades inflow of foreign capital to them. At the moment, the amount of venture capital companies is almost the same as it was in the end of 1980s and most of the private equity and venture capital funds are limited companies. They are managed by a separate management companies which can manage several funds at the same time. The fund are organized as LPs. (Luukkonen, 2006)

In the beginning of 1990s the Finnish venture capital market still remained reasonably small in size and was characterised by various company structures. (Luukkonen, 2006) The market started to grow rapidly in the later of the decade even being comparably small to international markets. The market failure market was and still is most persistent in seed and start-up stages and the limited availability of venture capital finance to early stages reduces high-quality deal flow to later stage investors. (Maula & Murray, 2003) This means the SMEs weak ability to acquire enough venture capital funding consequences to their ability to grow and develop weakens resulting viewer and perhaps lower-quality and high-risk deal flow to later stage investors. In addition, since SMEs are considered important factors of economic growth the lack of funding and reduced market slows economic growth as well as social welfare.

After the rapid market growth of later half of 1990s, the market crashed in 2001 and 2002 due declining market conditions. The declining market has particularly strong influence on areas of market failure that is the seed and early-stages. The supply of private venture capital finance to early stages started to decline after 2002 from being over 60 % to around 30 % of all investments. Supply of private venture capital became inadequate. The crash was followed by more intense government intervention that aimed to improve funding of SMEs in early-stages. (Maula et al., 2007) Public agencies

involvement in areas of worst market failure became more distinct public when Finnish Industry Investment (FII) established new seed and early-stage support program in 2003/2004 and Tekes began to provide of start-up loans. (Maula et al., 2007) Before 2002 most of the public investments were done by the Finnish National Fund for Research and Development (Sitra) and its regional venture capital funds. The figure 3 shows the low level of early-stage investments of member funds of Finnish Venture Capital Association in from 2002 to 2006.

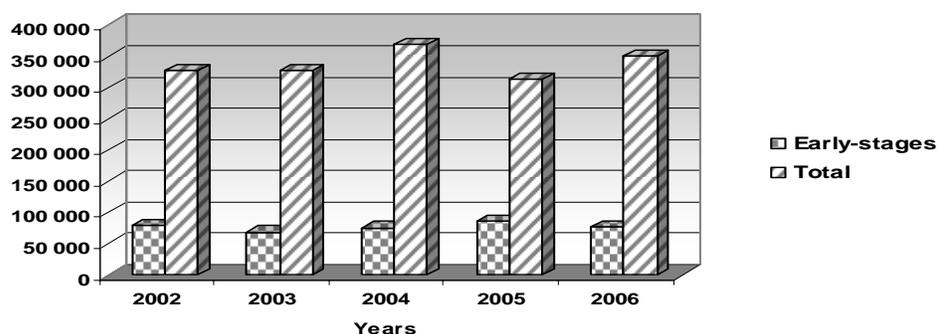


Figure 3. Annual venture capital investments to seed, start-up and other early-stages and total investments through private VC funds in Finland 2002-2006 (1 000 €). (Source: FVCA Yearbooks 2003-2007/8)

The level of early-stage investment each year has remained low compared to total investments. This would indicate that the amount of private VC investments has not been able to reach the previous high levels and fully survive from the crash in 2001 and 2002. The share of private VCs investing in early-stages was at the highest point just before the market crashed and has still remained low ever since. (Maula et al., 2007) But on the other hand the share of private investors has increased compared to public investing indicating that private VCs are now investing more than before and the investments are done to later-stages.

The share of public investments from the total amount of investments has remained stable and in 2006 the public sectors share of total investment was 14 %. The public investors have been investing smaller amounts to several companies mostly them being

in their existing portfolio and amount of syndicated investment with private VCs has remained reasonably low. (FVCA, 2007) Therefore no distinct conclusions of relationships between public and private fundraising cannot be drawn. Years with low level of private fundraising has not be resulted corresponding increase in public fundraising. The figure 4 shows the amount of all new funds raised each year and public sector's share of new funds.

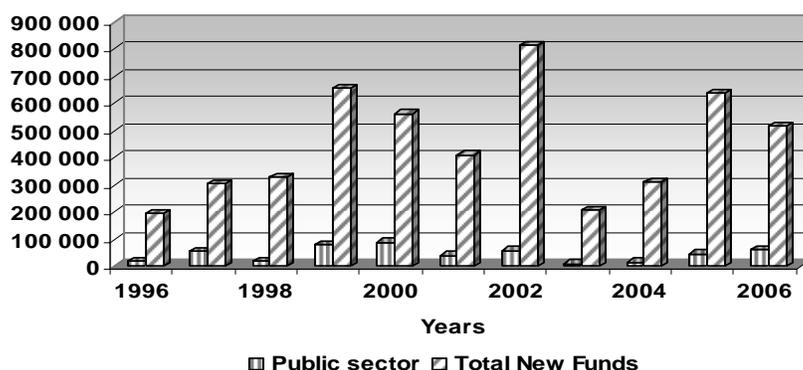


Figure 4. Public sector's share of raised annual new funds in 1996-2006 (1 000 €). (Source: FVCA Yearbook 2007/8)

Even that private venture capital investing to early-stages decreased in 2002 and correspondingly private equity investments to later-stages increased, the transition has not affected to the amount of funds raised that year. Year with high amount of raised new funds do not seem to be in a connection levels of public fundraising. The high level of new funds raised in 2002 may have reduced the need to raise new funds in 2003 while the level of private investment has remained almost the same and the Finnish venture capital market has not grown during these years. Since the private investing in early-stages has stayed same the transition can be a consequence of the fact that private VCs have become risk-averse than earlier or they might be relying on public investment to correct market failure in early-stage and their ability to generate high-quality deal flow to later stage investments therefore it would not be sensible to make risky investments. Lack of investment can also be a result of low-quality deal flow from early-stage companies, poor risk-return relation or the fact that public agencies have not

been able to provide incentives to private investors and on the contrary have crowded out private investing. Since none of these reasons alone can fully explain the lack of private investing public agencies have a role in fulfilling the gap, at least in short term.

Public agencies have different strategies in filling the funding gap and relationships and co-operation between public actors determine how well it can be done. The public agencies have quite a range of strategies as well as measures. Sitra concentrates on developing targeted industry through its program and finances its activities by yields from its endowment capital and returns on its VC investments. FII makes direct investments as well as acts as a fund-of-funds. Finnvera and Avera invest in funds. The fourth public agency Tekes concentrates on supporting SMEs' R&D. The last three are under Finnish government and receive funding from it. The diverse investment strategies and funding sources of public agencies affect to the nature of their investment portfolio's size and extent. Like the figure 4 showed the relationship between public and private fundraising is not clear therefore it is necessary to examine public investing by viewing the development of portfolios of each agency. Figure 5 shows the portfolio investments to SMEs of FII, Sitra and Finnvera. Endowment capital investments are excluded from Sitra's investment to improve comparability.

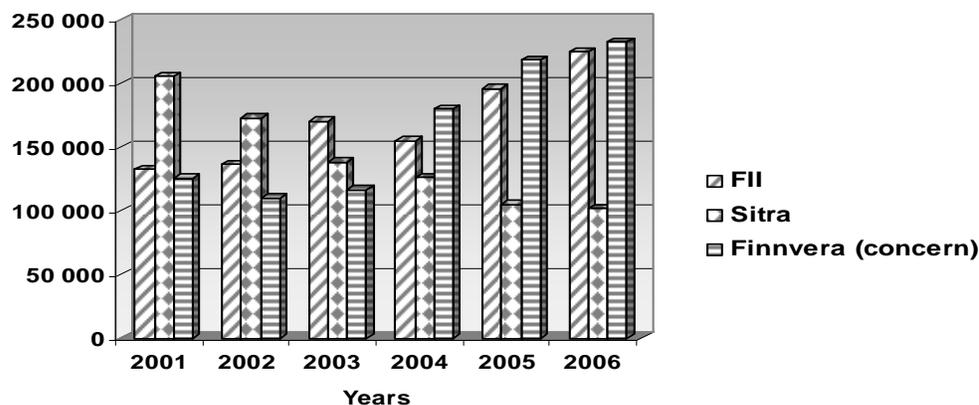


Figure 5. The Portfolio investments of FII, Sitra and Finnvera concern in 2001-2006
(1 000 €). (Source: FII, Sitra and Finnvera Annual reports 2001-2006)

Figure 5 shows an increased investment activity of FII and Finnvera concern through increased value of portfolio investments compared to Sitra's reasonably stable investment pattern. Sitra's stable and smaller value of investment can be explained by its position as an independent agency and financial limits that it has as well as concentration on certain industries. FII and Finnvera on the other hand have strengthened their portfolio which could be a consequence of governments more intense aim on improving SMEs funding and more capital allocated to these agencies. Also Tekes has increased its support to SMEs R&D between 2001 and 2006. Figure 6 shows the amount of Tekes annual R&D loans and grants and start-up loans.

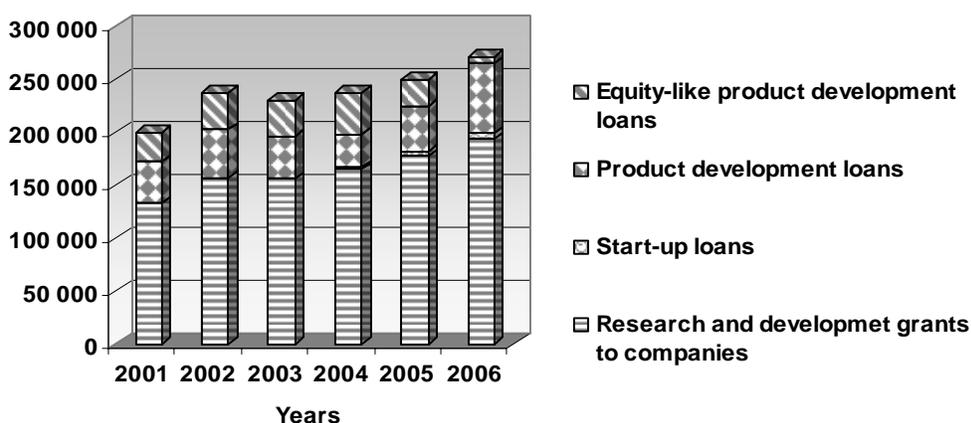


Figure 6. Tekes's annual investments and grants in 2001-2006 (1 000 €).

(Source: Tekes Annual reports 2005 & 2006)

Great share of Tekes support is given in grants to companies. Loans and equity-like loans count for smaller amount of annual support. Particularly equity-like loans have decreased towards 2006 that can be a result of Tekes concentrating on admitting R&D grants and loans that do not hinder SMEs possibilities to acquire VC funding in the future. Equity investors are entitled to ownership in the company and large outside investor's ownership can impair private VCs' interest to invest in SMEs. It is likely that Tekes will maintain and probably strengthen its role in supporting SMEs' R&D in the future. However the roles of other public agencies may change as the search for more efficient public support and sufficient SME funding continues.

4. CONCLUSION

This thesis has examined the relationship between public and private venture capital investing. The relationship has been studied in frameworks of venture capital investing and public financing theory. The theoretical frameworks have been complemented by viewing the development of Finnish venture capital markets and Finnish public agencies.

Previous studies have examined justifications of government interventions. The public interventions have been found to be justified in cases of market failures impacted by funding gap, information asymmetries and unattainable spillovers of SMEs. The dominant view suggests that government intervention should be done by indirect measures aiming to develop the more favourable venture capital framework and encourage private investing and furthermore, that direct measures, should be used as complementing measures. The effects of government interventions cannot be clearly stated due to the contradicting views of them. However since SMEs have been proven to be contributors of economic growth public supports to them can increase nation's innovativeness and employment and contribute to the sales of companies. Effects of improving preconditions and incentives that result greater private venture capital investing cannot be clearly stated.

When examining development of the Finnish venture capital until year 2006 the great impact of public agencies became evident and crucial. However distinct connection between private and public investors' investments could not be found. Additionally public investors' action seemed to have concentrated more on identifying the market failure and correcting it directly rather than having indirect approach to it and putting more focus on creating more favourable ground for private investors. This can be seen in increased volume of financial support to SMEs through larger portfolios. Fortunately public agencies have recently started to emphasize the use of indirect measure that can be seen as a healthy sign of development.

The nature of ever changing and diverse venture capital markets offer interesting subjects for research in the future. The aim to correct market failures in SME financing motivates public agencies to develop their action even further therefore efficiency and justifications should be scrutinized continuously.

REFERENCES

Literature

Abell, P., Nisar, T. M.: "Performance effects of venture capital firm networks". *Management decision*, 2007, vol. 45, No. 5, 923-936.

Audretsch, D. B., Link, A. N., Scott, J. T.: "Public/private technology partnerships: evaluating SBIR-supported research". *Research Policy*, 2002, vol.31, No. 1, 145-158.

Berger, A. N., Klapper L. F., Udell, G. F.: "The ability of banks to lend informationally opaque small businesses". *Journal of banking and Finance*, 2001, vol. 25, No. 12, 2127-2167.

Berger, A. N., Udell, G. F.: "The economics of small business finance: The roles of private equity and debt markets in financial growth cycle". *Journal of Banking and Finance*, 1998, vol.22, No. 6-8, 613-673.

Bygrave, W. D., Timmons, J. A.: *Venture capital at the Crossroads*, United States of America, Boston, Harvard Business School Press, 1992.

Coleman, S., Cohn R.: "Small firms' use of financial leverage: Evidence from 1993 National Survey of Small Business Finances". Babson College, 1999, Available: http://www.babson.edu/entrep/fer/papers99/XVI/XVI_A/XVI_A.html.

Cressy, R.: "Funding gaps". *The Economic Journal*, 2002, vol.22, No.477, F1-F16

Cumming, D. J., MacIntosh, J. G.: "Crowding out private equity: Canadian Evidence". *Journal of Business Venturing*, 2005, vol. 21, No. 5, 569-609.

Deakin, D., Hussain, G.: "Risk assessment with asymmetric information". *International Journal of bank marketing*, 1994, vol. 12, No.1, 24-31.

Da Rin, M., Nicodano, G., Sembenelli, A.: "Public policy and the creation of active venture capital markets, *Journal of Public Economics*, 2006, vol. 90, No. 8-9, 1699-1723.

De Meza, D.: "Overlending?". *The Economic Journal*, 2002, vol. 112, No. 477, F17-F31.

De Meza, D., Webb, D. C.: "Too much investment: A problem of asymmetric information". *Quarterly Journal of Economics*, 1987, vol. 102, No. 2, 281-292.

De Meza, D., Webb, D. C.: "Credit rationing: Something's Gotta Give". *Economica*, 2005, vol. 73, No. 292, 563-578.

Free, M. S.: "Are Small Innovators credit rationed?". *Small Business Economics*, 2007

Galai, D., Wiener, Z.: "Government Support of Investments Projects in the Private Sector: A Microeconomic Approach", *Financial Management*, 2003, vol. 32, No. 3, 33-50.

Giot, P., Schwienbacher, A.: "IPOs, trade sales and liquidations: Modelling venture capital exits using survival analysis", *Journal of Banking and Finance*, 2007, vol. 31, No. 3, 679-702.

Griliches, Z.: "The search for R&D spillovers". *Scandinavian Journal of Economics*, 1992, vol. 94, 29-47.

Gompers, P. A.: "Optimal Investment, Monitoring, and the Staging of Venture Capital". *The Journal of Finance*, 1995, vol. L, No. 5, 1461-1488.

Jaffe, A. B.:” Economic Analysis of Research spillovers and implications for the Advanced Technology Program”, National Bureau of Economic Research Prepared for the Advanced Technology Program, 1996, Available: <http://www.atp.nist.gov/eao/gcr708.htm>

Jääskeläinen, M., Maula, M., Murray, G.:”Propit distribution structures and compensation structures in publicly and privately funded hybrid venture capital funds”. *Research Policy*, 2007, vol. 36, No. 7, 913-929.

Kanniainen, V., Keuschigg, C.:”Start-up investment with scarce venture capital support”. *Journal of Banking and Finance*, 2004, vol. 28, No. 8, 1935-1959.

Kortum, S., Lerner, J.:” Assessing the contribution of venture capital to innovation”. *RAND Journal of Economics*, 2000, vol. 31, No. 4, 674-692.

Leleux, B., Surlemont, B.:” Public versus private venture capital: seeding or crowding out? A pan-European analysis”. *Journal of Business Venturing*, 2003, vol. 18, No. 1, 81-104.

Lerner, J.:”The Government as Venture Capitalist: The Long-Run Impact of the SBIR Program”. *Journal of Business*, 1999, vol. 72. No. 3, 285-317.

Lerner, J.: *Venture Capital and Private Equity: A Casebook*, United States of America, Harward Business School and National Bureau of Economic Research, 2000.

Lerner, J.:”When bureaucrats meet Entrepreneurs: The Design of Effective Public Venture Capital Programmes”, *The Economic Journal*, 2002, vol. 112, No.477, F73-F83.

Meggison, W. L., Weiss, K. A.:“Venture Capitalist Certification in Initial Public Offerings“. *Journal of Finance*, 1991, vol. 46, No. 3, 879-903.

Parker, S. C.:“Do Banks ration credit to new enterprises? And should Governments intervene?“. *Scottish Journal of Political Economy*, 2002, vol. 49, No. 2, 162-191.

Phan, P. H., Siegel, D. S., Wright, M.:“Science parks and incubators: observations, synthesis and future research“. *Journal of Business Venturing*, 2005, vol. 20, No. 2, 165-182.

Sapienza, P.:“ The effects of government ownership on bank lending“. *Journal of Financial Economics*, 2002, vol. 72, No. 2, 357-384.

Sapienza, H. J., Korsgaard, M. A., Goulet, P. K., Hoogendam, J. P.:“The effects of agency risks and procedural justice on board process in venture capital-backed firms“. *Entrepreneurship and Regional Development*, 2000, vol. 12, No. 4, 331-351.

Stiglitz, J. E., Weiss, A.:“Credit Rationing in Markets with Imperfect Information“, *American Economic review*, 1981, vol. 7, No. 3, 373-409

Publications

Auer, J.: Venture Capital –toimiala Suomessa 1988”, Suomen itsenäisyyden juhlavuoden 1967 rahasto, Helsinki,1989, 1-17.

European Commission: “Best practices of public support for early-stage equity finance”, 2005.

European Commission: “Seed Finance”, 2006, 1-12.

European Private Equity and Venture Capital Association: "Employment Contribution of Private Equity and Venture Capital in Europe", 2005, 1-7.

Finnish Venture Capital Association Yearbooks 2003-2007/8.

Hirsch, J.: "Public Policy and Venture Capital Finance Innovation: A Contract Design Approach", *Risk Capital and the Financing of European Innovative Firms (RICAFE)*, 2005, 1-48.

HM Treasury: "Bridging the finance gap: a consultation on improving access to growth capital for small businesses", 2003, 1-58.

Lacker, J. M.: "Does Adverse Selection Justify Government Intervention in Loan Markets", Federal Reserve Bank, 1994, 61-93.

Lahti, T.: "The Role of Venture Capital in Filling the Equity Gap". Helsinki School of Economics 2004, Mikkeli Business Campus Publications, No. 40, 1-88,

Luukkonen, T.: "Venture Capital Industry in Finland- Country Report for the Venture Fun Project", 2006, ETLA Discussion papers, No. 1003.

Maula, M., Murray, G.: "Finnish Industry Investment Ltd: An International Evaluation". Ministry of Trade and Industry, Industries Department, 2003.

Maula, M., Ahlström, J., Haahkola, K., Heikintalo, M., Lindström, T. S. Ojanperä, H., Tiainen, A. T.: "The prospects for Successful Early-Stage Venture Capital in Finland". Sitra, 2006.

Maula, M., Murray, G., Jääskeläinen, M.: "Public Financing of Young Innovative Companies in Finland". Ministry of Trade and Industry, Industries Department, 2007.
2007

United Nations Economic Commission for Europe: “ Financing Innovative Development”.
United Nations, 2007.

Ali-Yrkkö, J.: “Exiting venture capital investments –lessons from Finland“, 2001, ETLA
Discussion papers, No.781.

Interviews

Anu Nokso-Koivisto, Director of Business Development and Technology
Commercialisation, Sitra.

Markku M. J. Maula, Professor of Venture Capital, Helsinki University of Technology.

Annual Reports

Sitra 2001-2006

Finnish Industry Investment 2001-2006

Finnvera 2001-2006

Tekes 2001-2006

Other

www.sitra.fi

www.teollisuussijoitus.fi

www.finnvera.fi

www.veraventure.fi

www.tekes.fi

APPENDICES

Appendix 1. Key Definitions determined by Maula and Murray (2003).

SME – Small and Medium Sized Enterprises

The category of small and medium-sized enterprises (SMEs) is made up of enterprises which have fewer than 250 occupied persons and which have either an annual turnover not exceeding 50 million euros, or an annual balance total not exceeding 43 million euros.

Venture capital

Professionally managed monies co-invested with the entrepreneur to fund an early stage (seed start-up) or expansion venture. Offsetting the high risk the investor takes, is the promise of high return on the investment. (EVCA)

Early-stage (seed and start-up)

Seed and start-up stages of a business. (EVCA definitions)

Seed: Financing provided to research, assess and develop an initial concept before a business has reached the start-up phase. (EVCA)

Start-up: Financing provided to companies for product development and initial marketing. Companies may be in the process of being set up or may have been in business for a short time, but have not sold their product commercially.

Private equity

Private equity provides equity capital to enterprises not quoted on a stock market. Private equity can be used to develop new products and technologies, to expand

working capital, to make acquisitions, or to strengthen a company's balance sheet. It can also resolve ownership and management issues. A succession in family-owned companies, or the buy-out and buy-in of a business by experienced managers may be achieved using private equity funding. Venture capital is, strictly speaking, a subset of private equity and refers to equity investments made for the launch, early development, or expansion of a business. (EVCA) In this thesis 'private equity' refers to later stage investments meaning other than seed-stage, start-up-stage, and expansion-stage investments.

Regional investment

Investments undertaken in regions outside the main metropolitan and capital centers with commonly both an economic and a social objective Risk capital The European Commission defined (in SEC (1998) 552 final of 31 March 1998)) risk capital as equity financing provided to companies in their start-up and development phases.

Appendix 2. Structure of interviews of Sitra's director Anu Nokso-Koivisto and Helsinki University of Technology professor Markku V.J. Maula.

Q1 *Role of public equity investors*

- Areas of market failure and lack of funding
- Methods and Instruments
- Division of labour of public agencies
- Private VCs/EU-projects/Other projects
- Independency & profitability vs. defined status and actions in Finnish law

Q2 Future

- Industries/Areas/Stages
- Exit possibilities
- Direct vs. Indirect investments
- Research
- Internationality

Q3 Justifications

- New investments only to program areas
- Problem areas
- Networks
- Success
- Size of venture capital market
- Profit and incentives