

COMPARISON OF CORPORATE VENTURE CAPITAL AND
INDEPENDENT VENTURE CAPITAL THROUGH
INFORMATION ASYMMETRIES

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Abstract

Growth ventures play a vital part in economic revival as developers and producers of novel services and technologies. An integral part of the growth venture process is venture capital. A field in which information asymmetries are severe and the issues of moral hazard and adverse selection can be utilized to scrutinize the competitive advantages of different types of investors. This thesis is a literature review researching how corporate venture capital (CVC) compares with a more traditional source of venture financing, independent venture capital (IVC) through information asymmetries.

Previous research on the topic has remained scarce and scattered. This can be seen through contradictory results within the previous studies. This thesis seeks to argue that the research is insufficient, and the contradictory results in previous research may be explained through the uniform grouping of different type of CVCs. In essence, CVCs should be divided into different groups based on their strategic objectives. These groups tend to face different types of information asymmetries leading to divergent competitive advantages. This aspect has largely gone unnoticed by the previous literature.

Based on the empirical evidence, it is proposed that CVCs and IVCs play complementary roles in growth venture financing. Compared to their IVC counterparts, CVCs tend to invest in more mature growth ventures and provide diverse support services to their portfolio companies. In continuation, their problems of information asymmetries towards growth ventures tend to be more severe, causing the potential dealflow to be more limited. However, due to the lack of applicable studies, the specific hypothesis that uniform grouping of CVCs has caused the contradictory results between previous studies is left indefinite.

Based on the evaluation of previous literature, this thesis casts a doubt on the public operations to fund growth ventures. Only highly skilled and specialized venture capitalists tend to be efficient within their work, which questions the effectiveness of any public initiatives within the field.

Keywords venture capital, information asymmetries, growth ventures, startups, economics

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Tiivistelmä

Kasvuyritykset toimivat uusien teknologioiden ja palveluiden kehittäjinä, jonka vuoksi niillä on tärkeä rooli talouskasvun luojina. Olennainen osa kasvuyritystoimintaa ovat riskipääoma-, eli vähemmistösjoiotukset. Sijoitusten tehokkuutta hankaloittaa epäsymmetrisen informaation ongelmat. Epäsymmetrisen informaation ongelmia voidaan hyödyntää tarkasteltaessa erilaisten riskipääomasijoittajien keskinäistä kilpailukykyä. Tämän maisterintutkielman tavoite on vertailla suuryritysten omien sijoitusyhtiöiden (corporate venture capital, CVC) ja perinteisempien, yksityisten sijoitusyhtiöiden (independent venture capital, IVC) kilpailukykyä epäsymmetristen informaatio ongelmien avulla.

Aikaisempi tutkimus aiheesta on hajanaista ja yleisesti ottaen vähäistä, joka on nähtävissä esimerkiksi ristiriitaisina tutkimustuloksina aikaisempien tutkimusten välillä. Tämä maisterintutkielma pyrkii osoittamaan, että aiheen ympärillä oleva tutkimus on puutteellista, ja että edellisten tutkimusten ristiriitaiset tulokset johtuvat erilaisten CVC-sijoittajien luokittelusta yhtenäiseksi ryhmäksi. Uuden näkemyksen mukaan CVC:t tulisi jaotella erillisiin alaryhmiin niiden strategisten tavoitteiden perusteella. Eri alaryhmät kohtaavat erilaisia epäsymmetrisen informaation ongelmia, joka johtaa eroavaisuuksiin niiden kilpailukyvyssä.

Tutkimustulosten perusteella tämä tutkielma esittää, että CVC:illä ja IVC:illä on komplementaariset roolit kasvuyritysten rahoituksessa. CVC:t sijoittavat hieman pidemmälle edenneisiin kasvuyrityksiin ja tarjoavat erilaisia tukipalveluita portfolioyrityksilleen IVC-sijoittajiin verrattuna. Epäsymmetrisen informaation ongelmat ovat kuitenkin CVC:iden tapauksessa vakavampia, jonka vuoksi niiden kyvykyys tehdä vähemmistösjoiotuksia on rajoittuneempi ja potentiaalisia sijoituskohteita on vähemmän. Aikaisempien tutkimusten puutteellisuudesta johtuen, spesifinen hypoteesi, että kaikkien CVC:iden käsittely yhtenä ryhmänä on johtanut ristiriitaisiin tuloksiin, säilyy kuitenkin kiistanalaisena.

Kokonaisuudessaan, kirjallisuuskatsauksen perusteella tehdyt löydökset asettavat julkisen sektorin toiminnot kasvuyritysten rahoittamisessa kyseenalaiseen valoon. Vähemmistösjoiotukset kasvuyrityksiin on toimiala, jolla vain ammattitaitoisimmat riskipääomasijoittajat onnistuvat toimimaan tehokkaasti, asettaen julkisen sektorin kyvykyuden tuottaa lisäarvoa kasvuyrityskentälle epäilyksen alaiseksi.

Avainsanat venture capital, riskipääomasijoitukset, informaatio asymmetria, kasvuyritys, startup, taloustiede

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1. INTRODUCTION

1.1 Background

1.1.1 Innovation & entrepreneurship as forces behind economic growth

Technological innovation is generally regarded as a significant factor affecting economic growth (Rosenberg, 2014). Typically, innovations are brought to market by either newly formulated high growth companies (often referred to as startups) or incumbent corporations. Academic literature has identified the economic importance of both groups (Wennekers & Thurik, 1999). Within the market incumbents, innovations are usually developed in deliberate R&D functions, whereas the high growth companies tend to be founded on a specific innovation. Within both groups, the objective is the same – to establish a competitive advantage. The similarities between entrepreneurship and corporate R&D go beyond this general observation. Corporate R&D has been described as an attempt to create an environment that encourages entrepreneurial mindset within a corporation (Coff, 2003; Ziedonis, 2004).

In colloquial language, the words startup, entrepreneurship and self-employment tend to be used interchangeably. However, there are various types of entrepreneurship. In the context of the thesis, it is essential to signify what is referred to as startups, entrepreneurship, or high growth venturing. An explicit distinction is to look at two extremes. In one end of the spectrum, we have self-employed entrepreneurs such as hairdressers and taxi-drivers. And in the other end of the spectrum, we have high-technology and high growth entrepreneurs, such as biotechnology startups. Naturally, the dividing line between the above-mentioned type of self-employment entrepreneurship and high growth venturing is often scarcely perceptible. Nevertheless, the fore-mentioned two extremes have several distinguishing factors sufficient enough to differentiate what is classified as a startup within the context of this thesis. The distinction is important because while high growth entrepreneurship is correlated with economic growth, the evidence for self-employment type is not clear (Blanchflower, 2000). Similar results have been presented by Haltiwanger et al. (2013), who found that it is the high growth ventures that create new jobs to the economy,

not all small companies. The authors summarize by stating that if policymakers want to target job growth, they should aim for more growth ventures, not just small companies.¹

Within the second extreme, the high growth entrepreneurs, which will be the focus of this thesis, one notable common factor is the presence of venture capital (VC) financing. No strict regulatory definition of venture capital exists, but generally VCs are described as firms that provide financing for startups in form of equity, debt or a combination of both. Of the current public limited liability US companies alone, 43% have raised venture capital financing at some point in their history (Strebulaev, 2015). Thus, it's no surprise that the importance of venture capital as a building block of growth venturing is well established in the economic literature (Koh & Koh, 2002; Samila & Sorenson, 2011). Bygrave and Timmons (1986) describe venture capital's role as a catalytic force that supports the existence of growth companies and economic revival. In continuation, Kortum & Lerner (2000), have found that venture funding accounts for around 14% of U.S innovative activity.

Throughout the past years, the accumulated total value of VC investments has been globally increasing. As depicted in Figure 1, the yearly VC investments in the U.S have grown almost five-fold during the past ten years, from 21.6\$ billion in 2009 to 99.5\$ billion in 2018 (PwC, 2019).

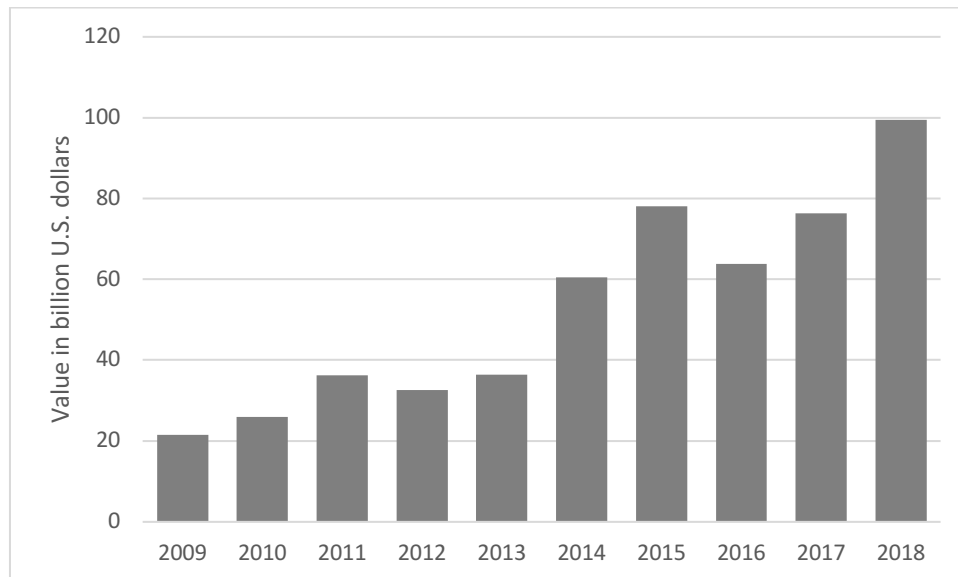


Figure 1: Value of venture capital investments in the U.S (PwC, 2019)

¹ It's important to note that technological innovation is not a prerequisite for a company to be classified as a high growth venture. High growth ventures can arise from a novel service concept or logistical innovations as for example in the case of AirBnb and Uber. As Mokyr (1990) has argued, innovation does not always require invention.

Following the incremental growth of VC investments, the economic role of entrepreneurship is becoming increasingly important. Many arguments have been presented to account for the recent rise in entrepreneurship including such as better access to capital, economic growth, cultural factors and easier access to global markets through, e.g., digital products and services (Wade, 2014). Whatever the driving force, high-growth entrepreneurship is becoming more frequent and hence its economic importance more significant. Moreover, it is becoming of ever greater importance for policymakers to understand the startup ecosystem. In which venture capital plays a significant role.

1.1.2 Growth of CVC's (Corporate Venture Capital)

One specific form of venture capital is corporate venture capital (CVC), defined as minority equity investments in private entrepreneurial growth companies by incumbent corporations (Chesbrough, 2002; Maula, 2001). Typically, CVCs have been structured to imitate traditional, independent venture capital (IVC) companies (Keil, 2004). However, two fundamental factors separate CVCs from the traditional IVCs. Firstly, while IVC funds have multiple investors (so-called limited partners, LPs), CVCs tend only to have one – the parent corporation. Secondly, IVC's primary and only goal is to generate financial returns for the LPs' investments. A CVC, in turn, as argued by MacMillan et al. (2012), is a modern corporate innovation tool that can target different financial and strategic objectives. For the past 15 years, CVCs have composed an increasingly larger share of the total global venture capital market activity. The current wave of CVCs is, however, not the first time the so-called corporate venture arms have been growing in popularity. In fact, it is at least the fourth wave of CVCs (Dushnitsky & Lenox, 2006). Dushnitsky and Lenox describe the phenomenon, where the number of CVCs tends to dramatically increase within economic booms and quickly disappear during the downturns, as the cyclical nature of CVC activity.

Scholars have presented various arguments to explain the cyclical nature of CVCs. These include such as disadvantage in reducing information asymmetries (Block & Ornati, 1987). Lack of incentives for fund managers (Chesbrough, 2000). Problems of internal politics within the corporation (Sykes, 1986), and the top management's hesitancy to abolish funds when they fail to produce immediate returns (Dushnitsky & Lenox, 2006). However, the causal connection between economic growth and increase in CVC activity is indefinite. Some academics have argued that evolved market characteristics account for the latest wave of CVC growth. These explanations, relying on fundamental changes in the

global business environment, include the following. Increasing global competition, changes in cultural factors, shorter technological cycles, shorter product-service lifetime cycles, improved global knowledge transfer, increase in knowledge complexity, and technological diversity (Dauderstädt, 2013; Fulghieri & Sevilir, 2009). The claim is that these fundamental changes have increased innovation activity risks and prices, and, accordingly lead to a demand in faster and more agile innovation processes. Virtues arguably offered by corporate venture capital. Moreover, as investing globally in growth ventures is becoming ever easier (Gompers et al., 1998), the recent developments have created strong incentives for corporations to adopt corporate venture capital as a modern tool for innovation and new growth.

A popular topic within the field is related to the consideration on when it is optimal for an entrepreneur to choose CVC funding over IVC, and vice versa. Due to the divergence in their respective structures and setup, CVCs have fundamental differences when compared to IVCs in what they aim to achieve, what they can offer to entrepreneurs and what kind of information asymmetry problems they possess (Chesbrough, 2000). From these fundamental differences, it follows that CVCs and IVCs should have distinct competitive advantages over each other due to their unequal capabilities in selecting potential portfolio companies, and providing support services for them. To understand these competitive advantages on a theoretical front, one must take into consideration the needs of all stakeholders involved in the venture capital process.

1.1.3 Stakeholders and needs

With the aim of rapid growth and high profits, high growth venturing tends to involve significant risks. Notably, if a growth venture is founded on a novel technology, it typically requires a substantial amount of funding before being able to turn the innovation into a viable, sellable service or product. Thus, a growth venture might generate losses for years before becoming profitable – if ever. This is what scholars refer to as the ‘gap in funding.’ In addition to the gap in funding, the growth ventures are typically considered to have a ‘knowledge gap’ as well (Jungman & Seppä, 2004). Meaning they lack skills and personnel to turn technological innovation into a successful business. Jungman & Seppä continue by describing a distinction between capital-intensive and knowledge-intensive investing. Capital-intensive refers to a plain supply of funding, while knowledge-intensive funding refers to advisory services provided by the investor. As the degree to which a startup is

lacking capital and knowledge differs case by case, from company to company, so does the weighting of the advisory and capital offered by different venture capitalists.

For the investors, growth ventures provide uncertain but potentially extremely lucrative investment opportunities. Investing in growth ventures can be denoted as a high-risk high-reward scheme due to two reasons. Firstly, a growth company is commonly not able to offer any collateral for the capital provided. The assets of a startup generally consist of intangible information such as tacit knowledge. In case of a failure and ultimately bankruptcy, intangible information tends to have no liquidation value, causing the investor to lose the majority, or in the worst case, all of her investment. And the less mature the startup is, the more strongly its assets and valuation generally rely on intangible information. Secondly, the information problems when investing in startups are intense. Information asymmetries tend to be most significant in areas where information is difficult to obtain, complex, or both. Within growth venture investing expert labor and intangible assets increase information asymmetries. Making it cumbersome for investors to detect and pick prominent investment opportunities from less prominent ones. Moreover, startups tend to lack reputation in terms of, e.g., business record, making the risk of fraud prominent.²

Due to high risks, lack of collateral and the specific needs of each startup, not limited to capital only, typical modes of financing such as bank loans have not played a significant role in high growth venture financing. Extending on this view, Stiglitz & Weiss (1981) argue that rational banks simply refuse to loan funds to risky projects tangled with high informational asymmetries. Traditional banks are also lacking the ability to monitor the startups and more generally unable or unfit to fill the knowledge gap of high growth ventures. According to Amit et al. (1998), this is the rationale for the whole existence of specialized venture capitalists. Venture capitalists have a competitive advantage in evaluating which growth ventures to finance as well as the necessary skills and tools to support them post-investment. In short, venture capitalists are equipped with relevant skills to operate efficiently in the field. They are often previous entrepreneurs themselves with vast networks of other investors and entrepreneurs. An essential part of venture capitalists specialized skills is the ability to reduce the informational problems in order to select sound investment opportunities from bad ones.

² For an example on the severity of information problems in high growth ventures, see the recent case of *Theranos*. Theranos raised a total of 1.4\$ billions of venture capital financing within more than 10 separate rounds of funding, before the company's technology was discovered to be inoperative and to some extent a hoax.

Venture capitalists can be regarded as a diversified, heterogeneous group. While most venture capitalists supply both advisory services and capital, the proportions differ. As a result, venture capital companies tend to specialize in specific niches. Typically, specialization takes place by focusing on certain maturity stages, technologies, industries, and business models.³ Specialization helps to reduce the informational problems and enhances the venture capitalist's competitive advantage over other investors (Amit et al., 1998). IVCs naturally tend to assess areas the fund managers have accumulated extensive knowledge in. In contrast, CVCs typically focus on areas in which the corporate has strategic interest towards.

From a policymaker's perspective, it is essential, that the highly complex growth venture financing markets, ridden with information problems, function well. Liquidity constraints in the form of entrepreneurs not being able to access capital could hurt the economy. Ultimately, as explained by Akerlof (1970) in his seminal paper, major information problems can have a fatal effect and cause the market to break down. Understanding the behavior of the stakeholders involved in the venture capital markets is vital to enable formulation of public policies that support the economically important market vertical spanning across all industries.

1.2 Research problem

Despite the growing importance of CVC as both, a financing source for growth ventures and as a strategical tool for established corporations to scan and develop innovative technologies, the amount of academic research on the subject remains scarce (Fulghieri & Sevilir, 2009). According to Dauderstädt (2013), the primary issue is that there is simply not enough data available. VC investors and investees are typically unwilling to share their investment, decision making, or other relevant information making it difficult to conduct empirical studies. However, the above explanation goes only half the way. It fails to justify why the subject has not been rigorously studied on the theoretical front. A clear understanding of the behavior of venture capitalists on a theoretical level would benefit both academics and policymakers. For academics, it would help to lay the cornerstones for future research, and the theoretical predictions could be utilized to counter-test hypotheses from previous studies.

³ As an example of a certain business model focus, a single VC might fund only software as a service (SaaS) growth ventures.

For policymakers, as stated in the previous chapter, understanding the behavior of venture capitalists and high growth ventures is vitally important for the efficient formulation of public policies to enable a thriving economy.

Arguably, the lack of theoretical front reflects the fragmentation of CVC research. In the spirit of the paper by Amit et al. (1998), ‘Why do Venture Capital firms exist?’, one might ask the same about CVCs. No mutual consensus between scholars seems to exist as to what are the competitive advantages of CVCs over IVCs. In fact, the current discussion on even whether IVCs and CVCs are substitutes or complements seems rudimentary. Nevertheless, some studies tend to take either stand as a given. While many authors have pursued to explain the differences in investment behavior between CVCs and IVCs, the results have occasionally been even contradictory. For example, Park & Bae (2018), argue that CVC’s have an advantage in later-stage investments, while Chemmanur & Loutskina (2009), state that CVC’s would be better off investing in less-mature startups compared to IVC’s. There are generally two alternatives as to what is causing the contradictory results. Either the results are caused by problems in the empirical data, or the shortcomings arise from within the actual theoretical model. Let us consider the former claim first.

Explaining contradictory results through problems within the empirical data itself seems plausible. A considerable proportion of studies within the field have been grounded on independently collected qualitative questionnaires. In such cases, for example, fabricating predictions based on a CVC fund manager’s answers can generate problems in terms of subjectivity and accuracy. However, what this rationale fails to explain, is why even some of the quantitative studies have conflicting predictions on the investment behavior of CVCs. For this reason, one must turn to the second possibility, that there is something within the theoretical model propelling sporadic results. Such could be the case if one were to argue that CVC’s do not form a comparable, uniform group. By definition, it would make comparing samples of ‘average’ IVC’s to ‘average’ CVC’s prone to errors, especially if the samples are small. Say one is looking to compare apples to oranges but is unwittingly comparing apples to a group that, in fact, consists of oranges, clementines, and mandarins. Then, a random sample of a population of ‘oranges’ could consist of mostly clementines. Especially if there would be a reason to believe more and better data is available for clementines. Within the subject of CVCs, the main argument goes as follows. Since separate CVC’s have different strategic and financial goals, they face different types of information problems with the other stakeholders, leading to different types of competitive advantages.

Therefore, they should not be considered as a single unified group. The central hypothesis is that if we cannot observe the true intentions of separate type of CVCs and instead group them, the results are vulnerable to become inadequate and biased.

On one level, such division has already been presented. Chesbrough (2002), distinguished between four modes of CVC by introducing driving, enabling, emergent and passive investments as four alternatives depending on the link of operational capability between the growth venture and the corporate, as well as the strategic versus financial goals of the CVC. These four modes of CVC activity are depicted in Figure 2.

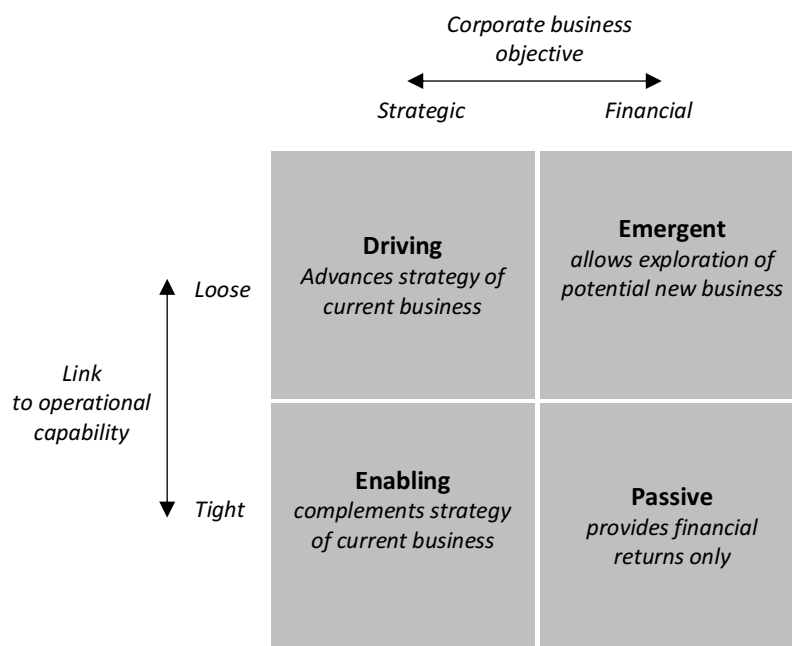


Figure 2: Four modes of CVC activity (Chesbrough, 2002)

While Chesbrough’s paper has been frequently referenced, scholars seem to continually ignore this division and instead considerer CVCs as one homogenous group.

Venture capitalists can broadly be said to compete on two fronts, in the price of equity and the level of support they can provide to the startup (Hellmann, 2002). The competitive advantages of different venture capitalists depend on how well they can support and solve other stakeholders needs. The problem can be scrutinized from both the startups’ viewpoint as well as from the venture capitalists’ viewpoint. From both perspectives, information asymmetries play an essential role. In turn, what type of informational asymmetries there are between the two parties and how well they can to be solved can substantially help to understand the comparative advantages of one type of venture capitalist over another. Considering this, it seems plausible to assume that how well a CVC can support a startup and what type of information asymmetries arises between the two parties depends

on the link of operational capability and the strategic versus financial motivation of the corporate parent.

Lastly, one must consider the possibility that CVCs simply do not have any competitive advantage over IVCs. This could also, in principle, be the case. Researchers such as Hellmann (2002) and Röhm et al. (2018), have suggested that on average CVCs tend to pay higher valuations than IVCs for similar investments. Which could reflect the fact that entrepreneurs require higher valuations when receiving financing from an investor they regard as an inferior option. However, there are examples of opposing results as well. For example, Xerox Technology Ventures is famously known for its success in financially outperforming most of the IVCs in the 1990s (Salager, 2018). Xerox's example could be considered as an outlier, but according to Wall Street Journal (2017), 61,7% of the high growth ventures with valuation over \$1 billion have raised funds from at least one corporate. A number, that alone highlights the fact that growth ventures are – at least in some cases – eager to seek CVC funding. Thus, even though comprehensive studies on the investment performance of CVCs are lacking due to the difficulty of obtaining data, it seems sufficient to conclude that CVCs possess competitive advantages over IVCs. In other words, niches where CVCs outperform IVCs must exist. At least until someone proves otherwise.

1.3 Methodology and objectives

1.3.1 Methodology and scope

Two frameworks are utilized to examine the main hypothesis of this study – that a uniform grouping of CVCs has caused the contradictory results in previous research. The first framework is the process and stakeholder approach. Process and stakeholder approach refers to the previously discussed model, where stakeholders and especially venture capitalists' processes and structures are studied.

The second perspective is the analytical framework, which is also the most important element of this study, focusing on information economics. It aims to analyze the informational asymmetries of the venture capital market that mainly exist in the form of principal-agent problems. This study will use multiple models of asymmetric information and employ them to examine the relationships between different stakeholders in high growth venturing. Differences in information asymmetries will be used to develop a framework for both, to scrutinize the potential competitive advantages of CVCs over IVCs, and to outline differences in asymmetric information between the four different modes of CVC activity.

The study has two significant methodological limitations. Firstly, this thesis is predominantly explorative rather than formally precise or rigorous. The objective is to understand the differences between CVCs and IVCs by employing previous models of information economics. However, this thesis does not attempt to develop a formal model to illustrate the disparities between the two. Above all, this study builds upon a gap that has not been recognized in the previous literature. Hence, no formal model exists, and any attempt to construct such a model is beyond the scope of this thesis. Instead, the main emphasis is to reflect on empirical findings of previous research within the framework mentioned above.

Secondly, this study is primarily analytical rather than empirical. Due to the difficulties of obtaining subject-specific, relevant, and reliable data, only previous empirical studies are applied to establish a deepened understanding of the research problem. The empirical section of the thesis focuses on a small number of previous empirical studies. As such, it will help to provide an indication of the relevant phenomena. Hopefully, these limitations can be sorted out in the future, and scholars are able to uncover novel ways to collect essential data regarding CVC activity in order to develop a more in-depth understanding of the subject through empirical studies.

1.3.2 Objectives of the study

Within the CVC literature, there is a clear research gap in understanding the competitive advantage of CVCs compared to IVCs. As described, this gap relies upon the theoretical front of the distinct type of information economics between startups and venture capitalists. Within its research discipline, this thesis will also aim to shed light on understanding the cyclical nature of CVCs and hopefully give directions for further research. In a broader context, this thesis aims to help to gain a better understanding of the overall venture capital market that could additionally provide normative implications for practice, over the formulation of public policies.

The central hypothesis is as follows. As different types of CVCs have different goals in strategical and financial dimensions, they face different types of information problems. Separating four distinct types of CVCs from each other and understanding their theoretical competitive advantages through information asymmetries is utilized to account for the contradictory results within the previous CVC studies. While IVCs have multiple LPs and are generally considered as neutral investors from the startups' standpoint, CVCs tend to have only one – the parent corporation. Due to this parent-CVC lifeline, as venture

capitalists, CVCs cannot be considered as neutral investors. Non-neutrality between a startup and an investor can emerge as interference within both, the objectives of the CVC and a growth venture, as well as the line of business of the startup and the CVC parent company.

Specifically, the various information problems caused by the conflict of interests between growth ventures and CVCs can affect the screening strategy of the investors. As CVCs are more tightly linked with the parent corporation than IVCs are with their LPs, CVCs need to pay particular emphasis to make sure the growth venture is a good fit with the strategic objectives of the parent company.

1.4 Structure of the study

The rest of this paper will be structured as follows. Chapter 2 reviews the previous literature on the economics of venture capital. Special emphasis is put on studies that comprise information asymmetries within growth venture finance. A relative majority of the academic papers are theoretical, but some empirical studies are included as well. The chapter will present means through which both venture capitalists and startups aim to diminish the information problems. The main finding is that on a general level, there exists a high level of understanding of informational asymmetries between an investor and an entrepreneur within the current literature. However, this aspect is at least partly lacking within the CVC field. Moreover, it is concluded that previous research has put minimal emphasis on understanding the differences between different type of CVCs.

Chapter 3 discusses the role of CVCs compared to IVCs within growth venture finance. Issues concerning whether CVCs and IVCs are complements or substitutes are addressed. In order to facilitate the comparison, a general model of the growth venturing process is introduced. Growth venturing process dismantles different phases a high growth venture goes through, as well as the typical shortfalls of growth ventures that investors aim to support in. The growth venturing process has an important role in the analytical framework of the study. It is concluded that CVCs and IVCs have complementary roles within growth venture financing.

Chapter 4 centers upon the economics of venture capital funds. How IVC and CVC funds are structured, and their relations to different stakeholders are presented. The primary focus is to develop an understanding of the principal-agent problems between fund managers and their limited partners. This chapter will also present the four distinct types of CVC investors in more depth. Based on the findings, it is hypothesized that all four different

CVC-types tend to have relatively distinct agency problems with the startups and their parent companies.

Chapter 5 presents an optimal theoretical screening strategy for a venture capital investor. This theoretical model of screening is used as a basis for further discussion on differences between CVCs and IVCs. Based on the model, it is argued that the strategic objectives of the parent corporation are likely to compose a divisive element of differentiation between IVCs and CVCs and their competitive advantages over each other. Finally, it is noted that distinguishing the factual situation between the four modes of CVC remains non-exhaustive due to lack of empirical data.

Chapter 6 summarizes the main findings of this thesis. Limitations of the study, as well as opportunities for further research, are presented. Finally, based on the findings, while carefully considering the limiting factors of this thesis, a set of policy recommendations are discussed.

1.5 Definitions of key concepts

Four key concepts are relevant to the present thesis. Depending on the context and users, multiple definitions for these concepts exist. Therefore, it is beneficial to clarify how they are defined within the scope of the present study.

Startup: Startup is referred to as a legally distinct business that is aiming for high growth. While within the distinction of this study, a typical startup is a relatively young company based on a novel innovation, no companies can be strictly ruled out based on age or the nature of their innovation. Instead, a vital classification is this that all referred startups face severe asymmetric information problems with their financiers. To limit the scope of this study, so-called corporate internal startups have not been included within this definition.⁴ Words startup, high growth venture, growth venture, and growth company are used synonymously.

Entrepreneur: The present study refers to the term entrepreneur as an originator and a manager of a startup. The definition is important since, within the literature, the term entrepreneur is often used to describe a number of things. The entrepreneur refers to a person

⁴ An internal startup refers to a high growth venture that is a subsidiary of an incumbent corporation. Generally internal startups aim to imitate the design of external startups through e.g. similar incentives and structures. For further information see for example (Ma et al., 2016)

(or persons) who brought the growth venture to life, leads its development, and has the highest decision-making power, especially when it comes to seeking venture capital funding.

Independent venture capital (IVC): Independent venture capital refers to institutional venture capital funds. By independent, this study denotes to the fact that IVCs' primary and sole objective is to generate returns on investment by investing in startups. In turn, an independent venture capitalist refers to a manager of a venture capital fund (or shortly fund manager). Private investors, such as angel investors are thus ruled out by the definition of the present study.

Corporate venture capital (CVC): Corporate venture capital is generally defined as capital that corporations invest in startups on their own, alongside traditional VC funds or in a syndicate of investors (MacMillan et al., 2012). Investments can be made by third-party funds, dedicated funds, or self-managed funds (Maula, 2001). For purposes of the present study, third party funds are excluded. Such funds are typically managed by external independent venture capitalists, and their structure and information problems are likely to differ from those of self-managed funds. In some cases, corporates make direct investments to startups from their balance sheet. This mode of operation mode is generally considered as a form of CVC activity as well. As in the case of third-party funds, this might cause differentiation in information asymmetries. Thus, only CVCs with formal fund structures are included within the scope of this study. Additionally, only CVC funds that have received all their capital from the corporate are included. As MacMillan et al. (2012) have pointed out, some CVC funds raise capital from external investors as well. Which, again, might influence the information asymmetries. Thus, such CVC structures are not included in the present study.

2. INFORMATION ECONOMICS IN GROWTH VENTURE FINANCING: LITERATURE REVIEW

This chapter describes the previous literature and its key contributions to asymmetric information problems within growth venture finance. The emphasis is to construe both sides of the bilateral information asymmetries between high growth ventures and venture capitalists. As well as on the mediums through which both parties aim to mitigate these information problems. The first sections describe the fundamental theory behind asymmetric information from the distinct viewpoint of each party. In the last section, the current state of research is quantified to the present thesis.

2.1 General Overview

Akerlof (1970) is famously known for his trailblazing paper on how asymmetric information can account for market inefficiencies. The main accomplishment of the paper was to rationalize how asymmetric information can be used to explain why some markets flourish while others fail. Condensed arguments would be as follows. In flourishing markets, information asymmetries are either absent, minor, or means through which they can be diminished exist. In stalling markets, not only are information asymmetries severe, but there is an absence of tools to mitigate them. Akerlof introduced the market for used cars as an illustrative example to showcase how markets can break down if the buyers are not able to differentiate a good car from a bad one (a ‘lemon’⁵). In Akerlof’s model, only the seller is expected to be in possession of this information, yet has no trustworthy mechanism to reveal it to the buyer.

Principal-agent approach (also referred to as agency theory) is one of the most well-known theories under asymmetric information. The agency theory refers to the asymmetric information between an agent, such as a doctor, banker, or a used car seller, and a principal, in contrast to the previous examples; patient, client or a used car buyer. In principal-agent theory, all parties are assumed to be selfish, rational, and risk-averse (Eisenhardt, 1989). Due to the problem of asymmetric information, if both parties maximize their utility, it is likely that that the agent will not always act in the best interest of the principal (Jensen & Meckling, 1976). Agency theory is typically divided into two categories:

⁵ The term *lemon* refers to an American nickname for a car that is found to be defective by the buyer, but only after it has been bought.

adverse selection and moral hazard. Furthermore, Hart and Holmström (1986), have divided moral hazard into hidden action and hidden information models. Both hidden action and hidden information are considered to have a key role in financial contracting (Hart, 2001). Adverse selection and moral hazard have also been used to explain more comprehensive market movements. Therefore, it is no surprise that the literature on venture capital finance has placed a great emphasis on asymmetric information.

2.2 Supply side of Venture Capital

2.2.1 Adverse selection and moral hazard

The supply-side of venture capital refers to the perspective of the venture capitalist (a fund manager), who is making the investment decisions. In this context, the venture capitalist is considered as a principal and the entrepreneur as an agent. Consider an example case where a growth venture is seeking for venture capital funding. As a manager of the startup, the entrepreneur is presumed to be in possession of superior information about the startup, the market it is operating in, as well as the overall demand for its product or service. After the hypothesized investment is made, the entrepreneur retains primary control over the business. This exposes the venture capitalist to both moral hazard and adverse selection problems (Amit et al., 1998).

Adverse selection refers to a risk in a situation where there exists a problem of hidden information before the investment takes place. The investor is not in possession of all information regarding the quality of the startup, the skills of the entrepreneur or the staff in general. This provides the entrepreneur, as an informed agent, an incentive to misrepresent information about the startup. In practical terms, this could mean overstating expectations or overrating the quality and skills of the personnel. In a CVC case, the entrepreneur might mislead the investor by overstating the growth venture's main priorities and ambitions to be aligned as a better fit with strategical objects of the CVC than they are in reality. A rational investor, as the principal, understands this risk, and if she has no tools to screen the applicants successfully, she may choose not to invest at all. Adverse selection may result if the market is filled with low-quality startups, that cannot, or are difficult to separate from the higher quality startups. And as a result, the market may break down.

Moral hazard refers to a risk in a situation where there exists a problem of hidden action after the investment has been made. If the investor is unable to monitor what the startup does with venture financing, the entrepreneur can be incentivized to shirk. In

practical terms, this could mean spending the funding on personal amenities or even swindling the money. This is especially likely if the startup is a low-quality project in the first place. In case of a strategical CVC investment, the entrepreneur might, post-investment, choose to pursue ambitions and objectives that are conflicting with the investor's strategic objectives. Thus, even if the investor has the ability to screen the applicants effectively but is missing the means through which to monitor them, she might decide not to invest at all due to the risk of moral hazard.

Moral hazard and adverse selection cause market failure in growth venture financing, which can lead remunerate projects to be unfunded or underfunded (Amit et al., 1998). For example, Chan (1983), has presented, that in the absence of informed venture capitalists, only inferior projects are offered to investors. In general, scholars have argued that venture capitalists have a unique role in the market by being able to mitigate adverse selection and hidden information problems. However, it is essential to note that these informational problems cannot be removed entirely. Under these terms, Kann (2001), argues that venture capitalists have developed mechanisms to attract superior agents and discourage inferior ones. Also, complementary to this view, Sahlman (1990), underlines that, in fact, most actions taken by venture capitalists during the investment process primarily exist to mitigate the informational asymmetries.

2.2.2 Methods to mitigate supply side information asymmetries

This section specifies the different methods applied by venture capitalists to mitigate the supply-side moral hazard and adverse selection problems, as presented in the current literature.

Due diligence

Venture capitalists apply extensive screening procedures to evaluate potential investment opportunities (Fried & Hisrich, 1994). Due diligence refers to the pre-investment screening procedure where investors try to understand the viability of the business and the skills of the management team in technological and market demand terms. As only a small number of potential projects receive financing after the screening, the aim is two-fold. Firstly, it helps to sort out the lemons during the screening process. Secondly, it discourages rational lemon entrepreneurs from applying for venture funding in the first place. Due to the due diligence process, a rational entrepreneur acknowledges that her probability of receiving funding is low if her business venture is a lemon. Since the process of seeking funding is time-

consuming, she may choose not to seek venture capital financing in the first place. Fried & Hisrich also argue that to achieve efficiency in screening, venture capitalists tend to specialize in specific industries and startup stages. This helps investors to achieve economies of scale in screening potential startups while becoming more efficient in diminishing the adverse selection problems.

Contract design

Sahlman (1990), describes contract design as a method to reduce the number of bad applicants through incentivization. Venture capitalists frequently use contract design in the contract agreement to tie the pay of the entrepreneur with the performance of the startup. Similarly, as with due diligence, contract design has a two-folded mitigation effect on agency problems. Firstly, it incentivizes the entrepreneur to give her full effort and decreases her possible incentives to shirk. Secondly, as Bergemann & Hege (1998), have argued, it discourages lemons from seeking venture capital financing in the first place. As a rational agent, a lemon entrepreneur understands that if she does not have the necessary skills to execute on the business plan, or that her business plan is not viable at all, she will choose not to seek for venture funding if her pay is tied to the performance of the startup. According to Lazear (1999), the latter mitigation effect of sorting is inherently even more powerful than the former incentive mechanism.

Staged financing

Staged financing refers to a procedure where the capital injections are made in smaller, consequent stages instead of all at once. This practice empowers the investor to see the entrepreneur in practice before making a full commitment. Staged financing allows the venture capitalist to discontinue making further investments if certain milestones are not reached by the startup (Guler, 2007). Accordingly, it gives investors an option to abandon unsuccessful projects and prevent further losses (Dixit & Pindyck, 1994). Depending on the stage of the startup, these milestones can range from product viability to revenue goals. Between each new round of financing, the investor can update and evaluate the viability of the growth venture simultaneously as the information asymmetries between the principal and the agent decreases. Arguably, the regime of staged financing in venture capital allows potential new investors to mitigate information asymmetries as well. When a venture capitalist that has not participated in previous funding rounds, while looking to invest in a

new upcoming round, she may interpret the financiers from the previous rounds as a signal of viability. The concept of signaling is described in detail in the section of syndication.

Allocation of control rights

Allocation of control rights is a method to mitigate adverse selection problems by discouraging weak startups from seeking venture capital funding. A venture capital investment contract typically states specific financial and non-financial performance measures. If the startup performs poorly and is unable to accomplish these performance milestones, the venture capitalist is entitled to a takeover. Kaplan & Strömberg (2003) find that venture capital contracts typically allocate cash flow rights, board rights, voting rights, and liquidation rights separately. The clauses can be beneficial for the entrepreneur as well. If the startup performs better than expected, the contract may state that the investor is required to renounce most of her rights.

Non-compete and vesting provisions

Venture capital investment contracts tend to include non-compete and vesting provisions. Non-compete and vesting provisions can be perceived as a component of allocation of control rights, but for purposes of clarity, they are here examined as a separate entity. They alleviate information asymmetries by making it more difficult and expensive for the entrepreneur to leave the startup in question after the investment has been made. In addition, to hinder above described moral hazard problems, these clauses are likely to mitigate the adverse selection problems by discouraging lemons from seeking or accepting the venture capital deal (Kaplan & Strömberg, 2003).

Syndication

Syndication refers to joint investing by two or more venture capital investors. Many venture capitalists claim that syndication is an effective tool to mitigate information asymmetries by increasing the objectivity of decision making. However, scholars have presented contradictory arguments as well. Lerner (1994), argues that syndication is often used as a tool of window dressing. By investing in successful and well-known, typically later-stage growth ventures, the venture capitalists artificially aim to make their investment portfolio seem auspicious. An investment portfolio that includes well-known and successful startups is used for marketing purposes in order to attract new deal flow. Dushnitsky (2006), finds that the majority of CVC investments have been made in syndication with IVCs. According

to Wright & Lockett (2003), CVCs consider syndication partnerships beneficial to increase their potential deal flow. In continuation, Wadhwa et al. (2016) argue that the popularity of syndication can also be explained by the efficacy of complementary advantages to alleviate information asymmetries. For example, a CVC might have an advantage in evaluating the technical feasibility of the startup, while an IVC involvement can mitigate the agency problems a startup can have towards a strategic CVC. A case, where a startup is the principal and CVC is the agent is described in further detail in the section of demand-side for venture capital.

Monitoring

Venture capitalists tend to be actively involved with their investee companies after the initial investment. There are three separate motives for this course of action. First, frequent involvement and support are regarded as a way to establish a competitive advantage by making the venture investor more sought after. Second, the involvement of a highly-skilled venture capitalist can increase the probability of the success of a startup. After all, most of the growth ventures tend to fail. Of all investments an average venture capital fund makes, only a small handful generate most of the fund's profits. Support by skilled venture capitalists can increase the odds of success, and the incentives to advise can be high in terms of return on investment. Third, investors are involved in the daily business for monitoring purposes. Monitoring reduces the problems of moral hazard, as it allows venture capitalists to keep track of the management team. Casamatta (2003), defines the advantage of the combination approach of both monitoring and support through agglomeration economies. By providing support and consultation, the investors gain relevant information from the monitoring perspective and increase the odds of higher returns on investment. Thus, providing both services together is more efficient than providing them separately. For CVC investors, there exists an additional benefit in agglomeration economies. Active involvement helps to create a better understanding for example of the underlying technology and market demand of the growth venture's product, which in turn helps to fulfill the strategic objectives of the CVC towards the parent corporation.

2.3 Demand side for Venture Capital

The demand side of venture capital refers to the perspective of the growth venture. An entrepreneur evaluates a decision whether to seek venture capital funding and ultimately, whether to accept the possible funding offer. Here, the growth venture is considered as the principal and venture capitalist as the agent. The premise is similar to the supply side case; after an investment is made, the entrepreneur is expected to remain decision-making power within the growth venture. A decision to seek venture financing alters the entrepreneur to both hidden information and hidden action and subsequently to moral hazard and adverse selection problems. As the agent, an investor can be incentivized to mislead the entrepreneur.

2.3.1 Adverse selection, moral hazard and opportunistic behavior

As a rational principal, an entrepreneur is aware of the risk of opportunistic behavior by the venture capitalists. When seeking venture capital financing, the startup must describe its product or service carefully in all relevant technical detail to the venture capitalist during the negotiation process. If the startup does not own the property rights of its idea in the form of, e.g., copyrights or patents, the process brings forth a risk of misuse of the confidential information (Berglund & Johansson, 1999). The venture capitalist might be incentivized to exploit the transferred information for alternative purposes. This could mean incorporating a competing growth venture, transferring the information to a portfolio company they have previously invested in, or in a CVC case transferring it to the parent company to start a new line of business (Dushnitsky & Shaver, 2009). The risk should be considered plausible. After all, the venture capitalist can regard a particular idea presented by a startup to be lucrative. However, the management team could be considered unskilled in managing and pursuing the idea of the growth venture further, and the venture capitalist might reject funding merely for such reasons. According to Dushnitsky & Shaver (2009), this risk is especially significant in the case of CVCs as it has both the ability and inclination to copy the idea. As a result, the entrepreneur may be hesitant to negotiate with a CVC and inclined to seek IVC funding only.

Casamatta (2003), uses the term double moral hazard, to describe a problem of moral hazard startups have towards venture capitalists. Casamatta's argument relies on the reckoning that ultimately, the success of a startup relies on both entrepreneurial efforts as well as on support and guidance provided by an investor. Both parties must exert effort

to improve the profitability of the startup. The problem of double moral hazard arises as a startup is unable to reliably observe the level of effort provided by the investor before signing the investment contract.

Exit-oriented entrepreneurs are also aware of the conflict of interest between short-, mid- and long-term orientation of each party. As a result, the investor might not target the most lucrative exit opportunities for the entrepreneur (Dauderstädt, 2013). This argument goes for both IVCs and CVCs as follows. CVCs aim to maximize the share value of the parent corporation, and in some exit options, like an initial public offering, the CVC might fear that their benefit in the startup is not maximized. What results is that an entrepreneur may distrust a CVC because of the fear of controlling the venture to satisfy corporate objectives at the expense of the startup (Block & MacMillan, 1993). A similar logic holds for IVCs as well. The objectives of IVCs emphasize short- and mid-term objectives due to the relatively short investing cycles in venture capital. For example, an IVC focused solely on investing in early-stage growth ventures is looking to maximize its return on investment before exiting at a point where later stage investors join in on the deal. Such priorities can potentially be conflicted with the long-term objectives of an entrepreneur and her startup.

2.3.2 Methods to mitigate demand side information asymmetries

Generally, the methods to alleviate informational problems from the demand side are limited. A rational entrepreneur acknowledges that high growth ventures financed by external capital can be more lucrative than internally funded startups. According to Casamatta (2003), this hypothesis holds, even if the entrepreneur would be able to fund the startup herself initially. After all, it is the venture capitalist that tends to hold more power within the negotiation process and have the last say in decision making.

Obtaining a head start

According to Berglund & Johansson (1999), entrepreneurs can reduce the moral hazard of opportunistic behavior by initially developing the growth venture without venture funding. By establishing a head start for her idea, the entrepreneur can achieve a better bargaining position with the investor, alleviating an investor's incentives to simply reject the funding and steal the idea. Additionally, the approach of obtaining a head start helps the entrepreneur to signal quality, and capability to manage the venture successfully towards the investors. From an entrepreneur's perspective, the combination of these two effects increases the net present value of the startup.

Equity funding

Sahlman (1990), has argued that partly for the very reason of the existence of the double moral hazard problem, venture funding tends to take the form of equity or convertible-equity. Venture capital financing with features of regular debt characteristics would not incentivize the investor to give an optimal level of effort in supporting the startup. As reasonable as the argument may seem, one should remain cautious whether this is true, or if instead, it is merely a by-product of other incentives than the source for the modus operandi.

Refusals & premium pricing

In his research, Hellmann (2002) indicates that CVCs often wound up paying a premium price for growth venture investments. *Ceteris paribus*, an average IVC pays a smaller price for the same investment compared to their CVC counterparts. This can be implied as such that startups insist on a premium price to mitigate the potential conflict of interest with the CVC investor. Based on this view, higher commitment through a premium price is beneficial towards aligning the incentives. In continuation, Dauderstädt (2003) goes even further with his argument on CVCs, by stating that exit-oriented startups often simply refuse to accept venture capital from CVC investors due to conflict of interest. However, empirical evidence on premium pricing is mixed. On the contrary to Hellmann (2002), Heughebaert and Manigart (2012), found no significant difference between CVC and IVC investors.

2.4 Addressing information asymmetries as an agent

Finally, one must turn to consider the case in which either an entrepreneur or investor – as an agent – can alleviate information problems with the principal counterparty. The previous sections have solely focused on methods used by the principal to mitigate adverse selection and moral hazard problems. For inherent reasons, tools to alleviate informational problems as an agent are restricted. A rational principal will invariably question the motive behind the methods undertaken by an informed party with superior knowledge to mitigate these problems. Previous studies, however, point to one crucial method, signaling.

Entrepreneurs want to signal their quality to investors. As previously addressed, the lack of information about the quality of the growth ventures can lead to markets being filled with low-quality projects. This adverse selection problem eventually leads to investors offering prices that better startups are not willing to accept (Amit et al., 1998). That is

precisely why, to signal their quality, startups are willing to share their business plan in all relevant detail to the investors.

To mitigate the problems of double moral hazard, venture capitalists, in turn, signal their quality by sharing and marketing their track record as an investor. It also incentivizes investors to build trust and commitment through long-term systematic activities and behavior. In addition, Dauderstädt (2003), argues that CVCs use two distinct strategies to address the informational problems caused by possible conflicts of interest. Firstly, CVCs underline at least a partial focus on generating financial returns in order to attract better deal flow. Secondly, CVCs typically position and brand themselves as independent organizations with distinct authority from their parent company. Also, according to MacMillan et al. (2012), CVC investors willingly offer not to receive board seats, nor have the rights to select other board members in order to mitigate moral hazard problems.

2.5 Assessment of the research situation - lack of CVC understanding

The previous literature on venture capital financing has demonstrated that the informational problems within the field in forms of adverse selection and moral hazard are severe. To mitigate these problems, both parties have implemented multiple methods and courses of action. However, as it appears, there exists no pertinent understanding of the research problem posed by this study. The previous contributions fail to establish an understanding on two separate fronts. Firstly, even though differences between CVCs and IVCs are well established in the literature, it fails to scrutinize the competitive advantages of each party in all of detail. As Fulghieri & Sevilir (2009) point out, there is a lack of CVC research on the theoretical front. Secondly, even though the literature has conceptually distinguished among four types of CVC investments (Chesbrough, 2002), no attempt has been taken to differentiate between them within the means of adverse selection and moral hazard.

However, the research seems to be moving into this direction. Hellmann (2002), studied the theoretical front of CVCs and IVCs but relied on the assumption that the value-added support services provided by the venture capitalists are similar in the case of CVC and IVC. Maula et al. (2005), disproved this generalization by demonstrating the idea that different investors can offer complementary services, and this should be considered as a fundamental starting point in any future research. However, it was not until Anokhin et al. (2016), who indicated the need to analyze a finer-grained view of the different types of CVCs in empirical studies. Their research argues that significant insights could be revealed by

studying the unique impact each different type of CVC has, rather than empirically studying the aggregated effects of all CVCs, or dividing them only between strategic and financial. More generally, the current academic understanding of the four types of CVC investments is stuck on a conceptual level.

Finally, Amit et al. (1998) note that even though venture capitalists have a competitive advantage in reducing the information asymmetries through screening and monitoring, they prefer to invest in startups in which informational problems are less severe. As a result, the cost of performing these functions are naturally lower. This view arises a fruitful hypothesis worth exploring. It may be that certain type of CVCs have leverage that helps them to be more efficient in alleviating particular type of information problems (through, e.g., lower costs). Arguably such CVCs would due to this competitive advantage have the ability to fund growth ventures that would go underfunded or unfunded without them. Vice versa, another type of CVC is not as efficient in mitigating the same informational problems. Dushnitsky & Shaver (2009) touch upon the latter, by displaying that under weak intellectual property protection, it reduces the likelihood that a startup seeks funding from a CVC when the product or service of the startup is under the same industry as the CVC parent company. Alternatively, as the authors continue, not all CVC investors are similar in the eyes of the growth ventures. Some CVCs are interpreted particularly prone to imitation, while others are construed to have better support potential and possess less or minor information problems.

To understand when each case might hold, one must examine in greater detail the different phases of the growth venturing process. These are studied in the following chapter, included with how IVCs and different type of CVCs differ in their investment style and preferences.

3. UNDERSTANDING THE GROWTH VENTURING PROCESS

This chapter discusses the model of the startup growth process. Growth ventures typically go through certain phases of development, which are analyzed based on previous research. In each stage, startups tend to have – on average⁶ – divergent needs and problems. That is, growth ventures in certain stages tend to have similar gaps in knowledge, gaps in funding, and a similar breadth of information asymmetries. Due to the benefit of specialization venture capitalists typically choose to focus on a specific stage. Whose stage-related needs and problems they are efficient to solve.

3.1 Stages of the growth venture process

Multiple models of the startup development process exist in the academic literature. One of the most frequently used, as proposed by MacMillan et al. (2012) is presented in Table 1. An identical model is also deployed by the US National Venture Capital Association (NVCA). The model consists of four growth phases, and serve the purposes of this thesis by being sufficiently explicit to determine the distinct theoretical background of each phase.

Stage	Definition
Seed/startup stage	The company has a concept or product under development, but is probably not fully operational. Usually, the company has been in existence for less than 18 months.
Early stage	The company’s product or service is in testing or pilot production. In some cases, the product may be commercially available. The company may or may not be generating revenue. Usually, the company has been in business for less than three years.
Expansion stage	The company’s product or service is in production and commercially available. The company demonstrates significant revenue growth, but may or may not be showing a profit. Usually, the company has been in business for more than three years.
Later stage	The company’s product or service is widely available. The company is generating ongoing revenue and is probably cash flow positive. It is more likely to be profitable, but not necessarily.

Table 1: Startup development stages. (Source Macmillan et al., 2012)

⁶ It’s important to note that this generalization rests on strong simplifications. Not all startups in the same growth stage are alike, but on average they tend to be. Thus, this simplification is assumed to represent the real world well enough.

In addition to the growth venture related differences presented in Table 1, the company characteristics between various stages alternate in two pertinent ways of importance for the present study. First, their primary source of funding. Typically, growth companies in the seed and startup stage are funded by friends, family, angel investors, and the founders⁷ (Van Osnabrugge & Robinson, 2000). Venture capitalists do, from time to time, participate in seed and startup rounds but are not the main source of financing within these stages (MacMillan et al., 2012). In turn, the expansion stage and later stage is the primary playground of venture capital financing. Van Osnabrugge & Robinson continue by showing that within the later stage, growth companies also start increasingly receiving funding from more traditional sources such as equity markets and banks.

Second, the extent and depth of informational problems differ from phase to phase. As the growth company matures, uncertainties regarding technical feasibility, commercial feasibility, and management skills decrease (Gompers, 1995; Sapienza & Gupta, 1994). Therefore, it is natural to consider that growth companies in the later stage, start to shift from venture capital funding towards more traditional sources of financing. The information asymmetries between the agent and the principal are increasingly diminishing, and the companies might already have collateral, making them eligible to seek, for example, bank loans.

⁷ To reflect the riskiness of becoming an entrepreneur, there exists a conventional wisdom that the first financiers of a newly founded startup is consisted by the term FFF, friends, family and fools.

3.2 Roles of IVC and CVC in growth venturing

MacMillan et al. (2012), studied the distribution of CVC investments and all venture capital investments in 2006 by the stage of the growth company receiving the funding. Their sample consisted of US based venture capitalists, and the differences are presented in Figure 3.

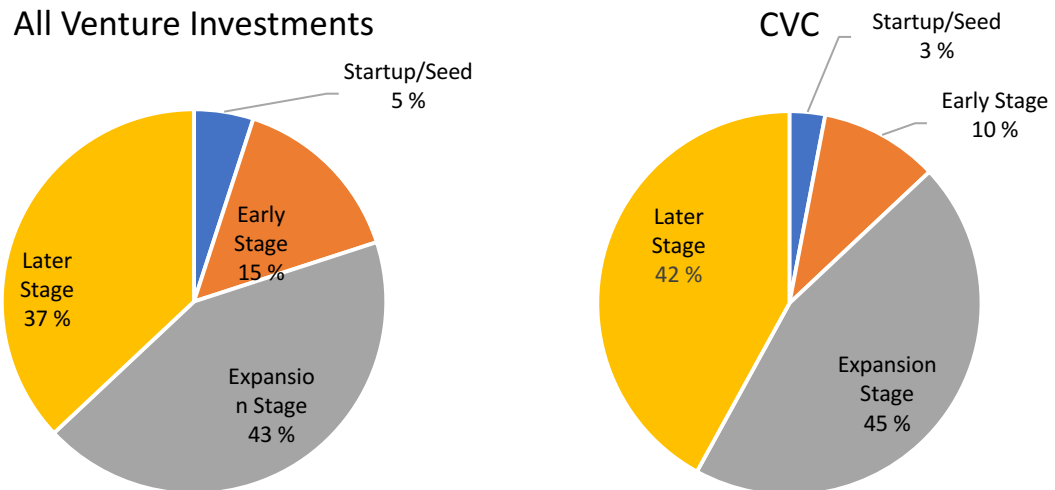


Figure 3: Investment by stage of development (Source: MacMillan et al., 2012)

Compared to IVCs, CVCs tend to invest a bit less in the startup/seed, and early-stage growth ventures while accordingly have a stronger focus on the expansion and later stage. Despite these differences, both groups investment patterns are relatively similar. Underlining the fact that IVCs and CVCs both are generally focused on expansion and later-stage growth ventures. Therefore, it seems unlikely that the underlying, consequential differentiating factors of CVCs over IVCs and vice versa would be based on direct competitive advantage within a certain investment phase. To strengthen their findings, MacMillan et al. present similar results from 1998 (before the dotcom bubble) as well. The two groups have again closely resembling investment distributions. The main difference between the two eras being that in 1998, all venture capitalists made more investments in the first two phases. CVCs (VCs) invested 7% (8%) to startup/seed stage and 23% (26%) to early-stage companies.

Another consideration to the CVC versus IVC discussion is to analyze the value-added services through monitoring and support both groups of investors are capable of offering. Such an approach has been studied by Maula et al. (2005). The authors collected survey data from CEOs and founders of US technology-based growth ventures that have received both IVC and CVC financing. This data was then scrutinized using pair-wise comparison, to test a set of 9 hypotheses regarding the competitive advantage of CVCs over IVCs. The results are presented in Table 2.

Hypothesis	Result
1. IVCs are more valuable in helping portfolio companies obtain additional financing than CVCs	True
2. IVCs are more valuable in helping portfolio companies recruit new employees than CVCs	True
3. CVCs are more valuable in helping portfolio companies attract new business partners than IVCs	Not supported by the data
4. CVCs are more valuable in helping portfolio companies attract new domestic customers than IVCs	True
5. CVCs are more valuable in helping portfolio companies obtain new foreign customers than IVCs	True
6. CVCs are more valuable in providing portfolio companies with information on customer needs and trends than IVCs	True
7. IVCs are more valuable in providing portfolio companies with information on competition than CVCs	Not supported by the data
8. CVCs are more valuable in providing portfolio companies with information on new technologies than IVCs	True
9. IVCs are more valuable in helping portfolio companies organize for early growth than CVCs	True

Table 2: Value-added investor comparison (Source: Maula et al., 2005)

Based on their findings, Maula et al. argue that the value-added contributions of CVCs and IVCs are complementary. IVCs are better capable of helping to raise additional financing, recruit employees, and advise on developing the organizational resources of the growth venture. CVCs, in turn, are better capable of helping to build commercial credibility and capacity, provide technological support and attract customers for the growth venture. The findings of Maula et al. (2005) support the stage-related differences between CVCs and IVCs presented earlier by MacMillan et al. (2012), by stating that IVCs support tends to be more valuable for growth ventures in early growth. The authors conclude by stating that it is in the interest of both venture capitalists and growth companies that both sources of venture capital, IVC, and CVC, are available due to their unique supporting capabilities.

Asymmetric information theory pointed out that for a growth venture, the fear of imitation can be stronger towards CVCs than IVCs. Dushnitsky & Shaver (2009) analyze this hypothesis through a sample of 1646 US growth ventures that received venture financing between 1990 and 1999. The authors distinguish their sample to two groups, those with weak intellectual property protection (IPP) and others with strong IPP. Using a logit model, they estimate the probability that a CVC investor and a growth venture form an investment relationship. The authors present two-fold findings. Under weak IPP, an investment

relationship between CVC and a growth venture is less likely to form when the growth company is operating within the same industry as the corporate parent. Moreover, under strong IPP regime, an investment relationship is more likely to form when the growth company is operating within the same industry as the corporate parent. Altogether, the findings by Dushnitsky & Shaver are consistent with the view that growth ventures are more concerned about the threat of imitation by CVC investors than IVC. Especially in the case of weak IPP and industry relatedness. As such, the paper provides an in-depth understanding of how the potential investment opportunities can be scarcer for CVCs compared to IVCs. The paper by Dushnitsky & Shaver (2009), should, however, be critically reviewed for its methodologies. Their distinction between weak and strong intellectual properties relies solely on interindustry variation. Thus, it diversifies some industries such as pharmaceuticals as strong IPP industries, while other industries such as computer equipment as weak IPP industries. A major concern of such methodology is that the harsh distinction of strong and weak IPP regimes between industries makes it prone to omitted variable bias.

Altogether, the above-presented studies shed light on the fundamental differences between CVCs and IVCs as well as their competitive advantage over one another. Although IVCs and CVCs tend to both focus on investments in expansion and later-stage growth ventures, they are rather complements than substitutes. In fact, growth ventures that receive both IVC and CVC financing have higher valuations at their IPOs compared to growth ventures that have solely received IVC or CVC financing (Maula & Murray, 2002). In addition, while CVCs have multiple advantages on the type of support they can provide to the startups, their pool of potential investment targets is strictly more limited compared to IVCs. This is what Dushnitsky & Shaver (2009) refer to as the ‘paradox of corporate venture capital.’ Some of the growth ventures that would benefit most from a CVC investor, never seek for CVC funding due to the fear of imitation. Thus, the CVCs and growth companies are left to balance with the pros and cons of the specific type of venture funding. Which could, to a large degree explain why syndication of investments is highly regular between IVCs and CVCs. Not only can it mitigate the informational problems toward growth ventures, but it is also beneficial for all parties due to the complementary advantages. For CVCs, syndication can help to generate deal flow they would not be able to receive on their own. High-quality deal flow is continuously referenced as a vital element for successful venture capitalists (Dauderstädt, 2013). According to Hochberg et al. (2007), better-networked investors show higher performance within both exits and follow-up financing rounds.

3.3 Four modes of CVC

The studies addressed above have solely focused on the aggregated effect of all CVC programs. Even though many scholars have frequently referenced the four modes of CVC by Chesbrough (2002), empirical studies based on the four models are lacking. For example, consider the study by Dushnitsky & Shaver (2009), in which the authors find that it is more challenging for a CVC to invest in a growth venture, the closer it is operating to the industry of the CVC parent. However, the product or service of the growth venture can be distinguished as a complement or a substitute with regards to the corporate parent despite the industry relatedness. Other things equal, it seems likely that the fear of imitation is more significant if the product or service is a substitute than if it is a complement ⁸.

A recent paper by Anokhin et al. (2016) utilizes Chesbrough's model to study the strategic effects of the four different type of CVC investments. The authors gathered a dataset of deals done by 163 corporations during four-year period to identify the strategic effects of emerging, driving, enabling and passive investments in terms of scale efficiency yields and the ability to benefit from innovative opportunities. With no access to first-hand information, for example, from the fund managers, the authors rely on multiple methods to divide the investments into the four categories and to measure their strategic effects. The main findings presented are that driving and enabling investments are explicitly beneficial, while emerging and passive seem not. Intriguingly, the authors suggest that emerging and passive have, in fact, detrimental strategic effects ⁹. However, the authors make no effort to rationalize this. In continuation, Anokhin et al., find that most CVCs distribute their investments unevenly between the four types. Most of the investments are passive (50%), some emerging (20%) and driving (16%) while only a small portion are enabling (5%). If driving and enabling investments are beneficial while emerging and passive are not, a question arises why 70% of CVC investments fall within the non-beneficial categories. More broadly, the findings proposed by Anokhin et al. (2016) may reflect one or more of the following.

Firstly, it is possible that the empirical findings by Anokhin et al. are simply unreliable. Given the required high amount of simplifications to categorize the investments

⁸ Even though this is an important notation from the standpoint of information economics, it doesn't invalidate the findings of Dushnitsky & Shaver (2009) by any means. Their CVC results simply point that on aggregate level this argument is consistent with the data.

⁹ For an in-depth description, see the section 6 of the authors' original paper '*Measuring driving, enabling, emerging and passive investments*'.

between driving, enabling, emergent, and passive, severe risks of biased results arise. Moreover, instead of obtaining first-hand data, the authors rely on information captured from an external database, managed by a third-party. Overall, such problems within the data could explain the high proportion of passive investments. After all, CVCs should, in general, avoid passive investments that fail to produce any sought-after strategic benefits for the parent corporation. As Chesbrough (2002) puts it, passive investing in growth ventures by incumbent corporations solely focused on seeking financial gains could arguably be considered even as a misuse of the parent company's shareholders' funds.

Secondly, the results may represent a more thorough shortcoming of CVCs in general. The corporate investors may plainly fail to make strategic investments. That is CVCs fund growth ventures they, at the time of the investment decision, consider as strategic, but which instead later turn out as passive investments. Failing to make strategic investments could arguably help to understand and explain the cyclical nature of CVCs. However, proposing such arguments is farfetched, and more fundamentally, studying the true nature of the situation is outside the scope of this study.

Lastly, it is worthwhile to consider whether driving and enabling CVC investments allows the fund managers to receive more and better-quality deal flow. If that were the case, it could depict a more in-depth indication of the comparative advantages of CVCs when making driving and enabling investments. For example, it could be that the informational problems are less severe, and or the corporates have better capabilities to support the growth ventures within these investments. Unfortunately, Anokhin et al. focus solely on strategic benefits for the parent corporation and do not address the financial success of the investee companies, making it difficult to examine such possibilities in detail.

Drawing upon the previous papers discussed above, it seems articulate to state that CVCs and IVCs play complementary roles in growth venture financing. This view is also strongly supported by the amount of syndication between the two parties within growth venture investments. And while it is acknowledged that the previous research from the field has occasionally hypothesized over the comparative advantages of CVC and IVC investors, the discussion is non-sufficient and somewhat tattered. Also, to be able to craft a rigorous model on the comparative advantages of IVC and different modes of CVC, one additional element needed has yet been left out of consideration. The element deals with the internal structures of both IVC and CVC. These are discussed in the following chapter.

4. ECONOMICS OF DIFFERENT TYPE OF VENTURE CAPITAL FUNDS

Most of the previous research on the economics of venture capital has focused on the relationship between the venture capitalist and the growth venture. However, it is essential to study the internal structures of CVCs and IVCs in order to develop a more holistic view of the differences between CVCs and IVCs. As noted in the first chapter, there are two main structural differences between IVCs and CVCs. First, while an IVC typically has multiple LPs, a CVC only has one. Second, an IVC has only financial objectives, while CVCs target strategic objectives as well. In line with the hypothesis of the present study, these features of the different type of venture capital funds may affect the decisions made by the fund managers. The argument goes as follows. Divergence in the organizational structures influences what kind of internal informational problems exist and the degree to which they arise. Consequently, these informational asymmetries affect the type of investments different venture capitalists are efficiently able to make. This happens through altering incentives, restrictions, and conventions.

4.1 IVC fund structure

4.1.1 Fund structure and formation

Majority of venture capital funds are structured as limited liability companies. Other legal structures exist, but typically solely as a response to deviant laws within some countries (Seppä, 2000). As managers of the fund, the venture capitalists oversee the setup process and are responsible for finding and attracting external investors to commit capital for the fund. It follows that the external investors act as limited partners and the fund managers as general partners of the newly formed fund vehicle. After a pre-defined, limited life, the company is liquidated, and the funds are redeployed between the external investors and the fund managers.

The external investors who inject capital in the fund are most commonly institutional investors such as pension funds, insurance companies, and government agencies (Poser, 2003). Additionally, a smaller portion of the funding comes from banks, family offices, wealthy individuals, and corporates (Barry, 1994). The general partners invest in the fund as well, but typically no more than 1% of the total fund value. Raising a venture capital

fund is rather slow. One venture capital fund has multiple investors, and all investments are separately agreed on. Additional work includes designing the fund, marketing to external investors, and negotiation of the terms. Typically, the whole process takes one to one-and-a-half years (Poser 2003).

Venture capital fund sizes tend to be relatively large. In 1988, the average size of a venture capital fund was a bit over \$47 million in the US (Sahlman, 1990). And the size has been increasing. Franklin et al. (2018), find that an average VC fund size was nearly \$136 million in 2017¹⁰. Several different arguments have been presented to justify the relatively large fund sizes. Firstly, as argued by Barry (1994), the regulatory framework requires every external investor (LP) only to have a minor share of the total fund. And since investors such as insurance companies manage vast amounts of money, they are not interested in making small investments. Due to the inefficiency of smaller investments, more substantially sized VC funds result. Secondly, the negotiation and contract costs within high growth venture investing are high, making it inefficient to set up small funds. Lastly, it may be argued that small fund size increases the risk for the external investor through volatility. Relatively small funds are incapable of diversifying their investments sufficiently enough. As described in Chapter 1, for a single VC fund, it is typically a small portion of the portfolio investments that end up generating the clear majority of the total returns on investment.

4.1.2 Investment process

The investment process of an independent venture capitalist can, in principle, be divided into three phases: ex-ante (as discussed above), pre-investment, and post-investment. Overview of an IVC investment process cycle is given in Figure 4 by Dauderstädt (2013).

Ex-ante	Pre-Investment				Post-Investment	
Fundraising	Deal Sourcing	Screening	Due Diligence	Decision Making	Monitoring	Exit

Figure 4: IVC Investment Process (Dauderstädt, 2013)

¹⁰ It has been argued that the average fund size has been increasing due to the fact that venture capitalists have ‘widened the funding gap’. In example, e.g. IPOs tend to take place later than ever, denoting that the median fund size has not increased as dramatically as an average fund size. Arguably the root cause for the large increase in average size has been caused by the new breed of so-called mega funds that have postponed the stage of IPOs.

Most of the steps in pre-investment and post-investment phases have been touched upon within the previous chapters. As explained by Dauderstädt, these steps typically consist of the following processes. Deal sourcing contains the search for deal flow and business plans of growth ventures. Screening focuses on a brief evaluation of the business plan, including product and market understanding as well as revenue and profitability expectations. Due diligence is a step of a thorough analysis of the team and business model followed by an audit like financial analysis. In decision making, the fund managers create an investment proposal that importantly contains the valuation and contract design. In successful cases, decision making leads to funding of the growth venture. The post-investment phase consists of monitoring and venture support and is finally followed by exit or divestment. The external investors are only active within the ex-ante fundraising, while fund managers typically actively report on the other activities as well, especially within decision making and exit phases.

4.1.3 Informational problems

Bearing responsibility for investing large pools of capital, accumulated from multiple external investors arises severe agency problems. Such is particularly true as the LPs are legally prevented from taking an active involvement within the investments of the fund, due to the limited liability structure (Hill et al., 2009). The posed informational asymmetries include both hidden information and hidden action. The case of hidden information is similar to the one between a startup and an investor. If the quality of the fund manager is not observable, external investors are not able to distinguish between competent and non-competent venture capitalists. This gives rise to potential adverse selection, and as a result, the external investors may end up offering prices only non-competent fund managers are willing to accept. A rational external investor acknowledges this and decides not to invest at all, causing market failure.

After the establishment of the venture capital fund, there is a risk of hidden action caused by the potential conflict of interest between fund managers and external investors. These can take the form of mismanagement of the fund and shirking. In accordance to the rationality presumption, the fund manager might be inclined to shirk, if her incentives are not aligned with those of external investors. Similarly, mismanagement of the fund might result due to the limited liability position of the fund manager. The fund manager, who carries no downside risk, but has a substantial potential gain, might be willing to take excessive risks which leads to moral hazard problems. The track record of a fund

manager serves as one mean to alleviate both hidden information and hidden action problems. However, as a source of information, it is limited.

Contract design is of key importance to alleviate the above described informational problems. Sahlman (1990) argues that most features in a venture capital fund contract between fund managers and external investors are in place, to both align the incentives of the two parties as well as to mitigate the agency problems. Sahlman refers to four key provisions established to protect external investors. First is the limited lifetime of the fund, typically ten years after which the company is liquidated. Commonly provisions to extend the lifetime are included, but they require consent by the limited partners. The limited lifetime aims to balance between safeguarding the external investors' positions and giving the fund managers adequate flexibility over the investment opportunities.

Second, the so-called takedown schedule states that external investors are initially required to invest only a minor proportion of their full commitment, typically anything between 25-33%. While the fund managers have high control over the timing of subsequent capital infusions to the fund, the limited partners reserve the right to refuse on investing beyond the initial capital injection. This structure helps to align the incentives of both parties. For example, if the limited partners suspect mismanagement by the general partners, they can refuse to inject more capital, at least until the issue has been resolved. To protect the fund managers, a described type of renegeing of the fund commitment tends to impose severe penalties over the external investors. Thus, external investors are incentivized to avoid exercising their right unless they suspect severe misconduct of the fund.

Third, fund managers standardly have a two-folded compensation scheme. They receive a yearly 2-3% fixed management fee, as a proportion of the entire fund, as well as 20% of the realized investment gains (so-called carried interest) of the fund (Gompers & Lerner, 1999; Lerner, 1994). This is an attempt to create a balance between two extremes. Fixed management fee gives the fund managers protection from market volatility, while the carried interest helps to align the incentives to resemble those of external investors. Also, as Sahlman (1990), points out, the carried interest typically generates at least half of the fund manager's total compensation¹¹. From the agency theory perspective, the two-fold compensation scheme not only mitigates moral hazard problems but decreases the adverse

¹¹ Though, Sahlman (1990) also notes that this proportion varies vastly. For example, to the most successful venture capitalists carried interest will generate a much larger share of their income.

selection through a sorting effect as well. The compensation scheme discourages non-skillful venture capitalists to set up venture capital funds with external investors on board.

Fourth, external investors tend to use monitoring to mitigate agency problems, similarly as the venture capitalist monitor the growth ventures in their portfolio. According to Sahlman (1990), these monitoring tools typically consists of different reporting and accounting policies. For example, after the fund vehicle is liquidated, an audit follows to detect possible mismanagement. Typically, the fund managers contractually agree to allocate a certain amount of their time to the fund management, however challenging to monitor. For this purpose, the fund managers are required to regularly provide reports on the progression of the investee companies and their investment decisions. Together these monitoring tools present the external investors with a better capability to pursue, e.g., litigation in case blatant mismanagement of the fund is suspected. As a result, monitoring mitigates the problems of both adverse selection and moral hazard.

Despite the above-described contract design restrictions, the IVC fund managers tend to have considerable discretion when it comes to managing the pool of funds. This is expected given that the fund managers should be the ones with necessary skills to make the investments, support the investee growth ventures and to monitor them. Moreover, recalling the fact that the external investors are for the most part institutions that manage funds multiple times larger than an average VC fund, they are inclined to take a relatively passive role for efficiency reasons. As Sahlman (1990) finds, the LPs investment in a single IVC fund typically represents a maximum of 1% of their total pool of capital. Hence, IVC fund investments are not regarded as a top priority by institutional investors. Arguably this could also partly explain why we witness negligible diversification within the IVC fund contract design. The external investors may prefer to opt for already proven contract designs merely for efficiency reasons. Meaning that they do not have to spend valuable time in order to quantify risk exposure within more novel models.

4.2 CVC fund structure

Unlike IVC funds that have a tendency to be more or less identical copies of each other structure-wise, CVC funds can and do to take many altering forms. The three typical CVC forms are third party funds, dedicated funds, and self-managed funds (Maula, 2001)¹².

¹² As stated in Chapter 1, third party funds have been excluded from the scope of this study.

4.2.1 Fund structure and formation

Dedicated CVC funds closely resemble traditional IVC funds. The corporate parent acts as an LP that commits a certain amount of capital for the fund. The capital is allocated for a pre-defined period, after which the fund vehicle can be liquidated (Keil, 2004). In turn, self-managed funds, as defined by MacMillan et al. (2012), are discretionary or evergreen funds. Investments are made when opportunities arise, and thus, no capital is committed beforehand. In continuation, the evergreen funds neither have a strict predefined lifecycle, unless otherwise decided upon during the setup process. In both investment models, CVCs are typically positioned as relatively independent organizations within the corporate (MacMillan et al., 2012). Moreover, fund managers similar to those of IVC have the primary responsibility for deal negotiation and decision making¹³.

Even though CVC funds have no ex-ante fundraising period, the setup process might not be any less light or timewise shorter compared to their IVC counterparts. Instead of fundraising, the ex-ante period is used to define the investment philosophy, related goals, and objectives. As argued by Dauderstädt (2013), to be able to achieve the sought after strategic benefits, careful planning of, e.g., inter-organizational linkages are crucial. Otherwise, the ability to capitalize on knowledge transfer and synergy exploitation might be lacking. Poser (2003), describes a five-stage CVC setup process that many of the researchers have followed: set strategy and objectives (which CVC benefits are targeted), define investment approach (fund size, terms and investment focus), determine organizational linkages (organization support in CVC activities), staff and compensation (required skill profile and compensation scheme) and set up monitoring (process to determine how to measure success).

Typically, the CVC fund managers are externally hired venture capital professionals, and only rarely are they employed from within the parent corporation. Moreover, as Dushnitsky & Shapira (2010), state the fund managers tend to move between the two investor types interchangeably during their careers. However, the job descriptions of fund managers are not directly comparable between the investor types. Compared to their IVC counterparts, the CVC fund managers typically do not invest their own money in the fund. More notably, there is a vast divergence within the compensation scheme of CVC fund managers. The earlier research found a fixed salary as the most common compensation

¹³ Generally evergreen funds use the term investment manager instead of fund manager to convey the job description more descriptively.

among CVC funds (Block & Ornati, 1987; McNally, 2002). While recently, the industry has seen growing heterogeneity in compensation schemes (Birkinshaw et al., 2002; Hill et al., 2009). The compensation schemes vary from IVC like carried interest rates to annual performance bonuses tied to financial and strategic objectives and metrics. Arguably the more recent change toward incentive-based compensation can partly be explained by the fund manager turnover. As Rauser (2002), explains, if a highly skilled investment manager is not compensated for high performance (e.g., return on investment, and strategic objectives), she may choose to transfer over to the traditional independent venture capital in search of better compensation. Thus, the mobility of fund managers can make it hard to retain and persist skilled fund managers within CVC's if they lack performance-based compensation.

Research and data on the average fund size of CVCs is scarce. This could be explained by the fact that for discretionary funds, investments come directly off the parent corporations balance sheet. According to MacMillan et al. (2012), of all CVC funds, the share of these evergreen funds is around 60%. Since the corporate parent is acting as the sole owner of the fund, disclosing information regarding total funds committed, earmarked, or available for investments is not required. Conventionally, corporations may choose not to share this information unless they do it for brand and marketing purposes. A similar argument holds for dedicated CVC funds as well. According to a survey by EY (2008), the majority of CVC funds fall within the range of 50 to 259 million USD.

4.2.2 Investment process

As with IVCs, the CVC investment process can be divided into three phases. Overview of the investment process is given in Figure 5, adopted from Dauderstädt (2013).

Ex-ante	Pre-Investment					Post-Investment	
Philosophy, Strategy	Deal Sourcing	Screening	Strategic DD	Financial DD	Decision Making	Monitoring	Exit

Figure 5: CVC Investment process (Dauderstädt, 2013)

Aside from the previously mentioned differences in the ex-ante phase, considerable differences exist also within the pre-investment and post-investment phases. In the former, two factors should be taken into consideration. First, on top IVC like solicited and

unsolicited investment opportunities, deal sourcing can emerge directly through the corporate business units. Secondly, CVC due diligence is divided into strategic and financial. Strategic due diligence refers to examining the strategic fit of the growth venture to the strategic objectives of the CVC. While IVC fund managers tend to execute the due diligence themselves or with the help of external consultants (Fried & Hisrich, 1994), CVCs tap on the corresponding BU personnel for expert assessment (Souitaris & Zerbinati, 2014). The profound interaction between fund managers and business units during both deal sourcing and due diligence underlines the importance of the link between CVC and the parent. The same pattern can be found in the post-investment phases as well. Dauderstädt (2013) argues that CVC's venture support in the monitoring phase tends to be more intense compared to their IVC counterparts, reaching far beyond management support, from R&D to distribution and marketing. Thus, multiple agents within the corporate tend to have an active role supporting the investee growth ventures after the initial investment decision, while gross of this interaction happens through the fund managers.

Finally, when it comes to CVC exiting the investment, there is an additional alternative, a corporate acquisition. The corporate acquisition would be comparable to a trade sale in an IVC case, but instead of an external agent, the CVC parent undertakes M&A activity itself¹⁴. While an average holding period of a CVC investment is similar to IVC, the chance for an extended holding period is considerably higher with CVCs (Dauderstädt, 2013). This can be due to the single limited partner relationship, securing CVCs with a lighter process to continue the investment if it is seen as strategically valuable.

4.2.3 Informational problems

CVC fund managers are responsible for a heterogeneous group of operatives with whom they continue a tightly-knitted interaction throughout the whole investment process. Such environment arises the likelihood of severe agency problems (Hill et al., 2009). Informational asymmetries can occur between the CVC and the corporate parent (management team) and between the CVC and the BUs that contribute to screening, due diligence, and venture support. Agency problems between fund managers and corporate parent are mainly equivalent to the IVC case presented earlier. For example, difficulty in observing the quality of the fund manager may lead to hidden information and adverse

¹⁴ However, Souitaris & Zerbinati (2014), have argued that CVCs don't typically consider acquisition by the parent company as a viable alternative. Their claim is that such activities can cause adverse reputational effects in regards of future investment opportunities.

selection problems. Again, the previous track record of the fund manager serves as a signaling method but is not fully sufficient. The moral hazard problem between the fund manager and CVC parent is two-fold. Firstly, the risk of shirking and mismanagement of the fund is highlighted through weaker incentives in terms of pay performance. If the fund manager is compensated merely with a fixed salary, she might be inclined to make less risky investments than would be strategically optimal for the CVC parent. Arguably this can lead to increased risk of mere window dressing activity. Overall, the CVC fund manager has stronger incentives to shirk, due to this incentive misalignment. Dushnitsky & Shapira (2010), have argued that lack of pay-performance could partly explain why CVCs tend to target growth ventures in later stages. Recalling that as the venture matures, the information asymmetries decrease, making them less risky investment targets. Secondly, if CVC fund managers receive similar, substantial, performance-based compensation as their IVC counterparts, the risk of moral hazard does not vanish. Instead, strong pay performance increases the risk of fund managers promoting their personal financial interests instead of the objectives, especially strategic ones, of the corporate parent. In turn, this behavior may reduce the attention over the strategic value of the investments, leading to suboptimal investments for the corporate (Hill et al., 2009).

Hidden action problems are also plausible between the BUs and the CVC fund. First, the BUs might offer suboptimal levels of assistance within screening, due diligence, and venture support due to lack of incentives. According to Dauderstädt (2013), such behavior is likely to appear due to a restricted possibility to monitor the relationship between the BUs and the portfolio company. Second, the incentives of a business unit might be protective and detrimental towards the growth venture. The BUs can be eager to protect their original business and technologies, causing them not to act in the optimal long-term interest of CVC parent. Such behavior is often referred to as not-invented-here syndrome leading suboptimal support towards the CVC activities (Poser, 2003).

Generally, CVCs utilize the same methods as IVCs to alleviate agency problems between CVC and the corporate parent. However, over and above the previously described IVC mediums, CVCs have introduced some new procedures as well. One peculiar case is the pay performance. The compensation scheme of CVC fund managers is a double-edged sword. As explained previously, both too weak and excessively strong pay performance models can lead to agency problems. This can arguably explain why many CVCs are beginning to lean towards a midway tradeoff model, where fund managers' compensation is tied to annual performance bonuses. These performance bonuses, in turn,

are linked to financial and strategic objectives and metrics, balancing between the two. The complexity of pay-performance in CVC is not limited to the agency problems between fund managers and the corporate parent. Since business units play an essential role to determine the success of portfolio companies, internal conflicts may arise due to fairness issues. As Chesbrough (2000), has argued, the fairness issues are acutely severe in cases where successful fund managers have received high compensation, while the high return on investment has not been distributed or reflected through the BUs compensation. Were such a situation to arise, it causes employee resentment. Overall, the difficulty to find an optimum to minimize the sum of agency problems might explain the variability of CVC fund manager compensation found in previous research. Moreover, Barry (2001), has stated that both the corporate inability to agree on performance metrics and the threat of fairness issues have been the root causes for lack of stronger pay performance in CVC units.

The previous research on how CVCs deal with the hidden action problems with BUs is scarce. To make matters more complicated, it is vital to keep in mind that the primary job of the BU personnel is not to support CVC portfolio growth ventures, but to advance the regular business of the corporate parent through other means. Dauderstädt (2013), argues that the primary tool to mitigate the not-invented-here syndrome is an active involvement of the BUs throughout the full investment process.

4.3 Comparison of IVC and CVC

It is now worthwhile to compare the overall investment environment of CVCs and IVCs. The most remarkable difference between the two investor types results from the corporate parent being the sole investor with strategical objectives. To fulfill the financial and strategical objectives, CVC fund managers interact closely with a heterogeneous group of corporate agents, with whom they have a distinct and diversified set of informational asymmetries that set them apart from IVCs. The summary of these differences is presented in Figure 6. Whereas IVC faces a double agency problem with external investors and potential portfolio companies, CVCs confront additional agency problems with business units of the corporate.

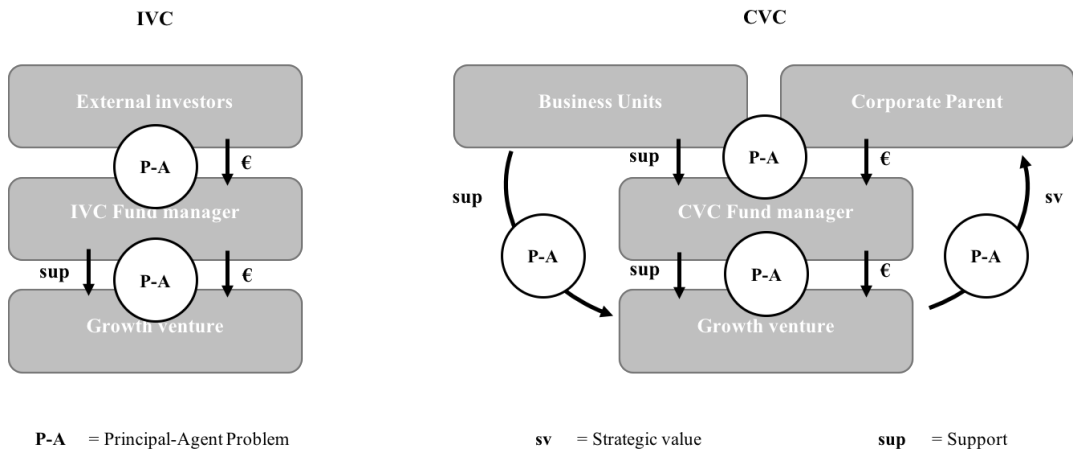


Figure 6: Principal-Agent problems in CVCs and IVCs

Recalling the fact that the external investors of IVC face incentive problems in terms of fund manager monitoring due to low representative share of the external investors' total assets in a single venture capital fund. It is now necessary to note that for a CVC, the circumstance is likely different. Corporate parent, acting as a sole limited partner with strategic goals, has a more significant inducement to place effort to monitor the fund managers. Considering CVCs investment environment as a whole, one sees a mission to seek an optimal balance between agency problems and the counterfactual potential comparative advantages that stem from the same origin. One example of such a case is presented by Dushnitsky & Shapira (2009). The authors use the phrase paradox of corporate venture capital to describe the fact that often the growth ventures that would due to the close industry proximity most benefit from a particular CVC funding, are unwilling to do so because of the risk of imitation. However, based on the previous literature addressed within this thesis, this is not merely the only such paradox CVCs face. In summary, four of such potential paradoxes are presented in Figure 7.

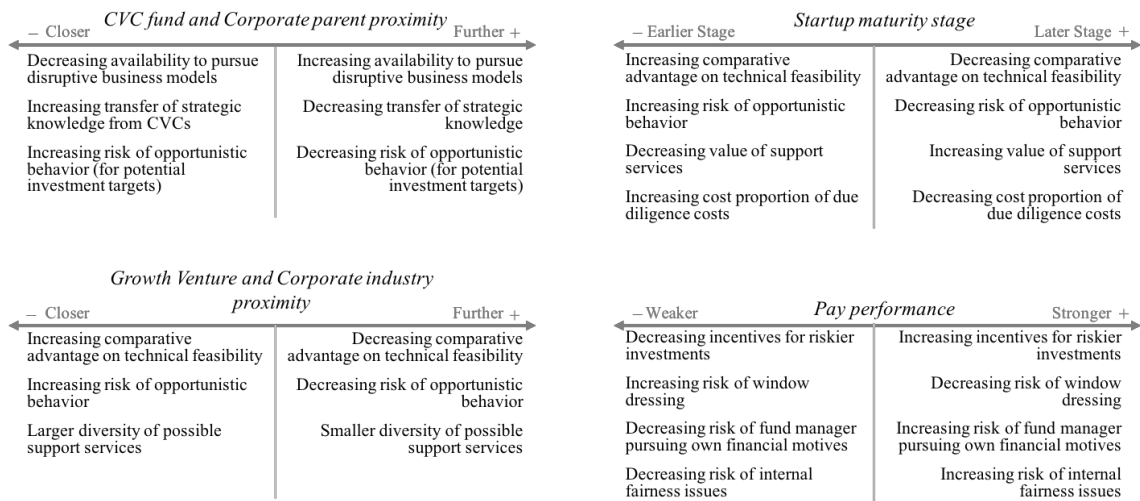


Figure 7: Four paradoxes of CVC

5. OPTIMAL SCREENING & MONITORING STRATEGIES FOR CVCS AND IVCS

Previous research has demonstrated how the competitive advantage of venture capitalists relies on their relative efficiency in mitigating asymmetric information problems by selecting, supporting, and monitoring growth ventures (Amit et al., 1998). The focus of this chapter is to address these aspects from a theoretical viewpoint. As Dauderstädt (2013) notes, optimal screening and monitoring strategies are often regarded as a white space for development, even for the best of venture capitalists.

5.1 Theoretical model of efficient screening

The first section will introduce the model by Amit et al. (1998), on how venture capitalists efficiently screen the investment targets. The model is relatively straightforward but serves as a basis for a more comprehensive examination of the present study's topic and findings.

An entrepreneur has a potential project or business idea and seeks for some potential investors. If an investor decides to commit capital for the growth venture, she will transfer the initial investment, I , to the entrepreneur. To keep the framework simple, assume the initial input I required, is fixed. The net operating revenue is denoted by R , and calculated as expected cash flow minus operating costs (e.g., production costs). Net operating revenue is expected to depend on effort, e , underlying project quality, q and a random variable, u , with an expected value of 0. The net cash flow from the project is then denoted by function

$$R(e, q) + u$$

Assuming the entrepreneurs and investors are risk-neutral agents that maximize expected value, the random variable, u , can be ignored¹⁵. This simple model gives an opportunity to understand the agency problems between a growth venture and the investor. If effort cannot be observed, the risk of hidden action exists, giving rise to moral hazard problems. Likewise, if quality cannot be observed by the investor but is known to the entrepreneur, the risk of hidden information exists, giving rise to adverse selection problems. Finally, assume that R is increasing in e and q , and that there is a decreasing marginal return on effort. This can be formally written through partial derivatives as

¹⁵ The random variable, u , presents exogenous uncertainty to the model. As Amit et al. (1998) note, it nevertheless plays an important role. Because of u , an investor who knows project quality is not able to infer effort directly from the realized cash flow.

$$R_e > 0, \quad R_{ee} < 0$$

Denoting the share of proceeds for the venture investor by α , the expected return on investment, V , for the venture capitalist is thus

$$V = \alpha R(e, q) - I$$

In turn, the expected return to the growth venture denoted by π is the share of the proceeds minus costs of the effort

$$\pi = (1 - \alpha)R(e, q) - e$$

For simplicity, within the discussion of adverse selection problem, assume that the problem of moral hazard does not exist. Thus, effort, e , can be ignored, and it is possible to solely focus on project quality, q , unobservable to the investor. Assume also that the return on investment for the investor depends only on the project quality. If $f(q)$ denotes the probability density function for project quality, we can now formally write the expected return to the investor as

$$EV = \int_q [\alpha R(q) - I] f(q) dq$$

If an average project is not worth funding, we have that $EV < 0$. Supposing that there exists severe information problems leading to adverse selection, this can very well be the case. Under these circumstances, if the investor is unable to screen the projects efficiently, no deals are made, despite the possibility that a certain percentage of the potential projects would turn out lucrative. The investor is willing to offer funding (or demand a share of the company) computed so that her investment would be profitable with average quality level. Consequently, entrepreneurs with lucrative projects will likely refuse to accept such offers due to underpricing. What follows is that the pool of projects available to the investors becomes even worse. As the investor realizes this, the market breaks down since the owners of profitable projects will choose not to attend the market.

If the investor has the ability to screen prolific projects from unworthy projects, the above described adverse selection problem can be at least partly avoided. Suppose the investor does this by acquiring information about the project through screening and due diligence, d , before making the investment. It follows that the investor will be seeking to invest in projects that exceed a certain threshold of quality, q^0 , defined as

$$\begin{aligned} V = \alpha R(e, q) - I &= 0 && \text{for } q = q^0 \\ V > 0 &&& \text{for } q > q^0 \\ V < 0 &&& \text{for } q < q^0 \end{aligned}$$

The investor is naturally only interested in projects above the threshold, $q \geq q^0$. Now the investor incurs an up-front cost of d , to become aware of the project quality. Assume, however, that she will only become informed with probability $p(d)$. With probability $p(d)$ she will be able to disclosure whether to invest or not. With probability $1 - p(d)$ the investor remains uninformed and will choose not to invest. The $p(d)$ detection function has the following properties. Putting more effort into due diligence raises the probability of finding out the true quality of the project. However, this effort has decreasing returns to scale as there is less new information available. Formally written as

$$\begin{aligned} p_{d=0} &= 0, & p_{d \rightarrow \infty} &\rightarrow 1 \\ p'(d) &> 0, & p''(d) &< 0 \end{aligned}$$

Now if we normalize the cost of carrying on due diligence as d , the expected return to the investor is

$$EV = p(d) \int_{q>q^0} (\alpha R(q) - I) f(q) dq - d$$

It follows that while putting more effort into screening increases the expected value of the investment, it simultaneously increases the direct cost of d , and thus decreases the expected value of the potential investment. Investors that have a comparative advantage at screening projects are more likely to engage in due diligence and ultimately make more investments, as lower values of d generate adequate levels of $p(d)$ for them.

This formula helps to formalize the competitive advantage of CVC under certain conditions. Recall the notion by Souitaris & Zerbinati (2014), that CVCs can often be more efficient in screening, especially in the case of sophisticated, novel technologies. While IVCs frequently rely on external consultants for due diligence support (Fried & Hisrich, 1994), and it is reasonable to believe that their services are relatively expensive, a CVC can rely on internal corporate experts¹⁶. However, it must be taken into consideration that for a CVC, the due diligence phase is two-fold. It consists of both strategic and financial dd. Denote strategic due diligence as d_s , and financial as d_f . The CVC is now more efficient in detecting potential investment opportunities if we have that

$$d_s + d_f < d(IVC)$$

¹⁶ Naturally dd support provided by the business units is not actually 'free' for the corporate, mainly because of the opportunity cost. However, it seems reasonable to assume that this opportunity cost is lower than the cost of hiring external consultants. However, any attempt to calculate such, actual costs, is beneath the scope of this study.

Arguably, this is more likely the case if the project includes comprehension of difficult technical feasibility, that becomes easier to observe with increasing expertise. And if subject-specific knowledge of corporate BUs increases the closer the potential investment target operates to the corporate parent's industry or operational capabilities, the smaller the cost of screening for the CVC¹⁷. This would underline the potential advantages of driving and emergent CVC investments. Additionally, it is possible that some CVC modes may have a relatively low cost of strategic due diligence, d_s .

The analysis so far has not considered how the stage of a growth venture and the size of investment can affect the optimality and efficiency of screening. The model by Amit et al. (1998) represents the cost of due diligence as a sunk cost committed before the final investment decision. While the total size of this cost depends on multiple things, such as technology and nature of the industry, it is reasonable to assume the cost is not one-to-one correlated with the proportion of the capital injection¹⁸. As a result, if the due diligence costs for a particular investor are high, she may prefer, on average, to invest in growth ventures that look for larger investments. Unless, if smaller projects offer proportionally higher expected return on investment. Thus, for example, a CVC with relatively high screening costs would be expected to prefer larger investment opportunities.

The investment size is usually related to the stage of development. Typically, the later the stage, the larger the investment. There exists another mechanism that affects the optimal screening through the stage of development. As noted in Chapter 3, the information asymmetries tend to be more extensive at the beginning of the company's existence. As the growth company matures uncertainties regarding technical viability, commercial feasibility, and management skills decrease. Or the other way around, the less developed the growth venture, the more difficult it is to efficiently screen the company. Again, spending time on screening increases the probability of detecting the project quality, but moreover, the probability is higher for more mature growth ventures. And as a result, screening is more efficient. Formally this can be written as follows. Add a parameter t , to the detention function to represent the stage of venture development. Formalize t to take values from 0 to 1, where $t=0$ represents a mere conceptual product or service, and $t=1$ corresponds to a fully established, cost-effective business.

¹⁷ The same principle can be seen the other way around as well. The further away from parent corporate industry or operational capabilities the growth venture is, the less likely it is that a CVC can leverage on BU's expertise.

¹⁸ For this argument to hold, smaller than proportional increase in cost of due diligence compared to the increase in investment size is needed.

$$p(d, t)$$

Now the above detention function will have the following qualities

$$\frac{\partial p}{\partial d} > 0, \quad \frac{\partial p}{\partial t} > 0, \quad \frac{\partial^2 p}{\partial d \partial t} > 0$$

Again, what follows is that investors with relatively high screening costs should prefer later stages. This may again represent CVCs in cases where they have no comparative advantage in financial due diligence over IVCs. Arguably, one important example of such case are passive investments. With no strategical interest and no linkages in operational capabilities, it is difficult to rationalize why CVCs would have any comparative advantage over the IVC investment professionals.

5.2 Pay performance and moral hazard

The previous section has been limited to the adverse selection problem between the growth venture and an investor. This section turns to the second relevant agency problem within the pre-investment phase affecting the investment decisions. That is the agency problem between external investors and fund managers. More precisely, the focus is to understand how the risk profile of an investor arises moral hazard problems. While other moral hazard problems such as shirking and misuse of the funds have been presented, these are left out of mathematical consideration within the scope of this thesis.

As venture capitalists (both IVC and CVC) invest money that is not their own, their incentives can be distorted. This is because of their limited liability towards the investments. In monetary terms, IVC fund managers stand to lose only their personal share in the fund (~2%) while CVCs have no liability. The upside potential, in turn, depends on the type of compensation scheme the fund manager has. In contrast, external investors will always have the correct incentives under any investment. Next, consider two cases. First, an IVC fund manager with a typical compensation model consisting of a carried interest of 20% and a fixed management fee 2% of the fund. Second, a CVC fund manager with a strictly fixed salary. Assume there are three different types of growth ventures $i \in \{1,2,3\}$ with returns $r_i \sim f(r_i)$. Each of the potential investment targets have a different expected net value so that:

$$E(r_1) > E(r_2) > E(r_3)$$

Assume also that each growth venture has a different risk profile, so that

$$r_2 < r_1 < r_3$$

In practice, r_2 is less risky than r_1 , while r_3 has highest volatility regarding the projected outcome. As a result, it can be that r_3 carries the most significant upside potential, while the probability for it to realize is lowest. Similarly, it can hold that while r_1 has a more substantial expected value and risk than r_2 , in case the upside potential of r_1 does not realize, r_2 provides better return on investment. For simplicity, assume that the investor can identify the quality of the projects without effort, and thus, there are no screening costs. Since a CVC manager receives a fixed salary, the model assumes she would be indifferent between all three investment prospects. However, it must be noted that this seems unlikely to represent the real world. It is reasonable to believe she has variable non-monetary incentives to make profitable investment decisions. Arguably, one such could be to portray an image of herself as a skillful investor, in order to retain her job and pursue further career opportunities. As such, she might be inclined to choose the most secure yet profitable investment over an investment that is riskier but which has higher expected return on investment ¹⁹.

Because of the distinct risk profiles, it can be that for some r_i an IVC fund manager will choose growth venture 3, CVC fund manager opt for growth venture 2 while the external investors would pick the first. Denote r as the growth of the investment and I , as the total investment. For simplicity, assume now that the venture capitalist makes only a one-time investment covering all of the funds. For the IVC, the expected return on investment is

$$\pi_{IVC} = \alpha r I + \beta I, \text{ for } r \geq 0$$

$$\pi_{IVC} = \beta I, \text{ for } r < 0$$

Here α denotes the carried interest (20%) and β the fixed management fee of the fund (2%). Since IVC has limited liability, they generate no losses when $r < 0$, but remain to receive the fixed management fee.

For the CVC fund manager, the expected return on investment is 0, but as mentioned, she is now expected to choose from within profitable projects the one with the lowest risk (smallest downside). For the external investor (here denoted as LP) the expected profit from the investment is

$$\pi_{LP(IVC)} = r I (1 - \alpha) - \beta I$$

¹⁹ For the presented model to hold, a similar case can be constructed if we were to consider that a project with higher risk, but lower expected value would provide more strategic benefits for the corporate parent than another project. If this targeted strategic benefit is not transferred through the compensation model to incentivize the CVC fund manager, she might prefer to choose a different investment opportunity than would be optimal for the corporate parent.

$$\pi_{LP(CVC)} = rI$$

Now consider we have three growth ventures, all looking for an investment of one million euros. In line with the previously presented expected profits

$$E(r_1) > E(r_2) > E(r_3)$$

and risk profiles

$$r_2 < r_1 < r_3$$

Suppose that the first growth venture promises a yield of 40% with probability 0.5 but -10% with probability 0.5. Thus, the expected return is 15%. The second growth venture is certain to provide a yield of 10%. The third growth venture promises a yield of 400% at probability 0.2, but -80% at probability 0.9 (expected yield 8%). The expected profits for an LP are

$$Nr. 1 \pi_{LP(IVC)} = 70\,000\text{€}, \text{ or } \pi_{LP(CVC)} = 150\,000\text{€}$$

$$Nr. 2 \pi_{LP(IVC)} = 40\,000\text{€}, \text{ or } \pi_{LP(CVC)} = 100\,000\text{€}$$

$$Nr. 3 \pi_{LP(IVC)} = -120\,000\text{€}, \text{ or } \pi_{LP(CVC)} = 80\,000\text{€}$$

While for the IVC fund manager the expected profits are

$$Project 1 \pi_{IVC} = 80\,000\text{€}$$

$$Project 2 \pi_{IVC} = 60\,000\text{€}$$

$$Project 3 \pi_{IVC} = 200\,000\text{€}$$

Since it was denoted that the CVC fund manager might choose Project 2 due to strong risk aversion, it is concluded that all different investors may prefer different projects. The choices reflect the fact that excessive risk-taking and risk aversion causes a problem of moral hazard between the external investor and the venture capitalists. From CVC perspective, the hypothesized link to the real world is as follows. Lacking correct incentives causes the CVC investor to choose safer investment bets than would be optimal. And since more mature growth ventures tend to be less risky, CVC investors may be inclined to target later-stage ventures.

The above analysis has solely addressed moral hazard caused by differentiation in compensation schemes towards financial gains. In other words, all agents have been assumed to merely optimize financial returns. Obviously, most of the time, this does not fully stand true for CVCs. Within the four modes of CVC, the previous model should be more accurate among emergent and passive investments as their financial objectives are stronger. This suggests that CVCs exercising emergent and passive investments should opt for stronger performance-based compensation. As denoted in Chapter 4, in case of strategical investments, the corporate parent can balance the fund manager incentives by tying their

compensation towards strategical objectives. To serve the purposes of driving and enabling investments, the mathematical model could be advanced by optimizing for a combination of both expected strategic and financial gains. While establishing such a model is outside the scope of this study, one would expect it to mainly corroborate the earlier findings. The venture capitalists, CVCs, and IVCs, under certain circumstances, will choose different growth ventures to invest in. And their preferences can easily contradict with those of their external investors.

5.3 Theoretical model of efficient monitoring

The model on adverse selection was predominantly focused on pre-investment phase information asymmetries between a growth venture and an investor. The effort provided by the entrepreneur was taken as a given, which allowed focusing strictly on the quality of the venture. Consequently, how the level of effort e , provided by the entrepreneur, affects the investment decisions by the venture capitalist through moral hazard is examined in this section. It is first modeled what causes the potential buildup of moral hazard. Followed by an examination of how efforts in monitoring and support can mitigate such problems by incentivizing the entrepreneur to provide more effort. Again, this section builds on the model by Amit et al. (1998).

For simplicity, assume now that quality, q , is observable and known to all parties. This makes it possible to focus solely on the effort e , provided by the entrepreneur. A rational, profit-maximizing entrepreneur will then optimize the following function with regards to her effort

$$\pi = (1 - \alpha)R(e, q) - e$$

Thus, the first-order condition is

$$\pi_e = (1 - \alpha)R_e - 1 = 0, \text{ or } R_e = \frac{1}{(1-\alpha)}$$

And the second-order condition for a maximum is

$$(1 - \alpha)R_{ee} < 0$$

Since investors share is expected to be positive, $\alpha > 0$, it must be that the factor $(1 - \alpha)$ is positive as well. And since it was already denoted that $R_{ee} < 0$, the second-order condition must hold. The efficient level of effort by the entrepreneur is calculated by maximizing the sum of investor's expected profits and entrepreneur's expected profits with regards to e

$$V = \alpha R(e, q) - I$$

$$\pi = (1 - \alpha)R(e, q) - e$$

Denoting the sum by S , we have

$$S = R(e, q) - I - e$$

Maximizing the above with respect to e , the first-order condition is then

$$R_e = 1$$

It follows from the combination of previous conditions

$$R_e > 0, R_{ee} < 0 \text{ and } R_e = 1 \text{ as well as } R_e = \frac{1}{(1-\alpha)}$$

that the entrepreneur will choose less than the first best level of effort if α is strictly positive. In other words, this explains the moral hazard problem. The entrepreneur's effort is declining in α . It is possible that a project is otherwise profitable but will remain unfunded due to the moral hazard problem. For example, the first-best level of effort could generate revenues that make the investment worthwhile to the investor, but if the moral hazard problem dampens the post-investment effort, and consequently the revenue, the investor might be unwilling to invest. Thus, it is possible there are no values of α that makes the investment feasible.

One way to mitigate the moral hazard problem is through monitoring. By choosing to monitor, the investor can encourage the entrepreneur to give more effort, closer to the level of first best. Denote the cost of monitoring to the investor by m . To reflect the impact of monitoring on entrepreneur's effort, the effort can be seen as a function of $e(\alpha, m)$. The profit for the investor from the investment is then

$$V = \alpha R(e(\alpha, m), q) - I - m$$

Inserting more effort in monitoring increases the investor's profit by committing the entrepreneur to provide a higher level of effort, but at the same time, it decreases the profit through the direct cost originated by the actual monitoring. If effort is unresponsive to monitoring, the investor will choose not to monitor. Conversely, if the entrepreneur is responsive to monitoring, the investor will choose to undertake it, to shift the entrepreneur's effort closer to the first best level. Thus, under certain circumstances, projects that are unfeasible for some investors, may receive funding from other investors that have a comparative advantage in monitoring.

Alongside monitoring the investor can, in various ways, provide support to the growth venture to increase its expected profit for the investment. As with monitoring, providing supporting services can incentivize the entrepreneur to give a higher level of effort. Monitoring and support are interlinked in the sense that they provide complementary benefits. That is, providing services to the growth venture can make it easier also monitor it

and thus decrease the direct cost of monitoring, and vice versa. The supporting services offered to the growth ventures are typically visible, such as giving strategic advisory, helping in subsequent fundraising, sales leads, new employees, or logistics. Support can affect the operating revenue of the growth venture in three ways: directly, indirectly, or through a combination of both. These are presented in Figure 6.

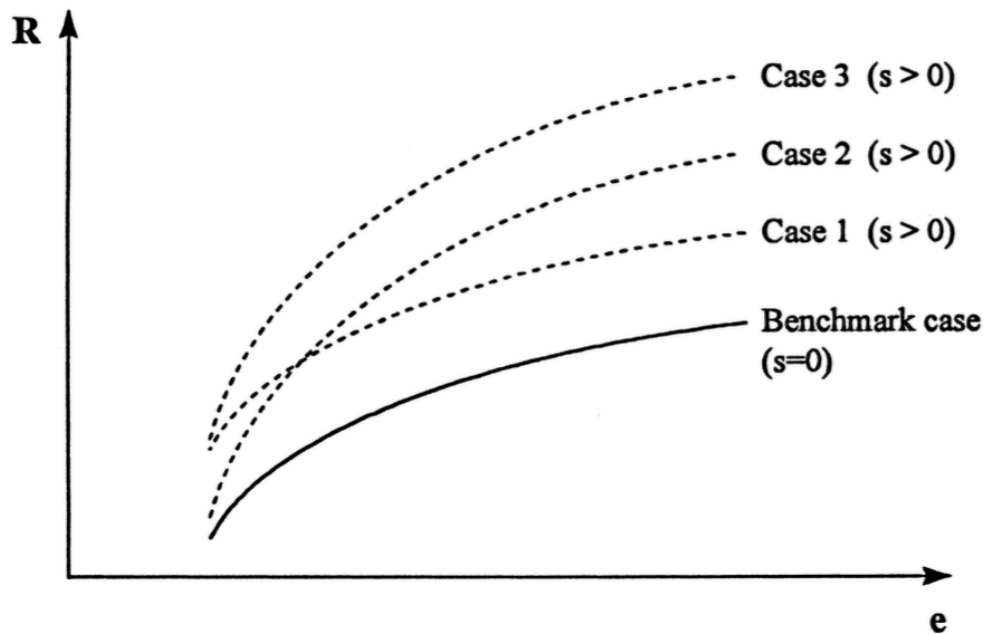


Figure 8: Impact of support services on net revenue (source Amit et al. 1998)

First, consider that support has a direct impact on the expected net revenue. This is depicted by Case 1 in Figure 6, as a parallel shift upwards from the benchmark case where $s = 0$. Providing support raises the revenue directly but has no effect on the entrepreneur's marginal productivity of effort R_e . In other words, the effect on the entrepreneur's effort is additive. When the investor increases support, $s > 0$, the impact on expected net revenue is ΔR . And since there is no effect on the marginal productivity of effort, the moral hazard problem is similar to the case without support.

The Case 2 demonstrates an example when support provided by the venture capitalist increases the entrepreneur's marginal productivity of effort, R_e , resulting in a steeper curve in $R(e)$. This is the case when providing support increases the expected revenue indirectly. The incentive constraint of the entrepreneur, $R_e = \frac{1}{(1-\alpha)}$, is affected by this change. And even though the problem of moral hazard is still prominent (but less so), the entrepreneur is now willing to provide higher effort²⁰. Finally, the Case 3 in Figure 6 depicts

²⁰ See Amit et al. (1998) for detailed proof and algebra.

an example when both direct and indirect effects exist. As with Case 2, this type of support affects the incentive constraint of the entrepreneur and dampens the problems of moral hazard. Increasing the likelihood that an investor will prefer to provide this type of support for the portfolio company.

What follows from the above analysis on the effect of support on entrepreneur's effort is similar to the case in monitoring. Investors that are highly skilled to provide value-adding services to their investee companies efficiently will invest in growth ventures that other investors might turn down. As a result, it is plausible that there exist growth ventures that would be deemed unfeasible investment targets, were it not that additional support services would be provided to them. The previous literature from the field has concluded that both CVCs and IVCs provide valuable services to their portfolio companies. However, there are two arguments on why CVCs might have a comparative advantage in the tasks of monitoring and support over their IVC counterparts. Firstly because of their potential relative advantage in providing support services and secondly due to the strategic benefits of providing such services. Let us consider the former first.

As proposed by Souitaris and Zerbinati (2014), CVCs provide supporting services to their portfolio companies on a much broader front compared to their IVC counterparts. Arguably, many of the CVC specific support services have, expressly, indirect effects on the marginal productivity of the entrepreneur's effort, allowing investing in growth ventures unattainable to investors not able to provide similar services. Consider, for example, a case where a CVC offers the growth venture an opportunity to take advantage of the corporate's supply chain, logistics structures, and know-how²¹. Such privileges might be unattainable to the entrepreneur without the help of a corporate. In turn, these services can ensure better cost-effectiveness leading to increased marginal productivity on the entrepreneur's effort, making a CVC the more compelling investor option.

The above model and related discussion have been constructed from the viewpoint of IVC, where the return on investment is the sole objective of the investments. However, it is important to take into consideration how the strategic objectives of a CVC can affect monitoring and support efficiency. In the model by Amit et al. (1998), support and monitoring have been denoted exclusively as costs beared by the investor in order to mitigate the agency problems. Recalling the fact that CVCs have strategic objectives in terms

²¹ The assumption here is that the supply chain and logistics services the corporate utilizes are relevant to the growth venture by being directly able to reap the benefits of them.

of scanning interesting technologies and ideas as well as leveraging on external sources of innovation (MacMillan et al., 2012), the presumption of monitoring and support solely as costs should not hold. The reason is that by monitoring and providing the supporting services, the CVC enables strategic information about, e.g., new markets to flow into the corporate. This can happen, for example, through the involvement of the business unit personnel when providing advisory services. As the above-described type of information flow is part of the objectives of a CVC, the total net cost, strategic plus financial, of providing such services can be lower to CVCs than for IVCs. This can help shed light on why CVCs provide more supportive services to their portfolio companies and find investment opportunities feasible, that independent venture capitalist will shun.

Finally, the natural next step is to consider how does the previous discussion reflect on the four modes of CVC activity. There are two particular dimensions to that: what type of CVCs have the best abilities to efficiently provide the most valuable support services to the growth ventures, as well as which kind of CVCs benefit most from the information flow enabled by support and monitoring. To touch upon the latter, a reasonable starting point would be to argue that, other things equal, driving and enabling investments as more strategically focused investments will have lower net costs of monitoring and providing support. Again, that is when presumed that support and monitoring generate direct or indirect strategic benefits. The case of which CVC investment types could comparatively offer the most valuable services for the growth ventures seems trickier. One assumption would be that when the portfolio companies are more tightly linked with the parent company's industry, their operational capabilities are better aligned and thus support services of higher value relative to the cost of providing them are available. Say the corporate parent and the investee company have similarities in terms of processes, supply chain, R&D capabilities, or customers. It would seem reasonable to argue that under such circumstances, the growth ventures should, on aggregate, be able to reap more valuable benefits due to the better direct fit for their purposes. The CVC would have the know-how while the financial, or opportunity cost of providing these services should be relatively low. Nonetheless, if both companies have, for example, similar processes, industry proximity might not be a prerequisite. Enabling investments, with loose operational capability but high strategic focus could be one example of such. Since enabling investments are often more complementary rather than competitive, the CVC might be able to offer various services that are of high value to the investee growth venture. Even if industry-wise the link between the two was loose.

5.4 Comparison of empirical evidence on CVCs and IVCs

The previous section addressed a theoretic approach on how moral hazard and adverse selection problems may affect which kind of growth ventures CVCs and IVCs end up investing in. While it is easy to show that the agency problems can cause the two investor types to choose differently, given the same investment opportunities, it is necessary to examine whether this actually happens. For obvious reasons, capturing differences in actual investor behavior as such is difficult. What this section aims to do is to seek empirical evidence of divergence in investor behavior that either support or counter the predictions made by the model. Difficulties regarding this comparison are met. Whereas numeric information about IVC activity exists, comparable data about CVCs seems almost non-existent.

Within the scope of the present study, four different aspects hypothesized by the model will now be analyzed through empirical evidence. First, the efficiency of IVCs and CVCs in screening. Second, and in continuation to the first, the aggregate strategic benefit of support and monitoring for CVCs in terms of the total net cost of support and monitoring. Third, the capability to provide support services that increase the marginal productivity of the entrepreneur. Fourth, how the existence or lack of fund managers performance-based compensation influences their investment decisions.

Evaluating the potential investment target generates a direct cost for both IVCs and CVCs. The cost can be denoted both timewise and in financial terms. According to Fried & Hisrich (1994), for IVCs, this evaluation process is both labor-intensive and time-consuming. The authors find that on average, the process from first meeting to receiving funding takes on average 97.1 days and consumes 129.5 hours of the venture capitalists time. Similar results have been repeated later by Gompers et al. (2016), who conducted a survey of 885 venture capitalists in 2015. Their study's corresponding numbers were 83 days and 118 hours. In further support of this view, Van Osnabrugge (2000), found that in monetary terms, IVCs spent an average of 1.3% of the amount invested on due diligence. In his research, the mean invested amount was 3.2M£, denoting a cost of 41 600£ for an average investment. Overall, these findings represent the fact that the screening process covers a significant part of VC personnel's tasks. Unfortunately, similar studies from CVCs are not available, making a direct comparison between the two investor types difficult. A starting point could be to assume that procedure-wise CVCs follow a similar framework as IVCs.

Under such an assumption, it would be possible to compare the effectiveness of the screening process solely. Indirect indications of CVCs comparative advantage in the efficiency of the screening do exist. Souitaris & Zerbinati (2014), based their study on simple questionnaire methods and received answers where for example one CVC fund manager described the advantage of corporate resources by stating that *“I could literally get to things within hours that would sometimes take a week to get to in an independent VC.”* While it is worth bearing in mind that single comments by fund managers can hardly be taken as any kind of scientific proof, we are also still missing one relevant item from the comparison between the investors. As noted in Chapter 4, CVCs do have some differences in their investment process, especially the strategic due diligence. Even though a CVC might be in all terms more efficient in the financial due diligence, it has to be more efficient in a combination of both financial and strategic due diligence for it to have a comparative advantage over an IVC. Additionally, the comparison of the different investors screening costs in monetary terms is difficult. As for a CVC, the cost of due diligence unless external services are bought, are mainly opportunity costs of the corporate business unit personnel. In turn, this may help to explain why previous studies have not attempted to calculate the cost of CVC investment process.

On top of the cost of strategic due diligence, one must also take into account the CVCs potential strategic benefits gained by carrying out monitoring and support services. The previous studies have given indirect indications of the existence of strategic benefits. As Souitaris & Zerbinati (2014), and Dauderstädt (2013) have pointed out, in general, CVCs are more involved with their investee companies for these strategic reasons. Nevertheless, again, it is difficult to estimate the value of such strategic gains, and no previous studies within this field exist. While monitoring and support costs are mostly timely, and their actual financial costs could at least, in theory, be calculated as opportunity costs, similar argumentation does not hold for the strategic benefits. As a resolution, Dauderstädt (2013) has proposed that CVCs strategic returns could be calculated through option modeling. However, forecasting the potential returns on an option seems extremely challenging and prone to speculative errors. Making it difficult to develop a model to value the strategic benefits in monetary terms. Thus, it must be concluded that the current empirical evidence is incomplete to provide any insights on this matter.

No commonly accepted, objective, model exists on how to measure the impact of support services on entrepreneur’s marginal productivity. In theory, it could be measured through the later on success of a growth venture, say in terms of growth, revenue, and or

profitability. But such an attempt to measure the effect has multiple issues. How do we know how long it should take, after the investor's entry, to affect the growth ventures success? So, most of all, any such model would be prone to generate spurious results. Take for example the case of comparing IVC and CVC. If for some reason, CVCs are unable to attract top quality deals, given now that their IVC counterparts can, it would make direct comparison strictly invalid. In such a case, the average likelihood of a growth ventures future success is unequal to begin with, between the two investor types. One measurement that has been used in the previous literature is the investor's impact on the innovativeness of the growth venture. *Álvarez-Garrido & Dushnitsky (2014)*, used publication and patenting output as a measure of innovativeness and found that CVC-backed growth ventures are associated with higher innovativeness compared to IVC-backed growth ventures. In contrary, *Park & Bae (2018)*, were not able to repeat these results on an average level. However, when the authors took the stage of the growth venture into consideration as a separate variable, similar results were obtained from later-stage ventures. According to *Park & Bae (2018)*, the benefit of CVC funding to a startup's innovation is far more significant when the investment relationship is formed later. This could arguably help understand why CVCs tend to focus on a bit later stages compared to their IVC peers. Also, while these findings may implicate that CVCs do have an advantage in providing more valuable services that do increase the marginal productivity of the entrepreneur, such reasoning should be treated with caution. Innovativeness is an abstract measurement, unlikely to capture the effect of all support services. Moreover, higher publication and patenting rates might only represent CVCs preferences and comparative advantage in doing just that, scientific publications and patenting. In the end, innovativeness is not the sole goal for any growth venture, and especially not for an IVC investor.

The way in which the fund manager's compensation scheme affects their investment decisions has been researched through the average investment stage. *Dushnitsky & Shapira (2010)* studied the impact of the compensation scheme on fund manager's investment practices in the US, using a sample of 13,096 investment rounds by both corporate and independent venture capitalist. Their main finding is that in the absence of performance-based compensation, CVCs tend to invest in more mature growth ventures. However, when CVC personnel's compensation is tied to their performance through, e.g., carried interest, their investment practices tend to resemble the IVC peers closely. According to *Dushnitsky & Shapira*, the impact of different compensation models on investment stage persists even after controlling for factors such as venture's industry and CVC's objectives.

The previous studies thus do seem to support this thesis' prediction on how fund managers' compensation scheme can affect their investment decisions. So, in the presence of pay-performance based compensation, both CVC and IVC fund managers tend to invest in similar stage growth ventures. It is worthwhile to note that the findings by Dushnitsky & Shapira (2010) do not either provide any hints that with high-powered incentives, CVC fund managers would invest in even earlier phases than their IVC counterparts.

It could be far more valuable to understand the empirical evidence of the four points presented above: screening efficiency, the aggregate benefit of support and monitoring, the capability to provide valuable support services and pay performance from the distinct perspectives of four different modes of CVC activity. Unfortunately, as the comparison of empirical results already lacks in overall on the IVC versus CVC angle, it would be even more challenging to accomplish between the different type of CVCs. Furthermore, as Anokhin et al. (2016) have noted, most CVC investors tend to make multiple types of CVC investments. Which, in turn, will make empirical research on the subject even more complicated. For example, regardless of whether a CVC fund manager chooses to make a passive investment or an emergent investment, her compensation scheme will remain the same. Therefore, this analysis has to be left for further research.

5.5 Discussion

This thesis has shown how difficult it is to compare the competitiveness of IVC and CVC investors. The main shortcomings are caused by the lack of theoretical foundation and tools to measure investor success, especially in strategic terms. As Dauderstädt (2013) has noted, no prevailing classification system on how to measure strategic success exists, and previous studies have mostly focused on one of the two. The return on investment for IVCs or managing of new ventures.

These problems seem to reflect the real world as well. It is challenging to pinpoint for a single growth venture when a CVC investor would be more beneficial compared to an IVC investor as there are multiple variables that can affect the superiority. Nevertheless, it would be valuable to construct even a simplified model to understand the mechanics better. After all, the findings of this study have given indications that there are situations in which CVC investors have a comparative advantage over their IVC peers. The discussion section of the thesis focuses on the above described multiple variable problem. Take the notion that on average CVCs tend to invest in later stage compared to IVCs (Allen

& Hevert, 2007; Dauderstädt, 2013; MacMillan et al., 2012). There are at least five different explanations that could account for this. Based on the findings of this thesis, they can explain the difference either alone or as a combination of different variables, depending on the unique situation.

First, because of the strategic due diligence, the combination of both financial and strategic due diligence can be more burdensome and more notably, accumulate a higher cost for a CVC to select potential investment targets. This does not out rule the possibility of a more effective financial due diligence, but merely suggests that the overall due diligence is more expensive and leads CVCs to select later-stage ventures, that provide them with better returns, both in terms of financial and strategic returns. Arguably, this is less of a concern in case of financially driven emergent and passive investments. As more financially focused investments, emergent and passive investments are less burdensome on the front of strategical due diligence. However, in the case of passive investments, it is questionable whether a corporate investment arm can be more effective in financial due diligence due to the lack of an operational link between the targeted growth ventures and parent company's expertise.

Second, it is plausible that the support services provided by a CVC are more valuable to later-stage growth ventures. If this is the case, then as rational value optimizers both the growth ventures and CVC investors acknowledge this and target CVC investments only in a later stage. This could, in general, be the case for all four modes of CVC activity, but especially for driving and emergent investments that have a strong operational link with the parent corporation. A later stage growth venture is typically looking to scale, and the tight operational link often increases the likelihood of the ability to leverage on corporate resources and global networks to do precisely that. After all, the operational capabilities of an incumbent corporation are typically optimized for large scale operations, instead of building from the ground up. As such, a more established growth venture might be better positioned to take advantage of the corporate support services.

Third, the problems of information asymmetry are smaller when the growth venture has achieved a better head start. The previous research has underlined the significance of the fear of imitation in the case of CVCs. If this is the case, then entrepreneurs with lucrative business models may simply refuse to take CVC funding in earlier stages. A rational CVC fund manager acknowledges this and chooses to approach only later stage ventures due to the risk of adverse selection in earlier stages. In line with the arguments of this thesis, the risk of imitation seems to be larger in case of a close operational link, as in

driving and emergent investments. And less so when the operational link with the corporate is loose, as in enabling and passive investments.

Fourth, the lack of performance based compensation may lead to window dressing for CVC investors. As Dushnitsky & Shapira (2010) have argued, as a growth venture matures, the informational problems decrease. Overall, this causes the risk level of an investment to decrease as well. Accordingly, the authors found that CVC fund managers with better compensation incentives do target earlier stages compared to their strictly regular wage receiving peers. The effect of pay-performance seems to exist in all four modes of CVC activity. However, an alternative explanation exists. Lack of compensation incentives might cause the investors with the best competence to make riskier investments in earlier stages to only accept positions where they receive performance-based compensation. Thus, the CVCs whose compensation is not linked to portfolio company performance may be unable to recruit fund managers specialized in earlier stages. Moreover, even though CVCs with stronger pay performance generally invest, stage-wise, similarly to their IVC peers, this might not necessarily be optimal for the corporate. Pay performance can incentivize the fund managers to make riskier bets than optimal, merely because it maximizes their financial returns, but not the investment fund owner's objectives.

Fifth, if all CVCs mainly make passive investments as proposed by Anokhin et al. (2016), it may lead the entrepreneurs to accept CVC funding only in later stages. As argued in this thesis, and by Chesbrough (2002), corporates should not partake passive investments. Passive investments fail to provide anticipated strategic or financial benefits for the corporate, and the ability to provide valuable utilities to growth ventures is dubious. This is due to the lack of linkage between the corporate competences and the growth ventures knowledge gap. In a later stage, a growth venture may, however, have a smaller gap in knowledge, but a significant gap in funding. In such a case, it may be optimal for the entrepreneur to raise CVC funding, as it may be cheaper for the growth venture. As Gompers & Lerner (1998) find, CVCs tend to pay a larger price for the same investments compared IVCs. Given this, the growth ventures' in demand of large sums of funding, can be incentivized to seek CVC funding since the entrepreneur and previous investors need to give away a relatively smaller percentage of the ownership for similar-sized capital injection.

The previous analysis can also shed light on the cyclical nature of corporate venture capital. Scholars have presented numerous reasons for the cyclical activity, all of which are at least partly supported by the findings of this thesis. These include CVCs disadvantage in reducing information asymmetries between the investor and the

entrepreneur (Block & Ornati 1987). Less motivated and capable fund managers due to lack of incentives in CVC funds (Chesbrough 2000). The problem of internal politics and information asymmetries between CVC and the corporate parent (Sykes, 1986). Sykes also suggested that when CVC fund is not able to produce immediate returns, the management of the parent may be inclined to terminate the CVC division. This thesis continues the discussion of the cyclical nature of CVC by arguing for one additional reasoning. If the primary share of all CVC investments are passive as proposed by Anokhin et al. (2016), it may reflect the fact that CVCs fail to make strategic investments. As previously argued, CVCs should avoid passive investments. The inability to make investments in accordance with the corporate objectives, whether driving, emergent, or enabling, can be realized by the top management of the corporate parent. Who may, in turn, be hesitant to abolish the fund under such circumstances.

6. CONCLUSION

6.1 Summary of key findings

This thesis has compared the investment behavior of independent venture capitalists and corporate venture capitalists. Based on the empirical evidence, it was concluded that CVCs and IVCs play complementary roles in growth venture financing. CVCs tend to invest in a bit later stage growth ventures, while the difference between them and their IVC counterparts is relatively small. The motive for targeted investment stage behavior seems controversial and remains debatable. Principally three different explanations exist. It can be either due to CVCs competitive advantage within later stage ventures, lack of investment manager's compensation incentives, or entrepreneurs' reluctance to accept corporate financing in earlier stages. More importantly, it was proposed that IVCs and CVCs offer diverse but complementary supporting services to their portfolio companies. Since both parties are willing to cooperate, it is no surprise that a significant proportion of CVC investments are done in syndication with IVC investors. Moreover, regardless of the root cause for the diversification on the investment stage between the two investor types, there is complementarity in terms of stage and services offered.

On a general level, it was hypothesized that the disparity in the operation of CVCs and IVCs originates from the structural differences between them. IVCs invest their LPs' money, with a sole goal of providing financial returns on investment. In turn, CVCs invest the corporate parent's money, with alternating goals from strategic only to financial only to a combination of the two. It was shown that the strategic objectives and link with the parent corporation cause CVCs to face both different type and more profound problems of asymmetric information compared to their IVC peers. The IVCs suffer from two-sided principal-agent problems. One between the high growth venture and the fund managers, and another between the fund managers and their external investors. In turn, CVCs confront at least three distinct principal-agent problems. One between the fund manager and the growth venture, second between the fund manager and the corporate management, and third between the fund manager and the corporate business units. In addition, a growth venture may encounter principal-agent problems directly with the corporate's business units. Awareness of these informational asymmetries gives rise to problems of moral hazard and adverse selection. Both CVCs and IVCs tend to tap on a diverse set of tools to mitigate these problems of asymmetric information to protect the interests of the principal. Based on the

previous empirical evidence, it was proposed that due to the risk of moral hazard and adverse selection, the pool of potential investment targets is distinctly smaller for CVCs. Most notably, the information problems between a CVC and a growth venture can be substantially more severe due to fear of imitation, and because of the incoherence between growth venture's ambitions and the corporate investor's strategic objectives.

The specific hypothesis of the thesis was that a uniform grouping of CVCs has caused the contradictory results between previous studies from the field. Instead of considering all CVCs to be similar, they should be regarded as separate type of investor groups depending on their ultimate goals. Within the present study, the CVC investments were categorized into four groups, accordingly with Chesbrough (2002): driving, enabling, emergent, and passive. Due to the lack of applicable studies and availability of data, no substantial observations were able to be made. As a result, this hypothesis was left indefinite. Nevertheless, Chapter 5 presented potential indications of such differences in informational problems between the four investment types. For example, earlier stage growth ventures operating within proximity of the corporate parent industry and capabilities, can be more inclined to turn down venture financing from the CVC due to the fear of imitation. In later stages, such informational problems may be less severe, as entrepreneurs tend to entrust their head start over the corporate. This may cause, for example, driving and emergent investors to target later stages.

6.2 Limitations of the study

There are many limitations to the present study. First and foremost, this study has been analytical and presents no new empirical evidence due to the lack of easily accessible data. It would be far more valuable to perform an econometric analysis on empirical data to test the hypothesis' of argued differences between different type of CVC investors. Also, by being limited to stylized models, this study has neither been able to recognize the holistic contract structure between a venture capital investor and a high growth venture in its entirety. Disregarded features include details on contract clauses concerning matters such as which party has the right to utilize what technologies after the deal. Such disregarded deal structures can have two-folded effects on what investment deals the corporate investors end up making. They can either help to mitigate agency problems between the two parties or cause deals to fall through by intensifying the informational problems. In principle, the issue could be that on average CVCs are able to attract at least as good deal flow (or same stage deal flow) as

IVCs, but a significant proportion of the best deals fall through due to disagreement on contract clauses.

On a more general level, the theory of asymmetric information has been criticized for its strong assumptions. Especially the assumption that the agent, as an insider, is always more informed than the principal, the outsider. As Maula (2001) has noted, in high growth venturing, it might not always be the case that the entrepreneur is the superior party to judge the growth venture's value and potential. In fact, outside professionals, namely venture capitalists, could have a more thorough understanding of the markets, and an overall superior capability to value the growth ventures probability for success.

Lastly, it has to be noted, within the analysis of this thesis, that specific type of investors, typically considered as CVC investors, have been excluded. A momentous occasion of such are corporations without a separate or dedicated fund. That is corporates that make minority high growth venture investments directly from their balance sheet. Such corporate investors without the typical venture capital structures may have distinct information asymmetries separating them from other CVCs. Which again, in principle, could make investment targets unattainable to other CVC investors prolific to them and vice versa. High growth ventures of a certain type might turn down incumbents investing directly from the parent corporation's balance sheet due to some profound agency problems. And in some cases, prefer corporates without venture capital structures over CVCs with a dedicated fund.

6.3 Directions for further research

The present study presents multiple fruitful avenues for future research, both empirical and theoretical.

Relying on the study by Anokhin et al. (2016), one starting point would be to empirically scrutinize why such a large proportion of the CVC investment are passive. As demonstrated within the present thesis, there should be no reason for CVCs to make passive investments as all other CVC investment types should outperform them. Thus, it would be of high importance to understand different variables that cause this behavior. In continuation, it would be valuable to compare how passive investments have succeeded in financial terms compared to other CVC investments. More broadly, this context could also be used to help shed light on the degree of incentive problems in fund manager compensation schemes by comparing different CVC managers' compensation schemes to their investment types. This would help to reveal whether there exists, for example, a linkage between passive

investments and lack of performance pay for the fund managers. The number of passive investments could also be used as a measure to predict the lifetime expectancy of a CVC. One starting point would be that the average short lifespan of a CVC could be to some degree explained by the inability to make the right investments. Namely, CVCs that end up making only or mostly passive investments might be more likely to be terminated sooner. Additionally, empirical studies on the CVC screening process are needed. Research on how much time, money and effort are consumed from the beginning of the negotiations right up to the point of investment decision would enable a more precise comparison of the investment process on an average level between IVCs and CVCs. Which, in turn, would help to establish better grounds to evaluate the potential comparative advantages CVCs might have in screening and due diligence over their IVC peers or vice versa.

From a theoretical point of view, a structuration of optimal investment behavior, and a comparison of these between the four investment modes would be a natural continuation. This could also be extended to create an understanding of theoretically optimal compensation models for each of the different type of CVC investors. Lastly, another useful direction for future research would be to develop a model that could able to estimate and take in consideration the strategical benefits of CVCs. Although, as noted in Chapter 5, the construction of such a model is likely to be extremely complicated and prone to errors.

6.4 Public policy implications

The thesis proposes several interesting findings on public policies. This thesis has emphasized how genuinely challenging the market of growth venture financing can be. Because of the vast informational asymmetries between the interested parties, only highly skilled and specialized venture capitalists tend to be efficient within their work. The reckoning that CVC investors tend to fail to make desirable strategic investments when their compensation incentives are missing calls in to question the public growth venture investment initiatives. In Finland, a share of government funds is channeled yearly through Business Finland for growth ventures. The mode of financing is not so much venture capital, but rather diverse business development and R&D programs. These programs have an aim to boost entrepreneurship within the country. In the public sector, the personnel in charge of the funding decisions are not compensated based on the consequent success of the subject but instead receive a fixed salary. The theory of asymmetric information questions their ability and incentives to choose top candidates who are then to receive governmental funding.

Arguably, to diminish the effect of adverse selection, seeking public financing has become arduous. Entrepreneurs with limited capacity are required to fill burdensome pre-defined forms to apply for the financing in the first place. This poses a secondary threat to these public initiatives. If seeking for public growth venture financing is too laborious, entrepreneurs might choose to target private venture capitalists directly. If their business seems lucrative enough, it may be, that attaining private funding is less burdensome compared to public financing. As a result, it could be that only those proficient in seeking public funding will do precisely that, regardless of the potential of their growth venture. The implication is that this can even exacerbate the adverse selection problem for public financing programs such as the one administered by Business Finland.

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