Where to Invest?

- Choosing the optimal stock market for investing in a cross-listed Nordic firm

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Abstract

The purpose of this study is to investigate whether the location of buying stocks in a Nordic cross-listed company matters in terms of 1) earning abnormal returns, or 2) gaining in optimizing the amount spent by buying the specific stock cheap. Nowadays, markets are becoming more integrated and if we believe in the efficient market hypothesis, prices of the same class of stocks paying the same dividend annually, of an MNC must be the same irrespective of the stock exchange it is listed upon. Though efficient market hypothesis exists in theory, market imperfection is a reality. All the Nordic (Swedish, Finnish, Norwegian, Danish and Icelandic) firms listed on foreign stock exchanges in addition to their home market have been included in the sample. In fact, this sample represents 100% of the population. The daily prices of cross-listed stocks have been analyzed and conclusions have been drawn based on the mean returns and mean prices along with Wilcoxon Signed-Rank test statistics. The data have been analyzed over the last ten years capturing the recent economic cycle. The whole period has also been divided into three sub-periods to establish comparisons with the whole period. This paper reports that even though returns on cross-listed stocks are statistically same over all periods, prices of the stocks vary according to the location of listing. That is, investors can buy from a stock exchange where the specific stock is underpriced thereby decreasing the amount invested in absolute term and optimizing the amount spent if not the return. The returns and prices have analyzed using the local currency of the MNC’s country of origin and Special Drawing Rights (SDRs). No considerable differences on the returns or pattern of price movements have been observed while using two currencies.

Key words: Cross-listing, Investors, Stock Markets, Nordic stocks, Capital market segmentation, Efficient Market Hypothesis, Wilcoxon Signed-Rank Test.
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1. Introduction

In this part we will introduce our readers to the world of multinational companies and cross-listings. We start out by giving a background to the issue at hand where we introduce these phenomena and explain the logic behind them. After this we go on to the problematization and the research question followed by the knowledge gap, the thesis purpose and the delimitation's of our thesis. Lastly we define some relevant concepts and give the reader the overall disposition of our thesis.

1.1 Problem Background

Issues of shares in the equity markets of two or more countries are termed as Euroequity issues or referred to as cross-listing (Buckley 2004, p. 561). This phenomenon of multinational enterprises (MNEs) listing across different stock exchanges is not new and has actually been an increasing trend among MNEs (Banalieva & Robertson 2010, p. 531). Since cross-listing facilitates access to foreign shares, the interest of investors in holding these shares is increasing over time as well (Abdallah, Abdallah and Saad 2011, p. 589). For instance, AstraZeneca, a Swedish and British merged biopharmaceutical giant, raises capital from stock exchanges in London, New York and Stockholm (Astrazeneca, 2012). Nokia, the Finnish-based telecom, raises capital from stock exchanges in Frankfurt, Helsinki, and New York. (Nokia, 2012). The frequency of such foreign MNEs’ cross-listing activity has tripled among the world’s 10 largest stock exchanges between 1986 and 1998 (Faff, Hodgson, & Saudagaran, 2002 as cited in Banalieva & Robertson 2010, p. 531). Pagano, Roell, & Zechner, 2002 (as cited in Banalieva & Robertson 2010, p. 531) find that the number of European MNEs engaged in cross-listing across nine European stock exchanges increased from 177 to 337, and those internationally increased from 320 to 516 between 1986 and 1997. They also concluded that the trend continues in the 21st century. Between 2005 and 2007, approximately $130bn of new capital has been raised worldwide through foreign cross-listings (BNYM, 2008 as cited in Banalieva & Robertson 2010, p. 531).

Stock offering is digested rather easily when it is issued in more than one market (Madura 2003, p. 86; Solnik 1988). When national capital markets are segmented or even partially segmented, firms deciding to cross-list their stocks on foreign exchanges are successful in raising the price of stocks as they overcome investment barriers of a segmented market (Stapleton and Subrahmanyam, 1977, Alexander, Eun and Janakiramanan 1987, p. 151, and Errunza and Losq 1985). One of the rationales for Euroequity issues is the hypothesis of capital market segmentation without which it would not have made sense for firms to issue shares in several countries. They could just issue in one country and let foreign investors buy directly from this market, provided that capital market integration existed. Even though investors have access to marketplaces all over the world, there still exists a home bias in many markets (Buckley 2004, p. 562). Strong and Xinzhong (2003, p. 312) conclude that evidence from their research shows that fund managers show significant relative optimism towards their home equity market As an example they state that U.S. investors place 98% of their equity portfolios in domestic equities, against a figure of 36.4% for the U.S. market as a proportion of the world equity market capitalization (Strong and Xinzhong, 2003, p. 307).

Reese Jr. and Weisbach (2002) list three major reasons for cross-listing: market segmentation/investor recognition, liquidity and commitment to reveal information. In their last part they reach the conclusion that firms with strong protection at home tend to cross-list in order to
access US investors and/or markets, while firms from countries with weak shareholder protection appear to cross-list, among other reasons, for the purpose of voluntarily bonding themselves to US securities and market regulations, allowing them to raise capital more easily at home and elsewhere outside the US. Issuing equity in different capital markets enhances the financial flexibility of the firm, getting access to a wider range of investors and capital in other currencies (Solnik, 1988). The choice of the stock exchange depends on the highest price the firm can earn, net of issuance costs, which is usually a country where the required rate of return is lowest (Buckley 2004, p. 562). Financial flexibility coupled with low required rate of return reduces the overall cost of capital for the firm. Moreover, this mechanism of backing up higher price and lowering cost of capital help curb the mispricing in an illiquid, segmented, home capital market. Regulatory complications in the form of queuing procedures on capital issues or restrictions on the issue of certain kinds of paper are avoided in Euroequity allowing the firm to raise capital from deeper capital markets. (Buckley 2004, p. 563)

Presence in various capital markets adds to the prestige of the company, increasing its visibility, getting its name recognized (Madura 2003, p. 86; and Madura 2001, p. 263; Solnik 1988 as cited in Marr, Trimble, & Varma 1991, p.13; ALEXANDER et al. 1987, p.151; Errunza & Losq 1985), Gordon et al. (1988) and Errunza and Losq (1985) argue that cross-listing stocks in foreign markets leads to a reduced investment barrier, increased prestige, increased liquidity, reduced cost of capital, and etc.) in international banking circles and may also earn some benefit on sales (Buckley 2004, p. 563). Moreover strategic interests are also served. Having a broader shareholder base, price volatility is reduced when large investors sell their shares (Madura 2003, p. 87; and Madura 2001, p. 263), its vulnerability to takeover is considerably lessened and in fact, it is in a better position to engage in foreign mergers and acquisitions (Buckley 2004, p. 563; Solnik 1988).

Cross-listing gives foreign investors the opportunity to diversify their portfolios with cross-listed stocks, benefit from lower transaction costs because the cross-listed stock is available in their (i.e. foreign investors) market, in their own currency; and information barriers are considerably reduced because cross-listing required additional financial disclosures as per the local regulation of the foreign country where the stocks are listed (Stonehill and Dullum 1982, and Alexander, Eun and Janakiramanan 1988).

It is very convenient for an investor to simply choose his/her home market for his/her investments. However, by ignoring where to buy the stock, the investor might give up the possibility to earn abnormal profits. Due to market imperfections stock prices in different markets are most often not in equilibrium. Even though it is the same stock with the same dividend, the price can still differ substantially in between markets.

Investing in other countries than one’s native country provides many opportunities but it also creates several risks. All investors face risks such as country risk, transaction risk and economic risk. However, an international investor faces other risks such as exchange rate risk and translation risk in addition to the above mentioned ones. Nevertheless, the benefit of international investments is that the investor is actually reducing his/her overall risk by diversifying his/her portfolio. The basic idea is that if one market performs poorly it is not a disaster since the other investments will hopefully counterbalance this loss. In an efficient market the investor can trust prices since they include all available information of each security. If the world market were to be efficient in its strong form, our
hypothesis that investors can earn extra profits by choosing the optimal market fails (Brealey, Myers and Allen, 2006). One argument here is that correlation among stock markets is not equal to one. There are quite a lot of studies on this issue, for example: Syllignakis & Kouretas (2011) and Savva, Osborn, & Gill (2009).

An important aspect to consider is the average performance of the stock exchange. This poses the problem of the market return and market premium that can be different in a domestic context and in an international context. The fact that we can observe differences in prices of the same stock on different markets is the main concern of this thesis. Ceteris paribus, why buy a more expensive stock or from a market which offers less returns when the stock itself is the same on each market?

1.2 Problematization and Research question

Today’s globalized market place has given investors countless different investment opportunities spread all over the world. The most important decision for an investor is of course what type of investment he/she wants to make. A rational investor will also try to diversify his/her portfolio in order to spread the risk. However, another important decision is where the investor should make this investment. For instance, an investor decides to invest in a particular company stock. After making this first decision the investor still has to consider, what types of stocks are offered? What is his/her risk preference? Does an A-stock or a B-stock fit his/her needs best? How many stocks does he/she want? When these kinds of issues have been taken under consideration, our area of focus begins. That is, where should the stock be purchased from?

For some stocks this decision is very easy since most companies only offer their stocks in one marketplace. However, many of the world’s largest companies have chosen to list their stocks in several different marketplaces. In this case, where to invest becomes an important issue. Even though investors have access to marketplaces all over the world, there still exists a home bias in many markets (Strong and Xinzhong, 2003, p. 307 and Buckley, 2004, p. 562). Home bias is in investors’ very nature since it is very convenient and since the investor probably has more knowledge about his “home market” than of other markets. Also, investing in one’s home market may be considered safe in the sense that there is no direct exposure to foreign exchange risk or country/political risk. But because of several market imperfections, it is not sure that the domestic market is the one offering the highest return. Yet, we have observed that the same stocks issued in different equity markets are often traded at different prices. This gives rise to our research question:

**Does the investing location matter for investing in Nordic cross-listed stocks?**

- Can an investor earn abnormal returns by choosing the “optimal” stock exchange from where to buy a specific Nordic cross-listed stock?
- Does a secondary market exist where Nordic cross-listed stocks are most often underpriced?

The “optimal” stock exchange, we define as: “the stock exchange that either offers opportunities for abnormal returns or offer the stocks at a cheaper price”. We define a Nordic cross-listed stock as: “a stock issued by a company founded in- and firstly introduced on any of the Nordic stock markets”.
1.3 Knowledge Gap and Thesis purpose

There have been ample studies on the implications of cross-listing, why it is needed, its benefits to companies, investors of different classes, and even its connection to CEO turnover. In most of these studies the benefits to the firms are identified and discussed. The Gurus of finance academia made cross-listing and US stock market synonymous. You, Parhizgari, & Srivastava (2012, p.201) mention that most of the previous studies on cross-listing focus on listings in the U.S. market, and Karolyi (2006, as cited in You et al. 2012, p.201) points out this bias in understudying of global listings. Reese, Weisback, Doidge, Karolyi, Lins, Miller, Marr, Trimble, Varma, Li Li, Nabar, Mian, Stapleton, Subrahmanyam and many others have done research on cross-listing and US has always been the base. In our findings Königsgruber’s (2009) paper was one with a different perspective, namely European. We did not find any single Nordic or Scandinavian paper in English connected to Nordic stocks and cross-listing. In our study, we take a Nordic perspective and employ Nordic stocks cross-listed in many different countries. Therefore, our study complements the literature on cross-listing by providing research on Nordic firms’ world listings.

The purpose of this paper is not to examine why firms decide to list abroad or what drive them to cross-list as this decision is taken as exogenous to our analysis. This is the supply side argument. Instead, we focus on the decisions of investors on where to invest in cross-listed stocks, the demand side argument. We want to investigate the cross-listing phenomenon of Nordic firms and want to find out from where exactly an investor should buy a Nordic cross-listed stock. Earlier studies have been performed to justify the cross-listing phenomenon and those were mainly done on US, German, UK and Japanese stock exchanges; however we chose to focus specifically on the Nordic market. For this paper, NASDAQ OMX Nordic (SSE, HSE, CSE & ICEX) and Oslo Bors will be the base stock exchanges and we will look into the companies listed on these exchanges to find out which of these have cross-listed in several stock exchanges. Then we plan to give a recommendation to an investor on where exactly he/she should buy the shares of such companies from.

Our major reason for choosing Nordic as the starting point is the fact that we study in a Swedish university and therefore want to connect our study to our “home market”, as well as the fact that we have not found any similar studies focusing on this market. Another interesting aspect about the Nordic market is that these markets are fairly small and that it therefore has been very important for MNE:s from this area to cross-list in order to reach a sufficient amount of investors.

This research will mainly focus on an investor perspective. However it might also be useful for: Nordic companies who are interested in the advantages/disadvantages of being listed in multiple stock markets; Stock exchange companies looking forward to attract more companies to list; and host government and policymakers to design policies in a way which increases this phenomenon. The Nordic countries combined represent a sizable market and we believe that several stakeholders in this area can find our research useful.

1.4. Audience

The audience we intend to reach with our research is readers with at least basic knowledge within finance. Even though we have included a glossary and several elaborate definitions we still take for granted that the reader knows some basic concepts within finance. However, we do not believe that
the reader needs any specific knowledge regarding cross-listing since the concepts regarding this phenomena are all sufficiently explained throughout the thesis. We believe that our research will be of high interest for all type of investors, however specifically interesting for investors which are considering or are already investing in cross-listed firms, even more specifically Nordic cross-listed firms. Our research can also be of high interest for managers interested in the advantages and disadvantages of listing in multiple stock exchanges. Our research can also be of interest to stock exchanges, governments and other types of regulators who might use our findings to attract more listings or capital inflows in their market place(s).

1.5. Delimitations

Our aim is to recommend an “optimal” stock exchange for investors interested in buying stocks of Nordic companies. Therefore, our research is most useful for those investors and may not be generalized to investors in all parts of the world. Not all Nordic companies are cross-listed in exact same locations, for some there may not be any location in common.

Our recommendation will be purely based on historical data of how stock prices of Nordic companies in various stock exchanges have behaved over the past ten years divided into three sub-periods. The sub-periods are:

2. "Oct 9, 2007 - Mar 9, 2009(Recession, Slump)"

The main reason behind choosing last ten years is because it reflects the recovery of global economy from the dotcom bubble of 2000, culminating to the boom of 2005, crash in 2008 and then recovery from 2010 onwards. Moreover, the duration of our research being limited to the time span of one academic semester and our strong desire to create a solid piece of work make it sensible for us to conduct a longitudinal study not involving more than the last ten years.

1.6. Definitions

*Multinational Enterprise/Company (MNC or MNE)* - “A corporation that has its facilities and other assets in at least one country other than its home country. Such companies have offices and/or factories in different countries and usually have a centralized head office where they co-ordinate global management. Very large multinationals have budgets that exceed those of many small countries. Sometimes referred to as a "transnational corporation”” (Investopedia, 2012).

*Nordic cross-listed firms:* Firms whose country of origin is in Sweden, Denmark, Norway, Finland or Iceland and whose shares were first traded in the stock exchanges of the respective countries.

*Cross-listing* - “The listing of a company's common shares on a different exchange than its primary and original stock exchange. In order to be approved for cross-listing, the company in question must meet the same requirements as any other listed member of the exchange, such as basic requirements for the share count, accounting policies, filing requirements for financial reports and company revenues” (Investopedia, 2012).
**Diversification** - “A risk management technique that mixes a wide variety of investments within a portfolio. The rationale behind this technique contends that a portfolio of different kinds of investments will, on average, yield higher returns and pose a lower risk than any individual investment found within the portfolio. Diversification strives to smooth out unsystematic risk events in a portfolio so that the positive performance of some investments will neutralize the negative performance of others. Therefore, the benefits of diversification will hold only if the securities in the portfolio are not perfectly correlated” (Investopedia, 2012).

**Foreign exchange risk** - “1. The risk of an investment's value changing due to changes in currency exchange rates. 2. The risk that an investor will have to close out a long or short position in a foreign currency at a loss due to an adverse movement in exchange rates. Also known as "currency risk" or "exchange-rate risk"” (Investopedia, 2012).

**Idiosyncratic Risk** - “Risk that affects a very small number of assets, and can be almost eliminated with diversification. Similar to unsystematic risk.” (Investopedia, 2012).

**Sophisticated Investor** - A type of investor who is deemed to have sufficient investing experience and knowledge to weigh the risks and merits of an investment opportunity. Typically, a sophisticated investor must have either a net worth of $2.5 million or have earned more than $250,000 in the past two years to qualify. (Investopedia, 2012)

**Country/Political risk** - “1. The risk of an investment's value changing due to changes in currency exchange rates. 2. The risk that an investor will have to close out a long or short position in a foreign currency at a loss due to an adverse movement in exchange rates. Also known as "currency risk" or "exchange-rate risk"” (Investopedia, 2012).

**Special Drawing Rights (SDRs)** – “a form of international money, created by the International Monetary Fund, and defined as a weighted average of various convertible currencies” (Oxford Dictionaries, 2012).

**Purchasing Power Parity (PPP)** - An economic theory that estimates the amount of adjustment needed on the exchange rate between countries in order for the exchange to be equivalent to each currency's purchasing power (Investopedia, 2012).

**International Fisher Effect (IFE)** - An economic theory that states that an expected change in the current exchange rate between any two currencies is approximately equivalent to the difference between the two countries' nominal interest rates for that time.

**Covered Interest Rate Parity** - This term refers to a condition where the relationship between interest rates and the spot and forward currency values of two countries are in equilibrium. As a result, there are no interest rate arbitrage opportunities between those two currencies (Investopedia, 2012).

**Rational Investor** - A rational investor is risk averse, prefers higher mean returns with less volatility in prices.
Nordic Markets – Our definition of the Nordic markets is in line with the official definition of the Nordic countries. The Nordic countries are: Denmark, Finland, Iceland, Norway and Sweden (Nationalencyklopedin, 2012 and allwords.com, 2012). Therefore the Nordic markets are the stock markets of each of these countries. These markets are: Copenhagen Stock Exchange (CSE), Helsinki Stock Exchange (HSE), Iceland Stock Exchange (ICEX), Oslo Bors and Stockholm Stock Exchange (SSE). CSE, HSE, ICEX and SSE are all owned by NASDAQ and these markets are also referred to as the NASDAQ OMX Nordic (NASDAQ OMX, 2012).

1.7. Disposition

Chapter 1: Introduction
P. 1-8
In this part we initiate our treatise introducing our readers to the world of multinational companies and cross-listings. We start out by giving a background to the issue at hand where we introduce these phenomena and explain the logic behind them. After this we go on to the problematization and the research question followed by the knowledge gap, the thesis purpose and our delimitation's. Lastly we define some relevant concepts and give the reader the overall disposition of our thesis.

Chapter 2: Methodology
P. 9-21
This chapter will depict the research philosophy, research approach, research strategies, time horizons and data collection methods available to conduct a research in the field of business administration and we will justify the ones we pick to answer our research question.

Chapter 3: Literature Review
P. 22-42
Since this part of our thesis is quite extensive, we have divided it into six parts. We start of by giving the reader an introduction to some previous research on the efficiency of the Nordic markets as well as a brief overview of its history. Thereafter we present the fundamentals of stock markets and of our basic theory such as the efficient market hypothesis (EMH). The reason for including the EMH is that this theory and the theory of imperfect markets underpin the primary reason for cross-listing. After providing these fundamentals we explore the various reasons for companies to cross-list. We divide these reasons in to non-financial ones and financial ones. Thereafter we summarize the advantages and disadvantages of cross-listing. Then we provide empirical evidence from two of the most researched countries when it comes to cross-listing, the US- and German markets. Lastly we make a summary about everything included in this chapter.

Chapter 4: Practical Method
P. 43-49
In this chapter we outline the practical conduct of how our data was gathered, basic information about our sample, how and why we chose the sub-periods, how we formulated the hypotheses and the statistical method we use to test our hypotheses and thereby be able to answer our research questions.

Chapter 5: Empirical Findings, Discussion & Analysis
P. 50-75
In this chapter we analyze each of our studied stocks, both in the whole period and in each sub-period. By comparing the mean prices of the same stock in different markets we are able to make recommendations on where to buy each stock from. The recommendations might differ within the sub-periods. Since our research did not find any significant differences between the returns of the stock exchanges we did not include any analysis on the returns.

Chapter 6: Conclusions & Recommendations
P. 76-78
In this chapter we draw conclusions on our paper based on our empirical findings and give suggestions for further research and discuss the limitations of our research. We finish the chapter by assessing the quality of our research.
2. Research Methodology

This chapter will depict the research philosophies, research approaches, research strategies, research methods and data collection methods available to conduct a research in the field of business administration. We justify each of the strategies we pick and in the end of the chapter we discuss quality issues of our research such as replicability, reliability and validity.

2.1. Choice of Subject

There are many reasons to why we chose to write a thesis within finance. First of all, this is the business field we find most interesting. Both of us have completed all the compulsory courses within the Masters of Finance Program at Umeå University. The courses we took were: Corporate Finance, Investments, Financial Statement Analysis and Risk Management. Both of us also intend to have future careers within the area of finance. We were particularly interested in the theories of market imperfections and on how an Investor can take advantage of these. We already had some basic knowledge on the area of cross-listing and we found it very interesting as to why the same stock could have a different price in different markets. We also found it interesting to learn more about why firms cross-list in the first place. In a fully integrated market there would not exist any incentives for this type of behavior. Therefore, we choose to make it our aim to investigate this intriguing phenomenon.

2.2. Preconceptions

Preconception is defined as “An opinion or conception formed in advance of adequate knowledge or experience, especially a prejudice or bias” (thefreedictionary, 2012). It is quite probable that researcher’s previous experiences, academic background, values and beliefs will have an impact on the choice of subject, the development of hypotheses and even on the conclusion of the research paper. This impact can also be termed as biasness which is absolutely not desirable in a scientific research. This is why Saunders, Lewis and Thornhill (2009, p.596) and Bryman and Bell (2007, p.30) advise business researchers to be objective to the research and not to let preconceptions affect his/her independence in the study. Our course “Research Methodology” has given us good knowledge regarding these kinds of considerations.

We are majoring in Finance and as mentioned earlier, we have taken courses in business schools across Europe. The bulk of our studies have been performed in Umeå, Sweden, but we have also gained knowledge from other perspectives through studies in Copenhagen, Aberdeen and Athens.
2.4. Research Onion

![Research Onion Diagram]

**Figure 1.1 The research process ‘onion’**

Saunders, Lewis and Thornhill’s (2003, p.82) “The research process ‘onion’” reflects the underlying issues deciding the choice of data collection method to answer the research questions. Before reaching the core, “data collection methods”, four important layers of the onion have to be peeled away. The first layer concerns the research philosophy that is to be adopted. The second one is about the research approach flowing in line with the research philosophy. Then the third one outlines the research strategy, fourth refers to the time horizons applicable to the research. Finally, all of these layers lead to the data collection method to be used to answer the research question. The bold text shows which methods we have chosen. The reason that we did not choose any research strategy in the third layer is that none of these corresponded well to our study. Saunders et al. (2003) included the research strategy “Exploratory, descriptive and explanatory studies”, which we used as our research strategy.

2.5. Research Philosophy

Research philosophy is dependent on the way we perceive the development of knowledge. This very thought about the development of knowledge affects the way we conduct our research. Our philosophical position explains our view of the world and how we are going to study it. The two major branches concerning research philosophy are the epistemological- and the ontological considerations.
2.5.1. Epistemological foundations

Epistemology concerns how knowledge can be acquired which Plato and his followers defined as *justified true belief* (Ryan, Scapens and Theobald, 2002, p.11).

Positivism, realism and interpretivism are the three research processes dominating literature. They necessarily do not have to be mutually exclusive but they are indeed different views on the way knowledge is developed and judged (Saunders *et al.*, 2003, p.83 and Bryman and Bell, 2007, p. 16). “An epistemological issue concerns the question of what is (or should be) regarded as acceptable knowledge in a discipline”. A central issue in this question is whether or not the social world can and should be studied according to the same principles as natural sciences (Bryman and Bell, 2007, p.16).

**Positivism** is the philosophical stance of natural scientists. Positivist researcher’s work with an observable social reality and the conclusions of such researches are “law-like generalisations similar to those produced by the physical and natural scientists” (Remenyi et al., 1998:32; as cited in Saunders *et al.*, 2003, p.83). Being an objective analyst, the researcher makes ‘detached interpretations’ about the collected data in an ‘apparently value-free manner’. Strong emphasis is put on highly structured methodology to allow replication (Gill and Johnson, 1997; as cited in Saunders *et al.*, 2003, p.83) and on quantifiable observations leading Positivist researchers to statistical analysis. The assumption underlying positivism are “independence of the researcher from the researched, determinism, that is there are causes and effects, the criticality of evidence, parsimony and the ability to generalize or model, especially in the mathematical sense of modeling. The emphasis of positivism is on quantifiable observations which lend themselves to statistical analysis” (Remenyi, D 1996, p. 22). However a plausible critique of positivism can be that social world of business and management is quite much complex to theorize it by specific ‘laws’ as done in physical sciences. Desirable and important insights of the complex world disappear when the complexity is simplified completely to a ‘series of law-like generalizations’. This argument underpins **interpretivism**. Business situations, a function of a particular set of circumstances and individuals, are complex and unique. This instantly diminishes the generalizability of research aiming to capture the ‘rich complexity’ of such situations. Then again, interpretivist researchers reckon that generalizability is not crucially important. Business organizations are subject to constant changes and today’s circumstance is not applicable in a few months’ time. Furthermore, if all organizations are unique, generalizability does not have much value anyway (Saunders *et al.*, 2003, p.84).

Saunders *et al.* (2003, p.84) state that the strongest argument for interpretivist philosophy, often associated with constructionism or social constructionism, is to discover what Remenyi et al. (1998:35; as cited in Saunders *et al.*, 2003, p.84) call ‘the details of the situation to understand the reality or perhaps a reality working behind them’. Interpretivism is needed to understand the subjective meanings motivating people to act the way they do in certain situations. Reality is viewed as socially constructed by Social constructionism. People may interpret the situations they find themselves in different ways. Their interpretations affect the way they behave or act in such situations. Their actions and behaviors may seem meaningful in context of these socially constructed interpretations and meanings. Interpretivists aim to understand the subjective reality of those interpretations to understand why people acted in the way they did under those situations. (Saunders *et al.*, 2003, p.84)
Realism rests on the foundation of the belief that there exists a reality independent of human thoughts and beliefs. In social sciences, especially in the study of business and management, realism is viewed as a philosophical stance which indicates the existence of large-scale social forces and processes affecting people’s interpretations and behaviors without the people being aware of such stimuli. External social objects and phenomena which may be independent of people can affect their perception of the world without them knowing it. Although realism may seem similar to positivism in the sense that they relate to the external, objective nature of some macro societal aspects, realism argues that people themselves are not study objects like those in natural science. Realism, when applied to the study of human subjects, “recognizes the importance of understanding people’s socially constructed interpretations and meanings, or subjective reality, within the context of seeking to understand broader social forces, structures or processes that influences, and perhaps constrain, the nature of people’s views and behaviors”. (Saunders et al., 2003, p.84-85)

Saunders et al (2003, p.85) say that there is no single “best” research approach. The main point is to find the answer to the research question. “The general principle is that the research strategy or strategies, and the methods or techniques employed, must be appropriate for the questions you want to answer” (Robson, 2002, p.80). Business and management research is most often a mixture of positivist and interpretivist with a tinge of realist. Our study is performed in a positivistic manner. We seek to find the answer to the question of whether there exists a stock exchange which offers the opportunity of earning abnormal returns on the stocks of Nordic cross-listed firms. In an efficient market, the price of the same stock should be the same regardless of where it is traded. In reality however, stocks of a cross-listed firm do not cost the same in all the stock exchanges they are traded in. We aim to answer our research questions with a yes or no based on the statistical test results of our collected data.

2.5.2. Ontological Foundations

Social ontology is concerned with the nature of social entities. The central issue is whether “social entities can and should be considered objective entities that have a reality external to social actors, or whether they can and should be considered social constructions built up from the perceptions of social actors”. These positions are called objectivism and constructionism. Objectivism asserts that social phenomena and their meanings have an existence that is independent of social actors while constructionism asserts that social phenomena and their meanings are continually being accomplished by social actors (Bryman and Bell, 2007, p.22).

We have chosen to take an objectivist perspective in our research. Our aim is to compare the prices of Nordic cross-listed stocks in different markets in order to answer our research question and our sub questions. This type of research fits very well with the objectivist approach since the prices we intend to compare are completely free from any type of bias. Objectivism is closely associated with quantitative studies such as ours whereas constructionism is closely associated with qualitative ones.

2.6. Research Approach
Gill and Johnson (1997, p.178) define theory as ‘a formulation regarding the cause and effect relationships between two or more variables, which may or may not have been tested’. Robson (2002, p.18) says quite the same but goes further saying, ‘a theory is a general statement that summarizes and organizes knowledge by proposing a general relationship between events - if it is a good one, it will cover a large number of events and predict events that have not yet occurred or been observed’. Theory may or may not be explicit in the research design but definitely in the finds and conclusions (Saunders et al., 2003, p.85). The extent to which researchers are clear and certain about the theory in the beginning of the research raises a crucial question about the research design. That is, whether the approach should be deductive/‘theory verification’, or inductive/’theory generation’ (Saunders et al., 2003, p.85; Robson 2002, p.62). In deductive approach a theory and hypothesis (or hypotheses) are developed and a research strategy is designed to test the hypothesis. Inductive approach involves collection of data and development of theory as the aftermath of data analysis (Saunders et al., 2003, p.85; Robson 2002, p.62). Though deductive approach is generally associated with the philosophical stance of positivism and inductive on the other hand with interpretivism, this must not always be the case. Saunders et al. (2003, p.85) reckon that labeling a research as for example positivistic simply because the research is deductive is “potentially misleading and of no practical value”.

**Deduction** is about testing theory. Deductive approach develops a theory which undergoes rigorous tests (Saunders et al. 2003, p.86). This approach is dominant in natural sciences where ‘laws provide the basis of explanation, permit the anticipation of phenomena, predict their occurrence and therefore allow them to be controlled’ (Hussey and Hussey, 1997, p.52)

Robson (1993, p.19) outlines the deductive/scientific approach in five sequential steps:

1. Deducing a hypothesis (a testable proposition about the relationship between two or more events or concepts) from the theory.
2. Expressing the hypothesis in operational terms (i.e. ones indicating exactly how the variable are to be measured) which propose a relationship between two specific variables.
3. Testing this operational hypothesis. This will involve an experiment or some other form of empirical enquiry.
4. Examining the specific outcome of the enquiry. It will either tend to confirm the theory or indicate the need for its modification.
5. If necessary, modifying the theory in the light of the findings. An attempt is then made to verify the revised theory by going back to the first step and repeating the whole cycle.

Gill and Johnson (1997, as cited in Saunders et al, 2003, p.86) emphasized the use of a highly structured methodology in deductive research to facilitate replication which is an important issue to confirm reliability. Saunders et al. (2003, p.86-87) mentioned three characteristics of deductive approach. First, to abide by the principle of scientific rigor, the researcher must be independent of what is being observed. Second, concepts ought to be operationalized in a certain way enabling facts to be measured quantitatively. Final characteristic of deductive approach is generalization.

The other major approach, namely the **inductive** approach, is one where the theory follows the data. Induction has its origin from the development of social sciences in 20th century when social scientists grew critical of deductive approach which established a cause-effect link between particular variables without paying any heed to how human beings interpret their social world.
Advocates of inductive approach criticize deductive approach because ‘of its tendency to construct a rigid methodology that does not permit alternative explanations of what is going on’ (Saunders et al. 2003, p.87). The sense of finality and certainty about the choice of theory and definition of the hypothesis do not allow development of alternative theory and even if there is the slightest chance it is limited within the highly structured research design (Saunders et al. 2003, p.87). Inductive approach pays much attention to the context in which events take place thereby making the study of a small sample of subjects plausible unlike that of deductive’s large sample size. Inductive researchers generally work with qualitative data and use various methods to collect these data to allow the establishment of different views of phenomena (Easterby-Smith et al., 2002; as cited in Saunders et al. 2003, p.88).

Easterby-Smith et al (2002, as cited in Saunders et al. 2003, p.88) suggested three reasons justifying the choice of research approach. First, it enables researchers to take a more informed decision about their research design. Research design is not only the method through which data is collected and analyzed but also the overall configuration of the piece of work. That is, what kind of evidence to be gathered and from where, and how this evidence is to be interpreted to answer the research question.

Second, it sparks researcher to think which research approach is appropriate for the for his/her work and which one are not. If he/her is interested is why something is happening than being able to describe what is happening, it makes more sense to adopt the inductive approach rather than the deductive.

Third, understanding of different research traditions enables the researcher to adapt his/her research design to contain/foam for the constraints. For instance, limited access to data, most probably for lack of knowledge in the subject area may simply hinder the researcher to formulate a hypothesis.

When researchers face dilemma about which research approach to adapt, Creswell (1994, as cited in Saunders et al., 2003, p.90) suggests looking into the nature of the research topic. This topic which has already been discussed widely in the literature, mostly leads researchers to define a theoretical framework and formulate a hypothesis resulting in a deductive approach. For a topic with little existing literature, maybe quite new and drawing much debate, it is more plausible to generate data and analyze and reflect on theoretical themes being reflected by the data.

Saunders et al. (2003, p.90) outlines three issues which dictates the research approach, time, risk propensity and audience. We have all three of these issues under consideration when deciding on research approach. Deductive research is quicker to complete, provided ample time has been devoted to setting up the study prior to data collection. Data collection is often based on ‘one take’ which is true in our case and time schedules can be predicted with accuracy. Inductive, on the other hand, may be lengthy due to the time it takes to collect data and analyze, and theory to emerge gradually. This takes researcher to another consideration, the extent to which he/she is prepared to take risk. There are some risks associated with deductive approach as well, like non-return of questionnaires. However with induction the researcher has to combat with the constant uncertainty of not finding any useful data patterns or emergence of theory. Lastly, there is the issue with audience. In Saunders et al.’s (2003, p.90) experience, most managers are familiar with the deductive approach and are quite more likely to believe in the conclusions resulting from this approach. Our audience is mainly investors, and we reckon they will prefer deductive approach and proving formulated hypotheses in
light of empirical evidence undoubtedly. Needless, to mention we have the time frame of one academic semester and not at all in any position to take risks. Ample research has been conducted in our subject area and there are already established theories. We identified a research gap in the Nordic market and we aim to contribute towards it through deduction from the theories and proving the hypotheses being realistic with more of positivism.

2.7. Research Strategy/Type of Research

Saunders et al. (2003, p.90) define research strategy as a general plan on how a researcher will go about answering the research question(s). Objectives derived from research question(s) will be clear, probable sources of data collection will be specified and also most likely constraints to be face while conducting the research have to be taken under consideration. Overall, the strategy must reflect that the researcher has thought carefully about why he/she will employer a particular strategy.

Saunders et al. (2003, p.91) outline seven strategies which researchers can consider to adapt. They are:

- **Experiment:** involves defining a theoretical hypothesis, sampling individuals from known population, allocating samples to different experimental conditions, introducing a planned change on one or more of the variables, measuring a small number of variable and finally establishing control of other variables.
- **Survey:** generally associated with deductive approach, involves collection of a large amount of data from a sizeable population in a highly economical way which are then standardized allowing comparison.
- **Case study:** ‘a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence’ (Robson 2002, p. 178)
- **Grounded theory:** data is collected without formulating an initial theoretical framework and then theory is developed from data. These data often generates predictions which are then tested in further observation to see whether the initial predictions have been right. Hussey and Hussey (1997; as cited in Saunders et al. 2003, p. 93) associate it with inductive/deductive approach.
- **Ethnography:** attached to inductive approach, with the purpose to interpret ‘the social world the research subjects inhibit in the way in which they interpret it’.
- **Action research:** the name suggests its ‘applied’ characteristic and is different from other forms of applied research because of its vivid focus on action and promoting change within an organization (Marsick and Watkins, 1997; as cited in Saunders et al. 2003, p. 94). Coghlan and Brannick (2001; as cited in Saunders et al. 2003, p. 94) said that its purpose is not just to describe, understand and explain the world but also to change it.
- **Time horizons:** splits in two strategies, cross-sectional and longitudinal. Cross-sectional is a ‘snapshot’ study of a particular phenomenon (or phenomena) at a particular time. Longitudinal study is more like a ‘diary’, spans over a period of time, studying change and development.
- **Exploratory, descriptive and explanatory studies:** Exploratory studies find out what is happening, seek new insights and ask questions and assess phenomena in new light (Robson 2002, p. 59). Descriptive study portrays an accurate profile of persons, events or situations (Robson, 2002, p. 59). Explanatory studies aim to establish causal relationships between variables.
However, the above strategies do not necessarily need to exist in isolation. They can be mixed and matched into a ‘multi-method’ study. This thesis follows the explanatory strategy, establishing a causal relationship between geographical location and abnormal returns on same class of cross-listed Nordic stocks. There also exists a longitudinal element as we will be working over a time horizon of 2002 to 2011. Another notable issue is, Bryman and Bell (2007) on one side and Saunders et al (2003) and Robson (2002) on the other side overlap research strategy and research type. Saunders et al (2003) and Robson (2002) recognize Exploratory, descriptive and explanatory studies as research strategies while Bryman and Bell (2007) regard those as types including a new type of research called predictive research.

Bryman and Bell (2007) outlines four types of research namely, exploratory research, descriptive research, analytical or explanatory research and predictive research. The type of our research is a mix of explanatory and a predictive research. We plan to establish an explanation for what is happening in a particular situation. That is when Nordic stocks are cross-listed, are the markets for those stocks offer an equilibrium price or are there significant price discrepancies across markets. Then we aim to generalize from the returns of stocks from different markets in three sub periods and we predict that these certain phenomena will repeat in future. Our recommendation will be strictly based on historical data of Nordic stock returns in different markets. We will also choose a base currency to reflect the returns and the criteria of the base currency will be historical stability.

2.8. Research Method

A very important consideration for any researcher is if he/she wants to do a quantitative- or a qualitative research. As the words indicate a quantitative research emphasizes quantification in the collection and analysis of data whereas qualitative research is more in depth and usually emphasizes words rather than quantification (Bryman and Bell 2007, p. 28). In our study we are collecting a large number of historical data in order to fulfill our purpose and answer our research question. We are confident that there is no need to look in depth in a qualitative manner in order to answer our research question. Furthermore, all our other choices (deductive, positivistic and objectivistic) are strongly connected with quantitative research.

2.9. Literature and Data source

Our research will use secondary sources such as databases, books, journals and websites. For our theoretical framework we use the Systematic review which is Positivistic and “Quantity” focused. The theory informs the search and synthesis is the research goal (Bryman and Bell, 2007, p.99-104).

We utilize books from Umeå University Library and several articles accessed from Business Source Premier which we are able to access since we are students of Umeå University. However, we have also used Google Scholar. All of the stock prices we use are taken from Thompson Reuters Datastream which is also accessed through Umeå University.

Using secondary data was the most feasible and plausible provided the nature of our study and research design. Moreover, this led to fewer resource requirements as they were readily available at the click of a button saving time and money (Ghauri and Gronhaugh, 2002; as cited in Saunders et al. 2003, p200; Bryman and Bell 2011, p.31-314) and also giving us the opportunity to analyze wide data set. We needed the data to answer our research question within the time frame of one academic
semester so secondary sources were undoubtedly the only viable alternative and made longitudinal studies feasible (Saunders et al. 2003, p.200-201; Bryman and Bell 2011, p.313-318). We got comparative and contextual data which can also result in unforeseen discoveries and the permanence of the data make our research findings more open to public scrutiny (Saunders et al. 2003, p.201; Bryman and Bell 2011, p.314).

Fortunately, our research is quite free from the disadvantages of secondary data cited in Saunders et al (2003, p.201-204). The data we gathered absolutely serves our need, is not difficult or costly to access, contain no unsuitable aggregations and definitions, initial purposes of those data and the way they have been presented do not cause any hindrance for us and we cannot really question its quality as it has been extracted from credible sources.

We believe our data will enable us to answer our research question and meet our objectives, and the benefits definitely outweigh the cost as they are made accessible to us free of charge.

The sources used in our research should definitely be considered trustworthy. All of the articles we have used from both Business Source Premier and Google Scholar are peer reviewed and written by authors with great insight in their respective fields of expertise. The stock prices used is also trustworthy since they are retrieved from Thomson Reuters Datastream - the world's largest financial statistical database (Thompson Reuters Datastream, 2012).

2.10. Reliability

Reliability refers to the consistency of a measure of a concept. There are three major factors to consider when measuring reliability: stability, internal reliability and inter-observer consistency. Stability concerns whether or not a measure is stable over time. A research with a high degree of stability will show little variation over time in the results obtained. Internal reliability concerns the consistency of the indicators that makes up a scale or index. If the indicators lack coherence the research is said to have a low internal reliability. Internal reliability can be measured in several different ways such as with the split-half method and with Cronbach’s alpha. Inter-observer consistency deals with the amount of subjective judgment incorporated in the research (Bryman and Bell 2007, p. 162-164).

2.11. Replication

Bryman and Bell (2007, p. 171) states that: “the results of a piece of research should be unaffected by the researcher’s special characteristics or expectations”. In order to check if a study complies to this, some researchers replicate each other’s studies. If other researchers fail to replicate your study, the validity of your study will be seriously challenged. Therefore researchers should aim to explain each step of the way in their procedures so that replication is possible.

All of the stock prices we intend to use will be taken from Thompson Reuters Datastream. This data is publicly available and therefore it is possible for other researchers to replicate our research. However, one limit to this is that the researchers have to have access to Datastream, which is not a costless resource. We were able to access this program through Umeå University’s subscription. Our findings our time-bound and researchers replicating our study will probably not arrive to the same results if they would chose a different time frame. The stock prices cited in Datastream are taken
directly from the stock markets and therefore it is possible to gain access to these numbers directly from the stock exchanges or from other reliable secondary sources.

2.12. Validity

Bryman and Bell (2007, p. 41) states that validity is in many ways the most important criterion of research - "Validity is concerned with the integrity of the conclusions that are generated from a piece of research". The main types of validity are measurement validity, internal validity, external validity and ecological validity. These categories are further divided in to several different subcategories.

Measurement validity is concerned with the issue of whether or not a measurement actually measures the concept that it is intended to measure. An example of this can be the issue of whether or not GDP truly measures the wealth of a country. Validity is divided in to several different categories: face validity, concurrent validity, predictive validity, construct validity and convergent validity. Any researcher who develops a new measure should make sure that it has face validity, that is, that the measure apparently reflects the content of the concept in question. In order to measure that concurrent validity the researcher needs to employ a criterion on which cases are known to differ and that is relevant to the concept in question. Predictive validity uses a future criterion instead of a simultaneous one to measure the validity. Construct validity encourages the researcher to deduce hypothesis from a theory that is relevant to the concept. Finally convergent validity is gauged by comparing researcher’s measures to other measures of the same concept developed through other methods (Bryman and Bell 2007, p. 164-166).

**Internal validity** relates to the issue of causality - “whether a conclusion that involves a causal relationship between two or more variables holds water” (Bryman & Bell, 2011, p. 41). The internal validity of an experiment is determined by the extent of control achieved in the study, that is the greater the control achieved, the higher the internal validity (Ryan, Scapens and Theobald 2002, p. 122). When the changes in the dependent variable have been brought about mainly by the independent variable changes and not by other confounding factors, the study is said to have a high internal validity (Ryan et al. 2002, p. 122-123). The results must arise as a result of the relationships between the variables and not as a result of the way the study has been designed. In a nutshell, the internal validity of an experiment determines whether valid conclusions can be drawn from a study (Ryan et al. 2002, p. 123). Threats to internal validity include: biased sample, survivorship biases (see, for example, Brown, Goetzmann and Ross, 1995, as cited in Ryan et al. 2002, p. 123), omission of reveland variables in a functional relationship, and measurement errors in the variables, regression towards the mean and maturity effects (Ryan et al. 2002, p. 123). The main question raised by internal validity: “how confident can we be that the independent variable really is at least in part responsible for the variation that has been identified in the dependent variable?”(Bryman and Bell 2011, p. 43). Ryan et al. (2002, p. 123) recommend to build sufficient controls to the research design to enhance the likelihood of drawing valid conclusions.

**External validity** concerns the question whether or not the “results of a study can be generalized beyond the specific research context” (Bryman & Bell, 2011, p. 42), that is, to other settings and samples (Ryan et al, 2002, p.123). Although a study will low internal validity will simultaneously implies low external validity, researchers have a choice to optimize one at the expense of another
(Ryan et al 2002, p. 123). Different researchers will tend to have different priorities between the two types of validity (Ryan et al. 2002, p. 123) depending on the nature of the research questions to be answered. Generally, in fundamental research internal validity is of prime importance, whereas in applied work, such as ours, external validity is more important (Ryan et al 2002, p. 123). Threats to external validity can be grouped into three broad categories.

First, population validity which is associated with the extent to which a researcher’s inferences drawn from the study of a specific population are justifiable. Researchers usually work with a sample of observations instead of the entire population. (Ryan et al. 2002, p. 123) However, in this research we are studying the entire population of Nordic cross-listed firms so population validity is not an issue for our research.

Second, time validity which is concerned with the extent to which results of a particular study at a point of time can be generalized to other periods of time (Ryan et al. 2002, p. 124). To enhance the time validity of our study we have decided to conduct our longitudinal study in three sub-periods of the most recent boom, recession to slump and recovery. Though the global economy is dynamic and business cycles repeat in more complex dimensions but we believe using the most recent past to answer our research questions is the most up-to-date approach at hand.

Third, environmental validity implies the extent to which the study results can be generalized across experimental settings. For financial research, international generalizability is a problem (Ryan et al. 2002, p. 124) and is true in our research as well. We do not claim that our study has international environmental validity but it sure is applicable for the Nordic region. Ecological validity concerns the question whether or not findings from business research have any application in people’s everyday, natural social settings. A high ecological validity implies that the researcher has intervened minimally in natural settings and avoided creating unnatural ones (Bryman & Bell, 2011, p. 42).

2.13. Chapter Summary
As mentioned in the introduction of this chapter, this chapter has included research philosophies, research approaches, research strategies, research methods and data collection methods available to conduct a research in the field of business administration. We have also discussed quality measures such as replicability, reliability and validity. We have thoroughly explained all these concepts and how they relate to our study. Furthermore we have argued for all the choices we have made on how to conduct our study.

We started the chapter by arguing for our choice of subject and continued it with stating our preconceptions. After this we included Saunders et al’s (2003) research onion and indicated each of the choices we made based on this figure. Thereafter we discussed the concepts of research philosophy divided into epistemological and ontological considerations. We chose to take a positivistic epistemological stand and an objectivistic ontological stand. Next, we turned to the research approach where we chose to do a deductive study. After that we explained the different kinds of research strategies. From this part we chose the explanatory strategy. Thereafter we explained the two different research methods; quantitative and qualitative methods. Our study is performed in a quantitative manner. Then we discussed which type of sources we will use to conduct our thesis. Our major sources are literature from Umeå library, data from Thompson Reuters
Datastream and articles from Business Source Premier and Google Scholar. In the last parts we discuss the concepts of reliability, replicability and validity. We also discuss how these concepts relate to our thesis and why our thesis should have a high degree on each of these concepts.

**Figure 1.2.:** Influences on business research
(Bryman and Bell, 2007, p. 30)

We conducted a quantitative research where our personal values and norms about how the stocks should react will not have any influence because we would base our conclusion strictly on statistical findings. Nevertheless, it is unlikely to be completely free of our values because our value influenced the choice of theories and our epistemological and ontological standpoints.

We chose the theories which seemed to be most relevant to the phenomenon we are researching. However, courses we took during our studies affected on the choice of theories which seemed relevant to us.

Practical considerations included the time span of one academic semester to formulate the research questions, conduct extensive literature review, formulate hypothesis, choose statistical tests and draw plausible conclusions to answer our research questions. If we had more time, we could have had a closer look on the costs of cross-listing for companies and transaction costs investors incur to buy from different stock exchanges. We could also look deeper into the behavioral finance issues connected with cross-listing.

A realist standpoint with more element of positivism forms the base of our epistemological foundation. We are objectivistic in our ontological foundation.
This model explains very well why we chose to do a quantitative research. We have chosen all the orientations associated with a quantitative research. The research we are doing could not have been performed in a qualitative manner since the basis of our thesis is existing data which we intend to draw conclusions from. Throughout our research we have kept a positivistic and objectivistic approach.
3. Theoretical Framework & Literature Review

Since this part of our thesis is quite extensive, we have divided it into six parts. We start of by giving the reader an introduction to some previous research on the efficiency of the Nordic markets as well as a brief overview of its history. Thereafter we present the fundamentals of stock markets and of our basic theory such as the efficient market hypothesis (EMH). The reason for including the EMH is that this theory and the theory of imperfect markets underpin the primary reason for cross-listing. After providing these fundamentals we explore the various reasons for companies to cross-list. We divide these reasons in to non-financial ones and financial ones. Thereafter we summarize the advantages and disadvantages of cross-listing. Then we provide empirical evidence from two of the most researched countries when it comes to cross-listing, the US- and German markets. Lastly we make a summary about everything included in this chapter.

3.1. Efficiency and History of the Nordic Market

Liljeblom, Löflund & Krokfors (1997) found significant increases in stock market co-movement among the Nordic markets. Regardless of this increase, their results indicate substantial benefits from international diversification for the Nordic countries (Liljeblom et al. 1997, p. 488).

In an earlier study Mathur & Subrahmanyam (1990) investigated the interdependencies among the Nordic and U.S. stock markets. Their study was done on four of the Nordic countries (Denmark, Finland, Norway & Sweden) and their results indicated that only Denmark was affected by the U.S. market. Far from surprising, the four Nordic markets had no influence on the U.S markets. Among the Nordic markets, the Swedish market had influence on the Norwegian- and Finnish market. The stock markets of Norway, Finland and Denmark had no influence on these three markets in question. The above stated result indicated that the four Nordic countries were less than fully integrated. However, they claim that investors may anticipate stock price changes in Finland and Norway by observing the Swedish market and perhaps achieve abnormal returns (Mathur & Subrahmanyam. 1990, p. 594-596).

Haavisto & Hansson (1992) investigated the potential gains from international diversification for different Nordic investor (Danish, Finnish, Norwegian & Swedish) investing in all the Nordic equity markets. They claim that investors might prefer to diversify within the Nordic market because of the similarities of these markets, such as common legislation, low trade barriers and similar which imply low transaction costs. They further claim that the industry diversity among the Nordic markets would add diversification benefits (Haavisto & Hansson. 1992, p. 581-582). Their study gave several interesting results. It showed that for a long-term investor, the exchange rate risk among the countries were negligible. Furthermore they showed that risk may be reduced by Nordic diversification. Thirdly their results indicated that the Nordic markets were segmented. Arguing from these results they claim that a long-term investor would have done very well by keeping an unhedged and diversified Nordic portfolio (Haavisto & Hansson. 1992, p. 588).

All of these studies are performed on the Nordic stock markets. However, we did not find any study which combined the area of cross-listing with the Nordic market. As mentioned earlier, not many studies have been performed on the Nordic markets in this field, and as visible in this part, most of the studies are outdated. The co-movement among the Nordic markets has increased since these studies were performed. For example, the launch of the OMX Nordic Exchange Brand introduced...
common presentation of Nordic listed companies and harmonized Nordic listing requirements. Below we show the history of the Nordic Stock Markets which gives a brief overview on the development of the Nordic Stock Markets and their gradual development into a more integrated market place.

**Table 3.1a History of the Nordic Stock Markets**

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1808</td>
<td>Copenhagen Securities Exchange (non-profit organization) starts trading.</td>
</tr>
<tr>
<td>1863</td>
<td>Stockholm Securities Exchange (Stockholms Fondbörs) founded.</td>
</tr>
<tr>
<td>1912</td>
<td>Helsinki Securities Exchange established.</td>
</tr>
<tr>
<td>1998</td>
<td>Merger of OM and Stockholm Stock Exchange -&gt; OM Group. The exchanges in Copenhagen and Stockholm entered into a strategic alliance named NOREX Alliance. The NOREX Alliance was unique by being the first stock exchange alliance to implement a joint system for equity trading and harmonize rules and requirements between the exchanges with respect to trading and membership.</td>
</tr>
<tr>
<td>2000</td>
<td>The Iceland Stock Exchange became a partner in the NOREX Alliance and moved its trading to the common trading system SAXESS later the same year.</td>
</tr>
<tr>
<td>2001</td>
<td>Common member and trading rules instituted in Nordic region. Oslo Bors moved its share trading to the NOREX Alliance's common trading system SAXESS.</td>
</tr>
<tr>
<td>2002</td>
<td>HEX becomes major shareholder of RSE Group ICEX.</td>
</tr>
<tr>
<td>2003</td>
<td>Merger of OM and HEX Group -&gt; OMHEX (HEX Group = HEX and Finnish Central Depository)</td>
</tr>
<tr>
<td>2004</td>
<td>Finnish and Swedish Central Securities Depositories (APK and VPC) merge to form NCSD, which later becomes a part of Euroclear Group. OMHEX brand name changed to OMX. Implementation of joint trading platform on all Nordic exchanges.</td>
</tr>
<tr>
<td>2005</td>
<td>Merger of OMX and Copenhagen Stock Exchange. Alternative market First North started. Foreign equities listed for the first time on ICEX.</td>
</tr>
<tr>
<td>Year</td>
<td>Event</td>
</tr>
<tr>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>2007</td>
<td>NASDAQ acquires OMX and the NASDAQ OMX Group is born.</td>
</tr>
<tr>
<td>2009</td>
<td>NASDAQ OMX Stockholm opens for trading in the most turnovered Norwegian shares.</td>
</tr>
<tr>
<td>2010</td>
<td>NASDAQ OMX launches common INET trading platform across its seven Nordic and Baltic equity markets.</td>
</tr>
</tbody>
</table>

(NASDAQ OMX, 2012).

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1819</td>
<td>The Christiania exchange (present day Oslo Boers) had three brokers and 234 trading businessmen.</td>
</tr>
<tr>
<td>1881</td>
<td>Stocks and shares are added to the exchange’s lists, and prices are set for securities, which includes 16 bonds and 23 shares, including Norges Bank.</td>
</tr>
</tbody>
</table>

(Oslo Bors, 2012).

### 3.2. Fundamentals of stock markets & basic theory

Foreign stock listings, information technology and decreases in costs and restrictions have all helped to globalize the stock markets (Madura, 2001, p. 263). The merger of Stockholm, Helsinki, Copenhagen and Iceland’s stock exchanges into NASDAQ OMX Nordic can be seen as a good example of this globalization. Madura (2001) explains that international trading traditionally have been limited by three barriers: transaction costs, information costs and exchange rate risk. However, these barriers have now been greatly reduced.

#### 3.2.1. Efficient Market Hypothesis

Buckley (2004, p. 736) defines an efficient market as “A market in which there is a sufficiently large number of buyers and sellers to eliminate an incentive for arbitrage transactions, and in which the trade-off between return and risk is fully reflected in prices”.

Like other great ideas, the concept of efficient capital markets emerged from a chance discovery (Brealey et al. 2006, p. 333). Kendall (1953, as cited in Brealey et al. 2006, p. 333) studied the behavior of stock and commodity prices expecting to find a regular pattern of price over a period of time but that did not seem to exist. Each series turned out to be a “wandering one”, like every week the “Demon of Chance drew a random number…and added it to the current price to determine the next week’s price”. Stock and commodity prices appeared to be following a random walk (Brealey et al. 2006, p. 333). By random walk Kendall (1953, p.11) implied that prices changes were independent of one another. Fama (1965, p. 59) finds evidence supporting random walk theory saying that analysts/chartists are more like astrologers and cannot predict future prices based on historical prices unless they can consistently prove that their predictions are right.
Then again, what if random walk was not the case and we could see that there was actually a tendency of a stock to rise based on the rising trend over one week. In that case, investors would rush to buy the stocks, inflating its price further until the stocks offer a “normal rate of return (Brealey et al. 2006, p. 336). The point is whenever a cycle becomes apparent, investors eliminate it immediately by trading (Brealey et al. 2006, p. 336). That is arbitrage (see 3.2.4. Arbitrage) which will “rapidly eliminate any profit opportunities and drive prices back to fair value” (Brealey et al. 2006, p. 349). Advocates of behavioral finance may agree that there are no easy profits, but counterpoint that arbitrage is costly and often ‘slow-working’, so the prices do not always reflect the fair value and there will be deviations from fair value (Brealey et al. 2006, p.349).

In competitive markets, today’s price of stock must already reflect the information in past prices. However, if markets are competitive, the prices should reflect all the information available to the investors. In that case, stocks could be fairly priced and returns would be unpredictable (Brealey et al. 2006, p.337). Bodie, Kane and Marcus (2009, p. 11) explain the efficient market hypothesis (EMH) as the notion that stocks already reflect all available information. EMH can be divided into three levels, the weak-, the semistrong- and the strong form, depending on the degree of information reflected in stock prices in each level (Fama 1970, Brealey et al. 2006, p.336, and Bodie, Kane and Marcus 2009, p.348).

**Weak Form:**
This version states that stock prices already reflects all information that can be derived by examining market trading data and that trend analysis therefore is of no use. Market trading data includes history of past prices, trading volumes and short interest. In this hypothesis, past stock data are publicly available and virtually costless to obtain. This theory holds that, if such data ever indicated reliable predictions regarding future performance, all investors would already have learned to exploit these predictions (Fama 1970, p.414; Bodie et al. 2009, p. 348 and Brealey et al. 2006, p.337).

**Semistrong Form:**
The semistrong form takes matters one step further and states that all publicly available information, such as those which can be gathered from reading financial press, regarding the prospects of a firm must be reflected in the stock price. In addition to market trading data this also includes: fundamental data on the firm’s product line, quality of management, balance sheet composition, patents, earnings forecasts and accounting practices. If investor have public access to this information, it should be reflected in stock prices (Fama 1970, p.414; Bodie et al. 2009, p. 348-349 and Brealey et al. 2006, p.337).

**Strong Form:**
Finally we arrive at the strong form, which is the most extreme version in the EMH. This hypothesis claims that stock prices reflect all information relevant to the firm, not only the publicly available information (Fama 1970, p.414). In this form, insider trading is not possible since even information available only to company insiders is reflected in the stock price (Bodie et al. 2009, p. 349). Both lucky and unlucky investors can be observed in this form but there is no superior investment manager who can consistently beat the market (Brealey et al. 2006, p.337).

Bodie et al. (2009) concludes that markets indeed are very efficient but that it is possible to earn money with superior information or insight. However, they claim that the bulk of evidence suggests
that continuous superior returns are virtually impossible since “the easy pickings have been picked” (Bodie et al. 2009, p.375).

3.2.2. Lessons of market efficiency:
Brealey et al. (2006, p.349) give suggestions to managers which also should be applicable for investors. That is, to start by accepting the idea that “there are no free lunches to be had on Wall Street”. They outline six lessons of market efficiency:

Lesson 1: Markets Have No Memory
The weak form of the EMH suggests that the pattern of last price cycles do not have anything to do with future prices. Economists suggest this when they say markets have no memory but in practice managers’ actions nullify such notion. Asquith and Mullins (1986, as cited in Brealey et al. 2006, p.349) find that managers prefer to issue equity over debt after an abnormal market rise to catch the market while it is high and vice-versa. Baker & Wurgler (2000, p.2249) find that firms tend to prefer equity financing before periods of low returns and prefer debt-financing, before periods of high returns. A narrow statistical perspective may suggest that the equity share in new issues is stronger and more robust than other known predictors of one-year-ahead market returns but Baker & Wurgler (2000, p.2249) find no empirical support for any specific mechanism which can link the equity share to subsequent returns even in an efficient market. They believe that stock market as a whole may be inefficient and that managers “exploit this inefficiency with their financing decisions”. In effect, the equity share often signals significant negative returns on the market (Baker & Wurgler 2000, p. 2249)

Lesson 2: Trust Market Prices
Prices of securities includes all available information about the value of each security and it is recommended to trust the market prices because most investors cannot constantly beat the market earning superior rates of return. If one wants to do so, he/she needs to know more than everyone else, that is all the market players. It will not be prudent of managers to think them smarter than the rest and commit mistakes being over-confident. (Brealey et al. 2006, p.350). Trusting the market prices while taking investment decisions is thus undoubtedly safer.

Lesson 3: Read the Entrails
Prices impound all available information in an efficient market, so anyone who can read the entrails, security prices can tell a lot about future to him/her. For instance if a company’s bonds are offering higher yield than the average, it signals that the company is in or most like to be in financial distress soon. Also, differences between long-term and short-term interest rates reflect investors’ expectations on future short-term rates. (Brealey et al. 2006, p. 350-351)

Lesson 4: There Are No Financial Illusions
In efficient market investors cannot be misled with ‘creative accounting’, that is, the use of accounting methods which stabilize and increase reported earnings. Investors are aware of the firm’s cash flows and the part of those they are entitled to. Investors can look behind the figures and understand what value the management has added to their wealth. (Brealey et al. 2006, p. 352)

Lesson 5: The Do-It-Yourself Alternative
Investors in an efficient market will not pay others for what they can achieve themselves. Managers cannot justify a merger saying that it stabilizes the firm and allows diversification because investors find it easier and cheaper to diversify their portfolio just by buying stocks of the two firms. The same is the argument for issuing debt to leverage the firm because investors can have the same effect borrowing in their own accounts. The question is, can the company reap a greater diversification effect cheaper than investors can or is the company in a better position to raise debt cheaper than investors? (Brealey et al. 2006, p. 352-353)

Lesson 6: Seen One Stock, Seen Them All
Brealey et al. (2006, p. 349) compares demand elasticity of stocks to be very close to coffee. Investors do not buy a stock for its unique quality but they buy it to earn a fair rate of return. It does not matter which company it is but if the prospective return is low, no one will buy it but if the return is expected to be high, investors will flock to it. On the flip side, Honghui, Noronha, and Singal (2004, p. 1928) studying the aftermath price impact of firms being added or deleted from S&P 500, find evidence questioning the validity of the downward sloping demand curve hypothesis, the information hypothesis, and the liquidity hypothesis which predict a symmetric response. They find an increased awareness for added stocks as investors learn about them but little or no impact on the awareness when stocks are deleted.

Brown (2011, p. 93-94) concludes that economists in general and financial economists were “blinded by an irrational faith in a discredited EMH and failed to see the bubble in asset prices and to give due warning of its collapse.” In theory the strong implication of EMH is that nobody, no practitioner, no academic and no regulator had the ability to foresee the credit-crunch/global recession of 2008. Brown (2011, p. 93) goes on to say that an unrealistic competitive equilibrium scenario implies the EMH but the EMH by itself does not imply anything about competitive equilibrium in the capital markets. The issue is not whether the hypothesis is true or false, but whether it is sufficiently true to serve as a practical benchmark for money manager performance. That is, depending on the degree of efficiency to what extent can investors trust or get signal from particular kinds of announcements to estimate the measures of equity risks. Sophisticated investors can always make money by exploiting the small and transient ways in which the markets deviate from the EMH, but small and otherwise uninformed investors may as well assume that the hypothesis is literally true. In our study we plan to find out the degree of market efficiency for same stocks listed in different stock exchange and is they any possibility for even the small and uninformed investors to earn abnormal returns solely based on investing in at cross-listed stock at a certain stock exchange based in a particular geographic location.

3.2.3. Market Imperfections

Market imperfection is the opposite of market efficiency. If we question the reason behind the inception of MNCs the answer is simply to exploit the market imperfections around the globe and reap the absolute benefits of diversification (Agmon & Lessard, 1977, p. 1049-1050). That way, just buying the stock of such MNC would give a diversified portfolio to the investor. Why would the investors need to think about investing in the capital markets of different countries then? The MNC on the shareholders’ behalf had already spread the risk by operating in different markets. Nevertheless, the prices of same class of stock of a certain company are not the same on a given
date. They may be quite close but not exactly the same. Arbitrage poses to remove market imperfections and restore efficiency.

3.2.4. Arbitrage

So far we have seen that no market is perfectly efficient. All markets contain imperfections, even though the amount and the degree of imperfections can vary substantially in between markets. Cohen and Winn (2007) write about four different types of market inefficiencies: inefficient firms, the existence of externalities, flawed pricing mechanisms and imperfectly distributed information (Cohen and Winn 2007, p. 38-43). Arbitrage is generally defined as ‘the simultaneous purchase and sale of the same assets or commodities on different markets to profit from price discrepancies’ (Shapiro 2010, p. 143). The concept of arbitrage is vital to international finance because numerous relationships between domestic and international financial markets, exchange rates, interest rates and inflation rates depend on arbitrage for their existence. In fact, arbitrage links markets and thus responsible for the globalization of markets. (Shapiro 2010, p. 143)

In competitive markets consisting of several willing buyers and sellers, if an individual or a group of individuals have low-cost access to information, exchange-adjusted prices of identical tradable goods and financial assets, then the transaction costs incurred to buy identical items must made the total cost equal worldwide. This is one of the main ideas of international finance originating from arbitrage or termed as the law of one price when international arbitrageurs following profit-guaranteeing dictum of “buy low, sell high” managers to prevent all but negligible deviations from equality. If markets were not imperfect, risk-adjusted returns on financial assets on different markets should be the same. (Shapiro 2010, p. 143)

Stein (2009, p. 1543) finds that sophisticated professional investors are playing a more dominant role in financial markets than they used to. When he questions whether this form of progress will ultimately help to make markets more efficient he does not find any absolute answer rather concludes saying that answer lies on what happens in future.

3.2.5. Equity home bias puzzle

Athanassakos et al (2010, p. 246) say that in a frictionless world, investors optimally diversify their investment portfolios across markets based on the risk characteristics of the stock. In this case, the location of trade should be irrelevant. Yet, the empirical evidence suggests that investors do not diversify their portfolios internationally and, instead, exhibit a preference for domestic equities or those located close to home. Familiarity with proximate firms may explain the home equity bias (Coval and Moscovitz, 1999; Huberman 2001; Ackert, Church, Tompkins, and Zhang, 2005 as cited in Athanassakos et al. 2010, p.246).

Strong and Xinzhou (2003, p. 307) and Bodie, Kane and Marcus (2009, p. 871-872) argue that though the potential benefits of international equity diversification are well known, investors repeatedly fail to exploit these benefits by preferring to concentrate their investments in the equities of their home country. In practice, portfolio investors ‘notoriously overweight’ home-country stocks against a neutral indexing strategy and underweight, or totally ignore foreign equity. Bodie et al
(2009, p. 872) terms this as home-country bias. Strong and Xinzhong (2003, p. 312) find similar evidence that fund managers show significant relative optimism towards their home equity market. Although a relative optimism, as opposed to an absolute optimism, cannot on its own explain the excessive preference for domestic equities, it sure does imply a bias towards domestic equities and a relative bias against foreign equities. This is reflected through investment portfolios biased towards domestic equities. U.S. investors’ equity portfolios include 98% of domestic equities, while U.S. market consists of 36.4% of the world equity market capitalization (Strong and Xinzhong 2003, p. 307). Nevertheless, their results contribute towards an explanation of the equity home bias puzzle.

3.2.6. International Investment and Diversification

MNEs manage portfolios of foreign cross-listings, which enables them to raise capital from investors located in a variety of foreign markets and, therefore, effectively spread the risk of foreign investing over several geographic locations. Foreign cross-listings expose MNEs to a variety of external environment factors, such as diverse political, economic, financial, etc. conditions that can also affect firm performance. (Banalieva & Robertson 2010, p. 532)

Characteristics of the firm is a potential explanation for cross-listing gains. Investors are attracted to stocks with different risk characteristics because these stocks provide the opportunity for further diversification of risk and superior performance (Sarkissian and Schill, 2004 as cited in Athanassakos et al., p246)

Investing in other countries than one’s native country provides many opportunities but it also creates several risks. All investors face risks such as country risk, transaction risk and economic risk. However, an international investor faces other risks such as exchange rate risk, transaction risk and translation risk in addition to the above mentioned ones. Nevertheless, the benefit of international investments is that the investor is actually reducing his/her overall risk by diversifying his/her portfolio. The basic idea is that if one market performs poorly it is not a disaster since the other investments will hopefully counterbalance this loss. In an efficient market the investor can trust prices since they include all available information of each security. If the market is efficient, our hypothesis that investors can earn extra profits by choosing the optimal market fails (Brealey, Myers and Allen, 2006).

For the firm’s home investors, cross-listing signals the quality of the firm through its ability to meet the international listing requirements. Such a positive signal encourages home investors to trade the firm’s shares. (Abdallah et al. 2011, p. 589)

Gagnon & Karolyi (2009) discuss about spillover effects on stocks due to high-trading volume in US. Price changes in conjunction with trading volume innovations observed in the home market (U.S. market) are more likely to spill over into the other market when U.S. (home) market investors are subject to more, rather than less, information asymmetry. Their findings also reveal that interactions of international stock return co-movements with volume shocks exhibit sensitivity to market frictions like transactions costs and foreign ownership restrictions (Gagnon & Karolyi, 2009, p. 983).
3.2.7. Foreign Exchange Markets

The total world foreign exchange market is the largest of all markets on Earth, moreover it is also the cheapest market in the world in which to deal. London is the largest center of foreign exchange followed by New York. Most of the foreign exchange markets have no individual, physical market place. Instead, the market is made up of banks and dealers making transactions through telephone and other telecommunication devices. To an unversed person, the word foreign exchange might simply be associated to the foreign exchange individuals require for travel or holiday purposes. However, these type of customers represents an insignificantly small part of the whole market. The actual major players in this market are: commercial banks, central banks, foreign exchange brokers, investment funds, corporations and high-net-worth individuals. Between 90-95 % of all foreign exchange transactions involve banks and around 90 % of all trades involve the US dollar (Buckley 2004, p. 11-12).

We chose to include some basic information about this market since it has major impact on the net return earned by an international investor. To investigate the impact of foreign exchange on returns from different stock exchanges, we perceive the return and price both from the home country currency and through special drawing rights (SDRs).

3.3. Reasons for companies to cross-list

*Here we cite the factors that motivate cross-listing phenomenon. We sub-categorize the reasons into two parts, Financial and Non-financial.*

3.3.1 Financial perks of Cross-listing

3.3.1.1 Lower Cost of capital

Issuing equity in different capital markets enhances the financial flexibility of the firm, getting access to a wider range of investors and capital in other currencies (Buckley 2004, p. 562). The choice of the stock exchange depends on the highest price the firm can earn, net of issuance costs, which is usually a country where required rate of return is lowest (Buckley 2004, p. 562). Financial flexibility coupled with low required rate of return reduces the overall cost of capital for the firm.

Countries’ institutional frameworks play a vital role for access to finance and equity valuations (e.g., La Porta, Lopez-de- Silanes, Shleifer, and Vishny, 1997, 2002 as cited in Hail & Leuz 2009, p.428). Coffee (1999, as cited in Hail & Leuz 2009, p.428) and Stulz (1999, as cited in Hail & Leuz 2009, p.428) suggest cross-listing in the U.S. as a way for firms from countries with poor institutions to overcome these shortcomings.

Hail & Leuz (2009, p.449) find strong evidence firms’ costs of capital decreases significantly when they are cross-listed on U.S. exchanges. Hail & Leuz (2009, p.450) find no evidence that Sarbanes-Oxley has diminished the benefits of U.S. cross-listings. However, they have not found similar cost of capital effects for listings on the London Stock Exchange. Firms from countries with weak disclosure regulation and weak protection of outside investors against self-dealing by corporate
insiders benefit the most from cross-listing on U.S. exchanges nonetheless. (Hail & Leuz 2009, p. 450)

Marr, Trimble, & Varma’s (1991, p.20) evidence is consistent with previous research which shows that stock prices decline on the announcement of domestic-equity offerings. However, after controlling for characteristics of firms choosing to finance with Euroequity, they find that the negative stock-price responses are proportionately smaller for Euroequity issues the larger the proportion of the issue financed offshore. These findings support the hypothesis that new financial instruments that reduce effective barriers to investment across national borders allow firms to capitalize on profitable financing opportunities in overseas markets. (Marr, Trimble, & Varma 1991, p.20)

3.3.1.2. Cross-listing premium

Doidge et al. (2004, as cited in Daugherty & Georgieva 2011, p. 219) define the cross-listing premium as “the increase in Market-to-Book for cross-listed foreign firms compared to non cross-listed foreign firms.” You, Parhizgari, & Srivastava (2012, p.214) find that foreign listing is associated with positive listing premium, followed by immediate positive abnormal returns and subsequently negative abnormal returns, while delisting is associated with negative returns, and weak evidence of being followed by positive returns. The premiums or loss, associated with both the listings and the delistings, are temporary and do not affect the stock valuation permanently. We find that market risk increases and decreases after listing and delisting, but this effect is not statistically significant.

Honghui, Noronha, and Singal (2004, p. 1928) document an asymmetric price effect surrounding the additions and deletions from S&P 500 index. Addition leads to a permanent positive price increase, but there is no decline for deleted firms. Their results posit support towards the investor recognition hypothesis in the sense that increased investor awareness following inclusion in S&P 500 leads to enhanced monitoring by investors, a reduction in information asymmetry component of the bid-ask spread, improved access to capital markets, and a reduction in Merton’s (1987) cost of under-diversification. However, the expected negative impact following deletions is negligible or nonexistent.

3.3.1.3. Investor recognition hypothesis and ask-bid spread

Merton (1987, p. 499-504) demonstrates that variation in the levels of investor recognition of a firm security influences stock prices. Merton (1987, p. 500) states that, “ceteris paribus, an increase in the relative size of the firm’s investor base will reduce the firm's cost of capital and increase the market value of the firm.” The magnitude of the effect will be greatest for lesser-known firms and for firms with large firm-specific variances. Therefore managers of the firm have an incentive to expand the firm's investor base. Merton’s (1987, p. 502) analysis suggests that expansion in the firm's investor base and increases in investment by the firm will tend to coincide. If exogenous events cause the investor base of the firm to expand, then the firm's cost of capital will fall which will make it optimal for the firm to increase its investment. If some other events inspire the firm to increase investment, then usually, the
firm will also want to increase its investor base. In both cases, the need for additional capital for new investment will often urge the firm to issue new securities.

Merton (1987) suggests an investor recognition hypothesis, based on his model of capital market equilibrium with incomplete information. According to Merton (1987), investors only buy stocks of which they are aware of because they do not have equal/full information about other stocks. Ceteris paribus, an increase in the ‘investor recognition’ factor, that is, in the number of investors aware of a firm, lowers investors' expected return by reducing the "shadow cost" of not being aware about a security, and hence increases the market value of the firm's shares. Thus managers prefer to cross-list to reduce this shadow cost (Baker, Nofsinger, & Weaver 2002, p. 495-496).

Foerster and Karolyi (1999, p. 1008-1010) find that non-U.S.firms cross-listing shares as American Depositary Receipts (ADRs) on U.S.exchanges earn cumulative abnormal returns of 19% during the year before listing, and a further 1.2% during the listing week but incur a loss of 14% during the year following listing. The unusual price changes are related to an increase in the shareholder base and the amount of capital raised. There is however a subsequent falls in returns as predicted by Merton (1987). Their tests support the market segmentation and investor recognition hypotheses.

Amihud, Mendelson, and Uno (1999, p. 1182-1183) study a unique feature of the Japanese equity market where companies are at a liberty to reduce the minimum trading unit (or lot size) of their stock. They find that this enhances liquidity and leads to an increase in the number of shareholders and stock prices. They also document evidence supporting Merton’s (1987) investor recognition hypothesis finding that stock price appreciation is positively and significantly associated with the increase in the stock’s investor base.

Honghui, Noronha, and Singal (2004, p. 1928) document an asymmetric price effect surrounding the additions and deletions from S&P 500 index. Addition leads to a permanent positive price increase, but there is no decline for deleted firms. Their results posit support towards the investor recognition hypothesis in the sense that increased investor awareness following inclusion in S&P 500 leads to enhanced monitoring by investors, a reduction in information asymmetry component of the bid-ask spread, improved access to capital markets, and a reduction in Merton’s (1987) cost of under-diversification. However, the expected negative impact following deletions is negligible or nonexistent. You et al. (2012, p.214) provide some support to by concluding that the relation between the pre- and post-event abnormal returns (ARs) and between the listing and delisting shows that market overreactions exist for foreign listings but not for foreign delistings.

Bodnaruk and Ostberg (2009, p.225) using a comprehensive database of Swedish stock holdings find that shadow cost of incomplete information is positively associated with returns. Plus, firms with low levels of investor recognition offer significantly larger returns than high-investor-recognition firms. They also find that shareholder base is negatively related to returns when controlling for the size and idiosyncratic risk. Zero-cost trading strategies based on shadow cost earn substantial profits that can be explained by a four-factor model. Their evidence concludes that investor recognition matters and is in favour of the investor recognition hypothesis over segmentation.
Chen and Chow (2011, p. 180 & 188-189) analyze trading activities relating to 208 IPO firms obtained from the transaction record database of the Taiwan Stock Exchange and find that an increase in the investor base can reduce the shadow costs and hence increase the value of the firm.

Kadlec & McConnell (1994, p. 611) document the effect on share value as a result of listing on the New York Stock Exchange and report the results of a joint test of Merton's (1987) investor recognition factor and Amihud and Mendelson's (1986) liquidity factor as explanations of the change in share value. Their findings are consistent with the predictions of the "superior liquidity" hypothesis and the findings of Klemkosky and Conroy (1985, as cited in Kadlec & McConnell 1994, p. 623), concluding that average absolute and relative bid-ask spreads are smaller following listing than before. On average, from before to after listing, stocks experience a 5 percent reduction in their absolute bid-ask spread and a 7 percent reduction in their relative bid-ask spread from before to after listing (Kadlec & McConnell 1994, p. 623) They also find that during the 1980s stocks, on average, earned abnormal returns of 5 to 6 percent in response to the announcement of listing on the NYSE, listing is associated with a 19 percent increase in the number of registered shareholders, and a 27 percent increase in the number of institutional shareholders.

Kadlec & McConnell’s (1994, p. 634-635) cross-sectional regressions reflect that investor recognition is a source of value from exchange listing and, therefore, support Merton's (1987) model. Controlling for changes in bid-ask spreads, firms which manage to increase their number of shareholders after a listing exhibit the greatest increase in stock price in response to the listing announcement.

There have been a number of studies predicting a relation between Merton’s asset pricing factors and the size of the ask-bid spread (Amihud and Mendelson 1989, as cited in Kadlec & McConnell 1994, p.628). Demsetz (1968, as cited in Kadlec & McConnell 1994, p.628) finds the larger the number of shareholders, the smaller ask-bid spread gets. Stoll and Whaley (1983, as cited in Kadlec & McConnell 1994, p.628) report that the greater the firm size, the smaller is the bid-ask spread. Kadlec & McConnell (1994, p.628) find empirical evidence that on average, exchange listing is associated with a decline in the security's bid-ask spread.

**3.3.1.4. Earnings management and cross-listing**

Lehavy and Sloan (2005, as cited in Ndubizu 2007, p. 1009-1010) posits that corporate events such as exchange listings increase investor recognition of a firm. They confirm a positive association between investor recognition and contemporaneous stock returns. Bradshaw et al. (2006, as cited in Ndubizu 2007, p. 1009-1010) find similar valuation benefits using analyst data in the sense that analysts set higher prices for firms raising new financing through cross-listing, an event that increases investors’ recognition. Lang, Lins, and Miller (2003, as cited in Ndubizu 2007, p. 1009-1010) find that firms cross-listing on U.S. exchanges have greater analyst coverage and increased market valuations. These benefits of cross-listing are likely to improve when firms time listing to a window of opportunity (period of high earnings) or manage earnings at the cross-listing period. Alford et al. (1993, as cited in Ndubizu 2007, p. 1009-1010) and Lang et al. (2006, as cited in Ndubizu 2007, p. 1009-1010) argue that firms have a tendency to manage earnings at the cross-listing period. Ndubizu (2007, p. 1009-1010, maybe refer to the whole article) investigates on whether firms manage earnings at cross-listing or cross-list exploit a window of opportunity.
Reporting less transparently allows foreign firms to manage earnings (Reese and Weisbach 2002, and Lang et al. 2006, as cited in Ndubizu 2007, p.1009-1010). This is why the SEC requires firms issuing an IPO at the time of cross-listing to comply with U.S. GAAP and Regulation S-X in Form 20-F, Item 18. The Committee of European Securities Regulators (CESR) considers International Financial Reporting Standards (IFRS) to be equivalent to U.S. GAAP. However, CESR does not accept the Item 18 requirements and the mandated reconciliation required in Item 17 for cross-listing existing home-country shares. The difference between the approaches of the SEC and CESR put forward their view on earnings management as an effect of cross-border listing. As the SEC requires more accounting transparency from IPO firms than from non-IPO firms, it does not allow the IPO firms an opportunity to manage earnings at the cross-border year. Foreign firms show reluctance to comply with the more-transparent Item 18 because they fear of revealing aggressive revenue recognition, hidden reserves, or a substantially underfunded pension plan (Frost and Kinney 1996, as cited in Ndubizu 2007, p.1009-1010).

Harris and Muller (1999, as cited in Ndubizu 2007, p. 1013) have used both price and return-valuation models and found that the U.S. GAAP earnings of cross-border firms are related to their market value. Lang, Lins, and Miller (2003, as cited in Ndubizu 2007, p. 1013) have found that cross-border firms tend to have better analyst coverage, which is associated with higher market valuations. Similar evidence have been provided by Amir et al. (1993, as cited in Ndubizu 2007, p. 1013) and Barth and Clinch (1996, as cited in Ndubizu 2007, p. 1013) where earnings reported by cross-border firms on Form 20-F relate to their stock market performance. Lang et al. (2006, as cited in Ndubizu 2007, p. 1013) have used both share prices and the proportion of small positive earnings to find that the reconciled accounting data of Form 20-F, Item 17 are less informative and more prone to earnings management toward a target than that of the control firms. In addition, Lang, Ready, and Yetman (2003, as cited in Ndubizu 2007, p. 1013) have found that cross-listing firms do not manage earning as aggressively as noncross-listing firms in their local home markets. Putting these together, it is evident that accounting measures of performance affect the stock prices of cross-border firms and transparency limits the opportunity for earnings management.(Ndubizu 2007, p. 1013)

Teoh et al. (1998, as cited in Ndubizu 2007, p1013-1014) report that a sample of IPO firms rather than a non-IPO sample tends to have income-increasing depreciation policies and bad debt allowances in the IPO year. They come to a conclusion that firms with unusually high accruals in the IPO year engage more in earnings management than other firms. As a whole, these studies suggest that the peak in earnings at the time of an IPO is because of managers’ incentives to improve stock prices and reduce the cost of capital. As the decision to go public is quite the same as to cross-listing, these incentives should exist for firms that cross-list. Thus, results from prior studies signal that managers of cross-listed firms have incentives to manage earnings upward or cross-list in periods of high performance. (Ndubizu 2007, p. 1013-1014)

3.3.2. Non-financial perks of cross-listing

3.3.2.1. Overcoming Capital Market Segmentation

Moreover, this mechanism of backing up higher price and lowering cost of capital help curb the mispricing in an illiquid, segmented, home capital market. Regulatory complications in the form of queuing procedures on capital issues or restrictions on the issue of certain kinds of paper are avoided in Euroequity allowing the firm to raise capital from deeper capital markets. (Buckley 2004, p. 563)

Banalieva & Robertson (2010, p. 544) warn managers that though cross-listing on several stock exchanges worldwide with very different corporate governance rules may, indeed, diversify the portfolio from adverse macroeconomic shocks, there is also the possibility of having a detrimental effect on firm performance. Banalieva & Robertson (2010, p. 544) suggest that MNE managers should consider cross-listing on multiple but institutionally similar foreign stock exchanges for optimal financial results. They also find that most Triad MNEs preferred Germany as a top cross-listing destination which seems to negate the regionalization hypothesis (Rugman & Verbeke, 2004; as cited in Banalieva & Robertson 2010, p.544) at the foreign cross-listing level. The regionalization hypothesis suggests that the world’s largest MNEs generate most of their revenues from their home regions (Rugman & Verbeke, 2004, as cited in Banalieva & Robertson (2010, p. 544). Banalieva & Robertson (2010, p. 544) showed that it is common for MNEs to raise capital globally.

3.3.2.2. Prestige and increase in stock value

Presence in various capital markets adds to the prestige of the company, increasing its visibility, getting its name recognized (Madura 2003,p. 86; and Madura 2001, p. 263) in international banking circles and may also earn some benefit on sales (Buckley 2004, p. 563).

Baker, Nofsinger, & Weaver (2002, p. 516-517) confirm that an international listing on either the NYSE or the LSE increases firm’s visibility considerably. They however find that the mean visibility increase is significantly larger for cross-listing on the NYSE than on the LSE. Upon examining weekly abnormal returns, they find a return pattern for both NYSE and LSE listed firms consistent with a reduction in the cost of capital following listing. This contributes to support Merton's investor recognition hypothesis.
3.3.2.3. Strategic Interests

Moreover strategic interests are also served. Having a broader shareholder base, price volatility is reduced when large investors sell their shares (Madura 2003, p. 87; and Madura 2001, p. 263), its vulnerability to takeover is considerably lessened and in fact, it is in a better position to engage in foreign mergers and acquisitions (Buckley 2004, p. 563).

3.3.2.4. Value of firm and Risk Management theories add

Nevertheless, cross-listing is an expensive process, getting accustomed with new compliance requirements, documentation and tax difficulties and needless to mention - new set of foreign regulations. Therefore Euroequity issue needs to be carefully evaluated in light of cost-benefit analysis by the financial executives before proceeding with the issue. (Buckley 2004, p. 563).

3.3.2.5. Bonding Hypothesis and Improved Corporate Governance

The bonding hypothesis of Coffee (1999, as cited in Lel and Miller 2008, p.1900) and Stulz (1999, as cited in Lel and Miller 2008, p. 1900) suggests that firms cross-listed on a major U.S. stock exchange have better corporate governance than non-cross-listed firms from the same country, ceteris paribus, since cross-listed firms are subject to strong U.S. investor protections. Cross-listing in the United States is associated with a market-based approach to increased investor protection (Lel and Miller 2008, p. 1900). They found that increased relation between CEO turnover and poor performance for cross-listed firms was strongest in countries with weak investor protections. Their results were consistent with the hypothesis that U.S. securities laws and regulations improve the corporate governance of cross-listed firms (Lel and Miller 2008, p. 1898)

On the flip side, several recent studies suggest that bonding through cross-listing in the United States is ineffective. For instance, Siegel (2005, as cited in Lel and Miller 2008, p. 1901) finds that the SEC and minority shareholders have rarely enforced U.S. laws against cross-listed firms and Lang, Raedy, and Wilson (2006, as cited in Lel and Miller 2008, p. 1901) find that the accounting data of cross-listed firms from weak investor protection environments are of lower quality even though cross-listed firms are required to follow nominally similar accounting standards as U.S. firms.

Lel and Miller (2008, p. 1933) constructed a database of over 70,000 firm-year observations from 47 countries and found that cross-listed firms were more likely to drop poorly performing CEOs than non-cross-listed firms. This effect was found in abundance for firms cross-listed on major U.S. exchanges with the strongest investor protections, rather than OTC, private placement, or London listings. They also found that the difference between cross-listed and non-cross-listed firms in CEO turnover sensitivity to firm performance was greatest in the countries with the weakest investor protections. Overall their results provided support for the major tenets of the bonding hypothesis and for the ability of cross-listings to improve global corporate governance. (Lel and Miller 2008, p. 1933)

Opponents of the bonding hypothesis (Burns et al., 2007; Siegel, 2005, as cited in You et al. 2012, p.203) argue that the hosting country's regulators have not effectively enforced the law against the cross-listed foreign firms (You et al. 2012, p.203). You et al.’s (2012, p.214) findings do not support
the bonding hypothesis. The home country's high investor protection has more positive influence on the listing premium than that of the listing country. This is mostly due to the fact that previous studies supporting bonding hypothesis typically employ stocks listed in the U.S. whereas our data is dominated by cross-listings in Europe. The results remain similar after they control for the variations in the P/E ratios of the home and the host markets.

3.3.2.6. Cross-listing and Trading Volume

Abdallah et al. (2011, p. 589) examine the relation between cross-listing on the U.S. and UK regulated and unregulated exchanges and trading volume for a sample of 500 foreign firms from 34 countries. Mittoo (1992, as cited in Abdallah et al. 2011, p.589) and Fatemi and Rad (1996, as cited in Abdallah et al. 2011, p.589) survey corporate managers and find that increasing trading volume has been perceived as a net benefit of cross-listing. However, whether the increase in trading volume is due to the firm’s commitment to increase the level of investor protection (i.e., by cross-listing on an exchange with better regulations) or the cross-listing per se (i.e., reducing segmentation between home and host countries) remains an open question with Abdullah et al. (2011) answer. Abdallah et al. (2011, p. 589) find that increase in trading volume is a function of both reducing segmentation and signaling investor protection. Furthermore, home market trading volume, firm size, firm returns, and analyst forecast accuracy are the major determinants of a firm’s trading volume.

Abdullah et al.’s (2011, p. 591) bonding hypotheses results are consistent with Roosenboom and van Dijk’s (2009, as cited in Abdullah et al. p.591) findings that an improved information environment and bonding create value for firms cross-listing on U.S. regulated exchanges. Nevertheless, Chung (2006, as cited in Abdullah et al. p.591) concludes that American Depositary Receipts (ADRs) of firms from high-investor-protection environments have low information costs and high liquidity, as measured by bid–ask and depth, thus questioning the extent to which foreign firms can bond themselves to U.S. laws. Therefore, the findings of Abdullah et al. (2011) contribute to the current debate and provide strong evidence that better investor protection is one of the main determinants of the gains from cross-listing. They also evidence that U.S. and UK investors trade foreign securities that originate from low-investor-protection countries more than they trade those from high-investor-protection countries, which is consistent with the bonding hypothesis.

You et al. (2012, p.214) find that trading volume, on average, increases after the listing and decreases after the foreign delisting and these changes in liquidity persist in the long run. Even after controlling for the market trend in trading volume, foreign listing/delisting still is associated with increased/decreased trading volume.

Sabherwal (2007, p.48) report that getting security analysts’ attention so that they follow a cross-listed firm and increasing the visibility of a cross-listed firm in the United States by publicizing it in the United States and disseminating information about it to U.S. investors could result in a greater U.S. share of trading volume in the firm. Bushee and Miller (2005, as cited in Sabherwal 2007, p.48) find that investor relations (IR) activities help improve the visibility of low-visibility firms and attract analysts, investors, media, and trading volume. Sabherwal’s (2007, p.48) result is consistent with this finding, and suggests that a cross-listed firm’s IR activities in the United States could help increase the U.S. share of volume in the firm’s stock.
Sabherwal (2007, p.48) also finds evidence supporting the theoretical prediction of Baruch, Karolyi, and Lemmon (2004, as cited in Sabherwal 2007, p. 49) that the greater the sensitivity of a stock’s value to information in the United States relative to information in the home market, the greater the U.S. share of trading volume.

Hailing, Pagano, Randl, & Zechner (2008, p. 755-756) conduct research on an international panel of companies with a US cross-listing and find that the fraction of trading in their shares carried out in the United States is larger for companies based in countries that are geographically close to the United States, confirming the regional hypothesis (Rugman & Verbeke, 2004; as cited in Banalieva & Robertson 2010, p. 544), that have underdeveloped capital markets, and that fail to enforce insider trading regulation effectively.

Hailing, Pagano, Randl, & Zechner (2008, p. 755-756) find that the relative attractiveness of US markets for the trading of cross-listed stocks appears to have decreased over time for developed market companies, while it has increased for emerging market companies.

In terms of company-specific characteristics, trading in the United States tends to be more active for stocks with a large presence of US institutional investors and with low correlation with the US market. For other characteristics the effects differ by country. Companies from developed markets can expect a more active US market if they are small, volatile, and technology-oriented. For companies based in emerging market, US trading volume is negatively related to volatility and technological intensity. Hailing et al. (2008, p. 756) also investigate the response of the domestic turnover rate to the cross-listing. Here too, the evidence differs sharply depending on the degree of financial development of the home country. Domestic trading increases in the cross-listing year and remains more active afterwards for firms based in developed, but not emerging markets. The difference is even sharper when the sample is split on the basis of enforcement of insider-trading rules. Where enforcement is effective, domestic trading volume increases after a cross-listing; in countries with poor insider-trading enforcement, it drops sharply.

These results shed new light on the decision to cross-list. Although on average, the cross-listings in Hailing et al.’s (2008, p. 756) sample are followed by a substantial amount of trading volume in US markets, this does not hold for many companies from developed countries, especially from Europe. For them, a cross-listing appears, if anything, to contribute to domestic trading activity. In these cases, clearly, cross-listing in the United States aimed not at developing an active market there, but at other purposes - such as enhanced access to local equity issuance, bonding to the stricter corporate governance rules of the US market, expansion by mergers and acquisitions in the US market, or simply greater product market visibility (see Merton (1987)) and reputation. Conversely, for companies from less-developed countries, the evidence is consistent with foreign market liquidity being a key driver of the cross-listing decision. However, when the home country is also characterized by poor protection against insider trading, cross-listing appears to become detrimental to home market liquidity. This has important implications for the competition between stock exchanges. While the liquidity of exchanges in developed countries benefits, on average, from international cross-listings of domestic companies, the liquidity of emerging markets is threatened.
Hailing et al. (2008, p. 756) leave an open question - whether these international differences in the effects of cross-listings are present also for other measures of market liquidity besides trading volume, such as bid-ask spreads and measures of price impact based on high-frequency price and quote data from the relevant markets? This is partly answered in “Investor recognition and ask-bid spread” chapter earlier by other academics.

Previous studies in North American and European markets reject the order flow diversion hypothesis, which states that international cross-listings reduce home country trading volume (Sie Ting & McInish 2002, p. 477). Sie Ting & McInish (2002, p. 477) test this hypothesis using data for equities cross-listed in Singapore and Malaysia finding that trading volume in Malaysia fell 42.9% when Singapore markets were closed for holidays. Furthermore, they show that trading volume in Malaysia did not increase following the implementation of regulations that ended the trading of Malaysian equities in Singapore in 1998. Hence, they reject the order flow diversion hypothesis. Sie Ting & McInish’s (2002, p. 484) findings support the view of Karolyi (1998, as cited in Ting & McInish 2002, p. 484), who concludes that the evidence shows that cross-border listings increase the liquidity of trading in the home market, and the work of Hargis and Ramanlal (1998, as cited in Ting & McInish 2002, p. 484), whose theoretical model predicts increased home-market trading volume for cross-listed shares.

Athanassakos et al. (2010, p. 263-264) study the effects of investor recognition and risk characteristics on the distribution of trading volume using a large sample of Toronto Stock Exchange (TSX) stocks cross-listed in the U.S. With a sample of 527 cross-listed firms over 16 years they find that firm visibility and risk characteristics both influence the U.S. share of trading volume for interlisted Canadian firms. Firms that are more visible to American investors are traded more heavily in the U.S. At the same time, firms that offer diverse risk characteristics are attractive to Americans because they provide unique return generating opportunities. U.S. investors are attracted to stocks that are different (e.g., small firms with few assets in the U.S.), but at the same time seek international exposure to generate high returns.

Athanassakos et al.’s (2010, p. 263-264) results are in contrast with the results of tests of a model of multi-market trading by Baruch, Karolyi, and Lemmon (2007, as cited in Athanassakos et al. 2010, p. 263-264) and provide important insight into the determinants of the location of trade. Baruch et al (2007, as cited in Athanassakos et al. 2010, p. 263-264) report that investors are attracted to stocks that are similar to those already trading in their home market. However, Athanassakos et al. (2010, p. 263-264) find that investors are drawn to stocks that offer distinct risk characteristics. This is consistent with the view that investors understand and value the benefits of international diversification, while at the same time seek international investment opportunities that provide high returns. (Athanassakos et al. p. 263-264)

3.4. Summary of the advantages and disadvantages of cross-listing

**Advantages:**
- Decreased cost of capital
- Access to more capital
- Prestige
- Good chance of a increased stock value
- Overcoming market segmentation
- Increased visibility (reduced “shadow cost”)
- On average companies experience an increased trading volume
- Improved corporate governance (if new market has more regulations)
- Reduced price volatility
- Less vulnerable to takeovers
- Increase in Market-to-Book ratio (“cross-listing premium”)

**Disadvantages:**
- Issuance Costs
- Possibility of decreased firm performance (especially if the markets have very different corporate governance rules)
- Getting accustomed with new compliance requirements, documentation, tax difficulties and a new set of foreign regulations

Looking at this comparison it seems as the benefits of cross-listing clearly outweighs the drawbacks. However, this would be a very oversimplified conclusion. As stated earlier in the literature review, cross-listing should only be performed after a thorough cost-benefit analysis. The primary question any company has to ask itself is weather all these benefits are worth all the costs of complying to a new stock market.

### 3.5. Research from the US- and the German market

#### 3.5.1. Firms with U.S. cross-listings

According to Merton’s (1987) investor recognition hypothesis, when a firm’s investor base grows, its cost of capital falls. A critical assumption of the model is that “an investor uses security k in constructing his optimal portfolio only if the investor knows about security k” (Merton, 1987, p. 488). One way a foreign firm can make its stock more visible and liquid is to list on a U.S. exchange (Athanassakos et al., p. 246). Foerster and Karolyi (1999, as cited in Athanassakos et al., p. 246) argue that increased investor recognition explains the returns pattern surrounding U.S. cross-listings.

Melvin and Valero (2009, p. 89) find that when a firm cross-lists in the USA, its primary rival in the home market that is not listed in the USA is hurt by the listing. Their results are consistent with the idea that firms cross-list as an attempt to reduce agency costs of controlling shareholders and thus are able to exploit growth opportunities as they have better access to external finance. Home rivals are at a relative disadvantage to the cross-listing firms. They conclude that firm’s cross-list in the USA to bond with US laws and regulations and reduce agency costs. Hence, they gain better access to external capital and exploit opportunities for growth. Melvin and Valero (2009, p.89) recommends that more transparent accounting and corporate governance standards coupled with stricter laws in the home market might serve as a partial substitute for a US listing.

Lang, Lins, & Miller (2003, p.349) mention five outcomes associated with U.S. cross-listings from prior studies. Firms with U.S. cross-listings:

1. have positive abnormal returns before and at the time of the listing announcement (Foerster and Karolyi [1999], Miller [1999], as cited in Lang et al., 2003, p.349),
(2) exhibit positive long horizon returns (Foerster and Karolyi [2000], as cited in Lang et al., 2003, p.349),
(3) experience declines in the cost of capital after the cross-listing (Errunza and Miller [2000], as cited in Lang et al., 2003, p.349),
(4) facilitate subsequent equity issues (Reese and Weisbach [2002], as cited in Lang et al., 2003, p.349), and
(5) exhibit higher firm valuations (Tobin's Q) reflecting a commitment to consume fewer private control benefits (Doidge, Karolyi, and Stulz [2002], as cited in Lang et al., 2003, p.349).

Ndubizu (2007, p. 1009) mention four specific benefits of cross-listing on U.S. stock exchanges:
(1) a more liquid market for foreign shares leading to lower bid-ask spreads,
(2) an ability to raise capital at cheaper prices on a more efficient market,
(3) broadening the shareholder base to diversify financial risk, and
(4) an increase in prestige and investors’ recognition of cross-listing firms.

Needless to say that there is significant evidence that cross-listing in the United States has positive economic consequences.

Li Li, Nabar, and Mian’s (2008, p. 38) cross-sectional analysis indicates that cross-listing is not positively associated with analyst coverage, and their time-series analysis yields only marginal evidence of a post-cross-listing improvement in forecast accuracy. Their evidence also says that cross-listing does not impact U.S. firms' valuations. Overall, their results conclude that U.S. firms do not experience the definite information intermediation improvements enjoyed by foreign firms cross-listing in the United States (Li Li et al. 2008, p.38)

### 3.5.2. Cross-listing in Germany

Banalieva & Robertson (2010, p. 539-542) found Germany to be the top cross-listing destination for the MNEs in their sample for the 2004–2006 period, receiving 83.08% of the average foreign cross-listings. They justify this phenomenon citing that, “the German equity market is the predominant player within the EU” (Gilmore, McManus, & Tezel 2005, p. 289), and “[a]lmost every important European private equity firm and many firms operating outside Europe started their investment activities . . . in Germany” as the German private equity market is “one of the leading and most mature in Europe”. Moreover, Listing on German stock exchanges allows the firms to avoid the stringent Sarbanes-Oxley (SOX) requirements in the U.S. When companies list on multiple stock exchanges within Germany, the firms can reduce the risk of dealing with several different institutional environments as they would have to comply with only one set of regulatory standards. Furthermore, listing on multiple German stock exchanges cushions the firms from complexities of dealing multiple currencies, unknown government restrictions, etc. that they would have experience had they listed in multiple countries instead. Finally, German listings allow foreign firms to gain increased visibility throughout Europe by accessing the various regional trading platforms that each stock exchange in Germany has (Banalieva & Robertson 2010, p. 539-542).

### 3.6. Summary
This chapter started off by introducing the readers to some research on the efficiency of the Nordic markets as well as an overview of its history. In this chapter we could see how the Nordics markets have become more and more integrated through mergers of stock exchanges, various harmonization rules and similar. After this we gave the fundamentals of stock markets & basic theory. In this chapter we first explained the Efficient Market Hypothesis and its three different market forms. Thereafter we cited six lessons to be learned from market efficiency and gave some basic theory on market imperfections and how these can exploited. After that we raise the theory of Arbitrage followed by equity home bias puzzle, where we write about Investors preferences for domestic stocks and their subsequent failure of reaping benefits from international diversification. Next, we write about International Investment and Diversification and take up both benefits and risks of these type of strategies. We end the chapter with some basics of another important market for our thesis, the foreign exchange market.

The third part of this chapter was about the reasons for companies to cross-list. To make this part more easy to read, we divided it into two parts, financial reasons- and non-financial reasons to cross-list. Since the fourth part of our chapter summarizes the advantages and disadvantages of cross-listing, we see no need to summarize this part once again.

Finally we provided research from two of the most researched countries regarding cross-listing, the U.S- and German markets. The U.S. market has been by far the most researched market in cross-listing and some of the empirical evidence from this market regarding positive effects of U.S. listings included: increased visibility and increased liquidity, reduction of agency costs (alignment with U.S. laws and regulations), growth opportunities, positive abnormal returns before and at the time of the listing announcement, positive long horizon returns, declines in cost of capital, easement of subsequent equity issues, higher valuation, lower bid-ask spreads and increased prestige. We also included some critique of some benefits that are claimed to be associated with U.S. listings.
4. Practical Method

In this chapter we outline the practical conduct of how our data was gathered, basic information about our sample, how and why we chose the sub-periods, how we formulated the hypotheses and the statistical method we use to test our hypotheses and thereby be able to answer our research questions.

4.1. Conduct

First, we identified the Nordic firms whose stocks are cross-listed on more than one stock exchange. We found such firms by looking into the stocks from OMX Copenhagen 20, OMX Stockholm 30, OMX Helsinki 25, OMX Iceland 6 and OBX 25 and cross-checking those companies’ respective websites. Each company’s website provided us with the exact information on where they are listed. However, in Thompson Reuters Datastream we found what at first seemed to be conflicting information. The data from Datastream seemed to show that almost all of the companies traded on more markets than their websites stated. However, we found out that this was due to the fact that these companies have subsidiaries and joint-ventures in those countries and therefore we could not regard them as the same class of stock (even though many of them had the same name in the database). For example Nokia’s website state that they are only listed in Helsinki, Frankfurt and New York even though a quick look at the OMX Stockholm 30 tells us that they are listed there as well. However, this stock represents Nokia’s Swedish division and is in fact (even though it has the same name) not the same stock as the ones traded in Helsinki, Frankfurt and New York.

We used DataStream to extract most of the data used in this thesis. Since we wanted the results of our study to be as exact as possible we decided to include all of the population, which is all Nordic cross-listed stocks, instead of using a sample. Daily closing prices of same stocks in different markets is the secondary data and will be used to explore anomalies in prices which should be exactly equal in theory (if no arbitrage profit) and correlation between the prices of same class stocks must be equal to 1 if efficient market hypothesis, Purchasing Power Parity and Fisher effect hold. Again, our goal is to identify if there are small deviations from the equilibrium and the law of one price and based on this find a stock exchange that offers investors an opportunity to earn abnormal returns. We downloaded these daily closing prices in both the local currency of the company’s origin and in Special Drawing Rights (SDR.s). DataStream already had the closing prices in several different currencies so we did not have to convert the prices ourselves. We used both these currencies in order to investigate the impact of foreign exchange on returns from different stock exchanges.

For some of the companies that have cross-listed in the recent past, we were unable to test the hypotheses on them for the whole period and therefore also for some of the sub-periods.

Table: 4.1a Firms and Listings
Currencies: SFr = Swiss Franc, USD = United States Dollar, SEK = Swedish Krona, GBP = Great Britain Pound, DK = Danish Krona, NOK = Norwegian Krona, CAD = Canadian Dollar. ADR = American Depository Receipt

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<td>OMX Helsinki</td>
<td>Equity</td>
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<tr>
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<td>USD</td>
<td>Non NASDAQ OTC</td>
<td>ADR</td>
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</table>

As evident from this table, there are some companies who have not been cross-listed during the whole period of our research. Therefore some of the companies were not applicable to use for some of the sub-periods either. If the company had been cross-listed for more than half of the sub-period we chose to include it. We chose this limit since we thought less than 50% would not have been significant enough and could have had a negative effect on the consistency of our results. Since Lundin Petroleum only has been cross-listed for one year we could not include this stock in any of the sub-periods. However, since this stock is the only Nordic stock cross-listed on the Canadian
market we chose to make a separate statistical test on the year it has been cross-listed. Even though one year might not be enough to make any type of generalizations, we still think it might be interesting to get an indication of the differences/similarities in returns and prices between the Swedish and the Canadian market.

Table:4.1b Countries and Listings

<table>
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<tr>
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<th>Sweden</th>
<th>Denmark</th>
<th>Finland</th>
<th>Norway</th>
<th>Iceland</th>
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</thead>
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<td>0</td>
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<td>0</td>
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<td>London Stock Exchange/LSE</td>
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<td>0</td>
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<td>4</td>
<td>0</td>
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4.2. Time Horizon

Figure: 4.2a (yahoo finance, 2012)
As said earlier, this is a longitudinal study taking the most recent economic cycle as the time horizon. We took the Dow Jones Industrial Average Index from Yahoo Finance and cut off the following three sub-periods according to min-max analysis:

2. "Oct 9, 2007 - Mar 9, 2009 (Recession, Slump)"

Figure: 4.2b, First Period

Figure: 4.2c, Mid Period

Figure: 4.2d, Last Period
4.3. Test Methodology

In this part we will explain each of our hypotheses and how they relate to our research questions.

Suppose that EMH holds and there is no market imperfection to allow profitable arbitrage, then

**H1: R*bar = Rbar**

One method of testing this hypothesis involves estimating $R^*$-bar (i.e. expected return from foreign listing) and R-bar (i.e. expected return from home market listing) for individual securities. We calculate the returns simply by taking today’s price minus yesterday’s price divided by today’s price. This gives us the everyday percentage return of each Nordic cross-listed stock. **If geographical location of where the stocks are listed matters then H1 will not be true and we will find answer to our research question, does the investing location matter for investing in Nordic cross-listed stocks?**

Provided H1 is rejected, we can turn to H2 to answer our first sub-question; *can an investor earn abnormal returns by choosing the “optimal” stock exchange from where to buy a specific Nordic cross-listed stock?*

**H2: R*bar > Rbar**

If evidence can be found supporting the H2 then it is possible to earn abnormal returns by investing in the “optimal” stock exchange.

Finally we can test H3 to answer our research question and our second sub-question: *Does the investing location matter for investing in Nordic cross-listed stocks? And: Does a secondary market exist where Nordic cross-listed stocks are most often underpriced?*

**H3: P*bar ≠ Pbar**, where $P^*$bar represents expected price at a foreign market and Pbar at home market

If evidence proving H3 right is found then we can conclude that a market exists where Nordic cross-listed stocks can be bought at a discount.

4.3.1. Tests of Normality
In order to decide the statistical tests, parametric or non-parametric, we do the test of Normality (see appendix 7.1.) for all stock prices and returns. Since the level of significance for all the variables are below 0.05, we conclude that the data is not normal.

Next we turn to the non-parametric tests. SPSS offers tests on one sample, independent samples and related samples. We select to do a related sample test because of our basic premise that if markets are efficient, same class of stocks must be priced the same over all stock exchanges. In other words, prices and returns in foreign listings should follow the prices and returns at home listing. Therefore, it can be said that variables, prices and returns, are dependent on each other for the same class of stocks.

4.3.2. Descriptive Statistics and Wilcoxon Signed-Rank Test

For all our data, mean/expected returns and mean/expected prices were calculated using the descriptive statistics tab from SPSS. Mean returns and prices were not numerically equal in any case. In other words, the mean returns or prices did not have the same absolute value. That is why we turned to Wilcoxon Signed-Rank test to test whether the returns or prices were statistically same for the same stock on different exchanges. For H1, if the level of significance would be above 0.05 we accept the hypothesis; in that case H2 is automatically rejected. If H1 would be less than 0.05 we reject the hypothesis and H2 is then automatically accepted. If the level of significance for H3 would be less than 0.05 we accept it and if it is higher we reject it.

We were inspired by how Alexander et al. (1988) compared the stock co-movements in different stock exchanges for cross-listed firms. They used Wilcoxon test to figure out whether the mean returns differed significantly to reject the notion that returns are the same for the same class of stock. SPSS made the application of the Wilcoxon Signed Rank Test quite convenient for us, because just looking at the level of significance of the test statistic told us whether we should accept or reject our hypotheses.

We could apply student-t test for certain firms’ sub periods which were normally distributed but we wanted to have a common test for all the firms in all periods to make the comparison more credible. The Wilcoxon Signed Rank test conducted by SPSS can be applied even if the data is normally distributed and therefore it was optimal to do this test on all firms in all periods.

Mean returns and mean prices were the bases of our analysis but Wilcoxon Signed-Rank test’s level of significance statistically confirmed whether we would accept or reject our hypotheses. We also included the number of times cross-listed stocks’ returns and prices on one exchange were higher and cheaper respectively than the other exchange(s). This was simply to strengthen our analysis.

4.3.3. Tests on entire population

Apart from the individual tests we also performed tests on the entire population of Nordic Cross-Listed Stocks. This was to determine if there were any market that offered continuously higher returns or continuously cheaper prices.
5. Empirical Results, Discussion and Analysis

In this chapter we will provide the reader with the results of our study. By using the data we have collected we will answer our three hypotheses: H1: Are the mean returns between the home market and the foreign market the same? H2: Either of the markets offered higher mean returns. H3: Does the mean prices differ between the markets? H1 will be used to answer our research question: Does the investing location matter for investing in Nordic cross-listed stocks? H2 will answer the first sub-question: Can an investor earn abnormal returns by choosing the “optimal” stock exchange from where to buy a specific Nordic cross-listed stock? H3 will also answer our second sub-question: Does a secondary market exist where Nordic cross-listed stocks are most often underpriced? Finally H3 will reconfirm the validity of H1 and therefore also our research question (Does the investing location matter for investing in Nordic cross-listed stocks?).

Please refer to the appendices to have a closer look into the detailed descriptive statistics of each company and each period. The appendix also contains ranks and test statistics which give information about which stock exchange outperformed the other for a specific stock and the z-statistic along with the level of significance. The appendix begins with the normality tests. Then goes on to descriptive statistics, second part, which provides information on the number of observed daily prices (N), mean price/return (Mean), standard deviation (Std Deviation) and finally the minimum and maximum price during the period. The first column states the name of the stock, the stock exchange, the denominated currency and finally if it is returns (R) or price (P). The descriptive statistics are divided into two parts, one for returns and one for prices.

The third part of the appendix provides the Wilcoxon Ranks Test. The first column shows the pair of stocks we are testing in the same manner as in the descriptive statistics. Negative ranks for returns corresponding to N show in how many cases the first stock offers higher returns than the second and vice versa. Negative ranks for prices corresponding to N show in how many cases the first stock has been cheaper than the second and vice versa.

The fourth part of the appendix shows if the test statistics were significant or not. Z is the test statistic and Asymp. Sig. (2-tailed) means the level of significance. In H1 we accepted the hypothesis if the level of significance was more than 0.05 and in H3 we accepted the hypothesis when the level of significance was less than 0.05.

We present the hypothesis test results in the tables below where ✔ means that the hypothesis is accepted and ✗ means that the hypothesis is rejected. To look into the outputs from our SPSS analysis please refer to the appendix. Some stocks have not been cross-listed during all the periods. On those we put Not Applicable (N/A) in the hypothesis fields. However, the stocks and sub-periods
we test the hypothesis on, most of them cover 100% of the observations. Seadrill, Atlantic Petroleum, Bank Nordik and Lundin Petroleum have been the exceptions. Analysis on Lundin Petroleum has been possible only for a part of the last period since it is the only company who cross-listed less than a year ago. Since this has been the only stock cross-listed on the Toronto Stock Exchange we think it will be interesting to include it. However, due to the low amount of observations we cannot make any statistically significant recommendation on where to buy this stock from.

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**Table 5a Whole Period Test Results**

**H3 is rejected for SIX Swiss and Stockholm (for both currencies). H3 is accepted in all other cases**

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Table 5b First Period Test Results
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</table>
**Table 5c Mid Period Test Results**

*H3 is accepted for London-Stockholm (both in SEK and SDR) and Stockholm-New York (only in SDR). For others, H3 is rejected

**H3 is accepted for Helsinki-Stockholm (only in SEK)

***H3 is rejected for Stockholm-SIX Swiss (both in SEK and SDR). For the rest H3 has been accepted

<table>
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<tr>
<th>Swedish Firms</th>
<th>H1</th>
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<td>AstraZeneca</td>
<td>✗</td>
<td>✗</td>
<td>*</td>
</tr>
<tr>
<td>Ericsson</td>
<td>✔️</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Lundin Petroleum</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Nordea</td>
<td>✔️</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
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<table>
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<th>Non Swedish Firm</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
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</tr>
<tr>
<td>Golar Lng (N)</td>
<td>✔️</td>
<td>✗</td>
<td>✗</td>
</tr>
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<td>✔️</td>
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<tr>
<td>Nokia (F)</td>
<td>✔️</td>
<td>✗</td>
<td>✔️</td>
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<tr>
<td>Norsk Hydro (N)</td>
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<td>✗</td>
<td>✗</td>
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<td>✗</td>
<td>✗</td>
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<tr>
<td>Royal Caribbean Cruises (N)</td>
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<td>✗</td>
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<td>Statoil (N)</td>
<td>✔️</td>
<td>✗</td>
<td>✗</td>
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<td>✔️</td>
</tr>
<tr>
<td>UPM Kymmene (F)</td>
<td>✔️</td>
<td>✗</td>
<td>✔️</td>
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</table>

**Table 5d Last Period Test Results**
*H3 is rejected only between Stockholm-SIX Swiss when prices are denominated in SDR. For all other pairs, H3 has been accepted.

H1 has been true for all the companies in all periods, that is, with a 5% level of significance R*bar is equal of Rbar. This means that no market offers investors to earn abnormal profits continuously. We can also infer that the rate of return is the same no matter where you invest.

Yet, H3 has been considerably true in most cases in all periods. Therefore, it is possible to earn abnormal returns by buying stock cheaper but earn the same dividends and rate of return. If you can buy the same class of stock at a cheaper price in location one, why pay more to buy the same stock from location two, when in fact you earn the same dividends and returns.

As H1 came true for all companies in all periods, we will not go deep into the analysis because statistically the daily returns over the periods have been the same. However, we will compare the mean prices, number of times the prices in location one have been cheaper than those of location two.

<table>
<thead>
<tr>
<th>Nordic Cross-listed firms</th>
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<th>H2</th>
<th>H3</th>
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<tr>
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<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>Ericsson</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>Lundin Petroleum</td>
<td>✓</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Nordea</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>TeliaSonera</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non Swedish Firm</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
</tr>
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<tbody>
<tr>
<td>Amer Sports (F)</td>
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<tr>
<td>Atlantic Petroleum (I)</td>
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<td>Seadrill (N)</td>
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<td>UPM Kymmene (F)</td>
<td>✓</td>
<td>x</td>
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and the level of significance of test statistics. Based on the level of significance of the test statistics we will recommend an optimal stock exchange to buy a particular stock from.

Table 5e Whole Period Test Results – Entire Population

<table>
<thead>
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<th>Whole Period</th>
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<tbody>
<tr>
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Table 5f First Period Test Results – Entire Population

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<th>H3</th>
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<tbody>
<tr>
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Table 5g Mid Period Test Results – Entire Population

<table>
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<th>H3</th>
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<tbody>
<tr>
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<td>×</td>
<td>✓</td>
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Table 5h Last Period Results – Entire Population

<table>
<thead>
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<th>Last Period</th>
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<th>H2</th>
<th>H3</th>
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<tbody>
<tr>
<td>Entire population</td>
<td>✓</td>
<td>×</td>
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</table>

5.1 Swedish firms:

ABB
**Whole Period:**
The mean price of SSE and HSE were the same to two decimal places. In NYSE the mean price was higher. Between SSE-SIX Swiss out of 2481 observations SIX Swiss was cheaper 1203 cases and tied at 65 cases. Statistically both SSE and SIX Swiss are cheaper than NYSE but we cannot make any recommendation between SSE and SIX Swiss since the difference is statistically insignificant.

**Findings:** We cannot recommend any stock exchange due to statistically insignificant difference between SSE and SIX Swiss. However, we can recommend not buying the ABB stock from NYSE.

**First Period:**
SSE gave the lowest mean price, followed by SIX Swiss and NYSE. Based on ranks and test statistics SSE turned out to be the place where ABB stocks can be bought cheapest during this period. Therefore, we recommend buying the ABB stock in the home-market which is SSE.

**Findings:** We recommend buying the ABB stock in the home market – SSE.

**Mid-Period:**
The statistical test established that NYSE has been most expensive in comparison with SSE and Swiss. SSE and SIX Swiss are almost at a tie (139.457730 & 139.472259 in SEK and 13.461000 & 13.462054 in SDR). This difference was not statistically significant and we could therefore not make any recommendations in between SSE and SIX Swiss based on this. In majority of the cases SIX Swiss was cheaper than SSE. NYSE was the most expensive according to the ranks test.

**Findings:** As we mentioned earlier, we could not make any recommendation in between SSE and SIX Swiss due to the extremely low difference in prices. However, we can recommend not buying the stock from NYSE.

**Last Period:**
Swiss SIX gave the lowest mean price followed by SSE and NYSE respectively. In majority of the cases Swiss SIX offered cheaper prices than SSE both in SEK and SDR. In majority of the cases NYSE offered higher prices than SSE and Swiss SIX. According to the level of significance of the test statistic SSE and Swiss SIX offered cheaper price than NYSE. When denominated in SEK the level of significance at which we accept the hypothesis is 0.045 but when denominated in SDR 0.054. Denominated in SEK, Swiss SIX offers cheaper price than Stockholm, but in SDR we cannot make any recommendation. Because the test result is not robust when switching currencies we do not think it is plausible to recommend any stock exchange. However, we can recommend not buying the ABB stock from NYSE.

**Findings:** We cannot recommend buying the ABB stock from NYSE since the test result is not robust in between the currencies.

**AstraZeneca**

**Whole Period:**
LSE offered the cheapest mean prices followed by SSE and NYSE respectively. The same order applies for the Wilcoxon Signed-Rank Test, in the majority of the cases LSE offered the cheapest price follow by SSE and NYSE respectively.
**Findings:** LSE had the lowest mean price which is statistically significant. Based on this we recommend LSE to be the best location to invest in AstraZeneca stock.

**First Period:**
LSE gave the lowest mean price, followed by SSE and NYSE respectively. Based on ranks and test statistic LSE is the cheapest, followed by SSE and NYSE. Therefore, we recommend buying the AstraZeneca stock from London.

**Findings:** We recommend buying the AstraZeneca stock from LSE.

**Mid-Period:**
H3 is rejected for LSE-NYSE and SSE-NYSE in SEK, and LSE-NYSE in SDR. SSE-NYSE is accepted for SDR at significance level of 0.044 which is also a cause of concern because when denominated in SEK we are unable to recommend which market that offered the cheapest price.

In majority of the cases NYSE and LSE offered cheaper prices than SSE. In case of LSE and NYSE when denominated in SDR, out of 370 observations in 185 cases LSE offered cheaper prices than NYSE and NYSE offered cheaper prices than LSE in 185 cases as well. In SEK, 186 of the cases NYSE were more expensive and in 184 cases LSE was more expensive. So, in case of the AstraZeneca stock, LSE and NYSE were highly efficient and offered basically the same prices on average.

**Findings:** As we mentioned earlier, we could not make any recommendation in between LSE and NYSE since they offered basically the same price on average. However, we can recommend not buying the stock from SSE.

**Last Period:**
LSE offered the cheapest mean price followed by SSE and NYSE respectively. In majority of the cases LSE offered cheaper prices than SSE and in the majority of the cases SSE offered cheaper prices than NYSE. Quite naturally, LSE offered cheaper prices than in NYSE in the majority of the cases as well. Based on test statistics LSE offers the cheapest price followed by SSE and NYSE.

**Findings:** Since LSE offered the cheapest mean price as well as offering the cheapest price in the majority of the cases, we recommend buying the AstraZeneca stock from London.

**Ericsson**

**Whole Period:**
SSE offered cheaper prices than NASDAQ in the majority of the cases. The mean prices are also cheaper in SSE than in NASDAQ.

**Findings:** The results are inconclusive. In majority of the cases SSE offered lower prices than NASDAQ, however since the level of significance was above 0.05 we cannot conclude that shares are sold at a discount in SSE.

**First Period:**
SSE gave both the lowest mean price and according to the ranks test SSE offered the cheaper prices in the majority of the observations. However, the level of significance was 0.05 in SEK and 0.057 in SDR. So, the level of significance is at par in SEK and a bit higher in SDR, therefore we do not think it is plausible to recommend SSE as the optimal stock exchange.

**Findings:** Since the level of significance was not lower than 0.05 we are not able to recommend any of the stock exchanges.

**Mid-Period:**
The mean is marginally less in SSE. Though in the majority of the cases NASDAQ offered cheaper price than SSE the Wilcoxon test statistic is not significant enough to prove that NASDAQ offers cheaper price than SSE. Therefore we are not able to recommend any market.

**Findings:** SSE and NASDAQ offer statistically the same mean price and therefore we cannot make any recommendation as where to buy the Ericsson Stock.

**Last Period:**
NASDAQ offered a cheaper mean price than SSE. When denominated in SEK, NASDAQ offered a cheaper price 404 cases out of 800 observations. Denominated in SDR, NASDAQ offered cheaper prices in 406 cases. Statistically NASDAQ offered cheaper prices than SSE with a level of significance of 0.043 and 0.037 for SEK and SDR respectively.

**Findings:** Since NASDAQ offered a cheaper mean price as well as the lowest prices in the majority of the cases we recommend buying the stock from New York.

**Lundin Petroleum**

**Whole Period:**
For Lundin Petroleum, TSE gave the higher mean returns of 0.2282% in SEK and 0.2292% in SDR compared to SSE 0.1791% in SEK and 0.1946% in SDR.

For both SEK and SDR, TSE beat SSE in majority of the cases and also has higher standard deviation compared to SSE.

The stock has been listed on TSE for too short period to recommend whether it is more rational to buy from TSE compared to SSE. Lundin has been performing well in the last one year following the cross-listing in TSE (Lundin Petroleum, 2012). However, as H3 is rejected, we cannot recommend any specific location to buy the stocks from.

**Findings:** Unable to make recommendation due to the rejection of H3 as well as we have too little number of observations from the TSE.

**Last Period** (based on the 269 first days following the listing in TSE):
TSE offers marginally lower mean prices than SSE and also offered the cheaper prices in the majority of the observations. However, the level of significance is too high for us to make any recommendation on where to buy the Lundin Petroleum stock.
Findings: SSE and TSE offered statistically the same mean price and therefore we are not able to recommend any of the markets.

Nordea

Whole Period:
In SEK, CSE beats SSE and SSE beats HSE and CSE beats HSE. However, in SDR, SSE beats HSE, CSE beats SSE but there is a tie between CSE and SSE. HSE offered the lowest mean prices followed by CSE and SSE.

Findings: In majority of the cases CSE offers a cheaper price than SSE and HSE offers cheaper price than SSE and CSE. Therefore our recommendation is to buy the stock from HSE.

First Period:
HSE gave the lowest mean price, followed by CSE and SSE respectively. Based on ranks and test statistic HSE is again the cheapest, followed by CSE and SSE. Therefore we recommend buying the Nordea stock from Helsinki.

Findings: We recommend buying the Nordea Stock from HSE.

Second Period:
The mean price was highest in SSE, followed by CSE and HSE respectively. By far, SSE offered more expensive prices than CSE and HSE. Between HSE and CSE, CSE offered higher price in 301 observations when denominated in SEK. In SDR CSE offered higher prices in 291 cases. So statistically HSE offers the cheapest price, followed by CSE and SSE respectively.

Findings: Since HSE has the lowest mean price and offers the cheapest price in the majority of the cases we can recommend buying the Nordea stock from Helsinki.

Last Period:
CSE offered a cheaper mean price than HSE and SSE respectively. In majority of the cases CSE was cheaper than HSE and SSE. HSE was cheaper than SSE in the majority of the cases.

Findings: Since CSE offered the cheapest mean price and was cheaper than HSE and SSE in the majority of the cases we recommend buying the Nordea stock from Copenhagen.

TeliaSonera

Whole Period:
HSE offered lower mean prices than SSE and in the majority of the cases HSE offered the lowest prices as well.

Findings: We recommend buying the TeliaSonera stock from HSE.

First Period:
HSE gave the lowest mean price and offered the cheapest price according to the ranks test as well. The test statistic was significant enough for us to recommend buying the TeliaSonera stock from Helsinki.

**Findings:** We recommend buying the TeliaSonera stock from HSE.

**Mid-Period:**
The mean price was lower in HSE than in SSE and HSE offered cheaper prices in the majority of the observations as well. If traded in SEK, HSE offers cheaper prices than SSE, however statistically when traded in SDR, HSE is not significantly cheaper than SSE.

**Findings:** Due to conflicting results between the currencies we are unable to recommend any of the stock exchanges.

**Last Period:**
Statistically HSE offered cheaper prices than SSE. In majority of the cases HSE offered cheaper prices as well. Therefore we recommend buying the TeliaSonera stock from Helsinki.

**Findings:** We recommend buying the TeliaSonera stock from HSE.

### 5.2 Non-Swedish Firms:

**NovoNordisk (Denmark)**

**Whole Period:**
CSE offered cheaper prices than NYSE in the majority of the observations as well as the cheapest mean prices.

**Findings:** In the majority of the cases CSE offered cheaper prices which are proven by the Wilcoxon test. Therefore, we recommend buying the NovoNordisk stock from there.

**First Period:**
CSE gave the lowest mean price and offered the cheapest price according to the ranks test as well. The test statistic was significant enough for us to recommend buying the NovoNordisk stock from Copenhagen.

**Findings:** We recommend buying the NovoNordisk stock from CSE.

**Mid-Period:**
CSE offered cheaper mean prices than NYSE. In the majority of the cases CSE also offered cheaper prices than NYSE. However, the test statistic was not significant enough to recommend any of the markets.

**Findings:** The test statistics were too low for us to make any recommendation.

**Last Period:**
CSE offers cheaper mean prices than NYSE and in the majority of the cases CSE offered the cheapest price as well.
Findings: The test statistics are significant enough for us to recommend buying the Novo Nordisk stock from Copenhagen.

**Amer Sports (Finland)**

**Whole Period:**
HSE offered cheaper mean price than non-NASDAQ OTC and in the vast majority of the cases HSE also offered lower prices.

**Findings:** The test statistic is significant enough for us to recommend buying the stock from HSE.

**First Period:**
HSE offered a cheaper mean price than non-NASDAQ OTC and offered lower price in every single observation.

**Findings:** The test statistic is significant enough for us to strongly recommend buying the stock from HSE.

**Mid-Period:**
HSE offered a cheaper mean price than non-NASDAQ OTC and offered lower price in every single observation except one.

**Findings:** The test statistic is significant enough for us to strongly recommend buying the stock from HSE.

**Last Period:**
HSE offered a cheaper mean price than non-NASDAQ OTC but non-NASDAQ OTC offered a lower price in the majority of the observations (405 out of 800).

**Findings:** The test statistic is significant enough for us to recommend buying the stock from HSE.

**Metso (Finland)**

**Whole Period:**
HSE offered cheaper price than Non-Nasdaq OTC in majority of the observations as well as lower mean prices.

**Recommendation:** In the vast majority of the cases HSE offered lower prices which are also statistically significant. Therefore we recommend the investor to buy the stock from HSE.

**First Period:**
HSE gave the lowest mean price and offered the cheapest price according to the ranks test as well. The test statistic was significant enough for us to recommend buying the Metso stock from Helsinki.

**Findings:** We recommend buying the Metso stock from HSE.
Mid-Period:
The test is significant enough to prove that NASDAQ offers cheaper prices than HSE in both euro and SDR. In the majority of the cases NASDAQ offered cheaper prices in both SEK and SDR. Therefore we recommend buying the Metso stock from New York.

Findings: We recommend buying the Metso stock from NASDAQ.

Last Period:
The mean price is cheaper in non-NASDAQ OTC than in HSE. Out of 800 observations, denominated in euro, 403 cases HSE offered cheaper prices than NASDAQ. Denominated in SDR, HSE offered cheaper prices in 398 cases (marginal majority).

Findings: Since the significance is above 0.05 we are not able to recommend any of the geographic locations.

Nokia (Finland)

Whole Period:
HSE offered lower mean prices than NYSE. Out of 2481 observation HSE offered cheaper prices in 1236 cases when denominated in euro and 1230 cases when denominated in SDR. The corresponding number for NYSE was 1243 for euro and 1247 in SDR.

Findings: Since the test results for Nokia’s stock were insignificant we cannot recommend any market from where to buy it.

First Period:
HSE offered lower mean prices than NYSE and offered the cheapest price according to the ranks test as well.

Findings: We recommend buying the Nokia stock from HSE.

Mid-Period:
The test is significant enough to prove that NYSE offers cheaper prices than HSE in both NOK and SDR. In majority of the cases NYSE offers lower prices than HSE in both NOK and SDR. Therefore we recommend buying the Nokia stock from New York.

Findings: We recommend buying the Nokia stock from NYSE.

Last Period:
NYSE offered a lower mean price HSE and in the majority of the cases NYSE offered the cheapest price as well. The test statistics are significant enough for us to recommend buying the Nokia stock from New York.

Findings: We recommend buying the Nokia stock from NYSE.

UPM (Finland)
Whole Period:
HSE offered cheaper prices than the non-NASDAQ OTC in majority of the cases as well as the lowest mean price.

Findings: In the majority of the cases HSE offered lower prices which are also statistically significant. Therefore we recommend buying the UPM stock from HSE.

First Period:
HSE gave the lowest mean price and offered the cheapest price according to the ranks test as well. The test statistic was significant enough for us to recommend buying the UPM stock from Helsinki.

Findings: We recommend buying the UPM stock from HSE.

Mid-Period:
In majority of the cases NASDAQ offers cheaper prices than HSE. Mean prices are also cheaper in NASDAQ and the test statistics are significant enough for us to recommend buying the UPM stock from New York.

Findings: We recommend buying the UPM stock from NASDAQ.

Last Period:
In a vast majority of the cases HSE offered lower price than non-NASDAQ OTC as well as offering a lower mean price.

Findings: The test statistics are significant enough for us to recommend buying the UPM stock from Helsinki.

Atlantic Petroleum (Iceland)

Whole Period:
In a marginal majority of the cases CSE offered cheaper prices than ICEX. However, ICEX offered the cheapest mean prices.

Findings: The test level of significance is above 0.05 which means that the mean prices are not statistically different.

First Period:
The period has too few observations to make any statistically valid recommendations.

Mid-Period:
For Atlantic Petroleum mean price was lower in ICEX than in CSE for both SEK and SDR. In majority of the cases ICEX was cheaper than CSE in both DK and SDR as well. However, the Wilcoxon ranks test is not significant enough to recommend any of the stock exchanges.

Findings: The test level of significance is above 0.05 which means that the mean prices are not statistically different.
**Last Period:**
ICEX offers a cheaper mean price than CSE but in the majority of the observations CSE offered the cheapest prices. Statistically ICEX offers the cheapest prices and we therefore recommend buying the Atlantic Petroleum stock from Iceland.

**Findings:** We recommend buying the Atlantic Petroleum stock from Iceland.

**BankNordik (Iceland)**

**Whole Period:**
Bank Nordik started trading from 21 June 2007 in both ICEX and CSE. We start from this date and end in 2nd April 2012.

When denominated in DK the mean price is lower in CSE and in the majority of the cases CSE also offers lower prices than ICEX. However, when denominated in SDR, ICEX offers cheaper mean price than CSE as well as lower price in the majority of the observations. The most plausible reason for this is that after 23rd February 2009 the stock was traded in ICEX at the flat rate of 100 DK till date. This led us to use BankNordik official website (BankNordik, 2012) to double check if DataStream was correct. As we suspected, the data provided on DataStream was not correct. Therefore, we used the data provided by BankNordik instead, since they did not provide the data in SDR and we could not synchronize the dates available on the website with dates available from DataStream. This means that we only included DK in our analysis.

The whole period included 1202 observations for CSE and 1197 for ICEX. This is probably due to different public holidays in Iceland and Denmark. However, we do not believe this small difference will have any significant impact on our test results.

ICEX offered a cheaper mean price than CSE and in the majority of the cases ICEX also offered cheaper prices.

**Findings:** We recommend buying the BankNordik stock from the home market which is ICEX.

**First Period:**
The period has too few observations to make any statistically valid recommendations.

**Findings:** Unable to provide any recommendation due to insignificant number of observations.

**Mid-Period:**
ICEX offered cheaper mean prices than CSE and in the majority of the cases ICEX offered cheaper prices as well. Statistically ICEX offer cheaper prices than CSE. Therefore we can recommend buying the BankNordik stock from Iceland.

**Findings:** We recommend buying the BankNordik stock from ICEX.

**Last Period:**
CSE offered marginally cheaper mean prices than ICEX. Out 769 observations, ICEX offered cheaper prices in 345 cases and in as many as 108 cases there was a tie.
Findings: The test level of significance is above 0.05 which means that the mean prices are not statistically different.

Frontline (Norway)

Whole Period:
NYSE offered cheaper mean prices than OSE and in the majority of the cases NYSE offered cheaper prices as well.

Findings: The test statistic is significant enough for us to recommend buying the Frontline stock from OSE.

First Period:
NYSE offered cheaper mean prices than OSE and in the majority of the cases NYSE offered cheaper prices as well.

Findings: The test statistic is significant enough for us to recommend buying the Frontline stock from OSE.

Mid-Period:
OSE offered marginally cheaper mean prices than NYSE. Denominated in SDR out of 370 cases OSE was cheaper in 186 observations. However, denominated in NYSE was cheaper in 191 observations.

Findings: The test statistic was not significant enough for us to recommend buying the Frontline stock from OSE.

Last Period:
OSE offered marginally cheaper mean prices than NYSE and in the majority of the cases OSE offered the cheapest prices as well.

Findings: The test statistic was above 0.05 which is not significant enough for us to recommend buying the Frontline stock from OSE.

Golar Lng (Norway)

Whole Period: Lower mean price in OSE than in NASDAQ as well as cheaper price in the majority of the observations.

Findings: We recommend buying the Golar stock from OSE.

First Period:
OSE gave the lowest mean price and offered the cheapest price according to the ranks test as well. The test statistic was significant enough for us to recommend buying the Golar stock from Oslo.

Findings: We recommend buying the Golar stock from OSE.
**Mid-Period:**
OSE offers cheaper mean price than NASDAQ in both NOK and SDR. In majority of the observations NASDAQ offered cheaper prices in both NOK and SDR. The test statistic is not significant enough to recommend any of the markets based on price.

**Findings:** The test statistic is too low for us to make any recommendation.

**Last Period:**
In majority of the cases OSE was cheaper than NASDAQ and OSE also offered a lower mean price than NASDAQ.

**Findings:** The test statistic was above 0.05 which is not significant enough for us to recommend buying the Golar stock from OSE.

**Norsk Hydro (Norway)**

**Whole Period:**
OSE offered the lowest mean prices and offered a lower price than LSE in the majority of the observations.

**Findings:** Since OSE offered the lowest mean prices and offered the lowest price in the majority of the observations we recommend buying the Norsk Hydro stock from OSE.

**First Period:**
LSE gave the lowest mean price and offered the cheapest price according to the ranks test as well. The test statistic was significant enough for us to recommend buying the Norsk Hydro stock from London.

**Findings:** We recommend buying the Norsk Hydro stock from LSE.

**Mid-Period:**
According to the mean OSE offers a cheaper mean price than LSE as well as lower prices in the majority of the cases of the Wilcoxon ranks test. However, the test statistic was not significant enough to recommend any of the markets.

**Findings:** The test statistics were too low for us to make any recommendation.

**Last Period:**
LSE offers cheaper mean prices than OSE and in the majority of the cases LSE offered the cheapest prices as well.

**Findings:** The test statistic was above 0.05 which is not significant enough for us to recommend buying the Norsk Hydro stock from LSE.

**Royal Caribbean Cruises (Norway)**

**Whole Period:**
OSE offered cheaper mean prices than NYSE and in a marginal majority of the cases OSE was cheaper than NYSE as well.

Findings: Since the level of significance is above 0.05 we cannot make any recommendation as where to buy the Royal Caribbean stock.

First Period:  
OSE offered lowest mean prices than NYSE and offered the cheapest price according to the ranks test as well.

Findings: Since the significance level is above 0.05 we cannot recommend buying the stock from OSE even though they offered the lowest price.

Mid-Period:  
NYSE offered cheaper prices than OSE in the majority of the cases. However, the mean prices were lower in OSE than in NYSE. The test statistic is not significant enough to recommend any of the markets.

Findings: Since the level of significance was above 0.05 there was no statistically significant difference between the markets. Therefore we cannot provide any recommendation.

Last Period:  
OSE offers cheaper mean prices NYSE and in the majority of the cases OSE offered the cheapest prices as well. The test statistics are not significant enough for us to recommend buying the Royal Caribbean stock from OSE.

Findings: Since the level of significance was above 0.05 there was no statistically significant difference between the markets. Therefore we cannot provide any recommendation.

SeaDrill (Norway)

Whole Period:  
NYSE offered the lowest mean prices, however OSE beat NYSE in the majority of the cases.

Findings: Since NYSE offered the lowest mean prices we recommend buying the SeaDrill stock from NYSE.

First Period:  
OSE gave the lowest mean price and offered the cheapest price according to the ranks test as well. The test statistic was significant enough for us to recommend buying the Seadrill stock from Oslo.

Findings: We recommend buying the Seadrill stock from OSE.

Mid-Period:  
The mean prices are cheaper in OSE than in NYSE and in the majority of the cases OSE offers cheaper prices. The test statistics are significant enough for us to show that OSE offers cheaper prices than NYSE and we therefore recommend this market.
**Findings:** We recommend buying the Seadrill stock from OSE.

**Last Period:**
OSE offers cheaper mean prices than NYSE and in the majority of the cases OSE offered the cheapest prices as well. The test statistics are significant enough for us to recommend buying the Seadrill stock from Oslo.

**Findings:** We recommend buying the Seadrill stock from OSE.

**Statoil (Norway)**

**Whole Period:**
OSE offered the cheapest mean price and offered a lower price than NYSE in the majority of the cases.

**Findings:** We recommend buying the Statoil stock from OSE since they offered the cheapest mean prices as well as the lowest price in the majority of the observations.

**First Period:**
OSE gave the lowest mean price and offered the cheapest price according to the ranks test as well. The test statistic was significant enough for us to recommend buying the Statoil from Oslo.

**Findings:** We recommend buying the Statoil stock from OSE

**Mid-Period:**
Out of 370 observations, in 187 cases OSE offered the cheaper price in NOK. In 186 cases of the 370 observations OSE offered cheaper price in SDR. The mean price is also lower in OSE. The test statistic is not significant enough to recommend any of the markets.

**Findings:** Since the level of significance was above 0.05 the prices were statistically the same on both markets and we are therefore unable to make any recommendation.

**Last Period:**
OSE offers cheaper mean prices than NYSE and in the majority of the cases OSE offered the cheapest prices as well.

**Findings:** The test statistics are significant enough for us to recommend buying the Statoil stock from Oslo.

**5.3. Entire Population**

**First Period:**
There is no statistical difference between the stocks home market and foreign market(s) in terms of offering abnormal returns over time. However, the home market offered cheaper mean prices than the foreign market(s).

**Mid Period:**
There is no statistical difference between the stocks home market and foreign market(s) in terms of offering abnormal returns over time. However, the home market offered cheaper mean prices than the foreign market(s).

**Last Period:**

There is no statistical difference between the stocks home market and foreign market(s) in terms of offering abnormal returns over time. However, the foreign market(s) offered cheaper mean prices than the home market.

**Whole Period:**

The results for the whole period turned out to be inconclusive. In terms of the home currency the foreign market offered the cheaper prices but denoted in SDR the home market offered the cheapest prices.
Table 5.3 Summary of Findings

<table>
<thead>
<tr>
<th>Exchange Type</th>
<th>Overall</th>
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<th>Mid</th>
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<td>0/6</td>
<td>0/6</td>
</tr>
<tr>
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<td>2/3</td>
<td>0/3</td>
<td>0/3</td>
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<tr>
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<td>2/6</td>
</tr>
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</tbody>
</table>
5.4. Overall Analysis

This table shows the number of recommendations each stock exchange received. This gives a good overview on where the generally best location to buy a Nordic stock is during the different periods.

Whole Period:

Some of the results need a bit of explanation. SSE for example looks worse than it is with its zero recommendation in all periods except the first (which had one). In many of the cases this was due to the high degree of efficiency between SSE and the compared markets. So, in several of the cases with Swedish stocks we could not make any recommendation since the difference between the markets was statistically insignificant. In the case of the Swedish company Lundin Petroleum we could not make any recommendation due to the small number of observations.

Our comparison shows that HSE and OSE are the two best places to invest in for the whole period. In 5 out of 6 cases, OMX Helsinki turned out to be the cheapest location to buy Nordic cross-listed stocks from. The sixth case involved a tie between OMX Helsinki and NYSE ADRs where we could not recommend any one of them to be a cheaper location than the other. Point to be noted here is that, 2 of those 5, namely TeliaSonera and Nordea, were Swedish. Therefore, for three out of four Finnish companies, OMX Helsinki has been the cheapest place to buy stock from.

Our study included 6 Norwegian firms and in 3 cases Oslo Bors (OSE) came out to be the best location to invest in. For fourth and fifth firm, Frontline and Seadrill respectively, NYSE turned out to be the cheapest location and the sixth firm, Royal Caribbean Cruises; we have been unable to come up with a recommendation.

We had 2 Icelandic firms in our sample, Atlantic Petroleum and Bank Nordik. For Bank Nordik, ICEX was the best location to invest in and in case of Atlantic Petroleum, ICEX and CSE generated statistically same prices.

In case of CSE, it had only one Danish firm, Novo Nordisk, which proved to be cheapest in CSE. The other 3 Nordic firms listed in CSE included 1 Swedish and 2 Icelandic.

The most noteworthy observation from our whole period analysis has been, in most cases Nordic stocks tended to be cheaper at home stock exchanges than in others. However, OMX Stockholm has been an exception because it tended to be much integrated and more efficient. Nevertheless, based on the results of this thesis, we reckon OMX Helsinki followed by Oslo Bors to be the best places to buy Nordic stocks from.

First Period:

For the six Swedish firms listed on OMX Stockholm (SSE), only for one, ABB, SSE proved to be the best location to invest in. For the rest five companies listed on SSE, two were at a tie with others, two were cheaper in HSE and one was cheaper in LSE.

Three out six Norwegian firms offered their stocks cheapest on Oslo Bors (OSE). For the rest three, one was offered cheaper on NYSE, another on LSE and for the last one we could not come up with any recommendation.
For the two Icelandic companies the number of observation was too low to run tests on them. Yet again HSE proved to be the best location where five out of the six stocks listed on it were being offered at the cheapest price. The sixth one, Nokia, was in a tie between HSE and NYSE ADR.

Similar to the whole period, the only Danish cross-listed stock was offered cheapest in OMX Copenhagen (CSE). The three other stocks listed on CSE were actually two Icelandic and one Swedish.

**Mid Period:**

SSE could not be the best location even in the mid period because Swedish stocks were offered at cheaper prices abroad or at similar prices to SSE. For CSE, two of the cross-listed stocks were offered at a cheaper price at ICEX and HSE respectively, and the other two, including the Danish Novo Nordisk, were not significantly offered at a cheaper price anywhere.

For the two Icelandic firms, one was cheaper in ICEX and for the other the test statistic was not significant enough to suggest any location to invest.

Four out of the six HSE listed companies were Finnish. Two of them were offered cheaper on Non-NASDAQ OTC, one in NYSE ADR and the last one was offered cheapest on HSE. For the two Swedish firms cross-listed on HSE, their stocks were offered cheapest on HSE.

**Last Period:**

Also in the last period, SSE’s position did not change. Of the six Swedish cross-listed stocks, one was cheaper on CSE, one on HSE, one on NASDAQ New York, one on LSE and for the rest two their markets were efficient enough not to offer lower prices in any of them.

For the Danish firm, Novo Nordisk, their markets were efficient, so it could not be bought at a discount anywhere. However, for the last period, CSE offered Nordea stock at the cheapest prices, a shift from HSE. The Icelandic firm, Atlantic Petroleum, also listed on CSE, offered cheaper price in their home market, ICEX. Finally, another Icelandic firm, Bank Nordik, listed on both CSE and ICEX, did not yield any significant test results to recommend any location over the other.

There was also a shift towards cross-listing efficiency for Norwegian firms. Only two offered cheaper prices on OSE and for the rest four, the markets were efficient enough not to allow us to give any recommendation as to where to invest.

Two out of the four Finnish cross-listed firms offered cheaper prices on HSE, one on NYSE ADR, and the fourth one’s stock exchanges were efficient enough not to allow us to recommend any location. For the two Swedish firms listed on HSE, Nordea was being offered at a discount on CSE but TeliaSonera was still offered cheap on HSE.

** Entire Population:**

The tests we performed on the entire population naturally reconfirmed H1 that the mean returns between home market and foreign market are the same as well as the rejection of H2. It also confirmed H3 that mean prices are not the same between the markets. In a slight majority of the cases the home market offered cheaper prices than the foreign market(s).
5.5. Discussion

There has been a rise in the trend of efficient markets along the years. Especially from the mid period, which represented the global financial crisis, we observed less stock exchanges offering stocks at a significant discount compared to its counterparts. This is in line with the conclusion made by Mun & Brooks (2012) that markets become more integrated after a global financial crisis.

Home bias is not usually associated with positive outcomes, as discussed in chapter 3. However, if home bias exists for Nordic investors, it is a blessing in disguise because overall, Nordic cross-listed firms’ stocks are cheaper in Nordic stock exchanges than in US. From the case of ABB it is apparent that Six Swiss and OMX Stockholm offer almost similar prices. For AstraZeneca, choosing between LSE and SSE was more difficult than between LSE and NYSE or SSE or NYSE. For these stocks the markets within Europe were more integrated than they were with the American markets.

Another notable issue was that Nordic firms usually traded in US through Non-NASDAQ OTCs or ADRs which are not exactly the same as equity on NYSE. ADRs generally should follow the home market prices and primarily firms issue these to reduce the listing and transaction costs. Therefore, in theory the prices of ADRs should be the same as home market equity. However, in our study we found that generally, Nordic cross-listed firms’ ADRs are more expensive than buying equities from home market.

Understanding observed patterns in multi-market trading is of great interest to managers who want to maximize their ability to raise capital at low cost, exchanges who vie for new listings, and regulators who are challenged with balancing investor protection and the continued competitiveness of U.S. markets. Moreover, as individuals and institutional investors search for superior performance, international exposure, being a key component in achieving high risk-adjusted returns, can also impact relative trading across markets for cross-listed stocks. (Athanassakos, Ackert, Naydenova, & Tafkov 2010, p. 245).

When our findings suggest that for a certain stock the markets are efficient, this does not imply that they will be so all the time. We merely suggest a base for the degree of efficiency. If the historical data suggested the home market to offer lower prices than foreign markets, investors will have a starting point. The six lessons of market efficiency already discussed in 3.2.2 must be kept in mind. Like Brown (2011, p. 93) found that sophisticated investors can always earn abnormal returns exploiting the anomalies or the deviations from EMH. Our study could be useful to them in understanding which market generally offers underpriced stock but we reckon uninformed investors would find our thesis most useful because just by investing in locations we suggested, over a period of time they would be better off than others who invested in other locations with higher mean prices.

We found ample evidence on market imperfections every time home stock exchange offered statistically lower mean prices than foreign listings and vice-versa. However, if one market offered superior returns or underpriced stocks for long, all investors would flock to the place offering underpriced stocks continuously. Here arbitrage comes into play and keep the prices ‘somewhat’ in equilibrium.

Though academics made critics on home equity bias, we found evidence that home bias in Nordic exchanges had been beneficial to investors if the investors were home biased. All the academic journals we studied for our theoretical frame on home bias were based on U.S., Asia and Western
and Central Europe. We believe our work on Nordic cross-listed firms add contradictory views on the existing literature which is also our contribution in the field of finance.

We also found evidence supporting Abdallah et al.’s (2011, p. 589) notion that cross-listing signals the quality of the firm through its ability to meet the international listing requirements. The home investors react to this positive signal by trading their share more and we believe that could be the reason for the continuous success of the stocks in their home markets and sometimes abroad. However, we are unable to draw any inference on the spillover effects discussed by Gagnon and Karolyi (2009) because trading volume and its interaction with prices is beyond the scope of this thesis.

Although foreign exchange risk attracts much attention in the field of academic research, we did not find any evidence on how changes in foreign exchange rates affect the return on stocks. We used the home currency and also SDRs while testing our hypotheses and we hardly found a case which changed the hypothesis results because of calculating mean prices or returns in two different currencies. Foreign exchange rates do change the returns on stock and at times these returns can be considerably high or low due to the home currency of the investors but in the whole period or sub-periods currency did not have any significant effect on the results of the statistical tests.

It is plausible to infer from our sample as to why they cross-listed and why mostly in U.S. We believe all the reasons cited in chapter 3 for which firms’ cross-list are applicable for Nordic Cross-listed firms. However, it was interesting to see that their share prices were most often more expensive or statistically same in U.S. Of course, they wanted to get into deeper financial markets but we reckon the prestige and image were the most crucial reasons for the Nordic firms to cross-listed in U.S. Also, by cross-listing they reaped the benefit of Merton’s (1987) investor recognition hypothesis. All our sample firms, except Nokia, have earned positive returns and gained rise in stock prices over all periods studied in this thesis. However, the effect of cross-listing on the ask-bid spread is beyond the scope of our research.

We also find evidence supporting Hailing et al.’s (2008, p.755-756) finding that the relative attractiveness of US markets for the trading of cross-listed stocks appears to have decreased over time for developed market companies because Nordic cross-listed firms’ stocks are more attractive to buy from their home markets. We agree with Hailing et al.’s (2008, p.756) that in European firms, a cross-listing appears, if anything, to contribute to domestic trading activity. In these cases, clearly, cross-listing in the United States aimed not at developing an active market there, but at other purposes - such as enhanced access to local equity issuance, bonding to the stricter corporate governance rules of the US market, expansion by mergers and acquisitions in the US market, or simply greater product market visibility (see Merton (1987)) and reputation.

From this research we also find supporting evidence towards Melvin and Valero’s (2009, p. 89) recommendation that more transparent accounting and corporate governance standards coupled with stricter laws in the home market might serve as a partial substitute for a US listing. Our sample included 18 firms who were cross-listed in 22 stock exchanges excluding their home ones. 13 out of these 22 listings were in US which means that 59% of our sample had cross-listings in U.S. Most probably the others did not feel the need to because Nordic markets are regarded as developed markets and also associated with transparent accounting and high corporate governance standards.
Nevertheless, the Nordic cross-listed firms did overcome capital market segmentation by cross-listing in deeper capital markets and the biggest evidence of this has been the results of H1 which proved that the mean returns are the same in all markets. The markets are efficient to a great extent when we compare daily returns but statistically for most of our sample firms, there exists a market where the prices are cheaper compared to others.

We agree with Merton (1987, p. 484) that financial models based on frictionless markets and complete information are often inadequate to capture the complexity of rationality in action. In real world situations these kinds of conditions are rarely seen and market participants are not always rational. Merton uses an example: “in the modern tradition of finance, financial economic organizations are regarded as existing primarily because of the functions they serve and are, therefore, endogenous to the theory”. Thus our findings support Merton’s notion and even though in theory markets are efficient, in reality they are imperfect and there exist chances of buying the stock at a cheaper location, optimizing the amount spent, even though the returns are the same.
6. Conclusion and Recommendations

In this chapter we draw conclusions on our paper based on our empirical findings and give suggestions for further research and discuss the limitations of our research. We finish the chapter by assessing the quality of our research.

6.1. Conclusions

The purpose of our research was to investigate whether geographic location matters when investing in a Nordic cross-listed stock. To investigate this we included 100% of the population, which are all the Nordic cross-listed firms over a period of ten years. The selection of the sub-periods was based on the business cycle during these years, starting with the recovery from the dotcom bubble to the peak of 2007 down to the slump of the sub-prime crisis and ended with the recovery up to April 2\textsuperscript{nd}. Our main research question was: Does the investing location matter for investing in Nordic cross-listed stocks? Following this main question we also devised two sub-questions: Can an investor earn abnormal returns by choosing the “optimal” stock exchange from where to buy a specific Nordic cross-listed stock? And: Does a secondary market exist where Nordic cross-listed stocks are most often underpriced? To answer the main research question we used three hypotheses: **H1**: The mean returns between the home market and the foreign market are the same. **H2**: Either of the markets offered higher mean returns. **H3**: The mean prices are not the same between the markets.

The first hypothesis was accepted since we did not find any significant differences between the returns across the markets. By default H2 was then rejected. H3 was accepted in most cases since we found evidence that stock markets existed where the stocks were underpriced. This meant that the amount needed to invest in this market was lower in absolute value; therefore we concluded that the investor could optimize the amount spent if not the returns.

For all Nordic cross-listed firms our evidence could not suggest a specific location because individual firms differed in locations of listings. Yet, we were able to find a certain location for each individual firm. We also found that HSE among all the Nordic stock exchanges offered cheaper prices in more cases than any other Nordic stock exchanges. On average for Norwegian firms, OSE proved to be the cheapest location for investing in Norwegian cross-listed firms. SSE came out to be the optimal stock exchange for only one stock during only one period. In many of the cases there were no statistically differences in terms of prices between SSE and other locations Swedish firms were listed. These results indicated that SSE was integrated to a wider extent with foreign stock exchanges than the other Nordic marketplaces.

Following the recession the markets became more integrated in a sense that they no longer offered significant price difference to the same extent as before the recession. This confirms the conclusion from Mun & Brooks (2012) that global financial crisis strengthens the correlation between stock markets.

The first sub-question is answered with a no, since H1 was accepted and H2 was rejected. However, we can conclude that investors can optimize the amount spent on the stock by choosing the optimal market, earning the same returns.
The answer to the second sub-question is yes, since both HSE and Oslo Bors offered cheaper mean prices in the majority of their observed cross-listed stocks during the whole period and the sub-periods. Therefore we can conclude that a secondary market exists where Nordic cross-listed stocks are most often underpriced.

Taking all the observations into two tables we reconfirmed that mean returns are statistically the same and that there are opportunities to earn extra profit by buying from the market which currently offers the cheapest price.

6.2. Contribution of our Research

This study has confirmed Merton’s (1987) critique on frictionless markets and how it does not imply in the real world scenario. Our study also confirms Brown’s (2011) proposition that EMH by itself does not imply anything about competitive equilibrium in capital markets. The issue is not whether the hypothesis is true or false but whether it is sufficiently true to serve as a practical benchmark for money manager performance. Therefore the degree of efficiency is important.

The practical contribution of our research is that investors can use our study as a starting point in choosing where to invest in a certain Nordic cross-listed stock. We contribute to the demand-side argument as to where exactly an investor may buy a Nordic cross-listed stock from. This research proves to be of special interest for investors willing to invest in OMX Helsinki since five out of six Nordic cross-listed stocks have been underpriced throughout the whole period as well as in the majority of the sub-periods. Our study has filled a gap in the cross-listing literature, exploring the cross-listing phenomenon in the Nordic market, which has been non-existent in published academic research conducted in English. Besides the practical contribution for investors our study may also be useful for Nordic companies who are interested in the pros and cons of being cross-listed; stock exchange authorities/companies looking forward to attract more listings; and host government and policy makers to design policies in a way which increases this phenomenon. Needless to say, the Nordic countries together represent a sizable market and several stakeholders in this area should find our research useful.

6.3. Limitations of Research

We have tested the hypotheses with appropriate statistical models to answer the research question. Yet there are some limitations of our study. Firstly, we could not find one single optimal stock exchange to invest in Nordic cross-listed firms that would outperform the market consistency. The markets vary on individual stocks. This was due to the fact that there are 4 stock exchanges in the Nordic region and all companies were not listed on the same stock exchange. For this reason we could not formulate a single test for all the firms in our sample. Secondly, our results are based on historical data and therefore do not necessarily reflect the future behavior or the stocks. This is connected to the first lesson of market efficiency, “Markets Have no Memory”, discussed in chapter 3.2.2. Thirdly, not all stocks were cross-listed for the whole period. Those were few in number but we reckon that the inclusion of them could enhance our findings.
6.4. Quality of Results

We believe our findings followed by analysis and discussion will be of use to investors, managers, stock exchange authorities, regulators and also governments. This research has scientifically proven that certain stock exchanges offer the same stock at lower prices and when investors know about this, they would prefer buying from stock exchanges which historically offer same stocks at lower prices, ceteris paribus. Stock exchange authorities and government can use the findings of this thesis to figure out ways to attract more listings or capital inflows respectively. However, we reckon it is important to assess the reliability and validity of the results that guide and set boundaries for the readers for the generalization aspect of our research. As already mentioned earlier that business world is subject to continuous changes and markets have no memory. In such a social setting it is not desirable to put blind faith in the way markets reacted in the past and expect them to do the same in future. We have worked through the whole business cycle of the recent past and this can act as a starting point or base as to how reflect upon similar trends in the future. Most importantly, one must keep in mind that our work has been purely based on Nordic firms so may not apply to firms from other parts of the world.

6.5. Suggestions for Further Research

During the course of our discussion we had issues upon which we could not reflect. This was because we considered those issues to be beyond the scope of this thesis. Firstly, this research could be replicated on other markets. It would be particularly interesting to see the results if similar research was done on emerging and developing markets. Secondly, we felt that Nordic markets should have had more attention from the academics. Even though they are regarded as narrow markets yet they are the homes to some of the Europe’s biggest MNCs and are also regarded as developed markets in terms of transparent accounting and high corporate governance standard. Exploring investor recognition hypothesis, effect on trading volume followed by cross-listing, and enhancement of bonding hypothesis followed by cross-listing for Nordic firms add further value to the existing research on cross-listing, EMH and market imperfection.

Most importantly further research is needed on the transaction costs and risk associated with investing in different stock exchanges, that is, will the stock be still desirable after paying commission to the brokerage house. An analysis reflecting on company’s beta and market beta for the Nordic cross-listed stocks can also add value to the choice of investment location. It can also be of particular interest to investigate the ease to invest in, in terms of regulations and access to markets, for investors, regardless of the location they are based in. Behavioral issues motivating the choice of location can be looked into as well.
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