LUT School of Business and Management

Bachelor's Thesis

Financial Management

Shareholder wealth-effects on corporate acquisitions: Evidence from pharmaceutical industry

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ABSTRACT

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The goal of this bachelor's thesis is to study wealth-effects of acquirer's shareholders on corporate acquisitions in the pharmaceutical industry. Second goal is to study whether abnormal returns differ between domestic deals and cross-border deals or not. The study focuses on acquisitions made by US listed companies and deals made between 2009 and 2016. An event study is conducted based on data of 88 deals to give answers to these questions.

Results suggest that the usual outcome in the announcement day is a small but positive abnormal return. Also cumulative average abnormal return in the whole 21 period around the event day is positive. The biggest cumulative abnormal return is found on period of event day and the following five days [0,5]. When abnormal returns between domestic deals and cross-border deals are compared we see that domestic deals are more likely to have a positive impact on shareholders wealth. Domestic deals have positive mean and median, when cross-border deals have positive median but negative mean. However, the fact that these results are not statistically significant has to be taken into consideration.

As a conclusion, corporate acquisitions tend to have a small positive impact on shareholders wealth and domestic deals are more likely to create wealth to shareholders.

TIIVISTELMÄ

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Tämän kandidaatintutkielman tavoitteena on tutkia yrityskauppojen vaikutuksia ostavien yritysten pörssikursseihin ja siten osakkeenomistajien vaurauteen sekä vertailla tuloksia maansisäisten sekä rajat ylittävien yrityskauppojen välillä. Tutkimus toteutetaan tapahtumatutkimuksena, jonka avulla saadaan selville onko yhtiöiden pörssikursseissa nähty ylituottoja. Aineisto koostuu 88 yrityskaupasta, jotka Yhdysvaltalaiset pörssilistatut lääkealan yritykset ovat tehneet vuosina 2009-2016.

Tutkimuksen tulokset osoittavat, että yrityskaupoissa ostajan pörssikurssissa nähdään keskimäärin pientä ylituottoa. Kun tapahtumajaksona on 21 päivää yrityskaupan julkistamisen ympärillä, nähdään tuloksista myös se, että tuon jakson aikana kumulatiiviset keskimääräiset ylituotot ovat positiivisia. Suurimmat kumulatiiviset ylituotot saadaan aikavälillä [0,5], eli yrityskaupan julkistamispäivän ja seuraavan viiden kaupankäyntipäivän aikana. Kun taas vertaillaan tuloksia kahden ryhmän välillä, nähdään, että maansisäisissä kaupoissa saadaan todennäköisemmin ylituottoja kuin rajat ylittävissä kaupoissa. Maansisäisten kauppojen tapauksessa sekä ylituottojen mediaani, että keskiarvo ovat positiivisia, kun taas rajat ylittävien kauppojen tapauksessa keskiarvo on negatiivinen. On kuitenkin otettava huomioon, että nämä tulokset eivät ole tilastollisesti merkitseviä.

Lopputuloksena voidaan todeta, että yrityskaupoilla on pieni positiivinen vaikutus osakkeenomistajien vaurauteen sekä maansisäiset kaupat tuottavat osakkeenomistajille todennäköisemmin enemmän ja positiivista ylituottoa.

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INTRODUCTION

After financial crisis, economic conditions have been different than ever before. Low interest rates and slow economic growth have driven companies to seek growth by mergers and acquisitions (M&A). Since financial crisis, total annual deal value has grown from $1.76 Trillion to last year's $3.37 Trillions. Total M&A deal value in 2018 was on track to beat the last high of $4.1 trillion after first half of this year. (Nabila, Ruth et al. 2018)

In the past M&A activity has been cyclical and usually one upcycle has lasted for 9 to 10 years (Deloitte 2018). Taken that, we are coming closer to the end of this M&A cycle and it is good time to start studying this cycle.

Often when M&A rumors or news hit the market, companies related to them have big moves in stock market. Especially in companies that are targets of acquisitions, we can see big gains in markets. That is also a conclusion of many studies that have studied reactions to M&As. More mixed results have been found when studying reactions in acquiror's stock prices. Even when prior research has shown that it is very difficult to do a successful acquisition, they are very common.

This thesis deals with corporate acquisitions and market reactions linked to them. Personally I find both M&As and financial markets very interesting and I think that combining both subjects in this thesis in form of an event study will deepen my knowledge in both areas. The event study is conducted on acquirers stock price movements around the announcement day of the acquisition.

1.1. Background

The subject of M&A has been interest of researchers for a long time. Wealth-effects have been studied in both short and long term. A usual finding in M&A research has been that target company's shareholders gain wealth when acquisition is announced. But in case of acquiring companies' results have been controversial and there is no

clear consensus of what happens when the news hit the market. Also, it has been found that post-financial crisis M&As have created more value than earlier M&A (Alexandridis 2017). Combining these findings of prior research, it is interesting to study acquirer's side of reactions on acquisitions that are made after financial crisis. As there is no clear consensus for acquiring firms, this study aims to contribute to that area providing evidence from the pharmaceutical industry.

The subject of M&A is generally important amongst corporate management and corporate finance professionals. Growth of a company is one of the main reasons behind shareholder value creation and often growth is carried out via external growth strategy (Vinogradova 2018). There are many things to pay attention to before engaging in M&A and for corporate managers it is important to acknowledge those pros and cons in M&A. Not only corporate managers benefit from understanding the subject and outcomes of this thesis. Investments professionals, such as asset managers and traders are a big group of people who could use findings in this area in their decision making. For example, traders could try to use these findings when searching for profitable trading strategy. In addition to those, researchers and students can benefit from these findings in their studies, work and research.

1.2. Research questions and goals of the study

The aim of this thesis is to provide evidence of whether corporate acquisitions create value to acquirer's shareholders in pharmaceutical industry in the short term or not. In addition to wealth effects, this thesis as an event study is also a study of efficient markets and targets to give some insight into market efficiency in such events. Some deal characteristics and their possible impacts on returns are also studied in the process. Derived from earlier research, main research question is as follows:

Do corporate acquisitions create value to shareholders in pharmaceutical industry?

And sub-question is:

Do abnormal returns differ between domestic deals and cross-border deals?

1.3. Focus of the study

The thesis is focusing on acquisitions made after financial crisis in the pharmaceutical industry. At the same time, focus is only on acquiring side of the deal. Only listed acquirers are involved in the study. That is mainly because of good availability of public stock and deal data. Geographically the study is limited to US markets that is the largest and most developed market in this industry.

Pharmaceutical industry is chosen because it is global and has been active in M&A. The industry has gone through many years of consolidation and one study shows that so called “big pharma” has changed from 32 companies in 1990 to only 12 companies in 2013 (Fernald, Pennings et al. 2017). Even though this study is not limited to “big pharma” companies it gives insight into consolidation in this industry. Although, in 2018 there have been fewer big deals in US, one of the biggest markets, than one could have thought (Grant 2018).

That raises the question if corporate managers think that they cannot create value through M&A. One finding of prior research has been that high market valuations can drive M&A volume (Shleifer, Vishny 2003). And as the case has been lately, market valuations in many developed markets have been high and it also makes the phenomena of M&A relevant.

Pharmaceutical industry in United States is also relevant industry because there has been pressure to lower their drug prices. President Donald Trump is readying a proposition according to which some drug prices would be tied to international average (Tirrel 2018). This could drive pharmaceutical industry to seek for new products and big profits through M&As.

1.4. Structure of the thesis

This thesis starts with theoretical introduction to mergers and acquisitions. After introduction to M&A, motives are discussed. After theory we move on to discuss prior literature and findings linked to the subject. Finally, in the empirical part of the study,

data, research method and results are shown and discussed. In the last part, conclusions from the study are drawn.

2. MERGERS AND ACQUISITIONS

M&A is a complex and interdisciplinary subject and understanding it needs some knowledge on definitions, theories and financial markets. This section aims to give a needed background on these subjects to reader to be able to understand the thesis without deeper knowledge.

It is easy to get confused with terms merger and acquisition, as they are often used together and even mixed with each other. Another term that can be seen used to refer to mergers and acquisitions is takeover. Merger is a situation where two companies are merged together and where target company is merged to acquirer and goes out of existence. Consolidation is a merger where two firms merge into a completely new company. An acquisition is a situation where company purchases another company's stock or assets and target company is left existing. Usually in mergers, companies are relatively close to each other in terms of size, but in acquisitions, relatively bigger company acquires a less powerful one. The buying company is referred as acquirer or bidder and the company that is acquired is often referred as a target company. (Gaughan 2011, 12-13, Ross, Westerfield et al. 2008, 813, Corelli 2016, 435)

2.1. Types of mergers and acquisitions

Mergers and acquisitions are usually categorized depending on companies' industries and home countries. Relating to acquirers and targets industry, mergers and acquisitions can be categorized in to three different types. The first of them where both companies operate in the same industry is called horizontal M&A. Then, if targets industry is either a buyer or seller to an acquirer, merger or acquisition is called vertical. The last type of M&A is conglomerate M&A where acquirer buys a company from different industry. (Berk, DeMarzo 2014, 933)

Mergers and acquisitions are categorized into two groups by their geographical types. Merger or acquisition is domestic, when company buys another company from same country. Then, M&A where company buys another company from other country is called cross-border M&A. Cross-border M&A can be seen as a corporate strategy that allows a company to enter new markets relatively quickly (Rani, Yadav et al. 2016, 4).

To acquire a company the acquiror needs to make an offer for the target and its shareholders. An offer can be opposed by the target's management and board. In this situation takeover is called a hostile takeover. Hostile takeover can also be such situation, where target's management is not informed of the offer when it is made. In general, in hostile takeovers offer is directed to shareholders and its goal can be to change the management of a company to achieve its full potential. (Corelli 2016, 441)

Tender offer is an offer made to target company's shareholders to purchase stock at some pre-specified price (Vernimmen 2014, 431). According to a study about management turnover in acquired companies, a tender offer is likely made with a goal of replacing the management to unlock the potential in target company. There is evidence that management turnover significantly increases in target firms after corporate takeovers regardless of whether they are considered as friendly or hostile takeovers. (Martin 1991)

2.1.1. Medium of payment

Acquisitions are usually paid either in cash or shares or a combination of them. In share payment, target's shareholders receive stock of the acquiring or combined company as the payment. In cash payment, existing shareholders receive cash payment for target's shares. There are also other possibilities and some payments can include debt instruments, options, deferred payments and so on. However, the usual payment consists of cash, stock or a combination of those. (Berk, DeMarzo 2014, 933)

The choice of payment can result from manager's private information about the company's situation. Historically, market valuations have affected the type of payment as high market valuations have increased the number of share deals. According to theory of stock market driven acquisitions, rational managers acknowledge when their

company is overvalued in the irrational stock market and take advantage of it, acquiring relatively less overvalued companies in share paid deals. This leads to negative post-acquisition abnormal returns in long term because it depresses acquirer's valuation, but it is still better than doing nothing. Overvalued stock as a medium of payment cushions the collapse of the acquirer's shares in the long run as it enhances the claim on capital of the acquirer's shareholders. (Majluf, Myers 1984, Shleifer, Vishny 2003, Vernimmen 2014, 797, 809)

According to Shleifer and Vishny (2003) a few implications can be drawn. When bidder offers cash for payment, bidder is undervalued and thus, should earn positive gains at least in the short period. If shares are offered, bidder is overvalued, and its share price should drop.

2.2. Reasons and motives

In public markets acquirer usually needs to pay premium over target company's market price and therefore needs to see value in the acquisition that overlaps the paid premium (Gaughan 2011, 142). In this chapter we look for usual reasons that drive companies to acquire other companies. The most usual reason seems to be synergies but depending on author, several reasons are found for M&As.

Older economic research has identified two broad reasons that are synergies and control of the target's managers (Martin 1991). Since then, findings have been complemented by many possible reasons for M&As, such as efficiency reasons, market discipline, managements selfish over-expanding or diversification (Andrade, Mitchell et al. 2001). Calipha, Tarba and Brock (2010) have listed three reasons for M&A found from prior research. On their list, the first of three is synergy and the other two are managerial self-interest and hubris. In addition to those, also pure growth can be seen as one major motive for M&A (Gaughan 2011, 125).

Also, how reasons are classified, depends on authors. Vernimmen et al. (2014, 799-801) classifies reasons for M&A as macroeconomic, microeconomic, and human factors. Macroeconomic factors include changes in market scope, increasing competition, legislative changes and increasing importance of financial markets. Then,

economies of scale, geographic and product complements, are listed among others as microeconomic factors. Finally, human factors include reasons to sell a company. Personal wealth-maximization or recent lack of success under a controlling shareholder to be mentioned a few. (Vernimmen 2014, 799-801)

2.2.1. Synergies

Earlier mentioned efficiency reasons are generally known as synergies. Synergies usually either result in reducing costs or enhancing revenues. First of these is often easier to achieve as they easily follow from layoffs of overlapping employees and resources. One possibility of synergies that can result in growing revenues is an acquisition that allows a company to expand to new markets. (Berk, DeMarzo 2014, 934-935)

Synergies can result in gaining economies of scale or economics of scope. A large company can gain economies of scale as its volumes are high and it has more power in negotiating deals with producers, for example. A bigger company usually results in economies of scale that leads to reduced costs and is a major reason for companies to engage in M&As. Economies of scope can be achieved when operations between different but related products are combined. For example, economies of scope can drive company to acquire another company that has a product which could be more efficiently distributed via acquirer’s distribution channels. (Berk, DeMarzo 2014, 935)

Synergies can be achieved also with vertical integration. As the definition says, vertical integration drives vertical acquisitions where company acquires another company that operates in the same industry but on different stage of the production cycle. For example, company can see that it benefits from taking control over its distribution channels or producers. Vertical integration leads to increased control and coordination. Therefore, management can make sure that both companies work towards a common goal. (Berk, DeMarzo 2014, 935)

Expertise is also one reason that creates synergies. Company can decide to acquire another company if it has strong expertise in some area that the bidder wants to expand to. This is one main reason for acquisitions in many high technology industries.

Pharmaceutical industry can also be seen as one, and good examples in this industry is acquiring a company that has a promising drug in development or superior expertise in its R&D. In the pharmaceutical industry M&As can create large knowledge synergies that result in an increase in the company's research productivity. (Ornaghi 2009, Berk, DeMarzo 2014, 935-936)

In addition to types of synergies discussed above, many other categories can be found from literature. According to Trautwein (1990) different types of synergies can be operational, managerial or financial. Operational synergies come from combining operations of acquired company to acquirer's operations or transferring knowledge between companies. Managerial synergies come when superior managers from bidder can benefit targets performance. Finally, financial synergies result in lower cost of capital. One reason that leads to financial synergies, is that bigger companies usually have access to cheaper capital.

2.2.2. Managerial motives

Earlier discussed reasons can be economically justified but it is also possible that managers have their own reasons to engage in M&A. Trautwein (1990) has named managerial self-interest as an empire-building theory. According to that, manager engages company in acquisitions to gain more power and utility to himself instead of creating shareholder value.

According to Berk & Demarzo (2014, 940) two main explanations for engaging in M&As that may not benefit shareholders are conflicts of interest and overconfidence. Conflicts of interest is largely the same as Trautwein's (1990) empire building theory. They emerge when manager prefers to run larger company that allows one to get more pay and prestige even if the acquisition does not benefit shareholders. The other explanation, overconfidence, is as simple as it sounds. People tend to overestimate their abilities, thus leading managers to overestimate their ability to succeed in M&As, therefore driving them to be active in M&As. (Berk, DeMarzo 2014, 940)

2.2.3. Pharmaceutical industry

In the pharmaceutical industry, acquisitions offer a source of new products relatively cost-effectively (Thrassou, Rossi et al. 2015). Companies have also justified M&As with outsourcing and complementing their research and development (Higgins, Rodriguez 2006, Alhenawi 2017). It is possible to gain huge returns in case of a blockbuster drug and that makes M&A attractive to pharmaceutical companies (Alhenawi 2017). This view is also supported by a study where it was found that total returns to shareholders correlate strongly with growth of blockbuster drug revenues (Agarwal, Desai et al. 2001). Therefore, it may be a big motivator for acquisitions.

The blockbuster motive is interesting and widely discussed. According to Danzon, Epstein et al. (2007) patent protection lasts for average of 12 years after drug gets market approval. When a few blockbuster drugs may count for over half of company's revenue, seems inevitable that patent expiration leads to decreased revenue and profits. Therefore, an incoming patent expiration or a gap in the pipeline may give a motive for management to look for acquisitions. (Danzon et al. 2007)

3. EFFICIENT MARKET HYPOTHESIS

In a famous paper, Fama (1970) introduced and discussed the hypothesis of efficient markets. According to theory, share prices always fully reflect all available information. Markets can be such efficient when a few assumptions are made. These assumptions are that there are no transaction costs in trading, all available information is free to everyone and every market participant agree on the implications of current information for the current prices and distributions of future prices. The statement that share prices fully reflect all available information is so general that is difficult to test. To be able to test the theory, efficiency is usually divided to three forms of efficiency that are weak form, semi-strong form and strong form of efficiency. (Fama 1970)

In the weak form tests of efficiency only historical price or return data is used. According to weak form of efficiency securities' prices reflect all historical price and return data. If markets are semi-strong efficient share prices fully adjust to all available

information. Such information can be for example earnings releases, stock splits, or other announcements that may affect prices. In the strong form tests of efficiency, it has been studied if private information gives an edge in the markets as an investor who has access to private information could benefit from the information before it is public and widely available. If markets are strong-form efficient, prices reflect all the information that may be either public or private. (Fama 1970)

4. PRIOR RESEARCH

Despite of wide range of prior research on M&A, theories, performance and explanations, there is no clear consensus on market reactions of acquiring firms. Event studies on performance of mergers and acquisitions have been done in many markets, industries and market conditions. Both short and long-term performance have been studied and lots of mixed results have been found. However, in the pharmaceutical industry, results have been promising.

A usual finding on M&As is that target company's shareholders gain value but acquirer's may have no impact or have even negative impact on their wealth (Bösecke 2009, 33). When 3688 mergers between years 1973-98 were studied, positive returns in both short and long term were found for target and for target and acquirer combined, but not for acquirer alone (Andrade et al. 2001). They also found that announcement period returns clearly differed between stock and non-stock financed deals, as acquirers in stock financed deals gained negative returns when non-stock financed deal returns were close to zero. Another study of mergers and acquisitions found out that acquirers in mergers gained negative abnormal returns five years after the event but in acquisitions, acquirers gained positive abnormal returns in a five year period (Loughran 1997).

A study that focused in M&As between 1980 and 2001 found out that transactions between 1990-1997 were profitable for acquirers shareholders but then deals made between 1997-2001 wiped out all those profits made earlier. Profits in this study are calculated from three day period around the announcement. (Moeller 2005)

Prior research claims that over half of mergers and acquisitions fails (Tarba, Brock et al. 2010, 1). Three usual characteristics in failing merger and acquisitions are found by Higgins and Rodriguez (2006). First is overbidding the target firm and the other two are selecting an incorrect target firm and failing the post-acquisition integration process. Agarwal et al. (2001) says that in the pharmaceutical industry, one reason for possible failure in the integration process is the difficult integration of R&D operations. Differences between companies' R&D operations make the integration more complex. To mention a few possible differences, different risk tolerance or different approach to decision making and governance are mentioned.

Mergers and acquisitions have been a subject of research also in pharmaceutical industry. One prior research on M&A in pharmaceutical industry shows that there are no positive abnormal returns on mergers but on acquisitions acquiring companies gained positive abnormal returns on both short and long-term. One reason might be that acquisitions might be easier for company to absorb. This study used both domestic and cross-border M&A and it also found that domestic M&A were more likely to gain positive abnormal returns. (Mahmud Hassan, Patro et al. 2007)

Another research in this industry found average positive abnormal returns of 3.91%, significant on 1% level, for acquirer on three-day event window around the announcement of the acquisition. They also found, contradicting to prior research, that stock financed deals outgained those financed in cash. (Higgins, Rodriguez 2006) Many studies have been conducted in addition to earlier mentioned ones. Authors of one study did not find significant wealth-effects when researching pharmaceutical M&As in US markets (Chaudary, Sarwar 2015).

In terms of market efficiency, Fama (1998) argues that event studies hardly can challenge market efficiency. He also gives an explanation to abnormal returns found in prior event studies. The efficient market hypothesis explains that expected abnormal returns are zero and abnormal returns are randomly split between positive and negative returns. (Fama 1998)

As we can see, research has seen very controversial and mixed results in the area of wealth-effects in M&As. Still, we can see some patterns and from prior literature we can draw a few hypotheses to be tested in the study.

i. *H_1 = Abnormal returns of acquiring company (AR) > 0,*

The other hypothesis is about geographical type of deal, and prior findings that domestic deals perform better than cross-border deals:

ii. *H_1 = ARs differ between domestic and cross-border deals*

5. DATA

List of acquisitions made by US listed pharmaceutical companies, act as data for this thesis. This dataset is gathered from Zephyr, a database that includes M&A data from all over the world. On the search, following terms must be met:

i. acquirer's industry must be North American Industry Classification System (NAICS) code 3254 "Pharmaceutical and Medicine Manufacturing"
ii. Only US listed acquirers are involved in the search.
iii. Deal is announced between beginning of 2009 to date 24.10.2016.
iv. Deal value must be public and minimum value is 1 M€
v. maximum stake prior to acquisition is set to 99% to avoid deals that Zypher found with deal type "Acquisition increased from 100% to 100%"

With this search strategy, a total of 133 completed deals were found from Zephyr. In the sample there can be multiple deals made by one company. The dataset is reviewed thoroughly to avoid overlapping events and events that would be influenced by another event by the same company are excluded from the study. After that, their share price information is imported from Yahoo! Finance. As Seiler (2004) suggests, S&P 500 is used as a proxy index to track market returns and also its information is imported from Yahoo! Finance. These prices are close prices adjusted for stock splits and dividends. If acquirors share price information is not found, acquisition is removed

from the dataset. After these operations, final data consists of 88 deals. The whole dataset is presented in appendix 1.

Before going further, some basic statistics about the data is presented. Table 1 shows statistics of the dataset. Deals are classified by geographical type of deal. From Table 1 we can see that domestic deals are more common than cross-border deals.

Table 1. Deal numbers

Type	Count of Deals
Total Number of Deals	88
Domestic	56
Cross-Border	32

6. METHODOLOGY

Event study methodology is used to examine the main research question which was: *do corporate acquisitions create value to shareholders in the pharmaceutical industry?* Then regression model is used to get answers on sub-questions where it is studied if payment method or geographical type of deal can explain abnormal returns.

6.1. Event study methodology

It is generally understood that stock prices reflect relevant information about a firm's future. When new information hits the market, stock price should adjust to reflect it. If markets were perfectly efficient stock prices should immediately adjust to newly learned information. However, often this is not the case. New information can be leaked before public announcement or stock prices do not immediately adjust to reflect new information. To study these reactions, event study methodology is used. (Seiler 2004)

Event study is a widely used method in financial studies. It is used to examine market reactions to well-defined events such as mergers and acquisitions, stock splits,

earnings releases and many other events. Using an event study methodology, one can find out if there are abnormal returns linked to an event, studying share prices during the event window. Abnormal returns are the difference between observed returns and expected returns of a security in the event window. (Peterson 1989, 36-37, Rani et al. 2016)

This methodology is based on the idea that share prices reflect discounted future cash flows. Therefore, significant news that may influence future cash flows, should be adjusted to share prices. That said, it is also a study of efficient markets. It gives evidence of how quickly share prices adjust to newly learned information. Event study methodology uses abnormal returns to tell if event creates or destroys value. (Rani et al. 2016, Fama 1991)

6.2. Structure of the event study

In the first place of event study, the event date is identified. The event date should be the day, when market first learns of new information. The less accurate in identifying the event date, the less powerful the study is. After identification of event date, event and estimation periods are defined. When defining the periods, number of trading days in both periods are chosen. The event period should consist of all days that new information could have an impact on. For example, on M&A studies, event period should start well before the event date, because leaks of information could impact stock price earlier than the event date. (Seiler 2004, 217-219)

In this study, event date is identified as the date, when announcement of acquisition is made to public. Event period is defined to start ten days before the announcement and to stop ten days after the announcement. Thus, event date consists of 21 trading days and can be marked [-10, 10]. Estimation period is defined to start 150 days before the announcement and to stop 11 days before the announcement. Estimation period is [-150, -11]. This timeline is shown in figure 1.

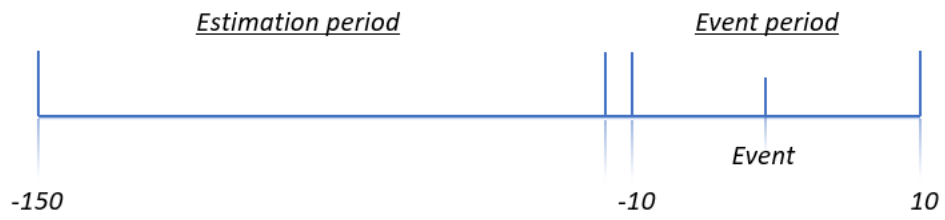

Figure 1. Timeline of the event study

The next phase of an event study is to select the sample of firms (Seiler 2004, 219). The selection process in this study has been told in chapter 5. As told, the final sample includes 88 acquisitions made by US listed companies in pharmaceutical industry during years 2009-2016.

After sample selection, next phase is to determine what returns would be if event did not occur. These nonevent returns can be approached in a few different ways. For example, market returns, control portfolio returns, or risk-adjusted returns can be used. The risk-adjusted return approach is the most common way of calculating expected returns. With this method, abnormal returns (AR) are the difference between actual returns and expected returns. (Seiler 2004, 220-221) Equation 1. shows how ARs are calculated:

$$AR_{it} = R_{it} - (E)R_{it} \quad (1)$$

Where AR_{it} is abnormal return of firm i in period t, R_{it} is actual return of firm i in period t and $(E)R_{it}$ is expected return of firm i in period t.

In risk-adjusted return approach, expected return for all the days of the event period are predicted with a regression. To obtain expected returns for a firm, its estimation period returns are regressed against market returns in the same period. That way firms alpha and beta can be calculated and those will be used to calculate expected returns in the event period. A common index to use as a proxy to market return is S&P 500. (Seiler 2004, 221) This method is often referred to as a market model. Equation 2 is the market model used to predict expected returns for the event period:

$$(E)R_{it} = \alpha_i + \beta_i R_{mt} + e_{it} \quad (2)$$

Where R_{it} is expected return for firm i in period t and R_{mt} is market return in period t. α_i and β_i are firm i's alpha and beta that are estimated with a regression earlier. The final term, e_{it}, is residual term which is assumed to be normally distributed with zero mean and constant variance. Therefore, abnormal returns when using market model are displayed in equation 3:

$$AR_{it} = R_{it} - \alpha_i - \beta_i R_{mt} \quad (3)$$

After ARs for each of the event firms have been calculated, average abnormal returns will be calculated. AARs are calculated with following equation:

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \quad (4)$$

Where N is number of firms in the sample.

After AARs, cumulative average abnormal returns are calculated to be able to study reactions over several days. CAR is simply the average of abnormal returns on defined time period. For example, CAR on day -3 is average of daily abnormal returns from day -10 to day -3. CARs are measured as follows:

$$CAR_{T1,T2} = \sum_{t=T1}^{T2} AAR_t \quad (5)$$

6.3. Statistical Significance

Statistical significances of average abnormal returns are tested with t-test. The following equation is used for testing H_0 = AAR = 0:

$$t_{AAR} = \sqrt{N}\,\frac{AAR_t}{S_{AAR_t}} \quad (6)$$

Where AR_t is abnormal return on time t and S_{AAR_t} is standard deviation across firms on time t. Standard deviation is calculated with following equation:

$$S^2_{AAR_t} = \frac{1}{N-1}\sum_{i=1}^{N}(AR_{i,t} - AAR_t)^2 \quad (7)$$

Finally, to test the hypothesis that CAR = 0, we make the assumption that there is no correlation between individual firms events. Hypothesis is tested with the following equation:

$$J_1 = \frac{CAR(t_1,t_2)}{\sqrt{\sigma^2(t_1,t_2)}} \sim N(0,1) \quad (8)$$

Variance in the denominator of equation 8 is calculated with equation 9:

$$\sigma^2(t_1,t_2) = \frac{1}{N^2}\sum_{i=1}^{N}(t_2 - t_1 + 1)\sigma_i^2(t_1,t_2) = (t_2 - t_1 + 1)\sigma_t^2(t_1,t_2) \quad (9)$$

In addition to these tests differences in means between groups domestic and cross-border deals are tested with analysis of variance.

7. RESULTS

Using the event study methodology introduced in previous chapter it was tested if there are abnormal returns linked to acquisition announcements in the pharmaceutical industry. In the study, 88 deals and their market reactions were examined. In this chapter, results of the event study are shown. From the results we can see that there are positive abnormal returns of 0,66 % on announcement days. Positive AR on event day suggests that investors believe that acquisition creates value for them. However, no statistical significance was found. Results can be seen from Table 2.

Table 2. Average Abnormal Returns

Day	AAR	T-ratio	P-value
-10	-0,568	-1,612	0,111
-9	0,281	-0,747	0,457
-8	0,211	1,008	0,316
-7	-0,359	-0,844	0,401
-6	0,287	1,032	0,305
-5	0,184	0,739	0,462
-4	0,066	-0,912	0,365
-3	0,023	0,096	0,924
-2	-0,018	-0,060	0,952
-1	-0,117	-0,365	0,716
0	0,655	1,089	0,279
1	0,023	0,059	0,953
2	-0,344	-1,046	0,299
3	0,018	0,062	0,951
4	0,465	1,923	0,058
5	0,303	0,892	0,375
6	-0,502	-1,395	0,167
7	0,068	0,159	0,874
8	1,105	1,916	0,059
9	-0,183	-0,604	0,548
10	-0,576	-1,582	0,117

From the results we can see that there are no significant AARs on the event period so we cannot draw too strong implications from these. Average return on event day being positive is expected as more ARs on day 0 are positive (47) than negative (41). What is interesting about these results in Table 2 is that AAR on day 8 has the biggest positive AAR and it is very close to being statistically significant on 5 % level. This could imply that markets are not that efficient, that share prices would instantly adjust to new information, but they rather react with a little delay to information learned on event day. Also, the fact that no extraordinary AARs or statistically significant abnormal returns were found on the days before the event, could suggest that generally there are no leakages of information prior to the event.

Table 3. CAARs in different periods

$[t_1, t_2]$	CAAR	Variance	J1	P-value
[-10, 10]	1,021	0,0012	0,2975	0,383
[-10, 0]	0,644	0,0010	0,1991	0,421
[-5, 0]	0,792	0,0012	0,2268	0,411
[-3, 3]	0,239	0,0013	0,0665	0,474
[-1, 3]	0,234	0,0037	0,0386	0,485
[-1, 1]	0,560	0,0020	0,1259	0,450
[0, 5]	1,120	0,0013	0,3071	0,380
[0, 10]	1,032	0,0014	0,2740	0,392
[5, 10]	0,215	0,0014	0,0569	0,477

Table 3 presents cumulative average abnormal returns from several different periods during the event period. We see that CAAR from the whole event period is positive, about 1,02 %. Also, there were no negative CAARs in these different periods. The strongest gains are gained during the period that includes event day and five trading days after the announcement. This leads to the implication that investors see that acquisition creates value and they are willing to buy shares in higher prices, resulting the price to increase more than markets in a few days following the announcement, thus gaining abnormal returns. Because not one period in this table is statistically significant, we should not draw too strong implications from CAAR results presented in the table 3.

These findings are in line with many earlier studies conducted on M&As. For example, Andrade et als. (2001) study did not find positive abnormal returns for acquirers on a set of 3688 mergers. Also, Chaudary & Samra's (2015) study drew the same conclusion of no positive abnormal returns. Although there are also studies that have found such findings, this is not a big surprise.

For further analysis CAARs were grouped by their geographical type. The whole list of CAARs in each group can be find from appendix 2. In domestic deals, acquirers seem to perform better in stock exchanges as their median CAAR is 1,62 % when cross-border deals median CAR is 1,26 %. Also mean of domestic deals CAARs is 2,19 % which is a lot higher than cross-border deal groups -1,03 %. These statistics are presented in table 4. Confidence levels of these means are tested, and they are either statistically significant on 5 % confidence level, or really close to it.

Table 4. Summary statistics of deals by geographical type

Domestic deals	
Mean	0,0219
Standard Error	0,0138
Median	0,0162
Standard Deviation	0,1036
Sample Variance	0,0107
Minimum	-0,2259
Maximum	0,3378
Sum	1,2282
Count	56
Confidence Level(95.0%)	0,0277

Cross-border deals	
Mean	-0,0103
Standard Error	0,0273
Median	0,0126
Standard Deviation	0,1546
Sample Variance	0,0239
Minimum	-0,4431
Maximum	0,4134
Sum	-0,3299
Count	32
Confidence Level(95,0%)	0,0557

Analysis of variance is done to find if variances in CARs between these groups differ statistically significantly. Acquirers CARs have smaller variance in domestic deals but differences between groups are not statistically significant. Results of one-way Anova are presented in Table 5.

Table 5. Results of one-way Anova

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Cross-border	32	-0,32985	-0,01031	0,023907
Domestic	56	1,228242	0,021933	0,010733

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0,021167	1	0,021167	1,367226	0,24552	3,951882
Within Groups	1,331451	86	0,015482			
Total	1,352619	87				

Neither from these results can we draw any strong conclusions. Although we can say that acquirers in domestic deals perform better than in cross-border deals, which is also a finding of prior research in this area. With this finding we can suggest that cross-border deals are usually more difficult to integrate in to the company or at least investors think that they are. Relative difficulty of cross-border deals can also be supported with the fact that number of cross-border deals is much lower than that of

domestic deals. However, differences between those groups are not statistically significant.

As AARs and CAARs found in this study are relatively small it is difficult to contribute to market efficiency discussion that is usually seen in event studies. These slightly small and positive AARs on event day and CAARs in the event period suggest that these acquisitions are not seen as that significant news to acquirer. Even if they are seen as positive news they are not seen significantly positive news. One of the reasons might be that the real value gained from the acquisition is seen in the longer period, rather than in couple of days around the announcement.

Other suggestion that we could make with these results, is that shareholders of the acquiring company see that premium paid for the target is relatively fair. If they saw that the acquisition is overvalued share price would fall and vice versa.

8. CONCLUSIONS

In this bachelor's thesis a study about wealth-effects on corporate acquisitions in the pharmaceutical industry was conducted. After reviewing relevant theories and literature, an event study was conducted with a sample of 88 acquisitions made by US listed pharmaceutical companies.

It was found that on the event day, companies gained average abnormal return of 0,65 %, although this finding was not statistically significant. Also cumulative average abnormal returns were positive in many different periods around the event. The whole event period [-10,10] was slightly positive, 1,02 %, but not statistically significant, When analyzing abnormal returns between groups domestic deals and cross-border deals it was found that acquirer's stock returns in domestic deals are higher than in cross-border deals, that are more likely to destroy wealth than domestic deals. In domestic deals mean AAR was 2,19 % when mean for cross-border deals was -1,03 %. Medians were closer to each other as domestic was 1,62 % and cross-border was 1,26 %.

In this area, many studies have been conducted, but there is no clear consensus on questions that were tried to answer in this study. With mixed results from prior research, findings of this study are in line with many studies and argue with others. In this particular industry, findings of positive AARs in acquisitions are in line with Hassan, Patro et als (2007) and Higgins (2006) studies. Both of these studies found acquirers gaining positive abnormal returns in the short term and Hassa, Patro et al (2007) also found that domestic deals perform better than cross-border deals. The most common finding from prior research that my results are in line with is that domestic deals perform better than cross-border deals. However, the fact that my findings were not statistically significant has to be taken in to consideration.

With these findings research questions presented in chapter 1 (p. 2) can be answered. The main question was: *Do corporate acquisitions create value to shareholders in pharmaceutical industry?* We can summarize these findings and answer that corporate acquisitions do seem to create value to acquirer's shareholders in pharmaceutical industry. The event day abnormal return and different CAARs are positive, suggesting that the wealth-effect on such event is positive. However, too strong actions should not be taken based on these findings as results are not statistically significant.

The sub-question was, *do abnormal returns differ between domestic deals and cross-border deals?* Results show that domestic deals gain higher returns than cross-border deals and their returns' variance is smaller. Results show that mean CAAR of domestic deals was 2,19 % and median 1,62 % when cross-border deals mean and median were -1,03 % and 1,26 %. However, Anova test shows that CAARs between groups do not differ statistically significantly.

From these findings, corporate managers, investors or anyone who might find them useful, should not draw too strong conclusions and make decisions based to them because they were not statistically significant. For example, investors should not rely on firm's activity in M&A in search of abnormal returns, and CFO's and CEO's should not engage in M&A trying to create short-term value to shareholders thinking that investors love acquisitions.

Going forward from here, it would be interesting to study mergers and acquisitions more in depth. A study about managers' motives in engaging in M&As could widen knowledge and contribute to existing literature about M&A theories. Also, same kind of event study could be conducted in emerging markets such as China or India, to find what kind of evidence it could prove.

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APPENDICES

Appendix 1. Deal data

Date	Company	Type
20.2.2009	SPECTRUM PHARMACEUTICALS INC.	Domestic
3.3.2009	VERTEX PHARMACEUTICALS INC.	Cross-border
12.3.2009	GILEAD SCIENCES INC.	Domestic
13.8.2009	HERBALIFE LTD	Cross-border
3.9.2009	RELIV INTERNATIONAL INC.	Domestic
17.9.2009	WOUND MANAGEMENT TECHNOLOGIES INC.	Domestic
26.10.2009	BIOMARIN PHARMACEUTICAL INC.	Domestic
7.12.2009	CELGENE CORPORATION	Domestic
14.12.2009	ABBOTT LABORATORIES INC.	Cross-border
30.12.2009	ANIKA THERAPEUTICS INC.	Cross-border
25.6.2010	GILEAD SCIENCES INC.	Domestic
2.7.2010	ELI LILLY AND COMPANY	Domestic
12.7.2010	JOHNSON & JOHNSON	Domestic
2.11.2010	CAMBREX CORPORATION	Cross-border
24.1.2011	AMGEN INC.	Domestic
2.2.2011	TRINITY BIOTECH PLC	Cross-border
5.4.2011	MERCK & COMPANY INC.	Domestic
8.4.2011	AMGEN INC.	Cross-border
3.5.2011	AKORN INC.	Domestic
23.6.2011	BIOMARIN PHARMACEUTICAL INC.	Cross-border
20.7.2011	PFIZER INC.	Domestic
22.7.2011	BRISTOL-MYERS SQUIBB COMPANY	Domestic
25.7.2011	ORASURE TECHNOLOGIES INC.	Cross-border
28.9.2011	JOHNSON & JOHNSON	Domestic
21.11.2011	GILEAD SCIENCES INC.	Domestic
16.12.2011	APRICUS BIOSCIENCES INC.	Domestic
26.1.2012	AMGEN INC.	Domestic
26.1.2012	CELGENE CORPORATION	Domestic
14.2.2012	BIOGEN IDEC INC.	Domestic
1.3.2012	TRINITY BIOTECH PLC	Cross-border
26.4.2012	JAZZ PHARMACEUTICALS PLC	Cross-border
2.7.2012	PERNIX THERAPEUTICS HOLDINGS INC.	Domestic
12.12.2012	MEDICINES COMPANY, THE	Domestic
19.12.2012	HERBALIFE LTD	Cross-border
21.12.2012	ACORDA THERAPEUTICS INC.	Domestic

7.1.2013	BIOMARIN PHARMACEUTICAL INC.	Domestic
25.4.2013	EMERGENT BIOSOLUTIONS INC.	Domestic
17.6.2013	JOHNSON & JOHNSON	Domestic
15.7.2013	ABBOTT LABORATORIES INC.	Domestic
17.7.2013	SPECTRUM PHARMACEUTICALS INC.	Domestic
13.1.2014	AGENUS INC.	Cross-border
11.2.2014	IMPRIMIS PHARMACEUTICALS INC.	Domestic
7.3.2014	PLANDAI BIOTECHNOLOGY INC.	Cross-border
23.4.2014	MEDICINES COMPANY, THE	Domestic
29.4.2014	BRISTOL-MYERS SQUIBB COMPANY	Domestic
29.4.2014	ENDO INTERNATIONAL PLC	Cross-border
9.5.2014	AKORN INC.	Domestic
10.6.2014	CELSION CORPORATION	Domestic
16.7.2014	PFIZER INC.	Domestic
5.8.2014	OXFORD IMMUNOTEC GLOBAL PLC	Cross-border
29.9.2014	AMAG PHARMACEUTICALS INC.	Domestic
30.9.2014	JOHNSON & JOHNSON	Domestic
29.10.2014	ABBOTT LABORATORIES INC.	Domestic
6.11.2014	PERRIGO COMPANY PLC	Cross-border
17.11.2014	ZOETIS INC.	Domestic
1.1.2015	IMPRIMIS PHARMACEUTICALS INC.	Domestic
6.1.2015	GILEAD SCIENCES INC.	Cross-border
11.1.2015	BIOGEN IDEC INC.	Cross-border
4.2.2015	INNOVUS PHARMACEUTICALS INC.	Domestic
27.4.2015	CELGENE CORPORATION	Domestic
14.5.2015	ULURU INC.	Cross-border
18.5.2015	ENDO INTERNATIONAL PLC	Cross-border
18.5.2015	LANNETT COMPANY INC.	Domestic
17.6.2015	ALLERGAN PLC	Cross-border
29.6.2015	AMAG PHARMACEUTICALS INC.	Domestic
28.7.2015	MERCK & COMPANY INC.	Cross-border
30.7.2015	ABBOTT LABORATORIES INC.	Domestic
25.9.2015	FITLIFE BRANDS INC.	Domestic
13.10.2015	TELIGENT INC.	Cross-border
11.12.2015	HORIZON PHARMA PLC	Cross-border
18.12.2015	MALLINCKRODT PLC	Cross-border
21.12.2015	AMGEN INC.	Domestic
23.12.2015	AGENUS INC.	Domestic

11.3.2016	ANI PHARMACEUTICALS INC.	Domestic
14.3.2016	INOVIO PHARMACEUTICALS INC.	Domestic
29.3.2016	ADAMIS PHARMACEUTICALS CORPORATION	Domestic
4.4.2016	GILEAD SCIENCES INC.	Domestic
28.4.2016	ABBVIE INC.	Domestic
9.5.2016	INCYTE CORPORATION	Cross-border
13.5.2016	MYLAN NV	Cross-border
9.6.2016	MERCK & COMPANY INC.	Domestic
23.6.2016	OXFORD IMMUNOTEC GLOBAL PLC	Cross-border
1.7.2016	PFIZER INC.	Domestic
5.7.2016	BRISTOL-MYERS SQUIBB COMPANY	Cross-border
8.8.2016	SORRENTO THERAPEUTICS INC.	Domestic
8.8.2016	ZOETIS INC.	Cross-border
13.9.2016	CELGENE CORPORATION	Cross-border
26.9.2016	CAMBREX CORPORATION	Domestic

Appendix 2. List of CARs [-10,10] grouped by geographical type

Cross-border	Domestic
0,413	0,338
0,234	0,270
0,173	0,191
0,129	0,180
0,099	0,140
0,091	0,137
0,090	0,133
0,071	0,122
0,031	0,119
0,028	0,108
0,024	0,097
0,023	0,093
0,022	0,078
0,017	0,071
0,015	0,067
0,013	0,065
0,012	0,065
0,009	0,058
-0,002	0,056
-0,023	0,054
-0,025	0,053
-0,034	0,047
-0,044	0,041
-0,052	0,035
-0,118	0,035
-0,119	0,020
-0,129	0,020
-0,143	0,019
-0,171	0,014
-0,223	0,013
-0,299	0,009
-0,443	0,009
	0,002
	0,001
	0,000
	-0,009
	-0,011
	-0,013
	-0,024
	-0,025
	-0,026
	-0,033
	-0,043
	-0,044
	-0,046
	-0,049
	-0,049
	-0,049
	-0,055
	-0,088
	-0,093
	-0,099
	-0,143
	-0,202
	-0,208
	-0,226