Post-merger performance of acquirers: Evidence from Finland

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Abstract

PURPOSE OF THE STUDY
The purpose of my study is to increase present knowledge on the acquirer's post-deal performance, which, although widely studied, has yet to reach scientific consensus on its success from acquirer's perspective. More precisely, I focus on the development of acquirer's return on equity and analyse which explains the alleged changes by breaking RoE down into components of net profit margin, asset turnover and leverage by using DuPont equation. This thesis helps to understand the diverse effects of mergers and acquisitions in general as well as adds to the narrow literature on Finland's M&A environment.

DATA AND METHODOLOGY
I use data on Finnish companies received from Asiakastieto. I construct datasets for both non-merging companies and merging companies, which I combine with financial data. I then execute nonparametric tests to compare the performance of non-acquiring companies to the acquirers. Additionally, I analyse the relative explanatory power of each RoE component in explaining the alleged changes in acquirer's RoE. In total, I examine the pre- and post-merger performance of 270 acquirers in mergers occurred in Finland between 2006 and 2011.

RESULTS
I find significant and strong results of acquirers' poorer RoE development in comparison to non-acquiring peer companies in the years following a merger. Moreover, I find that most of the post-merger performance gap between acquirers and non-acquirers can be explained by acquirers' significantly weakening net profit margin following mergers. Interestingly, acquirers' operational underperformance seems to be long-term as the phenomenon is significant also at the end of the observation period. Although the gap in net profit margin between the two groups explains most of difference in RoE development, mergers seem to increase also the asset inefficiency of acquirers. However, contrary to net profit margin, asset inefficiency seems to peak immediately in the next year following a merger. Acquirers are significantly more leveraged than non-acquirers are during the whole observation period, but this has only a limited explanatory power over the observed differences in the RoE development of the two groups.

Keywords Mergers and acquisitions, DuPont analysis, Post-merger performance

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TUTKIMUKSEN TARKOITUS
Tämän tutkimuksen tarkoituksena on auttaa kasvattamaan ymmärrystä ostajan taloudellisesta suorituskyvystä yritysjärjestelyn jälkeisinä vuosina. Aihe on laajasti tutkittu, mutta tieteellinen konsensus yritysjärjestelyjen onnistumisesta ostajan näkökulmasta on saavuttamatta. Perehdyn tutkimuksessani ostajan oman pääoman tuoton kehitykseen ja analysoin, mikä selittää oletetut muutokset siinä paloittelemalla OPO:n tuoton nettotuottomarginaaliin, pääoman kiertonopeuteen ja leveraatioon käyttämällä DuPont-menetelmää. Tämä tutkielma auttaa ymmärtämään yrityskauppojen ja –fuusioiden moninaisia vaikutuksia yleisesti minkä lisäksi se tarjoaa lisätietoa kirjallisuuteen liittyen suomalaisiin yritysjärjestelyihin.

DATA JA MENETELMÄT
Tutkimuksessa käytetty data on peräisin Asiakastiedolta. Luon vertailuryhmät sekä yhtiöistä, jotka eivät ole toteuttaneet yritysjärjestelyjä että yhtiöistä jotka ovat toteuttaneet fuusion ja yhdistän nämä tiedot yhtiöiden taloudelliseen dataan. Toteutan tämän jälkeen nonparametrisiä testejä verratakseni fuusioituneiden ja ei-fuusioituneiden yhtiöiden taloudellista kehitystä. Lisäksi analysoin oman pääoman tuoton komponenttien suhteellista selitysvoimaa ostajan oman pääoman tuoton oletetun muutoksen osalta. Tutkin yhteensä 270 ostajan taloudellista suorityskykyä ennen ja jälkeen toteutuneen fuusion. Fuusiot ovat toteutuneet vuosien 2006 ja 2011 välillä.

TULOKSET
Löydän merkitseviä ja vahvoja tuloksia sen puolesta, että yritysostajien oman pääoman tuoton kehittyminen yritysfuusion jälkeisinä vuosina on huonompaa kuin verrokkiyritysten. Löydän myös, että suurin osa suorituskyvyn eroista yritysostajien ja muiden yritysten välillä voidaan selittää yritysostajien merkittävästi heikkenevällä nettotuottomarginaalilla fuusioiden jälkeen. Mielenkiintoisena havaintona huomaan, että ostajien operatiivinen aliperformointi näyttää olevan pitkäaikaista, sillä ilmiö on merkitsevä ja vahva myös havaintoajan lopussa. Huolimatta siitä, että nettotuottomarginaali selittää suurimman osan eroista OPO:n tuoton kehityksessä, fuusiot näyttävät lisäävän myös ostajien taseen tehottomuutta. Kuitenkin, toisin kuin nettotuottomarginaali, taseen tehottomuus saavuttaa lakipisteensä heti fuusiota seuraavana vuonna. Ostajat ovat huomattavasti leveroituneempia kuin muut yritykset koko havaintoajan, mutta tällä on vain rajallinen selittävä voima oman pääoman tuoton kehityksen erojen suhteen.

Avainsanat Yrityskaupat ja fuusiot, DuPont-analyysi, Yrityskaupan jälkeinen suorituskyky

Contents

Table of tables and figures

1 Introduction

The academic discussion has revolved around success of mergers and acquisitions ("M&A")[1] already for decades. Due to the complexity of the phenomenon, the topic has generated a lot of interest not only in financial accounting literature but also e.g. among organizational researchers[2]. Although the evidence on the positive effects is clear for target companies, an interesting aspect of the topic has been the lack of clear consensus on whether acquisitions have generated shareholder value for acquirers. Although there is no clear consensus, a significant number of academics argue that mergers and acquisitions constantly fail to generate acquirer's shareholder value (e.g. Grubb and Lamb, 2000; Bruner, 2002). Literature has suggested several explanations for this from lack of proper integration plans to acquiring company's management's hubris, but further research is needed to strengthen these views.

1.1 Background and motivation

The total value of global mergers and acquisitions annually is, according to Statista, 3 999.6 billion U.S. dollars[3] exceeding the gross domestic product of all countries except for United States, China, Japan and Germany[4] in 2018. The amount involved in M&A globally underlines the significance of such strategic decisions for companies and thus understanding them thoroughly is crucial. Although prior literature regarding M&A activity is vast and, as said in the introduction of this thesis, they constantly fail to generate value for the acquirer, prior literature that focuses on the changes in acquirers' fundamentals after the acquisition is more limited, especially in the context of smaller markets such as Finland.

[1] The terms merger and acquisition are used interchangeably in the thesis
[2] In fact, contrary to financial accounting literature, the organizational aspects of M&A are well covered also in Finnish context with prominent researchers such as Satu Teerikangas and Eero Vaara contributing to the literature.
[3] M. Szmigiera, "Value of mergers and acquisitions (M&A) worldwide from 1985 to 2018 (in billion U.S. dollars)", read 14.08.2019, https://www.statista.com/statistics/267369/volume-of-mergers-and-acquisitions-worldwide/
[4] "World Economic Outlook Database", read 14.08.2019, https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/index.aspx

Although fluctuating annually, the number of mergers and acquisitions activity globally is on the rise[5] and almost 50 000 deals were made in 2018 alone. While the amount of deals has increased and M&A research has been active for over 40 years (e.g. Cartwright, Schoenberg 2004), the failure rate of them has remained rather constant over the whole period. For example, when researching European acquisitions in 1974 Kitching found out that around 46-50% of them fail to meet their objects whereas newer publications (e.g. Schoenberg 2006) have indicated similar failure rates.

Despite the fact that academic interest in M&A performance is extensive, the emphasis in literature has understandably been in the performance of companies from major markets such as the United Kingdom or United States. Furthermore, financial accounting literature tends to skew towards research on larger, publicly listed companies due to availability of data. Due to these reasons, I find it an inspiring starting point to examine the performance of domestic Finnish acquisition in this thesis and see whether the results bear a resemblance to prior literature.

In this thesis I will examine acquisitions effect on shareholder value in private Finnish acquisitions. The source data is from Asiakastieto[6] and it consists of Finnish limited liability companies that have ended their operations by merging with another company between 2006 and 2011. I have also received balance sheets and income statements of the acquiring companies from the database of Asiakastieto. Moreover, I have received comprehensive financial information on majority of all limited liability companies in Finland which enables me to compare acquirers' performance to that of non-acquirers.

Measuring M&A performance using objective indicators, such as acquirers' stock market returns or development of fundamentals (e.g. Datta and Puia, 1995; Carrow, Heron and Saxton, 2004) is not a new approach within M&A research, on the contrary. However, most of these studies have not paid significant attention to the root causes of explaining constant M&A failures and investigating factors that affect acquisition success is still an important research question (Carrow, Heron and Saxton, 2004).

[5] "M&A Statistics", read 14.08.2019, https://imaa-institute.org/mergers-and-acquisitions-statistics/
[6] A publicly listed Finnish company gathering Financial information on companies

1.2. Research question and main findings

This thesis aims to investigate the long-term success of M&A from the acquirer's perspective in the context of domestic Finnish acquisitions. The focus will be on the following research questions:

1) Does the acquirer's return on equity differ significantly from that of non-acquirers in the years following a merger?
2) When the possible differences in acquirers' and non-acquirers' post-merger RoE are decomposed using DuPont analysis, do some variables explain the changes more than others do?

Using data gathered from Asiakastieto I construct a group of acquirers and compare their RoE development in a five-year period around the merger to non-acquirers' (later also "control group") development.

I find out that the return on equity of acquirers is significantly lower than that of non-acquirers in the years following a merger. After one year, acquirers' median RoE is almost 6% lower than non-acquirers' equivalent. What's more, the difference in RoE keeps growing in the following years and is 7,7% lower than non-acquirers' RoE three years after the merger.

For my second research question, I find that there indeed are significant differences in how the variables behave after the merger. Net profit margin decreases annually after the merger and is on average 1,9% worse than control group's margin in the third year after the merger. I also find that acquirers' asset turnover is lower than that of the control group's every year during the observation period but the dispersion between the two groups is at its largest in the year of the merger. Less surprisingly, acquirers are on average significantly more leveraged than their non-acquiring peers.

To tackle some potential hiccups of the data used I also run analyses using only the data of companies performing better than the control group before the merger. These results support earlier findings.

The findings of this study strongly support the view that acquisitions in general have had a negative effect on the return of equity as well as net profitability of the acquirer. Although similar findings have been made globally, as far as the author is aware, this is the first time such findings are reported from acquisitions focusing on domestic Finnish acquisitions.

1.3. Contribution to existing literature

Although literature on the performance of M&A is significant and comprehensive, domestic research in Finland is not vast. Moreover, quantitative research is usually performed by using data on publicly listed companies whereas this study covers also privately-owned companies.

DuPont analysis is a common tool for financial statement analysis used to measure fundamental performance of companies by decomposing return on equity into multiplicative components (e.g. Soliman, 2004). Using this methodology when investigating changes in acquirers' fundamentals after an acquisition might bring us some new insight on the factors influencing acquisition success, especially in the Finnish context.

The rationale for this study is to add to the existing and wide, but controversial academic discussion on the success of mergers and acquisitions. Although acquirers' post-transaction performance has been an identified research area for decades, univocal understanding on whether it usually pays off or not for the buyer is missing. Therefore, any new aspects that can be brought to the table to widen the knowledge should be academically interesting.

The thesis contributes to the existing literature by increasing our knowledge on the fundamental factors that affect acquirer's post-transaction performance. Moreover, the thesis provides a fruitful basis for analysing whether acquisitions have been a successful growth strategy in recent years. What's more, most studies regarding post-transaction performance focus solely on listed companies whereas this research includes also privately-owned companies.

1.4. Methodology

In this thesis, I will first introduce prior literature on the rationales of mergers and acquisitions from an acquirer's standpoint, which is followed by an analysis of the findings of their success according to prior literature. After that, I will briefly rationalize the usage of DuPont analysis in the empirical part of my thesis.

The first step in the empirical part of the study is to compare the performance of domestic acquirers to the control group of non-acquiring companies both pre- and post-transaction. This will be done

by analysing changes in Return on Equity (RoE) and variables constituting RoE. After that I will break down the presumed changes in RoE by using three-step DuPont analysis. The focus of the thesis is to find out how big of a portion do different components, profitability, asset turnover and financial leverage, of return on equity explain and whether the results are statistically significant. As mentioned before, prior literature on the topic is rather extensive and of the opinion that acquisitions on average are destroying acquirers' shareholder value due to several reasons. However, although academic literature on the subject has recognized explanatory factors behind this, it has not paid much attention to the relative explanatory power of changes in asset structure and efficiency as well as operative performance in acquirers' post-acquisition problems. Therefore, the aim of this thesis is to provide further insight on the pitfalls of acquisitions for acquirers.

Return on equity can be decomposed into several components by using DuPont analysis. Initially the analysis was popularized by DuPont Corp. in the early 1900's and consisted of two steps - profitability and asset turnover. Later, the focus in the usage of DuPont analysis has however been in the development of RoE instead of RoA, which was made possible by adding an extra variable, assets to equity -ratio, to the initial formula. Although the formula has seen some further variations and additions, this so-called three-step DuPont model is still widely used in financial analysis to get more detailed information on companies' profitability than just analysing RoE as such.

1.5. Structure of the thesis

The structure of the thesis is as follows. In the following section the thesis introduces the main findings of prior literature concerning M&A rationales and post-acquisition performance from acquirer's perspective as well as how DuPont analysis has been used in literature to decompose return on equity in different fields of research. Section 3 presents the hypotheses of this thesis and how they are drawn from the prior literature. This will be followed by an introduction to the methodology and to the data construction in the chapter 4. Section 5 presents the empirical findings of the conducted tests. After that, the 6th section of the thesis provides an analysis on whether or not the empirical results of the thesis are consistent with the existing literature and the interpretation of the results. Finally, section 7 concludes the thesis.

2 Review of the relevant literature

This chapter presents relevant research publications and their findings regarding M&A activity and the use of DuPont analysis in measuring companies' fundamental performance thus constituting the framework for the thesis.

First, the most common rationales behind acquisition are presented which is followed by analysing the factors that are recognised in the literature as having a either a positive or a negative effect on the acquirer's performance after the acquisition. After a brief review on the acquisition rationales, the findings of prior literature regarding the post-acquisition success of acquirers is reviewed. This is followed by an introduction to the theoretical framework of DuPont analysis. Lastly, as, to the author's knowledge, DuPont analysis has not been widely used in prior research to investigate acquirer performance, a justification for the methodology used in this thesis is given.

2.1. Mergers and acquisitions

According to Sudarsanam (2003), there are several identified rationales for mergers and acquisitions. The earliest observed merger wave that occurred in the US in 1890's, was derived from companies seeking monopoly power and economies of scale. Since then, strict antitrust laws have led to decline in monopolistic mergers, but other rationales have increased the volume of M&A activity to record highs.

Although the rationales for acquiring businesses vary a lot, they always share a common stated objective of achieving synergies and financial gains. However, a study after study since the beginning of M&A research some 50 years ago, has come to the same conclusion that merely half of all mergers and acquisitions meet their initial financial expectations (Cartwright, Cooper, 1993). However, not meeting the initial expectations of the transaction does not necessarily equal to unsuccessful acquisition. An argument about failing acquisitions, especially emphasised by consulting firms, derives from rather narrow acquirer's returns –perspective. While it's true that initial financial expectations of acquirers are not often met, that does not as such work as an argument for failure of acquisitions. To fully understand the overall impact of mergers and

acquisitions and the different angles determining their success, perspectives of the target as well as different stakeholders of the companies taking part in the transaction should be taken into account (Sudarsanam, 2003). While acknowledging these perspectives, this thesis however focuses on the perspective of acquirer's returns.

The reason why companies are seeking for acquisitions varies significantly and according to e.g. Sudarsanam, the rationale in fact contributes to the success of the acquisition. However, the wide range of acquisition motives also emphasises the complexity of building comprehensive models explaining the phenomenon (Das and Kapil, 2012).

Sudarsanam has classified M&A rationales as driven by either economic, strategic, finance theory-related, managerial and organizational motives. Economic motives are rationalized e.g. by scale and cost benefits and the focus is the company's operating environment. Strategic acquisitions are usually motivated by acquiring resources and capabilities with an aim to achieve sustainable competitive advantage. Finance theory observes merger decision within the framework of various stakeholders and involves elements such as shareholder wealth maximization and agency problems. Managerial motivated mergers are driven by utility of the management whereas organizational perspective on mergers involves different actors within the firm that all have different perspective, motives and expectations of the merger.

Trautwein (1990) on the other hand classifies merger rationales to under efficiency driven mergers which create net gains through synergies; monopolistic mergers aiming at achieving market power; raider mergers where the target's wealth is transferred to bidders through e.g. excessive compensation after the takeover; valuation theory based mergers which are executed by managers who have better information about the target's value than the stock market; empire-building driven acquisitions are motivated by management maximizing its own utility instead of shareholders' value; process theory driven mergers are not entirely rational but might be resulting e.g. from managerial hubris; disturbance theory mergers are a result of macroeconomic phenomena.

Berkovitch and Narayanan (1993) highlight three major motives for takeovers: synergy, agency and hubris. Their analysis concluded that the majority of the takeovers was justified by synergies and on average, these acquisitions generated positive total gains. An interesting finding was that

the major reason for value-reducing acquisitions was agency motivated acquisitions while hubris driven takeovers are neutral in terms of value development.

To summarise literature focusing on M&A rationales, the primary motive for M&A seems to be is synergies, although several other rationales exist.

In earlier M&A studies that examined the financial performance of the acquirer, stock market reactions around the acquisition were preferred as a measure of the M&A success due to the assumption that the capital market as such is sufficient enough to reflect the M&A quality (Kangkang 2016). Although, the academic literature regarding the factors affecting M&A performance has been vast for decades, the emphasis on literature has shifted from focusing on stock market returns to human aspects such as integration in explaining the outcomes of acquisitions already in the 1990's (Cartwrigh, Cooper, 1993). Additionally, researchers have later examined the differences of M&A success based on e.g. types of acquirers and payment methods. Also, strategic management literature has been active on M&A with a focus on antecedents of acquisition performance of acquirers. In the following section I go through in more detail the findings of previous M&A literature.

2.1.1. Findings of previous M&A studies

According to Bruner (2002), M&A research offers four approaches to measure M&A profitability. **Event studies** focus on the shareholders' abnormal returns in the period – either short term or long term - that surrounds the announcement of a transaction whereas **Accounting studies** examine acquirer's financials (i.e. balance sheets and income statements) before, and after, transactions to observe the changes in financial performance. This is also the methodology used in this Thesis.

In addition to abovementioned, similarly structured methods, which are essentially tests of hypotheses, also descriptive methodologies are widely used. **Surveys of executives** are often simple standardized questionnaires to a sample from which results are aggregated across to yield generalizations. **Clinical study** is an inductive research methodology where focus is on one or few transactions in which the transactions are observed in great detail to induce new insights.

In his article "Does M&A Pay?", Bruner (2001) has compiled the findings of several studies in each of the abovementioned methodologies. Also, the special features of the methodologies and findings related to them have been analysed. For example, market-based event research method allows also the analysis of target firm returns whereas accounting studies offers an insight into the drivers of profitability of M&A.

Event studies in the field of M&A profitability strongly support the view that target firm shareholders receive significant abnormal returns on average despite variations in variables such as time period, type of deal and observation period. Two prominent surveys (Jensen and Ruback 1983; Datta, Pinches and Narayanan 1992) conclude that the abnormal returns for target company's shareholders have, on average, been in the range of 20-30 percent. However, the question on buyers' returns is a bit more complex as studies focusing on them reveal that the distribution of results between short-term event studies that perceive value destruction (13 studies), value conservation (14 studies) and value creation (17 studies) is rather even. An interesting observation is that studies that examined long-term returns to buyer firms on average show negative returns. However, the interpretation of long-term returns is more uncertain due to possible confounding events that are not related to the transaction.

When both, returns to acquirers and targets are taken into account, market-based studies suggest that the combined returns are on average significantly positive. Out of the 20 marked-based studies Bruner analysed, almost all reported positive combined returns, with more than half of them being significantly positive. In conclusion, market-based studies indicate that M&A does pay for the target's shareholders and in total but does not so for the acquirer's shareholders.

Loughran and Vijh (1997) examined the impact of payment method used in acquisitions and found that companies who complete stock mergers earn significantly negative excess returns of -25,0% whereas companies that complete cash tender offers earn significantly positive excess returns of 61,7% in a five-year period following the acquisition.

A recent study by Alexandridis, Antypas & Travlos (2017) found out that post-2009 the abnormal returns for acquiring companies' shareholders have been significant and one driver for that has been the improved performance of so-called mega deals, priced at least $500m, which are often associated with distinct agency problems, media attention and investor scrutiny. The explanatory

factor behind the improved shareholder profits seems to be related to the better corporate governance leading to more considered transactions among acquiring firms in the aftermath of the financial crisis.

Observing accounting studies gives more or less similar results on M&A profitability as event studies. Of the 13 studies Bruner compiled, two studies[7] showed significant negative post-acquisition performance, three reported significant positive returns[8] and the rest of the studies yielded non-significant results. Although an old study, Geoffrey Meeks' (1977) research on long-term success of transactions that occurred in the United Kingdom between 1964 and 1971 is an interesting publication in relation to this study. He examined the long-term RoA development of the acquirers compared to non-acquirers from the same industries and found out that the RoA of acquirers declines over the following years rather than suddenly after the transaction.

Exhibit 6
Excerpted Findings About the Change in Profitability of British Acquirers Following Acquisition
(Meeks (1977), page 25)

	Change in profitability versus industry and versus pre-deal performance	Percentage of observations in which change in profitability is negative.
Year of transaction	0.148[a]	0.338[a]
Year +1	-0.015	0.536
Year +2	-0.010	0.517
Year +3	-0.058[a]	0.527
Year +4	-0.098[a]	0.660[a]
Year +5	-0.110[a]	0.642[a]
Year +6	-0.067	0.523
Year +7	-0.073	0.619
	a significantly different from zero at 1%	a significantly different from 0.5 at 5%.

Figure 1 - Findings of Meeks' study regarding long-term success of transactions

Mueller's (1980) comparison of M&A studies across several nations found out that the acquirers' reported slightly worse profitability in the years following transactions but the results were not significant.

[7] Meeks, 1977; Saltner and Weinhold, 1979
[8] Healy, Palepu, Ruback 1992; Chatterjee, Meeks 1996; Seth 1990

Rau and Vermaelen (1998) on the other hand studied acquirers' post-acquisition success and found that although acquirers in mergers underperform in the three years following the acquisition, it is predominantly due to the poor performance of low book-to-market (high Tobin's Q) "glamour" acquirers in comparison to the performance of high book-to-market companies (low Tobin's Q).

One of the most cited research papers examining the post-acquisition performance of acquirers by Healy, Palepu and Ruback (1992) ascertained interesting – and contradictory – results compared many other studies regarding the success of acquisitions from the acquirers' perspective. The sample of 50 largest U.S. mergers between 1979 and mid-1984 in their study performed significantly better relatively their industries. Furthermore, realised increases were due to post-merger improvements in asset productivity while maintaining the same level of capital expenditure and R&D costs as the benchmark companies.

When analysing previous studies of smaller samples, i.e. surveys of executives and clinical studies, striking similarities in results compared to large-sample studies are found. Although qualitative studies focusing on very small samples are statistically deficient limiting the possible assertions one can compose, they often add value in providing in-depth observations and possible explanations to the phenomenon.

Of the 13 executive surveys Bruner analysed, six showed negative results whereas the rest were either negative or neutral. In addition to the previous studies, Bruner also conducted a poll asking business executives their opinion on whether they think M&A deals create value for buyers and meet their strategic objectives. On average, the polled executives saw that only 37 percent of acquisitions are value creative for the acquirers and only on fifth of the deals meet the strategic goals buyers' had set. However, the opinions of the respondents varied quite a lot which is in line with other studies, despite the used methodology, in the field of M&A profitability research.

When it comes to strategic management literature, relatedness and similarity between the parties is the most studied deal characteristics that is argued to impact to the success of M&A (Kangkang, 2016). Montgomery and Singh (1987) found evidence that acquisitions that are related in product, market or technological terms create higher value than unrelated acquisitions. Although several other studies have seconded the view, also some opposite findings have been presented as Seth

(1990) showed empirical evidence that value is created in both, related and unrelated acquisitions, and related acquisitions do not create significantly more value than unrelated ones.

To conclude, although broader discussion on the profitability of M&A from the buyers' perspective seems to be of the opinion that acquisitions usually destroy buyers' shareholder value – especially this seems to be the consensus among consultants – academic community has not reached unanimity on neither short- or long-term effects of acquisitions for the buyers. In a way this emphasise also the importance of further research in the field.

While recognising the shift in emphasis in academic literature towards human aspects of M&A, I focus on the financial point of view in analysing the determinants of M&A success. However, using DuPont analysis and disaggregating acquirers return on equity into components explaining profitability (Net Income/Revenue), asset efficiency (Revenue/Assets) and financial leverage (Assets/Equity), might help to better understand on how much operational aspects explain the post-transaction performance in comparison to changes in asset structure and thus bridge the gap between the two school of thoughts. This is due to the conjecture that operational performance is related to the success of human aspects of M&A whereas changes in asset structure are not.

2.2. DuPont analysis

In the early 1900s, an employer of DuPont Co. named F. Donaldson Brown, was assigned to analyse and develop the finances of General Motors, an underperforming auto manufacturer at the time, of which DuPont had acquired a significant stake. The initial DuPont analysis was developed in 1918, when Brown realised that by multiplying net profit margin with total asset turnover return on assets (ROA) can be calculated.

$$\frac{Net\ Income}{Revenue} * \frac{Revenue}{Ave.Assets} = \frac{Net\ Income}{Ave.Assets} \qquad (1)$$

Since then, the emphasis in financial analysis has been more towards return on equity (ROE) instead of ROA which has also led to modification of the initial formula to include the ratio of total assets to equity (e.g. Greenwood 1980; Sheela and Karthikeyan,2012; Flesher and Previts 2013).

$$\frac{Net\ Income}{Revenue} * \frac{Revenue}{Ave.Assets} * \frac{Ave.Assets}{Ave.Equity} = \frac{Net\ Income}{Ave.Equity} \qquad (2)$$

Although simplistic, DuPont analysis is still a relevant model when analysing the profitability of companies. Due to its' simplicity, the model is also an efficient tool in analysing the root causes of profitability changes in different situations, such as after an acquisition.

These abovementioned components of DuPont ratio cover three important areas of financial performance – profitability, operating efficiency and leverage. The rationales for using these specific ratios are explained by Isberg (1998).

Several profitability ratios can be used to measure company's profitability at different levels of the operation. Gross profit measures the profitability of the operations after deducting variable costs from sales, operating profit takes also fixed costs into account and net profit is the bottom-line profitability after all cash flows, making it also the most comprehensive of those ratios.

The purpose of efficiency ratios, such as fixed asset turnover and working capital turnover and the most comprehensive of them, total asset turnover, which is used in DuPont ratio, is to reveal whether companies' assets are used effectively to generate sales. In financial ratios that combine items from both the balance sheet and income statement, a bias stemming from the use of flow variables (income statement) and items measured at a fixed point of time (balance sheet). Therefore, using a simple average for balance sheet items (beginning+ending/2) should be used to control for some of the bias.

Debt can be used to leverage the return on equity by investing it into projects which return more than the cost of debt leaving the residual to the equity owners. However, debt creates fixed payment requirements for the company which can risk the equity position if the company's profitability plunges. Average Assets/Average Equity –multiplier, used in DuPont analysis, is directly comparing the proportion of debt in the firm's capital structure.

According to Arditti (1967), an investment can only be justified if the answer to the question "Will the acquisition of this asset increase the value of the owner's equity?" is positive. In other words, only the investments whose present value to the owners is more than the cost of the investment, should be chosen. This is of course the case also regarding acquisitions, which are particular types of investments by the company. As return on equity should be at the core of all acquisitions,

understanding the measure as thoroughly as possible is of paramount importance in improving the quality of companies' acquisition decisions.

In reference to Healey, Palepu and Ruback's observation on acquirers' improved operational efficiency, DuPont analysis is an efficient tool for analysing whether this is also a valid conclusion in the context of this thesis.

As Isberg (1998) states, the elegance of using DuPont analysis when measuring Companies' performance lies in its simplicity. Although it should not be used as a replacement for more comprehensive financial analysis, DuPont analysis enables the researcher to quickly identify the relevant changes in the three areas of the ratio helping to focus subsequent inquiries to the most meaningful findings. For the purpose of this thesis, analysing changes in the three areas of DuPont ratio allows an adequate overview on the effects of acquisitions for acquirers in Finnish context.

3 Hypotheses

The research questions of the thesis are derived from the literature review and discussed in this section. Although based on prior literature there seems to be a slight lean towards negative excess returns in the following years for the acquirer among academics, the literature covering the topic is all but unanimous. However, the first hypothesis is derived from accounting studies of which majority suggest that, on average, acquirers perform worse than their control groups in the following years.

> H_1: The RoE of the acquirers is significantly lower than that of the non-acquirers after the acquisition

Although prior literature on the success of M&A from the buyer's perspective is diverse, and studies arguing for significant positive post-acquisition performance can be found (see Healey, Palepu, Ruback 1992), I presume in this thesis that compared to non-acquiring companies, acquirers' return on equity is lower in the years following the merger. This hypothesis is rationalized by the fact that market-based event studies studying the subject have mostly focused on the short-term gains which mirror only the shareholders' expectations, not fundamental

performance. Event studies from the field focusing on long-term performance seem to actually support negative post-acquisition performance. Additionally, several studies that have focused solely on acquirer's post-acquisition returns instead of total returns, have reported poorer results in comparison to non-acquiring peers.

From the first hypothesis I derive my secondary hypotheses. As RoE can be split into three components – net profit margin, asset turnover and leverage – and the RoE of the acquirers is hypothesised to be significantly lower than that of the non-acquirers, it is logical to presume that also the components of the RoE are lower than control group's equivalents. Additionally, recent research (e.g. Cooper, Gulen and Schill, 2008) has found out that the future stock returns of companies whose assets increase through investments have been lagging behind the stock returns of companies with contracting balance sheets. Mortal and Schill (2015) argue in their recent publication that the long-term underperformance of merged companies is even solely explained by the growth in acquirer's assets. Therefore, it is reasonable to predict that acquirers' assets are used inefficiently causing the asset turnover of acquirers to be lower than that of the non-acquirers in the years following the transaction. It is also known that majority of acquisitions are at least to some extent leveraged (e.g. Harrison et al. 2013) indicating that the above presumption of lower post-transaction values of RoE components does not hold when it comes to leverage. Therefore, my secondary hypotheses are as follows:

> H2: Net profit margin of acquirers is significantly lower than that of the non-acquirers after the acquisition
>
> H3: Asset turnover of acquirers is significantly lower than that of the non-acquirers after the acquisition
>
> H4: Leverage of acquirers is significantly higher than that of the non-acquirers after the acquisition

4 Data, Variables and Methodology

The empirical part of this study compares the performance of domestic acquirers to non-acquiring domestic companies' post-merger performance. Also the pre-merger performance in t_{-1} (where t is the year of the merger) will be covered but mainly for control purposes and not much emphasis should put on it for the reasons covered in section 4.4.. The changes in performance are done by analysing changes in return on equity and variables constituting RoE.

This part aims to investigate whether the changes in acquirer's profitability in the years following an acquisition are significant in the context of Finnish companies. I will break down the presumed changes in RoE by using three-step DuPont analysis. The focus is to find out which different components – net profit, asset turnover and financial leverage – of return on equity explain the possible changes and whether the results are statistically significant.

4.1. Data

4.1.1. Data origin

The source data is from Asiakastieto, who granted me an access to their data consisting of tens of thousands of companies that have ended their operations for several reasons in recent decades in Finland. Of these companies, approximately 11 000 had ended operations by merging with another company between 2006 and 2017. The source material includes all Finnish legal forms that have ended their operations officially during the time period. In addition to the aforementioned, I also received balance sheets and income statements of the acquiring companies from Asiakastieto. Although this dataset was comprehensive, not nearly all financial information of the acquirers was included which limited the number of observations.

The data in this research includes only acquisitions were the target has been merged into the acquirer. Acquisitions were the ownership of the company changes, but the company ID remains intact are not included meaning that a large share of all Finnish acquisitions during the research period have not been taken into account.

4.1.2. Data construction

The raw data of the study required significant construction in order to be applicable. In this section all the stages of data construction are presented and given rationales.

Two separate datasets were needed to construe the research topic. One that included the information of all the Finnish companies that had ended their operations during the research period and one that included the financial information of Finnish limited liability companies from the same time period.

The dataset containing the financial information of Finnish companies was construed the following way. First, I limited the size of the companies in this study to exclude all companies with less than 700.000€ in revenue. All micro-undertakings were excluded from the dataset due to overrepresentation of such companies. The threshold is one definition of a micro-undertaking per Finnish Accounting Act 1336/1997 (Chapter 1, Section 4b) and transactions involving smaller companies would increase the sample significantly causing a bias towards micro transactions.

Secondly, all companies identified as "acquirers" were excluded from the control group. The companies defined as acquirers included all the companies that were involved in a merger of relevant size[9]. To clarify, also acquirers that were at a later stage defined as non-applicable for the analysis due to e.g. being subsidiary mergers were excluded. On the other hand, companies who had done acquisitions but not merged the targets are classified as non-acquirers due to an inability to recognise such companies. However, the total amount of insufficient companies in the control group data is negligible.

The number of companies after each stage of data construction is presented below. The final number represents the number of individual companies used in the control group analysis. However, the actual comparison was executed so that each acquirer was compared against those control group companies, which were classified to the same 3-digit TOL classification code as the acquirer[10].

[9] Mergers where the target's revenue exceeded 5% of the acquirer's revenue are considered as relevant, as defined further in this section.
[10] "Standard Industrial Classification TOL 2008" is an industry classification system used in Finland which is based on NACE Rev. 2.

Stages of data construction – all non-acquirers

Explanation of construction stage	Number of companies
Original data from Asiakastieto	240 267
Exclusion of companies with revenue less than 700.000€	52 752
Exclusion of companies defined as acquirers	40 452

Table 1 – Stages of data construction – all non-acquirers

The construction of the relevant acquisitions is as follows. First, I limited the research to contain only ordinarily merged companies and excluded e.g. combination mergers. Secondly, I combined the group of ordinarily merged companies with the dataset containing financial information on Finnish companies. Thirdly, only mergers where the target's revenue exceeded 5% of the acquirer's revenue were taken into account. Acquisitions that were relatively smaller are considered as non-significant. Fourthly, in order to catch the long-term effect of acquisitions only companies that had sufficient financial information for four subsequent years, $t_{-1} – t_3$, where t is the financial year of the merger. The financial year before the merger measures the pre-transaction performance of the acquirers where as $t_1 – t_3$ examine the development of post-transaction performance.

As the raw data used in this study included a significant amount of holding companies and other non-operative companies, an important step to secure a non-biased data was to define the variables. The first variable, further defined in section 3.2.1., net profit/revenue, was set to exclude companies with net profit margin less than -30% or more than 30%. A company with losses or profits in excess of 30% from the revenue are likely in a development stage or holding companies and thus their operative performance is atypical. Average revenue / average assets -ratio, ATO, further defined in section 3.2.2., does not take into account companies with a revenue of less than 0,1 times of average assets nor companies with ATO of more than 20. The former is a clear sign of e.g. a holding structure or of development phase company whereas companies with a ratio exceeding the latter restriction are likely from unorthodox industries and could harm the interpretation of the data.

Average assets divided by average equity (section 3.2.3.) is a measure of leverage. All companies with negative ratio, i.e. negative equity, were erased as well as companies with an equity level of less than 5% of total assets as companies with larger leverage are very likely in an unhealthy situation. Finally, the companies with RoE (section 3.2.4.) of less than -100% or more than 100% were also excluded from the observations as they were regarded as outliers. Above restrictions in variables tackle the problem of bias towards atypical observations.

Lastly, I recognise that a significant portion of mergers are de facto e.g. changes in group structure where for example a subsidiary is merged into a parent company. Therefore, it was essential to manually exclude all assumed subsidiary mergers.

Stages of data construction - acquirers

Explanation of construction stage	Number of observations
Number of companies in the dataset containing all companies that have ended their operations	203 150
Exclusion of acquirers not classified as ordinarily merged	11 032
Exclusion of mergers where target's revenue less than 700 000€	3 390
Exclusion of mergers where target's revenue is less than 5% of acquirer's revenue	1 784
Exclusion of identified subsidiary mergers (manually excluded)	1 122
Mergers with data for t_{-1} – t_3 observations and acquirers are within the variable restrictions	270

Table 2 – Stages of data construction - acquirers

After data construction the final data was formed as presented in table below. As explained above, observations were not directly compared to all non-acquirers but instead to the companies within same industry classification from the larger control group.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Mergers, N	-	31	35	46	36	57	65	-	-	-
Non-acquirers, N	11 831	11 801	11 612	13 698	14 093	14 244	15421	16 647	17 271	17 329

Table 3 – Combined data

The variable medians of non-acquirers for years 2005 and 2012-2014 are computed for the long-term performance examination of acquirers. For example, an acquisition performed in 2006 requires the control group's variable medians for year 2005 (t_{-1}) whereas an acquisition performed in 2011 requires similar data for years 2012-2014 ($t_1 – t_3$).

The research design used is such that acquirers' variables were matched individually against the median of control group's companies from the same TOL-code for the given variable and year. Median values are used instead of mean values as statistical analyses are performed by using non-parametric tests as justified in the following section. For example, if an acquirer performed an acquisition in 2007 (t_0), the acquirer's asset turnover in 2006 (t_{-1}) was matched against control group's median asset turnover in 2006. After matching all individual acquisitions to their respective control groups, I subtracted the control group's median variable values individually from acquirers' values which formulates the delta of the given variable.

The reason for comparing the delta of the variables instead of the variables as such is to create a known standard value of the control group's median enabling the usage of one sample Wilcoxon signed-rank test when determining whether the median of acquirers' variables is significantly different from the non-acquirers' median. By using the variable's delta, the known standard value, i.e. the control group's median for the given variable, is zero.

4.2. Methodology

In this section, the methodology of how the variables are tested for the hypothesis is described. To clarify, this section explains the selection of methodology for testing against hypotheses but does not go through the methodologies for additional robustness tests.

According to Fahoome (2002), nonparametric tests are often more powerful than parametric tests for real world data as they are rarely normally distributed. To test the normality of the data used in this study, I performed Shapiro-Wilk tests for each of my datasets as according to Ghasemi and Zahediasl (2012), it is nowadays regarded as having more power than traditionally the most used normality test, Kolmogorov-Smirnov test. Additionally, Barber & Lyon (1996) argue that non-parametric tests are better suited than parametric t-tests when measuring changes in operating measures as homoscedasticity and normal distribution of error terms are likely to be violated when dealing with financial measures.

4.2.1. Shapiro-Wilk

To confirm or discard the arguments above, I run Shapiro-Wilk tests to each dataset used in this study. All the datasets of this study are non-normally distributed (exhibit E), significant at $P < 0.01$, meaning that non-parametric tests should be used for further statistical tests.

4.2.2. Wilcoxon signed-rank test

As the non-acquirers' median variable values, i.e. known standard values, are known, one-sample Wilcoxon signed-rank test can be applied for the statistical analyses. The calculation[11] of each statistic, denominated as *W*, is done by calculating the absolute values of the differences between observed values and standard value and ordering the values from smallest to largest.

$$|d_i| = |x_i - m_0|, i = 1,2, \dots, n$$

[11] Introduction to Statistical Inference Lecture 3: Nonparametric Statistical Tests, Pauliina Ilmonen

where x_n is the observed value and m_0 is the population median.

Each observed value is then defined a signed rank "R_*" which is multiplied with the sign of the difference"$x_i - m_0$".

Test statistic *W*, defined below, is then the sum of either the positive or the negative ranks.

$$W = \sum_{R*(X_i)>0} R_*(X_i)$$

Under H_0, the expected value of *W* is as follows:

$$W = \frac{n(n+1)}{4} \qquad (3)$$

$$\sigma^2 W = \frac{n(n+1)(2n+1)}{24} \qquad (4)$$

If the value of the W is too large or small compared to the expected value, then H_0 is rejected. All Wilcoxon sign-rank test calculations are performed with a statistical program SPSS.

To sum up, the empirical tests of this study are based one-sample Wilcoxon signed-rank tests. In total, four variables are tested against the standard value of the given variable. The standard values are the calculated median values of the non-acquiring companies included in the dataset available, excluding those that did not meet the restrictions described in section 4.1.2. above. The variables are tested individually from years t_{-1} – t_3 (see section 3.2.) meaning that in total 20 Wilcoxon signed-rank tests are performed.

4.3. Variables

This section presents all the variables used in analyses of this study. The construction of the study is based on the components of a three-step DuPont analysis. The variables of the individual acquirers are compared to the derived median values of non-acquirers. Acquirers' variables are compared annually against the control group of all companies as described in the methodology section. Thus, for each variable, five (t_{-1} – t_3) values are calculated. In all the formulas below, *A* stands for an individual acquirer and $\tilde{x}$ (*CG)* marks the annualised median of the control group.

4.3.1. Profitability (ΔProfitability)

Acquirer's net profit divided by its' revenue in a given year after which it is deducted from the control group's median of net profit/revenue which gives us the delta of the variable, i.e. the difference between the acquirer's net profit / revenue and control group's median.

The following formula is used to calculate the delta of profitability of an acquirer for the statistical tests:

$$\frac{A_t\,Net\,Profit}{A_t\,Revenue} - \tilde{x}\left(\frac{CG_t\,Net\,Profit}{CG_t Revenue}\right) = \Delta\frac{A_t\,Net\,Profit}{A_t\,Revenue}\text{, where} \qquad (5)$$

- Observations with -0.3 < $Net\ Profit$ > 0.3 are not included in this study

4.3.2. Asset turnover (ΔATO)

Acquirer's revenue divided by its' average assets in a given time after which it is deducted from the control group's median asset turnover which gives us the delta of the variable, i.e. the difference between the acquirer's ATO and control group's median ATO.

The following formula is used to calculate the delta of ATO for the statistical tests:

$$\frac{A_t\,Revenue}{(A_{t-1}\,Assets+A_tAssets)/2} - \tilde{x}\left(\frac{CG_t\,Revenue}{(CG_{t-1}\,Assets+CG_tAssets)/2}\right) = \Delta\frac{A_t\,Revenue}{A_t\,Ave.Assets}\text{, where} \qquad (6)$$

- Observations with 0.1 < ATO > 20 are not included in this study

4.3.3. Leverage (ΔAE)

Average asset divided by average equity is the variable used in DuPont-analysis to measure a company's leverage. Acquirer's average assets to equity in a given year is calculated after which it is deducted from the control group's median asset to equity ratio, which gives the delta of the variable, i.e. the difference between the acquirer's AE and control group's median AE.

The following formula is used to calculate the delta of AE for the statistical tests:

$$\frac{(A_{t-1}\,Assets+A_tAssets)/2}{(A_{t-1}\,Equity+A_tEquity)/2} - \tilde{x}\left(\frac{(CG_{t-1}\,Assets+CG_tAssets)/2}{(CG_{t-1}\,Equity+CG_tEquity)/2}\right) = \Delta\frac{A_t\,Ave.Assets}{A_t\,Ave.Equity}, \text{ where} \qquad (7)$$

- Observations with AE < 0.05 are not included in this study

4.3.4. Return on Equity (ΔRoE)

As presented in section 2.2. of this thesis, return on equity can be derived from above variable by multiplying them together and RoE is thus simply the product of those variables. Control group's median return on equity is then subtracted from an acquirer's RoE giving us each acquirer's ΔRoE.

The following formula is used to calculate RoE for the statistical tests:

$$\left(\frac{A_t\,Net\,Profit}{A_t\,Revenue}\right) * \left(\frac{A_t\,Revenue}{A_tAve.Assets}\right) * \left(\frac{A_t\,Ave.Assets}{A_tAve.Equity}\right) = A_tRoE \text{ , where} \qquad (8)$$

- Observations with -1 < RoE > 1 are not included in this study

5 Findings

This chapter presents the findings of this thesis from the statistical tests conducted. The absolute figures of the non-acquirers are presented in exhibits A, B, C and D since direct conclusions of the relation between acquirers' and non-acquirers' absolute figures are not presented. Instead, the relative difference between the two are analysed further below. This applies to all variables.

5.1. Results

5.1.1. RoE

The table presents the descriptive statistics of the acquirers' return on equity around the merger. Additionally, the statistical significance of difference in RoE between acquirers and non-acquirers is shown. Number of observations is 270. Significance levels are based on one-sample Wilcoxon sign-rank test. *, ** and *** denote levels that differ significantly from non-acquirers' median at 10%, 5% and 1%, respectively. C and b following the z score denotes whether the difference is based on positive or negative ranks, respectively.

Year	N	Mean	Std. Dev.	25%	Median	75%	Difference in non-acquirers' median	Z
t-1	270	0,1671	0,2235	0,0191	0,1199	0,2520	-3,81 %***	-3,011b
t0	270	0,1322	0,2904	0,0019	0,1012	0,2898	-5,50 %**	-2,498b
t1	270	0,1156	0,2183	0,0041	0,0789	0,2185	-5,97 %***	-4,593b
t2	270	0,0894	0,2318	-0,0006	0,0655	0,1944	-8,03 %***	-4,983b
t3	270	0,0562	0,2483	-0,0023	0,0518	0,1643	-7,68 %***	-6,101b

Table 4 - RoE of acquirers in comparison to non-acquirers

The table 4 above describes the development of RoE among acquirers both in absolute terms and in comparison to peers. An interesting observation is the constant decrease of RoE during the observation period. The median RoE of the acquirers during the year of the merger is 10,1% while the mean is 13,2%. The median RoE of the acquirers drops down during the observation period 6,0% in total. For the top performing quartile, the decrease in RoE is 8,8% whereas the worst performing quartile saw an average decline of 2,1%.

RoE of acquirers is adjusted to the control group's performance by deducting each individual acquirers RoE for the given year from the median RoE of the peers. Although acquirers' median

RoE is significantly poorer than non-acquirers RoE already pre-merger, the dispersion grows by 3,9% during the observation period.

5.1.2. Net profit margin

The table presents the descriptive statistics of the acquirers' net profit margin around the merger. Additionally, the table presents the statistical significance of difference in net profit margin between acquirers and non-acquirers. Number of observations is 270. Significance levels are based on one-sample Wilcoxon sign-rank test. *, ** and *** denote levels that differ significantly from non-acquirers' median at 10%, 5% and 1%, respectively. C and b following the z score denotes whether the difference is based on positive or negative ranks, respectively.

Year	N	Mean	Std. Dev.	25%	Median	75%	Difference in non-acquirers' median	Z
t-1	270	0,0416	0,0559	0,0049	0,0305	0,0651	-0,76 %	-1,189b
t0	270	0,0458	0,1005	0,0005	0,0246	0,0686	-1,09 %	-1,205b
t1	270	0,0295	0,0496	0,0008	0,0176	0,0477	-1,73 %***	-4,376b
t2	270	0,0221	0,0493	-0,0001	0,0117	0,0475	-1,86 %***	-5,153b
t3	270	0,0203	0,0521	-0,0005	0,0115	0,0462	-1,73 %***	-4,739b

Table 5 - Net profit margin of acquirers in comparison to non-acquirers

As shown in table 5, the median net profit margin among the acquirers one year prior the acquisition is 3,0% and in the acquisition year 2,5%. Net profit margin decreases in the following years after the acquisition and the median value is 1,9% worse in t_3 compared to t_{-1}. The standard deviation of acquirers is significantly higher in t_0 than in any other year around the merger which tells that profitability among acquirers disperses during the year of merger.

The development of acquirers' net profit margin adjusted to the control group's net profit margin, presented on right, supports worse performance control group's every year around the merger. However, the results are significant only from t_1 to t_3. During the observation period, the dispersion between the two groups grows by 1,0% but reaches its high of 1,86% already in year t_2. For the top performing quartile, the decrease in net profit margin is 1,9% whereas the worst performing quartile saw an average decline of 0,4%.

5.1.3. Asset turnover ratio

The table presents the descriptive statistics of the acquirers' net profit margin around the merger. Additionally, the table presents the statistical significance of difference in ATO between acquirers and non-acquirers. Number of observations is 270. Significance levels are based on one-sample Wilcoxon sign-rank test. *, ** and *** denote levels that differ significantly from non-acquirers' median at 10%, 5% and 1%, respectively. C and b following the z score denotes whether the difference is based on positive or negative ranks, respectively.

Year	N	Mean	Std. Dev.	25%	Median	75%	Difference in non-acquirers' median	Z
t-1	270	1,9632	1,2510	1,1728	1,7504	2,4188	-0,2597***	-4,140b
t0	270	1,8484	1,1682	1,0623	1,6634	2,2604	-0,3099***	-5,348b
t1	270	1,9496	1,0984	1,2291	1,8239	2,4219	-0,2389***	-4,227b
t2	270	1,9485	1,1116	1,2007	1,8636	2,4258	-0,2384***	-3,410b
t3	270	1,9455	1,2567	1,1902	1,7918	2,3989	-0,1856***	-4,069b

Table 6 - Asset turnover ratio of acquirers in comparison to non-acquirers

The median asset turnover ratio among the acquirers in the acquisition year is 1,66. It is notable that both the mean as well as the median of the variable are at their lowest in the year of acquisition and that the median ATO among acquirers between $t_{-1} – t_3$ is significantly lower than median ATO of non-acquirers in any years observed. This indicates lower operational efficiency among acquirers than that of non-acquirers both pre- and post-transaction. Acquirers' asset turnover is significantly lower than non-acquirers ATO during all years observed but the dispersion is at its largest during the year of the merger. However, in both absolute terms and compared to peers, acquirers' median asset turnover improves over the observation period, which shows that the asset inefficiency caused by mergers is a short-term drop.

5.1.4. Leverage

The table presents the descriptive statistics of the acquirers' leverage around the merger. Additionally, the table presents the statistical significance of difference in leverage between acquirers and non-acquirers. Number of observations is 270. Significance levels are based on one-sample Wilcoxon sign-rank test. *, ** and *** denote levels that differ significantly from non-acquirers' median at 10%, 5% and 1%, respectively. C and b following the z score denotes whether the difference is based on positive or negative ranks, respectively.

Year	N	Mean	Std. Dev.	25 %	Median	75 %	Difference in non-acquirers' median	Z
t-1	270	3,2509	2,6847	1,6521	2,3864	3,7555	0,2743***	-5,372c
t0	270	3,3575	2,6115	1,7124	2,4807	3,9017	0,3815***	-6,743c
t1	270	3,5230	2,8447	1,7675	2,5050	4,2149	0,3708***	-7,252c
t2	270	3,5149	2,7590	1,7690	2,5610	4,1008	0,4051***	-6,968c
t3	270	3,5345	2,8480	1,7429	2,5302	4,2435	0,3621***	-6,788c

Table 7 - Leverage of acquirers in comparison to non-acquirers

The median average assets to equity ratio during the year of acquisition is 2,48 whereas the mean value is 3,36. In absolute terms, acquirers' assets to equity remains steadily in the range of 2,4 – 2,6, but as shown in the table below, their leverage peaks in comparison to non-acquirers two years after the merger.

Although acquirers are more leveraged than non-acquirers, at a 1% significance level, over the whole observation period, the dispersion between acquirers' and control group's ratios grows by almost 0,1 during the year of the merger indicating that acquisitions on average are to some extent financed with debt, as expected.

5.2. Results of the acquirers' financial development

The median RoE of the acquirers in t_{-1} was 12,0% whereas the mean was 16,7%. The median RoE is thus -3,8% lower than non-acquirers' corresponding, significant at p-value 0.01. Such pre-acquisition performance is not supported by prior literature and although a possibly interesting topic for further research, a natural explanation for it is the possibility of mismatches between the occurrence of given acquisition and merger (further explained in section 4.3.). Nonetheless, acquirers' median RoE drops another 1,7% lower compared to the control group in the year of the

merger and slides down another 2,2% during the three years following the merger. For all years during the observation period, acquirers' median RoE is significantly lower than that of the non-acquirers. Standard deviation among acquirers increases from 0,22 in t_{-1} to 0,29 in t_0 which implies that mergers cause dispersion among acquirers' returns on equity.

When it comes to the development of net profit margin, acquirers' relative net profit margin worsens from -0,76% of t_{-1} to -1,73% of t_3 compared to the control group indicating a 0,97% acquisition-related slide in long-term net profit. Compared to other DuPont-variables, net profit margin's standard deviation increases significantly from t_{-1} to t_0 fully explaining the increase in return on equity's standard deviation among acquirers.

Similar to net profit margin, also acquirers' asset turnover ratio is lower than that of non-acquirers during the whole observation period. However, contrary to other variables, the dispersion between the variables of the two groups is at its largest in the year of the merger. Although the dispersion shrinks after t_0, it remains significant also from t_1 to t_3. Asset inefficiency due to acquisition of unnecessary assets is a valid explanation for the phenomenon and supported by recent research (Mortal and Schill, 2015).

As net profit margin, acquirers' relative leverage peaks not until the second year after the merger. Although several potential explanations can be found for this, deferred payments or cash injections after the acquisition to manage working capital are the most obvious answers. This is also supported by the fact that when analysing only companies whose net profit margin remained positive post-merger, saw a decline in asset to equity –ratio between t_{-1} and t_2/t_3.

Although the findings are clearly showing that post-merger performance of the acquirers does not reach that of non-acquirers, further analyses are conducted in the following sections to increase the robustness of the study. However, the above tests conducted are already robust enough to answer whether the hypotheses presented in chapter 3 are supported. Table on the next page presents the hypotheses of this study and compares them with the above findings:

Hypotheses		Support
H1	The RoE of the acquirers is significantly lower than that of the non-acquirers after the acquisition	**Yes**
H2	Net profit margin of acquirers is significantly lower than that of the non-acquirers after the acquisition	**Yes**
H3	Asset turnover of acquirers is significantly lower than that of the non-acquirers after the acquisition	**Yes**
H4	Leverage of acquirers is significantly higher than that of the non-acquirers after the acquisition	**Yes**

Table 8 - Support for hypotheses

5.3. Post-acquisition performance of the acquirers with high pre-merger RoE

Although above findings strongly support the view of majority of prior literature that acquisitions have a value destructive effect rather than a positive one on the acquirers, an interesting finding was the significantly negative RoE for the acquirers a year before the transaction took place. The literature on acquirers' pre-merger performance is narrow and the above findings left unclear whether the poor post-merger performance can be explained by the fact that companies performing poorly already pre-acquisition try to turn around their performance by doing major strategic decisions, namely acquisitions, and fail despite. Although not as exciting, another possible explanation for the poor pre-merger performance could be the fact that in some mergers the time between the closing of the acquisition and the merging of company IDs takes rather a long time causing the merger to be allocated to another year (t_1) than it de facto should. Therefore, the data for year t_{-1} could include observations where the ownership has changed but the legal merger has yet to take place causing the observations for t_{-1} be slightly corrupted. The relative amount of such observations should not be big and taking t_{-2} observations into account would have decreased the amount of observations significantly due to incomplete source material.

For these reasons, I decided to conduct another statistical test that included only the companies whose pre-acquisition return on equity exceeded that of the non-acquirers in absolute terms, i.e. "acquirers with high pre-merger RoE". However, as the group of acquirers with high pre-merger RoE excludes companies performing poorly in relative terms, the distribution of the sample cannot

be assumed to be symmetrically distributed, which is one of the assumptions of the Wilcoxon signed-rank test. Instead, sign tests were conducted.

Descriptive statistics and results of the sign tests for each variable are presented in the following sections. All results are further discussed at the end of the chapter.

5.3.1. Development of RoE, acquirers with high pre-merger RoE

The table presents the descriptive statistics regarding RoE of the acquirers with high pre-merger RoE around the merger. The table also presents the statistical significance of difference in RoE between acquirers with high pre-merger RoE and non-acquirers. Number of observations is 100. Significance levels are based on a sign test. *, ** and *** denote levels that differ significantly from non-acquirers' median at 10%, 5% and 1%, respectively.

Year	N	Mean	Std. Dev.	25	Median	75	Difference in non-acquirers' median	Z
t-1	100	0,3701	0,2159	0,2031	0,3357	0,4835	12,34 %***	-9,90
t0	100	0,2284	0,3059	0,0432	0,2217	0,4191	4,57 %***	-2,70
t1	100	0,1680	0,2280	0,0413	0,1396	0,2940	-1,39 %	-0,30
t2	100	0,1027	0,2600	-0,0064	0,1120	0,2603	-3,30 %	-0,70
t3	100	0,0824	0,2849	0,0027	0,0838	0,2313	-5,90 %***	-2,70

Table 9 - Acquirers with high pre-merger RoE – Development of RoE

Table 9 above reports the changes of acquirers with high pre-merger RoE' return on equity before adjusting the performance to the non-acquirers' performance as well as after comparison to peer companies. The sample consists of 100 companies ("acquirers with high pre-merger RoE") and is the same in the following variables. The standard deviation of the high-performing acquirers grows significantly in t_0, which indicates that M&A success disperses significantly also among those companies who are performing well, similar to all acquirers.

5.3.2. Development of net profit margin, acquirers with high pre-merger RoE

The table presents the descriptive statistics regarding net profit margin of the acquirers with high pre-merger RoE around the merger. In addition, the table presents the statistical significance of difference in net profit margin between acquirers with high pre-merger RoE and non-acquirers. Number of observations is 100. Significance levels are based on a sign test. *, ** and *** denote levels that differ significantly from non-acquirers' median at 10%, 5% and 1%, respectively.

Year	N	Mean	Std. Dev.	25	Median	75	Difference in non-acquirers' median	Z
t-1	100	0,0804	0,0556	0,0388	0,0632	0,1086	2,78 %***	-5,10
t0	100	0,0681	0,1177	0,0080	0,0454	0,1015	0,67 %	-0,50
t1	100	0,0402	0,0520	0,0088	0,0285	0,0594	-0,46 %	-1,10
t2	100	0,0280	0,0570	-0,0003	0,0237	0,0547	-1,29 %	-1,30
t3	100	0,0271	0,0545	0,0005	0,0209	0,0508	-1,43 %**	-2,10

Table 10 - Acquirers with high pre-merger RoE – Development of net profit margin

Acquirers with high pre-merger RoE suffer a significant decline in net profit margin in the years following the merger. The median net profit margin drops down by more than 4,2% and is significantly lower than the peers net profit margin by the end of observation period. The post-merger performance of acquirers seems to be significantly poorer than that of non-acquirers irrespective of pre-merger performance.

5.3.3. Development of ATO, acquirers with high pre-merger RoE

The table presents the descriptive statistics regarding asset turnover of the acquirers with high pre-merger RoE around the merger. In addition, the table presents the statistical significance of difference in asset turnover between acquirers with high pre-merger RoE and non-acquirers. Number of observations is 100. Significance levels are based on a sign test. *, ** and *** denote levels that differ significantly from non-acquirers' median at 10%, 5% and 1%, respectively.

Year	N	Mean	Std. Dev.	25	Median	75	Difference in non-acquirers' median	Z
t-1	100	2,0042	1,0210	1,3069	1,9313	2,4833	-0,084	-1,30
t0	100	1,7884	0,9316	1,2336	1,6670	2,2832	-0,215**	-2,50
t1	100	1,9151	0,9052	1,2644	1,8706	2,4816	-0,150*	-1,90
t2	100	1,9082	0,8887	1,2767	1,8062	2,4681	-0,169	-1,50
t3	100	1,9138	0,8999	1,2828	1,8780	2,3918	-0,120	-1,30

Table 11 - Acquirers with high pre-merger RoE – Development of asset turnover

Table 11 above reports the changes of asset turnover before adjusting it to the non-acquirers' performance as well as the development of the ratio in relation to non-acquirers. The median asset turnover –ratio drops by 0.2 immediately during the year of the merger but recovers partly already in the next year.

5.3.4. Development of leverage, acquirers with high pre-merger RoE

The table presents the descriptive statistics regarding leverage of the acquirers with high pre-merger RoE around the merger. In addition, the table presents the statistical significance of difference in leverage between acquirers with high pre-merger RoE and non-acquirers. Number of observations is 100. Significance levels are based on a sign test. *, ** and *** denote levels that differ significantly from non-acquirers' median at 10%, 5% and 1%, respectively.

Year	N	Mean	Std. Dev.	25	Median	75	Difference in non-acquirers' median	Z
t-1	100	3,5632	2,9405	1,8395	2,4494	4,1334	0,475**	-2,10
t0	100	3,3286	2,1417	1,8641	2,7051	3,9250	0,523***	-2,70
t1	100	3,5156	2,3561	1,7955	2,7530	4,2378	0,556***	-3,50
t2	100	3,5777	2,4413	1,7894	2,6544	4,2992	0,543***	-2,70
t3	100	3,5792	2,3941	1,8078	2,5863	4,8007	0,462	-1,30

Table 12 - Acquirers with high pre-merger RoE – Development of leverage

Table 12 reports the changes of leverage before adjusting the performance to the non-acquirers' performance. Similar to the wider observation group in the previous section, also among companies with high pre-merger RoE, a notably higher asset to equity –ratio than that of non-acquirers can be observed already pre-merger.

5.4. Results of the acquirers with high pre-merger RoE

The median RoE of the acquirers with high pre-merger RoE in t_{-1} was 33,9% which was over 15,0% better than that of the non-acquirers (statistically significant difference at 1% confidence level). However, already in t_1, the difference in RoE had diminished and even shifted in favor of the non-acquirers by 0,9% (not significant statistically). By the end of the observation period, year t_3, the

acquirers with high pre-merger RoE median RoE had gone down almost 23,8% to 10,1%, which meant 4,7% poorer median return on equity than non-acquirers' RoE matched for the year t_3, again significantly different from the non-acquirer's median at 1% confidence level. In short, the return of equity of the acquirers with high pre-merger RoE weakened 19,7% in comparison to the non-acquirers. Similar to the tests conducted with all acquirers in section 4.2., the RoE of the acquirers seems to weaken gradually after the transaction.

Net profit margin of the acquirers with high pre-merger RoE is 6,5% in t_{-1} which is 3,0% better in comparison to the non-acquirers and a significant difference at 1% level, meaning that the acquirers with high pre-merger RoE' median bottom line is significantly better than non-acquirers' equivalent partly explaining the difference in RoE as well. The statistically significant positive difference in net profit margin however melts down to a difference of 0,2% in favour of non-acquirers in t_1 (non-significant) indicating a strongly weakening operational performance. In t_3, the difference in net profit margin between acquirers with high pre-merger RoE and non-acquirers is 1,0% for the good of non-acquirers, which is significant at 5% significance level. The total drop in net profit margin between the observation period 4,4%.

Asset turnover of the acquirers with high pre-merger RoE is constantly weaker than that of the non-acquirers. However, significantly so only during the year of the acquisition, when ATO drops from 2,0 to 1,7, which is 0,37 lower than non-acquirers' asset turnover. Like among all acquirers, ATO of the acquirers with high pre-merger RoE seems to recover from the acquisition rather quickly but never reaches non-acquirers.

Leverage of the acquirers with high pre-merger RoE is significantly higher than non-acquirers' leverage in $t_{-1} - t_2$ (significant at 1% significance level). The median asset to equity ratio of the acquirers with high pre-merger RoE revolves between 2,5 and 2,7 and the difference to the median asset to equity of the non-acquirers is at its peak in t_0.

5.5. Regression analysis

In order to study the explanatory power of each component of RoE, I conduct ordinary least square regressions on the change of each variable between year t_{-1} and years t_1, t_2 and t_3 (in separate

regressions). The year of comparison is t_{-1} instead of t_0 as t_{-1} figures are cleaner from merger related changes. Additionally, I study the change of the same variables among the companies whose pre-merger RoE exceeded industry averages. All the variables are explained in section 4.3. The following OLS-regression model is used:

$$RoE_{i,t} = \beta_0 + \beta_1 * Profitability + \beta_2 * ATO + \beta_3 * AE + \varepsilon, \qquad (9)$$

Where variables describe the change in each variables' absolute figures between defined years around the merger. In other words, in $t_{-1} - t_1$ regression each observation's each variable's absolute value in year t_{-1} has been deducted from the same observation's absolute value in year t_1.

The objective of below regressions is to estimate the relative power of each independent variable in explaining the observed changes in RoE in the years following a merger. To measure the relative power, I use standardized regression coefficients, i.e. betas, which standardizes the variance of each variables to having a mean of zero and a standard deviation of 1. The interpretation of a standardized coefficient is such that if an independent variable has a beta of 0,7, an increase of one standard deviation in that given independent variable increases the dependent variable by 0,7 standard deviations if other variables are held constant[12].

The regressions including all acquirers have r^2 between 52,4% - 56,4% meaning that the regressions account more than half of the variation in changes in RoE whereas the model including only acquirers with high pre-merger RoE "High performers" account between 39,1% - 45,1% of the variation. All regressions are statistically significant with F-value's significance of <0,01. However, there are significant differences in the explanatory power of coefficient estimates of the variables.

[12] Freedman David, Statistical models: Theory and practice, Cambridge U Press, 2009, page 86

Regression results

The table below reports the multivariate regression results for change in merged companies RoE between t_{-1} and t_1, t_2 and t_3. The results on the left of each column represent those of all merged companies whereas values on the right of the same columns show the results of companies with high pre-merger RoE. The table presents standardized coefficients (betas) first whereas the figures in brackets below are unstandardized coefficients. ***,**,* indicate significance at the 0.01, 0.05, and 0.10 level or better, respectively.

	$t_{-1} - t_1$		$t_{-1} - t_2$		$t_{-1} - t_3$	
	All acquirers	*High perf.*	*All acquirers*	*High perf.*	*All acquirers*	*High perf.*
Intercept	*-0,010*	*-0,048**	*-0,015*	*-0,352****	*-0,042***	*-0,117**
Net profit margin	0,723*** (3,429)	0,664*** (3,516)	0,732*** (3,345)	0,641*** (3,245)	0,730*** (3,360)	0,641*** (3,044)
Asset turnover	0,172*** (0,064)	0,349*** (0,136)	0,061 (0,041)	0,172** (0,069)	0,038 (0,015)	0,265** (0,100)
Leverage	0,015 (0,02)	0,113 (0,013)	0,078* (0,011)	0,172 (0,020)	0,078* (0,010)	0,132 (0,015)
R^2	0,564	0,451	0,531	0,425	0,524	0,391
F value	114,504	26,334	100,360	23,607	97,643	20,565
Pr > F	<0,01	<0,01	<0,01	<0,01	<0,01	<0,01

Table 13 - Regression results

As shown in table 13, changes in net profit margin have the largest relative explanatory power in analysing the changes in return on equity post-merger. This applies to all observed periods meaning that the drop in acquirer's net profit margin occurs immediately after the merger and lasts at least until the end of the third year post-merger among both all acquirers and acquirers with high pre-merger RoE. The beta of net profit margin is between 0,6 and 0,75 meaning that a decrease of one standard deviation in net profit margin decreases RoE 0,6 – 0,75 standard deviations indicating significantly higher impact in relative terms than other variables. The unstandardized coefficient of around 3,0 – 3,5 means that a decrease of one percentage point in net profit margin explains roughly 3-3,5% of the change in RoE in the given time period. Coefficients of net profit margin are statistically significant at the 0,01 level or better in all regressions.

Changes in asset turnover seem to have a strong relative explanatory power when analysing the changes in RoE one year after the merger when the beta of the variable is 0,172 among all acquirers

and 0,349 among acquirers with high pre-merger profitability. The unstandardized coefficient indicates that a decrease of 0.1 in average equity to turnover –ratio in the year following a merger decreases return on equity by 0,6-1,4%. An interesting observation regarding the ratio is that it stays statistically significant among companies with high pre-merger RoE whereas among all acquirers the ratio's explanatory power diminishes. This indicates that high-performing companies seem to acquire more imprudently than companies with lower profitability leading to a long-lasting asset inefficiency and lowering returns.

Compared to changes in net profitability and asset turnover, changes in leverage seem to have a relatively lower explanatory power to changes in return on equity. However, as seen in sections 5.1.4. and 5.3.4., acquirers' leverage is already pre-merger significantly higher than that of non-acquirers. To further analyse the effect of leverage in acquirer's post-merger results, it should be of paramount importance to fully understand the reason for such a big pre-merger difference in asset structure in comparison to non-acquirers.

The conclusions of regression analyses are consistent with the results of nonparametric tests carried out in sections 5.1. – 5.4..[13] The regression analyses support that:

1) Around two thirds of acquirer's decrease in RoE can be explained by lowering net profit margin
2) Decrease in asset turnover has a significant short-term effect on acquirers RoE post-merger. Acquirers' with high pre-merger RoE suffer from asset inefficiency for a longer period.
3) Although acquirers' leverage differs from non-acquirers significantly, post-merger changes in acquirers' leverage do not have a strong explanatory power over the observed changes in RoE.

[13] Net profit margin is the only independent variable that can have both negative and positive values in absolute terms in the test setting used in this thesis (theoretically, also asset to equity –ratio can be negative if the sign of equity is negative). As RoE is the product of the net profit margin, asset turnover and leverage (DuPont equation), net profit margin's sign determines whether RoE is negative or positive. When RoE is negative, increase in asset turnover and leverage decrease RoE in absolute terms and vice versa. To increase the robustness of the regression analysis, I re-run the tests excluding all observations where net profit margin was negative in absolute terms in either observation year.

The results are in-line with the regressions presented principally. The beta of net profit margin is between 0.6 and 0.7 with a significance level 0.01 confirming that more than half of changes in RoE post-merger are due to changes in net profit margin. Asset turnover's beta is over 0.2 with a significance level of 0.01 when analyzing changes in RoE one year post-merger, but decreases in the following years, similarly to the regression analyses above. Interestingly, results regarding leverage are more diverse as $t_{-1} – t_2$ results indicate negative correlation (beta -0.1) whereas other results indicate positive correlation, beta being around 0.1. However, the results regarding leverage are not significant.

5.6. Limitations, Reliability and Validity

As defined earlier in the thesis, the objective of this study was to analyse whether acquirers' post-acquisition RoE has differentiated from that of the non-acquirers in Finland during the observation period. Furthermore, the aim is to identify how the different components of RoE explain this difference in performance of the two groups. Although multiple studies exist on buyers' performance after a merger, findings have not been univocal. The differences might be explained by e.g. the period of the observations, sample selection, robustness or geographical focus of prior studies.

5.6.1. Limitations

I have recognised limitations to this study that could potentially impair the findings presented above. Firstly, as only acquisitions in which the target has been merged into the acquirer's company ID, several acquisitions occurred in Finland during the research period are excluded. However, this should not be an issue as subsidiary mergers are removed from the sample and the remaining sample includes a significant portion of all domestic transactions.

Secondly, the regression analyses conducted in the thesis are prone to some misinterpretations. Leone et al (2017) point out that empirical accounting studies are often exposed to extreme data points which might harm the interpretation of the results as OLS is sensitive to extreme values. To prevent extreme observations from influencing the results, I have excluded such observations according to section 4.1.2..

What's more, the dependent variable of the regression analyses, RoE, is the product of independent variables used in the regression. As such, this is not a problem as the variables are independent from each other. The problem deriving from the test setting is the sign of net profit margin which can be either negative or positive whereas other asset turnover and asset to equity –ratio, are always positive (excluding companies with negative equity). Due to this, the sign of net profit margin determines whether other independent variables have a positive or negative impact on RoE. To

increase robustness of the regressions, I re-run regressions excluding all observations where net profit margin was negative (see footnote 13) to increase the robustness of the regression analysis.

5.6.2. Reliability and validity

Validity refers to the degree of how accurately the study measures the concepts it is designed to measure whereas reliability refers to the accuracy of the methodology used. I have taken multiple measures to secure the reliability and validity of my results for all hypotheses. Return on equity is used as the main variable to determine the performance of acquirers in comparison to the control group. As return on equity is the direct measure of shareholders' profit, it can be considered as a valid and objective performance measurement. When it comes to reliability, all variables are derived from DuPont analysis and the statistical tests are executed by nonparametric tests which have less statistical power than parametric test. As the findings are significant despite using nonparametric tests, they can be considered reliable.

Generalizability, i.e. external validity, indicates whether the findings of the study are applicable to a broader setting. Although direct conclusions from the results of this study cannot be made outside of Finland, in the context of Finnish mergers and acquisitions, these results can be generalized.

To increase the validity of the study, I matched the acquirers' results to those of non-acquirers from the same industry using TOL codes. According to Bruner (2002), best accounting studies are usually paired-sample comparisons where the acquirer group is compared to non-acquirers of the same size and industry. The importance of industry-specific comparisons is highlighted by the fact that mergers often tend to happen in waves driven by consolidation of some industries. Without pairing the industries, merger waves in some industries during the observation period could have skewed the results.

6 Discussion

My results shed light on the M&A environment in Finland and have implications for academia but also for professionals engaged in mergers and acquisitions. In this chapter, I will discuss my results and implications on the acquirers' post-acquisition performance. Several interesting future research subjects are also suggested.

My results imply that while all variables significantly differ from non-acquirers', asset efficiency and leverage do not change around a merger as significantly as net profit does. My regression results confirm the results of my non-parametric tests by showing that the changes in net profit margin explain the vast majority of the changes in RoE in years following a merger. Nonetheless, it is a notable observation that also asset efficiency of acquirers bends down immediately following the merger and the phenomenon is even stronger among the companies whose pre-merger RoE exceeded that of the peers. These findings regarding asset efficiency also have a strong explanatory power over changes in RoE in the year following merger but on a longer term the effect remains only among companies with high pre-merger RoE.

My results regarding domestic acquirers' post-merger performance in Finland are statistically significant and find strong evidence that:

- the post-merger return on equity of acquirers weakens significantly in comparison to non-acquirers in the years following a merger;
- most of this is due to lowering profit margins that remain as such at least until the end of third year post-merger;
- the acquirers seem to be also inherently different companies in comparison to non-acquirers when it comes to asset structure as the results imply that companies who are acquiring, are already pre-merger leveraged stronger than non-acquirers. Literature finds several behaviouristic explanations for that, but the phenomenon is not analysed in this thesis further.

However, to clarify, my study does not doom all mergers to fail as it merely shows that on average acquirers have not been able to match their pre-merger return on equity. It also finds out that the standard deviation of acquirers RoE increases significantly following a merger meaning that the

dispersion between acquirers' performance varies significantly. In addition, low return on equity after an acquisition does not automatically mean that the acquisition does not meet acquirers' shareholders' financial objectives. Having said this, my study clearly indicates that acquirers' operational performance worsens significantly following a merger and recovers slowly.

6.1. Acquisitions are followed by years of underperformance

My results show that acquirers in Finland during the observation period of 2006-2011 have underperformed significantly in comparison to non-acquirers in the years following a merger. The effect is relatively large with an average disparity of 8,6% in RoE in the year following the merger. What's more, the disparity is also long-lasting and in fact growing in the following years, being 9,6% in the third year after the merger. This is in line with Meeks' (1977) findings that the negative impacts of an acquisition are long-term rather than a sudden shock. These results are considerably more negative from the acquirer's point of view than majority of the prior literature. As discussed before, my results also indicate poorer pre-acquisition performance than that of the control group.

The focus of this study is purely on the acquirer's RoE development around a merger. This means that the combined pro forma RoE of the acquirer and the target before the merger has not been analysed. Although that would give a more holistic picture of the performance of the whole entity (target and acquirer), the rationale for analysing only acquirers' pre-merger performance is to secure consistency in analysing the development of return on equity for the acquirers' shareholders. In other words, the focus is not to measure how the combined RoE of the target and the acquirer evolves around merger but to measure how the return on equity changes from the perspective of acquirers' shareholders. Having said that, broadening the analysis of this study to include also targets' RoE pre-merger would be a fruitful extension to this study.

My results suggest that the acquirers' poor return on equity after the acquisition is explained by both lowering net profit margin as well as inefficient use of assets whereas higher leverage than that of the control group's improves acquirers' RoE. Net profit margin of the acquirers' seems to worsen by almost 1% from t_0 to t_3 implying that merger and acquisition processes might cause chronic operational issues for the acquirer. Similarly, although acquirers' asset inefficiency seems

to peak at the year of the merger, also the following years see lower asset turnover than that of non-acquirers. These findings are in line with Mortal and Schill's (2015) findings regarding asset growth as explanatory to acquirers' poor post-acquisition performance.

However, my results leave also room for speculation, as also the pre-merger performance of acquirers is significantly worse than control group's performance. This could indicate that companies already operating poorly are prone to imprudent strategic decisions such as acquisitions. However, as explained in section 4.3., the possible, but unidentifiable, time difference between some deals and mergers might have corrupted the interpretation of results in t_{-1}. Therefore, I executed the statistical tests also with so-called overperforming companies and found out that although their asset turnover was practically on par with control group's one year prior the merger, similarly to the group including all acquirers, also acquirers with high pre-merger RoE' asset turnover decreased significantly below non-acquirer median during the year of the merger. Although acquirers with high pre-merger RoE seem to recover from the shock with no significant long-term inefficiencies, also these results clearly indicate that mergers cause at least short-term harm to acquirers' asset efficiency. As this study does not compare the acquirers within their industries, further research could focus on that.

The net profit margin of acquirers with high pre-merger RoE was on average significantly higher (3,0%) than that of the non-acquirers one year prior to the merger. However, that difference had turned in favour of non-acquirers by the first year following the merger and kept growing during the observation period. By the third year following the merger, the acquirers with high pre-merger RoE' net profit margin was 1,0% lower than non-acquirers', significant at p 0.05.

At least in the context of Finnish mergers, the evidence is clear that they impair acquirer's return on equity post-acquisition. My results support the fact that instead of one clear reason for that, there seems to be several factors explaining the phenomenon, of which some can be observed by decomposing the development of acquirers' RoE using DuPont analysis.

When comparing my results to Bruner's (2002) classification of studies on acquirer returns falling into three equal groups showing either value-creation, value-preservation or value-destruction, my results go into the last group.

6.2. A possible explanation for the underperformance

The most prominent explanation in M&A literature for failures in creating shareholder value after an acquisition is unsuccessful post-acquisition integration processes. Each company have their unique business model consisting of four value-creating elements (Christensen et al. 2011):

1. Customer value proposition,

   which means the company's ability to do the job either more effectively, conveniently or affordably than others.

2. Profit formula,

   i.e. a revenue model and cost structure that determines how to company generates profit required to maintain operations.

3. Resources,

   meaning e.g. the employees, customers, technology, products and facilities used to deliver the customer value proposition.

4. Processes,

   such as manufacturing, sales and R&D.

Of those elements, only resources can be attached as such into the acquirer's business model since the resources exists also apart from the company.

Integration of other elements is, however, more complex as neither customer value proposition, profit formula nor processes exist only within the organization. Integration of those elements requires putting emphasis on both integration of tasks such as sales and R&D as well as on human aspects such as communication to increase employee satisfaction and sharpen employees' roles in the new organization (Birkinshaw and Bresman, 2000). Although the desirable level of integration varies from the integration of only a few strategic functions to an all-encompassing integration, it nonetheless requires notable efforts from the acquirer (Haspelagh and Jeminson, 1991).

My results, showing significantly poor operational performance among acquirers in the years following the acquisition, imply that at least in Finland, emphasis on post-acquisition integration is not necessarily as big as it should. This is also supported by the fact that the operational

performance of the acquirers does not take only a short-term hit but rather a long-lasting damage indicating deep-rooted problems in their operations.

Additionally, as recent literature (Mortal and Schill, 2015) suggests, also the asset growth effect might be a viable, but only a partial, explanation for the underperformance. Although my study does not directly indicate inefficiencies caused by asset growth, it does so indirectly by showing lowering asset turnover ratios among acquirers in the years following the acquisition.

These questions require further research. An interesting topic would be for example to study what kind of integration practices are in use among acquirers in Finland. Especially interesting it would be to study this among acquisitive small and mid-cap companies which constitute the majority of the observations used in this study.

6.3. Can the underperformance be avoided?

Although my study strongly supports negative post-acquisition performance for the acquirer, several prior studies suggest otherwise. This applies also to financial accounting studies and for example Healy, Palepu and Ruback (1992) have reported significant abnormal improvements in asset productivity in the years following the merger. Also, some recent studies (see e.g. Alexandridis, Antypas & Travlos 2017) have come up with findings supporting significant abnormal returns for acquiring companies' shareholders post-2009. However, contrary to my study, these studies focused on large to mega deals as the former examined 50 largest U.S. mergers whereas the latter investigated deals priced at least $500m. Although not all prior literature has had such focus on larger deals, prior research on smaller non-public mergers and acquisitions has been in a minority.

When considering that larger deals are under strong investor scrutiny and media attention among other things, their corporate governance and transaction consideration can be expected to be better than that of small non-public companies. Although Alexandridis et al. argue that larger companies' corporate governance has improved since the financial crisis, it can be presumed that their corporate governance has historically been better than that of smaller companies. Also, as discussed in previous section, failure of post-acquisition integration has been acknowledged in M&A

literature as one of the key reasons for acquirers' poor post-acquisition performance. It can also be presumed that larger companies have a better access to integration tools but also a better understanding of the requirements needed for a successful M&A process.

It can thus be implicitly inferred from the findings of my thesis and prior literature on the topic that mergers and acquisitions are not doomed to fail but the complexity of such processes is not necessarily sufficiently understood. Acquirers' return on equity in my study is lower than that of non-acquirers due to both poorer net profit margin and asset inefficiency. Therefore, emphasis must be put on both what to buy to avoid excess assets as well as to the integration of target to ensure cultural convergence of the merging companies.

7 Conclusion

In my thesis, I study the post-acquisition performance of acquirers by comparing their return on equity, net profit margin, asset turnover and leverage to non-acquirers' corresponding ratios. My research focuses on domestic mergers in Finland and my aim is to find out whether 1) acquirers' long-term return on equity differ significantly from that of non-acquirers in the years following an acquisition and whether 2) the possible difference in return on equity can be more explained by some variables of the RoE over others. For the latter research question, I decompose RoE by using DuPont analysis. I find that acquirers' post-acquisition return on equity is significantly poorer than that of non-acquirers. I also find that the effect is long-lasting and the dispersion between acquirers' and non-acquirers' returns actually increases in the years following the merger. The difference seems to be due to both poor development of net profit margin after the acquisition as well as asset inefficiency, although the increase in dispersion is mainly explained by constantly worsening net profit margin in comparison to non-acquirers.

I use data on domestic Finnish mergers from 2006 to 2011 granted for me by Asiakastieto. I construct 20 datasets, which I use to compare the development of acquirers' figures to those of non-acquirers'. I execute the statistical analyses by using Wilcoxon signed-rank tests. The nonparametric tests are followed by a regression analysis, which strengthens the results of nonparametric tests that poor net profit margin development among acquirers explains majority of the growing dispersion in performance. The regressions also reveal that acquirers with high pre-merger RoE tend to suffer from asset inefficiency longer than acquirers in general after a merger. This might indicate that well-performing companies are either 1) prone to acquiring companies with more inefficient asset base than theirs and are not able to integrate their practices to improve efficiency or 2) paying too much for the targets and thus inflating goodwill on their balance sheet.

My results support strongly my main hypothesis that acquirers' post-acquisition return on equity is lower in comparison to non-acquirers' RoE. Also, my secondary hypotheses regarding lower net profit margin and asset turnover as well as higher leverage than those of non-acquirers in the years following the merger hold. When examining the results of those acquirers, whose pre-merger RoE exceeds peer companies' RoE, I find that also their RoE eventually slides below that of non-acquirers, especially due to lowering net profit margin.

In the discussion of this thesis, I suggest some potential explanations, recognized by academics, for the weak performance in the years following the merger. I propose that post-acquisition integration practices in Finland are not at a level they should to ensure a painless continuation of operations. I also suggest that companies acquiring other companies tend to buy unnecessary assets and do not carve those assets out entirely, causing asset inefficiency.

These results have implications for academics but also for practitioners. Although the narrative that mergers and acquisitions tend to fail is popular among consultants and other practitioners, academics have not been unanimous. However, this study strengthens the claim of the practitioners regarding acquirers' post-acquisition challenges, at least in Finnish context. Furthermore, the results also shed light on the magnitude of such challenges and may help the management to assess how much they should invest on ensuring a smooth acquisition as well as a sufficient post-acquisition integration.

For academics, this study provides a fruitful starting point for the usage of DuPont analysis in further research on acquirers' post-acquisition performance. For example, this methodology could be replicated to other settings, such as to involve public U.S. companies and compare the results within industries.

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Exhibits

Exhibits A, B, C and D show the development of return on equity, net profit margin, asset turnover and leverage of non-acquirers between 2005 and 2014. As the figures below show, the downturn of Finnish (and global) economy affected significantly on the profitability of Finnish companies in general. The observations of this study have been matched against peer companies from the same observation period to control against macroeconomic changes.

Exhibit A – *Annual development of return on equity 2005-2014, non-acquirers*

Year	Variable	N	Mean	Std. Dev.	25 %	Median	75 %
2005	Return on Equity	11831	0,2579	0,2707	0,0946	0,2180	0,3869
2006	Return on Equity	11802	0,2363	0,2606	0,0815	0,2051	0,3666
2007	Return on Equity	11612	0,2578	0,2602	0,0958	0,2279	0,3968
2008	Return on Equity	13698	0,2212	0,2730	0,0360	0,1652	0,3286
2009	Return on Equity	14093	0,1674	0,2694	0,0083	0,1059	0,2476
2010	Return on Equity	14244	0,1762	0,2639	0,0148	0,1110	0,2462
2011	Return on Equity	15422	0,1880	0,2691	0,0118	0,1095	0,2479
2012	Return on Equity	16647	0,1807	0,2710	0,0040	0,0909	0,2234
2013	Return on Equity	17271	0,1685	0,2712	0,0001	0,0765	0,1951
2014	Return on Equity	17329	0,1712	0,2702	0,0003	0,0795	0,2016

Exhibit B – *Annual development of net profit margin 2005-2014, non-acquirers*

Year	Variable	N	Mean	Std. Dev.	25 %	Median	75 %
2005	Net Profit/Revenue	11831	0,0561	0,0629	0,0130	0,0401	0,0813
2006	Net Profit/Revenue	11802	0,0532	0,0616	0,0120	0,0385	0,0790
2007	Net Profit/Revenue	11612	0,0575	0,0629	0,0143	0,0433	0,0867
2008	Net Profit/Revenue	13698	0,0510	0,0672	0,0051	0,0281	0,0583
2009	Net Profit/Revenue	14093	0,0435	0,0674	0,0013	0,0203	0,0480
2010	Net Profit/Revenue	14244	0,0454	0,0657	0,0023	0,0212	0,0470
2011	Net Profit/Revenue	15422	0,0448	0,0642	0,0018	0,0185	0,0404
2012	Net Profit/Revenue	16647	0,0444	0,0645	0,0006	0,0146	0,0340
2013	Net Profit/Revenue	17271	0,0427	0,0642	0,0000	0,0122	0,0298
2014	Net Profit/Revenue	17329	0,0442	0,0664	0,0001	0,0129	0,0309

Exhibit C – *Annual development of net profit margin 2005-2014, non-acquirers*

Year	Variable	N	Mean	Std. Dev.	25 %	Median	75 %
2005	Asset turnover	11831	2,7171	2,0449	1,4771	2,2321	3,3591
2006	Asset turnover	11802	2,6139	1,8697	1,4685	2,1871	3,2790
2007	Asset turnover	11612	2,6691	1,9045	1,4927	2,2116	3,3012
2008	Asset turnover	13698	2,6229	1,8926	1,5905	2,3522	3,4535
2009	Asset turnover	14093	2,4139	1,8017	1,4280	2,1642	3,2110
2010	Asset turnover	14244	2,4417	1,8046	1,4587	2,2097	3,3003
2011	Asset turnover	15422	2,5302	1,8415	1,5455	2,3556	3,5028
2012	Asset turnover	16647	2,5415	1,8429	1,5929	2,4206	3,5682
2013	Asset turnover	17271	2,5149	1,8572	1,5786	2,3953	3,5701
2014	Asset turnover	17329	2,4720	1,8306	1,5417	2,3648	3,5627

Exhibit D – *Annual development of leverage 2005-2014, non-acquirers*

Year	Variable	N	Mean	Std. Dev.	25 %	Median	75 %
2005	Ave. Assets/Ave. Equity	11831	3,4266	3,1149	1,5564	2,2707	3,9920
2006	Ave. Assets/Ave. Equity	11802	3,3385	2,9629	1,5743	2,2709	3,8524
2007	Ave. Assets/Ave. Equity	11612	3,3104	2,9962	1,5308	2,2032	3,7648
2008	Ave. Assets/Ave. Equity	13698	3,2512	2,9398	1,6386	2,4169	4,1234
2009	Ave. Assets/Ave. Equity	14093	3,2328	2,9581	1,6189	2,3793	4,1067
2010	Ave. Assets/Ave. Equity	14244	3,2091	2,9685	1,6099	2,3889	4,0907
2011	Ave. Assets/Ave. Equity	15422	3,2498	2,9725	1,6849	2,5339	4,3442
2012	Ave. Assets/Ave. Equity	16647	3,2835	3,0070	1,7564	2,6392	4,5740
2013	Ave. Assets/Ave. Equity	17271	3,2619	2,9588	1,7512	2,6472	4,6589
2014	Ave. Assets/Ave. Equity	17329	3,2217	2,9452	1,7438	2,6326	4,5408

Exhibit E below shows the results of Shapiro-Wilk test conducted to analyse the distribution of observations used I the study. The test was conducted as several academics recommend using nonparametric tests when measuring changes in operating measures. Shapiro-Wilk test confirms that all datasets used in the study are non-normally distributed with a significance level $p<0,01$ and thus nonparametric tests should be preferred.

Exhibit E – *Test of normality*

	Shapiro-Wilk Statistic	df	Sig.
t-1 ΔNet Profit/Revenue	0,922	270	0,00
t-1 ΔRevenue/Average Assets	0,876	270	0,00
t-1 ΔAverage Assets/Average Equity	0,676	270	0,00
t-1 ΔROE	0,915	270	0,00
t0 ΔNet Profit/Revenue	0,757	270	0,00
t0 ΔRevenue/Average Assets	0,891	270	0,00
t0 ΔAverage Assets/Average Equity	0,711	270	0,00
t0 ΔROE	0,948	270	0,00
t1 ΔNet Profit/Revenue	0,897	270	0,00
t1 ΔRevenue/Average Assets	0,914	270	0,00
t1 ΔAverage Assets/Average Equity	0,708	270	0,00
t1 ΔROE	0,917	270	0,00
t2ΔNet Profit/Revenue	0,953	270	0,00
t2 ΔRevenue/Average Assets	0,893	270	0,00
t2 ΔAverage Assets/Average Equity	0,73	270	0,00
t2 ΔROE	0,947	270	0,00
t3 ΔNet Profit/Revenue	0,93	270	0,00
t3 ΔRevenue/Average Assets	0,839	270	0,00
t3 ΔAverage Assets/Average Equity	0,802	270	0,00
t3 ΔROE	0,879	270	0,00