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The role of domestic and foreign venture capital in successful Nordic firms.

Cross-border venture capital investments in the Nordic technology sector, a study of the determinants and the impact of the nationality of venture capital and on the exit valuation of firms with domestic and foreign VC at the time of exit via trade sale between 1998 and 2013.

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Abstract

Using a unique dataset, we provide new stylized facts about the determinants of domestic and foreign venture capital (VC) in Nordic technology firms exited via a trade sale, between 1998 and 2013. We investigate the relationship between the nationality of a VC and the one of the acquirer. We examine determinants including the presence of foreign and domestic VC on the exit valuation. Differences in a firm's characteristics seem to appear depending on the presence of a foreign or a domestic VC. Foreign VCs use more monitoring mechanisms materializing with a higher number of rounds, number of investors and a stronger presence of syndication than firms with only domestic investors. The time to exit differs for firms with foreign VC exiting at an older age than others. Moreover, there is a strong presence of domestic VCs in the Nordics and a growing presence of foreign VCs. Among our eight technology sectors, foreign VCs are over-represented in firms requiring a large capital investment. Within the Nordics Norway has the strongest domestic market and Sweden has the most open market to foreign VC. In the second part, we show that there is a strong relationship between the acquirer's nationality and the VC's nationality. For example, a presence of an American VC in a firm increases the predicted probability for the company to be acquired by an American firm. Lastly, using a price to sale ratio, we present evidences of the exit multiple variations depending on the presence of a domestic or a foreign VC. The regression analysis illustrates that the presence of a domestic VC increases substantially the exit multiple. Our thesis gives a better understanding of the investment behavior of foreign and domestic VCs, of the impact of the VC's nationality and of the exit multiple.

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Key words:

Venture Capital, Early Stage Investment, Cross-border, Nordic region

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1. Introduction and definition

Since their early days in the United States, venture capital (henceforth VC) firms such as the American Research and Development Corporation (ARDC) are assumed to have a local investment strategy (Cuming and Dai 2010). Different factors such as geographic remoteness which increases transaction costs or principal-agent theory leading to post-investment monitoring provide hints that cross-border VC investments can put in jeopardy the chance of a successful investment (Mäkelä and Maula, 2008). Since the mid-90s, cross-border VC investments defined as investments made by VC investors in portfolio companies located in other countries than the country from which the investments is managed have become a significant phenomenon (Mäkelä and Maula, 2005). The American VC market is still predominantly a domestic market; however, the European one has become more international and continues to expand. Even the European government acknowledges the important role that cross-border investment plays for the growth of the general economy (Wilson, 2013). In 2012, the total amount of cross-border investment within Europe and between Europe and non-European countries represented around 50% of the European domestic investment (EVCA 2012).

Researchers have started to investigate the cross-border investment phenomenon primarily by focusing on the drivers of the venture capital internationalization process at a macro or industry level (Madhavan and Iriyama, 2009) or on the conditions and strategies deployed by VCs to overcome liabilities of distance and foreignness (Guler and Guillen, 2010). Others have compared the European and American venture capital industry (Axelson and Martinovic, 2011). The globalization of VC and the role of domestic and cross-border investments have not been researched extensively (Da Rin et al., 2011). Some studies investigated the impact of foreign VC compared to domestic VC in emerging markets such as in China (Humphery-Jenner and Suchard, 2013). Despite the increasing interest in the VC internationalization process, research on the investment behavior of domestic and foreign VC and on the impact on portfolio companies at the time of exit are scarce when it comes to developed markets such as Europe.

There is a dearth of comprehensive evidence on a model reflecting how domestic and foreign VC investor's behaviors are affected by the firm's duration, monitoring or business sector. Additionally, there is little research examining the relationship between the VC's nationality and the acquirer's nationality or examining the relationship between the presence of a domestic or a foreign investor and the exit valuation multiple. We aim to fill this gap by answering three questions: (1) What are the factors determining the presence of domestic and foreign VC investors? (2) Does a foreign or a domestic VC impact the presence of the nationality of the acquirer? (3) Are foreign and domestic VCs determinants on the exit valuation of a company in a trade sale?

VCs invest in different sectors such as life sciences, renewable energy or in high-technology. The importance of the development of high-tech startups (Hellman and Puri, 2002) plays a significant part in the social and economic growth. Technology firms with characteristics such as fast obsolescence of their technology and the goal to reach a sizable market need to have an international mindset from the start (Coviello and Munro, 1995; Knight & Cavusgil, 2004). In addition, an appropriate level of funding is essential for a technology venture to

pursue an international strategy. Growing companies located in a market with limited domestic supply of venture capital can benefit from cross-border VC as an alternative to domestic funding.

The Nordic region is often defined as one of the world's most attractive regions for start-ups. All four Nordic countries are within the top 10 best countries to start a company (Appendix 15). They also hold leading positions in the global innovation index (Appendix 15). Moreover, the technology sector has been booming in the Nordic countries over the last 15 years with approximately 9 per cent of the billion dollar exits between 2005 and 2009 from Nordic countries such as Skype or Qliktech (Creandum, 2012). In addition, nowadays the Nordic region has a strong position in Europe with many promising companies that have not yet exited through an IPO or a trade sale such as Spotify or Klarna. Different reports, such as the one by Menom publication (2010) or the one by Norden (2011), examined the growth of cross-border investment in the Nordics. The Nordic region is seen as an attractive investment location by foreign investors; for instance, approximately EUR 501 million was invested in the Nordics by European investors between 2007 and 2010 (Menom, 2010).

The IPO is often defined as the home run exit (Dimov et al., 2006) due to the gain of public exposure and the strong track record for entrepreneurs and investors. It is the most empirically researched exit vehicle (Schwienbacher, 2005; Dimov et al., 2006). At the same time, the M&A literature has given limited attention to venture-backed acquisition. Nevertheless, the number of IPOs drastically decreased after the tech bubble and never recovered to the pre-tech bubble level in Europe. Today, the main exit route for VC-backed companies in Western countries is via trade sales. Acquisitions have remained at a stable price level over time even during and after the financial crisis (Ernst & Young, 2012). Trade sales in the Nordic region represent a large share of the number of exits of successful firms backed by venture capital. On average, trade sales represent 26.8 per cent of the exit of firms backed by venture capital over the period 2007 to 2012 in the Nordic countries including Denmark, Finland, Norway and Sweden (EVCA, 2012).

Past theses on domestic and cross-border VC investments did not investigate the impact on firms. The lack of data on trade sale exits may be a reason (Lerner, 1995). These studies rely mostly on interviews which may give a distorted view of the reality. The lack of a well-organized database makes any research in this field challenging. The dataset used in this thesis is one of the most advanced to study Nordic trade sales of technology firms. A unique set of observations was gathered for this study with information on 284 firms founded in the Nordics and exited via a trade sale during the chosen time period. We started the creation of our dataset with an exclusive set of observations from a Swedish venture capital's proprietary database. In a second step, we cross-checked and we added information from commercial databases such as Thomson One, SDC platinum and Zephyr. For each firm included in our dataset, more than twenty variables were researched to allow a thorough descriptive and regression analysis. Lastly, we gathered information on price to sale exit multiple for 126 of the 284 firms.

The time period studied in this thesis spreads from 1998 to 2013. The fifteen year span was divided into three periods encompassing the tech bubble (1998-2001), the post tech bubble phase (2002-2007) and the financial crisis (2008-2013). It allows us to analyze the variation of the presence of domestic and foreign VCs over time.

The first part of our thesis analyzes the difference in investment behavior between domestic and foreign VCs on technology firms exited via a trade sale. We find the description and the regression analysis contradicting the arguments that firms with foreign VCs are the fastest to exit. In addition, both the descriptive and the regression analyses support the fact that foreign VCs use more monitoring mechanisms than domestic VCs. This is materialized by a higher number of VCs, a higher number of investments rounds as well as a common use of syndication which has seen an increase over time.

We find that foreign and domestic VCs differ in terms of presence among our eight technology sectors. Foreign investors seem to prefer investing in companies with a large capital need for creating a product such as the Telecommunication, Equipment and Semi-conductor sectors. On the other hand, domestic VCs have a strong presence in technology segments such as Internet, Software, Software as a Service (SaaS) and Gaming. At a country level, domestic investments have a strong footprint all over Scandinavia. Norway seems to have the strongest domestic market and Sweden appears to be the most open to foreign investment.

In the second part, we show that there is a strong relationship between the acquirer's nationality and the VC's nationality. Sharing the same nationality seems to be a factor in trade sale exits. For example, a presence of an American VC in a firm increases the predicted probability for the company to be acquired by an American firm. In addition, a large proportion of domestic targets have a presence of a domestic VC and a large fraction of firms acquired by American companies received investment from American VCs. An entrepreneur and a VC may be interested in selling their company to a specific company or to a chosen foreign country. An international acquisition may bring recognition to an entrepreneur and a VC from the entire technology industry which may be useful for future ventures and building a stronger network. However, our regression analysis only confirms the relationship between an American acquirer. Hence, we cannot confirm the relationship between the acquirer's nationality and the presence of only domestic VCs or at least one foreign VC.

In the third section, we examine the impact of the presence of domestic and foreign VCs on the price to sale ratio (henceforth PSR) exit multiple. It aims to give a better understanding of the characteristic of the general PSR and the impact of the presence of a domestic or foreign VC. Our regression and descriptive analysis confirm that the presence of a domestic VC has a positive relationship on the PSR. However, only the descriptive analysis provides evidence that firms with only domestic VCs have the largest PSR and evidence of a negative relationship between the presence of foreign VCs and the PSR. Thus, our analysis seem to confirms the argument that foreign VC-backed companies are at a more advanced stage than firms with only domestic VC in term of sales and growth.

The paper is innovative and unique in many ways. One characteristic is the use of an empirical dataset rather than qualitative interviews with investors or a grounded theory structure (Engløkk et al., 2011; Sunde and Ekås, 2012; Mäkela and Maula. 2008). Therefore, it provides a higher degree of transparency as it avoids the risk connected to interviews or surveys such as investor preference risk. In addition, former studies tend to focus on IPOs and not on trade sale. The IPO is the exit route with the most easily accessible information compared to

other types of exit. There is a real scarcity of data concerning VC-backed firms in all commercial databases. Given the limited attention to VC-backed acquisition, we sole focus on trade sale exits in order to get a better understanding of the determinants of one of the most important exit route that is still under-researched.

Cross-border investment is seen as an under-research topic (Da Rin, 2011). As explained previously, the phenomenon has grown substantially over the last two decades and it is expected to continue in the future. Hence, by researching the determinants of firm's characteristics of a firm with a foreign and/or a domestic VC as well as the relationship between investor and acquirer and the connection between the presence of investor and the exit multiple, we are opening new perspectives for future research. Lastly, many past studies on cross-border investment focus on emerging markets such as China or India but very few on developed markets such as Europe (Humphery-Jenner and Suchard, 2013). As one of the first investigation into European trade sales, we believe that evidence gathered from a region such as the Nordics provides a good foundation for future research. A study at a country level would have been interesting if there was enough previous research on cross-border investment in the Nordics and if the number of observations was not limited. Lastly, by focusing on acquisition of only technology firms our thesis offers to gain a better understanding of this fast growing industry.

A paper by Bottazzi and Da Rin (2002) on the European financing of innovative companies has similarities with the first section of our thesis. As one of the main considerations is the focus on determinants of venture financing. Nevertheless, their research is restricted to the "Euro.nm" exchange, a pan-European network of regulated markets dedicated to growth companies, with a time span of only two years, from 2000 to 2002. A paper by Hallström and Yazdani (2008) analyzes the determining factors of two different types of investors, formal and informal VC in Sweden between 1994 and 2005. The study also investigates the investor characteristics at the time of exit in Swedish firms. However, it investigates the role of venture capital and business angels with no differentiation between domestic or foreign VC. Moreover, it investigates only at a country level and with a sole focus on IPO exit. Two recent studies investigate the impact of foreign investors compared to domestic VCs on companies. One research tests whether and how foreign VCs can facilitate international IPOs of entrepreneurial companies in China (Humphery-Jenner and Suchard, 2008). Unlike our research, it only focuses on one route of exit in an emerging market. Another research by Paeleman et al., (2010) studies the effect of obtaining initial finance from cross-border VC opposed to only domestic VC on the growth pattern of European Technology VC-backed companies. The authors gather information about sales, employment and total assets within 766 European high-tech companies that initiate investment relationship with VC. The paper studies the impact of cross-border investment within the technology space in Europe but on more quantitative factors (sales, assets) at a company level. It does not investigate the investor's characteristics or the relationship between VC and acquirer or VC and exit valuation. To our knowledge, no paper has previously investigated the acquisition of VC-backed technology firms in the Nordic regions.

2. Background and theoretical framework

2.1. Venture Capital investor

A VC is a professionally managed capital pool that is invested in equity securities in private company. VCs usually invest in early and growth stage firms which do not distribute a dividend and have a high risk of failure. In order to mitigate the risk, investments are typically staged in multiple rounds (Sahlman 1990, Gompers 1995). In addition, it is common that multiple investors share the investment through syndication (Lerner 1994). VCs have an active investment management strategy on their portfolio companies with mentoring, consulting and monitoring (Ehrlich, et al., 1994; Lerner 1995; Sapienza, et al., 1996). There exist three main categories of VC. The independent VC fund is the most common type of fund (Sahlman, 1990). The two other types are the captive fund part of an organization such as a bank or a firm and the public fund funded by a government (Iskalsson, 2006).

An independent VC is a closed-end fund with the characteristic of an investment holding period of on average seven to ten years. It is generally constructed around a general partnership organization. General partners (GP) make investment decisions and manage the portfolio company with an active role via for example board position. The GPs raise venture capital funds commonly from institutions such as pension funds or insurance companies. Investors are called limited partners and they are not involved in the investment decision process. After the lifetime of the fund all remaining capital and stocks are distributed to the investors (Cumming and Johan 2008; Sahlman, 1990). In the case of capital gains from firms exited via an IPO or a trade sale, the limited partners receive immediately the returns. Thus, the sole source of creation of return on investment is made by a company's exits.

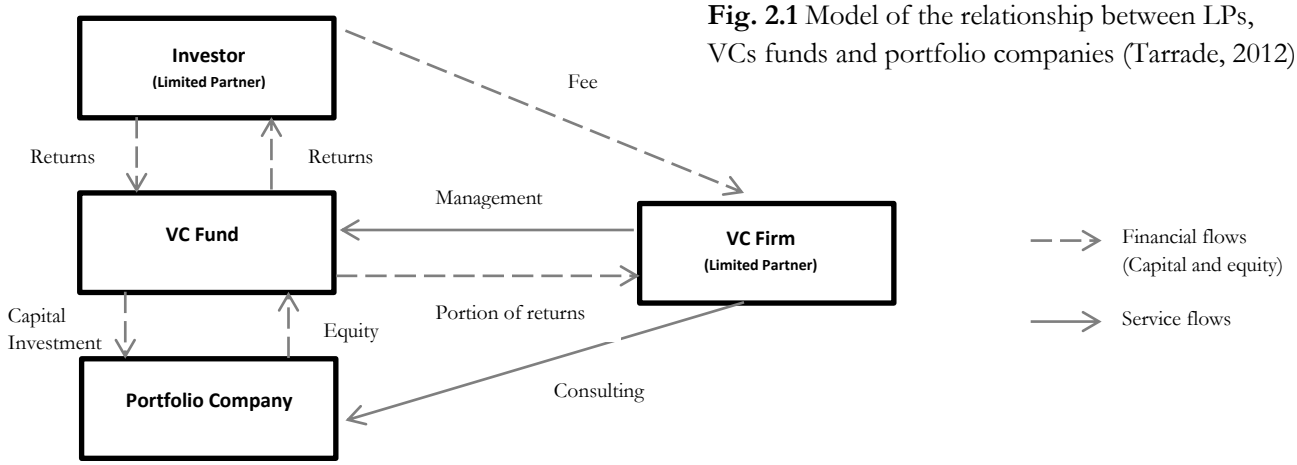


Fig. 2.1 Model of the relationship between LPs, VCs funds and portfolio companies (Tarrade, 2012)

Profitable exits are the only source of capital gains for VCs. For this reasons, they have a central position in the strategy of VCs (Cumming and Macintosh, 2003). Successful exits are quite challenging to obtain and many portfolio companies are kept after the designated fund period. There are five principal exit vehicles and they are ranked in preferential order by a VC as follow: IPO, trade sale, secondary sales, buybacks and write-off. The IPO is often defined as the home run exit (Dimov and Sheperd, 2005). However, the literature differs on whether an IPO or a trade sale results in a higher valuation due to the potential synergy that a trade sale can create for the potential acquirer (Schilit, 1991).

Past studies tend to focus on IPOs. Such bias may be explained by the following reasons. One is that it gives to entrepreneurs and VCs a high return and a strong reputation signal from the IPO exit (Dimov et al., 2006). Another is the lack of data on trade sale exits as no firms are required to publicly disclose information during a trade sale unlike for IPO exits. Nevertheless, after the dotcom bubble, trade sales have become the dominant exit vehicle (Giot and Schwienbacher 2007, Iskalsson, 2007). Trade sales have a more monotonic hazard rate than IPOs, making it a more universal exit route (Giot and Schwienbacher, 2007). Over the period 2007 to 2012, the percentage of firms exited via a trade sale in the Nordics has remained strong, over 25 per cent on average (Figure 2.2). A trade sale can be defined as a strategic acquisition of a firm backed by a VC. The investor receives immediate cash in return as soon as there is a change in the ownership. Instead of cash an exchange of shares can take place between the VC and the company. These shares are then distributed among the limited partners (LP) or sold later on the stock market.

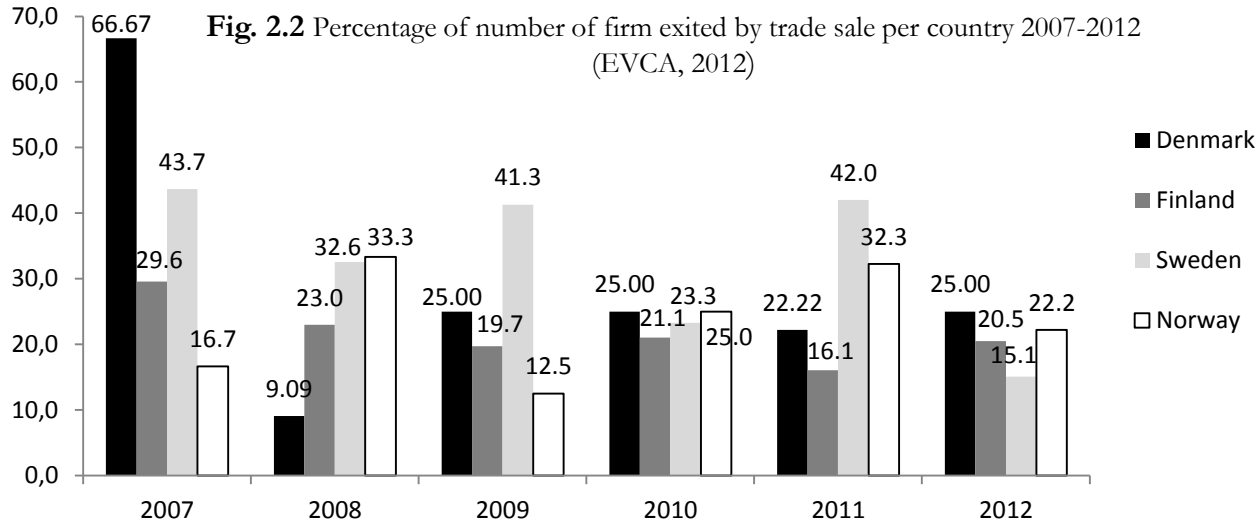


Fig. 2.2 Percentage of number of firm exited by trade sale per country 2007-2012 (EVCA, 2012)

A VC aims to have a successful exit from its portfolio company. IPO exits have been researched more extensively than trade sale exits due to the precedent mentioned reasons such as easy access of IPOs data. The lack of precedent studies on VC-backed acquisition in general and moreover in the Nordic region trigger the interest to know more about the characteristics of such exits.

2.2. Cross-border venture capital benefits: value adding services

The importance of the diversification for risk-averse investors is not something new. Daniel Bernoulli argues in his 1738 article about the St. Petersburg Paradox that risk-averse investors want to diversify: "... it is advisable to divide goods which are exposed to some small danger into several portions rather than to risk them all together". More recently Harry Markowitz, in his paper "Portfolio Selection", mathematically formalized the idea of diversification which reduces the level of risk but not generally eliminates it without changing the expected portfolio return. Thus, an investor's investment thesis should be to maximize the expected portfolio return (μ_p) while minimizing the portfolio variance of return (σ_p^2). In other words, the decision to hold a security should not be properly evaluated in isolation but only as a part of a portfolio.

A VC manages its portfolio company with the same goal that a fund manager of an asset management firm would - maximizing its return while minimizing its risk. Investing internationally is a way to find diversification in a portfolio. Hence, a VC may decide to invest in a foreign country for different reasons. For example, a VC might realize that there is a shortage of interesting investment in its domestic market and that it is more interesting to invest in another market. A VC might believe that it can add value to a foreign portfolio company and thus, creates positive return on its investment. Past empirical research hypothesizes that investors value multinational company as a means of diversifying their portfolios but with only limited empirical results (Morck and Yeung, 1991). However, an international industry survey of 505 VC firms illustrates that diversification of geographical risk is one of the main reasons why VCs are interested in investing outside of their home market (Deloitte, 2006). Even though, researchers have not come to an agreement about the diversification by international firms it seems that it is fairly used in practice. Furthermore, a VC might see a foreign investment not only as a way to create return through an investment in a company. Using the analogy between a VC firm and a multinational firm, a company can increase its market power over suppliers, distributors and customers via internationalization. An international investment may give to a VC a certain recognition from its peers and limited partners. For instance, it can help to convince limited partners for a future fundraising as it shows that the firm has a large market exposure not limited to its domestic market (Tarrade, 2012).

VC-backed companies have a higher chance to go public or to be acquired and at the same time a lesser likelihood to fail compared to non-VC backed firms (Puri and Zarutskie, 2012). In addition to the active management, VCs do more than just providing financial resources to their portfolio companies during the length of their investment. Past studies have acknowledged that VCs are considered to be value-added investors in excess of their monetary support (Hellmann and Puri, 2002; Lerner, 1995; Sapienza, 1992). By participating in a wide range of activities, from formulating and assisting the execution of the firm strategy as well as being part of the recruitment process, VCs contribute to the creation of value (Hellmann and Puri, 2002).

A foreign venture capital (FVC) has a different value-added compared to a domestic venture capital (DVC) on the top of its position as financial investor. A FVC may be able to bring a real industry-specialized knowledge that a DVC would not be able to provide. The experience from the foreign VC market and the past investments enable the access to information and advice that a domestic investor would not be able to offer. In addition, an international network can help in internationalizing a firm to new opportunities and leanings as well as facilitating future round of investment (Chetty and Holm, 2000). Network linkages have been shown to be an important factor in determining the choice of location of foreign direct investment (Chen and Chen 1998). The impact of a FVC in the development of companies is relatively a new field in venture capital research. But it was recognized that a FVC is able to add value in a different manner than a domestic VC would. Using a large sample of Chinese portfolio companies that received VC investments between 1988 and 2011, a recent study by M. Humphery-Jenner and J. Suchard (2013) presented that FVCs significantly increase the likelihood that a portfolio company will be listed on a foreign exchange. It indicates that foreign VCs do indeed contribute to the internationalization

of portfolio companies. In addition, two studies using large samples drawn from ThomsonOne found that companies financed by foreign VCs tend to outperform firms with only domestic VCs (Chemmanur et al., 2010).

VCs adopt different strategies to maximize the return of their investments such as international investment. The internationalization of VC investment has increased over the last two decades and it is expecting to continue. Thus, entrepreneur of successful company face the decision to choose whether to receive investment from domestic and/or foreign VC. Both type of VCs create specific value-added to the company through for example network and experience. Hence, investigating the different investment behavior of both VC and the impact on the portfolio such as on the acquirer's nationality or exit valuation would be interesting.

2.3. Agency theory: control action

An agency relationship refers to a relationship between a party (the principal) who engages another party (the agent) to perform a task on his behalf that involves delegating some decision making to the agent (Jensen and Meckling, 1976). Conflicts of interests arise when the interest of the agent and principal are miss-aligned. Such discrepancies lead to agency problems of moral hazard and adverse selection. The principal can use monitoring or contracting as a mechanism to mitigate agency problems.

Even though there are some limits to the comparison between a VC and an entrepreneur due for instance to the fact that the success of the entrepreneur's venture might be a more important reason than financial motives. It is a common view to designate the VC as the principal and the entrepreneur as the agent. VCs are considered "among the most sophisticated of financial intermediaries at mitigating information asymmetries and agency costs" (Cumming, 2006). Before investing, a VC will perform a thorough due diligence process (Weidig and Mathonet, 2004). At the time of the investment's decision, the VC will structure the investment deal in a legal contract aiming to enforce alignment of the entrepreneur's interests with the VC's preferences. All these steps are implemented to reduce any adverse selection and to create a good structure for the future relationship between the VC and the entrepreneur. However, no contract and no due diligence process can completely eliminate the future morale hazard. As a result, VCs use different mechanisms against moral hazard.

A portfolio company does not immediately receive its needed investment sum from VCs but rather in multiple rounds of investment. Staged financing can help to strengthen monitoring and to mitigate agency problems (Wang and Zhou, 2004). Each round of investment can be viewed as an option to invest for the VC. Following the literature in real option theory, it gives the possibility for the VC to invest, delay or exit depending on the company ability to reach specific milestones such as a specific number of users.

Active monitoring is a way for a VC to hedge against moral hazard. Such involvement may be via a seat on the board of directors, a regular communication and active position in the strategy of the portfolio company. A seat on the board of director is a way to keep control over the decisions of a company and it is even more important

when a company faces challenges such as the replacement of the CEO (Lerner, 1995). Being a board member of a portfolio company is a way to sustain a lasting and trusting relationship between an investor and an investee. In addition, regular communications through informal meetings and visits outside the board meeting are also important. A past research has documented that on average VCs spend 80 hours per year on-site with each of their portfolio companies and visit their portfolio companies on average 19 times per year (Gorman and Sahlman, 1989). Lastly, the involvement of the VC in the strategy of the portfolio company from the recruitment of new employees to the planning of new investment round enables the investor to increase the chance of a successful exit.

Past studies have shown that VCs are more successful when more attention is allocated to a portfolio company. However, the distance between the investor and the investee may increase the intensity of agency problems. A foreign investor does not share the same information and monitoring cost that a domestic VC would. Additional costs may come from the differences in the legal environment, tax system as well as the business habits. The geographic distance adds cost and challenges for a VC to monitor and to mentor portfolio companies (Lutz et al., 2012; Humphery-Jenner and Suchard, 2013).

The cost of monitoring is positively correlated with the distance; a longer distance means a higher cost (Baclcarcel, 2004). Faster and safer methods of transportation such as airlines and trains ease travel possibilities. However, the time spent on a plane or on a bus is a time that a VC will have less for working with a portfolio company or for communicating with limited partners. Furthermore, difference in the language spoken by an entrepreneur and a VC will be an additional hurdle and cost. The innovation in the telecommunication industry with the mobile phone, internet and video conference does not resolve completely the geographic remoteness (Fritsch and Schilder, 2008). Past studies demonstrate that distance is a barrier to timely and effective information exchange by analyzing the difference between VCs located in a distance from 5 minutes to 10 hour travel time from their portfolio companies (Sapienza 1992 Sapienza et al., 1996). In addition to increasing the costs, the distance lowers the intensity of monitoring. The hypothesis made by Gupta and Sapienza that "the extent of VC firm's monitoring and involvement is likely to be inversely proportional to the geographic distance between them and the portfolio company." was confirmed by different studies (Sapienza 1992, Lerner, 1995).

The distance affects foreign VCs in their investment decision and in their monitoring behavior. In order to mitigate the agency conflict, foreign VCs have been found not to be the first investor in early stage companies. A young company in the early phases of its technical and organizational development is more likely to require a higher level of involvement from its investors than a company at a later stage (Gupta and Sapienza, 1992). Domestic VCs seem to be better at supporting a venture in its early development, while the resources of a cross-border VCs are especially valuable in a later phase when international expansion becomes more important (Devigne et al., 2011). Along with investing after a domestic VC, a foreign VC bridges the distance between itself and a growth company by syndicating (Sorenson and Stuart, 2001). The syndication enables the VC to share the risk and potential reward (Fritsch and Schilder, 2008). Syndication can be made with only domestic or foreign

VC but also between a foreign and a domestic VC. The latter is the form of syndication with the highest potential. By partnering with a local VC, a foreign VC can use its knowledge for internationalization and let the domestic VC have a stronger monitoring activity. Furthermore, the foreign VC is able to gain experience and a better understanding of the market which may be useful in future investment.

The impact of a foreign VC on the performance of a portfolio company has yet to be fully documented to give clear evidence. The connection between the geographic distance and the performance of the VC investments was researched. The finding demonstrates that distance is negatively correlated with the likelihood of a successful exit via an IPO or a trade sale (Cumming and Dai, 2009). However, in other studies the argument that a domestic VC adds significantly more value to a portfolio company than a foreign VC has not been proved (Sapienza et al., 1996).

After an investment in a portfolio company, a VC uses different monitoring mechanisms to mitigate any possible morale hazard. The monitoring mechanisms characteristics are different for a domestic and a foreign VC due to distance, market knowledge or experience. Moreover, Foreign VCs are found to invest at a later stage than domestic VC. Hence, understanding the investment behavior of a foreign or a domestic VC on a portfolio company would be interesting for practitioners and researchers.

3. Hypothesis

The thesis aims to shed the light on three topics related to foreign and domestic VC investment in successful companies. One is to describe the characteristics of investments of domestic and foreign VC at the time of exit. The two others are to investigate the impact of a foreign VC and domestic VC on the nationality of the acquirer and on the exit valuation. This section describes the three models that we construct for each of the three topics of our thesis.

3.1. Modeling the determinants of Domestic and Foreign VC

The first model attempts to explain the presence of a foreign and a domestic VC in a successful technology entrepreneurial firm from the Nordics at the time of the trade sale. The Investor variable describes the presence of a VC at the exit time using four dependent variables: at least one domestic VC, at least one foreign VC, at least one foreign and one domestic VC and only domestic VC. As explanatory variables, we have chosen the age of the firm (the time between the firm registration and the exit), the monitoring variables includes number of rounds (staggering investment), number of VCs that a firm received investment from throughout its pre-exit time and a dummy reflecting the presence of a syndication and a syndication composed of a domestic and a foreign VC. In addition, the independent variable representing three business cycles at the time of exit, the technology sectors, and the four Nordic countries are used in the first model.

Dependent variable:

$$Investor = \begin{cases} Domestic\ VC \\ Only\ domestic\ VC \\ Foreign\ VC \\ Foreign\ and\ domestic\ VC \end{cases}$$

Regression Models:

1) $Investor = \beta_1 \text{ Age of the firm}_t$
$+ \beta_2 \text{ Number round}_t$
$+ \beta_3 \text{ Number of VC}_t$
$+ \beta_4 \text{ Dummy Syndication}$
$+ \beta_4 \text{ Dummy Syndication foreign and dummy}_t$

2) $Investor$ = (No constant)
$+\sum \beta_4 \ Business\ cycle_t$

3) $Investor$= (No constant)
$+\sum \beta_5 \ Sector_t$

4) $Investor =$ (No constant)
$+\sum \beta_5 \ Country_t$

3.1.1. Domestic and Foreign VC presence – The Dependent Variable

For the regression analysis, we use four dependent variables to search for differences in the investor behavior. The dependent variable takes the value one if there is a presence of a specific VC and zero if not. The first dependent variable models the presence of having at least one domestic VC in the firm at the time of exit. Due to the very large share of domestic investment in our sample, over 88 per cent, we use the dependent variable only domestic VC. Two other dependent variables are used in our analysis; one modeling the presence of at least one foreign VC and another displaying the presence of the combination of at least one domestic and one foreign VC. For each of the dependent variable, the same independent variables are used in the regression analysis. Hence, we are able to analyze the differences in term of investment behavior between firms with a presence of a foreign and a domestic VC.

3.1.2. Age of the firm – duration

The variable age of the firm (time to exit) is expressed in years from the firm's registration year to the year of exit via trade sale. It is meant to illustrate the influence of the age of the firm on the dependent variable, investor. The time to exit is one of the parameters determining the attractiveness of an investment (Douglas, 1992). A shorter time to exit will increase the present value and the return of the investment for the investor and hence,

increase its attractiveness (Sahlman and Scherlis, 1987). The type of exit affects the duration of VC-backed firms. The likelihood to exit via an IPO increases during the first years and then declines afterward. A trade sale has a more monotonic hazard rate, making it a more universal exit route over time (Giot and Schwienbacher, 2007).

Past studies have not clearly shown evidence on the relationship between the location of the investor and the time to exit. In a past study, no evidences were found on the impact of the distance on the exit speed or the value growth (Cumming and Dai, 2009). In addition, the level of value-adding from the VCs has been seen to be negatively correlated with the time to exit for a company (Giot and Schwienbacher 2007). A higher level of monitoring through for example syndication is expecting to shorten the duration (Esbenlaub et al., 2009). Thus, following the idea that a higher level of monitoring such as a higher number of rounds will influence the time to exit, we are expecting that firms with only domestic VC take on average more time to exit than firm with both foreign and domestic VCs. As we discussed in the section two, foreign VCs are expected to have more monitoring mechanisms than domestic VC.

Hypothesis 1: Firms with only domestic VC are younger at the time of exit via trade sale than firms with presence of at least one foreign VC.

3.1.3 Monitoring

A limited number of previous studies investigate the difference in monitoring between a domestic and a foreign VC. As seen in the literature review of the agency theory, distance has an effect on the way monitoring is done. Foreign VCs have been shown to invest at a later stage than domestic VCs (Devigne et al., 2011). In addition, syndication has been seen as an important form of monitoring mechanism for foreign investors (Sorenson and Stuart 2001). However, there are mixed evidences of real differences in monitoring between foreign and domestic VC firms. Even though it seems that foreign VCs are more involved at a strategic level whereas domestic VCs are more active at an operational level (Pruthi et al., 2003). In order to get a better understanding of the monitoring of a domestic and a foreign investor, we use three independent variables: number of rounds, number of VCs and syndication.

Number of rounds/Staging investment

Staging investment in successive rounds is a common tool used by VCs. Staging is defined as an instrument for controlling agency risk and allowing the investor to use each round as an option to stop or to continue financing in a portfolio company (Gompers, 1995). In addition, there is a positive relationship between the number of rounds and the quality of the company's country legal enforcement. Investors prefer to obtain directly larger stakes in companies that are located in countries with inferior legal protection in order to avoid problems with being a small stakeholder (Balcarcel et al., 2009). Furthermore in a recent study by Tian (2011), the substitute relationship between staging and monitoring is examined as well as how staging decisions depend on the proximity between VC and company. The research shows that staging is more likely when there is greater geographic distance between a portfolio company and a VC firm.

Hence, as the Nordic countries have a good reputation for their legal enforcement (The World Justice Project, 2013). We are expecting that overall the number of rounds is important. In addition, the number of rounds is assumed to be higher for firms with a presence of foreign VC compared to the one with only domestic VC, as foreign VCs are expected to use more monitoring mechanisms.

Hypothesis 2: Overall, with a high quality of legal enforcement in the Nordic countries, we expect on average a large number of rounds in our sample. In addition, firms with foreign investors are expected to have a higher number of rounds than firm with only domestic VC.

Syndication

In a syndicated deal, a number of VCs co-invest in a company. On the top of sharing their financial resources, investors share risk and the potential gain that the investee may bring in the future (Mäkelä and Maula 2008). Furthermore, the portfolio company will have access to a larger network for potential partnerships and acquirers. Hence, the firm will see more value from a syndicated round rather than from a sole investor round. As evidence of this added value, past studies have shown that the time to exit of a company diminishes with the presence of a syndicated round.

A Foreign VC may see syndication as a way to partner with a domestic VC to mitigate potential agency problems. Domestic investors are likely to be the lead investors as they have easier access to the portfolio company while foreign VCs are likely to have a more strategic approach and a lesser level of monitoring (Fritsch and Schilder, 2008). The investor's distance was shown to be negatively correlated with the probability of success. Hence, syndication by a foreign and a domestic VC is a way to increase potential investment success. However, the presence of a local syndication partner is positively correlated with success of a foreign VC investment. The syndication between a domestic and a foreign VC mitigates the negative effect of the distance (Chemmanur et al., 2010).

The first independent variable modelizes the presence of a syndicate round of investment and the other the presence of a syndicate round composed of a domestic and a foreign VC. From past studies, we expect to see a positive relationship between the presence of a syndicated round and a foreign investor. In addition, the presence of syndication should also be positive in firms with both foreign and domestic investors. Firms with only domestic investor are not expected to have a strong relationship with the presence of syndication.

Hypothesis 3: There exists a positive relationship between syndication and a foreign VC and there is a negative one between syndication and a domestic VC. Furthermore, firms with only domestic VC are expected to have a low level of syndication unlike firms with both foreign and domestic VC.

Number of VCs

At each round of investment, early investors can decide to keep investing or to sell their stake as well as holding their position. In addition, new investors can join through syndication or independently in another round. Foreign and domestic VCs do not share the same investment timing. Early investment stages are dominated by

the presence of domestic VC and later investment stages have a larger share of foreign investors. Domestic VCs seem to have a competitive advantage for supporting a venture in its early days, while the resources from a foreign investor are especially valuable in a later phase when international expansion becomes more important (Devigne et al., 2011).

At each round of investment, a VC will collect and analyze relevant information to perform a thorough due diligence. The additional costs that foreign VCs experience encourage the selection of a lead investor responsible for the due diligence, and the main responsibility to be present for the portfolio firm (Lerner, 1994; Sahlman, 1990).

The independent variable number of VC defines the total number of VC that a successful technology firm has received investment from during its time pre-exit. It illustrates the relationship between the investor and the number of VCs. It is expected that firms with only domestic investor at the time of exit will have a lower number of investors. On the other hand, firms with a foreign VC and from both foreign and domestic VCs at the exit time will have a higher number of investors. Foreign VCs do not generally invest alone. They prefer investing with other investors to mitigate risk and to combine their knowledge and networks. In addition, the higher the numbers of rounds the higher the chances are to have a high number of VCs.

Hypothesis 4: We expect to see a positive relationship between the presence of a foreign VC and the numbers of VCs and the opposite relationship for a presence of at least one domestic VC. Firms with only domestic VC are expected to have a lower number of VCs compared to other groups of Investor. Companies with at least one foreign VC and companies with both foreign and domestic VCs are expected to have a large number of VCs. Moreover, Firms with both domestic and foreign investors are expected to have the largest number of VCs.

3.1.4. Industry

A characteristic of technology VC investment is that foreign investors have been seen to be more represented in certain business segment. It is argued that investments in capital intensive company such as hardware or semi-conductors need more face to face and operating intervention than an internet firm (Jungwirth et al., 2004).

In the technology sector, we can distinguish different sub-sectors from telecommunication to software. In this thesis, we organize our sample in eight groups[2]: Telecommunication, Equipment, Internet, Semi-conductor, SaaS - Software as a service, Software, Games and Other (IT Consulting, accessories). In addition, segmentation is created by differentiating a company with a need of a large investment (High Capex) and another with lesser investment need to start its venture (Low Capex). Large investment needs can be due to large R&D expenses, expensive proof of concept and manufacturing facility. Such groups correspond to Telecommunication, Equipment and Semi-conductor. The other groups with less needed investment to start a company include Internet, Semi-conductor, SaaS - Software as a service, Software and Games. Lastly, we do not include the segment Others in either of the Capex set.

[2] See appendix for detailed description of each sub-group

Domestic investors are expected to be present in all sectors. However, it is anticipated that some sectors are more represented than others. For example, segments with cutting edge technology which require large investment and very specific knowledge with at the same time a high level of uncertainty may be more represented by investment from specialized foreign investors than domestic ones. Most foreign VCs have a specific investment profile, and specialize in certain industries (Zider, 1998). Foreign specialized VCs are able to have a competitive advantage compared to domestic investors as they may have more experience and knowledge to assess a company's prospect and to sustain the growth of a company.

The due diligence process and the monitoring of technology companies is not the same for every technology segment. Some firms require more on-site access than others. For example an internet firm may be able to share more easily its product's development as most of its business is dematerialized and available on the internet. On the other hand, a semi-conductor company needs a different due diligence process with more face to face contact and manufacturing facility control. An argument is that foreign VCs may choose to invest in firms requiring more capital and where they can use at best their knowledge in cutting edge technology. A recent analysis on the Nordic regions confirms that foreign VCs typically invest in larger ventures, requiring more capital. While domestic VCs have somewhat smaller investments than others. Thus, we expect to see a positive relationship between the presence of a foreign VCs and sectors requiring large investment (High Capex). Alternatively, domestic investors are expected to be over represented in sectors such as Internet and Gaming (Low Capex) with less capital intensive than High capex firms.

Hypothesis 5: Domestics VCs are presents in the entire eight sectors but with a lesser importance in large capital investment one. Firms financed with only domestic VC will be predominantly seen in firms in the Internet and Software business broadly defines as Low Capex. Finally, foreign VCs will have a positive relationship with high capital expenditure's firms, high Capex.

3.1.5. The Business Cycle

Unlike an IPO, a trade sale is a more universal exit channel as not only the most successful portfolio company can exit via this route. Past studies have shown that an IPO tend to be the most preferred exit route for VCs (Lerner, 1994; Cumming and MacIntosh, 2001). However, the IPO market in Europe has never recovered after the tech-bubble in 1998 to 2001. After the burst of the dot-com bubble, trade sales have become an important way to exit as seen previously in our section number two. The exit route via a trade sale is not only for the most prosperous firm but also for less profitable venture. In addition, trade sales are less correlated to business cycle than IPOs and thus, they are much less dispersed over time (Giot and Schwienbacher, 2003).

The business cycle variable's influence on the dependent variable is approximated by the time period the portfolio company is exited. The study periods in this thesis starts in 1998 and ends in 2013. Three business cycles are analyzed the first one is defined as the tech-bubble from 1998 to 2001, the second one starts from 2002 and ends in 2007 and finally the last one is the period of the financial crisis from 2008 to 2013.

The greater heterogeneity in the type of firms and the lesser relationship interaction between trade sale exits and business cycles enable to compare the investment behavior over time of domestic and foreign VCs. The relationship between a business cycle and an investor give a better understanding of the presence of foreign and domestic investor over time in successful Nordic firms. Hence, it is expected to see a stable proportion of domestic VCs over time. On the other hand, a greater presence of foreign VCs over time is expected due to the increase of interest for Nordic technology firms over the past years (Reuters 2012).

Hypothesis 6: The number of trade sales is expected to increase after the tech bubble. The presence of domestic VC is expected to be stable over the three business cycles. On the other hand, the presence of foreign VC is expected to increase over time.

3.1.6. Country of Origin

The firms of our dataset are all from the Nordic regions which include four countries: Sweden, Norway, Finland and Denmark. The Nordics are often defined as one of the world's most attractive region for building a start-up. All the four Nordic countries are in the top 10 of the best countries to start a company ranking (Appendix 15). In addition, they have leading positions in the global innovation index (Appendix 15). Each of the four countries has its own language, own currency and respective competitive advantage. However, the region appears to be integrated with a remarkable high level of attractiveness from foreign investment. Since the burst of the tech bubble, foreign direct investments (covering all M&As and greenfield investments) into the Nordics have grown 50 per cent faster than the EU15 average. In addition, the overall economic growth outperformed the rest of Europe in term of business cycle and other indicators. Different reports such as the one by Menom publication (2010) and by Norden (2011) examined the growth of cross-border investment in the Nordics. Between 2007 and 2010 approximately EUR 501 million was invested in the Nordics from European VCs (Menom, 2010). The technology sector has been really booming in the Nordics over the last 15 years with approximately 9 per cent of the worldwide billion dollar exits between 2005-09 from Nordic countries (Creandum, 2012) such as Skype or Qliktech. In addition, the Nordic region has a strong position in Europe with many promising companies which have not yet exited through IPO or trade sale such as Spotify or Klarna.

Sweden is the largest country in term of inhabitant and GDP size in addition; it has the most mature private equity market. On average Nordic countries have between 25 and 30 per cent of investments made by foreign VCs. Sweden is attracting more venture capital relative to the size of its economy than any of its European neighbors over the past five years. Sweden is benefiting from a strong heritage in design and engineering as well as a wired population keen for innovation (Reuters, 2012). On the other hand, Norway has the lowest share of investment from foreign investor and a strong domestic VC market (Norden, 2011).

The Nordic region is an interesting geographical area to analyze the relation of foreign and domestic VC and technology firms. We expect that foreign investor and Sweden have a strong positive relationship while others Nordic countries have one with a lesser magnitude. In addition, domestic VC investments are expecting to be important in all the four countries but with a stronger presence in Norway.

Hypothesis 7: We expect to see a strong presence of domestic VCs in all the four countries. Sweden is expected to display a strong presence of foreign investment and Norway is expected to have the strongest domestic market.

3.2. Modeling the relationship acquirer and investor

Dependent variable:

$$\text{Acquirer} = \begin{cases} VC\ nationality = Acquirer\ Nationality \\ Domestic\ VC \\ American \end{cases}$$

Independent variable:

$$Investor = \begin{cases} Domestic\ VC \\ Only\ Domestic\ VC \\ Foreign\ VC \\ Foreign\ and\ Domestic\ VC \end{cases}$$

Regression Model:

1) $$\text{Acquirer} = \beta_1\ \text{Number round}_t + \beta_2\ \text{Age of the firm}_t + \beta_3\ \text{Number of VC}_t + \beta_4\ Investor + \beta_5\ Dummy\ US\ VC$$

3.2.1 Complementarity of investor and acquirer

The second model aims to present the relationship between acquirer and investor. More precisely, it seeks to show evidence of the impact of the presence of a VC either domestic or foreign on the nationality of the acquirer. There are three dependent variables which takes a binary value (1 or 0) depending on the type of acquirer of the portfolio company. The acquirer variable designs the dummy variable such as: one of the VC shares the same nationality as the acquirer; one of the VC and the acquirer share the same nationality as the portfolio company (domestic VC) and lastly, the acquirer is from the United-States. In our regression analysis, we choose to add also the variable Investor as an independent variables representing the monitoring effect (number of rounds, number of VC, syndication) and the performance (age of the firm). The main objective of the model is to investigate the relationship acquirer and investor. Hence, we do not use additional independent variables and we do not analyze the determinants of monitoring and performance linked to the acquirer which may be interesting to analyst for a future studies.

A precedent research finds that the presence of a common VC in the target and acquirer firm affects the chance to have a successful acquisition as well as the purchase price (Gompers and Xuan, 2009). In addition, a VC shares its network and knowledge on a specific geographical market. A foreign VC is able to have a positive role by legitimizing the unknown firm in that market (Mäkelä and Maula, 2005). A foreign investor can raise the awareness of a company outside the domestic market of the firm to potential new business partners, investors and acquirers.

The literature related to cross-border M&A highlights the obstacle that an acquirer and a target company may face. The international span creates additional challenges to the cultural integration process (Shimizu et al., 2004). The costs experience by a firm operating in a different market than the target company are sometimes defined as a "liability of foreignness" (Zaheer, 1995). In addition, potential synergies from international M&As are not quite supported by empirical evidence, "Only lawyers, investment bankers and original sellers have prospered in most of these acquisitions, not shareholders" (Porter, 1987).

With such level of uncertainty, international M&As drive acquirers to have a thorough due diligence process and to carefully choose the right target firm. One common reason of fail international M&A is the lack of attention to the target company's culture including leadership and communication. Differences in management style and business logic may create challenge in the post-acquisition period. Even though the theory predicts that the more culturally distant is the M&A the more successful it will be with the synergies. Empirical evidences have shown that acquirer firms may be quite reluctant to change and that the performance post-acquisition of a firm located in a distant market often draw poor performance (Lee, Shenkar, and Li, 2008; Li and Guisinger, 1991).

A common culture between a VC and an acquirer company may be a catalyst for diminishing the uncertainty level and increasing the probability of a successful trade sale. The main value-adding activities for the portfolio company from a VC are the assistance and the financial and strategic advice. Examples of such assistance can be found through strategic advice, recruiting management or mentorship. In addition, the access to the investor network enables to increase contact for potential future acquisition or partnership. A VC acts as a bridge builder between the acquirer and the target, reducing information asymmetry by conveying information between the two firms through his personal relationship (Gompers and Xuan, 2009). An acquirer company faces a great level of uncertainty when acquiring a fast-growing company and it relies on the prominence of the affiliates of the target firm to make its judgments on the firm potential (Stuart et al., 1999). Thus, firms backed by prominent VC partners are expected to perform better than comparable ventures lacking such prominent partners.

The presence of a VC may be interpreted by the acquirer as a signal that the target firm has a certain quality level. In addition, the presence of a VC sharing the same nationality as the potential acquirer may be seen as a strong advantage. The target company may have a better position to apprehend the culture of the acquirer company as the investor would have shared its previous mentorship and strategic advice with the acquirer company. It is expected to see a positive relationship among firms sharing the same nationality between at least one of their VCs and their acquirer. In addition, an American acquirer is expected to have a positive relationship with the

presence of an American VC or other foreign investor. American VCs are often considered as the ones with the most experienced, knowledge and networks. Hence, when an American VC invests in an European firm, it is a signal that the target company is seen as very promising. For example, in our sample, 50 per cent of the firms exiting with a value estimated worth more than EUR 100 million received investment from an American VC.

Hypothesis 8: We expect to see a positive relationship between the nationality of an investor and the one of the acquirer. More precisely, the presence of a domestic VC in a firm will have a positive effect on the presence of a domestic acquirer. In addition, the presence of an American VC will increase the chance for a firm to be acquired by an American company.

3.3. Modeling the determinants of the exit valuation using Price/Sale multiple (PSR)

Dependent variable:

$$Investor_t = \begin{cases} Domestic\ VC \\ Only\ domestic\ VC \\ Foreign\ VC \\ Foreign\ and\ domestic\ VC \end{cases}$$

Regression Models:

1) $$\text{PSR} = \beta_1\ \text{Number round}_t + \beta_2\ \text{Age of the firm}_t + \beta_3\ \text{Number of VC}_t + \beta_4\ \text{Dummy Syndication}_t + \beta_4\ \text{Dummy Syndication foreign and dummy}_t$$

2) $$\text{PSR} = \beta_1\ \text{Number round}_t + \beta_2\ \text{Age of the firm}_t + \beta_3\ \text{Number of VC}_t + \beta_4\ Investor_t$$

3) $$\text{PSR} = \text{(no constant)} + \sum \beta_4\ Business\ cycle_t$$

4) $$\text{PSR} = \text{(no constant)} + \sum \beta_5\ Sector_t$$

5) $$\text{PSR} = \text{(no constant)} + \sum \beta_6\ Country_t$$

The third model aims to present the relationship between the exit valuation using the multiple price to sale ratio (henceforth PSR) and the Investor variable. The impact of the presence of domestic or foreign investor on exit valuation is interesting for practitioners and researchers. It is a rare opportunity to have been able to gather

information on the exit multiples of technology Nordic firms. We use the same independent variables that we use for the regressions in the model number one. The explanatory variables comprehend monitoring variable (number of rounds, number of VC, syndication), investor presence at exit (domestic, only domestic, foreign, both foreign and domestic), performance (age of the firm) and some additional variables such as business cycle, sector and country.

3.3.1. Price/Sale Multiple ratio – dependent variable

Internet stocks first put the price/earnings (PE) aside as many firms exited through IPO and trade sale during the tech bubble (1997-2001) without profit at the time of their exits. In this case profitability does not drive the market valuation but it is driven by the promise of future earning and high future growth revenue. Thus, firms with a high PSR have more potential risks as the assumption of potential high growth is dependent on the realization of such high growth. In case that the expected growth does not materialize the valuation will dramatically drop.

The PSR reflects the investor belief that revenue is more important than profit. For early stage companies, revenue is a proxy for marketplace acceptance and market share because these firms often do not yet achieved profitability at time of exit. The PSR creates a common measure for comparing companies and their investors' expectations on that basis. Unlike with a PE ratio where earnings can be manipulated through write-offs and other accounting adjustments, sales figure give a much more clear representation of the financial situation of a company.

The PSR is the company's price at the time of the trade sale exit divided by the trailing twelve month sales. A company trading at a PSR of less than one such as 0.8 means that you can buy for one euro of the firm's sale for only 0.8 euro. One key determinant of the PSR is the profit margin. A decline in profit margins has a two-fold effect. First the reduction in the profit margins reduces the price to sales directly. Then, lower profit margin can lead to lower growth and a lower PSR (Damodaran 2013). All technology firms do not share the same profit margin and variation does happen among the different industry groups. For instance, E-commerce firms have a lower profit margin than software companies.

Out of our 284 observations, we were able to gather the exit sale price and the sales figure for 126 observations. Even though, we were not able to find information for our entire sample, the observations give the possibility to have a better understanding on the determinants of the exit valuation and more specifically the relationship between investor and PSR exit valuation. A positive independent variable coefficient increases the PSR ratio and implies that the market perceives the firm with a high potential growth in the near future. A negative independent variable coefficient decreases the PSR ratio and consequently mitigates the expected future growth of the company.

3.3.2. Independent variables – Investors

As seen previously in the model number two about the relationship between the acquirer and the investor, there is a high level of uncertainty about the future growth and the asymmetric information when an acquirer evaluates

a target company. Most of private VC-backed firms have little operating history and few customers or hard assets. VCs help to legitimize the portfolio company to prospect investors and prospect acquirers through the VC's network (Sapienza and Timmons 1989; Ehrlich 1994).

The investor presence has an impact on the exit valuation. Research reveal that underpricing in IPOs is a less common phenomenon compared to non-VC backed firms, although the performance is not significantly different over a longer period of time (Cumming and Macintosh, 2003; Megginson, 1991). In the case of a trade sale exit, the legitimation role of the VC was shown to be not as important as for the exit valuation during an IPO (Cumming and Johan, 2008). The acquirer is more able to perform a thorough due diligence than shareholders. Nevertheless, VCs have reasons to help to value at a fair price the acquisition of one of their portfolio company. Trade sales have become a common exit route and VCs are repeatedly "staking their reputation" on not selling overvalued assets to other companies. The reputation of a VC to sell at an overvalued price may tarnish its reputation in the long run. For instance, it may have damaging effects on potential future trade sales as buyers would be reluctant to trust VCs known for inflating the valuation of their portfolio company (Gompers and Xuan, 2009).

As seen in our literature review about the difference in monitoring between domestic and foreign VCs, foreign investors often invest after domestic investors. A recent paper studies about how cross-border VC as opposed to domestic VC influence the development of their portfolio companies over seven years after their investment (Devigne et al., 2010). Findings demonstrate that cross-border VC-backed firms exhibit higher sales growth compared to companies backed by only domestic VC after a couple of years. In addition, firms receiving syndicate investment comprising both domestic and foreign VCs grow to the biggest sales generator. Moreover, foreign VCs seem to add value with their international networks and specialized industry knowledge. A portfolio company seems to reach a level of sales and growth that a firm with only domestic VCs is yet to have.

We expect that the PSR differs with the presence of a foreign and a domestic VC. Domestic investor's variable is expecting to increase the PSR and to have a higher ratio than firm with at least one foreign VC. Moreover, firms with only domestic VCs are expecting to have the highest PSR ratio. The intuition is that firms with only domestic VC are not at the same business evolution than firm with foreign VCs. The latter have been able to use international network and specific knowledge that helped to increase the sales. Hence, the acquirer is expecting to see a higher growth in the future when buying a firm that has received investment only by domestic VC compared to a firm with a foreign VC.

Hypothesis 9: We expect to see a positive relationship between the presence of a domestic VC and the PSR. Moreover, firms receiving investment only from domestic VCs are expected to have the highest PSR among all PSR's group.

3.3.3. Independent variable

In addition, to the variable Investor, we use the same independent variables as in the model number one. Even though, the focus of the third model is to seek the relationship between domestic and foreign VC and the PSR,

the relationship between the variables such as monitoring or country gives a better understanding of our PSR sample. The past literature findings have been presented in the model one about the independent variables hence, we only present the hypothesis for each of the below variables.

*Monitoring (*Number of rounds, VC, syndication): Each of the monitoring variables is expected to be seen positively by the acquirer. Hence, monitoring variables are expected to be positively related to the PSR.

Performance (Age of the firm): As seen before the time to exit is one of the parameters determining the attractiveness of an investment (Douglas, 1992). A short time to exit may give high expectation of growth of sales and profit for the future as the firm has not yet shown all its potential. On the other hand, as a company gets older, the expectation decreases. The age of the firm is expected to have a negative relationship with the PSR. A younger firm will have a higher PSR compared to an older firm.

Business Cycle: The tech bubble is expecting to have the highest PSR among all three business cycle. This period is defined as a period of overvaluation. The third period, 2007-2013, appears after a number of successful exits in the Nordics which might have triggered the interest of a large number of investors. We expect to have a higher PSR for the third period compared to the second period. However, the level of the period number three and two is not expected to be similar than the first business cycle.

Sector: Firms in sectors such as Internet, gaming, SaaS and gaming have historically higher PSR valuation compared to other such as Telecommunication (Damodaran, 2013). We expect to see these sectors with the highest exit valuation among our eight industries.

Country: It is quite difficult to predict that a country in the Nordics will have a premium or a discount effect on the PSR exit multiple. A study from Norden (2010) mentioned that data on cross-border divestments is limited as the nationality of acquirers in trade sales exits is not available. Hence, we cannot draw an hypothesis on the country effect on the PSR.

4. Methodology and Dataset

4.1. Data collection and sampling

4.1.1. Dataset

The challenge for researching on acquisition of VC-backed company is multiple but it is mainly driven by the relatively few data points publicly available (Da Rin et al., 2010). Previous studies have shown that databases such as VentureOne or Venture Economics do not include all information about American private company backed by VC and exclude on average 15 per cent of financing rounds information (Kaplan et al., 2002). The information on European VC-backed companies is even more difficult to obtain than the one about American VC-backed firms. Due to the lack of market publication requirements of endowment in the European Union most top-performing European funds do not publish their financial data. There is a very small dataset available

in Europe with only 21 per cent of funds in database representing only 15 per cent of the industry (Earlybird, 2011). This makes it difficult to obtain information about the investors and the round of financing for companies. Past studies about VC used different data sources. A recent survey by Da Rin et al. (2011) present the five most used data sources from commercial databases, to hand-collected survey or proprietary dataset. However, given the variety of data sources, the choice of the research questions impacts the choice of the data source.

Previous studies focusing on IPO were able to gather information from firm prospectus (Hallström and Yazdani, 2008) but it exists no public digital storage for private trade sale exits making any study challenging. In this thesis, the main list of observations of trade sales was extracted from a proprietary database of a well-known Swedish VC. The Swedish VC has been gathering information on the exit of technology VC-backed companies from the Nordic region since its inception. The dataset offered an unprecedent set of observations. The Swedish VC firm used different sources such as interviews, press releases or commercial databases to create its proprietary database. Even though this dataset offered a good insight of the Nordics firm exits there were some limitations. First, the dataset did not focus only on trade sale exit but also included IPO, LBO or MBO. Moreover, even though the dataset presented information on the acquirer and the investor nationality, the proprietary database lacked information on other variables such as number of rounds, VCs or presence of syndication.

Therefore, using different commercial databases such as ThomsonOne or Zephyr, we gathered approximately 90 trade sale exits to the proprietary database. We added for each of the 284 firms used in our regression models more than twenty independent variables such as a dummy variable modeling the presence of syndication. The collection of information creates a unique dataset for the purpose of this thesis with observations spanning over 284 Nordic firms[3] from 1998 to 2013. From our knowledge, it is one of the most complete dataset of Nordic trade sales created. Lastly, the third model uses a sub-sample, 126 out of the 284 observations. The limitations on the information of the exit price and sales value lead to a smaller sample. Nevertheless, it is one of the first studies to gather information on a substantial number of exit valuation multiples, more than 100, and on different information on Nordic technology trade sale exits.

Short list of Trade sale

The following criteria were used in order to exclude firms that were not in line with the definition of technology firm backed by venture capital in the Nordics for our thesis:

Age of the company: Firms with more than 30 years between foundation and trade sale were excluded as they appeared no to share the same capital and managerial constraints characterizing entrepreneurial firms.

Non-trade sales Exit (IPO, Management and Leverage buy out…): These companies do share the same characteristics that trade sales exit firms have.

Incomplete information: Each firm must have all the information use in the independent and dependent variables in order to be incorporated in our dataset.

[3] The names of the 284 firms used in this thesis are not disclosed due to confidentiality reasons linked to the venture capital proprietary database.

4.1.2. Definition of Investor and Acquirer

Investor

The differentiation between domestic and foreign VC is at the center of this thesis. Following the definition that a cross-border VC investment is defined as an investment made by a VC in a portfolio companies located in another country than the country from which the investment pool is managed (Mäkelä and Maula, 2005). For example, an American VC managing its fund in Palo Alto, CA and investing in a technology firm in Stockholm is defined as a foreign VC investor. On the other hand, a Swedish VC managing its fund in Malmö and investing in a technology firm in Stockholm is defined as a domestic VC investor.

A differentiation between a foreign VC based in the Nordic region and based outside the Nordic region would have been interesting but we decided not to include this differentiation due to the limited number of observations and the lack of previous research on the comparison of domestic and foreign investment in the Nordics. We range in the same group of foreign investor a Norwegian VC investing in Sweden and managing its fund in Norway and a French VC investing in Sweden. Lastly, an effort has been made to investigate the location of the fund management. Several VCs have offices located in several countries; however, these offices are often only used for representation and the investment decisions are not made in these offices.

Acquirer

The acquirer variable defines three categories. One with a shared nationality between the acquirer and one of the VC presents at the time of exit, another for which the acquirer and company are from the same country (domestic acquisition) and finally one for which the acquirer is American.

4.2. Regression analysis

4.2.1. Probit regression

We used a Probit regression in the first two regression models where we analyze the domestic and foreign investment characteristics and the relationship between acquirer and VC. In the Probit regression, the dependent variable is a binary outcome variable. It takes the value zero if a company has no foreign investors and one if there is a presence of a foreign investor at the time of exit. The independent variable includes firm age, number of rounds and VCs as well as market cycle dummies, sector dummies, and country and market condition. The binomial distribution of the dependent variable is captured by the Probit regressions.

One has to note that multicolinearity appears when the three dummies of market cycle or the four dummies of countries or the eight dummies of sector are used in a same regression. In order to avoid such problems, it is possible to use a regression without one of the independent variable such as only two of the three business cycles. With this method, the coefficient variables found in the regression should be carefully analyzed. The omitted independent variable's coefficient value is found in the constant coefficient variable and the other variables value represent the difference in value compared to the constant's coefficient. For example, if the constant coefficient is 0.5 and the coefficient of the business cycle two and three are 0.002 and 0.004. It means

that the coefficient of the independent variable of the first business cycle is 0.5 and the coefficient of the business cycle two is 0.5002 and three is 0.5004. In this thesis, we use another method consisting of a regression without a constant. Hence, we are able to keep all the independent variable in one regression. Using this process, the independent variable's coefficient and the T-statistics found have the same interpretation as in a regression with a constant. The coefficients are easy to read and there is no need for further computation to derive the value of the independent variable's coefficient. However, the R-square should not be taken into account as its approximation in the case of a lack of constant does not give reasonable information. A Logit regression model could have been implemented; however, as the dependent variable only take binary variables and no value between 0 and 1 (e.g. 0.85) the Probit regression seems more adequate by definition.

4.2.2. OLS regression

In the third model, unlike in the two others the dependent variable price to sale ratio (PSR) is a continuous variable. The regression uses the ordinary least squares (OLS) which is a method for estimating the unknown parameters in a linear regression. This method minimizes the sum of squared vertical distances between the observed responses in the dataset and the responses predicted by the linear approximation. The independent variable used are the same as the one in the first model in addition to the dummy variable of VC nationality (i,e. domestic, only domestic, foreign and both foreign and domestic).

5. Descriptive results & Foreign and domestic VC

The thesis investigates the presence of foreign and domestic investors within three aspects. First we analyze the determinants of domestic and foreign VC in Nordic technology firms exited via a trade sale then the assumption that a foreign or a domestic VC impacts the acquirer's nationality and finally by examining the determinants of the exit valuation using the PSR. Each section has a descriptive analysis of the data and then a regression analysis using a Probit or OLS regression.

5.1. Descriptive results & Foreign and Domestic behavior

The first section investigates the factors determining the presence of domestic and foreign VC investors in Nordics Technology firms at the time of exit via trade sale. In this part, the sample is composed of 284 firms.

5.1.1. General descriptive results:

The section gives a descriptive analysis of the sample use in our thesis. First, the distribution characteristics of domestic and foreign VCs are analyzed in addition to the sector, business cycle and country. The characteristics of the firms such as age and monitoring are presented as well. This section intends to give a better understanding of our overall sample that we use in our thesis.

Table 5.1a Domestic and Foreign capital frequency

	Foreign VC		
Domestic VC	No	Yes	Total
No	0	36	36
Yes	140	109	**248**
Total	140	144	284

Table 5.1b Domestic VC presence and Only Domestic VC

	Only presence of Domestic VC		
Domestic VC	No	Yes	Total
No	36	0	36
Yes	108	**140**	248
Total	144	140	284

Frequency tables of presence of VC. For example, in the table 5.1a, there are 109 firms with a presence of at least one domestic and one foreign VC. In the table 5.1b, there are 140 firms with presence of only domestic VC.

The two tables, 5.1a and 5.1b give a better understanding of the proportion of domestic and foreign investors in our sample of VC-backed technology firms. 248 firms out of the 284 firms (i.e. 85 per cent) have at least one domestic VC at the time of exit. Such high level of domestic presence in our sample and the relative size of the group without a domestic VC (i.e. 36/284) make quite challenging finding a pattern determining the presence of at least one domestic VC. Hence, we use the presence of a company with investment from only domestic VCs, present in 140 out of 284 firms (i.e. 49 per cent), to shed the light on the effect of domestic VC on firms and to compare it against the presence of foreign VC.

Table 5.2a
Foreign VC and Foreign VC not from Nordics

	Foreign VC not from Nordics		
Foreign VC	No	Yes	Total
No	140	0	140
Yes	52	92	**144**
Total	192	**92**	**284**

Table 5.2b
Foreign VC and Foreign VC from Nordics

	Foreign Nordics VC		
Foreign VC	No	Yes	Total
No	140	0	140
Yes	64	80	144
Total	204	**80**	284

Frequency tables of presence of VC. For example, in the table 5.2a, there are 92 firms with a presence of at least one foreign VC not from the Nordic region. In the table 5.2b, there are 80 firms with a presence of at least one foreign VC from the Nordics. In the table 5.2c, there are 47 firms with at least one American VC.

Table 5.2c
Foreign VC and American Foreign VC

	Foreign VC		
US_dummy	No	Yes	Total
No	140	97	237
Yes	0	**47**	47
Total	140	144	284

The share of firms with at least one foreign VC is quite significant with presence in 144 out of 284 firms or 51 per cent (Table 5.2a). The foreign VC group can be divided in two sub-groups with VCs from the Nordics such as a Swedish VC investing in Denmark and foreign VCs from outside the Nordics such as an American or German VC. The presence of Foreign VCs from outside the Nordic region is more important than the presence of Nordics foreign VCs, 92 > 80 firms (Table 5.2a & 5.2b). It is quite interesting to see that foreign VC from

outside the Nordics VCs represents an important share of the total investors in technology firms. In addition, American investors have the most important presence in foreign VCs from outside the Nordics with 47 firms out of 92 firms or 52 per cent (Table 5.2c). Hence, American VCs have a strong presence in the Nordic region. Cross-border investment inside the Nordic region has also a strong position despite not being as important as from outside the Nordics which is in line with previous analysis such as Menom (2011).

Fig. 5.1a Firm proportion of B2B & B2BC

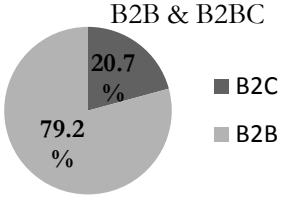
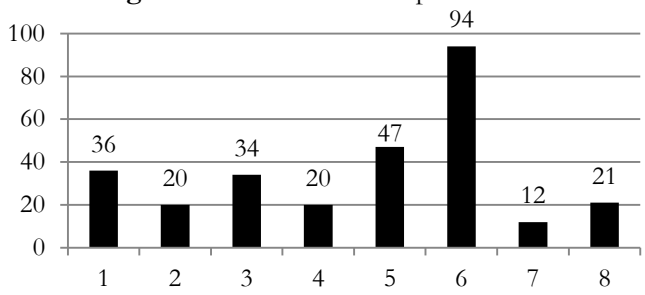


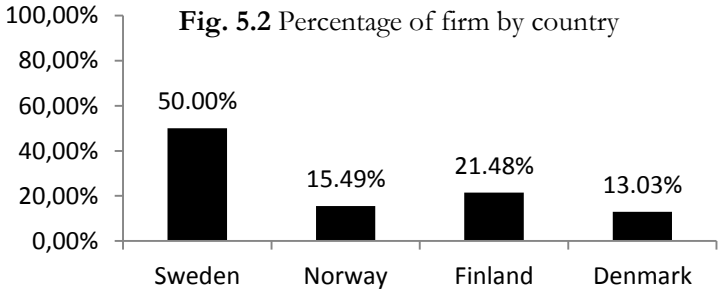
Fig. 5.1b Number of firms per Sector



Legend:
1) Telecommunication
2) Equipment
3) Internet
4) Semi-conductor
5) SaaS
6) Software
7) Games
8) Others

Technology firms in the Business-to-Business (B2B) area represent 79.2 per cent of our dataset. On the other hand, companies in the Business-to-Consumer (B2C) space account for 20.7 per cent of our sample (Fig. 5.1a). It is interesting to note that the B2C section does not account for the largest share of our sample but that B2B ventures have the largest portion. It is consistent with previous studies about technology firms (Norden, 2010). Using eight sectors from the technology space, we list our various Nordic companies. The software class accounts for the largest number of firms with 94 businesses (i.e. 33 per cent of the sample) and followed by software as a service (SaaS) with 47 firms or 17 per cent of our sample (Fig. 5.1b). Furthermore, we use in this thesis a division in two groups one including sub-sectors with a large need of investment such as the number 1, 2 and 4 (i.e. 27 per cent of our sample) and another consisting of the groups 3,5,6,7 or 66 per cent of our sample (Fig. 5.1b).

Fig. 5.2 Percentage of firm by country



Our dataset covers firms from the four countries of the Nordic region. Sweden has the largest share of our sample with half of the companies followed by Finland with 21.48 per cent, Norway with 15.49 per cent and Denmark with 13.09 per cent (Fig. 5.2). Such distribution confirms the result from the study of EVCA and Norden about the exit distribution in the Nordics. A study at a country level instead of a regional level was not pursued for two main reasons. One is the relative low number of observations per single country. Even Sweden - with the largest share of our sample - has only 142 firms. A small sample size may impede the possibility of a consistent regression analysis but it gives the opportunity to gain a better understanding of a region such as the Nordics. Thus, our analysis on firms from the Nordics opens the door to future studies at a country level.

Age of the firm

Over the three business cycles, a firm exited via trade sale has seen its time to exit, from the company registration to the sale, increase over time (Appendix 3). Moreover, the duration might actually be even larger if one takes into account the possibility that the founders started working on their company before the registration of the firm. Over the first business cycle (1997 to 2001), a firm takes on average 5.2 years to exit. After the tech bubble, the length rises to an average of 8.9 years and to an average of almost 10 years (9.9 years) for the firm sold during the financial crisis. As expressed before in the section about the age of the firm, a short duration attracts a high level of attention from the market. However a longer duration might show a more conservative approach for an acquirer waiting to see more evidence of the potential of a company. Hence, an increase in the duration does not necessarily mean that acquirers see firms less attractive in the last business cycle compared to the first one.

Monitoring

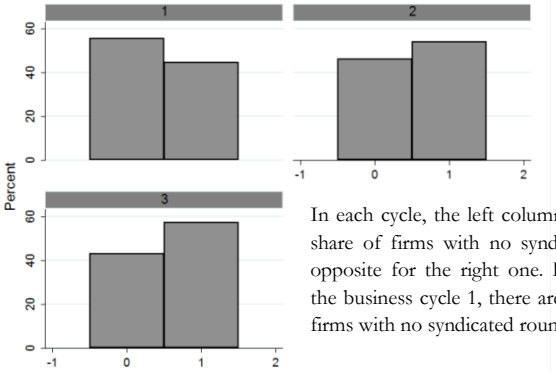
The number of rounds at the exit time increased on average over our study period. During the tech bubble, the majority of the numbers of rounds (almost 95 per cent) was between one and three rounds. Over the next two cycles, the proportion of rounds over three increased and the average of rounds for the cycle number two and three represented: 2.68 and 2.89 compared to 1.69 for the cycle one (Appendix 1). The number of VCs has also increased over time. On average there are 2 VCs per firm in the first business cycle, and 2.57 and 2.75 for the second and third business cycle respectively. In addition, the proportion of the number of VCs over 5 has increased over time (Appendix 3).

Table 5.3 Syndication and Syndication of domestic and foreign VC

		Syndication		
Syndication		No	Yes	Total
Foreign	No	130	56	186
and	Yes	0	98	98
Domestic	Total	130	154	284

In the table 5.3a, for example there are 98 firms with a syndicated round composed of a foreign and a domestic VC.

Fig. 5.3 Percentage Syndication dummy over the three business cycles



In each cycle, the left column represents the share of firms with no syndication and the opposite for the right one. For example, in the business cycle 1, there are 55 per cent of firms with no syndicated round.

The percentage of firms with at least one syndicated round is about 40 per cent during the tech bubble period. However, the percentage grows over time and reaches 55 per cent during the second business cycle and 60 per cent during the last business cycle (Fig. 5.3). Overall, syndication is a common monitoring method used by VCs in 154 firms of our sample or equivalent to 54 per cent of our dataset (Table 5.3). At a firm level, the share of syndicated round represents on average one third of the rounds for firms with syndicated rounds. The share of syndication is stable and slightly increasing over time representing around one third of the total of round per firms (Appendix 6). In addition, the distribution of syndication with a foreign and a domestic VC is important with 98 out of the 154 firms (appendix 7). Lastly, over time the share of syndication in a firm with a presence of domestic and foreign VC represents 66 per cent for the first two periods and 60 per cent for the last period

(appendix 7). Syndication is a common mechanisms in VC investment. The syndication between domestic and foreign VC has a strong presence over the three business cycles.

Complementarity

In a large part of the sample, 109 out of 284 firms (Table 5.1a), both foreign and domestic VCs have invested in the same firm which indicates a complementary relationship between the two groups. Only a few numbers of firms receive investment from only foreign VC, 36 out of 284 or 12 per cent (Table 5.1a). The topic of complementarity is not research in more details. A lack of information about the investment round dates and other information create obstacles for a possible empirical analysis in this thesis.

5.1.2. Modeling VC behavior – Regression results

Table 5.4 Domestic and Foreign Venture Capital presence and firm

		Domestic VC	Only DVC	FVC	FVC + DVC	All Sample
Number		248	140	144	108	284
% of all sample		87%	49%	51%	38%	100%
Firm age	*Average*	8.88	8.54	9.23	9.31	8.9
	Median	8	8	8	9	8
Number of VCs	*Average*	2.67	1.80	3.35	3.81	2.6
	Median	3	1	3	3	2
Number of rounds	*Average*	2.69	1.97	3.20	3.62	2.6
	Median	2	1	2	3	2
Number of Firm with Syndicated round		141	49	105	92	154
	%	56.9%	35.0%	72.9%	85.2%	54.2%
Percentage of Syndicated round	*Average*	37.9%	24.8%	47.6%	54.8%	36.0%
Number of Syndicated round per firm	*Average*	1.13	0.54	1.6	1.91	1.07
Industry (%of sub-sample):						
Telecommunication		10.9%	7.9%	17.4%	14.8%	12.7%
Equipment		7.3%	7.1%	6.9%	7.4%	7.0%
Internet		11.7%	13.6%	10.4%	9.3%	12.0%
Semi-conductor		7.7%	7.1%	6.9%	8.3%	7.0%
SaaS - Software as a service		16.5%	18.6%	14.6%	13.9%	16.5%
Software		34.7%	30.7%	35.4%	39.8%	33.1%
Games		4.4%	5.7%	2.8%	2.8 %	4.2%
Other (IT Consulting, accessories)		6.9%	9.3%	5.6%	3.7%	7.4%
Markets (% sub-sample)						
IT Boom (1998-2001)		10.1%	12.1%	6.9%	7.4%	9.5%
After IT boom (2002-2007)		50.8%	48.6%	53.5%	53.7%	51.1%
Financial crisis (2008-2013)		39.1%	39.3%	39.6%	38.9%	39.4%

Note: Sample size: 284 measured at the time of trade sale exit

This section analyzes the factors determining the presence of domestic and foreign VCs. The table 5.4 presents descriptive information about the different firm characteristics linked to the presence of at least one domestic VC (domestic VC), the presence of only domestic VC (only DVC), the presence of at least one foreign VC (FVC) and the presence of at least one domestic and one foreign VC (DVC+FVC) at the time of exit. The section is constructed as follow for each explanatory variable; descriptive and regression analyses are used to construct a detailed analysis.

Table 5.5 Determinants of domestic and foreign VC at the exit time – Regression results

	(1)	(2)	(3)	(6)
	Domestic	Only		Both FVC &
VARIABLES	VC	DVC	FVC	DVC
Number of rounds	0.0709	-0.0254	0.0254	0.0603
	(0.0710)	(0.0507)	(0.0507)	(0.0502)
Number of VC	0.00952	**-0.248*** **	**0.248*** **	**0.224*** **
	(0.0969)	(0.0833)	(0.0833)	(0.0766)
Time to exit	-0.00326	-0.0202	0.0202	0.0247
	(0.0170)	(0.0142)	(0.0142)	(0.0158)
Syndication (dummy)	0.307	**-0.421***	**0.421***	**0.828*** **
	(0.262)	(0.221)	(0.221)	(0.233)
Constant	0.837***	1.061***	-1.061***	-1.790***
	(0.228)	(0.195)	(0.195)	(0.218)
Pseudo R-squared	0.0325	0.157	0.157	0.254

Regression of presence of domestic and foreign venture capital in 284 Nordic Technology firms exited through a trade sale during 1998 and 2013. Asterisks *, ** and *** indicate statistical significance at the levels 10%, 5% and 1% respectively.

Firm age – Time to exit:

Our data indicates in the table 5.4 that the age of the firm at the time of the trade sale shows variation with the presence of domestic and foreign investors. The presence of domestic VC seems to have a diminishing impact on the time to exit. Companies with only domestic VCs have the shortest time to exit with an average of 8,54 years and firms with a presence of at least one domestic VC and at least one foreign VC at the time of the trade sale have an average age of 9.31 years. On the other hand, the presence of foreign investors seems to inflate the firm's age. Businesses with at least one foreign investor at the time to exit exhibit an average age at the trade sale of 9.23 years. Firms with investment from foreign VC are older at the exit time than firm with only domestic VC. Lastly, the descriptive table 5.4 shows that firms with both domestic and foreign VC are the oldest at the time of exit.

The regression analysis in the table 5.5 cannot confirm the descriptive analysis on the relationship between the presence of a domestic or a foreign VC and the age of the firm. No coefficients are statistically significant and the coefficient values are very small under 3 per cent. Only the coefficients give hints that there may be a positive relationship between the presence of a foreign VC and the time to exit while a negative relationship occurs with

the presence of a foreign investor. However, this cannot be clearly demonstrate within our sample which may be due to the size of our sample.

Hypothesis 1: Firms with only domestic VC are younger at the time of exit via trade sale than firms with a presence of at least one foreign VC.

- The descriptive analysis and the sign of the coeficient in the regression analysis support our hypothesis that firms with only domestic VCs are younger at the time of exit than firms with at least one foreign VCs. Nevertheless, we cannot fully confirm our hypothesis as none of the coeficients in our regression analysis are significant.

Monitoring:

Number of rounds – staging of investment

On average Nordic technology firms have 2.6 rounds at the time of exit. The descriptive analysis suggests that on average a firm with at least one foreign VC has a greater number of rounds than a firm with at least one domestic VC; respectively 3.2 and 2.69 rounds. Furthermore, entrepreneurial companies receiving only domestic investment have the least number of rounds only 1.97 rounds at the time of exit. Firms with both domestic and foreign VCs have the largest number of rounds with 3.62 on average (Table 5.4).

No coefficients of the independent variable number of rounds in our regressions are statistically significant. Hence, we cannot confirm the description analysis (Table 5.5). The standard errors are two large preventing to draw an analysis with the coefficient's sign.

Hypothesis 2: Overall, with a high quality of legal enforcement in the Nordic countries, we expect on average a large number of rounds in our sample. In addition, firms with foreign investors are expected to have a higher number of rounds than firm with only domestic VC.

- On average Nordic technology firms have a relative large number of rounds at the time of exit with 2.5 rounds. The descriptive analysis confirms that a firm with at least one foreign VC has on average a higher number of rounds than a firm with at least one domestic VC or only domestic VCs. Nevertheless, the regression analysis cannot fully support our assumption due to the lack of statistically significant coefficient.

Syndication

The descriptive analysis shows evidence that syndication is a method more common when there is presence of foreign investment. 72.9 per cent of firms with foreign VC have at least one syndicated round and the number increase with companies having both domestic and foreign investment up to 85.1 per cent. On the other hand, the figure reduces drastically to 35 per cent for entrepreneurial firms backed by only domestic VCs. Syndicated rounds represent approximately 50 per cent of the rounds for a firm with at least one foreign VC and about 25 per cent of the total number of rounds per firms with only domestic VCs. In addition, 85.2 per cent of firms with a presence of at least one domestic VC and one foreign VC from our sample have at least one syndicated

rounds which represent the higher proportion from all the groups. Moreover, firms with both domestic and foreign VCs have a more common use of syndication than any other groups, 54.8 per cent of the rounds on average are syndicated rounds. Hence, it confirms that foreign VCs have a more frequent use of syndication than domestic VC and that it gives hints that investments with both domestic and foreign VC use often syndication.

The regression analysis (table 5.5) supports the idea that syndication is commonly used by foreign VCs with a significant coefficient of 0.421 at a ten per cent level. In a presence of a syndicated round before the time of exit, it increases the probability by 0.421 to have a presence of a foreign VC at a ten per cent level. In addition, the regression shows an even stronger relationship between the presence of syndication and the presence of both domestic and foreign VC with a coefficient of 0.828. In a presence of a syndicated round before the time of exit, it increases the probability by 0.828 to have a presence of both foreign and domestic VC at a one per cent level. Therefore, there is a higher level of certainty about the strong positive relationship between the presence of a syndication and the presence both domestic and foreign VC than for the presence of at least one foreign VC. It provides hints that investment made by both foreign and domestic VC often use syndication.

On the other hand, the presence of syndication has a negative relationship between the presence of only domestic investors and the presence of syndication. In a presence of a syndicated round before the time of exit, it decreases the predicted probability by 0.421 to have a presence of a firm with only domestic VC at a ten per cent level. Finally, we cannot confirm the relationship between a syndicated round and the presence of at least one domestic VC as the coefficient is not statistically significant.

Presence of a syndicated round composed of domestic and foreign VC

The table App 9 and App 10 in the Appendix give evidence of the importance of rounds composed of both domestic and foreign VC in the total of our sample. 98 firms have at least one syndicated round composed of a domestic and a foreign VC or approximately or 68 per cent of the firm with a foreign VC. The regression analysis (Appendix 8) shows strong evidence of the positive relationship between the presence of syndicated round and the presence of at least one domestic and one foreign VC at the exit time. In a presence of a syndicated round composed of at least one domestic and one foreign VC before the time of exit, it increases the probability by 2.289 to have a presence of a firm with both domestic and foreign VC at the exit time at one per cent level.

Hypothesis 3: There exists a positive relationship between syndication and a foreign VC and there is a negative one between syndication and a domestic VC. Furthermore, firms with only domestic VC are expected to have a low level of syndication unlike firms with both foreign and domestic VC.

- Our hypothesis about the positive relationship between the presence of a foreign VC and the presence of syndication is confirmed as well as the negative relationship between the presence of a domestic VC and the presence of syndication. In addition, firms backed by only domestic VC show the lowest number of presence of syndication among the different groups.

- Our analysis supports the hypothesis that foreign VCs have a strong preference to invest using syndication. In addition, our analysis suggests the common use of syndicated round composed of domestic and foreign investors.

Number of VCs

The number of VCs follows the same pattern as the number of rounds described previously. A company with investment from at least one foreign VC has a larger number of VCs on average than a firm with at least one domestic VC, respectively 3.35 and 2.67 VCs. A firm with only domestic VCs reflects even more evidence of the impact of domestic VC on the number of VCs. Firm with only domestic VCs exhibit the lowest number of VCs with only 1.8 VCs on average per firms. In addition, firms with both domestic and foreign VC display the largest number of VCs per firm with on average 3.81 VCs per firms (Table 5.4).

The regression analysis supports our assumption that there is a positive relationship between the number of VCs and the presence of a foreign VC as well as the opposite relationship with the presence of a domestic VC. The coefficient of the explanatory variable number of VCs is equal to 0.248 and is statistically significant at a one per cent level in the regression with the dependent variable having at least one foreign VC (Table 5.5). For each additional VC at the time of exit, it increases the probability by 0.248 to have a presence of a foreign VC in a firm. On the other hand, the coefficient in the regression with the dependent variable signaling the presence of only domestic VC takes the value of -0.248 and it is statistically significant at the one per cent level. For each additional VC at the time of exit, it decreases the probability by 0.248 to have a presence of a firm with only domestic VC. Moreover, the coefficient of the number of VCs in the regression with the dependent variable indicating the presence of both domestic VC and foreign VC is statistically significant and equals to 0.224. It confirms that the presence of a foreign VC leads to an increase in the number of VC. Lastly, the relationship between the presence of at least one domestic VC and the number of VCs cannot be confirm because the coefficient in the regression Table 5.5 is not statistically significant at less than ten per cent level.

Hypothesis 4: We expect to see a positive relationship between the presence of a foreign VC and the numbers of VCs and the opposite relationship for a presence of at least one domestic VC. Firms with only domestic VC are expected to have a lower number of VCs compared to other groups of Investor. Companies with at least one foreign VC and companies with both foreign and domestic VCs are expected to have a large number of VCs. Moreover, Firms with both domestic and foreign investors are expected to have the largest number of VCs.

- The descriptive analysis confirms the positive relationship between foreign VC and the number of rounds as well as the negative relationship between the presence of a domestic and a foreign VC**.** In addition, the regression analysis supports the hypothesis concerning the negative relationship between the number of rounds and the presence of only domestic VC as well as the positive relationship between the presence of a foreign VC and the number of rounds. However, we are not able to confirm the negative relationship between the presence of at least one domestic and the number of VCs.

Market – Business Cycle

The relative small size of our sample may create challenges for the analysis of the number of trade sales over time. The descriptive analysis gives hints that among the groups, the proportion of trade sales during the first period was quite small compared to the two following periods. The IPO was the most favored exit route during that time. The period from 2002 to 2007 represents the largest share of firms exited over the three periods with around 50 per cent our sample. It is consistent with the idea that after the tech bubble, acquisition became a very important exit route for VCs and portfolio companies. The most recent business cycle has seen a decrease in the number of exits. As mentioned before, our sample does not cover all the universe of trade sales of firms backed by VC in the Nordics during 1998 and 2013. However, it certainly gives a clue that trade sales increased after the tech bubble and slightly decreased during the financial crisis.

Table 5.6 Determinants of domestic and foreign VC at the exit time, Business cycle – Regression results

	(1)	(2)	(3)	(4)
VARIABLES	Domestic VC	Only DVC	FVC	Both FVC and DVC
1998- 2001	**1.446*** **	0.331	-0.331	**-0.535** **
	(0.359)	(0.246)	(0.246)	(0.254)
2002-2007	**1.122*** **	-0.0779	0.0779	**-0.253** **
	(0.132)	(0.104)	(0.104)	(0.105)
2008-2013	**1.108*** **	-0.0224	0.0224	**-0.319*** **
	(0.149)	(0.118)	(0.118)	(0.121)

Regression of presence of domestic and foreign venture capital in 284 Nordic Technology firms exited through a trade sale during 1998 and 2013. Asterisks *, ** and *** indicate statistical significance at the levels 10%, 5% and 1% respectively.

The regressions in the table 5.6 display the independent variable's coefficients of the three business cycles. Only regressions numbered one and four, we have statistically significant coefficients at a one per cent level. In regression number one modeling the dependent variable as the presence of at least one domestic VC in the firm, the three business cycles' coefficients are positive. In the first business cycle, the coefficient is equal to 1.446. In a presence of a firm exiting between 1998 and 2001, it increases the predicted probability of having a firm with at least one domestic VC by 1.446 at a one per cent level. The coefficients modeling the relationship between the business cycle and the presence of at least one domestic VC diminish over time: 1.446>1.122>1.108. It may be interpreted as there is a slight decrease of chances to have a presence of a domestic VC in a firm acquired over time. Different reasons can explain such variation. One possibility is that domestic VCs have started to invest outside their domestic market and thus, they have less funding for their domestic market. But we would need a more thorough analysis to be able to give a clear interpretation of the slight decrease.

In the regression number four (table 5.6) which models the dependent variable as the presence of at least one domestic and one foreign VC, the three business cycles' coefficients are negative. In the first business cycle, the

coefficient is equal to -0.535. In a presence of a firm exiting between 1998 and 2001, it decreases the predicted probability of having a firm with at least one domestic and one foreign VC by 0.535 at a one per cent level. The coefficients modeling the relationship between the business cycle and the presence of at least one domestic VC increase over time, from -0.535 to -0.319. Hence, a possible interpretation is that the presence of a domestic and a foreign VC in successful acquired company increase over time even though it is not yet a common practice. We cannot confirm our hypothesis on the relationship between the presence of at least one foreign VC or only domestic VC over time due to a lack of statistically significant coefficients.

Hypothesis 6: The number of trade sales is expected to increase after the tech bubble. The presence of domestic VC is expected to be stable over the three business cycles. On the other hand, the presence of foreign VC is expected to increase over time.
-Over time, trade sales have seen an increase after the period of tech bubble. The presence of domestic VC over time is strong and with only a slight decreasing trend. The presence of both domestic and foreign VC in a firm is still not the most common type of investment but it seems on an increasing trend over time. The regression analysis cannot confirm that the presence of foreign investor increased over time.

Industry sectors

The table 5.1 displays the distribution among the eight sectors in the technology space according to the presence of a domestic or a foreign VC. Firms in the software business represent the largest segment within the groups with approximately one third in each set. The telecommunication business represents the second largest group in firm with a presence of at least one foreign VC and in firm with at least one domestic and one foreign VC, respectively 17.40 per cent and 14.80 per cent. Firms with at least one domestic VC and firms with only domestic VC share the same second largest business group, SaaS, with respectively 16.50 per cent and 18.60 per cent. The description analysis appears to show that domestic VCs are more represented in technology sector without a large capital intensive business models. Firms from the industry number 1, 2 and 4 representing the firms with a large needed investment from the start cover 26.70 per cent of our sample. However, this proportion increases to 31.2 per cent and to 30.5 per cent for firms with at least one domestic VC and firms with both domestic and foreign VC. On the other hand, the share of the same group of firms (1, 2 and 4) has a lower share of firms with at least one domestic VC and firms with only domestic VC, respectively 25.9 per cent and 22.1 per cent.

The regression analysis (Appendix 11) within the eight groups of technology firms as explanatory variables indicates in the first regression ,with a dependent variable modeling the presence of at least one domestic VC at the time of exit, that all the sector's coefficients are positive and statistically significant at a one per cent level. A positive coefficient means that a firm's sector leads to an increase in the predicted probability to have a firm with at least one domestic VC at the time of exit. The higher the positive coefficient the stronger is the relationship between the presence of a domestic VC and a sector. For example, in a presence of a firm part of the Software sector, it increases the predicted probability of having a firm with at least one domestic VC by 1.372 at a one per

cent level. Sectors with the largest positive coefficient are semi-conductors (1.645), Games (1.383) and Software (1.372) and the smaller are Internet (1.049), Other (0.876) and Telecommunication (0.674).

In the regression number two and three only one sector (Appendix 11), Telecommunication, has a statistically significant power; at a five per cent level. A firm from the Telecommunication segment increases the predicted probability of having a foreign VC at the time of exit by 0.508. On the other hand, it decreases the predicted probability of having only domestic VC at the time of exit by 0.508. It shows that there is a negative relationship between the investment of only domestic investors in Telecommunication firms and the opposite for firms with the presence of a foreign VC. In the regression number four (Appendix 11), three sectors have statistically significant power; at a five per cent level for Internet and SaaS and at a one per cent level for Other. A firm from the Saas, Internet or Other segment decreases the predicted probability of having both domestic and foreign VC at the time of exit by respectively by 0.470, 0.541 and 0.876. It displays evidence that the presence of a domestic and a foreign VC is less likely in firms within segment such as Internet, SaaS and Others.
The regression number five to eight (Appendix 11) use the same intuition as the previous one but instead of eight sectors we use only three segments: Capex High, Capex Low and Others. As seen previously, Capex High includes Telecommunication, Semi-conductor and Equipment and Capex Low includes the other segments except Others. In the regression number five; all the coefficients are positive and statistically significant at a one per cent level. Capex High increases the predicted probability of having at least one domestic VC at the time of exit by 1.003. It is lesser than Capex Low with a predicted probability increasing by 1.243. In the regression number eight, only Other and Capex Low are negative and statistically significant at a one per cent level. Capex Low decreases the predicted probability of having at least one domestic and one foreign VC at the time of exit by 0.306. It gives indication that there is a negative relationship between Capex Low segment and firms with both domestic and foreign VC. Unfortunately, we cannot confirm the relationship between the High or Low Capex group and the presence of domestic and foreign VCs, due to a lack of statistically significant coefficients, in regression number six and seven.

Hypothesis 5: Domestics VCs are presents in the entire eight sectors but with a lesser importance in large capital investment one. Firms financed with only domestic VC will be predominantly seen in firms in the Internet and Software business broadly defines as Low Capex. Finally, foreign VCs will have a positive relationship with high capital expenditure's firms, high Capex.
- The presence of domestic VC in all sectors is confirmed. In addition, the fact that domestic VCs are less present in capital intensive businesses (Capex High) is confirm for firm with at least one domestic VC. Lastly, the negative relationship between Capex low segment firm and firm with a domestic and a foreign VC is confirmed. It validates our hypothesis that domestic VCs are more present in Low Capex and that investment with both domestic and foreign VCs are less present in Low Capex firms. The descriptive analysis confirms that foreign VCs are more represented in in high Capex firm. However, we cannot fully confirmed such hypothesis as none coefficients are statistically significant except for the telecom industry.

Country:

Sweden represents the largest country in our sample with 50 per cent of our dataset (Appendix 12). Swedish firms have the highest percentage of firms with a presence of at least one foreign VC with 56.3 per cent (Appendix 12). In addition, Denmark has 51.4 per cent of its firms with a presence of at least one foreign VC per firms. At the same time, Sweden and Denmark have the lowest level of presence of at least one domestic VC per firm with respectively, 85.9 per cent and 83.8 per cent (Appendix 12). Furthermore, Sweden has the largest ratio of firms with investment from both domestic and foreign VC at 42.3 per cent. Hence, Sweden seems to be the country receiving the most investment from foreign VC among the four Nordic countries and with a lower level of domestic VC investment presence.

Norway seems to differentiate itself among its peers with a stronger domestic market. Norway has approximately 95.5 per cent of its companies with at least one domestic VC. Moreover, 61.4 per cent of the Norwegian firms have only domestic VC compared to 43.7 per cent in Sweden. Lastly, Finland appears to have a strong domestic market with 86.9 per cent of the country's firms with at least one domestic VC (Appendix 12).

The regressions one to four in Appendix 13 display regressions with the same methodology as regressions with the industry sectors (Appendix 11). The four independent variable models the country of origin of the firms from our sample. In the first regression modeling the presence of at least one domestic VC as a dependent variable, all the coefficients are statistically significant at one per cent level and positive. For example, in a presence of a firm from Sweden, it increases the predicted probability of having a firm with at least one domestic VC by 1.077 at a one per cent level. Norway has the largest coefficient with 1.691. It reinforces the idea that Norway has the strongest domestic market among the four Nordic countries. On the other hand, Denmark and Sweden have the lowest coefficient, 0.986 and 1.077 respectively. It gives hints that firms from these two countries are less dependent from domestic VC. In the fourth regression, the coefficients of the independent variable of Sweden and Denmark are negative and statistically significant at a ten per cent level. In a presence of a firm from Sweden or Denmark, it decreases the predicted probability of having a firm with both domestic and foreign VC by 0.195 and 0.382 respectively at a ten per cent level. On the other hand, in a presence of a firm from Norway or Finland, it decreases the predicted probability of having a firm with both domestic and foreign VC by 0.410 and 0.446 respectively at a ten per cent level. Hence, it suggests that the joint investment by foreign and domestic VC is not positively affected by the country of origin; however, Sweden seems to be the most open to joint investment among the four countries. As seen previously, the size of our sample may distort some results and one must be cautious with the analysis of the regression. No coefficients in the regression models number two and three are statistically significant leading to no further analysis.

Hypothesis 7: Domestic investors are present at a strong level within the entire Nordic region. Sweden is expected to display a strong presence of foreign investment. On the other hand, Norway is expected to have a strong domestic market.

- Both descriptive and regression analysis confirm that domestic investors have a strong presence within the four Nordic countries. Furthermore, both descriptive and regression analyses describe an overrepresentation of

domestic VC in Norway and an over representation of foreign VC in Sweden. Lastly, Denmark seems to have an open market for foreign VCs but we cannot fully confirm this argument with our regression analysis.

5.2. Descriptive results & Acquirer behavior

In this second section, we analyze the relationship between acquirer and investor. First we present a descriptive analysis of the acquirer's company characteristics and distribution. Then, we use a regression analysis to have a more thorough analysis with a focus on the relationship of VC's nationality and acquirer's nationality.

5.2.1. General descriptive results

Table 5.7 Acquirer Nationality presence, firm and Investor characteristics

		Acquirer firm and VC nationality are similar	**Domestic Acquirer**	**American Acquirer**
Number		123	93	78
% of all sample		43.67%	32.7%	27.5%
Firm age	*Average*	8.12	8.05	7.56
	Median	8	7	7
Number of VC	*Average*	2.74	2.19	2.82
	Median	2	2	2
Number of rounds	*Average*	2.52	2.15	2.51
	Median	2	2	2
Number of Firms with Syndicated round		73	42	46
	%	59.3%	45.2%	59.0%
Percentage of Syndicated round	*Average*	40.1%	29.1%	38.1%
Number of Syndicated rounds per firm	*Average*	1.10	0.68	1.05
Industry (%of sub-sample):				
Telecommunication		10.6%	9.7%	17.9%
Equipment		5.7%	7.5%	5.1%
Internet		11.4%	12.9%	11.5%
Semi-conductor		3.3%	2.2%	6.4%
SaaS - Software as a service		21.1%	25.8%	16.7%
Software		33.3%	25.8%	34.6%
Games		6.5%	6.5%	2.6%
Other (IT Consulting, accessories)		8.1%	9.7%	5.1%
Markets (% sub-sample)				
IT Boom (1998-2001)		10.6%	9.7%	14.1%
After IT boom (2002-2007)		56.1%	53.8%	56.4%
Financial crisis (2008-2013)		33.3%	36.6%	29.5%

Note: Sample size: 284 measured at the time of trade sale exit

Table 5.8a to 5.8c Distribution of acquirer in our sample

VC nationality Acquirer	**Table 5.8a** Freq.	Percent
No	161	56.69
Yes	123	**43.31**
Total	284	100.00

Domestic Acquirer	**Table 5.8b** Freq.	Percent
No	191	67.25
Yes	93	**32.75**
Total	284	100.00

American Acquirer	**Table 5.8c** Freq.	Percent
No	206	72.54
Yes	**78**	27.46
Total	284	100.00

The acquirer variable is used to examine three groups: one for which the acquirer shares the same nationality as one of the VCs at the time of exit, another for which the acquirer and portfolio company share the same nationality (domestic acquisition) and finally one for which the acquirer is an American firm. The tables 5.8 display the distribution of each acquirer group. 43.31 per cent of the firms have one of their investors with the same nationality as their acquirer. It is the largest ratio in the three groups of acquirer. It highlights the importance of sharing the same culture and network in an acquisition of a VC-backed company. In addition, 32.75 per cent of the firms in our dataset were acquired domestically and around two thirds of the technology firms in the Nordics were acquired by a foreign company. Such a high number of foreign acquirers reinforces the argument on the importance of foreign acquirer for Nordic company. Moreover, the table 5.9a indicates that among the 93 domestic acquisitions 82 firms were acquired by domestic firms and also received investment from domestic VC. This figure provides evidence of the strong link between a domestic VC and a domestic acquirer. Lastly, 27.46 per cent of the firms in our sample were acquired by American firms. Likewise, 41 per cent (i.e. 78/191) of foreign acquirers were from the United-States (Table 5.8c and 5.9a). America hold the lead position in the foreign acquirer country.

Table 5.8d Interaction between a domestic acquisition and a shared nationality between one of the VC and the acquirer

VC nationality Acquirer	Domestic acquisition No	Yes	Total
No	147	14	161
Yes	44	79	123
Total	191	93	284

The table 5.9a displays information of the share of domestic and foreign VC and the acquirer's nationality. It displays evidence of the importance of domestic VCs among the three segments of acquirers. Out of the 93 domestic acquisitions 82 have at least one domestic VC. Whereas only 39.8 per cent of the domestic acquisition target firms have at least one foreign VC. It shows the strong link between the domestic acquirer and domestic VC. In addition, 25 per cent of the acquisition made by American firms received investment from American VC. Moreover, one third of the firms have a presence of a foreign VC at the time of exit. The table presents a strong relationship between the nationality of VCs and the nationality of the acquirer for domestic and at a lesser lever for foreign acquisition.

	Acquirer			
	VC nationality = Acquirer	Domestic Acquirer	American Acquirer	All
Domestic VC	114	**82**	68	248
% of Investor	46.00%	33.10%	27.40%	100.00%
% of Acquirer	91.90%	88.20%	87.20%	
Only Domestic VC	65	56	33	140
% of Investor	46.40%	40.00%	23.60%	100.00%
% of Acquirer	52.40%	60.20%	42.30%	
FVC	60	37	45	144
% of Investor	41.70%	25.70%	31.30%	100.00%
% of Acquirer	48.40%	39.80%	57.00%	
US Dummy	30	9	20	47
% of Investor	63.80%	19.10%	42.60%	100.00%
% of Acquirer	24.20%	9.70%	25.30%	
FVC + DVC	50	26	35	108
% of Investor	46.30%	24.10%	32.40%	100.00%
% of Acquirer	40.30%	28.00%	44.30%	
Total	126	93	78	284

Table 5.9a Acquirer and Investor distribution.

		Acquirer		
		Equal VC	Domestic	USA
Acquirer	Equal VC	1.0000		
	Domestic	**0.5863*** 0.0000	1.0000	
Investor	DVC	**0.1194*** 0.0443	0.0178 0.7654	-0.0027 0.9642
	Only DVC	0.0478 0.4218	**0.1524*** 0.0101	-0.0860 0.1483
	FVC	-0.0478 0.4218	**-0.1524*** 0.0101	0.0860 0.1483
	FVC+DVC	0.0352 0.5551	**-0.1448*** 0.0116	0.0867 0.0981
	US Investor	**0.1844*** 0.0013	**-0.1290*** 0.0234	**0.1505*** 0.0054

Table 5.9b Correlation table between Acquirer and Investor

The table 5.9b displays a correlation table between the acquirer and the investor. There is a positive relationship (0.1194) between a firm with at least one domestic VC and an acquirer with the same nationality as one of the VC. In addition, there is also a positive relationship between the presence of an American VC and an acquirer with the same nationality as one of the VC. The last column exhibits a positive relationship between an American acquirer and an American VC which supports the hypothesis that there is a positive relationship between the nationality acquirer and the VC. Another example supporting our thesis is the positive relationship between a domestic acquirer and the presence of only domestic VC in a firm and alternatively, there is a negative relationship between the presence of at least a foreign VC and a domestic acquisition. Hence, the correlation table shows strong suggestion of a positive relationship between an acquirer and an investor nationality.

5.2.2 Modeling Acquirer behavior – Regression results

In this section, we use a regression analysis to analyze the relationship between the dependent variable acquirer and the dummy explanatory variable representing domestic or foreign VC at the time of exit.

The regression in Appendix 16 confirms the positive relationship between the presence of a domestic VC and an acquirer sharing the same nationality as one of the VC. In a presence of a firm with at least one domestic VC, it increases the predicted probability for a firm to be acquired by a company sharing the same nationality as one of the VC presents in the firm at the time to exit by 0.442 at a ten per cent level error. In other words, a Swedish firm with at least one Swedish VC at the time of exit increases the predicted probability by 0.442 to be acquired by a firm from Sweden or from one of its VC's country of origin present at the time of exit. The regression number two displays a positive coefficient between the presence of a domestic VC and the presence of a domestic acquisition which is consistent with our findings in our precedent descriptive analysis. Moreover, we have hints that there is a negative relationship between the presence of a domestic VC and an acquirer from America with the sign of the coefficient modeling the presence of a domestic; however, the coefficient is not statistically significant which limits our analysis. Furthermore, the regression number two shows also a lack of statistical significance in the coefficient modeling the presence of domestic VC. Hence, we cannot completely confirm our hypothesis concerning the presence of at least one domestic VC and the acquirer with our regression analysis except for the positive relationship between the presence of a domestic VC and the acquisition of a firm sharing the same nationality as one of the VC.

The table Appendix 17 models the presence of at least one foreign VC at the exit. The regression analysis gives limited results as none of the coefficients modeling the relationship between VC and acquirer are significant. The sign of the coefficients modeling the relationship of having at least one foreign VC at the time of exit and the acquirer nationality is consistent with our descriptive analysis. Having a foreign VC increases the possibility to be acquired by an American VC and decreases the probability of acquisition by a domestic firm. Similarly, the same relationship is found between the presence of both domestic and foreign VC and the acquirer nationality (Appendix 18). However, we cannot fully confirm our hypothesis on the relationship between the acquirer nationality and the presence of a foreign VC due to non-statistically significant coefficients.

The table Appendix 19 portrays the relationship of the presence of a firm with only domestic VC and the acquirer. The explanatory variable "only domestic VC" is not statistically significant in any of the three regressions limiting our findings. Nevertheless, the sign of the coefficients confirms that a firm with only domestic VC has a positive probability to be acquired by a domestic firm.

In the table Appendix 20, regressions numbered one and three have positive and statistically significant coefficient modeling the presence of at least one American VC and the acquirer's nationality. In a presence of a firm with at least one American VC, it increases the predicted probability for the firm to be acquired by a company sharing the same nationality as one of the VC present in the firm at the time to exit by 0.059 at a one per cent level error. The presence of a domestic or an American VC shows a positive relationship for a company to be acquired by a company sharing the same nationality as one of the VC. In a presence of a firm with at least one American VC, it increases the predicted probability for the firm to be acquired by an American company by 0.419 at a ten per cent level error. It confirms the assumption that having an American VC increases the probability for a firm to be acquired by an American company.

Hypothesis 8: We expect to see a positive relationship between the nationality of an investor and the one of the acquirer. More precisely, the presence of a domestic VC in a firm will have a positive effect on the presence of a domestic acquirer. In addition, the presence of an American VC will increase the chance for a firm to be acquired by an American company.

- The descriptive analysis confirms the hypothesis that the presence of a VC from a country increases the probability to be acquired by a company from the same country. The regression analysis confirms the relationship with an American VC and an American acquirer as well as the relationship between the presence of a domestic or American VC and the acquirer sharing the same nationality as one of the investor. However, we cannot confirm the other relationships as the coefficients are not statistically significant.

5.3. Descriptive results & Valuation determinant

In this third part, we analyze whether foreign or a domestic VCs are determinants on the exit valuation of a company in a trade sale using a Price to sale ratio (PSR). First we use a descriptive analysis to have a better understanding of our sample and its characteristics. Then in a second part, we use a regression analysis with the dependent variable PSR.

Table 5.10 Price to sale characteristics

		PSR	PSR DVC	PSR Only DVC	PSR FVC	PSR DVC+FVC	All Sample
Number		126	112	61	65	51	284
% of all sample			89%	54%	107%	78%	
Firm age	*Average*	10.33	10.14	10.00	10.63	10.31	8.9
	Median	9	9	8	10	10	8
Number of VCs	*Average*	2.78	2.93	1.72	3.77	4.37	2.6
	Median	2	2	1	3	4	2
Number of rounds	*Average*	2.87	2.97	2.05	3.63	4.08	2.6
	Median	2	2	1	2	3	2
Number of Firms with Syndicated round		33	28	22	11	6	154
	%	26.2%	25.0%	36.1%	16.9%	11.8%	54.2%
Percentage of Syndicated round	*Average*	36.4%	37.7%	23.8%	48.2%	54.3%	36.0%
Number of Syndicated round per firm	*Average*	1.18	1.20	0.49	1.80	2.20	1.07
Industry (%of sub-sample):							
Telecommunication		17.5%	16.1%	11.5%	23.1%	21.6%	12.7%
Equipment		5.5%	5.4%	6.6%	4.6%	3.9%	7.0%
Internet		9.5%	9.8%	11.5%	7.7%	7.8%	12.0%
Semi-conductor		11.1%	11.6%	11.5%	10.8%	11.8%	7.0%
SaaS - Software as a service		15.1%	15.2%	18.0%	12.3%	11.8%	16.5%
Software		30.2%	31.3%	26.2%	33.8%	37.3%	33.1%
Games		0.8%	0.9%	1.6%	0.0%	0.0%	4.2%
Other (IT Consulting, accessories)		10.3%	9.8%	13.1%	7.7%	5.9%	7.4%
Markets (% sub-sample)							
IT Boom (1998-2001)		7.1%	7.1%	8.2%	6.2%	5.9%	9.5%
After IT boom (2002-2007)		57.9%	58.0%	55.7%	60.0%	60.8%	51.1%
Financial crisis (2008-2013)		34.9%	34.8%	36.1%	33.8%	33.3%	39.4%

Note: Sample size: 126 At the time of exit

5.3.1. General descriptive results

Our dataset includes 284 observations of Nordic technology firms which exited via a trade sale between 1998 and 2013. We were able to find the company's price at the time of the acquisition and the trailing twelve months of sales for 126 firms or approximately 44 per cent of our sample. The size of this new dataset is relatively small; however, it presents a unique opportunity to have a better understanding of the determinants characteristics of the PSR. For each of the 126 data points we have the same variables that we gathered in the first model such as the firm's age at exit time, number of rounds, and investors.

The table 5.10 displays the characteristics of the firm's PSR such as the average number of monitoring variables including the number of VC, the number of rounds, the presence of syndication and the variation over time. Moreover, the firm's PSRs with the presence of domestic and/or foreign VCs are exhibited. It aims to give a better understanding of the characteristics of the general PSR and the impact of the presence of a domestic or foreign of VCs. Due to the small size of our sample; we only use the general PSR ratio in our regression analysis. Finally, the last column is used as a benchmark to compare the characteristics of our sub-sample of firm with an estimated PSR and our sample used previously in the model two and three.

The comparison between the characteristics of the PSR sample and our entire dataset presents strong similarities. The PSR sample's characteristics do not deviate drastically from the sample that we used previously. However, there are some exceptions. For example, the average age of the firms in the PSR sample is larger than the one from the entire sample, 10.33 > 8.9. In addition, the distribution of firms among the eight industries shows differences. For instance, the gaming industry has approximately five times less of the share in the PSR sample than in the total sample. Moreover, the telecommunication business is larger in the PSR sample with 17.5 per cent relative to 12.7 per cent in the large sample. Therefore, the PSR sample is a not perfect copy of our larger sample but it does provide relatively similar characteristics to illustrate the relationship between VC presence and the exit multiple PSR.

Table 5.11a Average domestic and foreign PSR & Statistics of PSR

Investor	Average	Median
Only DVC	12.59	2.37
DVC	12.03	2.94
DVC+FVC	11.35	3.06
FVC	9.82	2.57

Sample statistics		Percentile	PSR
Max	176.83	0.9	23,01
Min	0.22	**0.75**	**6,48**
Average	11.16	0.5	2,57
Median	2.53	0.25	1,25

Table 5.11b Statistics Investor's PSR

	PSR	PSR DVC	PSR Only DVC	PSR FVC	PSR DVC+FVC
Average	**11.16**	**12.03**	**12.59**	**9.82**	**11.35**
Median	2.53	2.94	2.37	2.57	3.06
Max	176.83	176.83	176.83	96.43	96.43
Min	0.22	0.29	0.29	0.22	0.44

Tables 5.11a and 5.11b provide more statistical information about the PSR and the presence of foreign and domestic VCs. The PSR's range is from 0.22 to 176.83. However, 75 per cent of the firm's PSR has a value equal to or less than 6.5 (table 5.11a). Our sample average is 11.16 but the median is equal to 2.53. Our dataset top 25 per cent value has very high values and influence the average value up of our entire sample. As seen before in section 3.3 of our thesis, PSRs can vary due to difference in revenue margin among the different business and in the growth expectation.

The table 5.11b displays statistics about the PSR exit multiple. The presence of a domestic VC appears to have a positive relationship to the PSR using the average. Companies with only domestic investors have the largest average PSR 12,59 and firms with at least one foreign VC have the lowest PSR exit multiple in this sample with 9,82 (table 5.3.2a). It appears that the presence of domestic VC increases PSR. The descriptive analysis using the average value seems to support our hypothesis about the relationship between PSR and presence of domestic and foreign VC.

5.3.2. Modeling VC behavior – Regression results

Investors

The regression analysis (table 5.12) confirms the strong positive relationship between the presence of at least one domestic VC and the PSR. In a presence of a firm with at least one domestic VC, it increases on average the PSR of the firm by 6.319 at a ten per cent level error. The result can be interpreted in different ways. For instance, a firm receiving domestic VC investment may be perceived more promising by an acquirer than a firm without domestic investment. The presence of a domestic VC could be considered as a signal that a company received due diligence and monitoring and that the domestic VC held strong expectation in the company for the future. The other coefficients illustrating the presence of foreign and domestic VC do not give a clear picture of their relationships with the PSR as none coefficients are statistically significant. Even though the sign of the coefficient of only domestic VC is positive and the sign of having at least one foreign VC is negative, we cannot clearly confirm our assumption on the relationship between investor and exit multiple.

Hypothesis 9: We expect to see a positive relationship between the presence of a domestic VC and the PSR. Moreover, firms receiving investment only from domestic VCs are expected to have the highest PSR among all PSR's group.

-Our regression and descriptive analysis confirm that the presence of a domestic VC exhibits a positive relationship with the PSR. However, only the descriptive analysis provides evidence of the fact that firms with

only domestic VC have the largest PSR and that it exists a negative relationship between the presence of a foreign VC and the PSR.

Table 5.12 Determinants of PSR at the exit time – Regression results

VARIABLES	(1) PSR	(2) PSR	(3) PSR	(4) PSR
Number of rounds	1.996	2.019	2.019	1.979
	(1.698)	(1.722)	(1.722)	(1.735)
Number of VC	-2.137	-1.851	-1.851	**-2.256***
	(1.498)	(1.256)	(1.256)	(1.315)
Time to exit	**-1.466*****	**-1.489*****	**-1.489*****	**-1.496*****
	(0.506)	(0.503)	(0.503)	(0.517)
Domestic VC	**6.319***			
	(3.633)			
Only DVC		1.233		
		(5.163)		
FVC			-1.233	
			(5.163)	
Both FVC DVC				2.293
				(5.828)
Constant	20.90***	25.30***	26.53***	26.28***
	(6.512)	(6.752)	(7.982)	(7.608)
Observations	126	126	126	126
R-squared	0.123	0.119	0.119	0.119

Regression of price to sale exit multiple ratios of 126 Nordic firms backed by venture capital exited via a trade sale from 1998 and 2013. Asterisks *, ** and *** indicate statistical significance at the levels 10%, 5% and 1% respectively.

Our main motivation is to gain a better understanding of the relationships between the investor and the exit valuation here modeled by the PSR. But we were able to gather characteristics on the PSR and we use this last section to present some findings regarding the relationships between the PSR and some firm's determinants such as the age of the firm, monitoring, sectors, business cycle and country. Researchers and practitioners might be interested to investigate such characteristics for future studies.

Age of the firm

For each additional year at the time to exit, the age of the firm decreases the PSR of the firm by 1.466 at a one per cent level error (table 5.12, regression one). Following the regression analysis result, an older firm would have a lower PSR ratio than a younger firm, ceteris paribus. It confirms our hypothesis that the age of the firm is expected to have a negative relation with the PSR.

Monitoring

No coefficients modeling a monitoring effect are statistically significant in our regression analysis (Table 5.12 and 5.13). Therefore, we cannot confirm or reject our hypothesis about the positively relationship between monitoring and PSR. A remark can be made about the sign of the coefficients which are positive for both syndication and the number of rounds. However, the coefficient of the explanatory variable number of VCs at

the time of exit is negative which contradicts our hypothesis but we cannot have a more detailed analysis due to the lack of statically significance

Table 5.13 Determinants of PSR at the exit time, Syndication – Regression results

VARIABLES	(1) PSR	(2) PSR
Number of rounds	1.687	1.990
	(1.563)	(1.739)
Number of VCs	-1.802	-2.134
	(1.359)	(1.367)
Time to exit	**-1.424*** **	**-1.490*** **
	(0.464)	(0.530)
Syndication	13.41	
	(8.253)	
Syndic FVC & DVC		1.188
		(7.104)
Constant	22.55***	26.39***
	(5.699)	(7.441)
Observations	126	126
R-squared	0.155	0.118

Regression of price to sale exit multiple ratios of 126 Nordic firms backed by venture capital exited via a trade sale from 1998 and 2013. Asterisks *, ** and *** indicate statistical significance at the levels

Sectors

We expected to see sectors such as Internet, SaaS, Software and Gaming driving the PSR up and with higher PSR compared to the other technology businesses. In the table Appendix 21, a presence of a firm from the Internet it increases respectively the PSR of the firm by 17.12 at a five per cent level error and by 11.49 at a ten per cent level error for firm in the Software technology segment. The coefficients of Games and SaaS are also positive but not statistically significant. Hence, we cannot confirm our hypothesis for these two groups. A note should be made regarding the coefficient of the Semi-conductor space. In a presence of a firm from the Semi-conductor segment, it increases the PSR of the firm on average by 27.50 at a one per cent level error. It contradicts the hypothesis that semi-conductor segment drives at a lower level the PSR compared to Internet, SaaS, Software and Gaming; however, this is due to the fact that the firm with the highest PSR, 176.83 is part of the semi-conductor segment. This value drives up the coefficients of the business segment. Our sample is relatively small and the presence of an outlier value such as the one mentioned previously one can alter results.

With regard to the high PSR of firms in the business space such as Internet, software, SaaS and gaming, many of these firms first focus on building a product and establishing a strong user's base before starting to monetize at a large scale. Therefore, at the time of exit, acquirers do not focus on profit but on past growth and customer base.

Using a segmentation of low and high Capex (capital investment needed), both coefficients are significant. The high capex group has a larger coefficient of 13.63 then compared to the lower Capex segment with 11 (Regression 2 Appendix 20). In other words, the sectors within the high capex segment, Telecommunication, Equipment and Semi-conductor, have on average a higher PSR at the exit time than others. However, this is

mainly due to the presence of an outlier in our sample driving up the valuation of the group high Capex. In order to have a clearer picture of the relationship between business sector and exit valuation, we would need a larger sample of observations.

Table 5.14 Determinants of PSR at the exit time, Business Cycle – Regression results

VARIABLES	PS
1998-2001 (dummy)	**41.05*** **
	(8.694)
2002-2007 (dummy)	**10.01*** **
	(3.053)
2008-2013 (dummy)	**6.968***
	(3.932)
Observations	126
R-squared	0.227

Table 5.15 Determinants of PSR at the exit time, Country – Regression results

VARIABLES	PS
Sweden (dummy)	**10.63*** **
	(3.249)
Norway (dummy)	**10.92***
	(5.837)
Finland (dummy)	8.221
	(5.975)
Denmark (dummy)	**19.95****
	(7.904)
Observations	126
R-squared	0.155

Regression of price to sale exit multiple ratios of 126 Nordic firms backed by venture capital exited via a trade sale from 1998 and 2013. Asterisks *, ** and *** indicate statistical significance at the levels

Business cycle

All three coefficients of the business cycle are statistically significant, table 5.14. In a presence of a firm acquired in the first business cycle (1998-2001), it increases the PSR of the firm by 41.05 at a one per cent level error. In a presence of a firm acquired in the second business cycle (2002-2007), it increases the PSR of the firm by 10.01 at a one per cent level error and by 6.968 at a five per cent level error for the firm acquired in the third business cycle. The tech bubble period has the largest coefficient among the three business cycles which is consistent with our hypothesis about the overvaluation of this period. The PSR valuation during the tech bubble was at a level four and six times compared to the period two and three respectively. The second period has a larger coefficient than the third period, 10.01 > 6.968. Hence, it contradicts with the idea that after the many successful exits from the Nordics in 2002-2007, investors may become more willing to pay a higher PSR.

Country

In the Table 5.15, Finland is the only country within the Nordic region without a statistically significant coefficient. In a presence of a firm from Sweden, it increases the PSR of the firm by 10.63 at a one per cent level and by 10.92 at a ten per cent level for a firm from Norway and by 19.95 at a one per cent level for a Danish firm. It may indicate that Norway and Sweden are more mature markets compared to Denmark. However, due to the limited size of our sample we suggest that further study investigate the difference of PSR exit multiple among the countries.

From our regression analysis, we cannot confirm our hypothesis about the interaction between the PSR and the monitoring mechanisms but there is evidence of a negative relationship between the age of the firm and the PSR. In addition, our hypotheses on the sector and business cycle are also confirmed. Our unique dataset provides the chance to have hints on the interaction between the PSR and firm's characteristics and to trigger interest for further study.

6. Discussion

To start with, this section answers our research questions expressed in the introduction. We thereafter move on to discuss how our findings relate to the previous literature. Further, we address potential limitations and implications of our study and we also present suggestions for further research.

Researchers have started to investigate the cross-border investment phenomenon by primarily focusing on the drivers of the venture capital internationalization process at a macro or industry level (Madhavan and Iriyama, 2009) or on the conditions and strategies deployed by VCs to overcome liabilities of distance and foreignness (Guler and Guillen, 2010). The globalization of VC and the role of cross-border investments remain under-researched (Da Rin, et al., 2011). There is a lack of comprehensive evidence on a model reflecting the domestic and foreign VC investor's investment behavior on acquired company. Using a unique dataset, we provide new stylized facts about the determinants of domestic and foreign venture capital in Nordic technology firms exited via a trade sale between 1998 and 2013. Moreover, we investigate the relationship between the nationality of a VC and the one of the acquirer. Lastly, we examine determinants including the presence of foreign and domestic VC on the exit valuation modeling by the price to sale ratio.

The first section aims to seek what factors determines the presence of a domestic and a foreign VC. We find that there exists difference in successful firm's characteristics depending on the presence of a foreign or domestic VC. Contradicting our hypothesis, on average, firms with at least one foreign VC are older at the time to exit than firms with only domestic VC. In addition, we confirm our hypothesis that the use of monitoring mechanisms is more pronounced with foreign VCs than domestic VCs. It is materialized by a higher number of VCs and a higher number of staggering investments, supporting past studies such as Tian (2011) and a common use of syndicated rounds in line with past studies such as Chemmanur et al. (2010).

Moreover, foreign and domestic VCs seem to differ in presence among the eight technology sectors. Foreign investors are over-represented in companies with a strong capital need such as in the Telecommunication, Equipment and Semi-conductor sectors. On the other hand, domestic VCs are over-represented in technology segments such as Internet, Software, SaaS and Gaming. However, the over-representation in the sector might be due to our sample and thus, a larger sample would be interesting in order to confirm our arguments.

At a country level, domestic investment has a strong footprint all over Scandinavia. Norway gives the impression to have the strongest domestic market and Sweden appears to be the more open to foreign investment which is

in line with previous studies such as in Menom (2010). Lastly, there are signs of an increase over time of foreign VC investment which is consistent with previous research such as Norden (2011).

The second model investigates the assumption that a foreign or a domestic VC impacts the presence of the nationality of the acquirer. Following precedent studies on the relationship of a VC in a portfolio company and in the acquirer firm at the time of acquisition (Gompers and Xuan, 2009), we investigate the possibility that the nationality of a VC increases the probability for a firm to be acquired by a company from the same nationality as one of its VC. Our hypothesis is confirmed by the descriptive analysis. The regression analysis confirms our hypothesis for two cases. One is the relationship between an American VC and an American acquirer and the other is about the relationship between the presence of a domestic VC and the acquirer sharing the same nationality as one of the VC. The latter provides evidence of the strong signal that the domestic presence gives to the acquirer. The other one shows the importance for an American acquirer to have a presence of an American firm in the target company.

The last section examines whether foreign and domestic VCs are determinants on the exit valuation using the PSR exit multiple. Our analysis presents evidence that the presence of domestic and foreign VCs influence the exit valuation. A recent paper demonstrates that cross-border venture capital backed firms exhibit higher sales growth compared to companies backed by domestic investors after a couple of years (Devigne et al., 2010). Hence, a firm backed by a foreign VC will be more mature in term of sales and growth than a firm with only investment from domestic VC. Our hypothesis about the positive relationship between the PSR and the presence of a domestic VC is confirmed in our descriptive and regression analysis. However, only the descriptive analysis provides evidence of the fact that firms with only domestic VC have the largest PSR and that there is a negative relationship between the presence of foreign VC and the PSR. Therefore, we cannot fully confirm that there is a negative relationship between the presence of at least one foreign VC and the PSR.

Potential Weaknesses

As in most venture capital research using empirical analysis, our study suffers from a relatively small number of observations. We use 284 observations in our first two models and the third models uses 126 observations to draw conclusion about the determinant of the PSR. Our results lack sometimes statistical power which could be remedied by more observations.

Another potential weakness in our study stems from the fact that we have only information on the portfolio company at the time of exit. Additional information on VC would have given a more in-depth analysis. For instance, the date of the first investment of a VC in a firm would have made possible the comparison between the time that a domestic and a foreign VC invest in a company. Moreover, with data on the size and the age of the VC at the time of investment, we would have been able to see whether there are differences between the characteristics of a domestic and a foreign VC.

Another criticism would be that we do not take into account the total number of firms receiving investment per country or the average firm's attractiveness per country. We noticed that successful Norwegian firms have on

average a strong presence of domestic VC compared to firms from other Nordic countries. But we cannot conclude on the reasons for such statistics. A low number of attractive firms in Norway compared to for instance Sweden may be a reason.

Lastly, we would like to make a comment regarding the extrapolation of our results. In relation to the Nordic technology firms, we believe that our results can be extrapolated to other regions in developed markets. However, our findings may not be representative for other business segments such as Life Sciences. In addition, the fast innovation in the VC investment sphere may create difficulties to stay relevant in the future.

Implication

Results from our study imply that there are differences in the investment behavior between a domestic or foreign VC. In addition, the presence of a domestic or/and a foreign VC influences the acquirer's nationality and the valuation exit multiple. "Scandinavia is home to a disproportionate numbers of successful start-ups…" Harry Briggs, Balderton Capital (2013). The Nordic region is one of the areas triggering the most interest from foreign VC and it is expected to keep a lead position as many promising companies such as Spotify or Klarna have yet to exit. The internationalization of venture capital creates new opportunities and challenges for entrepreneurs of successful Nordic companies. Domestic or foreign VC investments in Nordic firms lead to multiple implications at a company level. Thus, it is interesting to understand the variation for practitioners and researchers.

Before being acquired, a company's goal is to grow its business and to maximize its chance for the future. An Investment from one or more VCs can help a company not only financially but also strategically. The investment behaviors of a domestic and a foreign VCs are not exactly similar. A foreign investor is more likely to use more monitoring mechanisms and on average increases the time to exit of the company. Different arguments may explain such differences. As seen in the literature review, foreign VCs may be incentivized to use more monitoring mechanisms to deal with the increasing distance and to hedge their investment to potential risks. In addition, more experienced VCs were shown to add more value and to invest in better companies than less experienced VCs (Sorensen, 2007). Following the idea that on average American VCs are more experienced than European ones (Earlybird, 2011), it would be possible that foreign VCs are on average more experienced than Nordic domestic VCs. Hence, Foreign VCs may deal with more complex businesses which need more monitoring mechanisms and also more time to fully implement their value-added but leading to higher growth in the time pre-acquisition. The difference in term of presence within the technology sectors depending on the level of capital intensity may be explained by different reasons. One is that foreign VCs have on average larger investment funds and thus, more financing possibilities than European VCs to invest in technology sectors needing large investment such as semi-conductor company (Earlybird, 2011).

At the exit time, a successful firm may increase its probability to be acquired by a firm from a specific country by previously receiving investment from a VC of this country. The U.S. is the market with the largest share of the foreign acquirer population. Having an American VC has a positive relationship for being acquired by an American firm. Hence, a successful company should pay attention to the nationality of investors for the future

successful trade sale. In addition to the acquirer's nationality, the presence of a domestic and a foreign VC may influence the exit valuation of the company. On average, firms with a presence of a domestic VC have a higher PSR than firms without a domestic VC. It confirms the argument that foreign investors accelerate the growth of a company materializing in higher sales level and lower exit multiple. While a firm with only domestic VCs will be seen as having a higher potential growth post acquisition.

Suggestions for Further research

Prior studies suggest that VCs operate relatively similarly in different countries (Sapienza et al., 1996), however; country-specific differences may still exit in the firm behavior. Hence, it would be interesting to research the impact of foreign and domestic VCs in other geographical areas (e.g. EU15) or at a country level such the United Kingdom. Additionally, our research does not differentiate foreign VC from the Nordic and foreign VC from Europe or from outside the Nordics. We want to portray a general differentiation between domestic and foreign VC as no other past studies to our knowledge investigated such topic. Therefore, a possible future research would be to investigate the difference between the cross-border investments inside the Nordics and from outside the Nordics, even though such research may experience difficulties to gather data. Another interesting research would be to investigate the differences in the characteristics of domestic and foreign VCs in the Nordics. For instance, the experience, the age or size of the fund could be determinants in the investment decision of a VC.

7. Conclusion

The aim of this thesis was to provide new stylized facts about the determinants of domestic and foreign VC in Nordic technology firms exited via a trade sale between 1998 and 2013. To do so, we investigate the investment behavior characteristics of domestic and foreign VCs. Moreover, we analyze the relationship between the nationality of a VC and the one of the acquirer and finally the impact of the presence of a domestic and foreign VC on the exit valuation using the price to sale multiple. We created an exclusive set of observations from a Swedish venture capital's proprietary database and from commercial databases and other sources.

First, we find that firms with at least one foreign VC have on average more monitoring mechanisms and more time to exit than firm with only domestic VCs. In addition, there are variations in the presence over time of domestic and foreign VC in technology business sectors and in the Nordic region. Second, we present evidence of the presence of a strong relationship between the acquirer's nationality and the VC's nationality. For example, a presence of an American VC in a firm increases the predicted probability for a company to be acquired by an American firm. Lastly, using a price to sale ratio, we present findings of variations in the exit multiple depending on the presence of a domestic or a foreign VC. A presence of at least one domestic VC increases the price to sale exit multiple. These findings contribute to the understanding of the role and presence of domestic and foreign VC in successful technology firms from the Nordic region. We hope that our research will give incentive to further studies in the field of venture capital in the Nordics and elsewhere.

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APP1. Appendix – Definitions

Acronyms

VC: Venture capital

DVC: Domestic venture capital

FVC: Foreign venture capital

PSR: Price to sale ratio

Capex: Capital expenditure, it describes in this thesis the amount of capital a company needs to start its business.

Definition of industry groups

Telecommunication: The Telecommunications Services economic sector consists of companies engaged in fixed-line and wireless telecommunication networks for voice, data and high-density data.

Equipment: Equipment, also associated to Hardware, in the computer world, refers to the physical components that make up a computer system.

Internet: Internet companies are firms whose main businesses is to use the internet to make sales to the public.

Semi-conductor: A materials product - usually comprised of silicon - which conducts electricity more than an insulator but less than a pure conductor, such as copper and aluminum.

SaaS-Software as a service: It is a software delivery model in which software and associated data are centrally hosted on the cloud.

Software: The software industry includes businesses for development, maintenance and publication of software that are using different business models, but mainly license/maintenance based. In this thesis, we do not include SaaS business in the Software segment.

Games: It defines the economic sector involving with the development, marketing and sales of video games on computer, mobile or internet.

Other (IT Consulting, accessories): The segment Other represents the other companies in the Technology sector that do not fit the other group.

Definition of variables

PSR: A dependent variable, describing the price to sale ratio at the time of the trade sale. We only gathered PSR's information on 126 out of our 284 sample.

Investor:

Domestic VC: A dependent variable, expressing the presence of at least one domestic VC at the time of exit in the portfolio company.

Only domestic VC: A dependent variable, expressing the presence of only domestic VC at the time of exit in the portfolio company.

Foreign VC: A dependent variable, expressing the presence of at least one foreign VC at the time of exit in the portfolio company.

Foreign and Domestic VC: A dependent variable, expressing the presence of at least one domestic and one foreign VC at the time of exit in the portfolio company.

Acquiror:

VC nationality = Acquirer nationality: A dependent variable, expressing the presence of at least one domestic VC at the time of exit in the portfolio company.

Domestic VC

American: A dependent variable, expressing the presence of an American Acquirer for the portfolio company at the time of exit.

Independent variable

Age of the firm: An independent variable, representing age of the firm the time of exit, starting from the registration year to the exit year date.

Number of VCs: An independent variable, representing age of the firm the time of exit, starting from the registration year to the exit year date.

Number of rounds: An independent variable, measuring the number of total round of venture capital investment at the time of exit.

Syndication: An independent variable, representing the presence of a syndicated round in the portfolio company at the time of exit.

Syndication of a domestic and foreign VC: An independent variable, representing the presence of a syndicated round composed of a domestic and a foreign VC in the portfolio company at the time of exit.

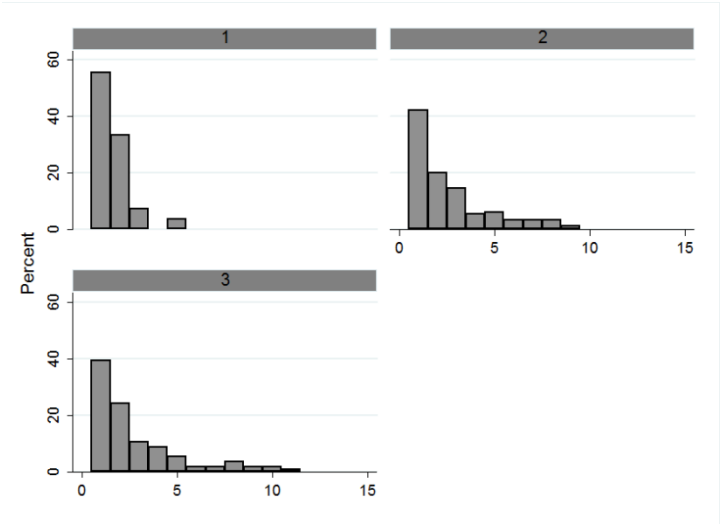
Sector: An independent variable, representing the sector of a firm among the eight technology sectors.

Business cycle: An independent variable, representing the time to exit of a firm among the three business cycles.

Country: An independent variable, representing the country of a firm from one of the four Nordic regions.

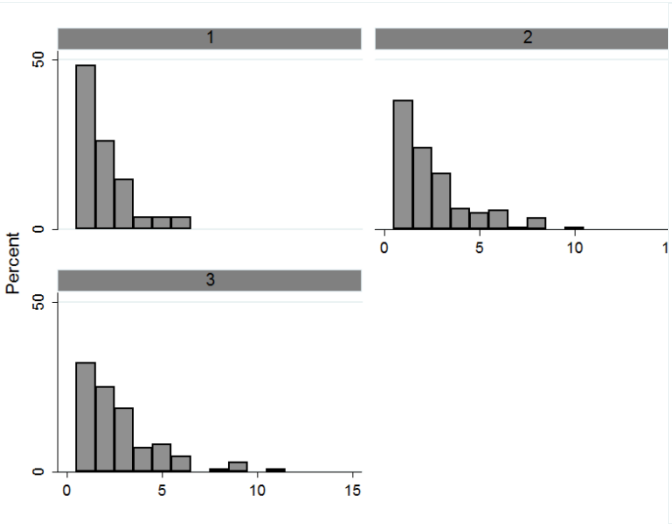
APP2. Regression Table

App 1. Number of rounds per firm over time



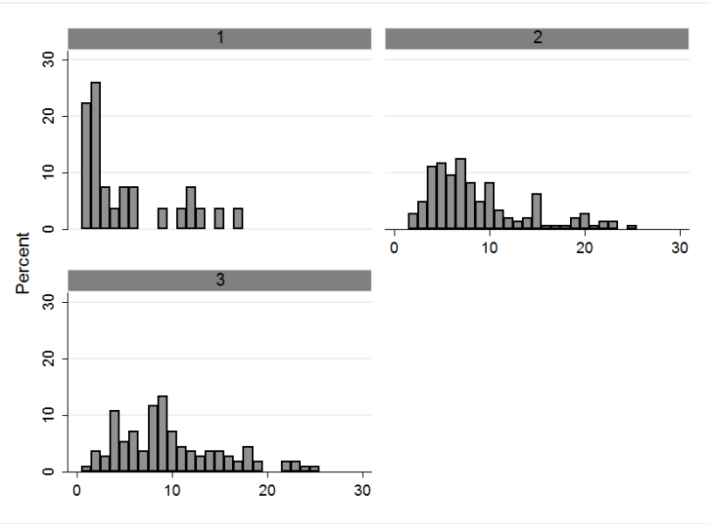
	Mean	Std. Dev	Freq
1	1.63	0.93	27
2	2.63	2.07	145
3	2.78	2.35	112
Total	2.59	2.13	284

App 2. Number of VC per firm over time



	Mean	Std. Dev	Freq
1	2	1.33	27
2	2.57	1.91	145
3	2.75	2.02	112
Total	2.58	1.91	284

App 3. Age of the firm at exit over time



	Mean	Std. Dev	Freq
1	5.22	4.91	27
2	8.86	5.22	145
3	9.8	5.40	112
Total	8.89	5.4	284

App. 4 Syndication dummy over time

	Mean	Std. Dev	Freq
1	0.44	0.57	27
2	0.54	0.50	145
3	0.57	0.50	112
Total	0.54	0.5	284

App. 5 Average number of syndication over

	Mean	Std. Dev	Freq
1	0.52	0.70	27
2	1.08	1.47	145
3	1.2	1.65	112
Total	1.07	1.5	284

App. 6 Percentage of syndication per total round

	Mean	Std. Dev	Freq
1	0.31	0.42	27
2	0.36	0.39	145
3	0.38	0.40	112
Total	0.36	0.40	284

App. 7 Syndication of foreign and domestic VC over time

		Business cycle						
Syndication		1		2		3		Total
Foreign and Domestic	No	4	33.3%	26	33.3%	26	40.6%	56
	Yes	8	66.7%	52	66.7%	38	59.4%	98
	Total	12	100.0%	78	100.0%	64	100.0%	154

App. 8 Determinants of domestic and foreign VC at the exit time, Syndication domestic & foreign – Regression results

	(1)	(2)	(3)
VARIABLES	Domestic VC	FVC	Both FVC & DVC
Number of rounds	0.0789	-0.0799	0.0189
	(0.0667)	(0.0775)	(0.0573)
Number of VC	0.0828	0.0316	**0.113***
	(0.105)	(0.106)	(0.0684)
Time_to_exit	-0.00393	0.0256	0.0260
	(0.0166)	(0.0171)	(0.0179)
Syndication domestic & foreign	-0.104		**2.289*****
(dummy)	(0.288)		(0.248)
Constant	0.832***	-0.821***	-1.732***
	(0.236)	(0.250)	(0.241)
Pseudo R-squared	0.0272	0.0120	0.506

Regression of presence of domestic and foreign venture capital in 284 Nordic Technology firms exited through a trade sale during 1998 and 2013. Asterisks *, ** and *** indicate statistical significance at the levels 10%, 5% and 1% respectively.

App. 9 Syndication of domestic and foreign and presence of both domestic and foreign VC

		Syndication of domestic and foreign		
Both FVC & DVC		No	Yes	Total
	No	166	10	176
	Yes	20	88	108
	Total	186	**98**	284

App. 10 Syndication domestic and foreign and presence of at least one foreign VC

		Syndication domestic and foreign		
		No	Yes	Total
FVC	No	140	0	140
	Yes	46	98	144
	Total	186	**98**	**284**

App. 11 Determinants of domestic and foreign VC at the exit time, Sectors – Regression results

VARIABLES	(1) Domestic VC	(2) Only DVC	(3) FVC	(4) Both FVC DVC	(5) Domestic VC	(6) Only DVC	(7) FVC	(8) Both FVC DVC
telecom	**0.674*** **	**-0.508** **	**0.508** **	-0.140				
	(0.227)	(0.219)	(0.219)	(0.210)				
Equipment	**1.282*** **	0	0	-0.253				
	(0.382)	(0.280)	(0.280)	(0.284)				
Internet	**1.049*** **	0.148	-0.148	**-0.541** **				
	(0.264)	(0.216)	(0.216)	(0.227)				
semi	**1.645*** **	0	0	-0.126				
	(0.473)	(0.280)	(0.280)	(0.281)				
SaaS	**1.138*** **	0.134	-0.134	**-0.470** **				
	(0.233)	(0.183)	(0.183)	(0.190)				
Software	**1.372*** **	-0.107	0.107	-0.107				
	(0.185)	(0.130)	(0.130)	(0.130)				
Games	**1.383*** **	0.431	-0.431	-0.674*				
	(0.520)	(0.374)	(0.374)	(0.393)				
Other	**0.876*** **	0.303	-0.303	**-0.876*** **	**0.876*** **	0.303	-0.303	**-0.876*** **
	(0.315)	(0.278)	(0.278)	(0.315)	(0.315)	(0.278)	(0.278)	(0.315)
Capex High					**1.003*** **	-0.233	0.233	-0.166
					(0.173)	(0.145)	(0.145)	(0.144)
Capex Low					**1.243*** **	0.0335	-0.0335	**-0.306*** **
					(0.123)	(0.0917)	(0.0917)	(0.0932)

Regression of presence of domestic and foreign venture capital in 284 Nordic Technology firms exited through a trade sale during 1998 and 2013. Asterisks *, ** and *** indicate statistical significance at the levels 10%, 5% and 1% respectively.

App. 12 Statistics of presence of domestic and foreign VC among the four Nordic countries

VARIABLES	Domestic	VC	Only	DVC	FVC		DVC &	FVC	All	
	248		140		144		108		284	100.0%
Sweden	122	85.9%	62	43.7%	80	**56.3%**	60	**42.3%**	142	50.0%
Norway	42	**95.5%**	27	**61.4%**	17	38.6%	15	34.1%	44	15.5%
Finland	53	86.9%	33	54.1%	28	45.9%	20	32.8%	61	21.5%
Denmark	31	83.8%	18	48.6%	19	**51.4%**	13	35.1%	37	13.0%

App. 13 Determinants of domestic and foreign VC at the exit time, Country – Regression results

VARIABLES	(1) Domestic VC	(2) Only DVC	(3) FVC all	(4) Both FV DVC
Sweden	**1.077*** **	-0.160	0.160	**-0.195***
	(0.131)	(0.106)	(0.106)	(0.106)
Norway	**1.691*** **	0.289	-0.289	**-0.410****
	(0.329)	(0.192)	(0.192)	(0.195)
Finland	**1.121*** **	0.103	-0.103	**-0.446*****
	(0.203)	(0.161)	(0.161)	(0.166)
Denmark	**0.986*** **	-0.0339	0.0339	**-0.382***
	(0.247)	(0.206)	(0.206)	(0.212)

Regression of presence of domestic and foreign venture capital in 284 Nordic Technology firms exited through a trade sale during 1998 and 2013. Asterisks *, ** and *** indicate statistical significance at the levels 10%, 5% and 1% respectively.

App. 14 Number and percentage of acquirer per business cycle

	1997 - 2001	2002 - 2007	2008 - 2013	Total
VC nationality = Acquirer	13	69	41	123
Domestic Acquirer	9	50	34	93
American Acquirer	11	44	23	78

VC nationality = Acquirer	39.4%	42.3%	41.8%	123
Domestic Acquirer	27.3%	30.7%	34.7%	93
American Acquirer	33.3%	27%	23.5%	78
TOTAL	33/100%	163/100%	98/100%	

App. 15 Worldwide nation ranking in innovation, competitiveness and corruption

Rank	Best Countries To Start a Company[1]	Global Innovation Index[2]	R&D as % of GDP[3]	Researchers per 1000 employed[3]	Global Competitive-ness Index[4]	Corruption Perceptions Index[5]
1	Denmark	Iceland	Israel	Finland	Switzerland	Denmark
2	Canada	Sweden	Sweden	Iceland	Sweden	New Zealand
3	United States	Hong Kong	Finland	Denmark	Singapore	Singapore
4	Sweden	Switzerland	United States	Sweden	United States	Finland
5	New Zealand	Denmark	Denmark	Norway	Germany	Sweden
6	Ireland	Finland	Austria	Austria	Japan	Canada
7	Switzerland	Singapore	Iceland	United Kingdom	Finland	Netherlands
8	Norway	Netherlands	France	Estonia	Netherlands	Australia
9	Iceland	New Zealand	Belgium	Slovenia	Denmark	Switzerland
10	Netherlands	Norway	United Kingdom	Luxembourg	Canada	Norway

Sources: 1) Small Business Administration's Office of Advocacy 2) INSEAD 3) OECD 2010 Factbook
4) World Economic Forum 5) Transparency International CPI 2010

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App. 16 Determinants of presence of nationality's acquirer at the exit time, Domestic VC – Regression results

VARIABLES	(1) Nationality VC = Acquirer	(2) Domestic acquisition	(3) Acquirer USA
Domestic VC	**0.442***	0.144	-0.0313
	(0.252)	(0.247)	(0.246)
Number of rounds	-0.0644	-0.00202	-0.0536
	(0.0476)	(0.0575)	(0.0511)
Number of VCs	0.0508	-0.00858	0.0799
	(0.0608)	(0.0697)	(0.0631)
Time to exit	**-0.0260***	**-0.0269***	**-0.0393****
	(0.0145)	(0.0147)	(0.0155)
Presence Syndication (dummy)	0.174	0.0317	0.0409
	(0.205)	(0.236)	(0.214)
Constant	-0.387	-0.136	-0.333
	(0.261)	(0.282)	(0.278)
Pseudo R-squared	0.0309	0.0412	0.0293

Regression of presence of specific nationality of acquirer in 284 Nordic Technology firms exited through a trade sale during 1998 and 2013. Asterisks *, ** and *** indicate statistical significance at the levels 10%, 5% and 1% respectively.

App. 17 Determinants of presence of nationality's acquirer at the exit time, Foreign VC – Regression results

VARIABLES	(1) Nationality VC = Acquirer	(2) Domestic Acquisition	(3) USA Acquirer
FVC VC	-0.236	-0.253	0.242
	(0.168)	(0.172)	(0.179)
Number of rounds	-0.0589	-0.0517	-0.0561
	(0.0464)	(0.0469)	(0.0513)
Number of VCs	0.0689	-0.0266	0.0649
	(0.0612)	(0.0672)	(0.0640)
Time to exit	**-0.0251***	**-0.0253***	**-0.0417*****
	(0.0144)	(0.0146)	(0.0155)
Presence Syndication (dummy)	0.245	-0.0983	-0.0125
	(0.206)	(0.218)	(0.216)
Constant	0.0104	0.141	-0.391**
	(0.183)	(0.189)	(0.194)
Pseudo R-squared	0.0267	0.0380	0.0347

Regression of presence of specific nationality of acquirer in 284 Nordic Technology firms exited through a trade sale during 1998 and 2013. Asterisks *, ** and *** indicate statistical significance at the levels 10%, 5% and 1% respectively.

App. 18 Determinants of presence of nationality's acquirer at the exit time, Both FVC and DVC – Regression

VARIABLES	(4) Nationality VC = Acquirer	(5) Domestic Acquisition	(6) USA Acquirer
Number of rounds	-0.0618	-0.0494	-0.0608
	(0.0463)	(0.0469)	(0.0518)
Number of VCs	0.0535	-0.0306	0.0631
	(0.0604)	(0.0677)	(0.0643)
Time to exit	**-0.0266***	**-0.0255***	**-0.0420*****
	(0.0145)	(0.0147)	(0.0154)
Presence Syndication (dummy)	0.197	-0.0924	-0.0384
	(0.209)	(0.222)	(0.223)
Both_FVC_DVC	-0.00171	-0.208	0.273
	(0.185)	(0.195)	(0.197)
Constant	-0.0199	0.0955	-0.339*
	(0.182)	(0.188)	(0.191)
Pseudo R-squared	0.0217	0.0352	0.0349

Regression of presence of specific nationality of acquirer in 284 Nordic Technology firms exited through a trade sale during 1998 and 2013. Asterisks *, ** and *** indicate statistical significance at the levels 10%, 5% and 1% respectively.

App. 19 Determinants of presence of nationality's acquirer at the exit time, Only DVC – Regression results

VARIABLES	(1) Nationality VC = Acquirer	(2) Domestic Acquisition	(3) USA Acquirer
Only DVC	0.236	0.253	-0.242
	(0.168)	(0.172)	(0.179)
Number of rounds	-0.0589	-0.0517	-0.0561
	(0.0464)	(0.0469)	(0.0513)
Number of VCs	0.0689	-0.0266	0.0649
	(0.0612)	(0.0672)	(0.0640)
Time to exit	**-0.0251***	**-0.0253***	**-0.0417*****
	(0.0144)	(0.0146)	(0.0155)
Presence Syndication (dummy)	0.245	-0.0983	-0.0125
	(0.206)	(0.218)	(0.216)
Constant	-0.226	-0.112	-0.149
	(0.229)	(0.241)	(0.240)
Pseudo R-squared	0.0267	0.0380	0.0347

Regression of presence of specific nationality of acquirer in 284 Nordic Technology firms exited through a trade sale during 1998 and 2013. Asterisks *, ** and *** indicate statistical significance at the levels 10%, 5% and 1% respectively.

App. 20 Determinants of presence of nationality's acquirer at the exit time, US VC – Regression results

VARIABLES	(1) Nationality VC = Acquirer	(2) Domestic Acquisition	(3) USA Acquirer
Number of rounds	-0.0448	-0.0653	-0.0395
	(0.0463)	(0.0477)	(0.0518)
Number of VCs	-0.00716	-0.00301	0.0368
	(0.0630)	(0.0702)	(0.0661)
Time to exit	-0.0248*	-0.0284*	-0.0379**
	(0.0145)	(0.0146)	(0.0155)
Presence Syndication (dummy	0.172	-0.133	0.00441
	(0.203)	(0.218)	(0.213)
US VC (dummy)	**0.590****	-0.401	**0.419***
	(0.236)	(0.246)	(0.233)
Constant	-0.00707	0.0987	-0.350*
	(0.182)	(0.188)	(0.192)
Pseudo R-squared	0.0381	0.0388	0.0384

Regression of presence of specific nationality of acquirer in 284 Nordic Technology firms exited through a trade sale during 1998 and 2013. Asterisks *, ** and *** indicate statistical significance at the levels 10%, 5% and 1% respectively.

App. 21 Determinants of PSR exit multiple at the exit time, Sectors – Regression results

	(1)	(2)
VARIABLES	PSR	PSR
Telecom	8.082	
	(5.760)	
Equipment	2.943	
	(10.21)	
Internet	**17.12****	
	(7.799)	
Semi-conductor	**27.50*****	
	(7.221)	
SaaS	6.290	
	(6.198)	
Software	**11.49*****	
	(4.383)	
Games	26.24	
	(27.02)	
Other	2.739	2.739
	(7.493)	(7.561)
Capex High		**13.57*****
		(4.157)
Capex Low		**11.25*****
		(3.258)
Observations	126	126
R-squared	0.205	0.156

Regression of price to sale exit multiple ratios of 126 Nordic firms backed by venture capital exited via a trade sale from 1998 and 2013. Asterisks *, ** and *** indicate statistical significance at the levels 10%, 5% and 1% respectively.