Two sides of the same coin?

* *Evaluating M&A performance from two different perspectives*

**Authors**

Anton Hansson

Theodor Östlund

**Supervisor**

Rikard Larsson

# Abstract

**Title:** Two sides of the same coin? – Evaluating M&A performance from two different perspectives

**Seminar Date:**  2015-05-25

**Course:** FEKN90, Master thesis in business administration, 30 ECTS

**Authors:** Anton Hansson and Theodor Östlund

**Supervisor:** Rikard Larsson

**Key words:** Mergers, Acquisitions, Event Study, BHAR, ROA, Regression Analysis

**Purpose:** This study’s purpose is to study the long term effects of M&A and to examine whether stock price is the only determinant of post-merger performance or if operating performance can be used as an additional determinant. How underlying variables impact these measures are also part of this study´s purpose.

**Methodology:** Aquantitative approach is used where two event studies are conducted to determine the long term effects of Mergers and Acquisitions. To study the stock performance a buy and hold abnormal return model with benchmark firms are used. The accounting figures will be measured by relating their development to an industry benchmark. To ensure the statistical T-tests are used in order to ensure statistical significance. Furthermore, multiple linear regressions will be used to examine how performance is affected by our set of variables.

**Theoretical framework:** The theoretical framework includes a description of mergers and acquisitions and why they occur. Furthermore, the relevant theories for this study, efficient market hypothesis and information asymmetry are also presented. A review of previous research conducted on M&A:s is also conducted.

**Empirical foundation:** The data sample consists of 64 transactions in Sweden, Norway, Denmark and Finland between 2004-01-01 to 2012-01-01. An additional criterion includes that both the acquirer and the target needs to be public.

**Conclusion:** This study finds no significant results in either long term stock or long term operating performance. Furthermore the results from the correlation between the measures indicate that there are a significant linear relationship between the measures after 24 months. Variables that had a significant on at least one of the measures included relative transaction size, market-to-book ratio and industry relatedness of the target and acquirer.

Table of Contents

[Abstract 2](#_Toc428399202)

[1. Introduction 5](#_Toc428399203)

[1.1. Background 5](#_Toc428399204)

[1.2. Problem discussion 5](#_Toc428399205)

[1.3. Question formulation 7](#_Toc428399206)

[1.4. Purpose 7](#_Toc428399207)

[1.5. Demarcations 8](#_Toc428399208)

[1.6. Target Group 8](#_Toc428399209)

[1.7. Thesis Outline 9](#_Toc428399210)

[2. Theoretical Framework 10](#_Toc428399211)

[2.1. Introduction to M&A Theory 10](#_Toc428399212)

[2.1.1. Motives for mergers and acquisitions 10](#_Toc428399213)

[2.1.2. Neoclassical reasons for acquisitions: 11](#_Toc428399214)

[2.1.3. Agency Theory 12](#_Toc428399215)

[2.1.4. Efficient Market Hypothesis 13](#_Toc428399216)

[2.1.5. Asymmetric Information 14](#_Toc428399217)

[2.2. Earlier M&A Studies 15](#_Toc428399218)

[2.2.1. Long term stock performance 15](#_Toc428399219)

[2.2.2. Long term operating performance 17](#_Toc428399220)

[2.2.3. Long term determinants 19](#_Toc428399221)

[3. Methodology 24](#_Toc428399222)

[3.1. Choice of method 24](#_Toc428399223)

[3.1.2 Inductive vs Deductive 24](#_Toc428399224)

[3.2. Literature review 25](#_Toc428399225)

[3.3. Event Study 25](#_Toc428399226)

[3.4. Data Collection 29](#_Toc428399227)

[3.5. Model to calculate abnormal stock returns 29](#_Toc428399228)

[3.5.1. Selection of Benchmark firms 30](#_Toc428399229)

[3.5.2. Calculation of Abnormal Return 31](#_Toc428399230)

[3.5.3. Winzoring 32](#_Toc428399231)

[3.6. Choice and elaboration of benchmark for operating performance 32](#_Toc428399232)

[3.7. Correlation 34](#_Toc428399233)

[3.8. Sample Exclusions 35](#_Toc428399234)

[3.9. Multiple Linear Regression 36](#_Toc428399235)

[3.9.1. Dependent variables 37](#_Toc428399236)

[3.9.2. Independent Variables 37](#_Toc428399237)

[3.9.3. Goodness of fit – R2 39](#_Toc428399238)

[3.10. Ordinary least squares assumptions 39](#_Toc428399239)

[3.11. Reliability and validity 41](#_Toc428399240)

[3.11.1. Validity 42](#_Toc428399241)

[3.11.2. Reliability 42](#_Toc428399242)

[4. Results 44](#_Toc428399243)

[4.1. Descriptive Statistics 44](#_Toc428399244)

[4.2. Results long term performance 45](#_Toc428399245)

[4.3. Correlation between the measures 46](#_Toc428399246)

[4.4. Multiple linear regressions 47](#_Toc428399247)

[5. Analysis 50](#_Toc428399248)

[5.1. Stock Performance 50](#_Toc428399249)

[5.2. Operating Performance 51](#_Toc428399250)

[5.3. Correlation 52](#_Toc428399251)

[5.4. Regressions 53](#_Toc428399252)

[6. Conclusion 58](#_Toc428399253)

[6.1. Conclusion 58](#_Toc428399254)

[6.2. Suggestions for further research 61](#_Toc428399255)

[References 63](#_Toc428399256)

[Appendices 68](#_Toc428399257)

[Appendix 1 - Tables 68](#_Toc428399258)

[Appendix 2 - Article 101](#_Toc428399259)

[Appendix 3 - List of Abbreviations 102](#_Toc428399260)

# Introduction

## Background

When reading articles and statements about mergers and acquisitions it is hard not be struck by the optimism of the acquiring CEO. An example of this is when SSAB, a Swedish steel company, announced the acquisition of the Finnish company Rautarukki, in January 2014. At the time of the acquisition the CEO of SSAB gave his comments (Svenska Dagbladet, 2014-01-14):

Martin Lindqvist, President and CEO of SSAB, said:

*"The proposed combination of SSAB and Rautaruukki is based on clear industrial logic. The identified synergies will significantly improve the efficiency and industrial flexibility of the combined company. This combination will enable us to do more for our customers, and internally be more flexible in adapting supply to market demand in all periods of the steel business cycle."* – (Globenewswire, 2014)

Approximately 17 months has passed since these announcements. Although it is hard to fully evaluate the effects of the merger a few indications can be seen. The SSAB stock has underperformed in comparison to the market. The decline is not uncommon, both Loughran & Vijh (1997) and Rau & Vermaelen (1998) find negative long term abnormal returns in their studies. But what about the synergy effects, has the merger lead to enhanced operating performance, or is the stock price the only tool to use when evaluating M&A?

## Problem discussion

There is an impressive body of research within the Mergers and Acquisitions area. Researchers have looked at this topic from many different perspectives, two of the most common being from either a strategic or a financial perspective. Research conducted from a financial point of view tests several different aspects, common examples include; announcement effects, long term performance effects, if the method of payment, geographical area or type of acquisition affects the performance. The results are not unanimous, neither in terms of results or the appropriate methodology to measure these results.

Since the last meta-analytic review of merger

and acquisition

1

(M&A) performance (Datta,

Narayanan, and Pinches, 1992), trillions of dol-

lars have been spent in the acquisition of tens

of thousands of firms (Gupta and Gerchak, 2002)

and dozens of studies examining post-acquisition

Performance have been published. Unfortunately,

research does not uniformly support managers’

apparent enthusiasm for the practice, with the

impact of acquisitions on acquiring firm per-

formance remaining ‘inconclusive’ (e.g., Haspes-

lagh and Jemison, 1991; Roll, 1988; Sirower,

1997). Further, existing empirical resea

Since the last meta-analytic review of merger

and acquisition

1

(M&A) performance (Datta,

Narayanan, and Pinches, 1992), trillions of dol-

lars have been spent in the acquisition of tens

of thousands of firms (Gupta and Gerchak, 2002)

and dozens of studies examining post-acquisition

performance have been published. Unfortunately,

research does not uniformly support managers’

apparent enthusiasm for the practice, with the

impact of acquisitions on acquiring firm per-

formance remaining ‘inconclusive’ (e.g., Haspes-

lagh and Jemison, 1991; Roll, 1988; Sirower,

1997). Further, existing empirical resea

Since the last meta-analytic review of merger

and acquisition

1

(M&A) performance (Datta,

Narayanan, and Pinches, 1992), trillions of dol-

lars have been spent in the acquisition of tens

of thousands of firms (Gupta and Gerchak, 2002)

and dozens of studies examining post-acquisition

performance have been published. Unfortunately,

research does not uniformly support managers’

apparent enthusiasm for the practice, with the

impact of acquisitions on acquiring firm per-

formance remaining ‘inconclusive’ (e.g., Haspes-

lagh and Jemison, 1991; Roll, 1988; Sirower,

1997). Further, existing empirical resea

Since the last meta-analytic review of merger

and acquisition

1

(M&A) performance (Datta,

Narayanan, and Pinches, 1992), trillions of dol-

lars have been spent in the acquisition of tens

of thousands of firms (Gupta and Gerchak, 2002)

and dozens of studies examining post-acquisition

performance have been published. Unfortunately,

research does not uniformly support managers’

apparent enthusiasm for the practice, with the

impact of acquisitions on acquiring firm per-

formance remaining ‘inconclusive’ (e.g., Haspes-

lagh and Jemison, 1991; Roll, 1988; Sirower,

1997). Further, existing empirical resea

Since the last meta-analytic review of merger

and acquisition

1

(M&A) performance (Datta,

Narayanan, and Pinches, 1992), trillions of dol-

lars have been spent in the acquisition of tens

of thousands of firms (Gupta and Gerchak, 2002)

and dozens of studies examining post-acquisition

performance have been published. Unfortunately,

research does not uniformly support managers’

apparent enthusiasm for the practice, with the

impact of acquisitions on acquiring firm per-

formance remaining ‘inconclusive’ (e.g., Haspes-

lagh and Jemison, 1991; Roll, 1988; Sirower,

1997). Further, existing empirical resea

Since the last meta-analytic review of merger

and acquisition

1

(M&A) performance (Datta,

Narayanan, and Pinches, 1992), trillions of dol-

lars have been spent in the acquisition of tens

of thousands of firms (Gupta and Gerchak, 2002)

and dozens of studies examining post-acquisition

performance have been published. Unfortunately,

research does not uniformly support managers’

apparent enthusiasm for the practice, with the

impact of acquisitions on acquiring firm per-

formance remaining ‘inconclusive’ (e.g., Haspes-

lagh and Jemison, 1991; Roll, 1988; Sirower,

1997). Further, existing empirical resea

However, there are some consensus in this area, Mandelker (1974), Dodd (1980) and Asquith (1981) all find a positive abnormal returns following a merger announcements for the targets and no significant returns for the acquirer. Their results concerning the target’s abnormal returns are supported by King et al (2004) who conduct a meta-analysis on a sample consisting of 93 studies. A meta-analysis is a technique that summarizes and draws conclusions based on other studies within the subject area. But contrary to Mandelker (1974), Dodd (1980) and Asquith (1981), King et al (2004) also find a small positive effect for the acquirer in the short term.

If the scope is changed to a longer perspective, the findings are more diverse. Agrawal et al (1992) find that the returns of mergers between 1955 and 1987 in the U.S earned significant negative returns after five years. These results are supported by Loughran & Vijh (1997) and Rau & Vermaelen (1998) who also find long term negative returns following mergers. Dutta & Jog (2009) also look at long term stock performance, but examine mergers in the Canadian market instead of the more commonly used U.S. market. Contrary to many U.S. studies, Dutta & Jog (2009) find no significant negative abnormal returns. The researchers highlight regulatory differences when conducting M&A:s between the countries as a possible reason for these results. Another reason for differences in results can be that different models are applied in different studies.

Measuring the success of M&A is in the most cases done by evaluating the stock performance. But other approaches have been made, for example it can be done using a qualitative methodology or it can be done using accounting measures. Examples of studies using the latter measurement are Healy et al (1992) and Ramaswamy & Waegelein (2003). The accounting measure these studies focused on were operating cash flows and market value of assets. Both studies find a significant positive effect of the performance on a long term. Ghosh (2001), who also use accounting measures does not find any positive abnormal returns after a merger, which contradicts Healy et al’s (1992) findings. The reason can be due to different methodologies between the studies.

Some studies examine both the stock and the accounting measures following transactions. Dutta & Jog (2009) look at both measures, but did not relate them to each other. This is also the case for Akben- Selcuk & Yilmaz (2011), who study M&A:s performed on the Turkish market. They did, like Dutta & Jog also examine both measures but did not relate them to each other.

Many studies focus on underlying determinants of the long term performance, Healy et al (1992) find that transactions containing acquirers operating in the same industry as their target have a superior post-merger performance than transactions where this is not the case. Another factor that has been examined is if the market-to-book ratio affects the long term performance. Rau & Vermaelen (1998) find evidence that companies with low market-to-book ratios outperform companies with high ratios. The relative size of the transaction and if the transaction was domestic or cross-border are also factors that have been examined with different results.

The differences in results across countries, methodologies and type of measurement show that mergers & acquisitions is an area of research where there still is a lot of research to be made. By looking at operating performance and stock returns as post-merger measurement, a gap in the current research is filled, since this study will also relate the measures to each other and examine how underlying factors affect both measures. The authors have not found any similar studies conducted in Sweden, Denmark, Norway or Finland and it would be interesting for decision makers in these countries to find out if M&A:s in general are successful in these markets from both a financial and an operating performance perspective. Furthermore, previous research implies that there could be differences in post-merger performance across countries, and that these differences could be explained by the regulatory environment. By focusing on the Swedish, Danish, Norwegian and Finnish markets the notion of different post-merger performance across countries are tested, since most research conducted up to date, take place in an U.S. market setting.

## Question formulation

The objective of this study is to answer the following four questions:

* Is there any long-term abnormal stock returns following M&A:s?
* Is there any abnormal operating performance following M&A:s in the long-term?
* How are the development of operating performance and the stock price correlated following M&A:s?
* How are these measures affected by underlying variables?

## Purpose

There are two main purposes of this study. The first purpose is to review the performance of M&A:s, both from an operating and a financial perspective in order to understand one has to take both measures into account when analyzing the performance of M&A:s. The second purpose is to analyze if a set of underlying variables affects the value creation or destruction after a transaction. The variables are: market-to-book ratio, size of the acquirer, relative size of the transaction, if the transaction is domestic or cross-border and industry relatedness.

This study’s contribution to the mergers and acquisitions field of study will be twofold. Firstly, there are to the researchers’ knowledge, no studies conducted in Sweden, Denmark, Norway and Finland that focuses on both the operating performance and stock price development when evaluating how successful M&A are. Secondly, this study will not only focus on operating performance and stock price development, but also how underlying determinants affect them.

## Demarcations

The study contains a set of limitations. First of all, only M&A:s conducted by Swedish, Danish, Norwegian or Finnish acquirers are examined in this study. No limitations are applied to the location of the targets. The transactions studied are mergers, acquisitions of shares and acquisitions of assets. Tender offers, which are examined in some of the prior studies, will not be distinguished from other transaction due to limitations of the software used for retrieving information about the M&A:s.

This study measures long-term stock and operating performance. Long-term in this study is defined as a time period of 1-3 years. Stock performance is measured with a model called buy and hold abnormal return, BHAR. Operating performance, which is the other measure, is in this study is defined as an adjusted form of return on assets.

Five variables influence on the measures are also examined. These are market-to-book ratio, size of the acquirer, if the transaction was domestic or cross-border, relative transaction size and industry relatedness. The researchers understand that there are more variables affecting operating and stock performance, but also that it is impossible to identify and measure all of these.

## Target Group

This study is of interest for academics within the field of corporate finance and auditing. Another target group that will find the study relevant and useful are consultants and decision makers who are thinking about, are in the process of undertaking or have conducted a M&A.

## Thesis Outline

This thesis has been divided into several parts.

# Theoretical Framework

*This chapter starts with a description of what M&A:s are. Then, motives for conducting M&A:s is presented along with relevant theories for this study. This is followed by a review of previous studies that examines long term stock performance, long term operating performance and determinants of performance.*

## Introduction to M&A Theory

Mergers and acquisitions are two different methods which bring two separate companies together to form a larger one. The aim of a merger is to combine two different companies, into one larger entity. The company that is left after the merger procedure is responsible for all the assets and liabilities of the two previous companies (Gaughan, 2007). An acquisition differs from a merger in the way that the transaction has the aim to incorporate the target company into the acquiring company, and still keep strategy and vision of the acquiring company. This means that there is not a consolidation of two companies based on the same characteristics and terms as in a merger (Arnold, 2008). Literature has had difficulties distinguishing mergers and acquisitions from each other. This is due to the fact that the original purpose for the transaction proves to be different in the end (Arnold, 2008). Finally, there is one more method for acquiring companies which is consolidation. Consolidation differs in the way that several companies can be formed into either several new firms or just one firm. Like merger their previous existence ends and they become a part of the new firm.

### Motives for mergers and acquisitions

A company can achieve growth either organically or through acquisitions. Firth (1980) states that growth is usually easier to achieve through acquisitions. Furthermore, Firth (1980) also reasons that there are two main theories for why companies perform acquisitions, and with these theories the performance of the companies after the acquisitions can be determined.

One of these theories for acquisitions is the *neoclassical* *economic theory of profit maximization,* which states that competition in the market motivates companies to maximize shareholder wealth. The conclusion of the theory is that if possible acquisitions will benefit shareholders the company will go through with the transaction.

Firth (1980) argues that the other main reason for why acquisitions are made is because managers in the board of directors wish to maximize their own personal wealth. This reason is based on agency theory and that managers are not always aligned with shareholders’ interests.

### Neoclassical reasons for acquisitions:

Trautwein (1990) summarizes the most predominant theories and motives within mergers and acquisitions. The theories that Trautwein (1990) identifies for motives of merger and acquisitions are: the efficiency theory, monopoly theory, valuation theory, process theory, raider theory and disturbance theory. Below the most relevant theories will be described more in-depth.

Synergy effects is one of the main arguments for acquisitions according to advocates of the neoclassical theory, Trautwein (1990) also calls this the efficiency theory. The belief states that two companies will create greater shareholder value and thereby be more efficient than if they would continue as separate entities. These synergies can be divided into two subgroups: financial and operational (Devos et al. 2009). Examples of financial synergies include lower cost of capital and lower tax rates. Operational synergies can be of two different characters; revenue increasing or cost decreasing. The former of the operational synergies can arise from an increased access to each other markets or customers. Cost decreasing examples include usage of assets more efficiently and lower fixed costs (Gaughan, 2007).

One of the other main theories is the monopoly theory which states that acquiring companies could also be used to exploit the market in a more favorable way. With large market shares, a company can dictate the market in a different manor which benefits the shareholders.

The disturbance theory is based more in the field of macroeconomic factors and changes of these factors that force mergers and acquisitions. Deregulations, technical innovations and price changes are examples of macroeconomic factors that cause industrial shocks. The acquisitions are a response to these changes and its purpose is to increase the efficiency of the company and therefor also create value for the shareholders (Mitchell & Mulherin, 1996).

### Agency Theory

The theories where managers maximize personal wealth have their origin in the agency theory. Adam Smith wrote in his book the *Wealth of Nations* (1776) that there will be a conflict of interest when managers deal with other people’s money rather than their own. This theory is developed by Jensen and Meckling (1976), who find that there is an issue in how managers operate and manage a firm. Agency theory states that there are two different parties in the company. The principals (shareholders) who hire someone to do a certain job for them and the agents (managers) who are hired to do a certain job in return for a compensation. The problem with the agency theory is that people tend to act in their own best interest at the other party´s expense. Two motives, the empire building theory and hubris hypothesis are based on agency theory.

*Empire Building Theory*

The empire building theory is based on the notion that managers tries to build large “empires” through transactions, since the larger the empire is the more compensation the managers will receive (Trautwein, 1990). Large empires also entail that company is probably more diversified than a smaller company, this minimizes the chance that the manager will be removed or fired since the company will always be performing reasonably well (Firth, 1990). The problem for shareholders is that empire building can lead to investments that are not profitable and thereby not aligned with their interests.

*Hubris Hypothesis*

Another possible motive for transactions is presented by Roll (1986). This motive is called the hubris hypothesis and, like the empire building theory, is also a motive which is not aligned with the shareholders’ interests. Instead the managers focus on their own interest and to maximize their personal wealth. The hubris hypothesis is based on the idea that top management in the acquiring company believe them to have a more correct valuation of the target company than the market has, which leads to irrational decision making and payment premiums that is too high.

*Relevance for this study*

It is important to understand that there are many different motives behind the decision to undertake M&A:s and that not all motives are aligned with the shareholders’ interests. When managers act out of self-interest and try to build empires is an example of a situation where this occurs. The empire building theory could perhaps explain why the post-merger performance in many cases are poor on a long term.

### Efficient Market Hypothesis

Eugene Fama developed a theory called efficient market hypothesis in 1970. In this hypothesis, Fama argues that a market is efficient if, at any given time, the stock price fully reflects all available information. The underlying assumptions in the market setting are that no transaction costs exist, there is no information asymmetry between market participants and all participants interpret the available information in the same way.

Fama identifies three different types of market efficiency that differ in terms of how fast information is incorporated in the stock price. The three types are weak, semi strong and strong.

*Weak Efficiency*   
If the market efficiency is weak, only historical data is incorporated in the stock price. This means that neither public nor private information about the corporation is reflected immediately.

*Semi Strong Efficiency*A semi strong efficiency in the market is characterized by public information, e.g. information in the annual report, and historical data is reflected in the stock price. Private information however, is not, which means that people with inside information about the company can trade, and gain returns on this information.

*Strong Efficiency*In a market with strong efficiency, all information is reflected in the stock price. A strong market efficiency implies that no participants can earn an abnormal return based on historical data, public information or private information.

*Criticism against efficient market hypothesis*

Behavioral finance is a field of study that stands in contrast to the efficient market hypothesis. Advocators of behavioral finance challenge the idea that investors are rational at all times and includes psychological and sociological theories when studying finance (Shiller, 2003). The main notion of behavioral finance is that markets are in fact not efficient and that investors behavior is the reason for this. Shiller points out anomalies as support for this.

*Relevance for this study*

Applying this hypothesis to a merger and acquisition context, a strong market efficiency implies that companies involved in an M&A are valued as separate firms by the market, and the potential premium the acquirer pays derives from the future presumed synergy effects. Systematic long term negative abnormal returns following a merger implies that the synergy effects are overestimated which suggests that the market is not efficient.

### Asymmetric Information

When one party holds more precise private information on the value of the good than another party a situation of information asymmetry arises. According to Wilson (1967), the party that is more informed has a much higher marginal expected return than the party that is uninformed.

Akerlof (1970) describes the phenomenon of asymmetric information on the used car market. In his example there are four types of cars; new and old, and both of these types can be either of good quality or bad quality (bad quality cars are mentioned as lemons). The owner of the car has more specific information about the quality of the car after owning it for a specific period of time than the rest of the market. This new information situation has led to information asymmetry between the sellers and the buyers. Since buyers have difficulties assessing the true value and quality of the used cars, lemons and good quality used cars trade at the same value. The owner of a good used car might assess the value of the used car to be the same as the new car, however, due to the existence of bad lemons in the used car market the buyers will expect the car to be of poorer quality than a new car. This will lead to owners of good used cars to not be willing to sell on the used car market since they will not receive the true value for the car, and this will further increase the likelihood and the expectance of cars being traded on the used car market to be of poorer quality. To summarize a viscous circle has arisen, where good quality cars are not being traded and only lemons are apparent in the used car market.

*Relevance to our study*

Information asymmetry is important to our study since it illustrates that there might be a difference in the perception in the value of the company from the market and the actual value that exists. Therefor successful mergers and acquisitions might not be seen as such from the market due to lack of information. Another relevant aspect is that a high degree of information asymmetry between the company and its stakeholders can lead to adverse selection. An increase in operating performance would send credible signals to the stakeholders, since this is a signal that is hard to mimic and thereby lower the information asymmetry and hence the adverse selection costs (Akerlof, 1970). These signals would mainly be that the transaction was fairly successful, even if the stock has not performed well.

## Earlier M&A Studies

M&A is an area where a lot of studies have been conducted. This study will review prior studies that examine long-term performance both when using stock performance and operating performance as measurements. Furthermore, studies that test different variables impact on performance will also be reviewed. Hypotheses for this study, based on prior research are stipulated at the end of each section.

### Long term stock performance

If a longer time perspective is adopted, the results are different. Agrawal et al (1992) examine long term post-merger performance. The market setting where this study takes place is the U.S. and the time frame between 1955 and 1987. A methodology where a size and beta adjusted portfolio is used and the results display a loss of approximately 10% five years after a merger. Moreover, the authors test the performance of each decade separately to investigate whether the market evolves and learns to value mergers more correctly. This wasn’t the case since underperformance occurred in the 1950s, the 1960s and the 1980s.

Loughran and Vijh (1997), come to similar results as Agrawal et al (1992), when they perform a study in an U.S. market setting during 1970-1980. By using a buy and hold method they obtain results of -15.9% in 60 months after a merger and no significant negative abnormal returns in 60 months after a tender offer[[1]](#footnote-1). The researchers also examine the size of the target relative to the acquirer and find that the returns tend to decrease when the relative size of the target increases.

Rau and Vermaelen (1998) study the long run performance of acquirers and the determinants of the performance. They do so by using a model that first adjusts for size and market to book value and then compare the returns with a reference portfolio. The researchers find that acquirers earn negative abnormal returns over a period of three years after a merger and that firms with low market-to-book ratio tend to outperform firms with high market-to-book ratio. Another contribution of the study is findings that acquirers in tender offers earn a significant positive abnormal return of 9% on average.

Most studies are performed on a US market, Dutta and Jog (2009), however, conduct a study of the long term performance of acquiring firms in the Canadian market. Their sample consists of 1300 acquisitions during a period between 1993 and 2002. The buy and hold strategy is used as to calculate returns, these returns are then compared to a reference portfolio to examine if abnormal returns is obtained on a period of 1-3 years. Contrary to many studies performed on the US market, the researchers find no significant negative abnormal returns. Dutta and Jog (2009) argue that this can be due to two reasons. First, there are differences in the regulatory and capital market environment between the US and Canada which can account for different results and secondly, usage of a more appropriate methodologies and benchmark firms they used. Based on the results of a majority of the research within this area leads to the following hypothesis:

*Hypothesis 1: Long term abnormal returns are negative following a transaction.*

Below a summary of the relevant previous studies within long term stock performance is presented.

*Table 2.1: Summary of previous long-term stock performance studies.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Study** | **Market** | **Methodology** | **Time period** | **Results** |
| Agrawal. Et al (1992) | US-market | BHAR, Size and beta adjusted portfolio | 1955-1987 | -10.26% Significant abnormal return for mergers in 60 months; No significant abnormal return for tender offers |
| Loughran & Vijh (1997) | US-market | BHAR, BV/MV adjustment) | 1970-1989 | - 15.4% significant abnormal return for mergers in 60 months |
| Rau & Vermaelen (1998) | US-market | BHAR, Control portfolio with size and BV/MV adjustments | 1980-1991 | -4% Significant abnormal return after transactions in 36 months; +8.56% significant abnormal return for tender offers |
| Dutta & Jog (2009) | Canadian-market | BHAR, Both control firms and reference portfolio | 1993-2002 | Insignificant results |

### Long term operating performance

Healy et al (1992) take a different perspective than most other studies on the topic of post-acquisition performance when they examine the post-acquisition performance of 50 U.S mergers in 1979-1984. Instead of evaluating stock price performance, the researchers evaluate and compare the changes in operating cash flow. Healy et al (1992) argue that using stock performance as a measure does not take possible market efficiency into account. The findings of this study implies that merged firms display significant improvements in performance and that this is a result of better asset productivity if one compare them to their industry. Another implication of this study was that there seems to be a correlation between increases in performance after a merger and the stock returns at the time of announcements.

A study that uses the same methodology as Healy et al (1992), is Ramaswamy & Waegelein (2003). In their study a sample of 162 merging firms is used. The time frame is set to five years and the researchers identify five variables that could affect the long term performance. These five variables are long term performance plans, method of payment, if the takeover was hostile or not and the industry of the merging companies was related. In addition, the sample is divided into two subsamples, mergers prior to 1983 and mergers afterwards. Overall, the study finds a positive effect on operating financial performance after a merger, which is consistent with Healy et al (1992). Another conclusion is that firms after 1982 had a more positive financial post-merger performance if their managers were compensated with long term performance plans.

In 2001, Ghosh argued in a study, that firms undertake acquisitions in times of superior corporate performance and that this would lead to biased results when comparing them to their industry, which Healy et al (1992) did in their study. What Ghosh suggests is a procedure, where the operating performance of acquirer is compared to a benchmark firm. This is a similar approach as Loughran and Vijh (1997) used. Ghosh also tests if there is a difference in performance depending on whether the acquisition was made with cash or with stocks. Two conclusions are presented, firstly, that there is no evidence that the operating performance improves following an acquisition and secondly, that the operating performance is superior when the acquisition is made with cash.

The long term operating performance in a European market setting is examined by Martynova et al (2006). Their study is based on 155 mergers and acquisitions in continental Europe and the UK between 1997 and 2001.To be able to have a more extensive perspective on operating performance than previous studies, the authors use four different measures of operating performance. In addition to the common measure of operating performance, EBITDA, used by Healy et al (1992), Ramaswamy & Waegelein (2003) and Ghosh (2001), this study also looks at EBITDA adjusted for working capital. Both these measures are scaled by both book value of assets and sales. The results show no evidence a significant better performance following a merger.

A third approach to measure the post-merger performance is adopted by King et al (2004). This study performs a meta-analysis, which means that a sample consisting of earlier studies is tested and analyzed. Their results show an initial positive announcement effect, both for the acquirer and the target. In a long term perspective, the researchers find no evidence that the post-merger financial performance is positive, both in terms of accounting performance and abnormal returns. These results indicate, according to the researchers that unspecified variables explain drive post-merger performance. The findings of the most recent research combined with findings on a European market setting leads to the following hypothesis about long term operating performance:

*Hypothesis 2: Long term operating performance is not superior following a transaction.*

Hypotheses one and two combined imply that there is a divergence between the measures. Since one of the purposes with this study is to relate the two measures to each other, a third hypothesis is formulated:

*Hypothesis 3: The correlation between stock performance and operating performance is not significantly positive in the long term.*

In the table below a summary of previous studies within operating performance is presented.

*Table 2.2: Summary of previous long-term operating performance studies.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Study** | **Market** | **Methodology** | **Time period** | **Results** |
| Healy et al (1992) | US-market | Industry-adjusted ROA | 1979-1984 | +2.8% abnormal operating performance after 60 months |
| Ghosh (2001) | US-market | ROA adjusted with control firms | 1981-1995 | No improvements in operating performance following a merger |
| Ramaswamy & Waegelein (2003) | US-market | Industry-adjusted ROA | 1975-1990 | +12.7% abnormal operating performance after 60 months |
| Martynova et al (2006) | European-market | ROA adjusted with control firms | 1997-2001 | No improvements in operating performance following a merger |

### Long term determinants

This section will present possible determinants of the long term performance. These determinants are divided into five variables, each of these will be described and be related to the findings of previous studies. The purpose of including these variables is to examine how they affect the value.

*Market-to-book ratio*

When looking at the growth potential of companies it is common to use the market-to-book ratio (Berk & DeMarzo, 2011). Rau & Vermaelen (1998) claim that managers in companies with high market-to-book ratios have a higher tendency to be overconfident and thereby conduct transactions under the influence by hubris. The reason for this is that companies with high ratios tend to have high past stock returns and high past growth in cash flows (Lakonishok et al, 1994). This suggests that companies with low market-to-book ratios should outperform companies with high ratios in the long run, since the analysis of the transaction and possible gains is more likely to be more careful.

*Hypothesis 4: There is a negative relationship between the market-to-book ratio and post-merger performance, both in terms of stock and operating performance.*

*Size of the acquiring company*

Moeller et al (2004) find that the stock performance for larger companies is poorer than for small companies, following a transaction, both on short-term and long-term. One reason for this can according to the researchers is that large companies pay higher premiums than smaller companies. Another reason presented by Moeller el al (2004) is that managers in smaller companies are better aligned with shareholders than in larger companies and that this would lead managers not to take actions out of self-interest, e.g. hubris or conduct empire building.

*Hypothesis 5: The size of the acquiring firm is affecting the long term stock and operating performance negatively.*

*Relative size of the transaction*

Martynova et al (2006) find that the relative size of the acquisition in comparison to the acquiring company´s size has a negative relationship for the acquiring company’s operating performance. Dutta & Jog (2009) also find similar results when examining the stock performance relationship with the relative size of transaction deals. One possible explanation could be the difficulty in managing big companies (Martynova et al, 2006). Contradictory results are found by Capron (1999) who argues that larger transactions increase the opportunities to realize synergies. Bhagat et al (2011) examine the relative transaction size influence on short term performance and their findings indicate a positive result as well. The divergence in results makes this an interesting variable to examining when applying a northern European market setting. The hypothesis in this study is based on the theory that there is larger deals lead to increased opportunities to realize synergies:

*Hypothesis 6: Relative large transactions affect the stock and operating performance positively.*

*Domestic or cross-border transaction*

Evidence has been found that cross-border transactions are correlated with poor performing deals. Hitt & Pisano (2003) find that possible reasons can be that international transactions have a more complex nature than national transactions due to laws, organizational cultures, and regulation being different. Black et al (2001) find significant negative stock performance when comparing cross-border with domestic ones. Conn et al (2001) on the other hand, find no significant underperformance of cross-border transactions compared to domestic, this is in line with the findings of Martynova et al (2006) who examine the European market. A third result was presented by Kang (1993) who find evidence that Japanese companies acquiring U.S. targets earn significant positive abnormal returns. The difference in results from prior studies makes it an interesting variable to examine further and the hypothesis is based on the results from the majority of the reviewed studies.

*Hypothesis 7:* *Domestic transactions outperform cross-border transactions in operating and stock performance in the long term.*

*Industry relatedness*

A determinant that researchers have examined from both an accounting and stock perspective is if the relatedness of the industries of the acquiring firm and the target affects the post-merger performance. Jensen (1986) claims that transactions between firms in unrelated industries are less likely to succeed, because the acquiring firm is unfamiliar with the target’s industry.

One study that focuses on relatedness in industries is Agrawal et al (1992). They find evidence that firms in transactions that operated within the same industry underperform firms in transactions were this was not the case. A possible reason for this can, according to the researchers is access to lower financing costs. This is contradictory to the findings of Maquiera et al (1998), whose results are positive when studying the returns of acquirers in transactions where the industries are related. Healy et al (1992) did not find any significance when examining if the relatedness of the industries has any impact on the operating performance, but after adjusting for outliers they find superior performance of firms that are related. The researchers state that firms within the same industry had increased opportunities to realize synergies as a possible reason for this performance. The hypothesis in this study will be based on the findings of the most recent studies conducted within this area.

*Hypothesis 8: Transactions where the acquirer and the target are within the same industry outperform transactions where this is not the case.*

*Table 2.3: Summary of previous studies examining determinant influences and performances.*

|  |  |
| --- | --- |
| **Previous Studies** | **Findings** |
| **Market to Book** |  |
| Rau & Vermaelen (1998) | Acquirers with low M/B have a superior post-merger performance than acquirers with high M/B |
|  |  |
| **Size** |  |
| Moeller et al (2004) | Large acquirers underperform smaller acquirers on both long-term and short-term |
|  |  |
| **Relative Size of Transaction** |  |
| Capron (1999) | Positive relationship between relative transaction size and post-merger performance |
| Martynova et al (2006) | Relative transaction size has a negative relationship with long term performance after a transaction |
| Dutta & Jog (2009) | Relative transaction size has a negative relationship with long term post-merger performance |
| Bhagat et al (2011) | Positive short-term effects following a transaction for large deals |
|  |  |
| **Domestic or Cross-border** |  |
| Kang (1993) | Positive abnormal returns for Japanese acquiring U.S. targets |
| Black et al (2001) | Domestic transactions outperform cross-border transactions |
| Conn et al (2001) | Location of target does not affect performance after a transaction |
| Hitt & Pisano (2003) | Cross-border transactions underperform compared to domestic transactions |
| Martynova et al (2006) | Location of target does not affect performance |
|  |  |
| **Relatedness of Industries** |  |
| Agrawal et al (1992) | Unrelated industry acquisitions outperform industry-related acquisitions |
| Healy et al (1992) | Acquisitions in related industries outperform acquisitions in unrelated industries |
| Maquiera, et al (1998) | Industry-related acquisitions have a superior performance than acquisitions where the industries are unrelated |

*Relevance for this study*

The relevance of describing the previous studies is to show what fields of the mergers and acquisitions have been researched, what methodologies have been used, and what results that have been present. Prior research lays the foundations on which the hypotheses in this study are based as well.

All the hypotheses are gathered in the table below to give the reader an easier overview of the aim of the study.

*Table 2.4: Summary of hypotheses*

|  |
| --- |
| **Summary of Hypotheses** |
| ***Hypothesis 1****: Long term abnormal returns are negative following a transaction.* |
| ***Hypothesis 2****: Long term operating performance is not superior following a transaction.* |
| ***Hypothesis 3****: The correlation between stock performance and operating performance is not significantly positive in the long term.* |
| ***Hypothesis 4****: There is a positive relationship between the market-to-book ratio and post-merger performance, both in terms of stock and operating performance.* |
| ***Hypothesis 5****: The size of the acquiring firm is affecting the long term stock and operating performance negatively* |
| ***Hypothesis 6****: Relative large transactions affect the stock and operating performance positively.* |
| ***Hypothesis 7****:* *Domestic transactions are outperforming cross-border transactions in operating and stock performance in the long term.* |
| ***Hypothesis 8****: Transactions where the acquirer and the target are within the same industry outperform transactions where this is not the case.* |

# Methodology

*This study will, as mentioned earlier, examine both the abnormal stock returns and the operating performance. The methodology chapter will start with a general discussion of what research design this study is based on. After that a section about the event studies used is presented, which is followed by a section about the sample selection criteria and how the data is collected. Then, the methods used to calculate abnormal stock returns, accounting performance and the correlation are described thoroughly. This is followed by a description of how the regression analysis is conducted.*

## Choice of method

During the execution of a study, two elementary approaches of empirics gathering can be made. The two approaches that can be used are quantitative approach and qualitative approach. This study takes a quantitative approach. The purpose and interest of this study is to evaluate performance from quantitative perspectives, therefore the quantitative approach is a natural choice. By using a quantitative research design a positivistic view on knowledge is applied. This means that knowledge is based on empirical methods, which is the case in this in study (Bryman & Bell, 2011).

### Inductive vs Deductive

There are two approaches when looking at empirics according to Bryman & Bell (2011). These approaches are deductive and inductive. A deductive approach means that the researcher takes a point of view from what is known within a certain area and takes into account the theoretical assumptions and thereafter deducts a hypothesis that needs to be revised from the empirics. The inductive approach means that the researcher deduces conclusions from empirical experiences. The results from the research area are analyzed and consequences of the results are drawn, and finally a possible conclusion can be reached. In this thesis a deductive approach will be used. Hypotheses are formulated based on the theoretical framework which consists of literature and previous studies within the field of M&A:s. The data collection is in conjunction with the stipulated hypothesis and the literature studied. The hypothesis and the formulated problem require a deductive approach since secondary data is analyzed and will lead to conclusions. One issue with a deductive method is that the data collection is limited and information is disregarded (Jacobsen, 2002). It is of great importance that there is an understanding for previous studies and their theoretical framework as well as a complete sample of data.

## Literature review

Articles are retrieved from LUBsearch and Google Scholar. The former is the University of Lund’s library’s search engine and the latter is a search engine from Google, specified on scientific articles. Both sources provide articles from reputable journals, e.g. Journal of Finance and Journal of Financial Economics. Furthermore, the articles used, cover both different time frames and different countries. Information is also retrieved from books, the books have been borrowed from the University of Lunds’s library.

## Event Study

In order to conduct this study, event studies will be performed, both when examining the abnormal stock returns following a merger and the operating performance after a merger. By using an event study, a framework where one can analyses the specific impact incurring from an event, is adopted. In this study’s case, the event of interest is M&A and the impact it has on stock and operating performance. MacKinlay (1997) discusses that the procedures in event studies are generally similar but it is also stressed that no unique structure exists. A description of the stages included in this study and the decisions involved are shown below.

1. *Identify the event of interest and the event windows.*

As mentioned above, the event identified is M&As, more specifically, the event is the date when the deal is completed. This study will contain three event widows; 12, 24 and 36 months. MacKinley (1997) proposes that the event window could start before the event in order to capture potential leakage. Examples of potential leakage involve rumors and insider trading. For that reason the event window in this study will start 30 days before the event takes place.

1. *Define sample selection criteria*

When deciding what sample to use a lot of considerations are done. Firstly, only completed transactions are included. Furthermore, M&A where either the acquirer or the target were within the financial industry is also excluded due to the different capital structure and regulations in these firms (Michelsen & Klein, 2011). To be able to find all relevant info, only acquirers and target companies that were public at least five year prior to the merger are included. *Time period,* *geographical area*, and *size* are additional factors where considerations are made, these will be discussed below.

*Time period*

This study is going to use an event window of 1-3 years which is the same as Rau & Vermaelen (1998) and Dutta & Jog (2009) use in their studies. The reason for this is to be able to look at how the performance develops in a long perspective and also remove temporary effects caused by the event (Andrade et al, 2001). The data is collected between 2004 and 2012, for two reasons. Firstly, to be able to capture as recent deals as possible and secondly, to have a timeframe with a manageable amount of deals that also captures transactions performed during different market conditions, such as the financial crisis around 2008, the financial boom preceding it and the recovery following the crisis.

*Geographical Area*

Most of the previous research is conducted on a U.S. market. However, Dutta & Jog (2009) examine a non-US market and find different results. This study is using Sweden, Denmark, Norway and Finland as market settings, since this is developed markets where lots of M&A:s take place. Furthermore, as in Dutta & Jog’s (2009) case, there are regulatory differences between these countries and the US regarding M&A:s which can lead to different results. Another aspect of why this geographical area is chosen is that the researchers have not found any similar research in these markets and it would be of interest to examine the effects of M&A:s, both accounting wise and stock wise.

*Transaction Size*

The criterion transaction size will include deals exceeding $50 million. To use the large transactions is consistent with the findings of Bhagat et al (2011), who find a positive relationship between transaction size and the abnormal returns following a transaction. Bhagat et al (2011) did, however, only look at a short term effects, which makes it interesting to examine if the effects of the transaction size are present in a longer time period too. The reason why the currency is dollars is because the software used, Thomson Eikon, states all deals in dollars by default. Another reason for only including large deals is that this is a common way, used by previous studies, e.g. Healy et al (1992) and Ghosh (2001), to make the amount of observations manageable to handle.

1. *Decide a model to calculate abnormal return*

This study is not using an asset pricing model, e.g. CAPM. Instead, a model called buy and hold abnormal return, further referred to as BHAR, is used to calculate the stock performance a thorough description of this model is presented in section 3.5. When calculating the operating performance this study adopts the method used by Ghosh (2001). This model is described in section 3.6.

1. *Statistical Testing*

In order to conduct these statistical tests a null hypothesis (H0) and an alternative hypothesis (H1) have to be formulated. Körner & Wahlgren (2006). If no statistical difference can be detected, H0 is rejected. On the other hand, if there is a statistical difference, H1 is not rejected which is interpreted that there is a statistical difference. In this study the difference to examine is whether the BHAR and ROA are statistically different from zero in different time periods.

H0: BHAR12,24,36 = 0

H1: BHAR12,24,36 ≠ 0

H0: ROA12,24,36 = 0

H1: ROA12,24,36 ≠ 0

There are two types of errors that can occur when testing hypotheses, type I and type II errors. Type I errors occur when the null hypothesis falsely is rejected and type II errors occur when null hypothesis is falsely accepted. Out of these two errors, type I are far more severe, since that leads to statistically significant conclusions about the characteristics of a sample that is not true. (Körner & Wahlgren, 2006)

A factor that has to be determined when testing hypotheses is the significance level. A significance level can be described as the probability of rejecting the null hypothesis when it is true, i.e. the probability of making a type I error. The most common significance levels are 10%, 5% and 1%. To find out whether the results are statically significant or not, two tests have been conducted, the t-test and Wilcoxon’s signed rank test. These two tests will be described below.

T-tests are a common way to test for significance and aim to examine if the results of the sample are generalizable on a population. Furthermore, since this study presents results on both stock and accounting performance, tests will be conducted on both set of measures for three time periods, 12, 24 and 36 months.

There are, however, some problems with this test. Firstly, Barber & Lyon (1997) claim that t-tests can be negatively biased when testing long term performance. Since this is the case in this study, to only test the significance with a t-test would lower the validity of the results. Another problem with the t-test is that it is a parametric test, which means that it assumes the observations to be normally distributed. (Körner & Wahlgren, 2006) But according to the central limit theorem, a sample can be assumed to be normally distributed if the number of observations exceeds 30 (Westerlund, 2005). Since there are 64 observations in this study, the sample can be assumed to be normally distributed. This means that a t-test can work as suitable test for significance. In spite of the implications of the central limit theorem a normality test is conducted to check if the samples are normally distributed.

To solve for the potential problems with a t-test another test is used as well, Wilcoxon’s signed rank test. This is a non-parametric test, which means that it does not assume the underlying data to be normally distributed. Moreover, Wilcoxon’s test eliminates the potential distortion that can be caused by extreme outliers. A disadvantage of using Wilcoxon’s test is that it can lack statically power, especially on a smaller sample when compared to the t-test. A difference between the two tests is that Wilcoxon’s test compares if the median is significantly different from zero, whereas the t-test that compare the mean. (Körner & Wahlgren, 2006) Both the t-test and the Wilcoxon’s test will be conducted using a software named SPSS.

*Test for normality*

In order to find out whether the observations are normally distributed or not, a normality test is conducted. In this study a Jarque-Bera test is conducted with a software program named Eviews. A Jarque-Bera test examines the skewness and kurtosis of a set of observations in order to determine if they are normally distributed. The skewness measures the distribution´s symmetry around its mean and the kurtosis is the fatness of the distribution’s tails (Brooks, 2008).

1. *Calculate and analyses abnormal returns*

The results of the event study is presented in chapter four and then analyzed in chapter five.

## Data Collection

Four programs have been used in this study, Thomson Reuters Datastream, Thomson Reuters Eikon, Eviews and SPSS. Thomson Reuters Datastream is a database and Thomson Reuters Eikon is used to retrieve and analyse data. The former is used to collect accounting data and stock prices from the firms of interest. Thomson Reuters Eikon is used to identify and filter M&A that matched the sample selection criteria. Both these programs are considered reliable and have been used extensively by previous researches. In order to ensure the validity of the data retrieved from the programs is double checked with the firms’ annual reports. SPSS and Eviews are software packages used for statistical analysis and are used when conducting the statistical tests in this study.

## Model to calculate abnormal stock returns

As stated in section 3.2, a method called Buy and Hold Abnormal Return (BHAR) is used to study the abnormal returns of the stocks. BHAR is a method in which the returns of the sample firms are compared to either benchmark firms with similar characteristics as a reference portfolio. Examples of studies using benchmark firms are Dutta & Jog (2009) and Loughran & Vijh (1997). There are however, other methods available. Rau & Vermaelen (1998) use a reference portfolio that is adjusted for size and market-to-book ratio. Agrawal et al (1992) also used a reference portfolio but adjusted for size and beta.

This study uses a model with benchmark firms since usage of reference portfolios have a tendency to lead to biased results (Barber & Lyon, 1997). In their study, Barber & Lyon (1997) describe three reasons that can explain the biased results when using a reference portfolio to calculate long term abnormal returns:

*New listing bias:* can occur when using a reference portfolio, if new firms a listed and will cause biased results

*Rebalancing bias:* incurs due to the returns of reference portfolios, e.g. equally weighted market index, are most often using a periodic rebalancing. This is not the case of the sample firms, which leads to biased results.

*Skewness bias:* is due to the long-term abnormal return potentially being positively skewed.

By using an approach with benchmark firms instead of a reference portfolio, all of these biases are mitigated. There will not be any new listings since there is only one firm to compare with, the returns of the benchmark is not using rebalancing when calculating returns and the benchmark firm is equally exposed to potential large returns. A different approach could have been to use an asset pricing model such as CAPM or Fama-French three factor model to calculate cumulative abnormal returns. These models however, have the drawback of potentially yielding miss specified test statics (Kothari & Warner, 1997)

Criticism has been raised against BHAR in general. Fama (1998) argues that usage of this model leads to a bad-model problem and that there is a probability that effects of other factors than the transaction is captured in the development of long term stock returns. Although this problem potentially exists, the measure Fama (1998) suggests, cumulative abnormal returns, causes statistical distortion when calculating long term returns (Conrad & Kaul, 1993). Furthermore, there is according to Andrade et al (2001), hard for investors to evaluate the expected effects of a transaction on a short term, which makes BHAR more appropriate to use as measure.

### Selection of Benchmark firms

The notion of using a benchmark firm is to be able to assess whether the acquirer performs abnormally well or poor by comparing it to a similar company who has not conducted a transaction. Barber & Lyon (1996) presents a set of filters that can be used to identify benchmark firms, which are adopted by Ghosh (2001). First of all, the matching firm cannot have conducted any significant transaction during the event windows. The second filter is industry, since firms within an industry seem to experience growth and decline at similar times and are more likely to be exposed to similar types of risks (Barber & Lyon, 1996). To be able to retrieve the industry of companies ICB industry codes are used. ICB stands for Industry Classification Benchmark, and this data can be retrieved from Datastream. Size is the third filter and the reason for this is that smaller firms tend to on average have lower earnings ratios than larger firms (Fama & French, 1995). The last filter is operating performance prior to the event, which is based on the theory of mean reversion. This means that firms with unusual well or poor performance tend to move towards the mean and to match firms with similar operating performance prior to the transaction controls for this (Barber & Lyon, 1996).

To be able to identify control firms, total debt and cash flows from operating activities are retrieved from of all traded shares on the Swedish, Danish, Norwegian and Finnish stock exchanges. Companies are matched on data the year prior to the acquisition, in order to mitigate potential leakage that could affect the data. To match on data a year before is also the case in studies by Loughran & Ritter (1997) and Ghosh (2001).

The first filter is that the benchmark firm cannot engage in transactions during the event windows are checked when the other filters are applied, which means that industry code is practically used as the first filter. All the firms that did not share industry code with the acquirer are filtered out. The next filter is size, defined as the market value of assets of the acquirer and target combined. This is calculated by adding book value of debt and market value of equity of the two companies. Book value of debt is the most accurate proxy to use, since market value is impossible to retrieve, due to the fact that all debt are not traded.

To be able to identify the firms with similar size an interval between 25% and 200% of the combined market value of the merging firm’s assets is set. This is the interval suggested by Barber & Lyon (1996) and leads to all companies with values above or below this interval being filtered out. Performance, defined as the combined cash flow from operating activities of the target and acquirer divided with combined market value of assets is set as the last filter. Then, the company with the closest value of performance is chosen as control firm.

### Calculation of Abnormal Return

After the matching is performed, the BHAR can be calculated. This is done by first calculating the returns of the acquiring company after 12, 24 and 36 months. The equation for this can be found below (eq 3.1).

*Equation 3.1*

After calculating the returns of the acquirer, the returns of the matching company is calculated using the same formula. When both the returns of the acquirer and the matching company are calculated, the matching firm’s returns are subtracted from the acquirer’s returns and the BHAR retrieved. The equation for this is illustrated below (eq 3.2).

*Equation 3.2*

### Winzoring

Another potential problem with BHAR is that extreme outliers can distort the result (Santos, 2011). To solve this problem one can use a method called winsorizing (Lien & Balakrishnan, 2005). In this method outliers are transformed into values on the frontiers in a pre-specified confidential interval. This method is also advocated by Santos (2011). This study has used a 95%-confidential interval which is two standard deviations from the means value, since this captures almost all observations and thereby does not distort the results to a large extent.

## Choice and elaboration of benchmark for operating performance

When evaluating the post-merger performance of companies from an accounting point of view, the most intuitive component to look at would be the net profit, since this states how much the company earns during a fiscal year, but as will be described below, this is not the case. Berk & DeMarzo argue in their book; *Corporate Finance* (2007), that although earnings are an accounting measure of the firm´s performance, they do not represent real profits, a firm cannot use its earnings to pay its daily costs such as goods, employees, fund new investments or pay dividends, since some of the items leading to earnings do not represent actual cash in- and outflows. Depreciation is an example of such an item.

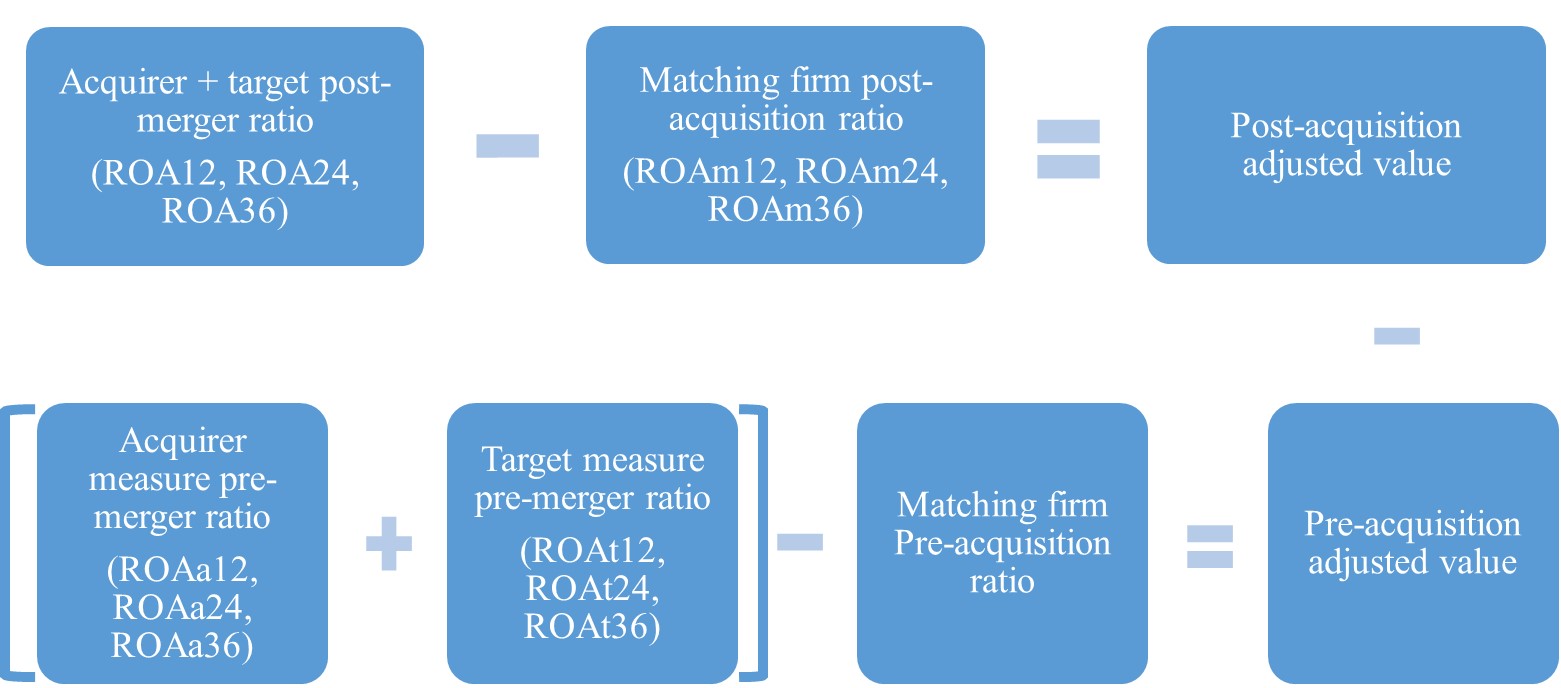
Therefor it is more appropriate to look at a company’s cash flow, which is disclosed in companies’ statement of cash flows. This statement consists of three parts; cash flow from operating activities, cash flow from investing activities and cash flow from financing activities. In this study, cash flow from operating activities is considered, since this can be used as a measure of a firms operating success (Fraser & Ormiston, 2014). Along with the benefit of measuring actual cash flows, usage of operating cash flows also leads to a more accurate measurement since the firm’s capital structure is not taken into consideration. This means that this measurement excludes cash flow to investors, which is not part of the operating activities (Koller et al, 2010).

Most previous studies, e.g. Healy et al (1992), Ghosh (2001) and Ramaswamy & Waegelein’s (2003) all aim at examining the operating performance and use an adjusted form of return on assets, ROA, as their benchmark for this. ROA is a ratio and the numerator is expressed as sales minus costs of goods sold, selling and general costs plus depreciation and amortization by Healy et al (1992), Ghosh (2001) and Ramaswamy & Waegelein (2003). Martynova et al (2006) use that measure, but also add different measures, including one, where differences in working capital are included since this would generate a more accurate measure of operating performance. As one of the aims with this study is to provide an answer to the question how the operating performance develops in the long term for companies, the most accurate form of operating performance possible are used. This measure is cash flow from operating activities. A usage of this measure only takes cash in- and outflows from the underlying operations into account and both changes in working capital and taxes are considered, which makes this a more accurate measure than previous studies. As a denominator, market value of assets are used. This is used by several previous studies, including Healy et al (1992), Ghosh (2001) and Ramaswamy & Waegelein (2003). However, Healy et al (1992) identify a potential limitation with the usage of market value of assets, namely that unexpected cash flow realizations can alter the market values of assets since market values are based on stock prices. But using market values are more accurate since this represents what the market would be prepared to pay for the assets and thereby the opportunity cost of the assets (Healy et al, 1992).

Section 3.5 describes differences in methodology when using a BHAR model. There are mainly two schools of thought regarding how to capture the post-merger performance, either to adjust the company of interest with an industry or to adjust it with control firms. This difference in methodologies is also present when examining the effects on operating performance. Healy et al (1992) and Ramaswamy & Waegelein (2003) use an industry adjusted measure whereas Ghosh (2001) uses control firms to adjust the data. This study uses the same approach as the latter, since there is a high probability of bias when using industry adjusted data. The bias is due to the tendency for merging firm to have a superior performance compared to industry in the period before the acquisition (Morck et al 1990). This argument is also consistent with Barber & Lyon’s (1996) notion, that the research design is miss-specified when examining operating performance of sample firms if they perform exceptionally well or poor.

Ghosh (2001) uses a set of criteria adopted by Loughran and Ritter (1997) in order to match with control firms. These criteria are industry, size and performance which are the same criteria used for matching firms when calculating BHAR. The reason for this is to be able to identify control firms with similar characteristics as the sample firms.

When the matching process is done, data from the acquirer, target and matching firm are retrieved for period ranging from three years prior to the acquisition to three years after. The data consists of components necessary to construct an adjusted ROA, described in earlier in this section. In order to examine the potential over- or under performance of operating performance the approach undertaken by Ghosh (2001) is adopted in this study. The first step of this approach is to adjust the combined ROA measure the acquirer and target by subtracting the ROA of the control firm, to mitigate the macroeconomic effects. Then the median ROA of the three years before the acquisition is subtracted from the ROA 12, 24 and 36 months after the acquisition. These steps are outlined in chart 3.1.

*Chart 3.1 Calculation of adj. ROA*

## Correlation

One of the purposes with this study is to examine the relationship between the stock- and operating performance. This is done by using a measurement called correlation coefficient. What the correlation coefficient aims to measure is how two different variables are affecting each other, i.e. if there is a linear relationship between them (Körner & Wahlgren, 2006). The correlation coefficient can take on values between -1 and 1. A value of 1, means that there is a strong positive relationship and that the two variables, i.e. if one variable increases by a unit, the other variable does it too. If the value takes on -1 there is a strong negative relationship which means that an increase in one variable leads to the opposite reaction in the other variable. A coefficient of zero, indicates that there is no correlation between the variables.

To be able to check the correlation between the variables, Eviews is used. This program arranges the variables in a matrix and also performs a t-test to check if the correlation between different variables is significantly different from zero. If there is a positive correlation between the stock performance and the operating performance, the variables develop in a similar way and an evaluation of a transaction’s performance can be done with either of the measures. If there is not any correlation between them, one can argue that only one measure is not enough to determine the success of M&A:s, since transactions can be deemed as fairly successful if the operating performance is enhanced, even if the stock performance is not improving, and the other way around.

## Sample Exclusions

1. From Thomson Reuters Eikon the total amount of Mergers and Acquisitions transactions that have been made in the world is retrieved.
2. Limiting to the dates: 2004-01-01 to 2012-01-01.
3. Thereafter a narrowing to transactions that had deal values larger or equal to $50m, this was done to ensure that the underlying data of the companies was easily accessible.
4. A limitation to transactions that had been fully completed was applied since partly completed or uncompleted transactions would have no value since the aim of the study is to look at the post-merger performance.
5. Thereafter a filter was applied to sorter out the transactions that had been made in the Sweden, Denmark, Norway and Finland.
6. Banks, Insurance and other financial institutions are excluded, see section(3.3. Step 2).
7. Limitation to public transactions.
8. If either the data for stock or operating performance is lacking the transaction will be excluded. The remaining sample after all limitations are 64.

*Table 3.1 Sample exclusions*

|  |  |
| --- | --- |
| **Steps** | **No. of Transactions Remaining** |
| 1. Global M&A Transactions | 947,387 |
| 2. Dates: 2003-01-01 to 2012-01-01 | 394,432 |
| 3. Deal Value >$50m | 45,357 |
| 4. Status: Completed | 34,631 |
| 5. Location: Sweden, Denmark, Norway, Finland | 1,164 |
| 6. Industry: Excluding Financial companies | 942 |
| 7. Target: Public | 208 |
| 8. Acquirer: Public | 142 |
| 9. Eliminating companies with lack of data | 64 |

## Multiple Linear Regression

A multiple linear regression for both stock and operating measures for each event window are conducted. This is done in order to find out how the relationship between a set of underlying variables and the performance measures look like. In order to conduct the regressions a program named Eviews is used. The regressions aim to investigate if there are underlying variables that affect the long term performance of the measures, and if there are variables that affect stock and operating measures differently. An example of this is if a high market-to-book prior to the merger has a bigger impact on the operating performance than the stock performance. A general formula for a multiple regression is illustrated in equation 3.3.

*Equation 3.3*

Y= Dependent variable

= Constant

= Slope coefficients

X1-Xm= Independent variables

= Residuals

is a constant and explains the average value that the dependent variable assumes when the independent variables are zero. The slope coefficients can be interpreted as the average change of the dependent variable if the independent variable changes by one unit. (Körner & Wahlgren, 2006)

### Dependent variables

Six different regressions are conducted, each of them have a different dependent variable. Three of the dependent variables are the accounting measure, ROA for each of the event windows specified in section 3.3. The other three dependent variables are the stock performance measure, BHAR for each event window. These variables are outlined in table 3.2

*Table 3.2*

|  |  |
| --- | --- |
| **Accounting** | **Stock** |
| ROA12 | BHAR12 |
| ROA24 | BHAR24 |
| ROA36 | BHAR36 |

### Independent Variables

As described in section 2.2.3, a set of determinants are chosen to examine their effect both on the long term stock returns and operating performance. These determinants are going to work as explanatory variables in the multiple linear regressions. The calculation and how they are retrieved is presented below.

*Market-to-book ratio*

Market-to-book ratio is, as described in section 2.2.3, a way to determine whether a company can be characterized as a growth company or not. Data to calculate this ratio is retrieved from Datastream for the acquiring company a year before the transaction. The formula for this ratio is presented below and the code for this variable in the regression tables will be *M\_B*.

*Equation 3.4*

*Size*

The second variable included is size. This variable is defined as the logarithmic value of the market capitalization of the acquiring company the year prior to the transaction. The code for this variable is *Log\_Size* in the regression tables

*Equation 3.5*

*Relative size of transaction*

As described in section 2.2.3, no consensus has been reached in terms of how the relative transaction size affects long term performance. In order to calculate this variable, the transaction size is divided with the market capitalization of the acquirer a year prior to the transaction. This variable is defined as *DEAL\_SIZE\_OF\_MARKET\_CAP* in the regression tables and the formula for this variable can be seen below.

*Equation 3.5*

*Domestic or cross-border*

If the transaction is performed on a domestic or international target is a variable where mixed findings are presented by previous studies. A dummy variable is used to measure this. The dummy variable takes on the value 0 if the target is from the same country as acquirer and 1 if this is not the case. In the regression tables this variable is named DOMESTIC\_INTERNATIONAL.

*Industry relatedness*

To examine if the relatedness of the industries of the acquirer and the target affect the performance is done by using a dummy variable. This variable takes on the value 0 if the industries are the same or 1 if not. *INDUSTRY\_RELATEDNESS* is the name of this variable.

### Goodness of fit – R2

When evaluating a regression it is appropriate to look at how well the regression model fits the data. By looking at R2 one can determine how well the model containing the explanatory variables explain the variation in the dependent variable. If the R2 value is close to zero it indicates that the model fits the data poorly (Körner & Wahlgren, 2006).

## Ordinary least squares assumptions

In order for the regression to be valid, a set of assumptions have to hold. For the regression to be valid, means that an ordinary least squares regression works as an efficient estimation model.[[2]](#footnote-2) There are six assumptions, but according to Westerlund (2005), only the first five needs to be met in order for the regression to be valid. The last one, that the error terms are normally distributed is the one that do not have to be met. These assumptions along with the tests conducted to check if they hold and the possible remedies if an assumption is violated are presented below. Another aspect that is described is what could happen if these assumptions are violated and ignored.

* 1. *The dependent variable can be written as a linear function of an intercept, explanatory variables and an error term.*

The linear function could be formulated as such:

There is a test called Ramsey’s RESET-test, that checks if assumption one is violated. The null hypothesis of this test is that the regression is correctly specified. According to the tests, presented in appendix 1 A3.1, this assumption holds for all tested regressions.

* 1. *E(ut) = 0*

This assumption means that the expected value of the error terms or residuals is zero. It is impossible to violate this assumption if a constant is included (Brooks, 2008). Since every regression used in this study have a constant, a test to examine this assumption is not necessary.

* 1. *Var(ut) = σ2 < ∞*

A problem of heteroscedasticity can occur if assumption 3 is violated. Heteroscedasticity means that the variance of the error terms is not constant and finite over all values of X. If the error terms are heteroscedastic, a problem of incorrect standard errors can incur. This can lead to false inference, which means that either type I or type II that are explained in section 3.3 can incur (Brooks, 2008). To detect this, a Breusch-Pagan-Godfrey test is conducted. This has a null hypothesis stating that no heteroscedasticity exists, and that no adjustments for this need to be made. As can be seen in appendix 1 A3.2, this is the case on all variables except one, the dummy variable examining if a cross-border transaction affects operating performance after 12 months. But since it is only significant on 10% level and more importantly no conclusions are drawn based on this variable, no consideration to this result is taken.

* 1. *Cov(ui ,uj) = 0*

The fourth assumption states that the error terms should not be correlated. Violation of this assumption is called autocorrelation and can lead to the same problems as violation of assumption three can, wrong standard errors and incorrect inference. A common way to test for autocorrelation is the Breusch-Godfrey test, which has a null hypothesis of no autocorrelation (Brooks, 2008). In this study no autocorrelation is found, since all the tests retain the null hypothesis. These tests can be found in appendix 1 A3.3.

* 1. *Multicollinearity*

Violation of the fifth assumption is called multicollinearity. This occurs if there is a high correlation between two or more of the explanatory variables. For example, the problem would be present in this study if market-to-book and the size of a company were highly correlated. Multicollinearity can affect the standard errors and provide incorrect inference. To test for this a correlation matrix between all the explanatory variables is used. A correlation above 0.8 is used as a rule of thumb for multicollinearity (Brooks, 2008). As can be seen in appendix 1 A3.4, no signs of multicollinearity can be detected.

* 1. *ut ~ N(0, σ2)*

Assumption six states that the error terms are normally distributed. Westerlund (2005) claims that OLS regressions still are valid, even if this assumption is violated. To check if the error terms are normally distributed, a Jarqeue-Bera test is conducted. The null hypothesis in this states that the error terms are normally distributed. As can be seen in in appendix 1 A3.5, the error terms are normally distributed for stock performance after 12 and 24 months and accounting performance after 36 months, but the error terms of stock performance after 36 months and accounting performance after 12 and 24 months are not. A way to mitigate this is to winsorize the observations as described in section 3.5.3. Since this is already done, combined with the fact that this assumption does not have to hold leads to no further adjustments in order to reach normally distributed error terms for all variables. Below, a summary of the test results are presented.

*Table 3.3 Summary of tests on assumptions.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Assumptions** | **Statistical T-test** | **BHAR 12** | **BHAR 24** | **BHAR 36** | **ROA 12** | **ROA 24** | **ROA 36** |
| 1. Modell is linear in its parameters and correctly specified | Ramsey´s RESET | YES | YES | YES | YES | YES | YES |
| 2. E(ut) = 0 | No test necessary | YES | YES | YES | YES | YES | YES |
| 3. Var(ut) = σ2 < ∞ | Breusch Pagan Godfrey | YES | YES | YES | YES | YES | YES |
| 4. Cov (ui, uj) = 0 | Breusch Godfrey | YES | YES | YES | YES | YES | YES |
| 5. Multicollinearity | Correlation Matrix | YES | YES | YES | YES | YES | YES |
| 6. ui ~ N(0, σ2) | Jarque-Bera | YES | YES | NO | NO | NO | YES |

## Reliability and validity

Two concepts are important to take into consideration when evaluating research, validity and reliability. Validity concerns the question whether the research really measures what it is supposed to. The concept of reliability highlights the question regarding the possibility to repeat the results of a study when using the same methodology, i.e. if the results are stable or not (Bryman & Bell, 2011).

### Validity

Validity is a concept with three different aspects, *measurement*, *external* and *internal*. *Measurement validity* highlights the question if the measures used in a study really represent what they are supposed to measure (Bryman & Bell, 2011). This type of validity can be a problem in this study, both when examining market value of assets and the operating performance measure. The problem with market value of assets, is that one component of this metric is market value of debt, which is impossible to obtain since a portion of the debt a company holds is not valued by the market because it is private. This has led to the use of book value of debt as a proxy. In terms of operating performance, this study uses cash flows from operating activities, whereas most previous studies have used EBITDA. The reason for this is that this is a superior benchmark of operating performance compared to the more common EBITDA and an usage of this will result in a higher measurement validity. A more thorough discussion about this can be found in section 3.6.

*External validity* refers to the possibility of generalizing the results of a study to other samples (Bryman & Bell, 2011). With this taken into account, one can argue that the results of this study can only be generalized to a sample with similar characteristics. Previous studies have proven this to be the case, for example, Dutta & Jog (2009) found differences in long term abnormal returns when comparing a Canadian sample with an American.

*Internal validity* is explained by Bryman & Bell as an issue of causality. The meaning of this is the problem of whether X is causing Y. If this is applied to this study, the problem whether the variables included really affect operating performance and stock performance or not. To mitigate this, relevant variables that can explain the variance are included in the regression.

### Reliability

There are two crucial stages that can affect the reliability, during the data collection and models used in the methodology. Datastream and Eikon, which has been the main programs used for collection of data are as in described in section 3.4 considered to be reliable sources of information. In order to ensure the reliability of this data cross references on some of the observations are made. For instance, the share price is cross referenced against official data from the exchange of where the company is registered, and market values are checked against companies’ annual reports. Another fact that increases the reliability of the data is the public status of both acquirers and targets, since this means that they have to follow certain accounting principles, i.e. IFRS (IFRS, 2013).

The reliability of the models used is also high, since these models have been used by several studies in the past. With that being stated there is a potential problem with reliability since the models are based on assumptions which has to be fulfilled in order to replicate the results.

# Results

*This chapter presents the findings of this study. It starts with a discussion of descriptive statistics of the sample. After this, the results of the stock performance and the accounting performance are presented. Then these results are related to each other in a correlation matrix. The chapter ends with the presentation of the results of the regression analysis.*

## Descriptive Statistics

When the criteria used in this study are applied and the companies with insignificant data are excluded, a final sample of 64 firms is left. The distribution of the sample’s transactions in time can be seen in table 4.1. As can be seen in this table, most transactions in the sample were performed between 2005 and 2009. This is rather surprising, due to the occurrence of the financial crisis around 2008.

*Chart 4.1*

Chart 4.2 shows the distribution of the M&A transactions by country. It is not surprising that most of the sample’s transactions take place in Sweden, both because it is the biggest economy and the fact that more companies are listed in Sweden than in the other countries. Out of the 64 observations, 23 transactions were performed domestically and 41 were performed on international targets.

*Chart 4.2*

*Test for normal distribution*

To test if the observations are normally distributed, a test called Jarque-Bera is used. Both stock performance and operating performance are tested in each event window. As can be seen in appendix A2.1, BHAR after 12 months is the only measure that has normally distributed observations. This means that Wilcoxon’s signed rank tests are more appropriate to use on a majority of the measures when examining if there are any significant returns following M&A:s, since this test does not assume the observations to be normally distributed.

## Results long term performance

The results of the long term stock performance are presented in table 4.1. The average stock performance after 12 months for companies conducting a transaction is negative returns of -1.94%. After 24 months, the average stock performance decreases to -9.47%. In a 36 month event window the average stock performance increases to 0.46%. However, none of these results are significant, neither when using a t-test or Wilcoxon’s test and therefor no generalizations can be made.

Table 4.1, presents the mean and the p-values of the BHAR for the three event windows. The p-values state the probability in percentage to reject the null hypothesis, i.e. the probability that the returns are significantly different from zero.

*Table 4.1 Results BHAR*

|  |  |  |  |
| --- | --- | --- | --- |
| **Time period** | **Mean** | **P-value t-test** | **P-value Wilcoxon’s test** |
| BHAR 12 | -1.9381% | 0.734 | 0.935 |
| BHAR 24 | -9.4699% | 0.289 | 0.316 |
| BHAR 36 | 0.4605% | 0.965 | 0.517 |

Table 4.2 shows the results of the operating performance measure, ROA. The discussion and elaboration of this measure can be found in section 3.6. As can be seen in the table, the structure is similar to the table presenting the results of BHAR. The mean value is -0.624% after 12 months, -0.575% after 24 months and 0.342% after 36 months. All of these results are close to zero and both the t-test and Wilcoxon’s test show that these results are not significant.

*Table 4.2 Results ROA*

|  |  |  |  |
| --- | --- | --- | --- |
| **Time period** | **Mean** | **P-value t-test** | **P-value Wilcoxon’s test** |
| ROA12 | -0.624% | 0.488 | 0.164 |
| ROA 24 | -0.575% | 0.497 | 0.264 |
| ROA36 | 0.342% | 0.758 | 0.574 |

## Correlation between the measures

Table 4.3 shows a correlation matrix and the results indicate that there are some cases of significant correlation between ROA and BHAR. These cases are BHAR and ROA after 24 months, which have significance on a 10% level. BHAR after 12 months and ROA after 36 months are also significant on a 10% level. This is also the case for BHAR after 24 months and ROA after 36 months. Lastly, there is significant correlation on a 5% level between BHAR after 36 months and ROA after 24 months. All the situations where there is significant correlation are highlighted in green in the table below.

*Table 4.3 Correlation Matrix*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Covariance Analysis: Ordinary | | |  |  |  |  |  |
| Date: 04/23/15 Time: 15:37 | | |  |  |  |  |  |
| Sample: 1 64 | |  |  |  |  |  |  |
| Included observations: 64 | | |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Correlation | |  |  |  |  |  |  |
| t-Statistic | |  |  |  |  |  |  |
| Probability | ROA12 | ROA24 | ROA36 | BHAR12 | BHAR24 | BHAR36 |  |
| ROA12 | 1.000000 |  |  |  |  |  |  |
|  | ----- |  |  |  |  |  |  |
|  | ----- |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| ROA24 | 0.297627 | 1.000000 |  |  |  |  |  |
|  | 2.454759 | ----- |  |  |  |  |  |
|  | 0.0169 | ----- |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| ROA36 | 0.334126 | 0.411771 | 1.000000 |  |  |  |  |
|  | 2.791335 | 3.557920 | ----- |  |  |  |  |
|  | 0.0070 | 0.0007 | ----- |  |  |  |  |
|  |  |  |  |  |  |  |  |
| BHAR12 | 0.142105 | 0.148670 | 0.209092 | 1.000000 |  |  |  |
|  | 1.130409 | 1.183784 | 1.683603 | ----- |  |  |  |
|  | 0.2627 | 0.2410 | 0.0973 | ----- |  |  |  |
|  |  |  |  |  |  |  |  |
| BHAR24 | 0.088839 | 0.227346 | 0.284968 | 0.698718 | 1.000000 |  |  |
|  | 0.702300 | 1.838259 | 2.340904 | 7.690431 | ----- |  |  |
|  | 0.4851 | 0.0708 | 0.0225 | 0.0000 | ----- |  |  |
|  |  |  |  |  |  |  |  |
| BHAR36 | -0.010546 | 0.217037 | 0.130704 | 0.557729 | 0.796088 | 1.000000 |  |
|  | -0.083043 | 1.750682 | 1.038066 | 5.290896 | 10.35789 | ----- |  |
|  | 0.9341 | 0.0849 | 0.3033 | 0.0000 | 0.0000 | ----- |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

## Multiple linear regressions

The results from the multiple linear regressions are presented in full in appendix 1 A2.5. Below extracts from these regressions are described. Each variable is described in terms beta and p-value for each event window.

*Market-to-book ratio*

*Table 4.4 Market-to-book ratio results*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **BHAR12** | **BHAR24** | **BHAR36** | **ROA12** | **ROA24** | **ROA36** |
| **Beta** | 0.029785 | 0.036775 | 0.029408 | 0.000408 | 0.004134 | 0.013360 |
| **P-value** | 0.3239 | 0.4208 | 0.5855 | 0.9304 | 0.3499 | 0.0172 |
| **Significant** | No | No | No | No | No | Yes |

As can be seen table 4.4 no significant slope coefficients are found, except the coefficient for ROA after 36 months. This means that market-to-book ratio of the acquirer before the transaction affects the operating performance in the long term on a 5% significance level.

*Size*

*Table 4.5 Size results*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **BHAR12** | **BHAR24** | **BHAR36** | **ROA12** | **ROA24** | **ROA36** |
| **Beta** | -0.031903 | 0.016993 | -0.027664 | 0.004925 | -0.000772 | -0.025974 |
| **P-value** | 0.7407 | 0.9073 | 0.8726 | 0.7424 | 0.9564 | 0.1421 |
| **Significant** | No | No | No | No | No | No |

Size of the acquirer has no significant impact on the performance after the transaction. This is the case on all event windows for both types of measures. There seems to be indications of smaller acquirers having a superior operating performance after 36 months, but since this is not significant, no conclusions can be made based on this.

*Relative Transaction Size*

*Table 4.6 Relative transaction size results*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **BHAR12** | **BHAR24** | **BHAR36** | **ROA12** | **ROA24** | **ROA36** |
| **Beta** | 0.033961 | 0.168691 | 0.199130 | -0.003423 | 0.011852 | -0.000576 |
| **P-value** | 0.5685 | 0.0651 | 0.0654 | 0.7113 | 0.1773 | 0.9576 |
| **Significant** | No | Yes | Yes | No | No | No |

Relative transaction size is, as can be seen in table 4.6, affecting the stock performance after 24 and 36 months on a 10% significance level. The slope coefficient, beta, is rather high in both of these event windows, which means that the relative transaction size is affecting the stock performance to a rather large extent.

*Domestic or cross-border*

*Table 4.7 Domestic or cross-border*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **BHAR12** | **BHAR24** | **BHAR36** | **ROA12** | **ROA24** | **ROA36** |
| **Beta** | 0.049480 | -0.125345 | 0.127463 | -0.013435 | 0.003231 | 0.021103 |
| **P-value** | 0.7177 | 0.5459 | 0.6033 | 0.5282 | 0.8719 | 0.3978 |
| **Significant** | No | No | No | No | No | No |

To check if the transactions conducted on a target in the same country have superior performance compared to cross-border transaction is the fourth variable. As can be seen in the table above, no significant results are found when examining this variable.

*Industry relatedness*

*Table 4.8 Industry relatedness*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **BHAR12** | **BHAR24** | **BHAR36** | **ROA12** | **ROA24** | **ROA36** |
| **Beta** | -0.025711 | -0.012776 | 0.120842 | -0.036880 | -0.011580 | 0.031493 |
| **P-value** | 0.8565 | 0.9527 | 0.6353 | 0.0990 | 0.5787 | 0.2261 |
| **Significant** | No | No | No | Yes | No | No |

The industry relatedness of the acquirer and the target is also used as a variable. According to the results, no significance can be found, except that acquirers in related industry as their target, seem to have a superior operating performance after 12 months.

# Analysis

*One purpose of this chapter is to compare the results in this study with the results in previous studies. Another purpose is to discuss the study relative to the theories it is based on. The chapter begins with the analysis of the long term stock and accounting performance. This is followed by a part where these two measures are related to each other. The chapter ends with an analysis of the regression.*

## Stock Performance

The buy and hold abnormal return is used as model to measure stock performance. As described in chapter four no significant abnormal returns, neither positive nor negative are found. This is the case when examining 12, 24 and 36 months. These results are not aligned with the findings of Agrawal et al (1992), Loughran & Vijh (1997), and Rau & Vermaelen (1998) who all find significant negative abnormal returns on a long term. The results of this study is however consistent with the findings of Dutta & Jog (2009) who perform a study on the Canadian market and do not find any long term negative abnormal returns either. An implication of this could be that the different regulations across countries can affect the abnormal returns, which is suggested by Dutta & Jog (2009). To analyses this possibility is, however, out of the scope of this study.

When calculating BHAR several different models are used. Rau & Vermaelen (1998) state that the results in long term studies are more sensitive to the model used than in short term studies. This can explain why the results differ from Agrawal et al (1992).

According to the efficient market hypothesis, elaborated by Fama (1970) all available information is immediately incorporated in the stock price. This suggests that all information about the transaction is immediately reflected in the stock price, and no abnormal returns, neither positive nor negative that derive from the transaction should be found. The lack of significance in the results suggests that the markets examined could possibly be characterized by strong or at least semi strong efficiency.

## Operating Performance

An adjusted measure of return on assets is used as a proxy for operating performance. As can been seen in chapter four, no evidence of long term abnormal returns is found. These results are similar to the stock performance results. To not be able to find any significant results is not consistent with the findings of Healy et al (1992) or Ramaswamy & Waegelein (2003), who both concludes that the operating performance improves after mergers. On the other hand, the results in this study are in line with the findings of Ghosh (2001) and Martynova et al (2006). This is also the conclusion of King et al (2004), who performed a meta-analysis based on prior studies.

One possible reason of why the results of this study are not aligned with the results of Healy et al (1992) and Ramaswamy & Waegelein (2003) could be the difference in methodologies applied. This study adopts the methodology of Ghosh (2001), who are influenced by Barber & Lyon (1996). The reason why this was chosen is discussed thoroughly in chapter three. Another reason why there is difference in results is the different measures applied. Healy et al (1992), Ramaswamy & Waegelein (2003) both used EBITDA as a proxy for operating performance. This was not the case in this study, instead a proxy that also adjusts for tax and changes in working capital was applied. The main reason for this choice is that one of the main target groups are companies and their opportunities to perform successful transactions and thus the purest proxy of measuring operating performance is applied.

Martynova et al (2006), who also conduct a study in a European market setting do not find any significant results either, the difference in the markets and legal origins between Europe and the U.S, could also be a reason why the results differ from the findings of Healy et al (1992) and Ramaswamy & Waegelein (2003), but this is as stated in the section above, out of the scope in this study.

In chapter two a theory named the empire building theory was presented. This theory suggests that managers can conduct M&A:s in order to get a better reputation and/or a higher compensation, i.e. out of self-interest rather than to undertake it because it will benefit the shareholders. Another theory that was described in chapter two was the hubris theory, which like the empire building has its origins in agency theory. The hubris theory is based on an overconfidence in valuation among decision makers were they believe themselves to know the true value of a target, even if that differs from market perceptions. One consequences of this is the occurrence of irrational decision making (Roll, 1986). The lack of significance in the results indicates that both of these theories can be present among decision makers in Swedish, Danish, Norwegian and Finnish companies, since shareholders do not benefit from the transaction. However, it should also be stated that even if these results indicates that this occurrence might exist, no conclusions can be drawn before this is investigated deeper.

Three neoclassical theories; the efficiency theory, the monopoly theory and the disturbance theory, are presented in chapter two. The efficiency theory states that synergies are a motive for conducting M&A transactions. If operating or financial synergies, described chapter two, are realized, they could appear in the adjusted ROA in three ways, either in lower costs, higher sales or a more efficient allocation of assets and lead to a higher ROA. A result that is not significantly positive indicates that these synergies are not realized, at least not during the event windows. It is hard to analyze whether the monopoly theory and the disturbance theory are reasons for acquiring among the sample in this study, since the benefits is hard to quantify. A lack of significance can be an indications of these motives since the benefits from these transactions potentially takes longer time to realize. dfdsfs

## Correlation

Table 4.3 shows correlation between the two measures in different event windows. Significant correlation could be found three times; stock and operating performance after 24 months, stock performance after 24 months and operating performance after 36 months, operating performance after 24 months and stock performance after 36 months. And lastly stock performance after 12 months and operating performance after 36 months. The other cases had insignificant correlation.

The correlation between the measures after 24 months is of interest, since this occurs during the same event window. A correlation coefficient of approximately 0.23, indicates that there is a relationship between the two measures after 24 months. Although, it is significant, the correlation is rather low, but implies that one only needs to use one of the measures when evaluating the performance 24 months after the transaction. Although it should be added that this correlation is only significant on a 10% level which makes this correlation rather weak.

After 12 months and 36 months however, no significant correlation can be detected. These results implies that when evaluating the success of a merger, one has to take into both the operating performance and the stock performance into consideration, unlike most studies today who only look at one of the measures.

One possible reason for this divergence in results is that these measures are focusing on different aspects, while operating performance look at past performance, the performance of stocks weigh in the future, i.e. the stock price can be explained as the discounted value of all future cash flows (Berk & DeMarzo, 2011). If one agrees with that definition, a correlation between the stock performance on a shorter term and the operating performance on a longer term would be present. This is the case with stock performance after 12 and 24 months and the operating performance after 36 months. While this goes beyond the scope of this study, it is interesting to find that stock price can be partly explained by the future operating performance. Especially the correlation between the stock performance after 24 months and the operating performance after 36 months interesting, since this is significant at a 2.25% level, which makes this the strongest correlation.

One can argue that operating performance, in some instances send credible signals of post-merger performance to the shareholders. This is based on the correlation between operating performance after 24 months and stock performance after 36 months. One can argue that an implication of this is that an increased operating performance after a transaction sends signals to the shareholders that the transaction are successful and this leads to positive stock performance. Other way around is also applicable, a decrease in operating performance send signals that lead to a negative stock performance.

## Regressions

The results of the regressions were presented in section 4.4. Below an analysis of the result will be presented. Each variable are analyzed separately and contain both stock performance and operating performance analysis.

*Market-to-Book Ratio*

Empirical evidence presented in chapter four indicates that no significance is found when examining if the market-to-book ratio affect the long term stock performance. This contradicts the results of Rau & Vermaelen (1998) who find that companies with low market-to-book ratios outperform companies with high ratios. One of the possible reasons for these findings is that managers in companies with high ratios act under the influence of hubris. The results of this study can imply that hubris is influencing managers in companies with high market-to-book ratios in Sweden, Denmark, Norway or Finland. The reason for this is that managers in growth firms overvalue the future benefits of the transaction which is supported by the lack of significance in terms of stock performance.

When it comes to operating performance, measured as ROA, the results are similar in the event windows with the length of 12 and 24 months. However, significance is found after 36 months, on a 5% level. The significant result after 36 months is positive and can be interpreted as higher market-to-book leads to improvements in performance as is interesting of two reasons. Firstly, that this results contradicts the hubris motive for high market-to-book companies for conducting transactions, presented by Rau & Vermaelen (1998), and secondly, that this differs from the stock performance result.

As described in section 2.2.3 a high market-to-book ratio implies that a company has growth potential according to the market. If strong market efficiency exists, high market-to-book values should generate superior operating performance in the future. The positive relationship is an indication that supports this.

*Size*

Another determinant considered is the size of the acquiring company. The findings of this study imply that long term stock performance is not affected by the size of the acquiring company in any of the event windows.

No significance is found when conducting regressions with this variable as explanatory and long term stock performance as dependent. This is consistent with the results explaining how the size affects the operating performance, presented in table 4.5. These results are not aligned with the evidence in this area provided by Moeller et al (2004), who find that deals performed by large acquirers tend to underperform in comparison to smaller acquirers. This is motivated by agency theory and that management in smaller firms is potentially better aligned with the shareholders’ interests. Although this could be the case, the evidence from this study does not support a better alignment between shareholders and management in smaller firms. A possible reason for the differences in results with prior research can be that the time period when the sample is collected, Moeller et al (2004) use a sample period between 1980 and 2001, whereas this study has a sample period from 2004 to 2012. The different market conditions present in the sample periods can maybe explain why the results differ.

*Relative transaction size*

Empirical findings in this study indicate that the long term stock performance, BHAR, is unaffected by this variable after 12 months. On the other hand, the findings after 24 and 36 months are that increased relative size of the transaction creates value for the shareholders. The slope coefficient is 0.17 after 24 months and 0.20 after 36 months, which is interpreted as a change of one unit in the relative transaction size causes a 17% or 20% in the stock performance. This means that stock performance following a merger is influenced by the relative transaction size to a fairly large extent. This variable is tested both from a stock performance and operating performance perspective by previous studies. Dutta & Jog (2009) find a negative relationship between the relative transaction size and long term stock performance, which contradicts the results of this study. A possible reason for this can be the difference in market settings and in the studies, since Dutta & Jog (2009) use Canada as market setting. The positive relationship in this study’s results supports the findings of Capron (1999). An argument for the positive relationship raised by Capron (1999) is that large transactions increase the possibilities to realize synergies.

In terms of operating performance, no significant results can be proven. Insignificant results are not in line with the findings of Martynova et al (2006) who find that the relative transaction size had a negative relationship with the operating performance. The differences in methodologies when defining operating performance, presented in section 3.6, can possibly explain this result. Insignificant results in terms of operating performance can be interpreted as a failure to realize synergies since a realization would most likely result in a superior performance. Due to the positive results in terms of stock performance, one can raise an argument that the positive performance is driven by expectations of superior future operating performance caused by the transaction, the larger it is. A longer event window could have provided more insights to this, if there still were insignificance when examining operating performance and if so, how the stock performance would react.

Another aspect of why there is a difference in the two performance measures can be that there is an information asymmetry between the company and its shareholders. A large transaction can be interpreted as a successful deal by the shareholders, even if the synergies are not realized, if the information asymmetry is high and the shareholders are unable to understand the true performance.

*Domestic or cross-border transaction*

To determine if a domestic transaction is more value creating than a cross-border transaction is the fourth variable of interest. As can be seen in table 4.7 no significance could be found in neither event window, both in terms of stock and operating performance. Prior research has found different result. For instance, Black et al (2001) present results indicating that companies conducting cross-border transactions underperform compared to companies conducting transactions domestically.

A possible reason for the divergence between this study and prior research can be that the time period in this study is more recent than earlier studies. As the world is becoming more globalized and the technology development enabling information to be attained easier, information asymmetry between acquirers and targets can be assumed to be lower. Thus, enabling acquirers to be as informed when they conduct a cross-border transaction as they are when they conduct a transaction domestically.

*Industry relatedness*

The relatedness between the acquirer’s and the target’s industries is the last studied variable. Long term stock performance is not affected by the relatedness in either of the event windows. Operating performance has on the other hand significant results after 12 months, but no significance after 24 or 36 months.

An insignificant result does not support the findings of Agrawal et al (1992), who point out financial synergy opportunities as a possible reason for their result. The divergence in results can possibly be derived from these financial synergies being harder to attain on the Swedish, Danish, Norwegian and Finnish markets than on the US. Markets, but no findings support this and this notion be analyzed more thoroughly before any conclusions about this can be drawn.

The significant result in operating performance indicates a negative relationship on 10% level, which can be interpreted as transactions within related industries outperform unrelated transactions after 12 months. This is in line with Jensen’s (1986) suggestion that transactions where the acquirer and target has different industries are more likely to perform, since the management are unfamiliar with the industry of the target and thereby lacks the competence to realize the synergy effects. It should also be remarked that, this relationship was only significant on a 10% level and had a slope coefficient of -0.037, which indicates that the relationship is rather weak. Healy et al (1992) also examine how industry relatedness influence operating performance and come to the conclusion that firms in related industries has a superior performance. These findings are partially supported by the results in this study.

A potential reason why the operating performance is only influenced by industry relatedness after 12 months and that industry relatedness does not affect stock performance significantly is that the shareholders do not expect any lasting superior performance from transactions within the same industry. The result shows that they are correct, since the operating performance is only slightly influenced after 12 months and then no influenced at all.

Both the ROA and BHAR are to complex measures that are influenced by a vast amount factors. To capture all of these factors are impossible, which can explain fairly low R2 in the regressions. Low R2 :s are also present in some of the prior studies and the R2 is similar to the ones in Martynova et al (2006). An interesting factor to illuminate is that the R2 is increasing for both measures when the event window is increased. This means that the goodness of fit becomes better, which should be interpreted that the variables are affecting both long term stock performance and operating performance to a larger extent in the long term. This implies that the determinants presented in this study have an increased influence on the performance after 36 months than they have after 12 and 24 months. The R2:s in this study can be found in appendix 1 A2.5.

# Conclusion

*The conclusion is based on the results and analysis in this study and puts the results in relation to the hypotheses formulated in chapter 2. Further implications of the results and suggestions for future research are also presented.*

## Conclusion

This study has two purposes, to review the performance of M&A transactions, both from a financial and an operating perspective, and to analyze how a set of determinants affected these measures. The purposes were broken down into eight hypotheses. To be able to perform this study, two event studies, one correlation analysis and six multiple linear regressions have been conducted.

The results indicated that no significance can be found, when examining stock and operating performance on 12, 24 and 36 months. This means that no abnormal positive or abnormal negative return can be detected in these measures. The researchers hoped, based on the majority of previous studies, to find significant negative abnormal stock returns on a long term, but the results is not that surprising, since there are previous studies, e.g. Dutta & Jog (2009) that also find insignificant results.

The hypothesis of no abnormal operating performance following a transaction was in line with the results of this study. As discussed in chapter two and five, the most recent studies within this area also find insignificant results when examining the operating performance following the transactions. The results of this study further enhance the notion that M&A:s in general do not add value for the shareholders. This is probably no news to managements in companies that are about to undertake an acquisition, which raises the question, why do they continue to undertake it?

This study discusses some motives for transactions. Three of the theories discussed are to realize synergy effects, perform empire building or to conduct transactions out of hubris. Even though it is hard to find clear evidence for the two latter motives, the lack of significance in the result can be deemed to have those motives even when that is not the case. Poor performance can simply be lack of realizing the anticipated synergies. Hubris and empire building are two theories that should be taken seriously, a way to solve it can be to increase the board’s controlling function on the management.

The lack of significance can possibly be explained by the dispersion in the sample. This dispersion can potentially have arisen by the models used to calculate abnormal returns. For instance, this study used benchmark firms when calculating abnormal returns. These benchmark firms are supposed to be similar to the firms in the sample and are chosen based on a set of filters discussed in 3.5.1. To include more filters, or a different set of filters could have mitigated the dispersion. Another factor that could have mitigated the dispersion is to increase the sample and thereby include more observations. To use reference portfolios along with benchmark firms and then take an average of these two measures could also potentially mitigate the large dispersion.

Decision makers in companies are, as stated in section 1.6 one of the target groups of this study. The results show that most stock and operating measures lack significant correlation, which implies that decision makers have to take both measures into account when evaluating the performance of a transaction. For instance, poor stock performance following a transaction can be influenced by more factors than the operating performance, and if the operating performance is increased after a merger the question whether the transaction really was unsuccessful is raised.

Lack of correlation between many of the measures also raises the question to whom the company is responsible to. Is it necessary to study different measures if the sole purpose of a company is to maximize shareholders’ value?   
We think that the increasing shareholders value is an important objective for a company, however looking at the performance from other perspectives can give indications on how healthy the transaction has been.

Chapter four presented results that the operating performance after 36 months was correlated with stock performance after 12 and 24 months. An implication of these variables being correlated is that shareholders are well informed about the company’s performance and that this could be a sign of fairly low information asymmetry between the shareholders and the company.

Hypothesis four to eight all aim at examining how a set of determinants influenced the different measures was tested using regressions and then analyzed in chapter five. A general conclusion is that there are variables that affects the value creation the measures differently. A summary of all the hypotheses can be found in table 2.4.

Hypothesis 4, 6 and 8 are partially supported by the results in this study, whereas no significance are detected in the other variables. Market-to-book ratio is the only variable that impacts performance on a 5% level. The other significant variables, relative transaction size and industry relatedness have a slightly weaker relationship since they are only significant on a 10% level.

These findings has a set of implications. First it is not enough to take the variables affecting one measure into account since they affects the measures differently. Another implication is that studies only examining one of the measures of post-merger performance leads to incomplete conclusions of the impact of determinants on performance following a transaction.

The market-to-book ratio only influenced operating performance on the long term, which is not aligned with previous research or our hypothesis, which stated that negative relationship between the market-to-book ratio and the performance measures. Apparently, the hubris motive that was presented as a reason for this for is not present on a Swedish, Danish, Norwegian or Finnish market setting.

The researchers hoped to find a significant negative relationship between the size of the acquirer and the post-merger performance. Flexibility and agility by smaller firms could have explained this. The hypothesis about domestic transaction performing significantly better than cross-border transaction did not hold. A reason for this can potentially be that earlier studies that find this to be the case have influenced the decision markers into be more cautious about future synergy effects and to make a more thorough analysis when they conduct cross-border transactions. There was partial evidence for the last hypothesis, that industry relatedness has a positive impact on the post-merger operating performance. The positive relationship between the stock returns and the relative transaction size, and the lack of significant relationship between the relative transaction size and operating performance can be explained by too large premiums being paid. These lead to high expectations of future performance and thus, an increase in stock price. If the premiums are too large one can argue that it is more difficult realize synergies and thereby generate a superior post-merger operating performance.

An implication presented in chapter five was that the variables have a greater influence on the performance after 36 months than they have after 12 and 24 months, due to an increasing goodness of fit. This ought to send signals to decision makers not to have a myopic view of how the post-transaction performance is affected by different variables. Another signal is that it takes time to be able to fully evaluate how variables, present before the transaction, such as market-to-book ratio, are affecting the performance.

Below a summary of the most important findings of this study is presented:

* Acquirers do not earn significant abnormal stock returns following M&A:s.
* Acquirers do not have a significant abnormal operating performance after M&A:s.
* There is a positive relationship between stock performance on 12 and 24 months and operating performance after 36 months.
* Operating performance and stock performance are correlated 24 months after a transaction.
* An increased market-to-book ratio leads to an increased operating performance after 36 months
* Transaction deal size has positive relationship with stock performance after 24 and 36 months
* Operating performance is somewhat enhanced after 12 months if the acquirer and target are within the same industry.

## Suggestions for further research

Below we will present suggestions to what academics could research in the future:

A deeper case study on a few companies to evaluate the post-merger-performance. This could be done by identifying firms with similar development of operating and stock performance. Thereafter examine if there are similarities in the characteristics that are value adding or value destroying for these firms.

As discussed earlier, the sample could be increased in order to lower the dispersion in results, since the large dispersion in our sample led to large standard errors and thereby insignificant results.

A study to investigate if the type of ownership affects the stock performance and operating performance differently. For example to examine if institutional owners are more focused on long term operating performance than families or if a certain type of owner has a high impact on the correlation between the measures.

Study operating and stock performance on the long term and add a legal perspective. This would be interesting, since there are differences across in M&A regulation across countries and it would be interesting to highlight how these differences affect the financial and operating performance of companies, since the results in this study differs from most studies conducted in the U.S.

By using more than one methodology for each measure that could increase the robustness of the results. An example of this is to use both control firms and reference portfolios both when calculating the abnormal stock returns and the abnormal operating returns.

Healy et al (1992) find positive relationship between the short term announcement effects on stock performance and long term operating performance. By applying this to a northern European market setting and to use a larger sample than Healy et al’s (1992) sample of 50 observations would be of great interest for academics, since this sends implications about market efficiency.

To use a large sample and identify a set of variables that can be used as proxies of hubris affecting the decision to undertake an acquisition is also an area where more research needs to be done. Rau & Vermaelen (1998) identify high market-to-book ratio of the acquirer as an indication. To include more variables, e.g. a variable that captures differences in compensation across companies and test against performance is a suggestion for a further study that creates an understanding of the hubris hypothesis.

# References

Agrawal, A., Jaffe, J.F., & Mandelker, G.N. 1992. *The post-merger performance of*

*acquiring firms: A re-examination of an anomaly*. The Journal of Finance, Vol. 47, 1605–1621

Akben-Selcuk, E., & Altiok-Yilmaz, A. 2011. *The Impact of Mergers and Acquisitions on Acquirer Performance: Evidence from Turkey*. Business and Economics Journal, Vol. 22, 1-8.

Akerlof, G. 1970. *The market for ‘lemons’: quality uncertainty and the market mechanism*. Quarterly Journal of Economics, Vol. 90, 629–650.

Arnold, G. 2008. *Corporate Financial Management*. 5th edition. Harlow, Pearson Education Ltd.

Andrade, G., Mitchell, M., & Stafford, E. 2001. *New evidence and perspectives on mergers*. Journal of Economic Perspectives, Vol. 15, 103-120.

Asquith, P., & Kim, E.H. 1981. *The impact of merger bids on the participating firms’*

*Security holders*. Journal of Finance, Vol. 37, no. 5.

Barber, B.M., & Lyon, J.D. 1996. *Detecting abnormal operating performance*. Journal of Financial Economics, Vol. 43, 359-399.

Barber, B.M., & Lyon, J.D. 1997. *Detecting Long-Run Abnormal Stock Returns: The Empirical Power and Specification of Test Statistics*. Journal of Financial Economics, Vol. 43, 341-372.

Berk, J., & DeMarzo, P. 2011. *Corporate Finance*. 3rd edition. Prentice Hall.

Bhagat, S., Malhotra, S., & Zhu, P. 2011. *Emerging country cross-border acquisitions Characteristics, acquirer returns and cross-sectional determinants*. Emerging Markets Review, Vol. 12, 250-271.

Black, E.L., Carnes, T.A., & Jandik, T. 2001. *The Long-Run Success of Cross-Border Mergers and Acquisitions*, University of Arkansas Working Paper.

Brooks, C. 2008. *Introductory Econometrics for Finance*. Cambridge University Press. 2nd edition.

Bryman, A., & Bell, E. 2011. *Företagsekonomiska forskningsmetoder*, Stockholm: Liber

AB.

Capron, L. 1999. *The Long-Term Performance of Horizontal Acquisitions*. Strategic Management Journal, Vol. 20, 987-1018.

Conn, C, Cosh, A., Guest P., & Hughes, A. 2001, *Long-Run Share Performance of UK Firms Engaging in Cross-Border Acquisitions*. Centre for Business Research University of Cambridge Working Paper 214.

Conrad, J., & Kaul, G. 1993. *Long-term market overreaction or biases in computed returns*. The Journal of Finance, Vol. 48, 39-63.

Devos, E., Kadapakkam, P., & Krishnamurthy, S. 2009. *How Do Mergers Create Value? A Comparison of Taxes, Market Power, and Efficiency Improvements as Explanations for Synergies*. Review Of Financial Studies, Vol. 22, 1179-1211.

Dimson, E., & Marsh, P. 1986. *Event study methodologies and the size effect: The case of UK Press recommendations*. Journal of Financial Economics, Vol. 17, 113-142.

Dodd, P. 1980. *Merger proposals, management discretion and stockholder wealth*. Journal of Financial Economics, Vol. 8, 105-138.

Dutta, S., & Jog, V., 2009. *The long term performance of acquiring firms: A re-examination of an anomaly*. The Journal of Banking & Finance, Vol. 33, 1400-1412.

Faccio, M., & Masulis, R.W. 2005. *The choice of payment method in European mergers and acquisitions*. Journal of Finance, Vol. 60, 1345–1388.

Fama, E. 1970. *Efficient Capital Markets: A Review of Theory and Empirical Work*. Journal of Finance. Vol. 25:2, 383-417.

Fama, E. 1998. *Market Efficiency, Long-Term Returns, and Behavioral Finance*. Journal of Financial Economics. Vol. 49:3, 283-306.

Fama, E., & French K. 1995. Size and book-to-market factors in earnings and

returns, Journal of Finance, Vol. 50, 131-155.

Firth, M. 1980. *Takeovers, shareholder returns, and the theory of the firm*. The Quarterly Journal of Economics, Vol. 94, 235 – 260.

Fraser & Ormiston. 2014. *Understanding financial statements*. 11th edition. Pearson

Gaughan, P. 2007. *Mergers, Acquisitions, and Corporate Restructuring.* 4th edition. John Wiley & Sons Inc. Hoboken, New Jersey.

Ghosh, A. 2001. *Does operating performance really improve following corporate acquisitions*. Journal of Corporate Finance Vol. 7, 151–178.

Healy, P., Palepu, K., & Ruback, R., 1992. *Does corporate performance improve after mergers?* Journal of Financial Economics, Vol. 31, 135 – 175.

Hitt, M., & Pisano, V. 2003. *The Cross-Border Merger and Acquisition Strategy: A Research Perspective.* Management Research: Journal of the Iberoamerican Academy of Management, Vol. 1, 133 – 144.

Jacobsen, D-I. 2002. *Vad, hur och varför? : Om metodval i företagsekonomi och andra*

*samhällsekonomiska ämnen*. Lund: Studentlitteratur.

Jensen, M. 1986. *Agency costs of free cash flow, corporate finance and takeovers*.

American Economic Review Papers and Proceedings, Vol. 76, 323-329.

Jensen, M., & Meckling, W. 1976. *Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Structure*. Journal of Financial Economics, Vol. 3, 305-360.

Kang, J. 1993. *The International Market for Corporate Control: Mergers and Acquisitions of US Finns by Japanese Firms*. Journal of Financial Economics,Vol.34, 345-371.

King, D., Dalton, D., Daily, C., & Covin, J. 2004. *Meta-Analyses of Post-Acquisition Performance: Indications of Unidentiﬁed Moderators*. Strategic Management Journal, Vol. 25, 187–200.

Koller, T., Goodhart, M., & Wessels, D. 2010. *Valuation: Measuring and Managing the Value of Companies.* 5th edition.

Kothari, S.P. & Warner, J.B. 1997. *Measuring Long-Horizon Security Price Performance*. Journal of Financial Economics, Vol. 43, 301-339.

Körner, S., & Wahlgren, L. 2006. *Statistisk Dataanalys.* 4th edition. Lund, Studentlitteratur AB.

Lakonishok, J., Shleifer, A., & Vishny, R.W. 1994. *Contrarian investment, extrapolation, and risk*. Journal of Finance, Vol. 49, 1541-1578.

Lien, D. & Balakrishnan, N. 2005. *On Regression Analysis with Data Cleaning vid Trimming, Winsorization and Dichotomization*. Communications in Statistics – Simulation and Computation, Vol. 34, 839-849.

Loughran, T., & Ritter, J.R. 1997. *The operating performance of firms conducting seasoned equity offerings*. Journal of Finance, Vol. 52, 1823–1850.

Loughran, T. & Vijh, M. 1997. *Do long-term shareholder benefit from corporate acquisitions?* The journal of Finance. Vol. 52, 1765-1790.

MacKinlay, C. 1997. *Event Studies in Economics and Finance*. Journal of Economic Literature, Vol. 35, 13-39.

Mandelker, G. 1974. *Risk and return: The case of merging firms*. Journal of Financial

Economics, Vol. 1, 303-336.

Maquiera, C., Megginson, W., & Nail, L. 1998. *Wealth Creation versus Wealth Redistribution in Pure Stock-for-Stock Mergers*. Journal of Financial Economics, Vol. 48, 3-33.

Martynova, M., Oosting, S., & Renneboog, L. 2006. *The Long-term Operating Performance of European Mergers and Acquisitions*. Finance Working Paper, No. 137, 1-39.

Mitchell, M. & Mulherin, H. 1996. *The impact of industry shocks on takeover and restructuring activity*, Journal of Financial Economics, Vol. 41, 193 – 229.

Michelsen, M, & Klein, C. 2011*. The Relevance of External Credit Ratings in the Capital Structure Decision-Making Process*. University of Hohenheim. Working Paper.

Moeller, S., Schlingemann, F., & Stulz, R. 2003. *Firm size and the gains from acquisitions*. Journal of Financial Economics, Vol. 73, 201–228.

Morck, R., Shleifer, A., & Vishny, R.W. 1990. *Do managerial objectives drive bad acquisitions?* Journal of Finance, Vol. 45, 31–48.

Petmezas, D. 2008. *What drives Acquisitions? Market valuations and bidder performance*. Journal of Multinational Management, Vol. 19, 54-74.

Rau, R. & Vermaelen, T. 1998. *Glamour, Value and the post-acquisition performance of acquiring firms*. Journal of Financial Economics, Vol. 49, 223-253.

Ramaswamy, K., & Waegelein, J.F. 2003. *Firm financial performance following mergers*. Review of Quantitative Finance and Accounting, Vol. 20, 115–126

Roll, R. 1986. *The Hubris Hypothesis of Corporate Takeovers*, Journal of Business, Vol. 59, 197-216.

Santos, F. 2011. *Essays in Financial Economics*, USA, Stanford University.

Shiller, R. 2003. *Efficient Markets Theory to Behavioral Finance*. Journal of Economic Perspectives, Vol. 17, 83-104.

Smith, A. 1776. *Wealth of Nations*.

Trautwein, F. 1990. *Merger motives and merger prescriptions*. Strategic Management Journal, Vol. 11, 283 – 295.

Westerlund, J. 2005. *Introduktion till ekonometri*. 1st edition. Lund, Studentlitteratur AB.

Wilson, R. 1967. *Competitive Bidding with Asymmetric Information*. Management Science, Vol. 13, No. 11, 816-820.

**Internet references**:

Stockholm TT. 2014. *SSAB tar över Rautaruukki*. Svenska Dagbladet. 22nd January. <http://www.svd.se/naringsliv/branscher/industri-och-fordon/ssab-tar-over-rautaruukki_8917712.svd> (Retrieved 2015-05-16).

Kyllönen, Taina. 2014. *SSAB and Rautaruukki to combine through SSAB making a recommended share exchange offer to Rautaruukki's shareholders .* Globenewswire. 22nd January. <http://globenewswire.com/news-release/2014/01/22/603801/0/en/SSAB-and-Rautaruukki-to-combine-through-SSAB-making-a-recommended-share-exchange-offer-to-Rautaruukki-s-shareholders.html#sthash.YiHryulS.dpuf> (Retrieved 2015-05-16).

Hagel III, J., Brown, J., & Davision, L. 2010. *The best way to measure company performance.* Harvard Business Review. 4th March. <https://hbr.org/2010/03/the-best-way-to-measure-compan.html> (Retrieved 2015-05-16).

IFRS. *IFRS Application Around the World*, *Jurisdiction Profile: Sweden.* 2013.

<http://www.ifrs.org/Use-around-the-world/Documents/Jurisdiction-profiles/Sweden-IFRS-Profile.pdf> (Retrieved 2015-05-18)

U.S. Securities & Exchange Commision. 2013. *Tender Offer.* SEC. <http://www.sec.gov/answers/tender.htm> (Retrieved 2015-05-18).

# Appendices

## Appendix 1 - Tables

**A1.1 BHAR A**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Acquirer** | **Target** | **Matching firm** | **BHAR12** | **BHAR24** | **BHAR36** |
| SECURITAS AB | Bell Group PLC | NCC | -99.88% | -212.6% | -194.5% |
| TDC AS | Song Networks Holding AB | Millicom | 19% | -69% | -260% |
| ORKLA ASA | Chips Abp | Swedish Match | 13.47% | 12.07% | 84.84% |
| SCHIBSTED ASA | TV4 AB | Alma Meda | 6.40% | -15.05% | 68.09% |
| ORKLA ASA | Elkem ASA | Sca | 32.44% | 62.98% | 143.06% |
| FORTUM OYJ | E ON Finland Oyj | Etrion | -30% | -102% | -95% |
| ELEKTA PUBL AB | Impac Medical Systems Inc | Meda | -105.8% | -212.6% | -194.5% |
| TELIASONERA AB | Turkcell Iletisim Hizmetleri AS | Stora enso | 0.00% | 35.72% | 47.70% |
| HEXAGON AB | Leica Geosystems AG | Finnlines | 111.8% | 148.18% | 185.4% |
| TELE2 AB | Versatel Telecom International NV | Millicom | -105.8% | -284.0% | -194.5% |
| NORSK HYDRO ASA | Spinnaker Exploration Co | Outokompo | -42.1% | -26.8% | -3.9% |
| FORTUM OYJ | Fortum Wroclaw SA | Metso | -11.66% | -74.67% | 60.34% |
| DSV A/S | Koninklijke Frans Maas Groep NV | Alfa Laval | -12.08% | -73.10% | -59.60% |
| FABEGE AB | Tornet Fastighets AB | Latour | 3.47% | -5.38% | -53.71% |
| TELENOR GROUP | Glocalnet AB | Teliasonera | 39.2% | 59.4% | -6.0% |
| WARTSILA OYJ AB | Total Automation Ltd | Hexagon | 28.46% | 21.06% | 29.05% |
| MARINE HARVEST ASA | Fjord Seafood ASA | Kabe Husvagnar AB | -105.8% | 66.09% | 44.31% |
| FLSMIDTH & CO A/S | Potagua A/S | B&B tools AB | 13.84% | 111.25% | 41.08% |
| VOLVO AB | Nissan Diesel Motor Co Ltd | Sandvik | 26.89% | 12.84% | -0.93% |
| ASSA ABLOY AB | Fargo Electronics Inc | Yit | -6.64% | -7.05% | 20.73% |
| LUNDIN PETROLEUM AB | Valkyries Petroleum Corp | Norweigan Energy | -87.97% | -53.02% | 20.87% |
| NOKIA CORP | Loudeye Corp | Comptel | 9.80% | 21.17% | 25.41% |
| NOVOZYMES A/S | GroPep Ltd | Revenio Group | -55.7% | -61.1% | 24.5% |
| COMPONENTA OYJ | Doktas Docum Sanayi ve | G4S PLC | 38.64% | 34.58% | -25.56% |
| ATRIA | Sardus AB | Mekonomen | -32.35% | -20.17% | -77.88% |
| ERICSSON | TANDBERG Television ASA | Novotek | -25.27% | -5.96% | 3.66% |
| ALFA LAVAL AB | Alfa Laval(India)Ltd | Stolt Nielsen | 34.08% | 34.65% | 78.66% |
| SCHIBSTED ASA | Stavanger Aftenblad ASA | MTG | -26.23% | -18.74% | -19.43% |
| NEW WAVE GROUP AB | Cutter & Buck Inc | Bang & Olufsen | 18.53% | -2.06% | 23.49% |
| SSAB SVENSKT STAL AB | IPSCO Inc | Norske Skogindust | 65.18% | 23.56% | 54.93% |
| FORTUM OYJ | OAO Territorial Generating | Hafslund | 41.78% | 26.77% | 34.00% |
| NOKIA CORP | NAVTEQ Corp | HIQ international | 0.02% | -34.31% | -52.80% |
| STOCKMANN OYJ | Lindex AB | Finnair | 16.45% | 24.41% | 42.60% |
| HEXAGON AB | NovAtel Inc | Nibe | 33.96% | -12.80% | 23.23% |

**A1.2. ROA A**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Acquirer** | **Target** | **Matching firm** | **ROA12** | **ROA24** | **ROA36** |
| SECURITAS AB | Bell Group PLC | NCC | -17.6% | -3.6% | -2.2% |
| TDC AS | Song Networks Holding AB | Millicom | 13.7% | -7.9% | -2.0% |
| ORKLA ASA | Chips Abp | Swedish Match | -6.0% | -3.2% | 0.7% |
| SCHIBSTED ASA | TV4 AB | Alma Meda | 0.8% | 2.7% | -1.1% |
| ORKLA ASA | Elkem ASA | Sca | 0.0% | 0.2% | -1.8% |
| FORTUM OYJ | E ON Finland Oyj | Etrion | -1.0% | -12.9% | -11.5% |
| ELEKTA PUBL AB | Impac Medical Systems Inc | Meda | -0.4% | -1.1% | -5.1% |
| TELIASONERA AB | Turkcell Iletisim Hizmetleri AS | Stora enso | 0.7% | 1.7% | 0.2% |
| HEXAGON AB | Leica Geosystems AG | Finnlines | -3.8% | -4.5% | -3.3% |
| TELE2 AB | Versatel Telecom International NV | Millicom | -0.6% | -1.4% | -1.0% |
| NORSK HYDRO ASA | Spinnaker Exploration Co | Outokompo | -10.4% | 1.7% | -11.5% |
| FORTUM OYJ | Fortum Wroclaw SA | Metso | 1.5% | -4.6% | -2.0% |
| DSV A/S | Koninklijke Frans Maas Groep NV | Alfa Laval | -2.0% | -2.2% | -1.7% |
| FABEGE AB | Tornet Fastighets AB | Latour | -9.3% | 7.5% | 0.1% |
| TELENOR GROUP | Glocalnet AB | Teliasonera | -1.5% | -1.2% | 9.3% |
| WARTSILA OYJ AB | Total Automation Ltd | Hexagon | -0.7% | -0.8% | -2.6% |
| MARINE HARVEST ASA | Fjord Seafood ASA | Kabe Husvagnar AB | -1.0% | -1.3% | 7.3% |
| FLSMIDTH & CO A/S | Potagua A/S | B&B tools AB | 11.2% | 9.8% | 26.5% |
| VOLVO AB | Nissan Diesel Motor Co Ltd | Sandvik | -1.3% | -1.1% | -13.2% |
| ASSA ABLOY AB | Fargo Electronics Inc | Yit | 9.7% | 3.2% | 6.0% |
| LUNDIN PETROLEUM AB | Valkyries Petroleum Corp | Norweigan Energy | -2.4% | 4.2% | -9.2% |
| NOKIA CORP | Loudeye Corp | Comptel | -0.7% | -4.4% | -6.6% |
| NOVOZYMES A/S | GroPep Ltd | Revenio Group | -8.3% | -11.6% | -16.4% |
| COMPONENTA OYJ | Doktas Docum Sanayi ve | G4S PLC | 5.9% | 9.8% | 5.5% |
| ATRIA | Sardus AB | Mekonomen | -0.7% | -6.1% | 0.9% |
| ERICSSON | TANDBERG Television ASA | Novotek | 3.0% | -1.5% | 17.6% |
| ALFA LAVAL AB | Alfa Laval(India)Ltd | Stolt Nielsen | -1.8% | 4.5% | 4.6% |
| SCHIBSTED ASA | Stavanger Aftenblad ASA | MTG | -0.1% | -8.6% | -2.9% |
| NEW WAVE GROUP AB | Cutter & Buck Inc | Bang & Olufsen | 2.0% | -11.0% | 23.5% |
| SSAB SVENSKT STAL AB | IPSCO Inc | Norske Skogindust | -2.1% | 9.9% | -2.1% |
| FORTUM OYJ | OAO Territorial Generating | Hafslund | -2.0% | -0.2% | -3.2% |
| NOKIA CORP | NAVTEQ Corp | HIQ international | -1.1% | -12.7% | -4.8% |
| STOCKMANN OYJ | Lindex AB | Finnair | -9.4% | 7.7% | 23.6% |
| HEXAGON AB | NovAtel Inc | Nibe | 3.6% | -2.4% | -5.0% |

**A1.3. Explanatory Variables A**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Acquirer** | **Target** | **Matching firm** | **M/B t-1** | **domestic\_international** | **Log Size** | **relative deal size** | **industry\_relatedness** |
| SECURITAS AB | Bell Group PLC | NCC | 3.36 | 1 | 6.588037 | 4.42% | 1 |
| TDC AS | Song Networks Holding AB | Millicom | 1.11 | 1 | 6.78651 | 11.28% | 1 |
| ORKLA ASA | Chips Abp | Swedish Match | 1.91 | 1 | 6.625946 | 11.31% | 1 |
| SCHIBSTED ASA | TV4 AB | Alma Meda | 2.13 | 1 | 6.028269 | 6.28% | 1 |
| ORKLA ASA | Elkem ASA | Sca | 1.22 | 1 | 6.690539 | 17.64% | 0 |
| FORTUM OYJ | E ON Finland Oyj | Etrion | 0.94 | 0 | 7.072238 | 3.66% | 1 |
| ELEKTA PUBL AB | Impac Medical Systems Inc | Meda | 3.16 | 1 | 5.669543 | 41.95% | 0 |
| TELIASONERA AB | Turkcell Iletisim Hizmetleri AS | Stora enso | 1.44 | 1 | 7.311808 | 15.12% | 1 |
| HEXAGON AB | Leica Geosystems AG | Finnlines | 1.55 | 1 | 5.809705 | 173.28% | 1 |
| TELE2 AB | Versatel Telecom International NV | Millicom | 1.72 | 1 | 6.627731 | 23.82% | 1 |
| NORSK HYDRO ASA | Spinnaker Exploration Co | Outokompo | 1.27 | 1 | 7.154078 | 17.85% | 0 |
| FORTUM OYJ | Fortum Wroclaw SA | Metso | 0.94 | 1 | 7.072238 | 1.52% | 1 |
| DSV A/S | Koninklijke Frans Maas Groep NV | Alfa Laval | 1.75 | 1 | 5.990535 | 39.96% | 1 |
| FABEGE AB | Tornet Fastighets AB | Latour | 0.52 | 0 | 6.158941 | 27.12% | 1 |
| TELENOR GROUP | Glocalnet AB | Teliasonera | 2.12 | 1 | 7.134946 | 0.40% | 1 |
| WARTSILA OYJ AB | Total Automation Ltd | Hexagon | 1.26 | 1 | 6.371562 | 2.81% | 0 |
| MARINE HARVEST ASA | Fjord Seafood ASA | Kabe Husvagnar AB | 0.54 | 0 | 5.546029 | 52.33% | 1 |
| FLSMIDTH & CO A/S | Potagua A/S | B&B tools AB | 2.08 | 0 | 6.115925 | 67.77% | 1 |
| VOLVO AB | Nissan Diesel Motor Co Ltd | Sandvik | 1.51 | 1 | 7.226136 | 1.15% | 1 |
| ASSA ABLOY AB | Fargo Electronics Inc | Yit | 2.91 | 1 | 6.706099 | 5.90% | 1 |
| LUNDIN PETROLEUM AB | Valkyries Petroleum Corp | Norweigan Energy | 2.64 | 1 | 6.380254 | 28.08% | 1 |
| NOKIA CORP | Loudeye Corp | Comptel | 4.47 | 1 | 7.809312 | 0.16% | 1 |
| NOVOZYMES A/S | GroPep Ltd | Revenio Group | 5.6 | 1 | 6.472133 | 2.16% | 1 |
| COMPONENTA OYJ | Doktas Docum Sanayi ve | G4S PLC | 1.09 | 1 | 4.758086 | 195.49% | 0 |
| ATRIA | Sardus AB | Mekonomen | 0.86 | 1 | 5.625694 | 17.28% | 1 |
| ERICSSON | TANDBERG Television ASA | Novotek | 3.7 | 1 | 7.670017 | 2.34% | 1 |
| ALFA LAVAL AB | Alfa Laval(India)Ltd | Stolt Nielsen | 2.82 | 1 | 6.56534 | 2.01% | 1 |
| SCHIBSTED ASA | Stavanger Aftenblad ASA | MTG | 2.87 | 0 | 6.271183 | 3.16% | 1 |
| NEW WAVE GROUP AB | Cutter & Buck Inc | Bang & Olufsen | 4.05 | 1 | 5.737135 | 24.36% | 1 |
| SSAB SVENSKT STAL AB | IPSCO Inc | Norske Skogindust | 1.63 | 1 | 6.651838 | 183.05% | 1 |
| FORTUM OYJ | OAO Territorial Generating | Hafslund | 1.77 | 1 | 7.281765 | 1.78% | 1 |
| NOKIA CORP | NAVTEQ Corp | HIQ international | 5.75 | 1 | 7.788094 | 12.32% | 0 |
| STOCKMANN OYJ | Lindex AB | Finnair | 3.09 | 1 | 6.304616 | 62.58% | 1 |
| HEXAGON AB | NovAtel Inc | Nibe | 1.9 | 1 | 6.439975 | 13.73% | 0 |

**A1.4. BHAR B**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Acquirer** | **Target** | **Matching firm** | **BHAR12** | **BHAR24** | **BHAR36** |
| PETROLEUM GEO-SVCS | Arrow Seismic ASA | Tgs | 7.04% | -42.04% | -33.40% |
| DOF ASA | DeepOcean ASA | Fred Olsen Energy | -22.56% | -25.10% | -4.33% |
| TELE2 AB | Tele2 Netherlands Holding NV | Tieto | -15.56% | -31.81% | 5.35% |
| NOKIA CORP | TrollTech ASA | Ericson | -35.36% | -51.00% | -67.17% |
| FORTUM OYJ | Territorial Generation | Arendals Fossekomp | -43.14% | -21.06% | -6.40% |
| ILKKA-YHTYMA OYJ | Alma Media Oyj | Unibet | 15.14% | -31.14% | 38.84% |
| PSI GROUP ASA | CashGuard AB | Nordic Semiconductor | 32.33% | 3.28% | 6.85% |
| SEADRILL LTD | Scorpion Offshore Ltd | Prosafe | -2.81% | 37.39% | 64.30% |
| DOF ASA | DOF Subsea ASA | Ganger Rolf | -8.15% | 16.16% | 14.99% |
| GETINGE AB | Datascope Corp | Vitrolife | -3.41% | 0.53% | -15.91% |
| AUSTEVOLL SEAFOOD | Leroy Seafood Group ASA | G5 Entertainment | 45.69% | 9.70% | -6.26% |
| PEAB AB | Annehem Fastigheter AB | Kongsberg | -67.24% | 0.37% | 28.02% |
| ICA GRUPPEN AB | Hemtex AB | Parken Sport & Entertainment | 111.8% | 109.19% | 127.32% |
| FASTIGHETS AB BALDER | Din Bostad Sverige AB | JM Ab | -13.72% | 95.64% | 139.39% |
| ORKLA ASA | Renewable Energy Corp ASA | Swedish Match | -38.60% | -73.92% | -147.98% |
| ILKKA-YHTYMA OYJ | Alma Media Oyj | Axfood AB | 15.02% | -9.07% | -15.11% |
| ALMA MEDIA OYJ | Talentum Oyj | Axfood AB | 8.93% | 5.57% | -25.65% |
| TELIASONERA AB | Eesti Telekom AS | TDC AS | -5.73% | -26.39% | -13.82% |
| OUTOTEC OYJ | Larox Oyj | Rederi ab trans | 50.00% | 65.16% | 144.04% |
| METSO OYJ | Tamfelt Oyj Abp | Finnlines | 70.02% | 17.40% | 48.16% |
| RATOS AB | HL Display AB | Kinnevik | -8.50% | -32.79% | -61.81% |
| VOLVO AB | Deutz AG | G4S PLC | 36.40% | -10.57% | 23.90% |
| WILH. WILHELMSEN | Otix Global Inc | Torm a/s | 67.44% | 127.89% | 114.84% |
| ELECTROLUX AB | Olympic Group | SCA | -5.14% | -9.32% | -43.06% |
| ASSA ABLOY AB | ActivIdentity Inc | Koebenhavns | -16.33% | -7.41% | 0.50% |
| MEDIVIR AB | BioPhausia AB | Oasmia | -28.74% | -44.37% | -145.27% |
| STATOIL ASA | Brigham Exploration Co | Lundin Petrolium | -19.68% | -10.38% | 34.13% |
| SANDVIK AB | Seco Tools AB | METSO OYJ | -14.46% | -20.46% | -60.74% |
| LATOUR | Tomra Systems ASA | RINGKJ. LANDBOBANK | -25.53% | -36.42% | -11.94% |
| KLOVERN AB | Dagon AB | Sponda | -14.56% | -15.86% | 21.39% |

**A1.5. ROA B**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Acquirer** | **Target** | **Matching firm** | **ROA12** | **ROA24** | **ROA36** |
| PETROLEUM GEO-SVCS | Arrow Seismic ASA | Tgs | 4.0% | 22.4% | 6.8% |
| DOF ASA | DeepOcean ASA | Fred Olsen Energy | -3.5% | -6.0% | -17.1% |
| TELE2 AB | Tele2 Netherlands Holding NV | Tieto | -6.8% | -9.1% | 2.7% |
| NOKIA CORP | TrollTech ASA | Ericson | -7.1% | -4.8% | 1.4% |
| FORTUM OYJ | Territorial Generation | Arendals Fossekomp | 6.5% | 0.1% | -4.3% |
| ILKKA-YHTYMA OYJ | Alma Media Oyj | Unibet | -2.7% | -1.1% | -5.9% |
| PSI GROUP ASA | CashGuard AB | Nordic Semiconductor | -2.3% | 4.0% | 4.9% |
| SEADRILL LTD | Scorpion Offshore Ltd | Prosafe | 0.8% | 2.7% | -4.1% |
| DOF ASA | DOF Subsea ASA | Ganger Rolf | -11.6% | -3.5% | 1.7% |
| GETINGE AB | Datascope Corp | Vitrolife | -6.0% | 1.2% | 1.8% |
| AUSTEVOLL SEAFOOD | Leroy Seafood Group ASA | G5 Entertainment | 6.3% | -15.9% | -0.8% |
| PEAB AB | Annehem Fastigheter AB | Kongsberg | 8.1% | 0.0% | -5.9% |
| ICA GRUPPEN AB | Hemtex AB | Parken Sport & Entertainment | -18.5% | -6.2% | -7.0% |
| FASTIGHETS AB BALDER | Din Bostad Sverige AB | JM Ab | -5.9% | 4.5% | -2.2% |
| ORKLA ASA | Renewable Energy Corp ASA | Swedish Match | 0.4% | 0.9% | 1.1% |
| ILKKA-YHTYMA OYJ | Alma Media Oyj | Axfood AB | -5.0% | -4.0% | 4.6% |
| ALMA MEDIA OYJ | Talentum Oyj | Axfood AB | -4.2% | -0.9% | 2.2% |
| TELIASONERA AB | Eesti Telekom AS | TDC AS | -2.5% | -4.7% | -2.0% |
| OUTOTEC OYJ | Larox Oyj | Rederi ab trans | 3.9% | 5.6% | 15.5% |
| METSO OYJ | Tamfelt Oyj Abp | Finnlines | 30.5% | 10.1% | 11.8% |
| RATOS AB | HL Display AB | Kinnevik | -5.7% | -7.9% | -15.5% |
| VOLVO AB | Deutz AG | G4S PLC | 3.2% | 3.1% | -1.1% |
| WILH. WILHELMSEN | Otix Global Inc | Torm a/s | 3.1% | 7.9% | 11.4% |
| ELECTROLUX AB | Olympic Group | SCA | -2.3% | -1.5% | -1.0% |
| ASSA ABLOY AB | ActivIdentity Inc | Koebenhavns | -1.6% | -4.3% | -5.4% |
| MEDIVIR AB | BioPhausia AB | Oasmia | 4.7% | 2.9% | 13.6% |
| STATOIL ASA | Brigham Exploration Co | Lundin Petrolium | 10.0% | 14.2% | 5.5% |
| SANDVIK AB | Seco Tools AB | METSO OYJ | -4.8% | -0.7% | -4.0% |
| LATOUR | Tomra Systems ASA | RINGKJ. LANDBOBANK | 1.9% | -4.3% | -3.4% |
| KLOVERN AB | Dagon AB | Sponda | -0.6% | 0.2% | -0.1% |

**A1.6. Explanatory Variables B**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Acquirer** | **Target** | **Matching firm** | **M/B t-1** | **domestic\_international** | **Log Size** | **relative deal size** | **industry\_relatedness** |
| PETROLEUM GEO-SVCS | Arrow Seismic ASA | Tgs | 4.64 | 0 | 6.518716 | 11.42% | 1 |
| DOF ASA | DeepOcean ASA | Fred Olsen Energy | 1.14 | 0 | 5.847977 | 21.15% | 1 |
| TELE2 AB | Tele2 Netherlands Holding NV | Tieto | 1.27 | 1 | 6.675299 | 3.70% | 1 |
| NOKIA CORP | TrollTech ASA | Ericson | 4.29 | 1 | 8.008577 | 0.13% | 1 |
| FORTUM OYJ | Territorial Generation | Arendals Fossekomp | 2.29 | 1 | 7.43646 | 14.25% | 1 |
| ILKKA-YHTYMA OYJ | Alma Media Oyj | Unibet | 2.58 | 0 | 5.201736 | 50.90% | 1 |
| PSI GROUP ASA | CashGuard AB | Nordic Semiconductor | 2.63 | 1 | 4.720548 | 125.60% | 0 |
| SEADRILL LTD | Scorpion Offshore Ltd | Prosafe | 1.94 | 1 | 6.869271 | 1.72% | 1 |
| DOF ASA | DOF Subsea ASA | Ganger Rolf | 1.83 | 0 | 5.797646 | 42.39% | 1 |
| GETINGE AB | Datascope Corp | Vitrolife | 4.7 | 1 | 6.589011 | 15.79% | 1 |
| AUSTEVOLL SEAFOOD | Leroy Seafood Group ASA | G5 Entertainment | 1.79 | 0 | 5.947806 | 61.23% | 1 |
| PEAB AB | Annehem Fastigheter AB | Kongsberg | 1.85 | 0 | 5.804126 | 9.26% | 0 |
| ICA GRUPPEN AB | Hemtex AB | Parken Sport & Entertainment | 2.24 | 0 | 6.181211 | 3.56% | 1 |
| FASTIGHETS AB BALDER | Din Bostad Sverige AB | JM Ab | 0.7 | 0 | 4.857899 | 50.20% | 1 |
| ORKLA ASA | Renewable Energy Corp ASA | Swedish Match | 2.31 | 0 | 6.765125 | 1.98% | 0 |
| ILKKA-YHTYMA OYJ | Alma Media Oyj | Axfood AB | 6.89 | 0 | 5.024243 | 47.29% | 1 |
| ALMA MEDIA OYJ | Talentum Oyj | Axfood AB | 9.91 | 0 | 5.567419 | 21.39% | 1 |
| TELIASONERA AB | Eesti Telekom AS | TDC AS | 2.08 | 1 | 7.266848 | 3.87% | 1 |
| OUTOTEC OYJ | Larox Oyj | Rederi ab trans | 6.98 | 0 | 5.653924 | 21.96% | 1 |
| METSO OYJ | Tamfelt Oyj Abp | Finnlines | 3.66 | 0 | 6.081586 | 24.94% | 0 |
| RATOS AB | HL Display AB | Kinnevik | 1.81 | 0 | 6.42641 | 5.09% | 0 |
| VOLVO AB | Deutz AG | G4S PLC | 1.39 | 1 | 7.054359 | 1.44% | 1 |
| WILH. WILHELMSEN | Otix Global Inc | Torm a/s | 9.89 | 1 | 6.488106 | 2.02% | 0 |
| ELECTROLUX AB | Olympic Group | SCA | 1.1 | 1 | 6.636869 | 10.84% | 0 |
| ASSA ABLOY AB | ActivIdentity Inc | Koebenhavns | 1.69 | 0 | 6.661525 | 35.82% | 1 |
| MEDIVIR AB | BioPhausia AB | Oasmia | 6.35 | 0 | 5.591147 | 25.89% | 1 |
| STATOIL ASA | Brigham Exploration Co | Lundin Petrolium | 1.83 | 1 | 7.725948 | 8.99% | 1 |
| SANDVIK AB | Seco Tools AB | METSO OYJ | 2.01 | 0 | 7.181325 | 6.22% | 1 |
| LATOUR | Tomra Systems ASA | RINGKJ. LANDBOBANK | 0.77 | 1 | 6.202322 | 9.60% | 0 |
| KLOVERN AB | Dagon AB | Sponda | 0.55 | 0 | 5.727305 | 145.58% | 1 |

**A2.1.**  **Normality tests on BHAR observations**

**BHAR 12**



**BHAR 24**



**BHAR 36**



**A2.2. Normality tests on ROA observations**

**ROA 12**



**ROA 24**



**ROA 36**

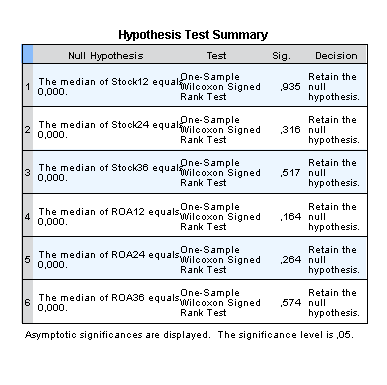


**A2.3. T-tests**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **One-Sample Statistics** | | | | |
|  | N | Mean | Std. Deviation | Std. Error Mean |
| BHAR12 | 64 | -1,9381% | 45,38367% | 5,67296% |
| BHAR24 | 64 | -9,4699% | 70,91430% | 8,86429% |
| BHAR36 | 64 | -0,4605% | 83,53025% | 10,44128% |
| ROA12 | 64 | -0,624% | 7,1538% | 0,8942% |
| ROA24 | 64 | -0,575% | 6,7360% | 0,8420% |
| ROA36 | 64 | 0,342% | 8,8224% | 1,1028% |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **One-Sample Test** | | | | | | |
|  | Test Value = 0 | | | | | |
| t | df | Sig. (2-tailed) | Mean Difference | 95% Confidence Interval | |
| Lower | Upper |
| BHAR12 | -,342 | 63 | ,734 | -1,93811% | -13,2746% | 9,3984% |
| BHAR24 | -1,068 | 63 | ,289 | -9,46992% | -27,1838% | 8,2439% |
| BHAR36 | -,044 | 63 | ,965 | -0,46046% | -21,3257% | 20,4048% |
| ROA12 | -,697 | 63 | ,488 | -0,6237% | -2,411% | 1,163% |
| ROA24 | -,683 | 63 | ,497 | -0,5750% | -2,258% | 1,108% |
| ROA36 | ,310 | 63 | ,758 | 0,3417% | -1,862% | 2,546% |

**A2.4. Wilcoxon’s signed rank test**



**A2.5. Multiple Linear Regresssions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: S12 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 18:59 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | 0.049480 | 0.136179 | 0.363345 | 0.7177 |
| INDUSTRY\_RELATEDNESS | -0.025711 | 0.141501 | -0.181701 | 0.8565 |
| LOG\_SIZE | -0.031903 | 0.095931 | -0.332564 | 0.7407 |
| M\_B\_T\_1 | 0.029785 | 0.029936 | 0.994955 | 0.3239 |
| RELATIVE\_DEAL\_SIZE | 0.033961 | 0.059208 | 0.573589 | 0.5685 |
| C | 0.080706 | 0.605793 | 0.133223 | 0.8945 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.027164 | Mean dependent var | | -0.019381 |
| Adjusted R-squared | -0.056702 | S.D. dependent var | | 0.453837 |
| S.E. of regression | 0.466526 | Akaike info criterion | | 1.402054 |
| Sum squared resid | 12.62349 | Schwarz criterion | | 1.604449 |
| Log likelihood | -38.86572 | Hannan-Quinn criter. | | 1.481787 |
| F-statistic | 0.323895 | Durbin-Watson stat | | 2.209546 |
| Prob(F-statistic) | 0.896605 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: S24 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 18:59 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | -0.125345 | 0.206324 | -0.607513 | 0.5459 |
| INDUSTRY\_RELATEDNESS | -0.012776 | 0.214387 | -0.059595 | 0.9527 |
| LOG\_SIZE | 0.016993 | 0.145345 | 0.116914 | 0.9073 |
| M\_B\_T\_1 | 0.036775 | 0.045356 | 0.810801 | 0.4208 |
| RELATIVE\_DEAL\_SIZE | 0.168691 | 0.089705 | 1.880500 | 0.0651 |
| C | -0.281264 | 0.917834 | -0.306443 | 0.7604 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.085358 | Mean dependent var | | -0.094699 |
| Adjusted R-squared | 0.006509 | S.D. dependent var | | 0.709143 |
| S.E. of regression | 0.706831 | Akaike info criterion | | 2.233011 |
| Sum squared resid | 28.97741 | Schwarz criterion | | 2.435406 |
| Log likelihood | -65.45634 | Hannan-Quinn criter. | | 2.312744 |
| F-statistic | 1.082552 | Durbin-Watson stat | | 1.848412 |
| Prob(F-statistic) | 0.379641 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: S36 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:00 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | 0.127463 | 0.243909 | 0.522584 | 0.6033 |
| INDUSTRY\_RELATEDNESS | 0.120842 | 0.253440 | 0.476806 | 0.6353 |
| LOG\_SIZE | -0.027664 | 0.171821 | -0.161004 | 0.8726 |
| M\_B\_T\_1 | 0.029408 | 0.053618 | 0.548471 | 0.5855 |
| RELATIVE\_DEAL\_SIZE | 0.199130 | 0.106046 | 1.877761 | 0.0654 |
| C | -0.161979 | 1.085030 | -0.149285 | 0.8818 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.078731 | Mean dependent var | | -0.004605 |
| Adjusted R-squared | -0.000689 | S.D. dependent var | | 0.835303 |
| S.E. of regression | 0.835590 | Akaike info criterion | | 2.567703 |
| Sum squared resid | 40.49623 | Schwarz criterion | | 2.770098 |
| Log likelihood | -76.16649 | Hannan-Quinn criter. | | 2.647437 |
| F-statistic | 0.991328 | Durbin-Watson stat | | 1.783742 |
| Prob(F-statistic) | 0.431057 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Accounting**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: A12 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:00 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | -0.013435 | 0.021170 | -0.634633 | 0.5282 |
| INDUSTRY\_RELATEDNESS | -0.036880 | 0.021997 | -1.676599 | 0.0990 |
| LOG\_SIZE | 0.004925 | 0.014913 | 0.330240 | 0.7424 |
| M\_B\_T\_1 | 0.000408 | 0.004654 | 0.087693 | 0.9304 |
| RELATIVE\_DEAL\_SIZE | -0.003423 | 0.009204 | -0.371873 | 0.7113 |
| C | -0.000662 | 0.094173 | -0.007033 | 0.9944 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.053842 | Mean dependent var | | -0.006237 |
| Adjusted R-squared | -0.027724 | S.D. dependent var | | 0.071538 |
| S.E. of regression | 0.072523 | Akaike info criterion | | -2.320761 |
| Sum squared resid | 0.305058 | Schwarz criterion | | -2.118365 |
| Log likelihood | 80.26434 | Hannan-Quinn criter. | | -2.241027 |
| F-statistic | 0.660104 | Durbin-Watson stat | | 2.292228 |
| Prob(F-statistic) | 0.655090 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: A24 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:01 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | 0.003231 | 0.019959 | 0.161899 | 0.8719 |
| INDUSTRY\_RELATEDNESS | -0.011580 | 0.020738 | -0.558381 | 0.5787 |
| LOG\_SIZE | -0.000772 | 0.014060 | -0.054893 | 0.9564 |
| M\_B\_T\_1 | 0.004134 | 0.004387 | 0.942345 | 0.3499 |
| RELATIVE\_DEAL\_SIZE | 0.011852 | 0.008678 | 1.365838 | 0.1773 |
| C | -0.009859 | 0.088785 | -0.111039 | 0.9120 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.051420 | Mean dependent var | | -0.005750 |
| Adjusted R-squared | -0.030354 | S.D. dependent var | | 0.067360 |
| S.E. of regression | 0.068374 | Akaike info criterion | | -2.438576 |
| Sum squared resid | 0.271154 | Schwarz criterion | | -2.236181 |
| Log likelihood | 84.03444 | Hannan-Quinn criter. | | -2.358842 |
| F-statistic | 0.628811 | Durbin-Watson stat | | 2.272373 |
| Prob(F-statistic) | 0.678434 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: A36 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:01 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | 0.021103 | 0.024774 | 0.851839 | 0.3978 |
| INDUSTRY\_RELATEDNESS | 0.031493 | 0.025742 | 1.223390 | 0.2261 |
| LOG\_SIZE | -0.025974 | 0.017452 | -1.488298 | 0.1421 |
| M\_B\_T\_1 | 0.013360 | 0.005446 | 2.453137 | 0.0172 |
| RELATIVE\_DEAL\_SIZE | -0.000576 | 0.010771 | -0.053441 | 0.9576 |
| C | 0.097574 | 0.110207 | 0.885370 | 0.3796 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.148008 | Mean dependent var | | 0.003417 |
| Adjusted R-squared | 0.074560 | S.D. dependent var | | 0.088224 |
| S.E. of regression | 0.084871 | Akaike info criterion | | -2.006297 |
| Sum squared resid | 0.417784 | Schwarz criterion | | -1.803902 |
| Log likelihood | 70.20151 | Hannan-Quinn criter. | | -1.926563 |
| F-statistic | 2.015152 | Durbin-Watson stat | | 2.155442 |
| Prob(F-statistic) | 0.089867 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

A3.1 Tests assumption 1

**Stock 12 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ramsey RESET Test | | |  |  |
| Equation: UNTITLED | | |  |  |
| Specification: S12 DOMESTIC\_INTERNATIONAL INDUSTRY\_RELATEDN | | | | |
| ESS LOG\_SIZE M\_B\_T\_1 RELATIVE\_DEAL\_SIZE C | | | | |
| Omitted Variables: Squares of fitted values | | | |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  | Value | df | Probability |  |
| t-statistic | 0.104685 | 57 | 0.9170 |  |
| F-statistic | 0.010959 | (1, 57) | 0.9170 |  |
| Likelihood ratio | 0.012304 | 1 | 0.9117 |  |
|  |  |  |  |  |
|  |  |  |  |  |
| F-test summary: | | |  |  |
|  | Sum of Sq. | df | Mean Squares |  |
| Test SSR | 0.002427 | 1 | 0.002427 |  |
| Restricted SSR | 12.62349 | 58 | 0.217646 |  |
| Unrestricted SSR | 12.62107 | 57 | 0.221422 |  |
|  |  |  |  |  |
|  |  |  |  |  |
| LR test summary: | | |  |  |
|  | Value | df |  |  |
| Restricted LogL | -38.86572 | 58 |  |  |
| Unrestricted LogL | -38.85957 | 57 |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Unrestricted Test Equation: | | |  |  |
| Dependent Variable: S12 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:04 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | 0.053149 | 0.141757 | 0.374933 | 0.7091 |
| INDUSTRY\_RELATEDNESS | -0.024128 | 0.143521 | -0.168114 | 0.8671 |
| LOG\_SIZE | -0.033663 | 0.098210 | -0.342771 | 0.7330 |
| M\_B\_T\_1 | 0.027894 | 0.035184 | 0.792805 | 0.4312 |
| RELATIVE\_DEAL\_SIZE | 0.029345 | 0.074233 | 0.395307 | 0.6941 |
| C | 0.089818 | 0.617194 | 0.145527 | 0.8848 |
| FITTED^2 | 0.942284 | 9.001126 | 0.104685 | 0.9170 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.027351 | Mean dependent var | | -0.019381 |
| Adjusted R-squared | -0.075034 | S.D. dependent var | | 0.453837 |
| S.E. of regression | 0.470555 | Akaike info criterion | | 1.433111 |
| Sum squared resid | 12.62107 | Schwarz criterion | | 1.669239 |
| Log likelihood | -38.85957 | Hannan-Quinn criter. | | 1.526134 |
| F-statistic | 0.267137 | Durbin-Watson stat | | 2.209931 |
| Prob(F-statistic) | 0.949998 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Stock 24 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ramsey RESET Test | | |  |  |
| Equation: UNTITLED | | |  |  |
| Specification: S24 DOMESTIC\_INTERNATIONAL INDUSTRY\_RELATEDN | | | | |
| ESS LOG\_SIZE M\_B\_T\_1 RELATIVE\_DEAL\_SIZE C | | | | |
| Omitted Variables: Squares of fitted values | | | |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  | Value | df | Probability |  |
| t-statistic | 1.225994 | 57 | 0.2252 |  |
| F-statistic | 1.503061 | (1, 57) | 0.2252 |  |
| Likelihood ratio | 1.665779 | 1 | 0.1968 |  |
|  |  |  |  |  |
|  |  |  |  |  |
| F-test summary: | | |  |  |
|  | Sum of Sq. | df | Mean Squares |  |
| Test SSR | 0.744488 | 1 | 0.744488 |  |
| Restricted SSR | 28.97741 | 58 | 0.499611 |  |
| Unrestricted SSR | 28.23292 | 57 | 0.495314 |  |
|  |  |  |  |  |
|  |  |  |  |  |
| LR test summary: | | |  |  |
|  | Value | df |  |  |
| Restricted LogL | -65.45634 | 58 |  |  |
| Unrestricted LogL | -64.62345 | 57 |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Unrestricted Test Equation: | | |  |  |
| Dependent Variable: S24 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:10 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | -0.138680 | 0.205723 | -0.674112 | 0.5030 |
| INDUSTRY\_RELATEDNESS | -0.011328 | 0.213466 | -0.053068 | 0.9579 |
| LOG\_SIZE | 0.097024 | 0.158760 | 0.611138 | 0.5435 |
| M\_B\_T\_1 | 0.040545 | 0.045265 | 0.895722 | 0.3742 |
| RELATIVE\_DEAL\_SIZE | 0.408766 | 0.215229 | 1.899212 | 0.0626 |
| C | -0.828639 | 1.017111 | -0.814699 | 0.4186 |
| FITTED^2 | -1.355342 | 1.105505 | -1.225994 | 0.2252 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.108857 | Mean dependent var | | -0.094699 |
| Adjusted R-squared | 0.015052 | S.D. dependent var | | 0.709143 |
| S.E. of regression | 0.703786 | Akaike info criterion | | 2.238233 |
| Sum squared resid | 28.23292 | Schwarz criterion | | 2.474361 |
| Log likelihood | -64.62345 | Hannan-Quinn criter. | | 2.331255 |
| F-statistic | 1.160462 | Durbin-Watson stat | | 1.783971 |
| Prob(F-statistic) | 0.340229 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Stock 36 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ramsey RESET Test | | |  |  |
| Equation: UNTITLED | | |  |  |
| Specification: S36 DOMESTIC\_INTERNATIONAL INDUSTRY\_RELATEDN | | | | |
| ESS LOG\_SIZE M\_B\_T\_1 RELATIVE\_DEAL\_SIZE C | | | | |
| Omitted Variables: Squares of fitted values | | | |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  | Value | df | Probability |  |
| t-statistic | 0.529534 | 57 | 0.5985 |  |
| F-statistic | 0.280406 | (1, 57) | 0.5985 |  |
| Likelihood ratio | 0.314070 | 1 | 0.5752 |  |
|  |  |  |  |  |
|  |  |  |  |  |
| F-test summary: | | |  |  |
|  | Sum of Sq. | df | Mean Squares |  |
| Test SSR | 0.198242 | 1 | 0.198242 |  |
| Restricted SSR | 40.49623 | 58 | 0.698211 |  |
| Unrestricted SSR | 40.29799 | 57 | 0.706982 |  |
|  |  |  |  |  |
|  |  |  |  |  |
| LR test summary: | | |  |  |
|  | Value | df |  |  |
| Restricted LogL | -76.16649 | 58 |  |  |
| Unrestricted LogL | -76.00945 | 57 |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Unrestricted Test Equation: | | |  |  |
| Dependent Variable: S36 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:12 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | 0.091196 | 0.254813 | 0.357892 | 0.7217 |
| INDUSTRY\_RELATEDNESS | 0.102765 | 0.257302 | 0.399395 | 0.6911 |
| LOG\_SIZE | 0.024900 | 0.199367 | 0.124898 | 0.9010 |
| M\_B\_T\_1 | 0.033592 | 0.054529 | 0.616029 | 0.5403 |
| RELATIVE\_DEAL\_SIZE | 0.363961 | 0.329059 | 1.106066 | 0.2733 |
| C | -0.510279 | 1.274642 | -0.400331 | 0.6904 |
| FITTED^2 | -0.593619 | 1.121022 | -0.529534 | 0.5985 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.083241 | Mean dependent var | | -0.004605 |
| Adjusted R-squared | -0.013260 | S.D. dependent var | | 0.835303 |
| S.E. of regression | 0.840822 | Akaike info criterion | | 2.594045 |
| Sum squared resid | 40.29799 | Schwarz criterion | | 2.830173 |
| Log likelihood | -76.00945 | Hannan-Quinn criter. | | 2.687068 |
| F-statistic | 0.862592 | Durbin-Watson stat | | 1.773386 |
| Prob(F-statistic) | 0.527947 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Accounting 12 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ramsey RESET Test | | |  |  |
| Equation: UNTITLED | | |  |  |
| Specification: A12 DOMESTIC\_INTERNATIONAL INDUSTRY\_RELATEDN | | | | |
| ESS LOG\_SIZE M\_B\_T\_1 RELATIVE\_DEAL\_SIZE C | | | | |
| Omitted Variables: Squares of fitted values | | | |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  | Value | df | Probability |  |
| t-statistic | 0.504091 | 57 | 0.6161 |  |
| F-statistic | 0.254108 | (1, 57) | 0.6161 |  |
| Likelihood ratio | 0.284680 | 1 | 0.5937 |  |
|  |  |  |  |  |
|  |  |  |  |  |
| F-test summary: | | |  |  |
|  | Sum of Sq. | df | Mean Squares |  |
| Test SSR | 0.001354 | 1 | 0.001354 |  |
| Restricted SSR | 0.305058 | 58 | 0.005260 |  |
| Unrestricted SSR | 0.303704 | 57 | 0.005328 |  |
|  |  |  |  |  |
|  |  |  |  |  |
| LR test summary: | | |  |  |
|  | Value | df |  |  |
| Restricted LogL | 80.26434 | 58 |  |  |
| Unrestricted LogL | 80.40668 | 57 |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Unrestricted Test Equation: | | |  |  |
| Dependent Variable: A12 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:15 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | -0.013474 | 0.021307 | -0.632376 | 0.5297 |
| INDUSTRY\_RELATEDNESS | -0.031361 | 0.024699 | -1.269747 | 0.2093 |
| LOG\_SIZE | 0.003078 | 0.015450 | 0.199227 | 0.8428 |
| M\_B\_T\_1 | 0.000367 | 0.004685 | 0.078255 | 0.9379 |
| RELATIVE\_DEAL\_SIZE | -0.007342 | 0.012094 | -0.607063 | 0.5462 |
| C | 0.002344 | 0.094972 | 0.024684 | 0.9804 |
| FITTED^2 | 20.63370 | 40.93247 | 0.504091 | 0.6161 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.058041 | Mean dependent var | | -0.006237 |
| Adjusted R-squared | -0.041113 | S.D. dependent var | | 0.071538 |
| S.E. of regression | 0.072994 | Akaike info criterion | | -2.293959 |
| Sum squared resid | 0.303704 | Schwarz criterion | | -2.057831 |
| Log likelihood | 80.40668 | Hannan-Quinn criter. | | -2.200936 |
| F-statistic | 0.585364 | Durbin-Watson stat | | 2.296587 |
| Prob(F-statistic) | 0.740525 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Accounting 24 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ramsey RESET Test | | |  |  |
| Equation: UNTITLED | | |  |  |
| Specification: A24 DOMESTIC\_INTERNATIONAL INDUSTRY\_RELATEDN | | | | |
| ESS LOG\_SIZE M\_B\_T\_1 RELATIVE\_DEAL\_SIZE C | | | | |
| Omitted Variables: Squares of fitted values | | | |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  | Value | df | Probability |  |
| t-statistic | 1.339249 | 57 | 0.1858 |  |
| F-statistic | 1.793588 | (1, 57) | 0.1858 |  |
| Likelihood ratio | 1.982818 | 1 | 0.1591 |  |
|  |  |  |  |  |
|  |  |  |  |  |
| F-test summary: | | |  |  |
|  | Sum of Sq. | df | Mean Squares |  |
| Test SSR | 0.008272 | 1 | 0.008272 |  |
| Restricted SSR | 0.271154 | 58 | 0.004675 |  |
| Unrestricted SSR | 0.262882 | 57 | 0.004612 |  |
|  |  |  |  |  |
|  |  |  |  |  |
| LR test summary: | | |  |  |
|  | Value | df |  |  |
| Restricted LogL | 84.03444 | 58 |  |  |
| Unrestricted LogL | 85.02585 | 57 |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Unrestricted Test Equation: | | |  |  |
| Dependent Variable: A24 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:17 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | -0.001984 | 0.020202 | -0.098205 | 0.9221 |
| INDUSTRY\_RELATEDNESS | -0.010612 | 0.020611 | -0.514863 | 0.6086 |
| LOG\_SIZE | 0.007812 | 0.015365 | 0.508398 | 0.6131 |
| M\_B\_T\_1 | 0.005040 | 0.004410 | 1.142819 | 0.2579 |
| RELATIVE\_DEAL\_SIZE | 0.036721 | 0.020472 | 1.793724 | 0.1082 |
| C | -0.065852 | 0.097594 | -0.674759 | 0.5026 |
| FITTED^2 | -35.43080 | 26.45572 | -1.339249 | 0.1858 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.080358 | Mean dependent var | | -0.005750 |
| Adjusted R-squared | -0.016446 | S.D. dependent var | | 0.067360 |
| S.E. of regression | 0.067911 | Akaike info criterion | | -2.438308 |
| Sum squared resid | 0.262882 | Schwarz criterion | | -2.202180 |
| Log likelihood | 85.02585 | Hannan-Quinn criter. | | -2.345285 |
| F-statistic | 0.830111 | Durbin-Watson stat | | 2.197057 |
| Prob(F-statistic) | 0.551604 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Accounting 36 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ramsey RESET Test | | |  |  |
| Equation: UNTITLED | | |  |  |
| Specification: A36 DOMESTIC\_INTERNATIONAL INDUSTRY\_RELATEDN | | | | |
| ESS LOG\_SIZE M\_B\_T\_1 RELATIVE\_DEAL\_SIZE C | | | | |
| Omitted Variables: Squares of fitted values | | | |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  | Value | df | Probability |  |
| t-statistic | 1.306325 | 57 | 0.1967 |  |
| F-statistic | 1.706484 | (1, 57) | 0.1967 |  |
| Likelihood ratio | 1.887930 | 1 | 0.1694 |  |
|  |  |  |  |  |
|  |  |  |  |  |
| F-test summary: | | |  |  |
|  | Sum of Sq. | df | Mean Squares |  |
| Test SSR | 0.012144 | 1 | 0.012144 |  |
| Restricted SSR | 0.417784 | 58 | 0.007203 |  |
| Unrestricted SSR | 0.405640 | 57 | 0.007116 |  |
|  |  |  |  |  |
|  |  |  |  |  |
| LR test summary: | | |  |  |
|  | Value | df |  |  |
| Restricted LogL | 70.20151 | 58 |  |  |
| Unrestricted LogL | 71.14547 | 57 |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Unrestricted Test Equation: | | |  |  |
| Dependent Variable: A36 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:19 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | 0.015970 | 0.024936 | 0.640425 | 0.5245 |
| INDUSTRY\_RELATEDNESS | 0.028738 | 0.025674 | 1.119358 | 0.2677 |
| LOG\_SIZE | -0.032351 | 0.018021 | -1.795238 | 0.0779 |
| M\_B\_T\_1 | 0.021781 | 0.008418 | 2.587527 | 0.0122 |
| RELATIVE\_DEAL\_SIZE | -0.001942 | 0.010757 | -0.180537 | 0.8574 |
| C | 0.134085 | 0.113052 | 1.186056 | 0.2405 |
| FITTED^2 | -10.29926 | 7.884151 | -1.306325 | 0.1967 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.172774 | Mean dependent var | | 0.003417 |
| Adjusted R-squared | 0.085697 | S.D. dependent var | | 0.088224 |
| S.E. of regression | 0.084359 | Akaike info criterion | | -2.004546 |
| Sum squared resid | 0.405640 | Schwarz criterion | | -1.768418 |
| Log likelihood | 71.14547 | Hannan-Quinn criter. | | -1.911523 |
| F-statistic | 1.984162 | Durbin-Watson stat | | 2.125083 |
| Prob(F-statistic) | 0.082951 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

A3.2 Tests assumption 3

**Stock 12 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Heteroskedasticity Test: Breusch-Pagan-Godfrey | | | | |
|  |  |  |  |  |
|  |  |  |  |  |
| F-statistic | 0.467427 | Prob. F(5,58) | | 0.7989 |
| Obs\*R-squared | 2.479015 | Prob. Chi-Square(5) | | 0.7797 |
| Scaled explained SS | 2.936531 | Prob. Chi-Square(5) | | 0.7098 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Test Equation: | |  |  |  |
| Dependent Variable: RESID^2 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:05 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| C | 0.814436 | 0.448013 | 1.817885 | 0.0742 |
| DOMESTIC\_INTERNATIONAL | 0.080071 | 0.100711 | 0.795060 | 0.4298 |
| INDUSTRY\_RELATEDNESS | 0.017654 | 0.104646 | 0.168706 | 0.8666 |
| LOG\_SIZE | -0.101557 | 0.070946 | -1.431472 | 0.1577 |
| M\_B\_T\_1 | -0.009202 | 0.022139 | -0.415649 | 0.6792 |
| RELATIVE\_DEAL\_SIZE | -0.013453 | 0.043787 | -0.307242 | 0.7598 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.038735 | Mean dependent var | | 0.197242 |
| Adjusted R-squared | -0.044133 | S.D. dependent var | | 0.337648 |
| S.E. of regression | 0.345018 | Akaike info criterion | | 0.798620 |
| Sum squared resid | 6.904176 | Schwarz criterion | | 1.001016 |
| Log likelihood | -19.55585 | Hannan-Quinn criter. | | 0.878354 |
| F-statistic | 0.467427 | Durbin-Watson stat | | 1.698665 |
| Prob(F-statistic) | 0.798932 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Stock 24 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Heteroskedasticity Test: Breusch-Pagan-Godfrey | | | | |
|  |  |  |  |  |
|  |  |  |  |  |
| F-statistic | 0.369498 | Prob. F(5,58) | | 0.8675 |
| Obs\*R-squared | 1.975676 | Prob. Chi-Square(5) | | 0.8525 |
| Scaled explained SS | 4.884855 | Prob. Chi-Square(5) | | 0.4301 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Test Equation: | |  |  |  |
| Dependent Variable: RESID^2 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:10 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| C | 1.319742 | 1.491866 | 0.884625 | 0.3800 |
| DOMESTIC\_INTERNATIONAL | 0.437029 | 0.335364 | 1.303149 | 0.1977 |
| INDUSTRY\_RELATEDNESS | 0.064495 | 0.348469 | 0.185081 | 0.8538 |
| LOG\_SIZE | -0.189059 | 0.236247 | -0.800263 | 0.4268 |
| M\_B\_T\_1 | 0.013191 | 0.073723 | 0.178927 | 0.8586 |
| RELATIVE\_DEAL\_SIZE | -0.040968 | 0.145809 | -0.280971 | 0.7797 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.030870 | Mean dependent var | | 0.452772 |
| Adjusted R-squared | -0.052676 | S.D. dependent var | | 1.119784 |
| S.E. of regression | 1.148898 | Akaike info criterion | | 3.204544 |
| Sum squared resid | 76.55810 | Schwarz criterion | | 3.406939 |
| Log likelihood | -96.54541 | Hannan-Quinn criter. | | 3.284278 |
| F-statistic | 0.369498 | Durbin-Watson stat | | 1.555868 |
| Prob(F-statistic) | 0.867475 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Stock 36 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Heteroskedasticity Test: Breusch-Pagan-Godfrey | | | | |
|  |  |  |  |  |
|  |  |  |  |  |
| F-statistic | 0.387471 | Prob. F(5,58) | | 0.8554 |
| Obs\*R-squared | 2.068670 | Prob. Chi-Square(5) | | 0.8396 |
| Scaled explained SS | 3.031681 | Prob. Chi-Square(5) | | 0.6951 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Test Equation: | |  |  |  |
| Dependent Variable: RESID^2 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:13 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| C | 1.936633 | 1.603936 | 1.207425 | 0.2322 |
| DOMESTIC\_INTERNATIONAL | 0.407970 | 0.360556 | 1.131501 | 0.2625 |
| INDUSTRY\_RELATEDNESS | 0.019123 | 0.374646 | 0.051042 | 0.9595 |
| LOG\_SIZE | -0.244350 | 0.253994 | -0.962031 | 0.3400 |
| M\_B\_T\_1 | 0.012917 | 0.079261 | 0.162972 | 0.8711 |
| RELATIVE\_DEAL\_SIZE | -0.107459 | 0.156762 | -0.685490 | 0.4958 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.032323 | Mean dependent var | | 0.632754 |
| Adjusted R-squared | -0.051097 | S.D. dependent var | | 1.204807 |
| S.E. of regression | 1.235205 | Akaike info criterion | | 3.349410 |
| Sum squared resid | 88.49235 | Schwarz criterion | | 3.551805 |
| Log likelihood | -101.1811 | Hannan-Quinn criter. | | 3.429144 |
| F-statistic | 0.387471 | Durbin-Watson stat | | 1.268955 |
| Prob(F-statistic) | 0.855422 |  |  |  |

**Accounting 12 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Heteroskedasticity Test: Breusch-Pagan-Godfrey | | | | |
|  |  |  |  |  |
|  |  |  |  |  |
| F-statistic | 0.919000 | Prob. F(5,58) | | 0.4753 |
| Obs\*R-squared | 4.698140 | Prob. Chi-Square(5) | | 0.4538 |
| Scaled explained SS | 10.26923 | Prob. Chi-Square(5) | | 0.0680 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Test Equation: | |  |  |  |
| Dependent Variable: RESID^2 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:15 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| C | 0.003836 | 0.014439 | 0.265640 | 0.7915 |
| DOMESTIC\_INTERNATIONAL | -0.005744 | 0.003246 | -1.769690 | 0.0820 |
| INDUSTRY\_RELATEDNESS | -0.004386 | 0.003373 | -1.300362 | 0.1986 |
| LOG\_SIZE | 0.001320 | 0.002287 | 0.577302 | 0.5660 |
| M\_B\_T\_1 | -7.82E-05 | 0.000714 | -0.109664 | 0.9131 |
| RELATIVE\_DEAL\_SIZE | -0.000720 | 0.001411 | -0.510243 | 0.6118 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.073408 | Mean dependent var | | 0.004767 |
| Adjusted R-squared | -0.006470 | S.D. dependent var | | 0.011084 |
| S.E. of regression | 0.011120 | Akaike info criterion | | -6.071128 |
| Sum squared resid | 0.007172 | Schwarz criterion | | -5.868732 |
| Log likelihood | 200.2761 | Hannan-Quinn criter. | | -5.991394 |
| F-statistic | 0.919000 | Durbin-Watson stat | | 1.924643 |
| Prob(F-statistic) | 0.475271 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Accounting 24 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Heteroskedasticity Test: Breusch-Pagan-Godfrey | | | | |
|  |  |  |  |  |
|  |  |  |  |  |
| F-statistic | 0.979149 | Prob. F(5,58) | | 0.4383 |
| Obs\*R-squared | 4.981700 | Prob. Chi-Square(5) | | 0.4181 |
| Scaled explained SS | 7.486388 | Prob. Chi-Square(5) | | 0.1869 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Test Equation: | |  |  |  |
| Dependent Variable: RESID^2 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:18 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| C | -0.009546 | 0.010616 | -0.899178 | 0.3723 |
| DOMESTIC\_INTERNATIONAL | -0.003967 | 0.002387 | -1.662184 | 0.1019 |
| INDUSTRY\_RELATEDNESS | 0.000501 | 0.002480 | 0.202130 | 0.8405 |
| LOG\_SIZE | 0.002232 | 0.001681 | 1.327605 | 0.1895 |
| M\_B\_T\_1 | 0.000561 | 0.000525 | 1.070256 | 0.2889 |
| RELATIVE\_DEAL\_SIZE | 0.000306 | 0.001038 | 0.294724 | 0.7693 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.077839 | Mean dependent var | | 0.004237 |
| Adjusted R-squared | -0.001658 | S.D. dependent var | | 0.008169 |
| S.E. of regression | 0.008176 | Akaike info criterion | | -6.686222 |
| Sum squared resid | 0.003877 | Schwarz criterion | | -6.483827 |
| Log likelihood | 219.9591 | Hannan-Quinn criter. | | -6.606489 |
| F-statistic | 0.979149 | Durbin-Watson stat | | 2.202852 |
| Prob(F-statistic) | 0.438291 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Accounting 36 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Heteroskedasticity Test: Breusch-Pagan-Godfrey | | | | |
|  |  |  |  |  |
|  |  |  |  |  |
| F-statistic | 0.591819 | Prob. F(5,58) | | 0.7062 |
| Obs\*R-squared | 3.106706 | Prob. Chi-Square(5) | | 0.6835 |
| Scaled explained SS | 4.993797 | Prob. Chi-Square(5) | | 0.4166 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Test Equation: | |  |  |  |
| Dependent Variable: RESID^2 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:20 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| C | 0.008975 | 0.017184 | 0.522277 | 0.6035 |
| DOMESTIC\_INTERNATIONAL | -0.001124 | 0.003863 | -0.290876 | 0.7722 |
| INDUSTRY\_RELATEDNESS | 0.004469 | 0.004014 | 1.113377 | 0.2701 |
| LOG\_SIZE | -0.001098 | 0.002721 | -0.403606 | 0.6880 |
| M\_B\_T\_1 | 0.000832 | 0.000849 | 0.979724 | 0.3313 |
| RELATIVE\_DEAL\_SIZE | -0.000695 | 0.001679 | -0.413567 | 0.6807 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.048542 | Mean dependent var | | 0.006528 |
| Adjusted R-squared | -0.033480 | S.D. dependent var | | 0.013017 |
| S.E. of regression | 0.013234 | Akaike info criterion | | -5.723070 |
| Sum squared resid | 0.010157 | Schwarz criterion | | -5.520675 |
| Log likelihood | 189.1383 | Hannan-Quinn criter. | | -5.643337 |
| F-statistic | 0.591819 | Durbin-Watson stat | | 1.976830 |
| Prob(F-statistic) | 0.706202 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

A3.3 Tests assumption 4

**Stock 12 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Breusch-Godfrey Serial Correlation LM Test: | | | |  |
|  |  |  |  |  |
|  |  |  |  |  |
| F-statistic | 1.898352 | Prob. F(2,56) | | 0.1593 |
| Obs\*R-squared | 4.063587 | Prob. Chi-Square(2) | | 0.1311 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Test Equation: | |  |  |  |
| Dependent Variable: RESID | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:05 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
| Presample missing value lagged residuals set to zero. | | | | |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | -0.073140 | 0.140767 | -0.519581 | 0.6054 |
| INDUSTRY\_RELATEDNESS | -0.124724 | 0.154675 | -0.806364 | 0.4234 |
| LOG\_SIZE | 0.035425 | 0.097000 | 0.365201 | 0.7163 |
| M\_B\_T\_1 | -0.001443 | 0.029671 | -0.048633 | 0.9614 |
| RELATIVE\_DEAL\_SIZE | 0.006577 | 0.060691 | 0.108372 | 0.9141 |
| C | -0.082721 | 0.599149 | -0.138064 | 0.8907 |
| RESID(-1) | -0.196513 | 0.138375 | -1.420146 | 0.1611 |
| RESID(-2) | -0.233721 | 0.150480 | -1.553168 | 0.1260 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.063494 | Mean dependent var | | 5.12E-17 |
| Adjusted R-squared | -0.053570 | S.D. dependent var | | 0.447630 |
| S.E. of regression | 0.459464 | Akaike info criterion | | 1.398955 |
| Sum squared resid | 11.82198 | Schwarz criterion | | 1.668815 |
| Log likelihood | -36.76656 | Hannan-Quinn criter. | | 1.505266 |
| F-statistic | 0.542386 | Durbin-Watson stat | | 1.902737 |
| Prob(F-statistic) | 0.798627 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Stock 24 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Breusch-Godfrey Serial Correlation LM Test: | | | |  |
|  |  |  |  |  |
|  |  |  |  |  |
| F-statistic | 1.130926 | Prob. F(2,56) | | 0.3300 |
| Obs\*R-squared | 2.484619 | Prob. Chi-Square(2) | | 0.2887 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Test Equation: | |  |  |  |
| Dependent Variable: RESID | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:10 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
| Presample missing value lagged residuals set to zero. | | | | |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | -0.062984 | 0.212020 | -0.297066 | 0.7675 |
| INDUSTRY\_RELATEDNESS | -0.097787 | 0.223573 | -0.437385 | 0.6635 |
| LOG\_SIZE | 0.025877 | 0.146123 | 0.177089 | 0.8601 |
| M\_B\_T\_1 | -0.001441 | 0.045267 | -0.031822 | 0.9747 |
| RELATIVE\_DEAL\_SIZE | 0.001146 | 0.090791 | 0.012628 | 0.9900 |
| C | -0.046563 | 0.916568 | -0.050802 | 0.9597 |
| RESID(-1) | 0.009470 | 0.135029 | 0.070135 | 0.9443 |
| RESID(-2) | -0.208325 | 0.138685 | -1.502146 | 0.1387 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.038822 | Mean dependent var | | -2.04E-17 |
| Adjusted R-squared | -0.081325 | S.D. dependent var | | 0.678203 |
| S.E. of regression | 0.705241 | Akaike info criterion | | 2.255915 |
| Sum squared resid | 27.85244 | Schwarz criterion | | 2.525775 |
| Log likelihood | -64.18927 | Hannan-Quinn criter. | | 2.362226 |
| F-statistic | 0.323122 | Durbin-Watson stat | | 1.803712 |
| Prob(F-statistic) | 0.940388 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Stock 36 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Breusch-Godfrey Serial Correlation LM Test: | | | |  |
|  |  |  |  |  |
|  |  |  |  |  |
| F-statistic | 4.550129 | Prob. F(2,56) | | 0.1204 |
| Obs\*R-squared | 8.982659 | Prob. Chi-Square(2) | | 0.1196 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Test Equation: | |  |  |  |
| Dependent Variable: RESID | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:13 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
| Presample missing value lagged residuals set to zero. | | | | |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | -0.110695 | 0.238239 | -0.464639 | 0.6440 |
| INDUSTRY\_RELATEDNESS | -0.248738 | 0.255828 | -0.972287 | 0.3351 |
| LOG\_SIZE | 0.086229 | 0.164160 | 0.525271 | 0.6015 |
| M\_B\_T\_1 | -0.016713 | 0.050746 | -0.329348 | 0.7431 |
| RELATIVE\_DEAL\_SIZE | 0.017704 | 0.102056 | 0.173471 | 0.8629 |
| C | -0.256511 | 1.024811 | -0.250301 | 0.8033 |
| RESID(-1) | 0.066835 | 0.131077 | 0.509887 | 0.6121 |
| RESID(-2) | -0.405986 | 0.133641 | -3.037879 | 0.0036 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.145042 | Mean dependent var | | 6.29E-17 |
| Adjusted R-squared | 0.038172 | S.D. dependent var | | 0.801746 |
| S.E. of regression | 0.786295 | Akaike info criterion | | 2.473500 |
| Sum squared resid | 34.62259 | Schwarz criterion | | 2.743361 |
| Log likelihood | -71.15201 | Hannan-Quinn criter. | | 2.579812 |
| F-statistic | 1.357180 | Durbin-Watson stat | | 1.961059 |
| Prob(F-statistic) | 0.241583 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Accounting 12 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Breusch-Godfrey Serial Correlation LM Test: | | | |  |
|  |  |  |  |  |
|  |  |  |  |  |
| F-statistic | 1.287519 | Prob. F(2,56) | | 0.2840 |
| Obs\*R-squared | 2.813526 | Prob. Chi-Square(2) | | 0.2449 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Test Equation: | |  |  |  |
| Dependent Variable: RESID | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:16 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
| Presample missing value lagged residuals set to zero. | | | | |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | -0.006833 | 0.021694 | -0.314956 | 0.7540 |
| INDUSTRY\_RELATEDNESS | -0.004773 | 0.022263 | -0.214400 | 0.8310 |
| LOG\_SIZE | -8.57E-06 | 0.014876 | -0.000576 | 0.9995 |
| M\_B\_T\_1 | -0.000732 | 0.004682 | -0.156242 | 0.8764 |
| RELATIVE\_DEAL\_SIZE | -0.004967 | 0.009706 | -0.511768 | 0.6108 |
| C | 0.012058 | 0.094512 | 0.127585 | 0.8989 |
| RESID(-1) | -0.232024 | 0.144763 | -1.602784 | 0.1146 |
| RESID(-2) | -0.041472 | 0.136772 | -0.303220 | 0.7628 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.043961 | Mean dependent var | | 1.82E-18 |
| Adjusted R-squared | -0.075543 | S.D. dependent var | | 0.069586 |
| S.E. of regression | 0.072166 | Akaike info criterion | | -2.303218 |
| Sum squared resid | 0.291647 | Schwarz criterion | | -2.033357 |
| Log likelihood | 81.70296 | Hannan-Quinn criter. | | -2.196906 |
| F-statistic | 0.367863 | Durbin-Watson stat | | 1.915941 |
| Prob(F-statistic) | 0.917145 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Accounting 24 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Breusch-Godfrey Serial Correlation LM Test: | | | |  |
|  |  |  |  |  |
|  |  |  |  |  |
| F-statistic | 1.647093 | Prob. F(2,56) | | 0.2018 |
| Obs\*R-squared | 3.555625 | Prob. Chi-Square(2) | | 0.1690 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Test Equation: | |  |  |  |
| Dependent Variable: RESID | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:18 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
| Presample missing value lagged residuals set to zero. | | | | |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | -0.006135 | 0.020333 | -0.301734 | 0.7640 |
| INDUSTRY\_RELATEDNESS | -0.002434 | 0.020556 | -0.118407 | 0.9062 |
| LOG\_SIZE | 0.004132 | 0.014117 | 0.292667 | 0.7709 |
| M\_B\_T\_1 | -0.000891 | 0.004393 | -0.202702 | 0.8401 |
| RELATIVE\_DEAL\_SIZE | -0.001958 | 0.008706 | -0.224860 | 0.8229 |
| C | -0.017508 | 0.088358 | -0.198147 | 0.8436 |
| RESID(-1) | -0.186196 | 0.139593 | -1.333855 | 0.1877 |
| RESID(-2) | -0.188588 | 0.132464 | -1.423688 | 0.1601 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.055557 | Mean dependent var | | -1.57E-18 |
| Adjusted R-squared | -0.062499 | S.D. dependent var | | 0.065605 |
| S.E. of regression | 0.067624 | Akaike info criterion | | -2.433236 |
| Sum squared resid | 0.256089 | Schwarz criterion | | -2.163375 |
| Log likelihood | 85.86354 | Hannan-Quinn criter. | | -2.326924 |
| F-statistic | 0.470598 | Durbin-Watson stat | | 1.989871 |
| Prob(F-statistic) | 0.851736 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Accounting 36 months**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Breusch-Godfrey Serial Correlation LM Test: | | | |  |
|  |  |  |  |  |
|  |  |  |  |  |
| F-statistic | 0.401548 | Prob. F(2,56) | | 0.6712 |
| Obs\*R-squared | 0.904847 | Prob. Chi-Square(2) | | 0.6361 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Test Equation: | |  |  |  |
| Dependent Variable: RESID | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/13/15 Time: 19:21 | | |  |  |
| Sample: 1 64 | |  |  |  |
| Included observations: 64 | | |  |  |
| Presample missing value lagged residuals set to zero. | | | | |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| DOMESTIC\_INTERNATIONAL | 0.001830 | 0.026410 | 0.069280 | 0.9450 |
| INDUSTRY\_RELATEDNESS | -0.001935 | 0.026106 | -0.074111 | 0.9412 |
| LOG\_SIZE | 0.000186 | 0.018094 | 0.010304 | 0.9918 |
| M\_B\_T\_1 | 0.000134 | 0.005554 | 0.024071 | 0.9809 |
| RELATIVE\_DEAL\_SIZE | 0.000277 | 0.010983 | 0.025240 | 0.9800 |
| C | -0.001356 | 0.112792 | -0.012020 | 0.9905 |
| RESID(-1) | -0.072310 | 0.138860 | -0.520738 | 0.6046 |
| RESID(-2) | 0.090097 | 0.140702 | 0.640341 | 0.5246 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.014138 | Mean dependent var | | -5.04E-18 |
| Adjusted R-squared | -0.109094 | S.D. dependent var | | 0.081434 |
| S.E. of regression | 0.085761 | Akaike info criterion | | -1.958036 |
| Sum squared resid | 0.411877 | Schwarz criterion | | -1.688176 |
| Log likelihood | 70.65716 | Hannan-Quinn criter. | | -1.851725 |
| F-statistic | 0.114728 | Durbin-Watson stat | | 1.972338 |
| Prob(F-statistic) | 0.997098 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

A3.4. Test assumption 5

**Test for multicollinearity**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | DOMESTIC\_INTERNATIONAL | INDUSTRY\_RELATEDNESS | LOG\_SIZE | M\_B\_T\_1 | RELATIVE\_DEAL\_SIZE |
| DOMESTIC\_INTERNATIONAL | 1.000000 | -0.106903 | 0.418745 | -0.084796 | -0.172124 |
| INDUSTRY\_RELATEDNESS | -0.106903 | 1.000000 | 0.113628 | -0.002021 | 0.044496 |
| LOG\_SIZE | 0.418745 | 0.113628 | 1.000000 | -0.055225 | -0.435623 |
| M\_B\_T\_1 | -0.084796 | -0.002021 | -0.055225 | 1.000000 | -0.174276 |
| RELATIVE\_DEAL\_SIZE | -0.172124 | 0.044496 | -0.435623 | -0.174276 | 1.000000 |

A3.5 Tests assumption 6

**Stock 12 months**



**Stock 24 months**



**Stock 36 months**



**Accounting Measure 12 months**



**Accounting Measure 24 months**



**Accounting Measure 36 months**



## Appendix 2 - Article

**Skepsis mot förvärv och fusioner fortfarande befogat**

**I en studie gjord på Lunds Universitet av Anton Hansson och Theodor Östlund kan det återigen bekräftas att förvärv och fusioner inte skapar värde för aktieägarna. Dessutom påvisas att aktiekursen inte alltid utvecklas på samma sätt som den underliggande verksamheten vilket kan ifrågasätta användandet av aktiekursen som ensidigt mått på förvärv och fusioners prestation.**

Studien, som ägde rum under 2015 undersökte företagsförvärv och fusioner på den Svenska, Danska, Norska och Finska marknaden mellan 2004 och 2012. Flera olika aspekter undersöktes. Till att börja med testades aktiekursens och den underliggande verksamhetens långsiktiga prestation efter ett förvärv. Det visade sig, som flera tidigare studier redan påvisat, att ingen onormal avkastning kunde skönjas i något av måtten. Studien testade även om dessa mått utvecklades på samma sätt och om det fanns underliggande variabler som påverkade de olika måtten.

**Tvetydiga resultat**

Resultaten huruvida de olika måtten påverkade varandra var tvetydiga. Överlag kom författarna fram till att en positiv aktiekursutveckling inte behövde betyda att den underliggande verksamhetens prestation varit positiv. Detta kan leda till svårigheter att bedöma hur bra ett förvärv presterat.

-Vi ser tendenser till ett ensidigt fokus på aktiepriset i tidigare studier. Genom att belysa ett annat prestationsmått hoppas vi skapa en mer nyanserad bild av hur en transaktion bör utvärderas. Det kan ju exempelvis vara så att företaget går väldigt bra, realiserar synergieffekter och bryter sig in på nya marknader, samtidigt som aktiekursutvecklingen inte vittnar om samma framgång, resonerar Anton och Theodor när jag träffar dem i Ekonomicentrums ljusgård i Lund.

Av de underliggande variablerna som undersöktes visade det sig sig att den relativa storleken på en transaktion, påverkade aktiekursutvecklingen men inte den underliggande verksamheten. Anledningen till detta tros vara att aktieägarnas förväntningar på framtida prestation ökar om den relativa storleken på en transaktion är stor. Däremot fanns inget stöd för att storleken på uppköparen eller om förvärvet var gränsöverskidande påverkade vare sig den underliggande verksamheten eller aktiekursutvecklingen.

-En hel del av resultaten kan bero på den informationsasymmetri som finns mellan aktörer i en transaktion. Till exempel tror vi att den ökade globaliseringen har bidragit till att informationsasymmetrin mellan de två företagen i ett gränsöverskridande förvärv har minskat, förklarar Anton.

**Dunkla motiv till förvärv**

Kortsiktighet och självintresse är två faktorer som alla företag bör sträva efter att motverka. Ändå uppdagas tecken på dessa gång på gång bland beslutsfattare, nu senast i Industrivärdensfären. Hansson & Östlunds studie bidrar till debatten kring dessa faktorer genom att, baserat på deras resultat hävda att indikationer på handlingar av självintresse kan påvisas bland beslutsfattare i samband med företagsförvärv.

-Vi hoppas att personer i beslutsfattande positioner tar till sig av våra implikationer och agerar utifrån vad som är bäst för företaget och inte dem personligen i framtiden. Säger Theodor hoppfullt.

Avslutningsvis hoppas författarna att forskningen inte avstannar här utan att man fortsätter att undersöka företagsförvärv och dess implikationer.

**Carl Sandahl**

**Dagens Industri – 2015.05.18**

## Appendix 3 - List of Abbreviations

BHAR – Buy and Hold Abnormal Returns

CFO – Cash flow from operating activities

EMH – Efficient Market Hypothesis

M&A – Mergers and Acquisitions

ROE – Return on Equity

ROA – Adjusted Return on Assets (Cash Flow from operations / market value of assets)

EBITDA – Earnings before interest, taxes, depreciation and amortization

OLS – Ordinary Least Squares

1. *Tender Offer -* The Securities and exchange commission (SEC) explain a tender offer as an extensive bid from a company or third party to purchase a substantial percentage of a company´s registered equity shares for a limited period of time. The offer is usually only valid for a specific time period and the price offered for the shares are generally at a premium. [↑](#footnote-ref-1)
2. Ordinary least squares is a regression method that is used to test the relationship of two or more variables, Multiple linear regression is an example of this (Brooks, 2008). [↑](#footnote-ref-2)