

# **The Wealth Effect of Banking Merger Announcements**

*An Event Study of the Nordic Financial Services Industry*

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## **Abstract**

The purpose of this paper is to provide further empirical evidence on merger gains in the financial services industry. This is done by means of an “event study” of the Nordic market. The data sample underlying the analysis consists of 28 Nordic mergers in the period between 1999 and January 2006. The empirical analysis in this paper calculates excess returns of financial institutions around the merger announcement date within a 30-days event window.

The findings support previous European research of Cybo-Ottone and Murgia (2000) who find support for the synergy hypothesis of M&A activity meaning that bidders and the combined entity experience positive cumulated abnormal returns, whereas the bidder’s CAAR are not significantly different from zero. In the empirical analysis, significant deviating merger gains between domestic vs. international, cross product vs. focused and shares- vs. cash-payment could not be found. This might be caused by the small data sample underlying the analysis. Further research is necessary to determine the success/failure of different merger drivers.

## Foreword

While trying to find literature on bank M&As, I was surprised how difficult it was to find information on the Nordic market in this field even though merger activity was rapidly increasing during the last decade. At the same time, there was an astonishing vast amount of research going on in the US and the rest of Europe. This sparked my interest in applying the “event study”-methodology in a Nordic context to see whether results are different from the rest of the world.

Not just because of the difficulty of finding data, I was dependent on the help and assistance of several people throughout the thesis writing process. In the following, I would like to mention some of these people personally:

First and foremost, thanks to my thesis supervisor Tore Leite whose door to his office was always open and who devoted his time to giving me valuable feedback and criticism throughout the entire planning and writing process.

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I would like to address a final recognition to my future wife, Anne E. Maanum, who encouraged me to keep going when progress was slow.

Bergen, 7 June 2006

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# Table of Contents

<b>ABSTRACT.....</b>	<b>2</b>
<b>FOREWORD .....</b>	<b>3</b>
<b>TABLE OF CONTENTS.....</b>	<b>4</b>
<b>TABLES.....</b>	<b>6</b>
<b>TABLE OF FIGURES.....</b>	<b>7</b>
<b>1. INTRODUCTION .....</b>	<b>8</b>
1.1 RECENT CONSOLIDATION IN THE FINANCIAL SERVICES INDUSTRY .....	8
1.2 TRIGGERS FOR THE RECENT M&A WAVE.....	11
1.3 MOTIVATION FOR THE STUDY.....	12
<b>2. THEORETICAL FRAMEWORK.....</b>	<b>14</b>
2.1 BASIC ECONOMICAL BACKGROUND FOR MERGER GAINS.....	14
2.2 DEVIATING MERGER ANNOUNCEMENT RESULTS BETWEEN THE US AND EUROPE .....	16
2.3 BIDDER VS. TARGET RETURNS .....	19
2.4 CROSS-SECTOR MERGERS .....	20
2.5 DOMESTIC VS. INTERNATIONAL MERGERS.....	25
2.6 CASH VS. STOCK PAYMENT .....	27
<b>3. DATA COLLECTION.....</b>	<b>30</b>
3.1 DATA COLLECTION FROM ZEPHYR.....	30
3.1.1 <i>Geographical scope</i> .....	30
3.1.2 <i>Industry classification</i> .....	31
3.1.3 <i>Listing</i> .....	31
3.1.4 <i>Deal type and status</i> .....	32

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3.1.5	<i>Results from Zephyr</i> .....	33
3.2	DATA COLLECTION FROM DATASTREAM .....	33
<b>4.</b>	<b>METHODOLOGY</b> .....	<b>35</b>
4.1	EVENT WINDOW .....	35
4.2	DETERMINATION OF ABNORMAL RETURNS .....	36
4.3	AGGREGATION OF THE ABNORMAL RETURNS .....	37
4.4	SIGNIFICANCE TESTS .....	38
4.5	STATISTICAL CONSIDERATIONS OF THE EVENT STUDY METHODOLOGY .....	40
<b>5.</b>	<b>ANALYSIS OF THE RESULTS</b> .....	<b>42</b>
5.1	RESULTS FOR THE ENTIRE SAMPLE .....	42
5.2	RESULTS OF MERGER DRIVERS .....	45
5.2.1	<i>Cross product vs. Focused Deals</i> .....	45
5.2.2	<i>Domestic vs. International</i> .....	47
5.2.3	<i>Medium of Payment</i> .....	50
5.3	REMARKS ON THE EMPIRICAL RESULTS .....	51
5.3.1	<i>Power of the Tests</i> .....	51
5.3.2	<i>Statistical vs. Practical Significance</i> .....	52
<b>6.</b>	<b>SUMMARY AND OUTLOOK</b> .....	<b>54</b>
6.1	SUMMARY OF THE EMPIRICAL ANALYSIS .....	54
6.2	FUTURE RESEARCH .....	55
	<b>REFERENCES</b> .....	<b>57</b>
	<b>APPENDIX 1</b> .....	<b>60</b>
	<b>APPENDIX 2</b> .....	<b>61</b>
	<b>APPENDIX 3</b> .....	<b>64</b>

## Tables

<b>Table 1: Final data sample retrieved from Zephyr and Datastream</b> .....	34
<b>Table 2: Entire Sample</b> .....	42
<b>Table 3: Bidder vs. Target (One- Sampled)</b> .....	43
<b>Table 4: Bidder vs. Target (Two-Sampled)</b> .....	43
<b>Table 5: One-Sample Cross product vs. Focused</b> .....	45
<b>Table 6: Two-Sample Cross product vs. Focused</b> .....	46
<b>Table 7: One-Sample Domestic vs. International</b> .....	48
<b>Table 8: Two-Sample Domestic vs. International</b> .....	48
<b>Table 9: One-Sample Method of Payment</b> .....	50
<b>Table 10: Two-Sample Method of Payment</b> .....	50

## Table of Figures

<b>Figure 1: M&amp;As of US Financial Institutions</b> .....	9
<b>Figure 2: M&amp;As of EU Financial Institutions</b> .....	9
<b>Figure 3: Becher (2000); Hubris vs. synergy hypothesis</b> .....	20
<b>Figure 4: Time Line of an Event Study</b> .....	36
<b>Figure 5: MacKinlay (1997); Power of event study methodology</b> .....	64

# 1. Introduction

The purpose of this paper is to provide further empirical evidence on merger gains in the financial services industry. This is done by means of an “event study” of the Nordic market. The data sample underlying the analysis consists of 28 Nordic mergers in the period between 1999 and January 2006. Beyond the investigation of whether Nordic banking mergers follow the empire building or synergy hypothesis, the impact of cross-segment deals, cross-border deals and the medium of payment will be of major concern to the study.

The paper is organized as follows: The rest of chapter 1 presents background information on the financial services industry and motivates the study; chapter 2 highlights economical and financial theory and previously undertaken research in the field; chapter 3 describes the data collection process; chapter 4 outlines the methodology used in the empirical analysis; its results are then pinpointed and discussed in chapter 5; finally, chapter 6 summarises the findings and tries to give an outline for further research in the field.

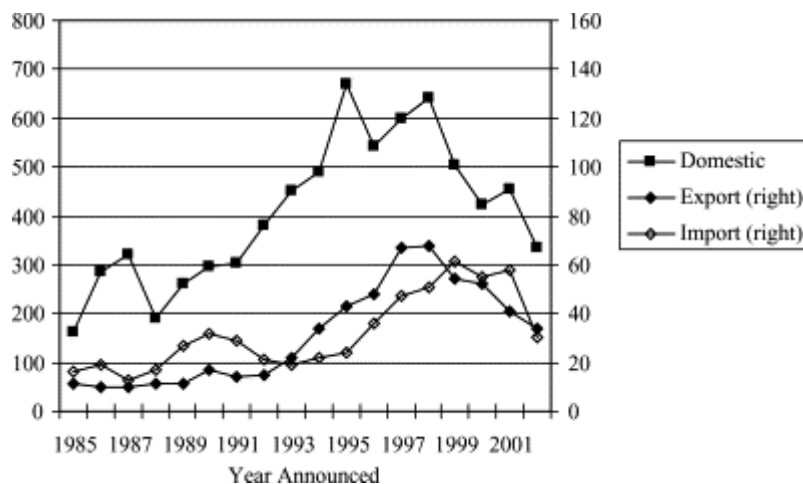
## 1.1 Recent Consolidation in the Financial Services Industry

The amount of M&A activity in the financial sector has been increasing rapidly in the last decade in most parts of the world. Becher (2000) states that US bank mergers have more than doubled in the 1990s. During this period, Europe also experienced a marked increase in merger activity in the financial services industry. Cybo-Ottone and Murgia (2000) point out that that the number of yearly European M&A deals increased from 15 in 1985 to 50-90 between 1986 and 1994. Beitel et al. (2004) explain the reduction of European commercial banks from 12.670 in 1985 to 8.395 in 1999 mainly by means of mergers between banks. Berger et al. (2004) provide a graphical illustration of M&A development in the US and Europe.<sup>1</sup>

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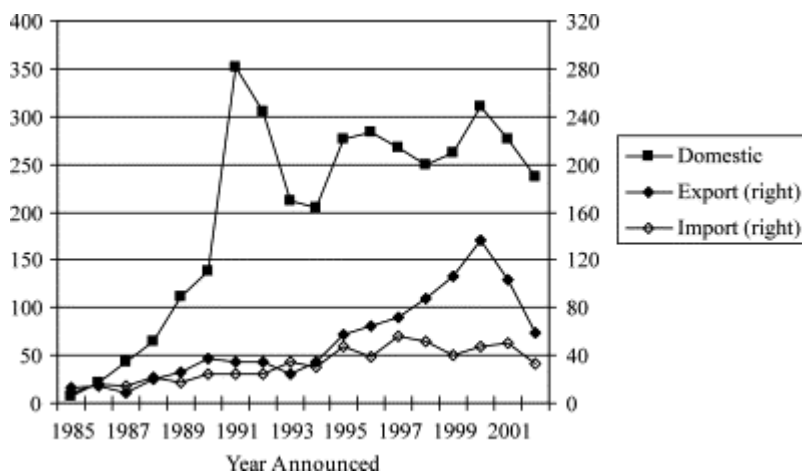
<sup>1</sup> Berger et al. (2004) take the data for the graphs from Thomson Financial Securities Data database on Worldwide Mergers and Acquisitions





*Figure 1: M&As of US Financial Institutions*

Figure 1 shows that the US experienced tremendous growth in domestic mergers. An export US M&A is a purchase of a non-US firm by a US firm. The opposite is valid for an import M&A. Domestic mergers are apparently the dominating merger type although there was also a strong increase in cross-border M&A.



*Figure 2: M&As of EU Financial Institutions*

Figure 2 illustrates the development of M&A activity within the EU. Mergers in which both parties involved are from EU member states are considered as domestic mergers. The graph for the EU looks similar to the one with US data.

An interesting feature of both graphs is the drop in M&A activity around the year 2000. Goergen and Renneboog (2004) explain the stylised fact that M&As occur in merger waves. The authors explain the drop around the year 2000 as signalling the end of the fifth merger

wave, which was caused by a collapse of consumer confidence and overcapacity of traditional markets.

According to Øverli (2003), industry concentration is highest in the Scandinavian and Benelux countries among the members of the EOS. Sweden and Finland have the highest Herfindahl-index<sup>2</sup> for market concentration. The author argues that internationalisation in the financial services industry takes place mainly through M&A and to a smaller extent through the establishment of foreign branches. High market concentration in Scandinavia can be interpreted as a sign of strong M&A activity in these countries during the last decade.

Recent history of the Nordic financial institutions market might explain the rather high market concentration. In addition, it is crucial to be aware of the most important incidents when studying this market. Lindblom (2001) provides a brief summary of the most important incidents.

Following the deregulation of the banking market in the 1980s, Scandinavian central banks enhanced the amount of money circulating in the economy. Banks had high amounts of money and granted high credits to market participants without proper risk management systems. Naturally, banks experienced high credit losses due to customers not being able to pay back debts. This led to a profound financial crisis in the beginning of the 1990s.

The banking crisis led to a change in the industry structure. Banks that were more efficient acquired less efficient ones. Thus, a period of consolidation and M&As followed the banking crisis. This consolidation continues to this day as there is still a vast amount of merger activity in the Nordic market.

Consequently, the observation of wealth effects after the announcement of a planned M&A is a contemporary topic especially in the Nordic market. Moreover, as shown above, virtually all industrialized countries have experienced a period of consolidation in the financial services industry. This global phenomenon provokes two questions:

- What triggers accelerating industry consolidation?
- What are the gains/outcomes of the consolidation?

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<sup>2</sup> According to Verdier (2003; 145), the Herfindahl-index is a “measure of the market share of the top five or ten banks”

The next section will briefly discuss the first question, whereas the paper's main intention is to enhance insight into M&A gains in the financial services industry.

## 1.2 Triggers for the recent M&A Wave

Section 1.1 described the rapidly increasing amount of banking mergers. Berger et al. (1999) provide several concurring reasons for the consolidation wave in the 1990s.

- Technological progress: Scale economies may have increased due to technological progress. New products, i.e. risk management tools, can be provided more efficiently by big firms than by others. New delivery services for depositor services such as ATMs may exhibit potential for scale economies.
- Improvements in financial conditions: Corporate finance theory argues that a high amount of “free cash-flow” increases M&A activities as more NPV-increasing investments can be undertaken. In the US, bank profits broke records in the 1990s.
- Accumulation of excess capacity or financial distress: Some industry participants might operate below the efficiency frontier, meaning that excess capacity may be removed by, i.e., substituting management. Similarly, management is tempted to undertake risky M&As in times of financial distress in an attempt to ensure its working places.
- International consolidation of markets: The globalization of markets reinforced internationalisation of the financial markets, too. International trade creates cross-border capital flow. Thus, a need for currency securitisation, international deposit and loans is created.
- Deregulation: Different acts in the EU and the US relaxed banking restrictions. Thus, cross-border, cross-segment deals became a valuable option for financial institutions. It increased their reach and opened up for further efficiency gains.

This list provides an insight into reasons for the accelerating financial consolidation taking place in the end of the last century. However, it just outlines the underlying reasons. It does

not provide any information on the economical justification of M&As. This paper intends to shed further light on merger gains and their origin.

### 1.3 Motivation for the study

Another introductory consideration is the choice of the regional scope in the analysis. As mentioned above, the paper investigates the Nordic market. The term Nordic as used in this paper includes Scandinavia, Iceland, Finland and the three Baltic countries.

Iceland has a very small home market. Thus, big local financial conglomerates are forced to expand their business activities abroad in order to grow. Many Icelandic companies have recently invested in the Scandinavian countries. This fact in addition to its historical and cultural ties, serve as justifications for Iceland's inclusion in the data sample.

The Baltic countries comprise Lithuania, Latvia and Estonia. These countries have become major investment opportunities for Scandinavian financial institutions during the last several years.<sup>3</sup> This was reinforced following the integration of the Baltic countries into the European Union. Joining the EU, they now had to stabilise their economical situations and reduce trade restrictions. As a consequence, FDI into these countries became more attractive. Ongoing investment activities of Scandinavian financial market participants in the Baltic countries made it natural to include these countries into the sample as well.

According to Houston et al. (2001), most research on bank mergers is based on one of two approaches. The first approach focuses on changes in accounting numbers and ratios before and after the merger. Beitel et al. (2004) call this approach performance studies because performance measures are compared. In this way, efficiency gains extracted from the merger can be determined. One major pitfall of this methodology is the difficulty in measuring efficiency gains reliably as these do not occur at once when the merger is established.

The second approach is the "event study" approach, which is applied in this paper. Given the requirement of efficient markets<sup>4</sup>, new information is incorporated immediately in the

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<sup>3</sup> See website of the Index of Economic Freedom for Estonia 2006

<sup>4</sup> For an explanation of market efficiency theory see chapter 2.6

current stock price. As such, it is possible to measure shareholders' expectations of future cash flows to the company when the merger is announced. A drawback of this methodology is that financing information is mixed with merger information. It is therefore difficult to analyse the effects separately. Moreover, in a consolidation wave, mergers are anticipated and the stock price reaction does not reflect the true value of the merger. In spite of its drawbacks, this method is widely accepted and used in banking merger research.

To the author's knowledge, there has been no research on the Nordic market undertaken using the event study methodology. This is probably because Nordic financial institutions have seldom been publicly traded (Vander Venet, 1998).

Generally, it is surprising that such few studies on the consolidation of the Nordic financial services industry have been undertaken recently. "Universal banking"<sup>5</sup> is most widespread in the Benelux countries and in the Scandinavian countries as the mergers between i.e. DnB and Gjensidige as well as between Storebrand and Finansbanken illustrate. In addition, this region is culturally assimilated, which might result in bigger gains stemming from international mergers within the region. Thus, the investigation of the Nordic market makes a valuable contribution to research in the field of banking M&As.

In summary, this paper's intent is to contribute to research in the field of M&A by undertaking an event study of merger announcement reactions in the Nordic financial services market. As a result of this undertaking, the gap pertaining to research on the Nordic market shall be reduced.

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<sup>5</sup> For an in depth discussion of universal banking see chapter 2.4

## 2. Theoretical framework

This paper intends to investigate the Nordic financial services market by means of an event study of stock price reactions to merger announcements between a Nordic bank and another market participant in the Nordic financial services industry. In addition, this paper tries to contribute to the ongoing discussion regarding reasons for value creation or destruction of M&As within the financial services industry. In particular, the variables cross-border vs. domestic, focused vs. product diversifying and cash vs. stock payments will be examined.

In the following section, an economical consideration of these variables in relation to merger announcement effects will be undertaken. The purpose of this exercise is to develop the background to formulate hypotheses about the expected behaviour of these variables in the empirical analysis.

### 2.1 Basic economical background for merger gains

To start out a theoretical discussion on wealth effects of merger announcements in the financial services industry, it is useful to consider basic financial theory about merger gains and losses. Brealey et al. (2006) discuss thoroughly the economical reasons for merger success. First, the authors argue that the merged firm needs to be worth more together than the separated entities:

$$Gain = PV_{AB} - (PV_A + PV_B) = \Delta PV_{AB}$$

A positive gain is an economical justification for a merger. However, firm A usually has to pay a premium above the present value of firm B in order to convince shareholders of firm B to agree on the merger. Thus, merger costs need to be considered:

$$Cost = cash\ paid - PV_B$$

Costs calculated in this manner constitute a measurement of the distribution of the merger gains between the shareholders of company A and B. Finally, the net present value of the merger to the acquiring firm A can be determined. The merger should be undertaken if NPV is positive.

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$$\begin{aligned} NPV &= \text{gain} - \text{cost} \\ &= \Delta PV_{AB} - (\text{cash} - PV_B) \end{aligned}$$

A positive NPV can be the outcome of the interplay of different merger benefits. Diaz et al. (2004) present a list of value-maximizing reasons for banking mergers. The foremost mentioned reason is scale economies. Other reasons constitute “*scope economies, market power, improvement of management efficiency, decrease of risk through geographic and product diversification*” (Diaz et al., 2004; 380). The impact of some of these reasons for merger gains will be tested in the empirical analysis of this paper. Accordingly, a theoretical discussion of these will follow in the next chapters.

In practise, mergers sometimes also take place without a positive NPV. Hence, such deals are undertaken without any measurable, economical benefit. Diaz et al. (2004) call merger motives, which cause the acceptance of such deals, non value-maximizing. Management and government incentives play a crucial role in this category of merger reasons.

Management incentives often deviate from shareholders incentives as managers earn higher salaries with increasing firm size. Managers are therefore tempted to acquire other companies just to grow faster and bigger. This phenomenon is referred to as agency problem (Berger et al., 1999).

Governments have direct influence on consolidation in the financial market through legislation and approval/disapproval of M&As. This is because financial stability is of public interest. Usually, governments are concerned about a too high market concentration. In case of financial distress of one of the biggest industry players, financial stability is endangered and governments are pressured to intervene. Hence, the respective bank in trouble is “*too big to fail*” (Berger et al., 1999; 147). Apparently, managers can reduce insolvency risk by growing in order to be classified too big to fail.

These merger motives are solely of strategic and political nature but nonetheless prevalent in the financial services industry. As such, the discussion whether mergers are economically justified will be of major concern in the research of this paper.

Finally, the paper investigates the role of medium of payment in Nordic banking mergers. The medium of payment seems to be crucial to the consideration of targets about whether to

accept a takeover bid. By evaluating the medium of payment, the paper progresses to an investigation of the second issue emphasized by Brealey et al. (2006), namely the distribution of merger gains between bidder and target shareholders.

## 2.2 Deviating merger announcement results between the US and Europe

Several studies find deviating results between US and non-US mergers (Cybo-Ottone and Murgia, 2000; De Long, 2003). First, this section highlights these deviations between the two regions. Subsequently, economic theory unfolds potential underlying reasons for the different behaviours of the two markets.

Becher (2000) finds for a sample of 558 US bank mergers during the period 1980-1997 a cumulative abnormal return of 22.6% on a 30 days event window basis and 17.1% for an 11 days event window for the targets. The bidders end up with a cumulative abnormal return of -0.1% on a 30 days event window and -1.08% on an 11 days event window. Becher (2000) states that bidders' return on an 11 days event window is significantly deviating from zero, meaning that bidders in US banking mergers experienced a negative return from the merger activity.

Madura and Wiant (1994) criticise this approach of focusing on short-term abnormal returns. Instead, the authors try to find long-term valuation effects of US bank acquisitions. Their sample data covers a 36-month-period. Results show a significantly negative CAR from the second month onwards. Hence, M&A gains in the US are doubtful even in the long-term.

However, research on European bank mergers and acquisitions has not yet been undertaken intensively. This is mainly due to the "*huge methodological difficulties of studying the fragmented European banking market*" (Cybo-Ottone and Murgia, 2000; 832). Vander Vennet (1998) links the rare occurrence of research about European banking mergers to the fact that European banks are seldom publicly traded.

Cybo-Ottone and Murgia (2000) claim their European study of bank merger wealth effects to be one of the first ones. In their research, they find a significantly positive CAR for the bidders and targets combined for all event windows when using a general market index as



benchmark. This finding does not hold for a bank sector index as benchmark as merger announcements usually tend to influence the entire bank sector's stock prices, especially in a small economy. This, in turn, reduces bidders' excess return. Cybo-Ottone and Murgia (2000) argue that the finding of a positive CAR opposes most US research, which usually states no wealth effect to the combined entity. DeLong (2003) estimates the CAR for the bidder as being higher for non-US-mergers than for the US control group, while returns on the targets are lower than for the non-US merger.

These apparently deviating results between US and European research make it necessary to further investigate into regional differences of merger announcements' wealth effect. Scholtens and De Wit (2004) distinguish between two basic theoretical approaches to explain differences in merger announcements gains.

The first approach is based on finance theory. It considers the degree of market segmentation vs. integration. In case of similar results between US and European merger announcements, economic literature suggests a globally integrated financial market, whereas deviating results indicate segmented stock markets between the two regions. The authors warn not to see market integration vs. segmentation as a binary variable. This is due to the apparent existence of a certain degree of integration.

Scholtens and De Wit (2004) identify the degree of market development as the second economical reasoning to explain merger announcements observations. The theory goes back to Fama (1991). It expects new information to have higher effects on stock prices in highly developed financial markets than in less developed ones.

According to Scholten and De Wit (2004), this opens up for the question of orientation of the respective financial market. Orientation of a financial market is dependent on the preferred source of financing of the members of a financial market. In case of a well-developed stock exchange, the issue of securities is an accepted alternative to bank lending. Thus, countries with a strong and active stock market as a financing source, i.e. the US, are considered as market-based systems, while countries, which primarily rely on bank lending for financing purposes, are called bank-based systems, i.e. Germany.

Demirgüç-Kunt and Levine (1999) try to estimate about 150 countries' financial structure in order to determine whether it is market-based or bank-based. One would expect quite similar

results for the Nordic countries, as geography, culture and economical development are assumed quite similar. However, the authors perceive Finland and Norway as rather bank-based, whereas Denmark and especially Sweden are ranked as market-based. This leads to the conclusion that financial structure between the Nordic countries varies from country to country in spite of their geographical proximity. Unfortunately, the article provides no information on the Baltic countries. Iceland is just partly considered in the article. However, the information given indicates a strong bank-based system.

De Long (2003) distinguishes between market-based and bank-based systems in her analysis of bank mergers. She finds that US bank mergers and market-based non US-mergers exhibit much more similar announcement effects than US bank mergers and non-US bank-based mergers. This means that higher abnormal returns to non-US acquirers compared to their US counterparts disappear in the existence of the same financial market system. Given the different financial system heritage within the Nordic countries, De Long's results imply the existence of different wealth reactions to merger announcements between the Nordic countries.

A drawback to the categorizations market- vs. bank-based systems is the existence of a gradual scale, meaning that none of the countries are purely market- nor bank-based (Scholten and de Wit, 2004). Thus, results might be difficult to interpret, especially because Norway, Finland and Denmark are not ranked among the most extreme countries on the bank- vs. market-based scale.

According to Scholten and De Wit (2004), there is a link between research investigating the market development theory and research investigating the drivers of mergers and acquisitions. Beitel et al. (2004) criticise European M&A research arguing that it fails to provide reasons for value creation or destruction of bank mergers. Consequently, the authors test 13 drivers developed from prior US-research for excessive returns to the shareholders in an attempt to explain bank merger success.

Drivers identified by Beitel et al. (2004) include the method of payments, the geographic focus of the merger and the product/activity focus of the merger. These drivers will also be examined in this paper. A theoretical background to these will be presented in detail in the following chapters.

## 2.3 Bidder vs. target returns

Earlier empirical results in the US and Europe correspond with each other in the unequal distribution of merger gains between the bidder and the target. In the following, reasoning for this phenomenon will be developed.

According to Brealey et al. (2006), sellers usually end up better off than buyers. The authors define two reasons for this phenomenon. First, the different size of the bidder and the target plays a major role in imbalances of merger gain distribution. The bidder is often much bigger than the target, leading to significantly higher abnormal returns to the target when the merger gains are equally shared in absolute dollar values. The second and more important reason occurs in cases in which different companies are bidding for the same target. The competitors are bidding up the price, leaving most of the merger gains to the stockholders of the target. Hence, it is rather straightforward to argue that the target company experiences a positive wealth effect in any case.

Roll (1986) discusses the fact that bidders are usually overpaying their targets. Given strong market efficiency, the target's true value is given through the stock price. Tender offers exceeding the market value of the company are consequently made on the management's hubris. Considering cases in which a rival to the bidder exists, they will bid up the price to a point, at which the winner is paying more than the target is worth even though management might still believe in the opportunity to extract synergies and to improve efficiency.

Roll (1986) defines this phenomenon as *hubris hypothesis*. It says that the bidder overestimates the value or the potential of synergies and, thus, pays too much. Consequently, the bidder's wealth effect will be negative, while the target experiences a strong raise in its stock price. The combined gain of the merger is about zero. Copeland et al. (2005; 764) describe this pattern with an expression actually known from initial public offerings (IPO's): "*the winner's curse*". The winner of a bidding war is actually losing due to the high expenses of a merger.

Becher (2000) undertakes an empirical analysis in order to test the *hubris or empire building hypothesis* vs. the *synergies hypothesis* in the banking industry. In order to complement the two extreme views, he introduces a third, the *hubris and synergies hypothesis*. In each of the

three hypotheses, he outlines the payoff structure that each hypothesis gives to the bidder, the target and the combined firm, respectively.

<b>Firms</b>	<b>Hubris or empire building hypothesis</b>	<b>Synergy hypothesis</b>	<b>Hubris and synergy hypothesis</b>
<b>Target</b>	<b>Positive</b>	<b>Positive</b>	<b>Positive</b>
<b>Bidder</b>	<b>Negative</b>	<b>Non-negative</b>	<b>Negative</b>
<b>Combined</b>	<b>Non-positive</b>	<b>Positive</b>	<b>Positive</b>

*Figure 3: Becher (2000); Hubris vs. synergy hypothesis*

Figure 1 shows these outcomes. The CAR to the target is positive in any case. However, while the bidder's return is negative for the hubris and the combined hubris and synergy hypothesis, it is non-negative in the case of the synergy hypothesis. Finally, the combined firm gains from the merger apart from the hubris hypothesis.

Becher (2000) finds in his analysis of US banks support for the combined hubris and synergies hypothesis. Interestingly, the European study of Cybo-Ottone and Murgia (2000) is in favour of the synergy hypothesis, which means that M&A activity in the financial services industry is justified economically from a bidder point of view.

The Nordic sample used in the empirical analysis of this paper is assumed to follow the European pattern. The explanation for this will mainly be developed throughout the next sections.

## 2.4 Cross-sector mergers

A discussion of cross-sector mergers can be deduced from the basic incentives for M&As. As discussed above, Becher (2000) distinguishes between the synergies and hubris hypothesis. Mergers are justified when the synergies hypothesis holds. Thus, synergies in form of, i.e., cost efficiencies or enhanced management efficiency can be achieved by merging the two entities. This section discusses more thoroughly the different forms for efficiency gains.

Brealey et al. (2006; 871) distinguishes between horizontal and vertical mergers. Conglomerates are a third category. *Horizontal mergers* are between companies within the same line of business, whereas there is no connection between companies building a *conglomerate*. Thus, horizontal mergers usually provide opportunities for synergies in the

form of economies of scale or scope. A *vertical merger* takes place between companies at a different stage of production. This kind of merger plays a negligible role in the financial services industry due to the lack of a traditional supply chain. While conglomerate building was quite popular in the 1960s and 1970s, focused mergers have become more central to acquirers.

Similarly, Berger et al. (1999; 144-146) distinguish between “*value-maximization*” and “*non-value maximization motives*”. He sub-divides value-maximizing motives in two further categories.

Companies gain value through consolidation in two ways, namely either by enhancing market power or by efficiency gains. Market power can be enhanced by means of in-market M&A, meaning that two market participants, which used to be competitors, merge. Thus, market concentration increases and the newly merged conglomerate might reinforce its market power in a way that its ability to influence retail prices increases.

Research (Vander Venet, 1997; Focarelli et al., 1998) finds stronger evidence for M&A’s motivated by efficiency gains in European transactions. Berger et al. (1999; 157) describe efficiency gains as “*made by changing input or output quantities in ways that reduce costs, increase revenues, and/or reduce risks to increase value for a given set of prices.*” This might be due to a variety of reasons, amongst these scale, scope and product mix efficiencies.

Apart from the static measurements of efficiency gains, Berger et al. (1999) emphasize the potential for X-efficiencies. This is a dynamic efficiency analysis and determines “*how much closer to or further from the optimal point on the best-practice efficient frontier these firms have moved*” (Berger et al., 1999; 162). The authors mention a potential 20% increase in efficiency ex ante. However, they fail to prove the estimated efficiency gains potential empirically. Because a different approach is used to measure X-efficiency (cost- or profit-function analysis) compared to stock announcement effects, X-efficiency will not be investigated in more depth in this paper.

Boot (2003) presents a list of sources for economies of scale and scope in the financial services industry:

- *Information-related economies:* Information-related economies of scale comprise economies, which are achieved by a more efficient use of databases and other technological aids. Scale economies can be achieved by developing an efficient distribution system, whereas scope economies mainly encompass all efficiency gains created by the reuse of already generated customer and product information.
- *Reputation and brand name marketing:* Scope economies can be extracted by the joint marketing effect to customers. The financial services industry sells more and more products that are heavily dependent on the firm's reputation.
- *Financial innovation:* Economies related to financial innovation are two-sided. On the one hand, it is argued that larger organizations innovate less due to complex structures and bureaucracy. On the other hand, economies of scale contribute to a competitive advantage due to the potential to sell the innovation to a broader customer base. This is especially crucial as competitors are usually able to imitate financial innovations easily.
- *Diversification:* Many financial products are close substitutes. By selling these products within the same organization, it is possible to extract economies of scope by diversification. However, this argument is debated heavily in corporate finance theory. Diversification is often mentioned as a reason for M&A. In contrast, it is as often stated that there is no rationale behind M&A activities as a means for risk diversification. Investors do not pay extra for something that they usually do more efficiently themselves – diversifying their portfolio (Brealey et al., 2006). Advocates of diversification effects argue that through M&A activities, capital is allocated internally to profitable projects, which would have to be raised externally at higher cost. However, it is also possible to destroy value by allocating capital to unprofitable investments.

The gains from banks merging with non-banking financial services companies such as insurances or investment banking companies can be explained by scope economies. Diaz et al. (2004; 380) address the economical reasoning behind scope economies in detail: “*Scope economies make it possible to reduce the cost per unit due to synergies derived from providing several services inside the same entity.*” This means that, i.e., providing insurance products in banks might lead to lower costs per sold product. The authors argue that scope

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economies can be realised by M&A. Interestingly, Cavallo and Rossi (2001) find that the realisation of scope economies is more common in European M&As. They attribute this to Europe's prevalent universal banking principle. *Universal banks* are banks selling non-banking products in addition to traditional banking products.

US legislation traditionally had strict restrictions on banking competition. Commercial banks were prohibited to merge with investment banks since 1933 and with insurance companies since 1954. Just recently the Gramm–Leach–Bliley Act from November 1999 began to loosen the tight regulations for universal banking in the US (De Long, 2003).

In contrast to the US, European legislation is less restrictive in regards to universal banking. The Second Banking Co-ordination Directive of 1989 established universal banking as a common standard in the European Union (Berger et al., 2004). Cybo-Ottone and Murgia (2000) consider universal banking as a European banking characteristic. Going further, the authors state that this less restrictive environment opens up for product expansion as well as cross-selling. The various opportunities of synergies can be illustrated by looking at the company “Allianz”, Germany's biggest insurance company. It is currently planning to install in its branches 1000 ATM-machines belonging to its daughter company, Dresdner Bank, within the next three years.<sup>6</sup> Cybo-Ottone and Murgia (2000) claim to be the first ones including cross product deals in their data sample. Thus, it stands to reason that universal banking might be one of the major explanations for the more beneficial European results.

Verdier (2003; 213) discusses the term “*banc assurance – the distribution of insurance products by banks*”. He distinguishes three different degrees of banc assurance, the highest being a “*full-fledged merger*”. According to the author, this level is most prevalent in the Nordic and Benelux countries. This is yet another justification to undertake this study on the Nordic financial services industry. It is interesting to see whether this high degree of banc assurance leads to higher announcement effects.

In addition, Diaz et al. (2004) argue that M&As between a bank and a non-bank financial services industry company can reduce risk to the merged company due to product diversification effects. This is because selling a variety of different products from within one

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<sup>6</sup>See Handelsblatt, Allianz will bei Bankdiensten helfen; Retrieved: January 28, 2006; <http://www.handelsblatt.com/pshb?fn=tt&sfm=go&id=1180516>

company can reduce “*credit entity risk*”. However, the authors state that this effect is discussed controversially. This is because the effect can be outweighed by misbehaviour of management, which is tempted to run a series of risky projects. This, in turn, increases systematic risk and bankruptcy costs. Allen and Jagtiani (2000; 485) conclude that “*potential gains from synergies and demand effects must be powerful enough to overcome the disadvantages of increased systemic risk exposure.*” Finally, Diaz et al. (2004) argue that not just bank specific risk rises, but also the entire financial system’s risk. This is due to a lower number of entities in the industry and thus, higher risk of financial instability because of one weak market participant in the industry.

Results of empirical studies about economies of scale and scope in the financial services industry seem inconclusive. Berger et al. (1999) mention in their review of different research undertaken in the field that the costs function of the financial services industry is U-shaped. This means that just small banks reveal a potential for efficiency gains, whereas medium-sized and large ones have no scale economies. Altogether, cost reduction is just about 5%. The authors find similar results for the measurement of economies of scope. Difficulties determining efficiency gains arise from different variables affecting merger gains, i.e. the reasons for market concentration and scale economies might apply at the same time. In this case, it is almost impossible to measure to which extent scale economies are the underlying source for gains and to which extent market concentration (Boot; 2003). Consequently, the author suggests putting more emphasis on the type of merger. It seems as if “*mergers with both a geographic and an activity focus are most value enhancing*” (Boot, 2003; 54)<sup>7</sup>.

Newer contributions find a somewhat higher potential for cost efficiency gains in the 1990s. According to Berger et al. (1999), this possibly reflects a higher potential for economies of scale and scope due to technological development in this decade. Hughes et al. (2001) find evidence for economies of scale when adjusting bank production models for capital structure and risk taking. Nonetheless, it remains difficult to measure economies of scale and scope. Cavallo and Rossi (2001) list a number of studies, which reach ambiguous conclusions about the existence of economies and diseconomies of scale and scope. Thus, stock market

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<sup>7</sup> Following Flannery, Mark (1999): Comment on Milbourn, Boot, and Thakor. *Journal of Banking and Finance* 23, p. 215–220.



reaction to the announcement of a cross-sector merger is assumed not to give a significantly higher abnormal return than an in-market merger. However, given the overall success of M&As in a European setting, cross-sector mergers are still likely to be profitable.

## 2.5 Domestic vs. International mergers

International trade theory is the cornerstone not just for non-financial economic activity, but also for multinational banking. Trade theory goes back to Ricardo's *law of comparative advantage*. It is based on the assumption that a firm in one country produces a product in its home country as long as it has a comparative advantage for the product. It exports the product and, in turn, imports products for which it has a comparative disadvantage. The price is set by domestic and international demand for the product (Berger et al., 2004). The law of comparative advantage implies that international trade most likely occurs between dissimilar countries. However, empirical research has shown that this is not always the case. As a consequence of the inconsistencies between empirical results and theory, *new trade theory* developed (Berger et al., 2004).

New trade theory does not require perfect competitive markets. This allows for increasing return to scales and heterogeneous consumer preferences and thus, product diversification. In addition, it also leaves firms the choice of exporting vs. foreign direct investments (FDI). In the case of FDI, firms produce and sell the product in the foreign market.

Williams (1997) distinguishes between internalization and eclectic theory. The former is based on the Coasian assumption that market failure occurs both in the domestic and the foreign market. Transaction costs caused by market failure induce firms to acquire international companies instead of buying the product or service on the free market. In doing so, it is possible to minimize transaction costs as market failure becomes internalized. Transferred to banking, transaction costs might constitute information asymmetries such as knowledge of the local customer base, which is important to create a lasting client-seller relationship. By buying the foreign financial services industry company, the knowledge of the local customer base is internalized and the bank can use the gained insight into the foreign market more efficiently.

Eclectic theory extends internalising theory by adding the requirement of an ownership advantage. Eclectic theory is based upon Dunning's model of multinational organisations. According to Dunning (1981), the preference of a FDI over an exporting strategy is based on three pillars, which all have to be satisfied independently: *ownership advantage, location advantage, and internalization advantage*.

An ownership advantage is developed in the company's home market and is not available in the host market before market entrance. By undertaking the FDI, the ownership advantage can be transferred to the host market. Usually, ownership advantages are knowledge-based as they are easily transferable over big geographical distances (Berger et al., 2004). Williams (1997) mentions product differentiation as a typical example for an ownership advantage in banking.

A location advantage induces a firm to move production abroad. Common location advantages include "*cheap factor prices in the host country; high transportation costs; import quotas and tariffs; and better access to the host country customers*" (Berger et al., 2004; 349). An internalization advantage corresponds with the internalization theory.

According to Williams (1997), this leads to a crucial difference between the theories. In case of the internalisation theory, the benefits of an acquisition are measured by total benefits vs. total costs, whereas eclectic theory calculates the merger gains by subtracting the incumbency costs from the ownership benefits. Williams (1997) concludes that, in his opinion, internalisation theory holds to explain internationalization in banking. Hence, he is in favour of the internalisation theory and outlines different sub-theories to the internalisation theory.

Berger et al. (2004) test the law of comparative advantages and new trade theory empirically. Interestingly, they find evidence for both theories. On the one hand, the authors find higher regularity for cross-border M&A between similar<sup>8</sup> countries, on the other hand they point out the US as having a comparative advantage in the financial services industry<sup>9</sup>.

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<sup>8</sup> The authors do not use the word similar. Instead they describe it as follows: geographically close, share common languages and legal systems, and have similar sized economies and similar levels of economic development

<sup>9</sup> Comparative advantage is achieved because the US has a high standard of export and import of financial services to and from the US.

Beyond this study, empirical studies have mainly focused on information costs as well as regulation between the countries, in which cross-border mergers have taken place. *“Additional efficiency barriers may include language, culture, currency and regulatory/supervisory structures; and explicit or implicit rules against foreign competitors”* (Berger et al., 2001; 125). As long as the efficiency barriers are sufficiently low, cross-border disadvantages may be overcome. Buch and De Long (2004; 2083) empirically test three potential sources of information costs: *“geographical distance, a common language, and a common legal system.”* The authors claim that privatization leads to a raise in merger activity. This statement is interesting for the data sample used to undertake the research in this paper. It is apparent that privatization in the Baltic countries reinforced Scandinavian banks’ M&A activity in this area.

The authors’ findings are as estimated. High information costs, measured in geographical distance and a common language, reduce merger incentives. At the same time, banks in less developed countries become more interesting to international acquirers when regulation becomes more reliable. However, Buch and De Long (2004) also find that the more regulated a country is, the less attractive its banks are to international investors.

Summarising the discussion above, it is not clear whether international mergers will outperform domestic mergers. Following internalisation theory reasoning, international mergers are more successful than domestic ones if total benefits of internalisation processes exceed total information costs. However, this can not be taken for granted as information costs are increasing in line with the cultural, geographical and economical distance between the countries of a merger. In the case of the Nordic market, in which languages and cultures are rather similar, one could expect slightly more successful international mergers compared to its domestic counterparts.

## 2.6 Cash vs. Stock payment

As discussed above, an important aspect in financial theory is asymmetric information. Asymmetric information simply means that the bidder’s management usually has inside information, which capital market participants and, subsequently, the target’s management do not have. Considering cases in which the bidder’s management constantly insist on buying the target by means of an exchange of stocks, the seller is likely to assume that the

bidder's management believes its stock price is currently overvalued. Accordingly, a bidder's cash offer implies the opposite. Thus, the choice of the payment method of a merger has a signalling effect to capital market participants and thus, the seller. The signalling effect is comparable to announcement effects of changes in dividend payments to stockholders.

By means of this argumentation, Brealey et al. (2006; 885) try to explain the phenomenon discovered by Andrade et al. (2001) that "*buying-firms' share prices generally fall when stock-financed mergers are announced*". In contrast, the authors find a slightly positive return to the stock price after the announcement of a cash-paid merger.

Eckbo et al. (1990) extend the asymmetric information hypothesis by stating that the asymmetry is two-sided, meaning that target management keeps secret information as well. The authors make the distribution of payment gains dependent on *overpayment costs vs. lost synergy gains*. While high bids lead to high overpayment costs, low bids are usually rejected and thus lead to lost synergy gains as the deal does not take place. By changing the medium of payment from cash to stock, bidders can share the risk of overpayment with the target. Subsequently, the authors develop an equilibrium model, which states that two-sided information asymmetry leads to an equilibrium mix of cash and shares in a takeover-bid. By choosing a certain mix of cash and shares in the offer, the bidder signals its value to the target, thereby resolving the information asymmetry. The revealed value is increasing and convex in the amount of cash used. Unfortunately, the authors find no conclusive support for the model when testing it empirically. It remains unclear whether the model or the empirical tests are mistaken.

Amihud et al. (1990) confirm the asymmetric information hypothesis. Moreover, they introduce another hypothesis – the tax effects hypothesis. It says that the owners of the target usually prefer to receive payment in stocks. This is because tax payments are due when stock gains are redeemed. That means that the target's stockholders save immediate tax payments if the medium is an exchange of common stocks. Hence, bidders usually have to pay a premium in cash takeover-bids to compensate target shareholders for the tax penalty (Eckbo et al., 1990).

The question of whether the capital market prefers stock or cash as a medium of payment is thus dependent on whether market participants buy into capital market efficiency or not. The more efficient the capital market, the faster new information is included in the market value

of a stock. The most extreme case, strong-form efficiency, implies that not even publicly traded information about a company is already included in the current stock price (Bodie et al., 2005). The more information investors, and thus the target's management, assume to be included in the current value of the stock, the better they feel insured against surprises of the bidder's management and the more they will prefer stock payments and, thus, the tax saving effect over cash and its safe value. The theory of market efficiency is closely linked to the theory about whether a system is bank- vs. market-based. Naturally, a distinct market-based system is more likely to accept stock payments than a bank-based one.

Information asymmetries and tax saving hypotheses effectively cancel each other out. It seems therefore reasonable to assume the effect of the method of payment as rather low. Unsurprisingly, De Long (2003) finds in her study of 397 US and 41 non-US mergers a slightly more positive CAR for mergers with solely cash as payment method. Nonetheless, the result is insignificant even at a 10% confidence level.

### **3. Data collection**

Having discussed and reviewed economic theory in the field of financial services consolidation and M&As, the empirical research underlying this paper will be presented.

In this chapter, the method of data collection will be discussed. The data collection process consisted of two steps. First, an M&A database had to be found in order to retrieve a complete list of mergers between companies in the Nordic market during the last several years. Having obtained a list of mergers, the second challenge was to find stock prices for both the bidder and target for all deals. Below, both steps of the data collection process are described in depth.

#### **3.1 Data collection from Zephyr**

The necessary data on M&As underlying this research are gathered from the online M&A database Zephyr<sup>10</sup>. The database provides various opportunities to specify the sample according to the user's needs. In the following, the conditions chosen for the analysis in this paper will be outlined and justified.

##### **3.1.1 Geographical scope**

The geographical scope of the data sample is restricted to the Nordic market. The Nordic market includes Scandinavia, Iceland and the Baltic countries. Following the categorization of the Internet database Zephyr, Finland is included in the Scandinavian countries.

Iceland plays a prominent role in the sample. This is mainly due to big Icelandic banks trying to get a foothold in the Scandinavian market. Kaupthing as well as Islandsbanki were quite active in acquiring local Norwegian and Swedish banks. At the same time, Iceland experienced consolidation in its domestic financial services industry also.

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<sup>10</sup> Zephyr is the online M&A database of Bureau van Dyk. The database currently contains more than 350.000 transactions worldwide and is updated on a regular basis. The database gives information on rumours, announcements and undertaken transactions.

The consideration of mergers including Baltic States is limited to Baltic States being the target. This is no strict constraint as most mergers involving Baltic countries display the Baltic entity as target. However, Baltic countries undergo a period of consolidation, too but as domestic mergers within Baltic countries are rather small in size, these were disregarded in the data sample.

### **3.1.2 Industry classification**

When it comes to the industry classification of the merger participants, both the bidder and the target have to fulfil prerequisites in order to qualify the deal for inclusion in the data sample.

First, the bidder has to be a bank. This requirement is necessary in order to narrow the topic down to bank mergers. Yet, an exception to this rule is made if a financial conglomerate is the acquirer and at least one division of the conglomerate is a bank.

The second restriction is more general in scope. The target company is required to be a financial institution. This includes banks, insurance and investment companies as well as general financial service providers. The target's industry has to be kept general in order to be able to examine the effect of universal banking.<sup>11</sup>

### **3.1.3 Listing**

The third feature that mergers have to fulfil in order to be included in the sample is compulsory listing. This means that both acquirers and targets need to be listed publicly. Mergers, in which only one of the involved entities is publicly listed, are eliminated from the sample.

Usually, saving banks do not have listed stock. However, many bigger saving banks issue primary capital certificates, which have a similar pattern as common stocks. Thus, such a saving bank's value is measurable on a daily basis even though value changes of these certificates are less frequent than of common stocks. Therefore, saving banks issuing

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<sup>11</sup> See chapter 2.4 about the economics of the universal banking principle

primary capital certificates are included in the sample given that the specific merger fulfils the other requirements as well.

Beyond the requirement of public listing, no further condition, linked to the deal size, is made. This is because publicly listed companies are assumed to be the biggest players in the industry.

Finally, there is no constraint for the medium of payment. One intention of this paper is to measure the differences in wealth effects between stock and cash payment of M&As. If the payment method of the deal is unknown, the merger is included in the sample generally, but eliminated when evaluating the method of payment.

### **3.1.4 Deal type and status**

Accepted deal types are limited to mergers and acquisitions. This means that all recently occurring deal types such as “*Management buy-outs (MBO)*”, “*leveraged buy-out (LBO)*” or “*joint ventures*” are excluded from the sample. This is because these deal types require additional consideration, which would be beyond the scope of this paper. Including these forms of deals into the sample without a theoretical foundation would reduce the accuracy and reliability of the results as additional factors might come into play.

Deal status contains information about the stage of the deal. Just pending and completed deals are included in the sample. This is because probability that a pending deal will be undertaken is assumed high. In contrast, announced or rumoured deals are not sufficient to be part of the data sample. In the early stages of a merger announcement, uncertainty about whether the deal will take place is high. Hence, the deal is not granted sufficient credibility even though the stock market already adjusts to the emerging information.



### 3.1.5 Results from Zephyr

Having adjusted the research for the above listed conditions, a list of altogether 39 M&As was obtained.<sup>12</sup> The list wrongly contained two deals, which included Polish targets. These were removed from the data sample instantly.

As for the other deals, it was essential to find data for the stock price around the announcement date of the M&A deal. Zephyr provides information on the rumour, announcement and completion date of M&As. For some of the deals, Zephyr stated bid premium returns for the targets including the date.

In case of a stated date for a bid premium return, this date was taken as day zero for the event study. As for the M&As without an explicit bid premium date, the announcement and rumour dates were highlighted as day zero. If rumour and announcement dates deviated, the earlier rumour date was accounted for as day zero.

## 3.2 Data collection from Datastream

Having identified the day zero for all deals in the sample, it was possible to find stock price information on all companies by means of Datastream, one of the most comprehensive databases in terms of equity markets, indices and macro economical time series. In case of lacking information on some companies, the websites of local stock exchanges were also screened for information.<sup>13</sup>

Again, deals were only kept in the data sample if there was stock information available for both entities involved in the deal. Otherwise, both entities were removed from the sample. After extensive research, the final sample comprised 28 M&A deals. Table 1 displays the final list.

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<sup>12</sup> For a complete list of the deals see appendix 1

<sup>13</sup> This is especially valid for the Icelandic stock exchange as Datastream was lacking information on many Icelandic companies

<b>Acquirer</b>	<b>Country</b>	<b>Target</b>	<b>Country</b>
Storebrand ASA	NO	Finansbanken ASA	NO
FöreningsSparbanken AB	SE	Hansapank AS	EE
Svenska Handelsbanken AB	SE	Bergensbanken ASA	NO
Merita Nordbanken Group	SE	Nordea Denmark/Unidanmark	DK
SEB AB	SE	Eesti Ühispank AS	EE
Merita Nordbanken Group	SE	Christiania Bank/Kreditkasse	NO
Spar Nord Bank A/S	DK	Aars Bank AS	DK
SEB AB	SE	Latvijas Unibanka AS	LV
FöreningsSparbanken AB	SE	Hansapank AS	EE
Danske Bank A/S	DK	RealDanmark A/S	DK
Svenska Handelsbanken AB	SE	Midtbank A/S	DK
Egnsbank Han Herred A/S	DK	DAI Holding A/S	DK
SEB AB	SE	Eesti Ühispank AS	EE
Sydbank A/S	DK	Egnsbank Fyn AS	DK
Ringkjøbing Landbobank	DK	Tarm Bank A/S	DK
Sampo Oyi	FI	Sampo Bank AS	EE
Kaupthing Bank HF	IS	JP Nordiska AB	SE
Sparekassen Faaborg A/S	DK	Regional Invest Fyn A/S	DK
Islandsbanki HF	IS	Sjóvá-Almennar tryggingar HF	IS
DnB Holding ASA	NO	Nordlansbanken ASA	NO
Danske Bank A/S	DK	Fokus Bank ASA	NO
DnB Holding ASA	NO	Gjensidige Nor ASA	NO
Islandsbanki HF	IS	Kredittbanken ASA	NO
Helgeland Sparebank	NO	Sparebanken Rana	NO
Islandsbanki HF	IS	Bolig- og Næringsbanken ASA	NO
FöreningsSparbanken AB	SE	Hansapank AS	EE
SEB AB	SE	Privatbanken ASA	NO
DnB NOR Bank ASA	NO	Nord/LB Latvija IAS	LV

*Table 1: Final data sample retrieved from Zephyr and Datastream<sup>14</sup>*

<sup>14</sup> For a detailed list containing all available information on each deal see appendix 2

## 4. Methodology

The methodological approach applied in this paper follows Brown and Warner (1985). The article forms the cornerstone for most event studies based on daily stock returns. In the following sections, the event study methodology will be presented and discussed in detail.

### 4.1 Event Window

The final sample consists of 56 securities and 28 events. Each event has an event day, which is the earliest of rumour, announcement and completion date.<sup>15</sup> The event day is defined as day zero. Stock information is gathered for every single security for altogether 129 days. The range lasts from day  $-104$  until day  $+24$ . The minus indicates that this date is before the event date.

The entire period is divided into two sub periods. The first period lasts from day  $T_0 = -104$  to  $T_1 = -6$  comprising, and is called the estimation window. As will be discussed below, the estimation window is needed to estimate ordinary least squares (OLS). In order to be able to calculate the estimates reliably, it is crucial to have an estimation period which is long enough. In this paper, the estimation period is 99 days. This does not comply with Brown and Warner (1985) who suggest an estimation period of 239 days in their paper. The rather small estimation period used in this paper is due to difficulties finding data for some securities dating farther into the past. However, the authors specify that a security was only included if it was possible to retrieve at least 30 daily returns in the entire period and if no return data was missing in the last 20 days. These requirements are fulfilled for all the securities in the final sample employed in this study of the Nordic market. Thus, reliability of the OLS estimates is assumed.

The other period, the event window lasts from day  $T_{1+1} = -5$  to day  $T_2 = +24$ . This leads to an event window of 30 days in this study. Event windows of other studies are sometimes shorter, i.e. Becher (2000). However, announcement effects in M&As might occur during a

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<sup>15</sup> By definition, the rumour date is before the announcement and completion date. However, in some of the mergers all three dates coincident.

longer period, especially when there is a bidding war or the target rejects the initial offer. Consequently, in order to catch some of these effects, the event window chosen is somewhat longer. Figure 2 illustrates the time line of an event study.

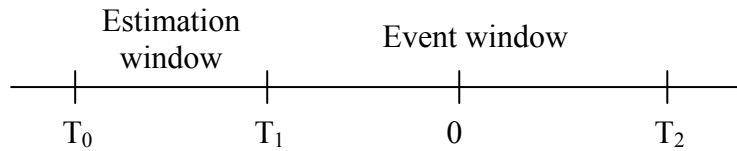


Figure 4: Time Line of an Event Study

## 4.2 Determination of Abnormal Returns

Excess returns in an event study can be calculated in different ways. According to Brown and Warner (1985), one can distinguish the *mean adjusted returns*, the *market adjusted returns* and the *ordinary least squares (OLS) market model*. This paper will use the OLS market model approach. It seems appropriate to use this model, as it is the only one which adjusts the excess returns of each security for market risk. In the following, this matter is explained in more detail.

Excess returns in the OLS market model are calculated as

$$A_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} \text{ with} \\ E[A_{it}] = 0 \text{ and } \sigma^2(AR_{it}) = \sigma_{\varepsilon_i}^2$$

“where  $\hat{\alpha}_i$  and  $\hat{\beta}_i$  are OLS values from the estimation period” (Brown and Warner, 1985; 7).

The equation adjusts for the security’s  $\hat{\beta}_i$  value.  $\hat{\beta}_i$  can be explained graphically as the slope of the security market line. Analytically,  $\hat{\beta}_i$  is the covariance between security i’s return and the market return divided by the variance of the market index (Brealey et al., 2006).

Most companies in the financial services industry have a  $\hat{\beta}_i$  below one. Thus, the stock value of the respective security changes less than 1% for a 1% change in the general market index. This, in turn, underestimates excess returns if the model in this research would not adjust for market risk.  $\hat{\alpha}_i$  is the intercept of the security market line.

$R_{it}$  and  $R_{mt}$  are the daily returns for security  $i$  and the general market index on day  $t$ , respectively. For this research, a general market index is chosen. A banking sector index would falsify the results somewhat as an announcement of a banking merger is likely to affect the banking sector index significantly, especially under consideration of the rather small economies under investigation. The general market index is aligned to the respective security's country of origin. Otherwise, it would be possible that the excess return of a Norwegian acquirer is determined with returns from the Swedish market index.

Abnormal returns are expected to be zero.<sup>16</sup> The variance of the abnormal returns for security  $i$ , calculated in the above described manner, is just valid for a large estimation period. This is because “*abnormal returns across time periods will become independent asymptotically*” (Campbell et al., 1997; 160).

### 4.3 Aggregation of the abnormal returns

Having calculated the excess return for every single security for every day during the event period, these must be aggregated. “*The abnormal return observations must be aggregated in order to draw overall inferences for the event of interest [...] – through time and across securities*” (Campbell et al., 1997; 160). The authors assume no correlation across the abnormal returns of different securities as long as any possibility of clustering can be eliminated. Clustering occurs if events have the same event window. Generally, this is not the case in the data sample underlying this paper as each merger announcement takes place at a different point in time.

Dasgupta et al. (1998) provide a detailed description of the two steps needed to aggregate excess returns. The notations below follow the authors' ones.

$$CAR_i(T_1, T_2) = \sum_{t=T_1}^{T_2} AR_{it} \text{ with}$$

$$\sigma_i^2(T_1, T_2) = (T_2 - T_1 + 1) \sigma_{\varepsilon_i}^2$$

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<sup>16</sup> For a reasoning behind this assumption see section 4.4

The requirement of a large estimation period is valid for the calculation of this variance as well. Finally, average cumulated abnormal returns can be determined by averaging out all events in the sample.

$$CAAR(T_1, T_2) = \frac{1}{N} \sum_{i=1}^N CAR_i(T_1, T_2) \text{ with}$$

$$Var(CAAR(T_1, T_2)) = \frac{1}{N^2} \sum_{i=1}^N \sigma_i^2(T_1, T_2)$$

## 4.4 Significance Tests

In order to formulate a null hypothesis in event studies based on the market model, it helps to recall one of the basic assumptions of perfect capital markets. In case of a perfect capital market, all securities are lying on the security market line as all securities are priced correctly. Hence, there are no excess returns in a perfect capital market. This explains why the expected value for abnormal returns in the OLS market model in section 4.2 is equal to zero. Consequently, the null hypothesis  $H_0$  and its alternative hypothesis are trivial to derive:

$$H_0: CAAR(T_1, T_2) = 0$$

$$H_1: CAAR(T_1, T_2) \neq 0$$

The null hypothesis can be tested using a t-test. The t-test is a significance test and measures whether a null hypothesis can be rejected reliably. The t-test can be undertaken with one sample or two samples. The one-sample t-test measures the significance of a sample mean in relation to a known population mean. In contrast, the two-sample t-test provides information about whether two sample means are significantly different from each other. The paper makes use of both versions. In the following, the statistical interpretation of the one-sample t-test will be clarified. From this, it is easy to extend the reasoning to the two-sample t-test.

To perform a one-sample t-test, one needs to use the following formula:

$$t = \frac{\bar{X} - \mu_0}{s_{\bar{X}}} \quad \text{where} \quad s_{\bar{X}} = \frac{s}{\sqrt{N-1}}$$

$\bar{X}$  constitutes the measured sample mean,  $s_{\bar{X}}$  is the standard error of the sample. The standard error is calculated by dividing the standard deviation<sup>17</sup> of the sample with the square root of the degrees of freedom.<sup>18</sup>  $\mu_0$ , the hypothesized sample mean, against which the measured mean shall be tested, is under the above formulated null hypothesis zero.

The alternative hypothesis can vary. The alternative hypothesis can be formulated in a manner that the measured sample mean is higher, lower or unequal to the hypothesized sample mean. In case of an unequal alternative hypothesis, a two-tailed t-test has to be undertaken as the experienced sample mean can be both higher and lower.

By testing the sample for the above-mentioned formula, a p-value is calculated. The p-value is a measurement for the likelihood that a “*more extreme*” result is reached given that  $H_0$  holds. Generally, a rejection rule can be applied. If the p-value is smaller than the significance level  $\alpha$ <sup>19</sup>,  $H_0$  is rejected. The smaller the p-value becomes in relation to the significance level  $\alpha$ , the higher the probability that the rejection of the null hypothesis is justified.

Transferred to the study in this paper, the t-test formula looks as follows:

$$t = \frac{CAAR(T_1, T_2)}{S_{CAAR(T_1, T_2)}} \quad \text{where} \quad S_{CAAR(T_1, T_2)} = \frac{s}{\sqrt{N-1}}$$

The two-sample t-test measures whether two sample means are significantly different from each other. In order to do so, the null hypothesis is adjusted to

$$H_0: CAAR(X) - CAAR(Y) = 0$$

$$H_1: CAAR(X) - CAAR(Y) \neq 0$$

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<sup>17</sup> The standard deviation is unknown and must be estimated from the data sample. Statistically, this distinguishes a t-test from a z-test.

<sup>18</sup> The degrees of freedom are used in order to make the result more unbiased. This is because sample scores can be chosen freely apart from the last in order to reach the known sample mean. Thus, degrees of freedom are calculated by subtracting one from the sample size N.

and the t-statistic formula of

$$t = \frac{CAAR(X) - CAAR(Y)}{S_{CAAR(X)-CAAR(Y)}} \quad \text{where}$$

$$S_{CAAR(X)-CAAR(Y)} = \sqrt{\frac{\sum (CAAR(X) - CAAR(\bar{X}))^2 + \sum (CAAR(Y) - CAAR(\bar{Y}))^2}{(N_X - 1) + (N_Y - 1)} \left( \frac{1}{N_X} + \frac{1}{N_Y} \right)}$$

## 4.5 Statistical Considerations of the Event Study Methodology

The reliability of event study methodologies has been widely discussed. Several potential problems leading to biased results have been identified in literature.

Campbell et al. (1997) discuss the use of a one-factor model such as the applied market model versus multifactor models. The potential gain of multifactor models is a reduction in variance. However, the authors state that “*gains from employing multifactor models for event studies are limited*” (Campbell et al., 1997; 156).

Another potential bias in event studies occurs through clustering of the event window. However, as explained in chapter 4.3, clustering is disregarded in this study as merger announcements take place at different calendar days.

Brown and Warner (1985) measure the impact of other issues concerning event studies when using daily stock returns. First, the authors discuss the effect of non-normality of daily stock returns and excess returns. The authors argue that the influence of this issue is low as returns converge to normality with increasing sample size. The assumption of convergence is derived from the Central Limit Theorem.

The second issue concerns non-synchronous trading intervals, meaning that market returns and returns from security  $i$  are measured in different time periods. These lead to biased OLS estimates of  $\hat{\beta}_i$  in the market model. The authors find no clear-cut benefit in detecting

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<sup>19</sup> Usually, the significance level in scientific research is set at  $\alpha=0.05$ . This leads to a 95% confidence interval.



abnormal performance from other models than the OLS. Thus, the OLS model is assumed to provide sufficient results. Moreover, market returns and security returns are measured at the same time in this study.

A final consideration is the choice of the right variance estimator. Non-synchronous trading might lead to serial dependence of excess returns. The authors show that incorporation of serial dependence improves results only marginally. Moreover, an increase of variance during the event window can alter the results of an event study. In this area, further research is still required.

To summarise, Brown and Warner (1985) reach the conclusion that an event study using the market model is a good model to estimate abnormal return. The use of daily stock returns usually causes few difficulties in event study methodologies. Moreover, just a few adjustments to the model enhance accuracy to the results significantly.

## 5. Analysis of the results

In this chapter, the results of the empirical analysis will be presented. The analysis undertaken in this paper is by no means exhaustive. It is to be viewed as a fundamental study taking up the issue of banking mergers in the Nordic market. Unfortunately, the small data sample restrained the opportunities for more thorough investigations.

First, results for the entire sample will be presented. Secondly, the impact of merger drivers on stock announcement effects will be pinpointed. Then finally, pitfalls of the statistical method applied will be addressed in order to interpret the achievements correctly.

### 5.1 Results for the entire sample

The objective of the analysis of the entire sample was to be able to draw a conclusion whether the Nordic financial institutions market follows hubris, synergies or a combined merger pattern. Therefore, the entire sample encompasses bidder as well as target returns of all 28 mergers included in the sample.

t-Test: One-Sample Entire Sample

	<i>Entire Sample</i>
Mean	0.117719519
Variance	0.050130373
Observations	56
Hypothesized Mean	0
df	55
t Stat	3.899234514
P(T<=t) two-tail	8.33623E-05
t Critical two-tail	2.575829304

*Table 2: Entire Sample*

Table 2 lists the results of the one-sample t-test assuming a null hypothesis with a zero mean for bidders and targets combined. The result shows a mean of 11.77%. This mean is equivalent to the average cumulative abnormal return (CAAR) of the entire sample. The p-value is about 0.0000833, which is much lower than the significance level  $\alpha = 0.01$ . Thus, the null hypothesis

$$H_0: \text{CAAR}(T_1, T_2) = 0$$

can be rejected reliably. This leads to the conclusion that bank mergers in the Nordic market give a significant positive CAAR.

This finding is not exhaustive in order to determine the basic merger strategy in the Nordic financial services industry. A closer look at the distribution of the returns between bidders and targets is necessary.

t-Test: One-Sample Bidder vs. Target

	<i>Bidder</i>	<i>Targets</i>
Mean	0.000195367	0.235243671
Variance	0.003817225	0.069653243
Observations	28	28
Hypothesized Mean	0	0
df	27	27
t Stat	0.016430838	4.631579885
P(T<=t) two-tail	0.986650142	2.39854E-06
t Critical two-tail	2.575829304	2.575829304

*Table 3: Bidder vs. Target (One-Sampled)*

t-Test: Two-Sample Bidder vs. Target

	<i>Bidder</i>	<i>Targets</i>
Mean	0.000195367	0.235243671
Variance	0.003817225	0.069653243
Observations	28	28
Hypothesized Mean Difference	0	
df	30	
t Stat	-4.588595059	
P(T<=t) one-tail	3.71232E-05	
t Critical one-tail	2.457261531	
P(T<=t) two-tail	7.42464E-05	
t Critical two-tail	2.749995652	

*Table 4: Bidder vs. Target (Two-Sampled)*

Table 3 and 4 show the results for the one- and two-sample t-test for the bidder and target group respectively.

The bidders have a CAAR of about 0.02%. The very high p-value ( $p = 0.98665014$ ) of the one-sample test reveals that the null hypothesis can not be rejected neither on a 1%-, 5%- nor 10%-significance level. Thus, every “extreme deviation” from the mean in the data sample must be interpreted as coincidental. This means that bidders experience neither a negative nor a positive CAAR.

In contrast, the targets experience a CAAR of 23.52%. This is a mean significantly different from zero on all significance levels. As a consequence, the null hypothesis of a hypothesized zero sample mean can be rejected with high reliability. The very low p-value of 0.00000239 confirms this.

Finally, the two-sample t-test intends to give the statement more credibility. The two-sample t-test measures the sample means' difference. The null hypothesis expects a zero sample mean difference. The result of this significance test supports the other findings as the p-values of both the one-tail and two-tail test are very low ( $p \ll \alpha$ ). This leads to rejection of the null hypothesis. Targets and bidders have significantly<sup>20</sup> different sample means with bidders' sample mean being zero and targets' one being positive.

To summarise, bidders and targets combined experience a significant merger gain. This merger gain is distributed unevenly between the groups. While targets experience a significant positive CAAR, bidders end up with CAAR equal to zero. Yet, bidders do not experience significant losses from the merger activities either.

Recalling the hypotheses of Becher about merger reasons, non-negative excess returns to bidders combined with positive CAARs to the target and the combined entity supports the synergy hypothesis. Thus, the empirical analysis undertaken in this paper finds empirically significant justification to merger activity in the Nordic region. As such, it confirms the findings of Cybo-Ottone and Murgia (2000) who find the same results for a European sample. Moreover, this finding confirms the assumption of previous studies of deviating stock announcement effects between US and European samples.

The congruence between the European results and the Nordic ones might confirm the statement that the universal banking structure characterises Europe made by Cybo-Ottone and Murgia (2000). Whether this or other aspects play a role in the European banking M&A success will be elaborated on in the next sections.

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<sup>20</sup> Significantly different on a 1%-, 5%- and 10% significance level

## 5.2 Results of Merger Drivers

This section presents and interprets the results obtained by the investigation of the different merger drivers. The intention is to point out possible different announcement effects to certain merger constellations. Specifically, the merger effect of cross product vs. focused, international vs. domestic and cash vs. shares payment shall be controlled for.

The methodology underlying this section is equivalent to the approach used in the previous one. First, CAAR for each merger driver is calculated. Thereafter, significance is measured by means of one- and two-sample t-tests.

In this section, the results are not separated into bidder and target returns. The results show whether combined firms reach positive average cumulated abnormal returns adjusted for the particular merger driver. This is due to the small sample size and, accordingly, difficulties to obtain significant results.

### 5.2.1 Cross product vs. Focused Deals

As discussed in chapter 2.4, the effect of cross product mergers is dubious. Some researches indicate potential for economies of scope or scale while others do not. The stock announcement effect analysis undertaken in this paper is somewhat limited in finding scale economies. Stock market reactions to announcements measure expectations of investors. Hence, it does not measure the potential for scale economies reliably. However, it does give an impression whether capital markets believe in the success of cross product mergers. A positive cross product announcement effect is thus interpreted as investors sensing potential for economies.

t-Test: One-Sample Cross product vs. Focused Deals

	<i>Cross product</i>	<i>Intra-sector</i>
Mean	0.122097437	0.114436080
Variance	0.067312712	0.038973328
Observations	24	32
Hypothesized Mean	0	0
df	23	31
t Stat	2.256949916	3.227454118
P(T<=t) two-tail	0.021139033	0.001041400
t Critical two-tail	2.575829304	2.575829304

*Table 5: One-Sample Cross product vs. Focused*

The critical t-value stated in the one-sample t-test in Table 5 is calculated for a significance level of  $\alpha = 0.01$ . The t-value for cross product deals does not exceed the critical value, in which case the null hypothesis can not be rejected. This leads to the conclusion that diversifying mergers do not have an overall success significantly different from zero given a 99%-confidence interval. However, cross product deals reveal significance for a 95%-confidence interval, which is often used as a measure for significance in scientific papers. In contrast, intra-sector mergers have significantly positive cumulative abnormal returns as the t-value exceeds the critical value also on a 99%-confidence interval.

The insignificance for the cross product examination is an indication for that CAAR in the case of cross product mergers might be zero. This would mean that the capital market does not perceive diversifying mergers as profitable, whereas intra-sector mergers seem to be more beneficial and create value to mergers. This finding would strongly contradict the argument that universal banking creates synergy effects.

On the other hand, one has to consider that the sample is significant on the 95%-confidence interval. The small sample size might be a statistical explanation for the insignificance of the cross product mergers' one-sample t-test. The small sample size entails a high variance, which, in turn, causes a low t-value.<sup>21</sup>

t-Test: Two-Sample Cross product vs. Focused Deals

	<i>Cross product</i>	<i>Intra-sectional</i>
Mean	0.122097437	0.11443608
Variance	0.067312712	0.038973328
Observations	24	32
Hypothesized Mean Difference	0	
Df	42	
t Stat	0.12079572	
P(T<=t) one-tail	0.452214445	
t Critical one-tail	2.418470354	
P(T<=t) two-tail	0.904428889	
t Critical two-tail	2.69806618	

*Table 6: Two-Sample Cross product vs. Focused*

The two-sample t-test in table 6 shall shed further light on the results found in the one-sample test. Given an apparent difference between cross product and focused deals in the

<sup>21</sup> For a more detailed discussion of the sample size see chapter 5.3.1

one-sample t-test, it is interesting to measure whether the sample means are deviating from each other.

The results in this test are unambiguous. The p-value of the t-statistic is so high that the null hypothesis can not be rejected for none of the significance levels of the analysis. Moreover, the t-value misses the critical value clearly. Thus, evidence shows that the sample means are insignificant and, consequently, have to be assumed to be equal.

The strong support for equal sample means makes it possible to draw the conclusion that investors seem to have as much faith in a cross product merger as they have on a focused one. This can be inferred from the fact that focused mergers have lower abnormal returns (11.44% vs. 12.27%). Hence, the question whether a merger is focused or not does not seem to play a major role in investor's perspective of a Nordic merger.

This finding contradicts the universal banking argument often discussed in relation with mergers. At least investors perceive potential synergy gains from cross product mergers as being not higher than focused ones. This might be due to a high number of small banks in the Nordic sample, which can improve efficiency by acquiring other banks through cost reductions and increase market concentration (Berger et al., 1999). The capital market perceives such mergers as profitable.

After all, the impact of the focus of merger seems to be overestimated in other research effort in this field. The announcement effect study for the Nordic market does not provide support for benefits of universal banking.

### **5.2.2 Domestic vs. International**

The results obtained above do not allow for drawing final conclusions about the success of cross product mergers. Thus, there must be other variables influencing success or failure of banking M&As in the Nordic market.

The next variable, which has been examined in this study, is the geographical or regional focus of the merger. This is whether domestic or cross-national mergers are more successful.

## t-Test: One-Sample Domestic vs. International

	<i>Domestic</i>	<i>International</i>
Mean	0.158742594	0.091175176
Variance	0.066852407	0.039160298
Observations	22	34
Hypothesized Mean	0	0
df	21	33
t Stat	2.813484949	2.646735759
P(T<=t) two-tail	0.003980618	0.007219662
t Critical two-tail	2.575829304	2.575829304

*Table 7: One-Sample Domestic vs. International*

The one-sample t-tests provides positive CAAR for both the domestic and international merger sample, meaning that both experience abnormal returns significantly different from zero on a 99%-confidence interval. It is striking though that the domestic M&A have a higher mean than international ones. Hence, domestic mergers have higher abnormal returns than international ones (15.87% vs. 9.12%). Thus, a two-sample t-test helps to figure out whether the difference is significant.

## t-Test: Two-Sample Domestic vs. International

	<i>Domestic</i>	<i>International</i>
Mean	0.158742594	0.091175176
Variance	0.066852407	0.039160298
Observations	22	34
Hypothesized Mean Difference	0	
Df	37	
t Stat	1.043766623	
P(T<=t) one-tail	0.151682613	
t Critical one-tail	2.431447397	
P(T<=t) two-tail	0.303365225	
t Critical two-tail	2.715408718	

*Table 8: Two-Sample Domestic vs. International*

The t-value is about 1.04, which is lower than the critical value of 2.72. The null hypothesis can not be rejected. In economical terms, this means that the difference between the samples means of domestic and international mergers is zero and that contingent deviations are purely coincidental.



However, the p-value is at about 0.15 for this data sample. Even though the result is insignificant from a scientific point of view<sup>22</sup>, a difference can be observed compared to the p-value of the cross product vs. intra-section data sample where the p-value was about 0.45. This means that the probability to receive an extreme result given that the null hypothesis holds is much higher in this data sample. An extreme value in the one-tail t-test would be a significantly higher abnormal return to a domestic merger than to an international one. Given the relatively low p-value, it is possible that a bigger sample size would lead to a significant result.

The means of the two mergers and the positive t-value of the two-sample t-test indicate that the probability of international mergers being more profitable than domestic ones can be excluded with high certainty. Thus, geographic expansion as the exclusive reason for international merger activity is not sufficient to justify such deals.

This is an interesting finding considering the theoretical discussion in chapter 2.5. Internalisation theory stated that if total benefits of internalisation processes exceed total information costs, international mergers are more successful than domestic ones. In the Nordic sample of banking mergers, information costs seem high enough to outweigh benefits from internalisation.

Information costs comprised the costs created from cultural and geographical dissimilarity. In spite of the cultural assimilation between Nordic countries, investors do not seem to perceive international mergers more favourable than domestic ones. International mergers in this study do generate positive abnormal returns. However, Buch and De Long (2004) proved that high information costs reduce merger incentives. Consequently, performance of mergers, in which cultures that are more unequal are involved, might be worse. Then, it becomes more doubtful whether international mergers are profitable at all.

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<sup>22</sup> For a more detailed discussion on statistical significance see chapter 5.3.2

### 5.2.3 Medium of Payment

Finally, the impact of the medium of payment on announcement effects is determined.

t-Test: One-Sample Method of Payment

	Cash	Shares
Mean	0.122845603	0.183283665
Variance	0.049821327	0.065726443
Observations	28	14
Hypothesized Mean	0	0
df	27	13
t Stat	2.859788074	2.577658458
P(T<=t) two-tail	0.003588174	0.007473759
t Critical two-tail	2.575829304	2.575829304

*Table 9: One-Sample Method of Payment*

Based on the overall success of M&As in the Nordic market, it is unsurprising that both cash and share payments generate significant, positive CAARs on a 90%-, 95%- and 99%-confidence interval even though the t-value just exceeds the critical value for share payments at  $\alpha=0.01$ . However, the mean of deals with share payment is higher than the mean for cash paid mergers. Recalling the weight of research on asymmetric information theory, this finding is not necessarily expected. A two-sample t-test provides further detail on whether the means are significantly different from each other.

t-Test: Two-Sample Method of Payment

	Cash	Shares
Mean	0.122845603	0.183283665
Variance	0.049821327	0.065726443
Observations	28	14
Hypothesized Mean Difference	0	
Df	23	
t Stat	-0.751141121	
P(T<=t) one-tail	0.230092383	
t Critical one-tail	2.499866736	
P(T<=t) two-tail	0.460184767	
t Critical two-tail	2.807335678	

*Table 10: Two-Sample Method of Payment*

As can be seen in Table 10, the null hypothesis that the samples' means are equal can not be rejected as the p-value is higher than 0.10. Hence, deviations have to be assumed to be by chance. No clear pattern can be determined based on the results of this analysis, meaning that CAARs of cash-paid and shares-paid deals have to be assumed equal.

Yet, the negative t-value allows for an inference that abnormal return on shares-paid deals is at the least not lower. This means that either asymmetric information theory can be discarded as empirically irrelevant or that there is an effect balancing asymmetric information. Given the latter case, the tax-effect seems to outweigh asymmetric information of the entities' management. Research in this paper does not provide information on the validity of the theories and, therefore, does not allow for a conclusion about the impact of the respective theories presented in chapter 2.6.

## 5.3 Remarks on the Empirical Results

The results in section 5.2 are similar out of one perspective. None of the two-sample t-tests undertaken provides statistically significant results. Nonetheless, cautious statements about the behaviour of the data sample were made. This section provides justification for the statements made in spite of the insignificant empirical results.

First, the limitation of the statistical method used will be presented. This creates awareness of the methodological difficulties underlying the study in this paper. Subsequently, a justification for the statements made will be derived.

### 5.3.1 Power of the Tests

Crucial to validity of t-tests is the actual power of the test. Power in hypothesis testing is defined as the “*ability to detect the presence of a nonzero abnormal return*” (Campbell et al.; 1997; 168). In other words, it is “*the probability of correctly rejecting  $H_0$  when  $H_1$  is true*” (Ruppert, 2004; 64). Campbell et al. (1997) mention that difficulties exist when one tries to measure reliably the power of a test. Appendix 3 shows an example of the power given standard deviations of  $\sigma=2\%$  and  $\sigma=4\%$  for different samples. As can be seen in appendix 3, the probability of detecting abnormal returns is increasing the bigger abnormal returns become. In order to detect low abnormal returns reliably, big sample sizes and low variances are needed.

Variances in the data sample of this paper are remarkably higher than in appendix 3. At the same time, sample sizes in the investigation of the merger drivers are varying between 14 and 34. Appendix 3 shows for  $\sigma=4\%$  and sample size of 14 a 15% chance to correctly

detect an abnormal return of 1%. Considering higher variance, the probability becomes even lower.

If an estimation of the power finds insufficient results, the power of the test can be enhanced. “*This can be done by a bigger sample size, shortening the event window or by developing more specific predictions of the null hypothesis*” (Campbell et al., 1997; 172). The most common way is to increase sample size.

A bigger sample size in all of the examined subgroups would have a two-sided effect. At the one hand, the direct influence of sample size on power and on the other hand, with a big enough sample size, it would be possible to look at bidders and targets in all subgroups separately. This would enhance the statistical and economical opportunities of this study. Thus, a bigger data sample in this study might potentially increase significance of the results and, ultimately, enhance credibility of the study.

### **5.3.2 Statistical vs. Practical Significance**

In chapter 5.2, several inferences were made from the data sample underlying the study. These inferences were made in spite of the rather low power of the tests. In the following, it will be highlighted how conclusions can be drawn on insignificant results.

Ruppert (2004) distinguishes the terms *statistical and practical significance*. If a null hypothesis can be rejected at a given significance level, the result is statistically significant. Statistical significance sheds light on whether the differences occurring in the study are attributable to chance or not. Significance as it is used in this paper refers to statistical significance.

However, Ruppert (2004) criticises the sole focus on statistical significance as it does not evaluate the practical importance of a statistical finding. This means that hypothesis testing might lead to statistical significance, but has no practical impact as the effect is too small. In contrast, some issues might have a meaning in practise even though statistical significance can not be reached in the hypothesis testing. This means that a mean difference between 9.12% and 15.87% might be of interest although the sample is statistically insignificant.

Ruppert (2004; 65) argues that a subject matter expert has to decide on “*how large is large enough*” for a result to be of practical significance. The inferences made in this paper are

perceived as “large enough” by the author. Apparently, these are based on practical significance, meaning that making the statement is worthwhile to practitioners. Potential criticism from the scientific world is therefore hazarded.

## 6. Summary and Outlook

In this paper, merger announcement effects of stocks in the Nordic market were studied. The sample consisted of 28 Nordic mergers in the period from 1999-2006. Below, the results are summarised and reviewed non-technically. The results are compared to the results of previous research in the field. Finally, this chapter tries to give an outlook on future research areas of Nordic bank merger announcements.

### 6.1 Summary of the Empirical Analysis

The empirical analysis in this paper was divided into two parts. The first part focused on whether Nordic financial services industry M&As provide merger gains to bidders, targets and the combined entity. The research was undertaken in order to be able to test the results of the European bank merger study by Cybo-Ottone and Murgia (2000).

In the event study of this paper, a positive cumulative abnormal return is found for the targets and the combined entity. At the same time, bidders achieve a merger gain not significantly deviating from zero. In other words, merger gains to bidders are non-negative. Thus, it can be argued with certainty that Nordic financial institutions M&As follow the synergy hypothesis, meaning that the involved parties create value by merging the two entities.

This finding verifies the evidence from Cybo-Ottone and Murgia who find the same result for a sample of 14 European bank mergers and, thereby, reinforces the assumption that there are different conditions for bank M&As between the US and Europe.

The second part of the analysis dealt with the drivers for merger activity. Three disputed drivers were investigated: cross product vs. focused, international vs. domestic and the medium of payment. The examination of cross product vs. focused deals does not provide conclusive results whether there is an advantage from diversifying business activity. In contrast to focused deals, cross product deals are statistically not different to zero. However, when testing mean differences, the null hypothesis assuming equal means can not be rejected. Other empirical research finds activity-focused mergers most value enhancing

(Boot, 2003). The findings in this paper indicate that value gains of focused and diversifying mergers are almost equal. Therefore, the choice of a merger's activity focus is not the most crucial issue.

Secondly, the geographical focus of bank M&A was tested. Results show a tendency towards domestic mergers being more profitable even though the mean-difference test does not allow for a rejection of the null hypothesis. However, it seems rather clear that international mergers are not more successful than domestic ones. Following Berger et al. (2001), this shows that efficiency barriers of international mergers are big even in the Nordic market, in which language and culture are similar. Thus, the results may predict problems with lower cultural assimilation.

The last variable evaluated is the medium of payment in M&As. The sample means are in favour of shares payment. Again, the mean-difference test is insignificant. As such, it is impossible to draw a conclusion. However, the result is somewhat surprising, as most research seems to put more weight on asymmetric information theory when discussing cash vs. shares payment. Following asymmetric information theory, cash payment would be expected to be more beneficial. This result contradicts prior research (De Long, 2003), which finds cash payments slightly more profitable. However, De Long (2003) also obtains insignificant results.

The insignificant results of the merger driver analysis limit the scientific reliability of this study. Insignificance is most probably caused by the small data sample. This fact is also mirrored in the low power of the test and opens up for follow up research on M&As in the Nordic financial market. An attempt to provide an outlook on future research in the field is made in the next section.

## 6.2 Future Research

As mentioned earlier, there has been little research on stock announcement effects on Nordic financial services M&As. It is therefore essential to recall that the research undertaken in this paper intended to initiate a discussion in this field. As such, it is to be seen as introductory and by no means exhaustive.

The problem of gathering data is due to few listed financial institutions in the Nordic market (Vander Vennet, 1998). This was an issue research in this paper struggled with. The Scandinavian banking crisis in the beginning of the 1990s did not allow for a data sample including deals, which took place in the middle of the crisis or were directly affected by it. This is because market values and stock announcement effects of financial institutions may not be usefully representative as a result of the crisis.

In the future, it will probably be possible to collect a bigger data sample as market consolidation and structural changes in the European financial services industry are likely to continue internationally (Øverli, 2003). The ongoing consolidation will affect the Nordic banking market too. DnB Nor's decision in 2005 to define Sweden as part of the company's home market reflects this.<sup>23</sup>

A bigger sample will ultimately increase the power of the test and, thus, make it easier to derive significant results. In addition, a bigger sample allows for a separated examination of the drivers for the bidders and targets.

Another issue is the choice of the merger drivers measured. In this paper, information on the mergers enabled the measuring of the above-mentioned drivers. Beitel et al. (2004) examine a more comprehensive list of merger drivers. Examples include the relative asset size of the target in relation to a bidder, profit efficiency, etc. Accordingly, a study of the Nordic market could incorporate other drivers.

Finally, event study methodology fails to measure whether synergies could be exploited successfully *ex post*. In order to execute a more holistic analysis of Nordic financial institutions M&As, performance studies and dynamic efficiency studies are indispensable.

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<sup>23</sup> See the company's annual report in 2006



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## Appendix 1

Complete list of M&As retrieved from the Zephyr database:

<b>Acquirer</b>	<b>Country</b>	<b>Target</b>	<b>Country</b>
BG Bank	DK	Realkredit Danmark	DK
Storebrand ASA	NO	Finansbanken ASA	NO
FöreningsSparbanken AB	SE	Hansapank AS	EE
Svenska Handelsbanken AB	SE	Bergensbanken ASA	NO
Islandsbanki HF	IS	FBA	IS
Merita Nordbanken Group	SE	Nordea	DK
SEB AB	SE	Eesti Ühispank AS	EE
Merita Nordbanken Group	SE	Christiania Bank/Kreditkasse	NO
Spar Nord Bank A/S	DK	Aars Bank AS	DK
SEB AB	SE	Latvijas Unibanka AS	LV
SEB AB	SE	Vilniaus Bankas	LT
SEB AB	SE	Eesti Ühispank AS	EE
FöreningsSparbanken AB	SE	Hansapank AS	EE
Danske Bank A/S	DK	RealDanmark A/S	DK
Kaupthing Investment Bank	IS	Frjalsi Fjarfestigarbankinn HF	IS
Svenska Handelsbanken AB	SE	Midtbank A/S	DK
Egnsbank Han Herred A/S	DK	DAI Holding A/S	DK
Nordea	DK	Nordea Bank Polska SA	PL
SEB AB	SE	Eesti Ühispank AS	EE
Sydbank A/S	DK	Egnsbank Fyn AS	DK
Ringkjøbing Landbobank	DK	Tarm Bank A/S	DK
Sampo Oyi	FI	Sampo Bank AS	EE
Kaupthing Bank HF	IS	JP Nordiska AB	SE
Sparekassen Faaborg A/S	DK	Regional Invest Fyn A/S	DK
Islandsbanki HF	IS	Sjóvá-Almennar tryggingar HF	IS
Nordic Baltic Holding AB	SE	Bank Komunalnz SA W Gdyni	PL
DnB Holding ASA	NO	Nordlansbanken ASA	NO
Danske Bank A/S	DK	Fokus Bank ASA	NO
DnB Holding ASA	NO	Gjensidige Nor ASA	NO
Kaupthing Bank HF	IS	Audlind HF	IS
Nordvestbank A/S	DK	Vestjysk Bank A/S	DK
Islandsbanki HF	IS	Kredittbanken ASA	NO
Helgeland Sparebank	NO	Sparebanken Rana	NO
Islandsbanki HF	IS	Bolig- og Næringsbanken ASA	NO
FöreningsSparbanken AB	SE	Hansapank AS	EE
Landsbanki Islands HF	IS	Buróarás HF	IS
OKO	FI	Pohjola-Yhtymä Oyi	FI
SEB AB	SE	Privatbanken ASA	NO
DnB NOR Bank ASA	NO	Nord/LB Latvija IAS	LV

## Appendix 2

List with all information of all M&As included in the empirical analysis:

<i>Acquirer</i>	<i>Industry</i>	<i>Target</i>	<i>Industry</i>	<i>Status</i>
Storebrand ASA	8775/8575	Finansbanken ASA	8355	Completed
FöreningsSparbanken	8355	Hansapank AS	8355	Completed
Svenska Handelsbanken	8777/8355	Bergensbanken ASA	8355	Completed
Merita Nordbanken	8355	Nordea/ Unidanmark	8355	Completed
SEB AB	8355	Eesti Ühispank AS	8355	Completed
Merita Nordbanken	8355	Christiania Bank/ Kreditkasse	8355	Completed
Spar Nord Bank A/S	8355	Aars Bank AS	8355	Completed
SEB AB	8355	Latvijas Unibanka AS	8355	Completed
FöreningsSparbanken	8355	Hansapank AS	8355	Completed
Danske Bank A/S	8355/8777	RealDanmark A/S	8355/8779	Completed
Svenska Handelsbanken	8777/8355	Midtbank A/S	8355/8777	Completed
Egnsbank Han Herred	8355	DAI Holding A/S	8777	Completed
SEB AB	8355	Eesti Ühispank AS	8355	Completed
Sydbank A/S	8355	Egnsbank Fyn AS	8355	Completed
Ringkjøbing Landbobank	8355	Tarm Bank A/S	8355	Completed
Sampo Oyi	8355/8575	Sampo Bank AS	8355	Completed
Kaupthing Bank HF	8777/8355	JP Nordiska AB	8777	Completed
Sparekassen Faaborg	8355	Regional Invest Fyn	8777	Completed
Islandsbanki HF	8355	Sjóvá-Almennar tryggingar	8575/8536	Completed
DnB Holding ASA	8355	Nordlansbanken ASA	8355	Completed
Danske Bank A/S	8355/8777	Fokus Bank ASA	8355/8777	Completed
DnB Holding ASA	8355	Gjensidige Nor ASA	8355/8777	Pending
Islandsbanki HF	8355	Kredittbanken ASA	8355	Completed
Helgeland Sparebank	8355	Sparebanken Rana	8355	Completed
Islandsbanki HF	8355	Bolig- og Næringsbanken	8355	Completed
FöreningsSparbanken	8355	Hansapank AS	8355	Completed
SEB AB	8355	Privatbanken ASA	8355	Completed
DnB NOR Bank ASA	8355/8777	Nord/LB Latvija IAS	8355	Pending

<b>Acquirer</b>	<b>Target</b>	<b>Announced</b>	<b>Rumoured</b>	<b>Completed</b>
Storebrand ASA	Finansbanken ASA	07.01.1999	07.01.1999	12.02.1999
Förenings Sparbanken AB	Hansapank AS	20.10.1999	20.10.1999	20.10.1999
Svenska Handelsbanken	Bergensbanken ASA	03.05.1999	03.05.1999	19.01.2000
Merita Nordbanken Group	Nordea/Unidanmark	06.03.2000	06.03.2000	29.06.2000
SEB AB	Eesti Ühispank AS	28.08.2000	28.08.2000	20.10.2000
Merita Nordbanken Group	Christiania Bank/ Kreditkasse	16.10.2000	16.10.2000	03.11.2000
Spar Nord Bank A/S	Aars Bank AS	15.11.2000	15.11.2000	15.11.2000
SEB AB	Latvijas Unibanka AS	20.11.2000	20.11.2000	20.11.2000
Förenings Sparbanken AB	Hansapank AS	29.12.2000	29.12.2000	29.12.2000
Danske Bank A/S	RealDanmark A/S	02.10.2000	02.10.2000	28.03.2001
Svenska Handelsbanken	Midtbank A/S	11.04.2001	11.04.2001	17.05.2001
Egnsbank Han Herred A/S	DAI Holding A/S	22.06.2001	22.06.2001	22.06.2001
SEB AB	Eesti Ühispank AS	27.02.2002	27.02.2002	27.02.2002
Sydbank A/S	Egnsbank Fyn AS	18.02.2002	18.02.2002	13.05.2002
Ringkjøbing Landbobank	Tarm Bank A/S	27.06.2002	27.06.2002	27.06.2002
Sampo Oyi	Sampo Bank AS	17.06.2002	15.05.2002	02.08.2002
Kaupthing Bank HF	JP Nordiska AB	29.08.2002	29.08.2002	17.02.2003
Sparekassen Faaborg A/S	Regional Invest Fyn A/S	01.11.2002	01.11.2002	01.04.2003
Islandsbanki HF	Sjóvá-Almennar tryggingar	28.10.2003	22.09.2003	31.10.2003
DnB Holding ASA	Nordlansbanken ASA	20.12.2002	16.12.2002	14.03.2003
Danske Bank A/S	Fokus Bank ASA	07.05.1999	07.05.1999	30.06.1999
DnB Holding ASA	Gjensidige Nor ASA	18.03.2003	01.07.2002	31.12.2003
Islandsbanki HF	Kredittbanken ASA	10.09.2004	12.08.2004	04.01.2005
Helgeland Sparebank	Sparebanken Rana	03.11.2004	03.11.2004	08.04.2005
Islandsbanki HF	Bolig- og Næringsbanken	29.11.2004	07.03.2001	09.05.2005
Förenings Sparbanken AB	Hansapank AS	22.03.2005	11.02.2005	01.07.2005
SEB AB	Privatbanken ASA	25.04.2005	21.04.2005	08.11.2005
DnB NOR Bank ASA	Nord/LB Latvija IAS	16.01.2006	10.01.2006	Outstanding

<b>Acquirer</b>	<b>Target</b>	<b>Payment</b>	<b>Bid premium</b>
Storebrand ASA	Finansbanken ASA	Cash	No information
Förenings Sparbanken	Hansapank AS	No information	No information
Svenska Handelsbanken	Bergensbanken ASA	No information	No information
Merita Nordbanken Group	Nordea/Unidanmark	Shares	15% on 03.03.2000
SEB AB	Eesti Ühispank AS	Cash	41% on 25.08.2000
Merita Nordbanken Group	Christiania Bank/ Kreditkasse	Cash	44% on 17.09.1999
Spar Nord Bank A/S	Aars Bank AS	Cash	67% on 14.11.2000
SEB AB	Latvijas Unibanka AS	Cash	Increased offer 25.10.
Förenings Sparbanken AB	Hansapank AS	No information	No information
Danske Bank A/S	RealDanmark A/S	Shares	71% on 29.09.2000
Svenska Handelsbanken AB	Midtbank A/S	Cash	151% on 10.04.2001
Egnsbank Han Herred A/S	DAI Holding A/S	Cash	21% on 21.06.2001
SEB AB	Eesti Ühispank AS	Cash	No information
Sydbank A/S	Egnsbank Fyn AS	Shares	65% on 15.02.2002
Ringkjøbing Landbobank	Tarm Bank A/S	Shares	67% on 26.06.2002
Sampo Oyi	Sampo Bank AS	Cash	5% on 14.05.2002
Kaupthing Bank HF	JP Nordiska AB	Shares	41% on 28.08.2002
Sparekassen Faaborg A/S	Regional Invest Fyn A/S	No information	5% on 31.10.2002
Islandsbanki HF	Sjóvá-Almennar tryggingar	No information	No information
DnB Holding ASA	Nordlansbanken ASA	Cash	21% on 19.12.2002
Danske Bank A/S	Fokus Bank ASA	No information	No information
DnB Holding ASA	Gjensidige Nor ASA	Shares	-17% on 28.06.2002
Islandsbanki HF	Kredittbanken ASA	Cash	32% on 11.08.2004
Helgeland Sparebank	Sparebanken Rana	Shares	No information
Islandsbanki HF	Bolig- og Næringsbanken	Cash	26% on 12.11.2004
Förenings Sparbanken AB	Hansapank AS	Cash	28% on 10.02.2005
SEB AB	Privatbanken ASA	Cash	16% on 20.04.2005
DnB NOR Bank ASA	Nord/LB Latvija IAS	No information	-28% on 09.01.2006

## Appendix 3

Table of power of event study methodology

Sample Size	Abnormal Return				Abnormal Return			
	.005	.010	.015	.020	.005	.010	.015	.020
	$\sigma = 0.02$				$\sigma = 0.04$			
1	0.06	0.08	0.12	0.17	0.05	0.06	0.07	0.08
2	0.06	0.11	0.19	0.29	0.05	0.06	0.08	0.11
3	0.07	0.14	0.25	0.41	0.06	0.07	0.10	0.14
4	0.08	0.17	0.32	0.52	0.06	0.08	0.12	0.17
5	0.09	0.20	0.39	0.61	0.06	0.09	0.13	0.20
6	0.09	0.23	0.45	0.69	0.06	0.09	0.15	0.23
7	0.10	0.26	0.51	0.75	0.06	0.10	0.17	0.26
8	0.11	0.29	0.56	0.81	0.06	0.11	0.19	0.29
9	0.12	0.32	0.61	0.85	0.07	0.12	0.20	0.32
10	0.12	0.35	0.66	0.89	0.07	0.12	0.22	0.35
11	0.13	0.38	0.70	0.91	0.07	0.13	0.24	0.38
12	0.14	0.41	0.74	0.93	0.07	0.14	0.25	0.41
13	0.15	0.44	0.77	0.95	0.07	0.15	0.27	0.44
14	0.15	0.46	0.80	0.96	0.08	0.15	0.29	0.46
15	0.16	0.49	0.83	0.97	0.08	0.16	0.31	0.49
16	0.17	0.52	0.85	0.98	0.08	0.17	0.32	0.52
17	0.18	0.54	0.87	0.98	0.08	0.18	0.34	0.54
18	0.19	0.56	0.89	0.99	0.08	0.19	0.36	0.56
19	0.19	0.59	0.90	0.99	0.08	0.19	0.37	0.59
20	0.20	0.61	0.92	0.99	0.09	0.20	0.39	0.61
25	0.24	0.71	0.96	1.00	0.10	0.24	0.47	0.71
30	0.28	0.78	0.98	1.00	0.11	0.28	0.54	0.78
35	0.32	0.84	0.99	1.00	0.11	0.32	0.60	0.84
40	0.35	0.89	1.00	1.00	0.12	0.35	0.66	0.89
45	0.39	0.92	1.00	1.00	0.13	0.39	0.71	0.92
50	0.42	0.94	1.00	1.00	0.14	0.42	0.76	0.94
60	0.49	0.97	1.00	1.00	0.16	0.49	0.83	0.97
70	0.55	0.99	1.00	1.00	0.18	0.55	0.88	0.99
80	0.61	0.99	1.00	1.00	0.20	0.61	0.92	0.99
90	0.66	1.00	1.00	1.00	0.22	0.66	0.94	1.00
100	0.71	1.00	1.00	1.00	0.24	0.71	0.96	1.00
120	0.78	1.00	1.00	1.00	0.28	0.78	0.98	1.00
140	0.84	1.00	1.00	1.00	0.32	0.84	0.99	1.00
160	0.89	1.00	1.00	1.00	0.35	0.89	1.00	1.00
180	0.92	1.00	1.00	1.00	0.39	0.92	1.00	1.00
200	0.94	1.00	1.00	1.00	0.42	0.94	1.00	1.00

Power of event study methodology for test of the null hypothesis that the abnormal return is zero. The power is reported for a two-sided test using  $\theta_1$  with a size of 5 percent. The sample size is the number of event observations included the study and  $\sigma$  is the square root of the average variance of the abnormal return across firms.

*Figure 5: MacKinlay (1997); Power of event study methodology*