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The stock market reaction to joint venture announcements

An empirical study of companies listed on Nordic stock exchanges

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Abstract

This thesis examines how the stock market reacts to joint venture announcements by firms listed on Nordic stock exchanges. We performed an event study on a sample of 988 joint venture announcements by 280 firms from January 1, 1995 to December 31, 2017. The primary objective was to determine whether joint venture announcements have a significant impact on the market valuation of the announcing firms. In addition, we attempted to identify determinants of the stock market response.

The analysis showed a cumulative average abnormal return of 0.88% in a three-day event window surrounding the joint venture announcements. This finding is significant at the 1% level, which is a strong indication that joint venture announcements have a positive effect on the market valuation of Nordic firms. The results are robust to the choice of normal performance model, event window and significance test. The average increase in shareholder wealth associated with joint venture announcements is approximately $20.0 million, while the median increase is $1.2 million. Even though there are differences between the Nordic region and the US, our findings seem to be consistent with the notion that Nordic firms experience similar market valuation effects as firms in the US.

The cross-sectional analysis showed that relatively smaller partners, *ceteris paribus*, experienced an increase in the cumulative abnormal return of 2.43 percentage points. This supports the notion that relatively smaller partners are able to extract more value from a joint venture than the relatively larger partners. We found no evidence supporting the hypothesis that there is a relationship between experience and the cumulative abnormal return. Furthermore, neither the business relatedness between the partners nor the business relatedness between the partner and joint venture have an effect on the cumulative abnormal return. However, firm size, joint venture type, number of partners and the time period seem to impact the joint venture performance.

Preface

This thesis was written as a part of our master profile in Finance and marks the end of five great years at the Norwegian School of Economics (NHH).

First and foremost, we would like to thank our supervisor, Prof. Karin S. Thorburn, who has helped us throughout the thesis. We would also like to thank the Department of Finance at NHH that have shown willingness to answer questions when necessary. Lastly, we would like to thank the administration at NHH for helping us access the data tools making this thesis possible.

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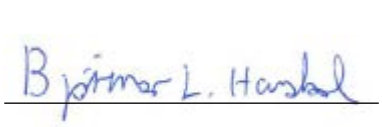

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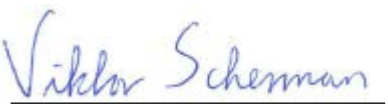

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1. Introduction

1.1 Structure

The thesis has seven sections. In the first section, the topic of the thesis as well as the motivation for choosing the topic are discussed. The second section reviews two of the most important theories for why firms perform joint ventures along with empirical findings from the joint venture literature. Based on this review, our hypotheses are derived. In the third section, an overview of the hypotheses that will be investigated further in the analysis section are presented. The fourth section describes the event study methodology used to test the hypotheses. The fifth section outlines how the sample was derived as well as giving an overview of the Nordic joint venture landscape. In the sixth section, we present the analysis and the results. The seventh section summarizes the most important findings from the thesis as well as recommendations for further research and limitations of the study.

1.2 Background and motivation

Joint ventures have become an increasingly popular alternative to achieve inorganic growth. They allow firms to combine assets and know-how without taking the risks associated with mergers and acquisitions (M&A). The value of joint ventures grew by 20% *per annum* from 1995 to 2015, which is twice the rate of M&A (Leroi & Leung, 2017). The increased recognition of joint ventures makes it an interesting topic for a master thesis.

The motivation for selecting the Nordic region is the similar characteristics shared by the individual countries. They are all small and open economies with a long history of close relationships. Moreover, they have similar ways of life, languages, religion and social structures. From a financial perspective, the countries have a similar risk profile, with political systems known for their stability. Furthermore, they have comparable corporate governance- and legal systems, which simplify the comparison of corporate actions. All countries, except Norway, are a part of the Nasdaq Nordic, which implies similar stock exchange rules.

While there are substantial similarities, there are also differences between the Nordic countries when it comes to sector distribution. Norway has a large proportion of companies within oil & gas and shipping, while Sweden has a strong financial and industrial sector. The latter sector is

also important in Finland, in addition to information technology and materials. The health care sector dominates the Danish market.

There has been a substantial amount of research on joint ventures and their ability to generate value, and the overwhelming majority has been on American companies. In recent years, joint ventures by European companies have received increased attention, but to our knowledge, no one has studied joint venture formation by Nordic companies. The already mentioned characteristics that unite the Nordic countries also make the Nordic region in some aspects different from the US. Furthermore, Nordic companies typically have a larger ownership concentration, which, *ceteris paribus*, imply less agency problems. It would therefore be of great interest to analyze how the market reacts to joint ventures announcements by Nordic firms.

2. Literature review

The literature review starts with defining a joint venture. Thereafter, the motivation for conducting joint ventures is examined using transaction cost economics and the resource-based view, followed by a review of the empirical findings from the joint venture literature. The literature review serve as a point of reference when developing our hypotheses, discuss the results and identify limitations of the study.

2.1 Joint ventures

Joint ventures are a way of inter-organizational cooperation, categorized as a hybrid governance structure[1] by Williamson (1985). There are two main classifications of joint ventures, equity and non-equity. An equity joint venture is a separate legal entity in which the partners own an equity stake. A non-equity joint venture is on the other hand a corporate agreement between the partners. In this thesis, we will only analyze equity joint ventures, which from now will be referred to as "joint ventures".

2.2 Motivation for joint ventures

Multiple theoretical frameworks have emerged to explain why firms perform joint ventures, with two of the most influential ones being the transaction cost economics (TCE) and the resource-based view (RBV) (Zhan & Luo, 2007). The TCE is a market-based view primarily focusing on efficiency. It uses an outside-in perspective where a firm's performance is explained through external industry structures and its competitive characteristics. The RBV is primarily focused on rent-seeking and uses an inside-out perspective where a firm's ability to develop capabilities and resources influence performance.

[1] There are three primary forms of governance structure. Firms can either manufacture the necessary products themselves, buy what they need in the open market or decide on a hybrid governance structure, which includes partnerships or acquisitions.

2.2.1 Transaction cost economics

The TCE regards the transaction, i.e. the entry mode, as the unit of analysis. The objective is to choose the governance structure that minimizes the transaction costs when conducting a transaction. Transaction costs refers to the expenses related to constructing and enforcing contracts, where opportunistic behavior plays an important role (Williamson, 1985).

The transaction costs depend on three main transaction attributes: asset specificity, uncertainty and frequency (Williamson, 1985). Asset specificity refers to the degree an asset can be applied in other situations without loss of value. Uncertainty concerns the degree of imperfect information surrounding the transaction, which makes it difficult to (1) specify the specific conditions of the contract *ex ante* and (2) monitor the fulfillment of the contract *ex post*. Transaction frequency refers to the number of times the partners perform transactions. The transaction costs are highest when the asset specificity and uncertainty is high, and the frequency of transactions is low.

According to Williamson (1985), a firm should choose the governance structure that minimizes the sum of production[2] and transaction costs. Hence, when the transaction costs exceed the production savings, the firm should perform the activities internally. However, capability restrictions, which usually arise when the distance between the firm and the field of operation is large, could make internal production infeasible. In situations where the asset specificity and uncertainty are high and the frequency is low, a hybrid governance structure is an attractive option due to transaction costs associated with opportunistic behavior inherent in market transactions (Osborn & Baughn, 1990). In a joint venture, the partners share the profits or losses obtained through the venture's performance, which align incentives to reveal and share resources, reducing opportunism (Hennart, 1988). Further, joint ventures have a superior monitoring mechanism as the partners might be legally entitled to verify the financial information and monitor through direct observation (Osborn & Baughn, 1990). Therefore, Kogut (1988) argues that joint ventures are suited for transactions characterized by high uncertainty and to some extent high asset specificity.

Mergers and acquisitions (M&A) is an alternative hybrid governance structure for overcoming capability restrictions. However, conducting M&A could affect the motivation of the acquired

[2] Production costs differ between firms, among others, due to the scale of operations and proprietary knowledge (Kogut, 1988).

management team and increase management costs, while aligning incentives through a joint venture alleviates these costs (Hennart, 1991). Further, M&A could be associated with costs of managing unrelated business activities (Kogut, 1988), and may not be feasible due to regulatory restrictions.

2.2.2 Resource-based view

The resource-based view adopts the resources as the unit of analysis. Unlike the TCE, the RBV assumes that companies can obtain a competitive advantage through valuable, inimitable, rare and non-substitutable resources (Barney, 1991). Instead of basing the entry decision on current market conditions, the companies' decisions depend on firm-specific resources and their ability to create competitive advantages that maximize value. RBV could therefore be thought of as a framework where reduction of costs (TCE) is not the only determinant in an entry decision.

From the RBV, joint ventures are motivated by the desire of at least one partner to make a better use of its competitive advantage (Tsang, 2000). A joint venture could involve pooling similar or different resources, which both can create value and lead to a competitive advantage, but in different ways.

Pooling of similar resources usually indicates a common motivation by the partners to increase the productivity of capital and firm assets through improving existing capabilities. The goal is primarily to reduce costs and/or increase market power in the current line of business by increasing economies of scale or reducing their dependence on suppliers by gaining control of valuable resources. (Hennart, 1988)

Joint ventures may also involve pooling of different resources, since certain resources are infeasible to trade in the market as they either are blended with other resources or embedded in organizations (Chi, 1994). Such joint ventures are usually a result of different motives by the participants, as they represents different opportunities for the partners (Hennart, 1988). However, each partner wants to take advantage of the other partner's resources, in order to discover new opportunities that previously were not available. Joint ventures are therefore common vehicles to develop new products as well as entering new lines of business or new countries (Barringer & Harrison, 2000). Joint ventures might also facilitate learning and sharing of knowledge, which the participating firms can use to better exploit their existing resources (Kogut, 1988). For instance, a company might perform a joint venture abroad, and use this obtained knowledge as a springboard to continue expanding their operations in that country

after the joint venture is terminated. The ability to extract the potential value depends, however, on the level of tacit knowledge and the firm's absorptive capacity. Tacit knowledge is difficult to transfer to others by means of writing it down or even verbalizing it, and could be costly for a new entrant to obtain as it often is a by-product of operating in a specific industry or country (Hennart, 1988). Absorptive capacity is the ability to "recognize the value of new information, assimilate it and apply it to commercial ends" (Cohen & Levinthal, 1990).

As in the TCE, M&A is another hybrid governance structure that may be used in order to pool resources to obtain a competitive advantage. However, Hennart (1988) argues that a joint venture is preferable when the resource required is a subset of those held by the firm, especially when the unsuitable resources are firm-specific and therefore difficult to divest. Instead of acquiring a firm just for obtaining a specific resource, a joint venture may be used for firms with a specific object in mind (Hamel, 1991).

Combining the two frameworks

Even though the TCE and the RBV are different in many ways, they highlight different aspects of the motivation for conducting joint ventures. However, they have both received criticism by scholars. Osborn & Baughn (1990) claim that the TCE is restricted to the efficiency and cost-minimization rationales. Treating each entry decision in isolation fails to take into account the firms' overall strategy. The RBV compensates by looking at the value-creating benefits of a transaction. However, critics argue that there is no clear and agreed basis for determining which of a firm's resources that in fact contribute to the firm's performance (Mosakowski & McKelvey, 1997). One way of overcoming the weaknesses of the two frameworks is by acknowledging that sustainable competitive advantage depend not only on the creation of value through resources, but also on the cost of controlling and protecting these with appropriate governance structures (Augusto & Souza, 2015).

2.3 Empirical findings from the joint venture literature

This subsection begins with a brief discussion about the different ways of measuring joint venture performance. Thereafter, we examine relevant empirical findings and develop our hypotheses.

2.3.1 Measuring performance of joint ventures

There are multiple approaches for measuring joint venture performance, including abnormal returns, financial metrics, survival rate, overall satisfaction and achievement of goals.

Financial information regarding joint ventures are often not available, as it tends to be integrated in the partners' consolidated corporate data. Research using financial metrics are therefore limited. Using stability or longevity as a measure of performance has been criticized because unsuccessful joint ventures may persist for a long time while successful ones may be terminated once the objective is reached (Gomes-Casseres, 1987). Satisfaction and achievement of individual or joint goals are dependent on extensive surveys, and managerial assessments of joint venture performance have received criticism for being biased and inaccurate (Kale, Dyer, & Singh, 2002). As there is a considerable disagreement regarding the reliability and validity of the mentioned approaches for measuring joint venture performance, abnormal returns for the partner firms has been the primary method of choice (Moskalev & Swensen, 2007). We will therefore focus our review on empirical research using abnormal returns when determining the performance of joint ventures.

2.3.2 Evidence on performance of joint ventures

The abnormal returns associated with joint venture announcements have been the focus of numerous empirical studies, with the majority finding that joint ventures create value for the shareholders (Moskalev & Swensen, 2007).

According to McConnell & Nantell (1985) and Burton, Lonie, & Power (1999), the risk-sharing effects and the possibility for synergies might result in joint ventures being perceived as more valuable than single ventures. Furthermore, as most listed companies state that their primary objective is to maximize shareholder value, it is fair to assume the companies will not enter a joint venture if the net present value (NPV) of the project, either directly or indirectly, is below zero. Hence, we develop the following hypothesis:

Hypothesis 1: *Joint venture announcements have a positive effect on the market valuation of the announcing firm.*

Factors affecting the performance of joint ventures

Previous studies argue that the joint venture performance can be explained by certain characteristics. However, it is difficult to draw conclusions to what these characteristics are due to the different approaches used in previous research regarding both the event study methodology and the determination and combination of variables (Merchant & Schendel, 2000).

We therefore start by reviewing the empirical findings regarding the characteristics that will be investigated further in a Nordic setting. Thereafter, other factors that have been shown to potentially affect the performance of joint ventures are shortly discussed.

Relative partner size

The majority of previous research find that the value creation is greater for the relatively smaller joint venture partners (McConnell & Nantell, 1985; Koh & Venkatraman, 1991).

McConnell & Nantell (1985) cited the "relative size hypothesis", which states that if the dollar value of the gain from a joint venture is divided approximately evenly between the partners, the gain should be proportionally larger in relative terms for smaller partners. However, the dollar value of the gain is not necessarily equal. Small firms entering joint ventures with large firms might benefit from a signaling effect, as the larger firms validate the smaller firms (Mohanram & Nanda, 1998). According to Jones & Danbolt (2004) a joint venture may represent a "significant breakthrough in terms of creating new growth opportunities" for smaller firms, whereas it for large firms only change the costs or risks associated with existing growth opportunities. Furthermore, when small firms engage in a joint venture, it is often on the request from large firms, which consider joint ventures as a way to gain access to tacit knowledge. In these instances, the larger firms typically provide capital, marketing expertise and distribution channels. This could imply asymmetric resource dependence, where larger firms are more dependent on smaller firms, resulting in greater bargaining power and ability to capture value for smaller partners. (Das, Sen, & Sengupta, 1998) These findings lead to our second hypothesis:

Hypothesis 2: *Partners that are relatively smaller than the other participants in a joint venture will experience higher abnormal returns.*

Experience

Previous research on how experience affects joint venture performance has yielded inconsistent results. Merchant & Schendel (2000) did not find a relationship between experience and abnormal returns. This contradicts the findings of Annand & Khanna (2000) that firms with prior joint venture experience achieve higher stock market returns when announcing joint ventures. However, Gulati, Lavie, & Singh (2009) found that experience only has an effect on abnormal returns in specific circumstances.

Companies with a small number of ongoing joint ventures may find it easier to manage their portfolio, as well as understand how each project fits with the firm's strategic objectives. However, firms with a large portfolio of joint ventures often have dedicated resources to follow up the investments (Kale et al., 2002). Furthermore, Simonin (1997) found that greater experience is linked with firms' abilities of effectively seeking out appropriate partners and reduces the transaction costs related to the construction of contracts. Greater experience also improves the firm's absorptive capacity and ability to anticipate and respond to challenges related to implementation and management of joint ventures (Annand & Khanna, 2000). These findings indicate that prior experience can affect firms' ability to create value as well as reducing uncertainty about future performance. However, the ability to learn and retain the knowledge accumulated through experience has been shown to depreciate over time (Lieberman, 1984; Darr, Argote, & Epple, 1995). This could indicate that the relationship between joint venture experience and joint venture performance is characterized by diminishing marginal returns.

Hypothesis 3: *Experience has a positive effect on abnormal returns.*

Business relatedness

Partner of interest and the other participants

The empirical literature disagrees on how the business relatedness between the partner of interest[3] and the other participants affects the joint venture performance. Balakrishnan & Koza (1993) found that abnormal returns were higher when the partners' businesses were dissimilar. This contradicts the findings of Koh & Venkatraman (1991), who showed that value creation increased with the degree of business relatedness between the partners. On the other hand

[3] The partner of interest is defined as the firm announcing the joint venture.

Mohanram & Nanda, (1998) found that firms that are neither too close nor too far away from each other observed higher abnormal return.

Hamel (1991) argues, in line with the RBV view, that the business distance between the partners cannot be too great to achieve value creation. Companies that are too far apart have difficulties learning from each other and achieving a competitive advantage by combining resources. Furthermore, the knowledge distance might make it difficult to communicate, which could increase the transaction costs and reduce the probability of achieving the purpose of the partnership.

Overlapping areas of expertise facilitate knowledge transfer and reduce the transaction cost (Koh & Venkatraman, 1991). However, scholars also argue that too small gaps limit the value creation potential as the firms mostly have duplicate assets (Mohanram & Nanda, 1998). Furthermore, Balakrishnan & Koza (1993), using the TCE logic, hypothesized that investors will not respond favorably to joint ventures between related partners, as the cost of valuing and buying complementary assets are minimal. The market might in these instances regard joint ventures as a sign of poor management since an acquisition would be the transaction mode that maximized shareholder value.

Based on the empirical findings, we believe that there is an optimal distance between the partners. Pooling both resources that are very similar or dissimilar may create value, but not as much as combining complementary resources.

Hypothesis 4: *Partners that are neither too close nor too distant from the other joint venture participants experience higher abnormal returns.*

Partner of interest and joint venture

Koh & Venkatraman (1991) and Merchant & Schendel (2000) found that abnormal returns increased with the degree of business similarity between the partner of interest and the joint venture.

Koh & Venkatraman (1991) argue that the opportunity for value creation is optimal when the business relatedness between the partner of interest and the joint venture is high. The scale economies can raise entry barriers by increasing the level of commitment required of potential entrants (Contractor & Lorange, 1988). It may also yield economies of scope, since opportunities for transferring skills and knowledge across value chains increase. This can

generate superior competitive insights, which enables the partner to better anticipate, comprehend and adapt to emerging threats and opportunities (Merchant & Schendel, 2000). Furthermore, the transaction costs are higher for joint ventures located in unrelated business areas and might indicate limited growth opportunities in the partner's current field of operation. Even though there might be potential in unrelated business areas, we believe that the ability to effectively extract value from the joint venture is higher when it is located in the partner of interest's business area.

Hypothesis 5: *Partners announcing joint ventures with high business relatedness experience higher abnormal returns.*

Other characteristics

By including firm size, scholars have been able to control for the assumption in the "relative size hypothesis", that the dollar value of the gain from a joint venture is divided approximately evenly between the partners. Previous research on how firm size affects the abnormal returns has not yielded consistent results (Koh & Venkatraman, 1991; Mohanram & Nanda, 1998; Burton et al., 1999; Annand & Khanna, 2000).

Osborn & Baughn (1990) argue that the sectors' different risk characteristics may affect the outcome and perception of a joint venture. This claim is supported by Mohanram & Nanda (1998), who found abnormal returns to vary systematically across sectors. The different types of joint ventures may indicate where in the value chains the activities are located. Hagedoorn (1993) argue that investors might have different perceptions of joint ventures in the upstream and downstream value chain, as they may be an indication of future growth potential.

The majority of previous research has found that abnormal returns increase when partners are located in countries that share similar characteristics (Chung, Koford, & Lee, 1993). The main argument is that partners from countries with different characteristics experience difficulties in effectively manage the joint venture, affecting both the transaction costs and ability to create value. The same argument can also be used for the location of the joint venture. Certain geographical markets can only be entered through a joint venture, the most common being China, and these markets are often analyzed separately. However, studies on the location of the joint ventures have yielded mixed results (Chung et al., 1993; Borde, Whyte, Wiant, & Hoffman, 1998).

Previous research indicates that the ownership structure might affect the performance of joint ventures (Moskalev & Swensen, 2007). Killing (1988) argue that equal ownership can affect the transaction costs and the ability to create value as the complexity of managing joint ventures and the risk of conflict between the partners increase. The number of partners may also affect the joint venture performance, but the empirical results are not consistent (Beamish & Kachra, 2004). Involving more partners has the potential to increase the variety of available resources. However, the complexity and risk of freeriding also increases, as it gets more difficult to detect whether the other participants deliver the promised resources (Hennart & Zeng, 2005).

3. Hypotheses

Hypothesis 1: *Joint venture announcements have a positive effect on the market valuation of the announcing firm.*

Hypothesis 2: *Partners that are relatively smaller than the other participants in a joint venture will experience higher abnormal returns.*

Hypothesis 3: *Experience has a positive effect on abnormal returns.*

Hypothesis 4: *Partners that are neither too close nor too distant from the other joint venture participants experience higher abnormal returns.*

Hypothesis 5: *Partners announcing joint ventures with high business relatedness experience higher abnormal returns.*

4. Methodology

4.1 Event study methodology

The event study methodology is one of the most frequently used empirical techniques in finance and accounting to measure the impact of a specific event on the value of a firm (MacKinlay, 1997). The premise is, given a semi-strong form of the efficient market hypothesis (see appendix A.1), that the effects of an event will be reflected immediately in security prices through investors incorporating the NPV of the expected future cash flows. The event study methodology is also based on assumptions of unanticipated events and no confounding effects (see appendix A.1) (McWilliams & Siegel, 1997).

Even though event studies do not have a unique structure, there is a general flow of analysis (MacKinlay, 1997). The initial task is to define the event of interest, which in this thesis is a joint venture announcement by Nordic firms.

The event window should be long enough to capture the effect of the event, but short enough to exclude confounding effects (McWilliams & Siegel, 1997). The period prior to the announcement may be of interest, as information regarding the joint venture could leak before the official announcement. MacKinlay (1997) also suggests including a period after the announcement day to the event window. This enables a gradual update of the stock price and capture the effects that occur after the stock exchange closes on announcement day. This is important to consider in our study because we do not know if the joint venture announcements occurred before or after the stock exchange closed on the announcement day. However, Brown & Warner (1985) showed that long event windows reduce the power of the test statistic, which could induce false inference regarding the significance of the event.

The next step of an event study is to define the estimation period. There is a trade-off between including more days in the estimation period to increase the statistical accuracy, and the risk of shifting return-generating parameters (Strong, 1992). In order to prevent biased estimates, the estimation period and the event window should not overlap (MacKinlay, 1997). The estimation period in our study therefore ends three days prior to the joint venture announcement day.

The timeline of our event study is illustrated in figure 4.1.

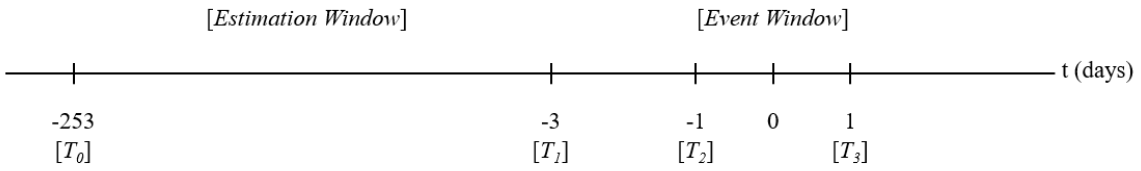

Figure 4.1: Event Study Timeline

The event day is defined as t=0. In our study, T_0, T_1, T_2 and T_3 is set to -253, -3, -1 and 1, respectively. The estimation window is between T_0 and T_1, which implies 251 days of stock returns. The event window is between T_2 and T_3, consisting of three days of stock returns. We also include the alternative event window [0, T_3] to ensure robustness.

It is necessary to establish a benchmark for normal performance, which is the expected return without conditioning on the event occurring (MacKinlay, 1997). To estimate normal performance, we use the market model, which is the model of choice of Brown & Warner (1985) and MacKinlay (1997). It assumes a linear relationship between the normal performance of an asset and the market portfolio (MacKinlay, 1997). The market model is expressed in equation 4.1.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \tag{4.1}$$

$$E(\varepsilon_{it} = 0) \qquad Var(\varepsilon_{it}) = \sigma_{\varepsilon_i}^2$$

R_{it} is the return of security i at time t, R_{mt} is the market portfolio's return at time t and ε_{it} is the error term – with an expected value of zero and variance of $\sigma_{\varepsilon_i}^2$. α_i, β_i and $\sigma_{\varepsilon_i}^2$ are parameters of the market model. The market model uses the ordinary least square method (OLS) during the estimation window to estimate $\hat{\alpha}_i$ and $\hat{\beta}_i$. We estimate a new $\hat{\alpha}_i$ and $\hat{\beta}_i$ for each joint venture, as the company characteristics may vary over time. To ensure robustness, we also examine if our results are affected by using the constant mean return model to estimate normal performance (see appendix A.6).

Thin trading could be a potential issue in an event study setting. The market model's OLS estimates of β could be biased and inconsistent (Brown & Warner, 1985), and the abnormal returns for the days in the event window might be inaccurate if there is no trading. Bartholdy, Olson, & Peare (2007) found that the stocks on the Copenhagen Stock Exchange were affected by thin trading, which makes it relevant for our study because Danish firms are a part of our

sample. To reduce the potential issue of thin trading, we exclude all events with trading in less than 50% of the estimation window, as applied in studies such as Fisher-Vanden & Thorburn (2011), and events without trading in the last two last days in the event window (see appendix A.2 for a more thorough discussion of thin trading). The latter requirement also ensures that we do not have any events without trading.

The estimated abnormal return (AR_{it}) for event i at time t is the difference between the realized return and the normal return estimated by the Market model ($\hat{\alpha}_i + \hat{\beta}_i R_{mt}$) as expressed in equation 4.2.

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \tag{4.2}$$

Since we use an event window with multiple days, the abnormal return observations must be aggregated through each day t in the event window, which is defined as the period between T_2 and T_3 (see figure 4.1), obtaining the cumulative abnormal return $CAR_i\ (T_2, T_3)$, as expressed in equation 4.3.

$$CAR_i\ (T_2, T_3) = \sum_{t=T_2}^{T_3} AR_{it} \tag{4.3}$$

When aggregating the abnormal return observations, we assume no problems with clustering (see appendix A.3). The average abnormal return (AAR_t) for day t in a sample with N events is expressed by equation 4.4.

$$AAR_t = \frac{1}{N} \sum_{i=1}^{N} AR_{it} \tag{4.4}$$

Finally, we calculate the cumulative average abnormal return $CAAR(T_2, T_3)$ in the event window for a sample with N events, which is expressed in equation 4.5.

$$CAAR(T_2, T_3) = \frac{1}{N} \sum_{t=T_2}^{T_3} AAR_t \tag{4.5}$$

4.2 Significance testing

In order to answer our hypothesis that joint ventures announced by Nordic firms have a positive impact on the market valuation, we must determine whether the CAAR is statistically different from zero.

The two categories of significance testing are parametric and nonparametric. Parametric tests assume normally distributed abnormal returns, while nonparametric tests are free of assumptions regarding the distribution (MacKinlay, 1997). Brown & Warner (1985) found that daily abnormal returns follow a non-normal distribution. Furthermore, Bartholdy et al., (2007) showed that Danish returns deviate from normality. However, Brown & Warner (1985) argue that the mean abnormal return in a cross-section of securities converges towards normality as the sample increases, and that parametric tests for significance of the mean abnormal return therefore could be well specified. Hence, we base our analysis on a parametric test, but also include a nonparametric test to ensure robustness.

A problem that could arise when testing abnormal returns in an event study setting is increasing volatility during the days surrounding the event (Christie, 1983; Rosenstein & Wyatt, 1990). We therefore base our analysis on the standardized cross-sectional test (Boehmer et al., 1991) that considers the change in variance close to the event day. The nonparametric test included to ensure robustness is the Wilcoxon singed rank test (Wilcoxon, 1945) (see appendix A.5).

4.2.1 Standardized cross-sectional test

The standardized cross-sectional test introduced by Boehmer et al. (1991) is a hybrid of the traditional cross-sectional test and the Patell (1976) test. It considers information from both the estimation and event window, which makes it more robust than its traditional counterpart when change in volatility is a potential issue. The standardized cross-sectional test requires uncorrelated cross-sectional residuals (Boehmer et al., 1991), whereas non-clustered events (see appendix A.3) are sufficient according to MacKinlay (1997).

In the standardized cross-sectional test, each standardized AR_{it} and CAR_i is aggregated through events. The test statistic for AR_t and CAR is expressed in equation 4.6 and 4.7, respectively.

$$Z_{1,t} = \sqrt{N} \times \frac{ASAR_t}{\sqrt{Var(ASAR_t)}} \tag{4.6}$$

$$Var(ASAR_t) = \frac{1}{N-1}\sum_{i=1}^{N}(SAR_{i,t} - ASAR_t)^2$$

$SAR_{i,t}$ is the standardized abnormal return for event i at time t, $ASAR_t$ is the average SAR_t at time t, $Var(ASAR_t)$ is the variance of $ASAR$ at time t and N is the number of events.

$$Z_1 = \sqrt{N} \times \frac{ASCAR}{\sqrt{Var(ASCAR)}} \tag{4.7}$$

$$Var(ASCAR) = \frac{1}{N-1}\sum_{i=1}^{N}(SCAR_i - ASCAR)^2$$

$SCAR_i$ is the standardized CAR for event i, $ASCAR$ is the average $SCAR_i$ and $VAR(ASCAR)$ is the variance of $ASCAR$ (see appendix A.4 for a more thorough review of the standardized cross-sectional test).

4.3 Cross-sectional study

In order to test our hypotheses regarding what characteristics affect the wealth creation associated with joint ventures announced by Nordic firms, we use a cross-sectional regression of the CARs on relevant variables. The cross-sectional regression is expressed in equation 4.8.

$$CAR_i = \delta_0 + \delta_1 x_{li} + \ldots + \delta_M x_{Mi} + \epsilon_i \tag{4.8}$$

$$E(\epsilon_i) = 0 \qquad\qquad Var(\epsilon_i) = \sigma_{\epsilon_i}^2$$

In equation 4.8, x_{li} is characteristic l for event i in a sample with M characteristics, δ_m, $m=0$, …, M are the regression coefficients, while ϵ_i is the error term - with an expected value of zero and a variance of $\sigma_{\epsilon_i}^2$.

The OLS is used to estimate the parameters of the regression model above. It assumes homoscedastic error terms, i.e. constant variance, but this assumption is violated in most cases (MacKinlay, 1997). We have therefore applied the standard errors derived from using the approach of White (1980).

There are certain aspects that should be considered when interpreting the results from a cross-sectional regression in an event study setting. The abnormal returns associated with an event could be related to firm characteristics through both the valuation effect of the event and an anticipation effect – where firm characteristics are used to forecast the likelihood of the event occurring (MacKinlay, 1997). For instance, firms with high joint venture experience could be anticipated to conduct more joint ventures in the future. Consequently, the observed valuation effect could deviate from the true effect (MacKinlay, 1997). However, Prabhala (1997) argues that the coefficients obtained from a cross-sectional regression are proportional to the true parameters, and that the associated t-statistics therefore could be interpreted as a conservative lower bound of the true significance level.

5. Data Sampling

5.1 Joint venture data collection

The data about joint ventures announcements by Nordic firms were obtained from the Securities Data Company's (SDC) Strategic Alliance Database. SDC gathers information from publicly available sources, such as trade publications, news and wire sources (Annand & Khanna, 2000). SDC is regarded as one of the most reliable sources of information (Bollaert & Delanghe, 2015), which makes it a good starting point for our analysis. For a thorough discussion on the choice of database and the advantages of SDC, see appendix B.1.

5.1.1 Selection criterion

In the extraction from the SDC database we used a criterion that at least one of the ultimate parents[4] of the joint venture participants had to be located[5] or primary listed[6] in a Nordic country. Based on these criteria, 2179 joint ventures announcements by Nordic firms constituted the sample, of which 1946 were conducted by listed Nordic firms.

5.1.2 Joint venture sample adjustments

There were four listed firms from Iceland performing five joint ventures in total. Furthermore, as Datastream only has limited coverage on Icelandic securities, these observations were excluded. We also registered inaccuracies in the sample. Some of the joint ventures were duplicates, and SDC reported certain ultimate parents as listed, while they in fact were either de-listed or had never been listed. Furthermore, the ultimate parents were sometimes wrongly identified. Some companies in the sample changed their company identifier code (CUSIP) during the years, primarily due to changes in the corporate structure or legal entity. However, the database did not always recognize these changes, and sometimes the changes were not logical. For instance, Saab-Scania AB became delisted in in 1991, and split into two companies in 1995. SDC recognized them, however, as *one listed* entity long after. Furthermore, the Danish company ISS A/S operated with three different CUSIP codes from the beginning of the

[4] An ultimate parent is defined as the legal entity that owns the majority of the voting power of the related company that performs a joint venture.
[5] As private companies located in the Nordic region may have previous experience with performing joint ventures before getting listed, we did not want to exclude these observations.
[6] Secondary listed companies on Nordic stock exchanges usually have a lower presence in the Nordic region than primary listed companies.

sample until 2005, even though it was listed the whole period. After adjusting these inaccuracies to the best of our ability (see appendix B.2 for explanation), the remaining sample consisted of 1827 joint venture announcements.

We used a 10-year period to find the firms' joint venture experience (see subsection 5.4). Since SDC only includes Nordic deals in their database from 1985, we used observations starting in 1995 in our analysis. This reduced the sample to 1356 observations by 336 unique Nordic listed firms.

5.2 Financial data collection

Thomson Reuters Datastream was used to obtain financial information from January 1, 1994. By transforming the CUSIP codes provided by SDC into Stock Exchange Daily Official List (SEDOL) identifiers, we gathered daily stock prices, volume and market capitalization for the participating Nordic firms. We controlled the SEDOLs ourselves and in the cases where Datastream could not find the correct security, we tried to find them manually. For firms that had multiple share classes, we selected the one with highest historical trading. Daily prices were also gathered for the index used to estimate the normal performance.

5.2.1 Stock prices

Adjusted daily stock prices, which account for corporate actions such as dividends and stock splits, were gathered in order to calculate daily stock returns. Datastream does not account for public holidays, which varies among the Nordic countries. The obtained stock prices for these days displayed the closing price from the previous day. Hence, we manually excluded the days when the stock exchanges were closed.

5.2.2 Index

Næs, Skjeltorp, & Ødegaard (2008) claim that the benchmark should reflect the local stock market. Furthermore, investors are, and have mostly been, local (see appendix B.3). We therefore argue that a broad Nordic index is preferable.[7] The FTSE World Nordic Total Return Index was chosen as it fulfills our criteria of daily total returns from January 1, 1994. Since the

[7] When adjusting for the ownership by the Nordic states, the majority of free float might be purchased by investors outside the Nordic region. One could therefore also argue the case for using a global index as a benchmark.

companies in our sample are traded in four different currencies, we converted the index to the appropriate currency.

5.3 Methodology specific criteria

To prevent clustering and compounding effects, we excluded all joint venture observations where the partner announced more than one joint venture during same event window. Furthermore, the partner of interest needs a share price history of at least 251 days to estimate market model parameters. To avoid the issues with thin trading, we excluded all events with trading in less than 50% of the estimation window, and events without trading in the last two last days of the event window. When adjusting for these criteria, the sample was reduced to 988 joint venture announcements by 280 unique firms.

5.4 Independent variables

This subsection describes how we created the independent variables used in the cross-sectional analysis. We defined the independent variables designed to capture the hypothesized influence of relative partner size, experience and business relatedness as "variables of interest". The other independent variables, referred to and treated as "control variables", are included to reduce the risk of omitted variable bias.

Relative partner size

The partner of interest can be of roughly the same size, considerably larger, or smaller than the other participants. In the instances where the participants were private, we used a combination of metrics to determine the relative size of the partners, including number of employees and financial figures such as sales and total assets. The practice of combining different metrics is not uncommon in the joint venture literature (Das et al., 1998). The variable used in the cross-sectional analysis to test the Hypothesis 2 is called "*Relative size small*"[8].

[8] We included the variable "Relative size medium" as a control variable in the cross-sectional analysis. In this way we compared relatively smaller partners to relatively larger partners (omitted variable).

Joint venture experience

Joint venture experience is defined as the natural logarithm of the number[9] of conducted joint ventures in the 10-year period prior to the announcement date of the specific joint venture. This approach is inspired by previous research (Merchant & Schendel, 2000; Feng, Jin, Sun, & Wang, 2015). The logarithmic scale is used to reduce the variance, but also because we expect a decreasing marginal effect on the ability to learn and manage joint ventures successfully. We argue that it is preferable to count joint ventures that were actually performed, not just announced, as the experience from joint ventures that never materialized is limited. The variable used in the cross-sectional analysis to test the Hypothesis 3 is called "*JV experience"*.

Business relatedness

The business relatedness is defined as either high, medium or low using the SIC codes[10] provided by SDC. Measuring business relatedness and knowledge gaps using SIC codes is the most common approach in the existing joint venture literature (Mohanram & Nanda, 1998; Merchant & Schendel, 2000).

High business relatedness imply that the companies are located in the same sub-sector[11]. Firms with medium business relatedness operate in the same sector[11], but not the same sub-sector. The business relatedness is low when the companies are located in different sectors. We only measure the business relatedness from the perspective of the partner of interest, against both the other participants and the joint venture. The variables used in the cross-sectional analysis to test the Hypotheses 4 and 5 is "*Medium partner relatedness*" and *"High JV relatedness*".

Control variables

Control variables were constructed based on the empirical findings in subsection 2.3.2. Firm size equals the natural logarithm of the firm's market value, expressed in mUSD, at the last day of the estimation window. The logarithmic scale is used to reduce the variance and follows the empirical precedent by Chan, Kensinger, Keown, & Martin (1997). The other control variables are dummies created using the information obtained from SDC. A joint venture located in one

[9] One observation was added to the number of performed joint ventures, as the natural logarithm of zero does not exist.

[10] Standard Industry Classification (SIC) is an industry classification system using four-digit codes. SIC divides the economy into 11 divisions, which range varies between two four-digit numbers. These divisions can be further broken down into major group, industry group and industry represented by the first two, three and four digits respectively. Please see appendix B.4 for an illustration of the SIC structure.

[11] Sector will in this thesis refer to one of the 11 divisions defined by SIC. Sub-sector refers to one of the 3-digit industry groups within each division.

of the Nordic countries is defined as a Nordic JV. At least one of the ultimate parents of the other participants must be located or listed in a Nordic country in order for the joint venture to have a Nordic partner. We also introduced some new control variables that are relevant to our sample. The dot-com crash and financial crisis are external shocks, which might affect investor's assessments of joint ventures. Even though the Nordic countries share many of the similar characteristics, there might be systematic difference between them, which calls for the inclusion of country specific dummies. We also added dummies for the companies that announced the most joint ventures, as there might be firm-specific effects.

5.5 Descriptive statistics

In the following subsections, we will provide an overview of the Nordic joint venture landscape and present the relevant characteristics for the analysis. The sample mentioned in the end of subsection 5.1.2 is used. This is after the manual adjustments to the information obtained from SDC, but before adjusting for the methodology specific criteria of thin trading, stock price history of at least 251 days and overlapping event windows.

5.5.1 Overview of the Nordic joint venture landscape

Table 5.1: Number of joint venture announcements, per year

Announcement year	Norway	Sweden	Denmark	Finland	Nordics
1995	23	57	12	24	116
1996	12	35	8	20	75
1997	18	32	8	33	91
1998	17	35	17	27	96
1999	21	32	11	32	96
2000	20	42	7	34	103
2001	11	49	17	18	95
2002	4	8	3	22	37
2003	6	7	4	13	30
2004	3	11	6	14	34
2005	12	10	3	15	40
2006	9	15	7	19	50
2007	20	24	7	12	63
2008	19	18	5	15	57
2009	4	6	7	9	26
2010	12	5	1	4	22
2011	19	18	2	11	50
2012	18	20	6	11	55
2013	12	12	3	11	38
2014	11	16	1	11	39
2015	11	17	4	10	42
2016	11	27	5	13	56
2017	14	14	5	12	45
Total	307	510	149	390	1356

Table 5.1 shows the number of *joint ventures announcements* by Nordic listed firms. Swedish firms had most announcements during the period with 510, followed by firms from Finland, Norway and Denmark. The number of announcements seem to be relatively stable from 1995 to 2001, with an average of approximately 95 per year. In the years after 2001, however, the number decrease drastically, ranging from 22 to 63. This could indicate that joint ventures overall became less favored by Nordic firms after the dot-com bubble. As SDC's coverage of deals has gradually improved over time, it could suggest that the actual decrease in joint venture announcements is even larger.

Table 5.2: Number of unique firms, by sector

Sector	Norway	Sweden	Denmark	Finland	Nordics
Agriculture, Forestry and Fishing	2	-	1	-	3
% of total per region	*3 %*	-	*3 %*		*1 %*
Construction	3	5	-	4	12
% of total per region	*4 %*	*3 %*	-	*5 %*	*4 %*
Finance, Insurance and Real Estate	6	19	4	7	36
% of total per region	*8 %*	*13 %*	*10 %*	*9 %*	*11 %*
Manufacturing	24	57	15	38	134
% of total per region	*31 %*	*40 %*	*38 %*	*50 %*	*40 %*
Mining	11	10	1	2	24
% of total per region	*14 %*	*7 %*	*3 %*	*3 %*	*7 %*
Public Administration	-	-	-	1	1
% of total per region	-	-	-	*1 %*	*0 %*
Retail Trade	1	-	-	2	3
% of total per region	*1 %*	-	-	*3 %*	*1 %*
Services	9	30	7	12	58
% of total per region	*12 %*	*21 %*	*18 %*	*16 %*	*17 %*
TCEGS*	19	17	11	7	54
% of total per region	*24 %*	*12 %*	*28 %*	*9 %*	*16 %*
Wholesale Trade	3	5	-	3	11
% of total per region	*4 %*	*3 %*	-	*4 %*	*3 %*
Total per region	78	143	39	76	336
% of total Nordic unique firms	*23 %*	*43 %*	*12 %*	*23 %*	*100 %*

*TCEGS = Transportation, Communications and Electric, Gas and Sanitary service

The number of *unique* Nordic listed firms with at least one joint venture announcement, and their respective sector location, is shown in table 5.2. Sweden account for 43% of the unique Nordic firms, while only 12% of the companies are Danish. Manufacturing is the largest sector with 40%, followed by Services and TCEGS with 17% and 16% respectively, while the remaining seven sectors account for the last 27%. There are variations in the relative size of the sectors within the Nordic countries. For instance, half of the Finnish firms are located in the Manufacturing sector, while it ranges from 31% to 40% for the remaining Nordic countries. Norway has, not surprisingly, the largest Mining sector with 14%. However, this is lower than one would expect given the country's dominating oil and gas sector. Furthermore, SDC reported two unique Norwegian firm from the Agriculture, Forestry and Fishing sector, which is disproportional to the seafood sector in Norway that accounts for roughly 11% of the total market capitalization of Oslo Stock Exchange (Oslo Børs, 2018). This finding could indicate that joint ventures are less common in these sectors.

Table 5.3: Average number of joint ventrues announcements per firm, by sector

Sector	Norway	Sweden	Denmark	Finland	Nordic average* per sector
Agriculture, Forestry and Fishing	1.0	-	1.0	-	1.0
Construction	1.3	7.8	-	3.0	4.6
Finance, Insurance and Real Estate	2.8	2.5	1.8	2.3	2.4
Manufacturing	3.4	4.3	3.9	6.9	4.8
Mining	7.6	1.2	3.0	5.5	4.6
Public Administration	-	-	-	3.0	3.0
Retail Trade	1.0	-	-	4.0	3.0
Services	3.6	1.6	2.0	2.3	2.1
TCEGS**	4.2	6.6	5.9	6.6	5.6
Wholesale Trade	2.0	1.2	-	1.3	1.5
Average* per region	3.9	3.6	3.9	4.9	4.0

*Average in the sample, not avereage of the averages

**TCEGS = Transportation, Communications and Electric, Gas and Sanitary service

Table 5.3 report the *average* number of joint ventures announcements per firm. The Nordic average is four announcements per firm, and there is variation both between the sectors and countries. Finland has the highest average number of announcements per firm with 4.9, while companies within the TCEGS and Manufacturing sectors announce on average 5.6 and 4.8 joint ventures, respectively. The cross-classification shows that Finnish firms within Manufacturing and Norwegian firms within Mining have more announcements than the rest.

Independent variables

Variables of interest

Table 5.4 displays the distribution of the variables of interest. The unique firms could be in more than one of the categories depending on the joint venture features and changes in firm characteristics over time.

Table 5.4: Variables of interest

Relative partner size	Larger	Same size	Smaller	Total
JV announcements	403	667	286	1356
% of total	*30 %*	*49 %*	*21 %*	*100 %*

Experience	High (5+)	Medium (1-5)	Low (0)	Total
JV announcements	246	249	861	1356
% of total	*18 %*	*18 %*	*63 %*	*100 %*

Partner-Partner business relatedness	High	Medium	Low	Total
JV announcements	372	345	639	1356
% of total	*27 %*	*25 %*	*47 %*	*100 %*

Partner-JV business relatedness	High	Medium	Low	Total*
JV announcements	390	427	531	1348
*% of total**	*29 %*	*32 %*	*39 %*	*100 %*

*8 JVs do not have a reported industry

Approximately half of the joint ventures are announced by firms that are roughly the same size as the other participants. The share of the relatively larger and relatively smaller is 30% and 20%, respectively.

At the time of the announcement, more than 60% of the Nordic companies did not have any previous experience with joint ventures. The Manufacturing and Mining sector have more joint venture announcements by companies with high experience from joint venture (appendix B.5). Forty-eight percent of the unique firms only announce one joint venture during the whole time period (appendix B.6), and the company with the most joint venture announcements is the Swedish firm Volvo with 54 (appendix B.7).

Almost half of the joint ventures contain participants with low business relatedness to the partner of interest. The other half is evenly distributed between medium and high relatedness. The distribution is more equal with regards to the joint venture relatedness, with approximately 40% having low business relatedness to the partner of interest. There seems to be a trend that joint ventures within the partners of interest's sector contain participants from the same sector as the partner of interest and vice versa (appendix B.8).

Control variables

Table 5.5 displays the distribution of the control variables. Information regarding countries, time period and sector location of the partner of interest has already been presented in table 5.1 and table 5.2.

Table 5.5: Control variables

Market value of partner (mUSD)	Small cap (<2,000)	Mid cap (2,000-10,000)	Large cap (10,000+)
JV announcements	697	385	274
Type of JV	Manufacturing	Other	Not specified
JV announcements	474	205	677
Geographical location of partner	Nordic	International	Not specified
JV announcements	454	902	-
Geographical location of JV	Nordic	International	Not specified
JV announcements	487	868	1
Ownership	Symmetrical	Asymmetrical	Not specified
JV announcements	830	516	10
Number of partners	Two	More than two	Not specified
JV announcements	1055	301	-

Most of the joint ventures are performed by firms with a market cap below 2 billion USD, usually referred to as small cap companies. There is a considerable variance within large cap group, with Nokia having the largest market cap of 290,130 mUSD during the peak of the dot-com bubble.

Manufacturing joint ventures is by far the most common joint venture type, with 474 announcements. There is, not surprisingly, a correlation between the sectors and what joint venture types they perform (appendix B.9). Moskalev & Swensen (2007) found that the rest of the world has a more balanced distribution, with joint ventures focusing on marketing, technology and R&D being more prominent. SDC does not report the type for around 50% of the joint ventures, and it is possible that a substantial portion of these could in fact be R&D and technology joint ventures, as these joint ventures types may be more ambiguous.

Approximately two thirds of the joint venture announcements are international, i.e. located outside the Nordic region. The same distribution applies for international and Nordic partners. Joint ventures outside the Nordics usually contain international partners, while joint ventures in the Nordics tend to be partnered with a Nordic firm (appendix B.10). Companies within Retail and Wholesale Trade and Finance, Insurance and Real Estate prefer Nordic joint ventures, while firms in Mining and Manufacturing mostly perform them abroad (appendix B.11). A possible explanation could be that companies in the latter sectors often are multinational corporations.

Roughly 60% of the joint ventures have symmetrical ownership. The overwhelming majority of the joint ventures have only two partners, with multiple partners being more common within the Mining sector (appendix B.12). Projects within oil and gas are usually very capital intensive, and companies may not wish to assume full exposure to unproven reserves.

6. Analysis

In this analysis, the hypotheses derived in subsection 2.3.2 are tested. In the first subsection, it will be examined whether joint venture announcements by Nordic firms have a positive impact on market valuation. In the second subsection, the relationship between the stock market reaction to joint venture announcements and the firm and joint venture specific characteristics derived in subsection 5.4, will be tested.

6.1 The stock market reaction to joint venture announcements

To examine the hypothesis that joint venture announcements by Nordic firms have a positive impact on market valuation, the following null hypothesis is tested:

$$H_0: The\ cumulative\ average\ abnormal\ return\ for\ Nordic\ firms = 0$$

$$H_A: The\ cumulative\ average\ abnormal\ return\ for\ Nordic\ firms \neq 0$$

To test the null hypothesis, the three-day event window [-1, 1] derived in subsection 4.1 and the standardized cross-sectional test derived in subsection 4.2.1 were used (these are applied if nothing else is specified). To examine the robustness of the results, we used an alternative event window [0, 1] and the Wilcoxon signed-rank test. We also investigated whether applying the constant mean return model to estimate normal performance affected the results.

Figure 6.1 : Daily CAARs, by individual countries and region

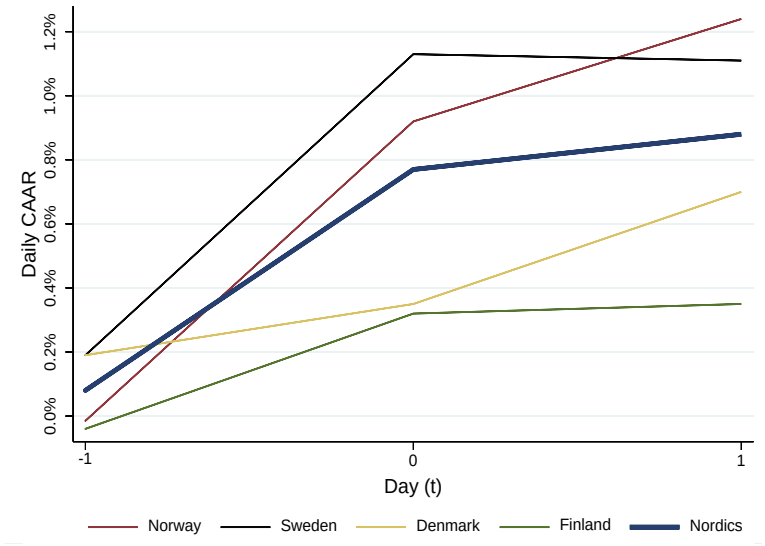

Table 6.1: AARs, CAARs and CMARs surrounding joint venture announcements

The market model is used to estimate abnormal returns during the event windows [-1, 1] and [0, 1]. The market model parameters are estimated over a 251 day estimation window ending on day -3, where day 0 is the event (announcement) day. FTSE World Nordic Total Return Index is used as a proxy for the market portfolio. The abnormal returns for each day in the event window are aggregated through events, yielding the average abnormal return (AAR) and over the event windows [-1, 1] and [0, 1], yielding the cumulative average abnormal return (CAAR) and the cumulative median abnormal return (CMAR). The sample consists of 225 event from Norway, 379 event from Sweden, 107 from Denmark and 277 events from Finland, i.e. a total of 988 Nordic events, in the period January 1995 to December 2017. The standardized cross-sectional test (Z_1) is used to test whether the AARs and CAARs are statistically different from zero. The Wilcoxon signed-rank test (Z_2) tests whether the CMARs are statistically different from zero. The alternative event window [0, 1] is included to examine if our results are robust to the choice of event window.

Panel A: Daily AARs and CAARs

Day (t)	Norway			Sweden			Denmark			Finland			Nordics		
	AAR (%)	Z_1	CAAR (%)	AAR (%)	Z_1	CAAR (%)	AAR (%)	Z_1	CAAR (%)	AAR (%)	Z_1	CAAR (%)	AAR (%)	Z_1	CAAR (%)
-1	-0.01	(0.1)	-0.01	0.19	(1.52)	0.19	0.19	(0.69)	0.19	-0.04	(-0.18)	-0.04	0.08	(1.15)	0.08
0	0.93***	(2.79)	0.92	0.94***	(2.63)	1.13	0.16	(0.93)	0.35	0.36***	(3.04)	0.32	0.69***	(4.81)	0.77
1	0.32*	(1.76)	1.24	-0.02	(-0.44)	1.11	0.35	(0.84)	0.70	0.03	(0.23)	0.35	0.11	(0.90)	0.88

Panel B: CAARs and CMARs over different event windows

Event window	Norway		Sweden		Denmark		Finland		Nordics	
[-1, 1]	CAAR (%)	Z_1	CAAR (%)	Z_1	CAAR (%)	Z_1	CAAR (%)	Z_1	CAAR (%)	Z_1
	1.24***	(3.04)	1.11**	(2.57)	0.70	1.30	0.35*	(1.90)	0.88***	(4.46)
	CMAR(%)	Z_2	CMAR(%)	Z_2	CMAR(%)	Z_2	CMAR(%)	Z_2	CMAR(%)	Z_2
	0.24**	(1.99)	0.17**	(2.44)	0.05	0.58	0.22*	(1.70)	0.22***	(3.49)
[0, 1]	CAAR (%)	Z_1	CAAR (%)	Z_1	CAAR (%)	Z_1	CAAR (%)	Z_1	CAAR (%)	Z_1
	1.25***	(3.39)	0.92**	(2.01)	0.51	(1.14)	0.39**	(2.34)	0.80***	(4.42)
	CMAR(%)	Z_2	CMAR(%)	Z_2	CMAR(%)	Z_2	CMAR(%)	Z_2	CMAR(%)	Z_2
	0.33***	(2.90)	0.16*	(1.89)	0.08	0.38	0.30*	(1.88)	0.26***	(3.62)

*** Significanse for a 2-tailed test at the 1% level

** Significance for a 2-tailed test at the 5% level

* Significance for a 2-tailed test at the 10% level

Table 6.1 shows the AARs, CAARs and cumulative median abnormal returns (CMARs) surrounding the joint venture announcements in our sample. Panel A presents daily AARs and CAARs during the event window, the latter is also graphically illustrated in figure 6.1. In Panel B, the CAARs and the CMARs over the event window [-1, 1] and the alternative event window [0, 1] are displayed.

On the announcement day, the AAR is significantly different from zero at the 1% level for the Nordic region and all countries except Denmark. This implies that joint venture announcements by Nordic firms, on average, have a significant effect on the market valuation on the announcement day. The AAR on the day prior to the announcement day is not significantly different from zero for any region, implying that information leakage is not an issue in our sample. On the day after announcement, Norway is the only region with an AAR that is significant at the 10% level. Hence, it appears that the joint ventures in our sample for the most part are announced before the stock exchange closes on the announcement day and that the information regarding the announcement is impounded at the announcement day. This is in line with the semi-strong form of the efficient market hypothesis (see appendix A.1).

As shown in Panel B, the CAAR is 0.88% over the three-day event window for the Nordic firms and is significantly different from zero at the 1% level. Thus, we reject the null hypothesis that CAAR for Nordic firms are equal to zero. This is also the case after using both the alternative

event window [0, 1] and the constant mean return model to estimate normal performance (see appendix C.1 for the results when using the constant mean return model). Further, when applying the Wilcoxon singed-rank test, the null hypothesis that the CMAR for Nordic firms is equal to zero, is rejected. This implies that our results are robust.

Overall, these results show that joint ventures, on average, have a significant positive effect on the market valuation of Nordic firms. This implies that investors believe that combining resources through joint ventures results in a positive NPV investment. For the 988 joint ventures announcements in our sample, the average increase in market capitalization is $20.1 million, whereas the median increase is $1.20 million. A CAAR of 0.88% is in line with previous research on joint venture announcements in the US (McConnell & Nantell, 1985; Keown, Laux, & Martin, 2005). Even though there are differences between the Nordic region and the US, our findings seem to be consistent with the notion that Nordic firms experience similar market valuation effects as firms in the US.

In the individual countries, the CAAR is 1.24%, 1.11%, 0.70% and 0.35% for Norway, Sweden, Denmark and Finland, respectively. The CAAR is significantly different from zero at the 1% and 5% level for Norway and Sweden, respectively. Finland's CAAR is significant at the 10% level, while Denmark's CAAR is not significantly different from zero. Even though Denmark has a higher CAAR than Finland, it is not significant due to higher variance and fewer observations. Further, the CMAR for Finnish firms are higher than for Swedish and Danish firms. This could imply that Sweden and Denmark have a couple of joint ventures announcements that accounts for a relatively large part of the overall effect on market valuation, while Finland has a few joint ventures announcements that lower the overall effect.

6.2 Cross-sectional analysis

In this subsection, the relationship between the stock market reaction to joint venture announcements and the firm and joint venture specific characteristics derived in subsection 5.4, is examined. To study the relationship, we run cross-sectional regressions with CARs over the event window [-1, 1] as the dependent variable and the firm and joint venture characteristics as independent variables. We include control variables to reduce the risk of omitted variable bias, in line with previous research. Due to the large number of control variables, we only show the variables of interest in table 6.2. The regression in table 6.2 gradually adds the variables of interest to examine how these affect the coefficients. The variables of interest will be discussed

in detail, while the significant control variables will be mentioned briefly. The entire regression can be found in appendix C.2.

Table 6.2: Cross-sectional analysis

The ordinary least square (OLS) method is used to run four regressions of the CAR over the event window [-1, 1] on joint venture and firm specific characteristics (see subsection 5.4 for definitions of the variables of interest and appendix C.2 for definitions of the control variables). The standard errors of the coefficients are adjusted for heteroskedasticity by using the White (1980) procedure. The sample consists of 988 joint venture announcements by Nordic firms in the period January 1995 to December 2017. There are five fewer observations in (1-3), relative to the original sample, due to one missing JV country observation (used for the control variable Nordic JV) and four missing ownership observations (used for the control variable Symmetrical ownership). There are three fewer observations in (4), relative to (1-3), because of three missing JV SIC codes (used for the explanatory variable High JV relatedness). The expected signs refers to the expected relationship between the explanatory variables CAR as stated in our hypotheses in section 2.3.2.

	Expected sign	(1)	(2)	(3)	(4)
Relative size small	+	0.0242***	0.0242***	0.0241***	0.0243***
		(3.19)	(3.18)	(3.18)	(3.18)
JV experience	+		0.0013	0.0013	0.0014
			(0.80)	(0.80)	(0.86)
Medium partner relatedness	+			0.0003	-0.0004
				(0.07)	(-0.08)
High JV relatedness	+				-0.0032
					(-0.80)
Intercept		0.0538*	0.0541*	0.0540*	0.0547*
		(1.94)	(1.94)	(1.90)	(1.91)
Observations		983	983	983	980
F		2.40	2.33	2.27	2.22
R^2		0.0982	0.0985	0.0985	0.0992

T-statistics in parantheses

*** Significanse for a 2-tailed test at the 1% level

** Significance for a 2-tailed test at the 5% level

* Significance for a 2-tailed test at the 10% level

The cross-sectional analysis in table 6.2 shows that the CAR, on average, increases between 2.41 and 2.43 percentage points when the partner of interest is relatively smaller than the other joint venture participants, *ceteris paribus*. Smaller firms often possess tacit knowledge desired by larger firms. This knowledge could increase the smaller partner's bargaining power and ability to capture value from the joint venture (Das et al., 1998). Further, smaller firms announcing a joint venture with larger firms could send a signal of new growth opportunities (Jones & Danbolt, 2004). Additionally, the relative size variable could be correlated with the

relative size of the investment. As long as the ownership stake does not offset the difference in market value, it is plausible that a relatively smaller partner invests more relative to its market value than the larger partners. We found that only 20% of the relatively smaller partners have a minority stake, whereas the difference in ownership is usually less than 10 percentage points. Since the CAAR is significantly different from zero, it is plausible that a larger investment relative to firm size will affect the share price more than a small investment. The relatively smaller size variable is significant at the 1% level, which provide supporting evidence for Hypothesis 2 that relatively smaller partners experience higher abnormal returns.

The effect of joint venture experience on CAR is not significantly different from zero. Hence, we found no evidence to support the Hypothesis 3 that joint venture experience has a positive effect on CAR. This fails to support the notion that experience is linked with the ability to realize the full potential of the joint venture as well as reducing the transaction costs. The finding is not that surprising due to the inconsistent findings by previous researchers (Chung et al., 1993; Borde et al., 1998). Furthermore, we tested a logarithmic relationship between experience and CAR, whereas the majority of the empirical research has assumed linearity. If we assume a linear relationship and exclude the firm dummies, experience becomes significant at the 1% level (see appendix C.3).

Having a partner from the same sector and a joint venture located in the same sub-sector as the partner of interest, both have an insignificant impact on CAR. Thus, we find no evidence to support Hypothesis 4 that partners that are neither too close nor too distant from the other participants or Hypothesis 5 that joint ventures with high business relatedness, have a significant effect on the abnormal returns. The market might regard joint ventures as a less attractive governance form in these situations, as the uncertainty and transaction costs are relatively low. The insignificant coefficients of “Medium partner relatedness” may also indicate that the ability to create value through combining complementary resources is not dependent on the specific sector location of the partners. Investors could also view increasing sector distance as less important for capturing value through a joint venture, which could be one reason why “High JV relatedness” is insignificant. However, the insignificant variables might also be explained by methodical reasons. A different definition of high and medium business relatedness might have yielded different results. Furthermore, it is assumed that the partners always provide resources solely from the business area it is located. This is not always the case, as firms are bundles of both generic and sector-specific resources. Business relatedness might therefore not be an optimal way to measure resource complementarity.

6.2.1 Significant control variables

The regression including all the independent variables is shown in appendix C.2. We found a negative relationship between firm size and CAR, which supports the finding by Koh & Venkatraman, (1991) and Mohanram & Nanda (1998). This could indicate that the dollar value of the gain is not shared equally between the partners, which is the assumption in the *relative size hypothesis* (McConnell & Nantell, 1985). Another possible explanation could be that as firm size increase, it becomes increasingly difficult to find projects with a large enough positive NPV to affect the firm's market value. Joint ventures with more than two partners negatively affect CAR, which could imply that the increase in the variety of available resources is not enough to compensate for the increase in transaction costs. Joint ventures in China have a negative sign, which is not that surprising due to inconsistent results from previous research (Chung et al., 1993; Borde et al., 1998). A surprising finding, however, is that joint ventures involving transfer of technology appears to have a negative relationship with CAR, as joint ventures could be recognized as an optimal vehicle for transferring tacit knowledge. Joint ventures before the dot-com crash experience lower returns, while the opposite is true for announcements after the financial crisis. Firms within the Agriculture, Forestry and Fishing and Retail sector and joint ventures involving licensing agreements have a negative relationship with CAR. Of the four firm dummies, Nokia, Ericsson and Volvo are significantly positive.

6.2.2 Multicollinearity

Problems with multicollinearity arise when two or more explanatory variables are highly correlated. Even though the model still can be used to predict CAR within the data sample set, it may not give valid results about the individual independent variables' coefficients and true significance (Allison, 2012). We used a correlation matrix and the variance inflation factors (VIF) to examine if the cross-sectional analysis had any potential problems with multicollinearity.

Due the large number of independent variables, table 6.3 only show the variable pairs from regression (4) in table 6.2, that have a correlation above $|0.3|$.

Table 6.3: Correlation matrix		
Variable 1	Variable 2	Correlation
RelativeSize_small	RelativeSize_medium	-0.386
RelativeSize_small	Firm size	-0.331
Nordic partner	Nordic JV	0.479
Exploration JV	Mining firm	0.408
Before 2001	Firm size	0.372
Before 2001	After 2008	-0.518
Norway	Finland	-0.336
Norwegian firm	Mining firm	0.396
Norwegian firm	Hydro	0.367
Ericsson	TCEGS firm	0.372

High correlation between the dummy variables that represent the same categorical variable is not surprising, especially if there are only a few categories. A bivariate relationship between the categories is not an issue, as we want to see if there are significant differences between them. However, correlation between the different categorical variables could be problematic. From table 6.3, only one of the variables of interest have a correlation above $|0.3|$ with the other independent variables. The "Relative size small" is not surprisingly correlated with "Relative size medium". It also correlates with firm size. This is understandable, as firms that are relatively smaller than the other participants often, but not always, have lower market value than firms that are relatively larger than the other participants. However, the "Relative size small" is still significant at the 1% level when we stepwise exclude one of the two correlating control variables. Performing the same approach to the control variables did not affect their significance level. Furthermore, the VIF values did not indicate any problems arising from multicollinearity in the cross-sectional analysis (see appendix C.4).

7. Conclusion and future research

This thesis has examined how the stock market reacts to joint venture announcements by firms listed on Nordic stock exchanges. An event study was conducted to test whether joint venture announcements have a significant impact on the market valuation of the announcing firms and to identify the determinants of the stock market response. The original data sample was obtained from SDC, which after adjustments consisted of 988 joint venture announcements by 280 firms from January 1, 1995 to December 31, 2017.

The analysis showed a cumulative average abnormal return (CAAR) of 0.88% in a three-day event window surrounding the joint venture announcements by Nordic firms. Using the standardized cross-sectional test, the null hypothesis that the CAAR is equal to zero was rejected at the 1% level. We therefore concluded that joint venture announcements have a positive effect on the market valuation of Nordic firms. The results remain significant at the 1% level when applying the constant mean return model to estimate the normal performance, the alternate event window [0, 1] and the Wilcoxon signed-rank test. This indicates that the results are robust. The average increase in market capitalization is approximately $20.0 million, whereas the median increase is $1.2 million. A CAAR of 0.88% is in line with previous research on joint venture announcements in the US (McConnell & Nantell, 1985; Keown et al., 2005), which could indicate that Nordic firms experience similar market valuation effects as American companies.

The average abnormal return (AAR) for Nordic firms on the announcement day is 0.69% and significant at the 1% level. The AAR on the day prior to the announcement is not significantly different from zero, implying that information leakage is not an issue. This is also the case for the day after the announcement, indicating that the joint ventures for the most part are announced before the stock exchange closes on the announcement day, and that the information is impounded at the announcement day. These findings indicate that the semi-strong form of the efficient market hypothesis holds.

The cross-sectional analysis found that relatively smaller partners, *ceteris paribus*, experience an increase in the cumulative abnormal return of 2.43 percentage points. This is line with previous research (McConnell & Nantell, 1985; Koh & Venkatraman, 1991), and supports the notion that relatively smaller partners are able to extract more value from a joint venture than the relatively larger partners due to signaling effects and increased bargaining power. We found

no evidence supporting the hypothesis that experience has a positive impact on the CAR. However, when assuming a linear instead of a logarithmic relationship, and excluding firm dummies, experience became significantly positive. Neither announcing joint ventures located in the same sub-sector as the partner of interest, nor having partners in the same sector as the partner of interest, had a significant impact on the CAR. This could indicate that the ability to create value through combining complementary resources is not dependent on a specific sector location of the other partners or the joint venture. Of the control variables, firm size, joint venture type, number of partners, joint ventures located in China and the time period seem to impact joint venture performance. The cross-sectional analysis also indicated that firm-specific characteristics can explain the difference in CAR.

Overall, the findings suggest that investors believe that combining resources through joint ventures result in positive NPV investments that increase the market value of Nordic firms. Even though we successfully identified characteristics that affect joint venture performance, the literature on joint venture formation in the Nordic region is limited at best. We therefore recommend future research to assess the variables in the cross-sectional analysis. The inclusion of interaction variables may be considered, especially when examining business relatedness. Future research could also evaluate alternative ways of determining the variables. A natural next step would be to test more specific variables based on different theoretical frameworks.

7.1 Limitations of the study

The sample provided by SDC contained several inaccuracies. Although we adjusted the information to the best of our ability, it is still possible that the sample contains inaccurate information. This could potentially affect both the results of the event study and cross-sectional analysis.

Furthermore, the variables included in the cross-sectional analysis, and how these are defined, could affect the significance levels and the interpretation of the results. We only used the primary four-digit SIC code of the partner of interest, the other participants and the joint venture when determining business relatedness. However, companies often have operations spanning across sub-sectors and sectors. We would therefore preferred to have the option of including secondary SIC codes, but these were not always provided by SDC. The implication is that companies might be closer to each other than what we defined. The relative size variable is not based on one specific metric, as not all companies publish the same information. Hence,

this approach relies to some extent on subjective assessments, which may affect the accuracy of the information. It would be preferable to include a variable of estimated cost, as it is plausible that there is a relationship between costs and the NPV. However, the participant firms rarely release financial information regarding the joint venture, and when they do, the figures are not always comparable. Most research papers therefore do not include this variable. We argue, however, that the inclusion of relative size between the partners may indicate how large the project is related the market value of the partners.

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Appendix A: Methodology

Appendix A.1: Assumptions of the event study methodology

For the event study methodology to work as a natural experiment to measure the valuation effect of an event, the assumptions of (1) a semi-strong form of the efficient market hypothesis, (2) unanticipated events and (3) no confounding effects, must hold (McWilliams & Siegel, 1997).

The efficient market hypothesis describes the stock market ability to incorporate information. According to Fama (1970), there are three levels of market efficiency: weak, semi-strong and strong. In the weak form, the market reflects all market information. The semi-strong form implies that all market and public information are reflected in the market, while the strong form states that all market, public and private information are reflected. For the event study methodology to measure the impact of an event, the financial information regarding the event must be reflected quickly in the market after the announcement, i.e. the semi-strong form of the efficient market hypothesis must hold. Even though market efficiency is a debuted topic, it is generally accepted that the market is approximately semi-strong efficient (Fama, 1991).

To measure the effect of an event, the event should be unanticipated. If information regarding the event leaks before the official announcement, it becomes difficult to determine when the market participants became aware of the new information (McWilliams & Siegel, 1997). To account for this potential issue, we included the day prior to the joint venture announcement in the event window.

To isolate the effect of the event of interest, there should not be any confounding effects from other events during the event window. To account for this issue, we excluded all joint venture observations where the participant announced more than one joint venture during the same event window.

Appendix A.2: Thin trading

Thin trading could be problematic in an event study setting because the estimated beta could be artificially low. Hence, thinly traded stocks could appear less risky, which cause lower expected returns and inflated abnormal returns. Studies such as Brown & Warner (1985) found supportive evidence for the market model's OLS estimates of beta being biased and

inconsistent. There are techniques for reducing these biases, such as the Scholes & Williams (1977). However, Brown & Warner (1985) found that using the Scholes & Williams (1977) procedure do not improve the specification and power of the test for abnormal performance beyond the OLS market model. To correct for thin trading, we therefore excluded all joint venture observations with trading in less than 50% of the estimation window and event without trading in both t=0 and t=1, i.e. the two last days of the event window.

Appendix A.3: Clustering

An assumption taken when aggregating abnormal returns across events is no covariance between the abnormal returns. This assumption is violated when there is clustering, i.e. overlaps between event windows, which could cause misspecification. The most common, and serious, form of time clustering occurs when the event analyzed is a result of an external factor that affect all events in the sample simultaneously. Clustering could also occur when the events are from the same period, which is the form of clustering relevant for our study. Brown & Warner (1985) found that time clustering could cause misspecification when the mean adjusted return model was used to estimate the normal performance during the event window. However, they also found that using the market model did not cause misspecification. Further, Boehmer et al., (1991) found that the standardized cross-sectional test is not affected by time clustering. We regard time clustering as a limited problem in our study because the events in our sample are not affected by an external factor at the same time, and we use the market model to estimate normal performance and the standardized cross-sectional test in our analysis.

Appendix A.4: Standardized cross-sectional test

In the standardized cross-sectional test, the AR_{it} and CAR_i are first divided by the standard deviation from the estimation window, which is adjusted for forecast error, as shown in equation A.1 and A.2, respectively. The standardization of AR_{it} performed as in Patell (1976) and the standardization of CAR_i is performed as in Mikkelson & Partch (1988).

$$SAR_{it} = \frac{AR_{it}}{S_{AR_{it}}} \tag{A.1}$$

$$S^2_{AR_{it}} = S^2_{AR_i}\left(1 + \frac{1}{ED} + \frac{(R_{m,t} - \bar{R}_m)^2}{\sum_{\tau=T_0}^{T_1}(R_{m,\tau} - \bar{R}_m)^2}\right)$$

SAR_{it} is the standardized abnormal return for event i at time t, $S_{AR_{it}}$ is the standardized standard deviation for event i at time t, $S^2_{AR_{it}}$ is the standardized variance for event i at time t, $S^2_{AR_i}$ is the variance of abnormal return i during the event window, $\bar{R}_m$ is the mean market return during the estimation window, $R_{m,t}$ is the market return for day t in the event window, ED is the number of days in the estimation window and $R_{m,\tau}$ is the market return for day τ in the estimation window.

$$SCAR_i = \frac{CAR_i}{S_{CAR_i}} \tag{A.2}$$

$$S^2_{CAR_i} = S^2_{AR_i}(T + \frac{T^2}{ED} + \frac{\sum_{t=T_2}^{T_3} R_{m,t} - T(\bar{R}_m)^2}{\sum_{\tau=T_0}^{T_1}(R_{m,\tau} - \bar{R}_m)^2})$$

$SCAR_i$ is the standardized cumulative abnormal return for event i, S_{CAR_i} is the standardized standard deviation for event i, $S^2_{CAR_i}$is the standardized variance for event i and T is the number of days in the event window.

For analyzing the standardized abnormal returns for any day t and any CAR, it is necessary to aggregate across the events of the sample. The average standardized abnormal return ($ASAR_t$) for any day t and the average standardized CAR ($ASCAR$) in a sample with N events is expressed by equation A.3 and A.4, respectively.

$$ASAR_t = \frac{1}{N}\sum_{i=1}^{N} SAR_{it} \tag{A.3}$$

$$ASCAR = \frac{1}{N}\sum_{i=1}^{N} SCAR_i \tag{A.4}$$

The test statistics for AR_t and CAR is expressed in A.5 and A.6, respectively.

$$Z_{1,t} = \sqrt{N} \times \frac{ASAR_t}{\sqrt{Var(ASAR_t)}} \tag{A.5}$$

$$Var(ASAR_t) = \frac{1}{N-1}\sum_{i=1}^{N}(SAR_{i,t} - ASAR_t)^2$$

$$Z_2 = \sqrt{N} \times \frac{ASCAR}{\sqrt{Var(ASCAR)}} \tag{A.6}$$

$$Var(ASCAR) = \frac{1}{N-1}\sum_{i=1}^{N}(SCAR_i - ASCAR)^2$$

Appendix A.5: The Wilcoxon signed-rank test

To examine the robustness of our results, we included the Wilcoxon (1945) signed rank-test as a supplement to the standardized cross-sectional test. The advantage of this test is that it considers both the magnitude and the sign of the abnormal returns (Dutta, 2014). Hence, the Wilcoxon signed-rank test could have more statistical power than nonparametric tests that only consider the sign of the abnormal returns.

The Wilcoxon signed-rank test is based on the premise that, under the null hypothesis, the sum of the ranks over and under the median should be equal. To test this, each absolute value of CAR_i is ranked from lowest to highest. Thereafter, the ranks of the positive CAR_i (R^+) are summarized (W) and standardized by subtracting the probability of observing W ($E(W)$) and divided by the standard deviation ($\sqrt{Var(W)}$). The test statistic is given by equation A.7.

$$T_2 = \frac{W - E(W)}{\sqrt{Var(W)}} \tag{A.7}$$

$$W = \sum_{i=1}^{N} R^+ \qquad E(W) = \frac{N(N+1)}{4} \qquad Var(W) = \frac{N(N+1)(2N+1)}{24}$$

Appendix A.6: Constant mean return model

In the constant mean return model, the normal performance of a stock is the stock's average return during the estimation window. The constant mean return model is estimated as shown in equation A.8

$$R_{it} = \mu_i + \varepsilon_{it} \tag{A.8}$$

$$\mu_i = \frac{1}{ED}\sum_{t=T_0}^{T_1} R_{it} \qquad E(\varepsilon_{it}) = 0 \qquad Var(\varepsilon_{it}) = \sigma_{\varepsilon_i}^2$$

In equation A.8, R_{it} is the estimated normal performance for event i at time t. μ_i is the average return for event i during an estimation period with ED days, while ε_{it} is the error term with an expected value of zero and a variance of $\sigma_{\varepsilon_i}^2$

Appendix B: Data sampling

Appendix B.1: Selection of database

Securities Company's (SDC) Strategic Alliance Database is the database most frequently used by scholars to collect information about joint ventures, followed by the Bureau van Dijk's Zephyr Database. Bollaert & Delanghe (2015), which performed a detailed comparison between the two databases, concluded that SDC has the edge over Zephyr. They highlighted both the accuracy of the information, especially the announcement date, as well as the coverage. The accuracy of the announcement date is critical in an event study setting. Fuller, Netter, & Stegemoller (2012) verify these results by examining the announcement date of 500 SDC deals and found it to be correct in over 90% of the deals. Annand & Khanna (2000) found that the reported contract type and alliance SIC codes were mostly accurate in SDC, while Barnes, Harp, & Oler (2014) came to the same conclusion regarding the firm-specific information. Bollaert & Delanghe (2015) found no support for the claim, presented among others by Huyghebaert & Luypaert (2010), that Zephyr has superior coverage of European transactions and deals of smaller value. However, both databases tend to overrepresent joint ventures performed by larger firms, due to difficulties obtaining information about smaller firms from public sources. Based on the discussion above, we decided to use SDC to collect information about joint ventures announced by Nordic firms.

Appendix B.2: Adjustments to the database

The companies and ultimate parents that performed the joint ventures were adjusted manually when we found inaccuracies. As ultimate parents only have to control the majority of the voting rights of the company that announced the joint venture, a listed company that announced a joint venture might have a different ultimate parent, either listed or private. In these instances, we used the listed company furthest down the corporate structure.

In order to account for the changes in the CUSIP codes, we matched the CUSIP codes with the corresponding SEDOL number at the time. Each listed security has a unique SEDOL number, and we used this identifier to display the number of unique companies and count joint venture experience. Companies whose securities changed SEDOL number for some reason are therefore treated as a "new" unique company. For instance, by assigning each company to SEDOL numbers, ISS A/S counted as one unique company until 2005 and not three.

To count the joint venture experience from the time a company was private, we assigned the SEDOL number to the historic observations in retrospect. In the event of companies getting de-listed, before making a reappearance on the stock exchange, the observations from the period the company were private were given the SEDOL number of the newly listed company. Continuing to use ISS A/S as an example, only the joint ventures performed while private, as well as from the time it reappeared on the stock exchange again in 2014, counts as experience, not from the time period it was previously listed. Hence, from 2005 and onwards, ISS A/S operates with a different SEDOL number, and is therefore treated as a different company than the "old" ISS A/S.

Appendix B.3: Share of foreign ownership in the Nordics

Figure B.3: Share of foreign ownership in the Nordics

The share of foreign ownership is calculated as the value of foreign holdings divided by total marked value.

	Norway	Sweden	Denmark	Finland
Per	Oct 2018	June 2018	Sep 2018	Aug 2018
%	38.76	41.5	48.9	50.9

Source: (Verdipapirsentralen, 2018; Statistiska centralbyrån, 2018; Danmarks Nationalbank, 2018; Sunomen Pankki, 2018)

Investors from the other Nordic countries are also included as foreign ownership. Hence, the number of non-Nordic owners is lower than shown in the figure B.3.

Appendix B.4: SIC structure

Table B.4.1: SIC Divisions

Range of SIC codes	Division
0100-0999	A: Agriculture, Forestry and Fishing
1000-1499	B: Mining
1500-1799	C: Construction
2000-3999	D: Manufacturing
4000-4999	E: Transportation, Communications, Electric, Gas and Sanitary service
5000-5199	F: Wholesale Trade
5200-5999	G: Retail Trade
6000-6799	H: Finance, Insurance and Real Estate
7000-8999	I: Services
9100-9729	J: Public Administration
9900-9999	K: Nonclassifiable

Table B.4.2: SIC Division breakdown

Division A: Agriculture, Forestry and Fishing
Major group 01: Agricultural Production Crops
Industry group 011: Cash Grains
Industry 0111: Wheat
Industry group 013: Field Crops, Except Cash Grains
Industry group 016: Vegetables And Melons
Industry group 017: Fruits And Tree Nuts
Industry group 018: Horticultural Specialties
Industry group 019: General Farms, Primarily Crop
Major group 02: Agriculture production livestock and animal specialties
Major group 07: Agricultural Services
Major group 08: Forestry
Major group 09: Fishing, hunting, and trapping

Appendix B.5: Joint ventures announcements in%, by sector and level of experience

Table B.5: Joint venture announcements in %, by sector and level of experience

Sector / Level of experience	High (5+)	Medium (1-5)	Low (0)	Total
Agriculture, Forestry and Fishing	-	-	100 %	100 %
Construction	9 %	24 %	67 %	100 %
Finance, Insurance and Real Estate	1 %	14 %	85 %	100 %
Manufacturing	**23 %**	22 %	55 %	100 %
Mining	**27 %**	10 %	63 %	100 %
Public Administration	-	33 %	67 %	100 %
Retail Trade	-	11 %	89 %	100 %
Services	2 %	13 %	84 %	100 %
TCEGS*	19 %	18 %	64 %	100 %
Wholesale Trade	-	-	100 %	100 %

*TCEGS = Transportation, Communications and Electric, Gas and Sanitary service

Appendix B.6: Joint venture announcements in %, by unique firms

Table B.6: Joint venture announcements in %, by unique firms

	High (5+)	Medium (2-5)	Low (1)	Total
Number of unique firms	17 %	35 %	**48 %**	100 %

Appendix B.7: The firms with the most joint venture announcements

Table B.7: The firms with the most joint venture announcements

	Volvo	Ericsson	Hydro	Nokia
Number of announcements	**54**	52	47	37

Appendix B.8: Number of joint venture announcements, by partner of interest and JV sector

Table B.8: Number of joint ventures announcemements, by Partner of interest and JV sector

	JV in same sector as partner of interest	JV in different sector than partner of interest	Total
Partner from same sector as partner of interest	**550**	162	712
Partner from different sector than partner of interest	267	**369**	636
Total	817	531	1348*

* There is 1348 and not 1356 joint venture announcements due to 8 missing sector observations

Appendix B.9: Joint venture announcements, by sector and joint venture type

Table B.9: Joint venture announcements, by sector and joint venture type

Sector / JV type	Exploration	Manufacturing	Other	Not specified	Total per JV type
Construction	-	3	1	51	55
% of total	*0 %*	*5 %*	*2 %*	*93 %*	*100 %*
Finance, Insurance and Real Estate	2	10	7	69	88
% of total	*2 %*	*11 %*	*8 %*	*78 %*	*100 %*
Manufacturing	9	**393**	96	151	649
% of total	*1 %*	***61 %***	*15 %*	*23 %*	*100 %*
Mining	**35**	29	3	43	110
% of total	***32 %***	*26 %*	*3 %*	*39 %*	*100 %*
Services	1	8	14	98	121
% of total	*1 %*	*7 %*	*12 %*	*81 %*	*100 %*
TCEGS*	3	27	30	242	302
% of total	*1 %*	*9 %*	*10 %*	*80 %*	*100 %*
Other	-	4	4	23	31
% of total	*0 %*	*13 %*	*13 %*	*74 %*	*100 %*
Total per sector	50	474	155	677	1356
% of total	*4 %*	*35 %*	*11 %*	*50 %*	*100 %*

*TCEGS = Transportation, Communications and Electric, Gas and Sanitary service

Appendix B.10: Joint venture announcements, by location of joint venture and partner

Table B.10: Joint venture announcements, by location of joint venture and partner

JV location / Partner type	Nordic JV	International JV	Total*
Nordic Partner	331	123	454
% of total	*73 %*	*27 %*	*100 %*
International Partner	156	745	901
% of total	*17 %*	*83 %*	*100 %*
Total*	487	868	1355
% of total	*36 %*	*64 %*	*100 %*

*One missing observation due to missing JV location

Appendix B.11: Joint venture announcements, by sector and joint venture location

Table B.11: Joint venture announcements, by sector and joint venture location

Sector / JV location	Nordic JV	International JV	Total per JV location**
Construction	29	26	55
% of total	*53 %*	*47 %*	*100 %*
Finance, Insurance and Real Estate	**53**	34	87
% of total	***61 %***	*39 %*	*100 %*
Manufacturing	186	**463**	649
% of total	*29 %*	***71 %***	*100 %*
Mining	24	**86**	110
% of total	*22 %*	***78 %***	*100 %*
Services	55	66	121
% of total	*45 %*	*55 %*	*100 %*
TCEGS*	115	187	302
% of total	*38 %*	*62 %*	*100 %*
Trade (Retail and Wholesale)	**21**	4	25
% of total	***84 %***	*1 %*	*100 %*
Other	4	2	6
% of total	*67 %*	*33 %*	*100 %*
Total per sector**	487	868	1355
% of total	*36 %*	*64 %*	*100 %*

*TCEGS = Transportation, Communications and Electric, Gas and Sanitary service

**One missing observation due to missing JV location

Appendix B.12: Joint venture announcements in %, by sector and number of partners

Table B.12: Joint venture announcements in %, by sector and number of partners

Sector / Number of partners	Two	More than two
Agriculture, Forestry and Fishing	100 %	0 %
Construction	85 %	15 %
Finance, Insurance and Real Estate	72 %	28 %
Manufacturing	82 %	18 %
Mining	66 %	**34 %**
Public Administration	100 %	0 %
Retail Trade	75 %	25 %
Services	79 %	21 %
TCEGS*	74 %	26 %
Wholesale Trade	75 %	25 %

*TCEGS = Transportation, Communications and Electric, Gas and Sanitary service

Appendix C: Analysis

Appendix C.1: Constant mean return model

To examine whether our results are robust to the choice of normal performance model, we tested the null hypothesis that the CAAR for Nordic firms are equal to zero (the same as tested in subsection 6.1), with using the constant mean return model to measure normal performance. In the constant mean return model, the normal performance of a stock is the stock's average return during the estimation window (see appendix A.6 for further explanation).

Table C.1: Constant mean return model

The market model and the constant mean return model is used to estimate abnormal returns during the event window [-1, 1]. The constant mean return and market model parameters are estimated over a 251 day estimation window ending on day -3, where day 0 is the event day. FTSE World Nordic Index is used as a proxy for the market portfolio. The abnormal returns for each day in the event window are aggregated through events and over the event window [-1, 1] yielding the cumulative average abnormal return (CAAR). The sample consists of 225 event from Norway, 379 event from Sweden, 107 from Denmark and 277 events from Finland, i.e. a total of 988 Nordic events, in the period January 1995 to December 2017. The standardized cross-sectional test (Z_1) is used to test whether the CAARs are statistically different from zero.

	Norway		Sweden		Denmark		Finland		Nordics	
Normal performance model	CAAR (%)	Z_1	CAAR (%)	Z_1	CAAR (%)	Z_1	CAAR (%)	Z_1	CAAR (%)	Z_1
Market model	1.24***	(3.04)	1.11**	(2.57)	0.70	(1.30)	0.35*	(1.90)	0.88***	(4.46)
Constant mean retun model	1.22***	(2.99)	1.15**	(2.55)	0.55	(0.91)	0.21	(0.98)	0.83***	(3.77)

*** Significanse for a 2-tailed test at the 1% level

** Significance for a 2-tailed test at the 5% level

* Significance for a 2-tailed test at the 10% level

From table C.1, the CAAR for the Nordics when using the constant mean return model is significant at the 1% level. Hence, we reject the null hypothesis that the CAAR for Nordic firms are zero. It yields the same conclusion as using the market model, which implies that our results are robust to the choice of normal performance model. The only notable deviation when using the constant mean return model is that the CAAR for Finnish firms no longer is significant at the 10% level.

Appendix C2: Entire regression

Table C.2: Regression (2) with all independent variables		
	Coefficient	T-statistic
Relative size small	0.0243***	(3.18)
JV experience	0.0014	(0.86)
Medium partner relatedness	-0.0004	(-0.08)
High JV relatedness	-0.0032	(-0.80)
Firm size	-0.0063**	(-2.23)
Relative size medium (dummy)	0.0013	(0.34)
Symmetrical ownership (dummy)	-0.0064	(-1.13)
More than two partners (dummy)	-0.0105**	(-2.04)
Nordic partner (dummy)	0.0031	(0.77)
Nordic JV (dummy)	-0.0040	(-0.85)
JV in China (dummy)	-0.0119**	(-2.19)
Exploration JV (dummy)	-0.0432	(-1.61)
Licensing JV (dummy)	-0.0284**	(-2.09)
Manufacturng JV (dummy)	0.0044	(0.71)
Marketing JV (dummy)	0.0049	(0.62)
R&D JV (dummy)	0.0027	(0.41)
Supply JV (dummy)	0.01756	(1.01)
Technology JV (dummy)	-0.0017**	(-2.31)
Agriculture firm (dummy)	-0.0334***	(-3.81)
Construction firm (dummy)	-0.0045	(-0.62)
Finance firm (dummy)	0.0040	(0.40)
Mining firm (dummy)	0.0355	(0.95)
Retail firm (dummy)	-0.0191**	(-2.33)
Services firm (dummy)	-0.0001	(-0.09)
TCEGS firm (dummy)	-0.0008	(-0.79)
Wholesale firm (dummy)	-0.0022	(-0.15)
Before 2001 (dummy)	-0.0067*	(-1.65)
After 2008 (dummy)	0.0158**	-2.36
Norwegian firm (dummy)	0.0015	(0.17)
Finnish firm (dummy)	-0.0064	(-1.27)
Danish firm (dummy)	0.0031	(0.56)
Nokia (dummy)	0.0344**	(2.49)
Ericsson (dummy)	0.0267**	(2.40)
Hydro (dummy)	-0.0168	(-0.88)
Volvo (dummy)	0.0122*	(1.72)
Intercept	0.0498**	(1.98)
Observations	980	
F	2.22	
R^2	0.0992	

*** Significanse for a 2-tailed test at the 1% level

** Significance for a 2-tailed test at the 5% level

* Significance for a 2-tailed test at the 10% level

Explanation of control variables

Firm size equals the natural logarithm of the partner of interest's market value, expressed in mUSD, at the last day of the estimation window. Symmetrical ownership implies that all the partners own an equal stake in the joint venture, while more than two partners indicate if the joint venture contains more than two partners. A joint venture located in one of the Nordic countries is defined as Nordic JV, while at least one of the ultimate parents of the other participants must be located in or listed a Nordic country in order for the joint venture to have a Nordic partner. JV in China indicate if the joint venture is located in China, while the JV type variables represents the joint venture classification by SDC. The firm sector variables represent the sectors where the partner of interest is located. The time dummies explain whether the joint venture was announced during the dot-com bubble or after the financial crisis. The Nordic country dummies indicate the location of the partner of interests, and the four firm specific dummies represents the companies with the most joint venture announcements.

Appendix C.3: Cross-sectional analysis with linear experience and no firm dummies

Table C.3: Cross-sectional analysis with linear experience and no firm dummies

	(2)
Relative size small	0.0238***
	(3.14)
JV experience (linear)	0.0005***
	(2.63)
Medium partner relatedness	-0.0009
	(-0.18)
High JV relatedness	-0.0032
	(-0.81)
Intercept	0.0443*
	(1.81)
Observations	980
F	2.53
R^2	0.0911

T-statistics in parantheses

*** Significanse for a 2-tailed test at the 1% level

** Significance for a 2-tailed test at the 5% level

* Significance for a 2-tailed test at the 10% level

Appendix C.4: VIF test

Table C.4: Variance inflation factors

	VIF	1 / VIF
Mining firm	2.20	0.45
TCEGS firm	1.99	0.50
Hydro	1.86	0.54
Firm size	1.75	0.57
Relative size small	1.74	0.57
Norwegian firm	1.67	0.60
Manufacturng JV	1.63	0.61
Before 2001	1.58	0.63
Finnish firm	1.58	0.63
Relative size medium	1.55	0.65
Ericsson	1.54	0.65
Nordic partner	1.52	0.66
After 2008	1.52	0.66
Services firm	1.49	0.67
JV experience	1.48	0.68
Nordic JV	1.43	0.70
Wholesale firm	1.35	0.74
Finance firm	1.32	0.76
Exploration JV	1.32	0.76
Danish firm	1.32	0.76
Vovlvo	1.29	0.78
Construction firm	1.27	0.79
Nokia	1.25	0.80
Medium partner relatedness	1.22	0.82
JV in China	1.22	0.82
Retail firm	1.22	0.82
More than two partners	1.21	0.83
High JV relatedness	1.15	0.87
Symmetrical ownership	1.14	0.88
Marketing JV	1.13	0.88
R&D JV	1.11	0.90
Licensing JV	1.04	0.96
Technology JV	1.06	0.94
Supply JV	1.06	0.94
Agriculture firm	1.03	0.97

In table C.4, the variance inflation factors (VIF) are displayed for the regression (4) in Table 6.2. Scholars disagree about what threshold values indicate a potential problem with multicollinearity. A common rule of thumb is that VIF and 1/VIF values below either 5 or 10 and above 0.20 or 0.10 respectively (O'Brien, 2007). The VIF and 1/VIF values in Table C.4 are well below 5 and above 0.20, respectively. Hence, it does not seem that there are any problems arising from multicollinearity in the cross-sectional analysis.