MINISTRY OF EDUCATION OF AZERBAIJAN REPUBLIC

AZERBAIJAN STATE UNIVERSITY OF ECONOMICS

INTERNATIONAL GRADUATE AND DOCTORAL CENTER

On the right of manuscript

Khaligzade Aytan Vagif

MASTER DISSERTATION

On the topic of

"Do mergers and acquisitions create shareholder value?" Evidence from High Technology Sector in the US

Specialty code and name : 060403 - "Finance"

Specialization : "Financial Management"

Supervisor :

Ph.D. Kamran Eyyubov

Head of the Master Program :

Ph.D.Ismayilzada Aliaga Atxam

Head of department

D.Sc. Kalbiyev Yashar Atakishi

Professor

BAKU - 2018

Declaration

In this thesis, I declare that all the information and results presented in visual, auditory and written form are obtained from my side by observing the academic and ethical rules and I have indicated the results and information which referred to other resources in the thesis.

Khaligzade Aytan

Khaligzade Aytan

"DO MERGERS AND ACQUISITIONS CREATE SHAREHOLDER VALUE?"

Evidence from High Technology Sector in the US

Abstract

In this study, the short-term effects of US High Technology sector mergers and acquisitions (M&A) on shareholder values are examined and analyzed during the period 2002 - 2014. Just before this analysis, company mergers and acquisitions terms are explained, and some topics like forms of, mergers and acquisitions decisions, company mergers and acquisitions , the advantages and disadvantages of mergers , the reasons that lead to mergers and acquisitions and discussed. Furthermore, issues related to the definition, the scope, the importance, and the designation of shareholder value are also handled. In the last part of the study, event study method is used while analyzing the effects of company association and short-term announcements on stock returns. In this study, abnormal returns of holding after purchase and cumulative returns are calculated, depending on the released-to-public information of the companies. According to these results, it is seen that mergers and acquisitions generally have short term effects on the share prices, and the information regarding the market efficiency is obtained.

Key Words : Mergers And Acquisitions (M&A) ,M&A Announcements, Company Value, Event Study, Cumulative Abnormal Return (CAR), Excessive Return.

Xalıqzadə Aytən

"BİRLƏŞMƏ VƏ SATINALMALAR SƏHM DƏYƏRİ YARADIRMI?"

ABŞ-da Yüksək Texnologiya Sektoru əsasında

Xülasə

Bu elmi işdə, 2002 - 2014-cü illər ərzində ABŞ Yüksək Texnologiya sektorunun birləşmə və satınalmalarının (B&S) səhm dəyəri üzərindəki qısa müddətli təsirləri araşdırılaraq analiz edilmişdir. Analiz etməzdən əvvəl, şirkət birləşmələri və satınalma şərtləri açıqlanmaqla, şirkət birləşmələri və satınalmalar, birləşmə və satınalma qərarları, birləşmə və satınalmalara yol açan səbəblər, birləşmə və satınalmaların üstünlükləri və mənfi cəhətləri müzakirə edilir. Həmçinin səhm dəyərinin izahı, əhatə dairəsinin, əhəmiyyəti və təyinatı kimi məsələlər müzakirə edilir. İşin son fəslində, şirkət birləşmələri və qısa müddətli elanların səhm gəlirləri üzərindəki təsirlərini analiz etmək üçün Hadisə Öyrənilməsi metodundan istifadə edilmişdir. Bu çalışmada, şirkətlərin birləşmə və satınalma əməliyyatından sonra ictimaiyyətə açıqlanmış məlumatlarına əsasən, əldə edilən anormal gəlirlər və məcmu gəlirlər hesablanmışdır. Bu nəticələrə görə, birləşmə və satınalmaların ümumi olaraq səhm dəyəri üzərində qısa müddətli təsirləri olduğu və bazar fəaliyyəti ilə bağlı məlumatların əldə edildiyi görülməkdədir.

Açar sözlər : Birləşmə və Satınalmalar (B&S), B&S elanları , Şirkət Dəyəri , Hadisə Öyrənilməsi Metodu, Məcmu Anormal Gəlir (MAG), Həddindən Artıq Gəlir.

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AR	: Abnormal Return
CAR	: Cumulative Abnormal Return
M&A	: Mergers And Acquisitions
US	: United States
USD	: United States Dollar

Introduction

Nowadays, in terms of companies, the phenomenon of globalization is evaluated with the new competition conditions. Today, almost all countries around the world have seen that national markets are not enough to compete as a result of globalization. An important effect that strengthens the influence of globalization on national markets is the increase in international capital movements. Parallel to globalization, many types of international capital movements are increasing strikingly. The international movement of foreign direct investments, portfolio investments, international bank credits and derivative financial products has increased significantly. As a result, globalization, trade, finance and many other areas have led to the development of agreed rules of conduct at international level . The most important of these rules is the new competition rules.

In these new competitive conditions caused by the phenomenon of globalization, companies now have to focus on their activities such as technological investments, cost-cutting measures, intensive research and development activities.

Companies must be large enough to continue their operations under new competitive conditions. One of the growth paths of companies that are obliged to achieve this size is to merge with another company, or else to make a company marriage. Companies try to achieve the synergy benefits they need to compete in this way.

What are Mergers and Acquisitions?

The aim of companies is to raise the market value to the maximum level. Of course it is imperative that businesses grow to realize this goal. Businesses follow two types of growth strategies. These are "intrinsic growth", which is the growth they have achieved using the funds they have created as a result of their activities or the resources they have provided from outside in new investment projects. The other

growth strategy grows through mergers called "external growth".
Generally, there are three types of firm combinations. These are :

- Merger
- Acquisition
- Consolidation

The merger, which is an external growth strategy , in general, two or more companies are combined under an organization in order to create a more efficient economic enterprise.
An acquisition is the purchase of one business or corporation by another in which there is no creation of a new company, so the acquirer gains control of its target through the purchase or exchange of stock. This is also called a takeover. The terms "merger" and "acquisition" are often confused and used interchangeably in the finance world, especially by business managers and finance executives. However, the difference may not really be significant because the net result is often the same, due to the fact that companies that previously had distinct ownership and separate structure are now operating under the same roof. However, the impact of M&A deals on corporate strategy, finance, tax and even culture might be very different, depending on how the agreement contract or deal specification is structured.

A consolidation is a type of business that same as a merger except that an entirely new company is created. In a this type of merger, the acquired firm and the acquiring firm terminate their previous legal existence and become part of a new firm. (Ross 2002, p.871)

Strategic definitions of mergers

There are three broad categories which mergers may be classified into:

- Horizontal mergers
- Vertical mergers
- Conglomerate mergers

Horizontal mergers - This is a merger of company which in the identical sector as the bidder. Companies' race with each other in product markets . For example, On April 18 in 2017 , According to the decisions of the General Meeting of Shareholders of AtaBank and Caspian Development Bank, CDB was abolished and merged into AtaBank. Another example is the merger of MBank and PROMTEXBANK that created Unibank.

Vertical mergers - A vertical merger that involves firms at different levels of the creation process. The purchase of a travel agency by an airplane company this is known as vertical acquisition.

Conglomerate mergers - A conglomerate merger is defined as when the target and bidder company are not associated to each other. A food firm the acquisition of a textile products firm would be fully considered a conglomerate merger.

Conglomerate combinations are divided into three groups :

- Product Extension Mergers

The production and distribution departments of companies are mergered, which aim to expand in production by combining similar publications. For example; as a newspaper company merges with a distribution company.

- Market Extension Mergers

It is the union of companies that operate in different regions and produce the same product. For example; It's like a company doing textile business in Shaki joining a company in Baku.

- Pure Conglomerate Mergers

It is the combine of companies that are not related in each other. For example; such as the merging of a paper-producing company with a furniture-producing company.

Why High-Tech Sector?

One of the most important events that occurred at the end of the last century (1997 - 2001) was the dot-com balloon that took place in the field of high technology. I want to investigate the mergers and acquisitions that occur in the US economy high tech industry after the dot-com bubble.

According to Cyberstates 2015 explore that published by CompTIA two year ago, US high technology industry employed about 6.5 million workers in 2014. Also, according to the president of CompTIA, Todd Thibodeaux , this sector has continued to make a important contribution to the US economy and accounts for about 7.1% of the overall GDP. High technology companies have been seen as front-runners in the US economy for more than two decades because of their research and development, technological advancement, careers creation and contribution to efficiency gain (Kohers and Kohers, 2000). Also, the development in information technology makes it easier to complete the M&A process as the M&As are believed to be triggered or facilitated by the combination of economic, regulatory or technological changes (Delong, 2001).

Kohers and Kohers (2000) show that firms operating in high-tech industry in general have a relatively high rate of growth feature and that their stocks grew faster than other sectors, with annual returns of 35% compared to 20% annual returns on the S&P 500 index return between 1993 and 1996. As technology-based sectors differ from other sector by the character of their high-growth rate, high-tech targets are measured to create higher wealth benefits to shareholders of acquiring firms compared to lower growth targets in other sectors. An additional feature of technology-based sectors is the intrinsic uncertainty related with high-tech firms whose values are dependent on future economic benefit or developments in untested and unknown fields. Furthermore, several high-tech firms might not generate cash flow in the near future, which make them looked riskier for the acquirers than M&As

in other areas. As a result, the gorgeous growth prospects of a high-tech target can be too expensive for the acquirers because the future performance and benefits may not be achieved after M&A.

As opposed to more recognized sectors, high-tech industries intend to constantly grow and manufacture brand new product with cutting-edge technology, and because of the inherent uncertainty of technological innovation and the unique risks of these emerging areas, it raises many interesting questions about wealth creation in high-tech M&As (Economist, 1996). According to hubris hypothesis, managers of high-tech acquirers engaging in M&A transactions must have some degree of confidence in their knowledge and capacity to make successful takeovers in the high-tech sector, or managers must be certain enough about future value creation as a consequence of M&A decisions. Equally important, managers of acquirers need to make sure that their shareholders or investors are instilled with confidence and insight about value creation through the acquisition as well. Whatever the case, when making an acquisition decision, some questions must be answered as accurately and thoroughly as possible. For example, how would investors and shareholders perceive the deals? Are they optimistic or pessimistic about this M&A decision and transaction? What will be the overall impact of an M&A announcement on company returns? These questions are especially important if the deals are financed by cash, by stock or by any other method of payment, or if the mergers and acquisitions are taking place during a market boom (bullish market) or during a market decline (bearish market), when it has to be considered whether it is the right time to realize such corporate combination strategy?

Research Objectives and Outlines

There is always a gap in literature of every area, and the literature in the field of M&A is no different with questions that need to be answered. All over its history, researchers have analyzed many aspects relating to M&A and questioned whether

M&A would develop or destroy the value of the two parties involved. Earlier literature has mainly emphasized the following: short-term effects of M&A announcements, long-term effects of M&A announcements, and post-merger operating performance (Martynova and Renneboog, 2005, 2008), the motives behind M&A activity, and antitrust law and takeover regulation introduced by the government as well as the effects of these litigations on M&A activity and markets. Most likely, no comparison has been made between abnormal returns generated by M&A activity in one sector before and after the subprime-crisis.

The objective of this paper is to study short-term market reactions to M&A announcements in the high technology sector in the US, particularly to find if there are significant abnormal returns to acquirers and to target firms at the time of the announcement dates, and to make statistical assessment so as to find if the high-tech sector produces higher investment gains for shareholders or investors compared to other industries. This aspect has not been examined before in research literature as the previous studies were mainly undertaken before 2010 and the samples were drawn from non-financial firms. In addition, a comparison between acquirers and targets for the full period sample will be provided, followed by a pre-crisis and post-crisis comparison as well as the market reaction to M&As by deal characteristic. A total sample of 464 announced and completed M&A transactions in US high-tech was identified between 2002 and 2014. The sub-period 2002-2007 (Pre-crisis) and 2009-2014 (Post-crisis) each comprised approximately 280 samples and covers the last two waves of M&A activity in the US. To realize this research, event study methodology is used, which follows the methodology of Brown and Warner (1985) and MacKinlay (1997), to measure the short-run abnormal returns surrounding M&A announcements. In order to determine the statistical significance of abnormal returns or cumulative average abnormal returns ($\overline{CARs}$), two parametric significance test J_1 and the standardized test J_2 of Patell (1976) are used in order to have a stronger and more consistent test result.

The paper will present as follows. Chapter I describes previous literature relevant to motives behind mergers and acquisition, and returns to the acquirers and target firms. Chapter II describes the data source, data collection construction process as well as the methodology used for this study. Chapter III provides the results and the discussion. At the end of the paper by summarizing the results and implications of the research findings, and finally offers suggestions for possible areas of further research concerning M&As.

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Chapter I. Literature Review

Previous literature has analyzed broadly whether M&As are a value creation or value destruction for the companies involved. Generally it finds that M&As do create value for shareholders over the short-term windows, particularly and predominantly for shareholders of the target firm[1]. Though, there are many results that acquirers or newly mergered firms have important negative returns over the long-term windows which exceed their positive short-term returns (Andrade et al., 2001; Rau and Vermaelen, 1998; Loughran and Vijh, 1997). In addition it has also been argued that M&As will be value-decreasing if rash decisions are made on M&As following the wave of recent "Merger Mania" and without thorough research being undertaken and long-term business consequences being considered (Franks et al., 1991; Andrade et al., 2001). Moeller et al. (2005) study takeover waves in the US between 1980 and 2001 and find that both shareholders of acquirers and bidding firms lost an aggregate $220 billion, while shareholders in the last period (1998-2001) of their study incurred the highest losses of $240 billion. Statistics demonstrate a important increase in the volume of M&A transactions in the US and the world in the recent years, although there is also evidence that bidders perform badly after acquisition with reduced performance. If this is the case are M&As worthwhile as a corporate strategy, and what motivates managers to pursue them?

This chapter will provide a summary of the previous literature relating to mergers and acquisitions in the US. It will firstly summarize the literature on the company value scope, importance and determination , advantages and disadvantages of mergers and acquisitions, secondly it will consider the M&A announcement effects on abnormal returns to acquirers and target firms, and thirdly the M&As announcement effect on abnormal returns by the method of payment.

[1]Dodd and Ruback, 1977; Dodd, 1980; Bradley and Jarrell, 1980; Eckbo, 1983; Asquith, 1983; Asquith, Bruner and Mullins, 1983; Lang, Stulz and Walkling, 1989; Frank, Harris and Titman, 1991; Kaplan and Weisbach, 1992; Smith and Kim, 1994; Higson and Elliott, 1998; Graham, Lemmon and Wolf, 2002; Bhagat et al., 2005; Goergen and Renneboog, 2004; Martynova and Renneboog, 2006.

1.1 Company value scope, importance and determination

All earlier researches done in the field of M&A value creation, affirm that shareholder value maximization should be the main objective of both boards and firm managers. As a result, value creation from M&A can be measured as changes in company share price.

Today, the quick development of capital markets, mergers and acquisitions and the increasing tendency to open to the public have led the firm owners and managers to accurately determine the value of the firm. In this section, the scope of firm value, the factors affecting firm value and the basic methods used in determining firm value will be discussed.

The value of a firm is defined as the purchase and sale price that buyers and sellers with full knowledge appreciate without any coercion. Firm valuation is also the determination of the firm's reasonable purchase and sale price. Firms need to evaluate from time to time for various reasons. These reasons can be stated as (Dikmen, 2003:p.51):

- Company mergers,
- Marketing companies' stocks,
- When the companies open to the public,
- Determination of the profit distribution ratios of the partners,
- In the case of partnering or leaving the company,
- Investigation of credit reliability
- In the transformation of private companies into capital companies,
- Privatization,
- The companies have been liquidated and restructured.

Determining firm value is one of the most controversial, most complex aspects of finance theory. The common point of the basic policies of financial management is to maximize the value of the company shareholders. In the funding policy of the firm, the answer is "what is the structure of the resources of the company so that the value of the company is maximum". The aim of the investment policy is to seek answers to the question "which resources should be tied to which assets, so that the value of the company is maximum". In the dividend policy, it is tried to clarify "how the firm should follow a dividend policy so that the value of this policy firm is maximized". As you can see, the common goal in all these policies is to maximize firm value.

1.2 The effects of company mergers to company value

The main reason for companies to merger is the desire for growth. As a result, companies want to increase their profits. As a result of these merger activities, the earnings that companies will receive from these transactions must be considered. The results of the merger of companies are of interest to the other investors as well as the companies involved in merging.

Some factors is affecting firm value in mergers . The value of the firm is influenced by many factors both inside and outside the company. We can summarize these factors in general as follows; (Akgüç, 1998: 865-868).

• *Inflation*: Stocks are the most resistant type of financial asset to inflation. The increase in sales and profits of firms with inflation also leads to an increase in the profit shares to be distributed. In this respect, stocks are preferred over fixed income assets during inflationary periods, which increases prices. However, the fact that inflation is so high can cause a decrease in stock prices as the risk increases.

• *Changes in Interest Rates*: Changes in interest rates affect the performance of stocks traded in the market. The increase in interest rates is affecting the stock performance, and hence its price, in the opposite direction, provided other conditions remain constant. When interest rates rise, stock prices usually fall.

• *Financial structure of the firm*: The weakness of the financial structure of the firm

and its inability to fulfill its obligations can cause a decrease in stock prices.

• *Management of the firm*: The achievements of the firms depend largely on the capabilities of the management staff. Management mistakes are a very important factor affecting stock performance. Because, as a result of effective management, the company's sales and profit will decrease and the risk will increase. In such a case, investors will not invest in these stocks and stock prices will fall.

• *Profit Share Distribution*: Profit share distributions of companies are welcomed by investors, demand is increasing and stock prices are rising. However, the profit share distributed among firms with high profitability and growth rate does not have much effect on the market prices of the company shares.

• *Opinions Published in Newspapers and Magazines*: The news is spreading rapidly in the active markets, and investors are immediately aware of any developments in the market.

Expert opinions and market rumors that investors use to get news increase the demand for the recommended stocks, so the price of that stock increases.

• *Other Factors*: In addition to these factors, many factors can affect stock performance, such as changes in the sector, changes in policies applied due to the political environment, and differences in risk expectations of investors.

1.3 Advantages and disadvantages of mergers and acquisitions

The main purpose of the companies' merger is to have a upper value than the total amount of the individual market values of the firms that will maintain their presence or to join the merger if the companies that operate independently operate.

When examining the underlying causes of corporate mergers, macroeconomic conjuncture such as tax and other regulatory arrangements and sectoral factors seems to be important factors in companies' merger.

The reasons that encourage companies to merge constitute the advantages of mergers. It is possible to list the reasons of company mergers as follows:

• Utilizing economies of scale

The standard cost per unit of producing services and goods relate with economies of scale. Often, economies of scale is taken advantage of relationship with the phrase spreading overhead . This phrase ascribes to the distribution of central services for example top management, corporate headquarters, and computer services.

-Parallel to the increase in production, the spread of fixed costs to a wider production volume will lead to a decrease in the cost of the final unit production.

-It is economically feasible to operate on a large scale after merger, to use existing machinery and equipment more efficiently and to enter idle production tools into the production process, as well as to make production costly and to realize higher efficiency and capacity.

-The merger facilitates the flow of technical information between firms as well as the implementation of research and development projects.

- Firms are able to provide some inputs as a result of merging and growing cheaper. The increase in quantity discounts as purchases grow, and the savings in transportation costs in large party purchases, are examples of a cheaper input base.

-Even when organized, significant savings can be achieved through merger. As a result of the merging of services that do the same functions in companies, significant staff savings can be achieved as well as a better incentive system can improve the creativity capacity of the staff and creative ideas can be used in a wider area.

• Take advantage of synergistic effects

Assume Firm A is think acquiring Firm B. If the total amount of the values of the separate firms is smaller than mergered company value, the acquisition will be beneficial :

$V_{AB} > [V_A + V_B]$

where V_A and V_B are the separate values of firms .

The incremental net gain from the acquisition is the difference between value of the mergered company and the total amount of values of the companies as apart companies is, ΔV:

$\Delta V = V_{AB} - [V_A + V_B]$

The acquisition is called to the generate synergy , when ΔV is a positive,. (Ross 2002, p.849)

The synergy effects from the merger of the company can be grouped under four main headings:

- ✓ Operational synergies: two businesses combine to benefit from scale economies and create synergies during operations such as management, distribution, production and marketing.
- ✓ Financial synergies: Increasing value of stocks versus lower transaction costs.
- ✓ Diversification: After consolidation, the management of the weaker side becomes stronger, the stronger side becomes more productive, and the weaker the management of the company is the more efficient use of its assets.
- ✓ Market power: The increase of the market power of the operator due to the decrease of competition

• M&A is more advantageous than internal growth

It is difficult and slow for companies to implement their internal growths. However, external growth is less costly than internal growth. The M&A has some advantages according to its internal growth.

- ✓ Fast, balanced growth,
- ✓ Lower costs,
- ✓ Financial simplicity,
- ✓ Lower risk,

- ✓ Reduced competition between companies.

• Reduced risk by diversification

Diversification refers to growth outside the area of operation. Such a growth can be realized by the establishment of new production facilities or it can be realized in the form of merging with the enterprises outside the main activity area.

• Expanding debt provisioning capacity

Some firms do not prefer to borrow as much as they are capable. This makes them potential winners. Many acquisitions are financed by debt and the addition of debt can provide significant tax savings.

• Increase the price / income ratio of stocks

If the buyer company expects to increase the price / income ratios of the stocks after merging with the target company, then the buyer company may request the merger with the target company

• Providing prestige

If the buyer company sees the merger as a factor in increasing the prestige of the company within the market, it may choose to merge.

• Competitive advantages

It is possible to reduce or increase competition with M&A. Mergers can be used to seize the market in various areas. Advantages that can be achieved with merger are as follows :

- ✓ Finding new markets,
- ✓ Increasing market share,
- ✓ Efficiency in price determination,
- ✓ Providing control power in the market.

In addition to these advantages, there are also disadvantages of M&A. The disadvantages of company mergers are :

- Loss of control,
- Culture conflict,
- Conflicts of interest,
- Expected values do not occur,
- Loss of the company over bad times in partnership

1.4 Theoretical Background of Mergers and Acquisitions

The mergers and acquisitions have a very long history. We can divide corporate conglomerations, which are considered to have started in the 1890s, on five major rounds based on activity volume. These periods, which are called merger waves; We can list them from the 1890s, the 1920s, the 1960s, the 1980s and the 1990s (Gregoriou and Renneboog , 2007: 1). But M&A experts have identified seven M&A waves in US history that happened more than a hundred years ago.

The first wave of M&As, horizontal integration, is between 1897 and 1907 and followed the depression of 1883. It occurred when US firms tried to create monopolies in their economy and business sectors; about two thirds were gathered in mining, petroleum products, food products, transportation and metals. The second wave of M&A, more of a vertical nature than horizontal started in 1916 during World War One lasting until the Wall Street crash on October 29, 1929. It is characterized by oligopolies rather than monopolies due to stricter regulations on the creation of the latter. This reform was the first large scale development of conglomerates, and American investment banks were very active in facilitating the transactions, thanks to availability of capital, economic development after World War I, and the technology shock . The third wave (1965-1969), also known as the conglomerate merger period, is characterized by diversification among companies and variety in product lines. However horizontal mergers during that time were subject to strict antitrust enforcement because it was considered harmful to competition. The third wave ended in mid-1969 during the presidency of Richard M.

Nixon, who was more tolerant of M&A activity. The fourth wave (1981-1989), characterized as the "mega-mergers" wave, occurred during the economic growth between the mid to late 1980s. This wave was fuelled by the availability of large amounts of funds coupled with the increase popularity of using debt to finance M&As. This wave is different from the other three by the size and significance of the acquired firms or the targets. The most important sectors were oil and gas, processed foods and pharmaceutical industries (Owens, 2015).

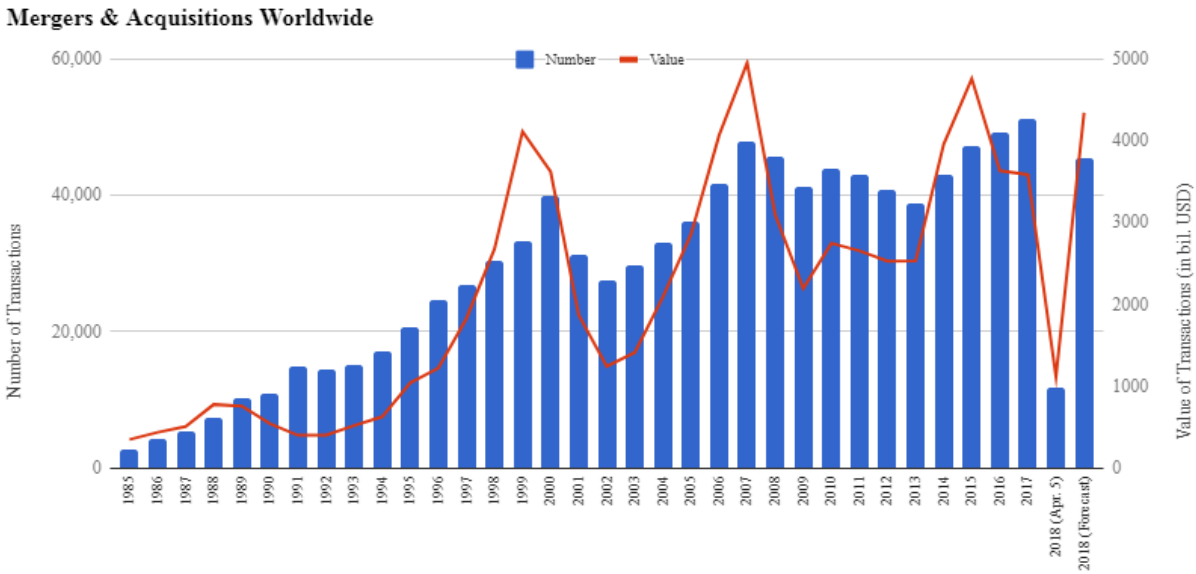
The fifth wave (1992-2000), was motivated by globalization, and started during the bearish market and when market deregulation was high. It was also a period of large transactions, about the same level as the fourth wave, but the emphasis of transactions was more on results and long-term business strategy, and the degree of leverage is not as high compared to the third wave. The prominent sectors in this period were banking and telecommunications. This wave finished in 2000 during the internet or dotcom bubble. The sixth wave (2001-2008) began after the recession in 2011, when enormous amount of money were injected into the economy together and interest rate were reduced to stimulate growth. Because of the stock market boom and cheaper leverage to finance acquisitions, M&A activity multiplied fuelled by high liquidity and cheap capital. However this gave rise to distortions which resulted in stock prices of the target firms being overvalued because of very high speculation and the perceived lack of risk. The consequent was the subprime crisis of 2007 which made it very hard to borrow due to business bankruptcy leading to global recession (Cordeiro, 2014).

The final and seventh wave, and this began after the sharp decline caused by the financial crisis. M&A activity recovered, especially in terms of numbers and value of deals. In 2014, investors seemed to demonstrate considerable optimism towards the market, and the value of announced M&A deals globally reached USD 3.485 trillion, a surge of 47% over the previous year becoming the largest number of transactions in terms of volume and value since 2007. However the difference between the numbers

of announced transactions and closed transactions widened as the number of cancelled deals increased both in the US and the world (Thomson Reuters, 2015).

Above all, the M&A waves resulted in major changes to the corporate structure around the world, causing a transition from a business environment where there were only small, medium-sized and local companies to a marketplace dominated by conglomerates or multinational corporations. What we are seeing now is a post-crisis business environment, characterized by risk aversion and an emphasis on organic growth by corporations (Cordeiro, 2014).

Since 1985, more than 325'000 mergers & acquisitions transactions have been announced with a known value of almost 34'900 bil. USD. In 2017, a new record has been broken in terms of number of deals with 15'100 which is a 12.2% increase over 2016. The record of total value of deals took place in 2015 with 24'100 bil. USD. From 1985 to 2018, the annual compound growth rate of agreements is 5.86%, while the value is 5.32%. The current trend in 2018 indicates that there will be a decrease in M & A this year. (*Source: Institute of Mergers, Acquisitions and Alliances (2018))*



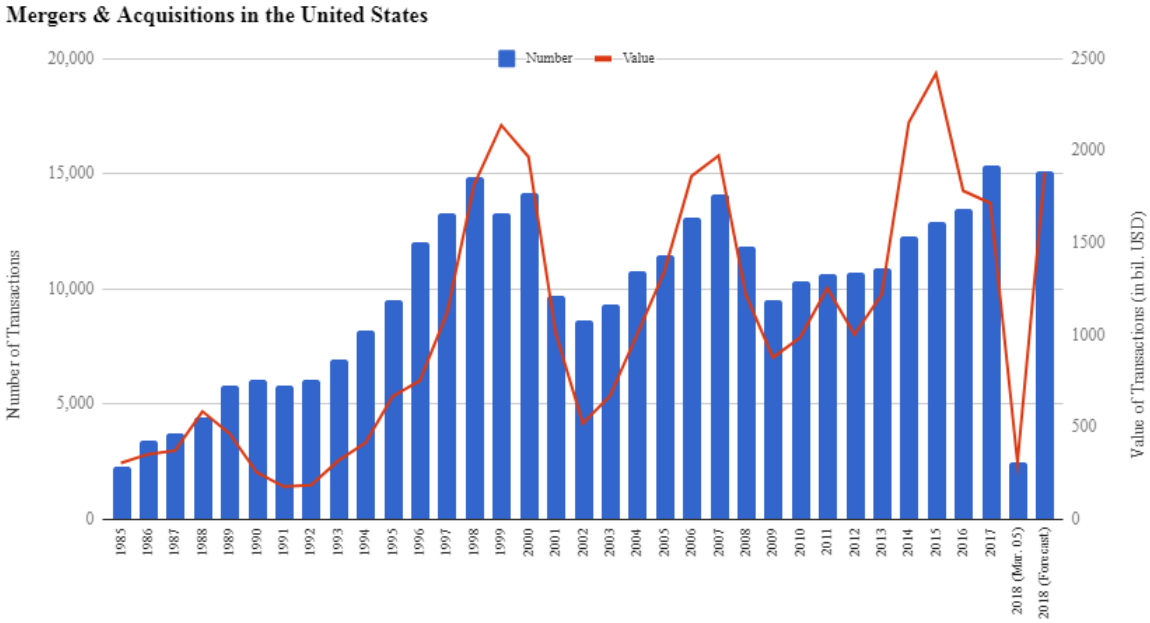


Figure 1- Announced M&As between USA and the World 1985-2017

Source: Institute of Mergers, Acquisitions and Alliances (2018)

1.5 Motives behind Mergers and Acquisitions

Researchers have planned and cited a number of hypothesis and theories to explain why companies engage in M&As. Some of the drivers are, for example, increase in market shares, increase in shareholder value, knowledge and technology transfer, tax liability reduction, resources distribution etcetera. Despite extensive research, merger motivation is mostly inconclusive. This paper will summarize three broad motivations that are identified and agreed by many researchers: Synergy, Hubris and Agency.

In the last two decades, synergy creation has been the main motivation driving managers and board of directors to complete M&A transactions. Sometimes acquirers pay above the value of the acquired firms in order to capture those synergy, so called hypothetical synergistic gain. Synergy is defined as financial and operational benefit or the increase in value which is the result of combination between two entities to

achieve a new and greater strength and value than the sum of the two separate entities (Frederikslust et al., 2000; Damodaran, 2005). According to Damodaran (2005) there are two types of synergy: operating synergy and financial synergy. Operating synergy could be achieved via economies of scale which offer acquirers cost efficiency, through better pricing which gives the merging firms more power and ability in term of product range and price imposition to final consumers. It is also achieved by the combination of different functional strengths and higher growth from existing as well as expanded markets (Damodaran, 2005). Financial synergy arises from the combination of two firms together which results in greater value than when they were operating separately. Financial synergy gives rise to financial benefits such as reduction in cost of capital, tax saving, better cash flow and increased debt capacity (Chatterjee, 1986, Fluck and Lynch, 1999). Previous studies [2] distinguish sources of synergies: those generating from the revenue side or revenue synergies or market-power theories, and those coming from the cost side or cost synergies or productive efficiency theories. Furthermore, synergy gives companies market power which could be as a result of a reduction in competition and higher profitability through the creation of monopolies or oligopolies (Andrade et al., 2001). According to Georgen and Renneboog (2004), when the main purpose for corporate takeover is synergy gain, shareholders of the firms involved in M&As should expected a positive wealth effect.

The second motive is hubris, which means excessive pride or over-confidence. The hubris hypothesis suggests that a manager can make mistakes when he identifies and undertakes the valuation of the equity of the target firm. Roll (1986) suggests that the hubris hypothesis is a possible explanation for the corporate takeovers phenomenon and tender offers in 1980s. He claims that bidders simply pay too much for their target firms when decision makers or managers are affected by hubris: meaning managers of bidding firm could be overconfident in their ability so that the valuation of target firm's equity is often too high, resulting in a high merger or takeover

[2]Jensen and Ruback (1983) and Eckbo (1983)

premium. High merger premium is sometimes unavoidable because shareholders of target firm will not sell below their current market value. In this case, it is necessary for both parties to undertake asset valuation before making M&A decision or agreement. Hubris hypothesis implies that if the M&A is overpaid, there could be a wealth effect transfer between bidder and seller. Consequently, wealth will increase for shareholders of the target firm and decrease for shareholders of the acquiring firm (Morck et al., 1990). In addition to the hubris hypothesis, Kelly (1994) took a different approach and showed that M&A activity is a herding activity and corporations do not intend to be left out from such growth opportunity as well as opportunity to develop its business horizontally and vertically. Shiller (1995) supports this finding and discusses that market trends or herding behavior is the main motive of corporate M&As and such behavior does not act in the best interest of bidder shareholders. Overall, the hubris hypothesis is one of the popular theories in behavioral finance to explain successful M&As deals and the poor subsequent operating performance, whereas market trends and corporate herding behavior are also considered to be the motives behind merger waves.

Next, one of the motives behind the increase in takeover offers is to alleviate agency problems or to remove inefficient and poor performance managers. The agency problem originates from the agency theory which explains the relationship between principals and agents. In finance, there are two agency relationships: shareholder and manager, shareholder and creditor. The agency problem happens when managers or executives, who act as the agent in charge of the company on behalf of the owner, might not act in the best interest of investors or shareholders, who are the principal or the owners of the company. In addition, it could happen when the principal and the agent have different attitudes towards risk as it could result in different actions being taken in relation to M&A realization or termination. To Shleifer and Vishny (1997), M&A is the most important tool for alleviating agency problems. Alternatively, it has been argued that some companies that were cash rich did not pay dividends to their shareholders but rather used in two way: firstly using the cash to acquire another

company in order to cover up for the shortfalls and under performance of the management team, secondly for the reason of bonus or higher remuneration (Frederikslust et al., 2000). Hodgkinson and Partington (2008) pointed out that managers sometimes engage in M&A for self-benefit at the expense of shareholders. Further, managers are possibly interested in acquiring companies in different fields of business in order to reduce their human capital risk (Seth et al., 2000). Additionally, corporate M&As might only be able to eliminate major inefficiencies but not minor inefficiencies, and acquirers may suffer from agency problems because they completed M&As that were too expensive for shareholders (Morck, Shleifer and Vishny, 1988; Shleifer and Vishny, 1997). Moreover, there is evidence that M&A activity in the 1980s were to address corporate management inefficiencies such as poor governance and diversification issues of those companies in the 1960s and 1970s (Kohers and Kohers, 2000; Holmstrom and Kaplan, 2001).

1.6 Short and long-term effects of company mergers on firm value

Long-term and short-term changes in merger transactions were also taken into account when stock performance was analyzed in the company's merger.

In the short term analysis, short turnaround stock performance including pre-merger announcement, announcement moment and post announcement is performed for both the buyer and the target firm. In the case of long-term analyzes, measurements are made for 3 to 5 years following the merger announcement.

Given the results of short-run analyzes, target firms often get statistically significant and positive excess returns. It is observed that companies that buy are usually compared with zero or negative excess returns. Looking at the results of long-term analysis, the firms that buy are still suffering losses.

1.6.1 Short-Term Wealth Effects Around M&A Announcements

Since M&As have announced, market participants and public investors have questioned which party benefits the most out of this activity and which stock to invest

in or to trade in order to earn capital gain or to generate higher return in the short-run. According to academic research on M&A announcement effects, it is evident that target stocks earn significantly high and positive returns, whereas bidder stocks exhibit only slightly positive returns. Sometimes abnormal returns are next to zero or even negative, over event window. The next will review and summarize the research relating to each party of M&As deals, including abnormal returns to acquirers and target firms.

1.6.1.1 Abnormal Returns of Acquiring Firms

In common, observed studies have shown different proof of abnormal returns to acquiring firms. Several researchers found positive returns and others found negative or zero abnormal returns nearby M&A announcements. The difference in result is mostly due to a various sample period, a various sample size and a various type of M&A being studied. It also differs according to the return model and length of event window being used. For example, Dodd and Ruback (1977) examined the effect of US tender offer announcements on stock returns between 1958 and 1978 and found that bidders exhibited a positive $CARs$ of 2.83%, and Dodd (1980) examined the effect of US merger announcements on bidders and found a negative $\overline{CARs}$ of -7.22%. In addition, Jenson and Ruback (1983) studied 13 scientific researches on takeover announcement effects on stock returns and found that the weighted average abnormal return to bidding firms was 3.81% for successful tender offers, and 1.37% for successful mergers. Following this, Lang, Stulz and Walkling (1989) studied short-term effects of 87 tender offers announcements between 1968 and 1986, using an 11-day event window, and found zero cumulative abnormal return to bidders. Next, Walker (2000) studied the short-term effects around M&A announcements between 1980 to 1996, using a market-adjusted model for predicted return and a 5-day event window (2 pre-event days, on event day, and 2 post-event days), and showed positive bidder $\overline{CARs}$ of 0.51% in case of tender offers and negative bidder $\overline{CARs}$ of -1.30% in case of mergers. Soon after on, Moeller, Schlingemann and Stulz

(2005) studied all types of announcement deals and compared three takeover waves from 1980 to 2001, using a 3-day event window [-1; +1] and a sample of 448 for the period 1980-1990, 1,519 for 1991-2001 and 729 for 1998- 2001, and they found positive acquirer $\overline{CARs}$ of 0.64%, 1.20% and 0.69% respectively. It can be noted that returns to bidding firms in the case of successful deals were very low or close to zero, but there is evidence that returns to bidding firms were slightly better when the M&A deals were unsuccessful or terminated. Dodd (1980) finds positive abnormal returns of 1.37% for acquiring firms after announcement of terminating the offer. It is possible that the bidders withdraw the offers after the re- evaluation of the synergy gain or because there is no creation of value from acquiring the target or perhaps the targets fight off the offers. Jensen and Ruback (1983) argued that analysing abnormal returns to bidders is not as easy as the target firms since there will be no effects around M&A announcements if the market participants or investors fully expect M&As to happen. In addition, bidders are mostly occupied with their strategic planning and corporate integration rather than engaging an isolated M&A transaction which therefore results in difficulty in determining the effects of M&A announcements on their stock prices (Malatesta, 1983).

Then again, there are also some studies that find negative abnormal returns for shareholders of bidding firms in the US. For example, Healy et al. (1992) studied the effect of 50 announcements of the largest acquisitions between 1979 to 1984 and showed that bidder $\overline{CARs}$ is negative at -2.20% using market-adjusted return model and event window of 5 days before the announcement of the first offer until the date the target is delisted from the public exchange. In addition, Byrd and Hickman (1992) examined the M&A announcement effects in the US between 1979 and 1984, using the sample of 128 tender offers and event window [-1; 0], and also found negative bidder $\overline{CARs}$ of -1.23%. Later in 2001, Andrade, Mitchell and Strafford compared short-term effects around M&A announcements in four sample periods (598 deals in 1973-1979; 1,226 deals in 1980-1989; 1,864 deals in 1990-1998; and a sum of 3,688

deals in 1973-1998), with the employment of [-1; +1] event window and market model. The results indicated negative bidder $\overline{CARs}$ in all sample periods: -0.3%, -0.4%, -1.0%, and -0.7% respectively. In addition, during the internet bubble between 2000 and 2001, Bhagat et al. (2005) used a sample of 79 tender offers and [-5; +5] event window and found statistically insignificant $\overline{CARs}$ of -0.81% for acquiring firms.

Generally, it is value to note that the results above are for completed domestic M&A deals between non- financial firms and the bidder results above are split among positive, zero, and negative abnormal returns relative to short-term announcement effects in the US. A more specific study on US high technology firms was conducted by Kohers and Kohers in 2000. They stipulated that technology-based sectors are vary from other types of sectors by their nature which features high rate of growth and inherent uncertainty due to heavily relying on future business performance and developments in not proven and unknown fields. Regarding shareholder wealth effects, they postulated that if high-tech targets possess attractive growth opportunities that would create value for acquirers, then acquiring those targets or desirable growth opportunities would result in positive reactions from investors or bidder shareholders. But, the uncertainty and unproven nature of high-tech corporations may cause investors and shareholders to be wary of the future merits of M&A. Therefore they hypothesized that if investors or bidder shareholders believe growth opportunity is not worth the cost, acquiring those growth potential targets would results in negative reactions towards bidder stocks. In this regard, their empirical research showed statistically significant positive $\overline{CARs}$ for bidders, using a standard market return model and an event window of [0; +1].

1.6.1.2 Abnormal Returns of Target Firms

Several researchers have found consistent result about the short-term announcement effects of M&As on target firms or acquired firms. Typically stock prices of target

firms raise significantly at the time of the announcement date. Target firms are perceived to be more chance than bidders or acquirers in terms of higher returns during the announcement of M&As. Dodd and Ruback (1977) and Chatterjee (1992) examine the impact of US tender offer announcements on bidders and report large positive returns from the event date, a statistically significant $\overline{CARs}$ of 20.89% for the period 1958- 1978 and 22.04% for the period 1963-1986 in that order. Additional, Dodd (1980) studied short-term effects of US merger announcements from 1970 to 1077, using market model and a 20-day event windows (-10 days before announcement, announcement day, and +10 days after announcement), and showed a highly positive $\overline{CARs}$ of 33.96%. Likewise, Dennis and McConnell (1986) used market- adjusted model and [0; +20] event window and report that there is statistically significant (at 5 percent level) positive $\overline{CARs}$ of 13.74% for US merger announcements between 1962 and 1980. In addition, Kaplan and Weisbach (1992) examine both merger and tender offer announcements of 209 sample from 1971 to 1982, using an 11-day event window [-5; +5], and report target $\overline{CARs}$ of 26.90%, while Graham et al. (2002) used shorter event window [-1;+1] with a 356 sample from all types of M&As between 1980 and 1995 and report target $\overline{CARs}$ of 22.51%, with both results being statistically significant at 1 percent level. Sometime later, Ang and Cheng (2003) examined all type of US M&A deals with 848 samples from 1988 to 2001. By using size and book-to-market ratio matched portfolio[3] and [-1; close] event window, they reported statistically significant (at 1 percent level) positive $\overline{CARs}$ of 26.11%.

According to the results summarized above, it seems that the size and the magnitude of short-term announcement effects on stock returns in the fourth and the fifth M&A wave are similar. Andrade, Mitchell and Stafford (2001) examined short-term announcement effects and compared the differences among the target returns of the three M&A waves (1973-1979, 1980-1989, and 1990-1998) and concluded that the

[3]Followed the Lyon and Barber (1996) methodology.

differences are not statistically significant, with target $\overline{CARs}$ around 16% in each M&A wave. The later study on target returns conducted by Bhagat et al. (2005), using a 79 sample of tender offers and [-5; +5] event window, found statistically significant and large $\overline{CARs}$ of 33.18% for the period 1997-2000 and 44.78% during the internet bubble between 2000 and 2001.

Additionally, previous research confirmed that share price reactions of target firms have occurred even before the announcement date, which suggests that there was information leakage relative to M&As and there might be trades based on insider information and rumours, or that the bids were anticipate by the market. Dodd (1980), Asquith (1983) and Asquith et al. (1983) showed that share prices of targets started to increase 20 trading days prior to the public press release of the mergers, with statistically significant (at 1 percent level) $\overline{CARs}$ of 21.78%, 13.30% and 16.80% respectively. Similarly, Schwert (1996) exhibits stock price reactions from 42 days before the announcement, with statistically significant (at 5 percent level) $\overline{CARs}$ of 11.90% for mergers and 15.60% for tender offers.

In summary, stock returns of target firms are mainly large around M&A announcements, and the results are consistent and statistically important among some researchers. In each M&A wave, the size and the magnitude of stock prices do not vary considerably. Having studied the takeover waves comparison, Bradley et al. (1988) and Bhagat et al. (2005) summarized abnormal returns over the 1960s, 1980s and 1990s amount to 18-19%, 32-35% and 32-45% respectively. The difference in abnormal returns in the first two periods mentioned above is due to the changes in M&As and insider trading regulation authorized in the United States (Martynova and Renneboog, 2005). Apart from this no earlier empirical research on abnormal returns to high-tech target firms has been found.

1.6.1.3 Abnormal Returns by The Method of Payment

Method of payment for M&A deals differs from one transaction to another. It depends on bidder's financial power and its asset value whether it is perfectly priced or not in the market. In addition, it depends on how whether the target firm prefers or agrees to accept the merger or takeover by cash or stock or the combination of cash stock. Commonly, the number of sample for cash financed mergers used in academic researches is higher than the number of sample for stock financed mergers. This might indicates the preference of both parties to use or to accept cash as the method of payment, or the success of M&As probably depends on how M&A deals are paid: by cash, stock, or the combination of cash and stock.

Many researchers agreed that cash payment mergers should outperform stock payment mergers in the post-merger operating performance[4], according to the agency theory or signalling hypothesis. In addition, some researchers[5] quarrel that the decision option in takeovers' payment method may be partially due to thought of agency cost because releasing existing and surplus free cash flows to finance takeovers could help alleviates potential agency problems. In terms of abnormal returns around M&A announcements by the method of payment, Kohers and Kohers (2000) studied the takeover wave between 1987 and 1996 and showed US acquirer $\overline{CARs}$ of 1.37% in cash offers (961sample) and 1.09% in stock offers (673 sample), and the results were statistically significant at 1 percent level. Similarly, Moeller, Schlingemann and Stulz (2004) examined the M&A announcement effects from 1980 to 2001 and found consistent result with Kohers and Kohers (2000). By using market model and a 3-day event window, Moeller et al. (2004) reported US acquirer $\overline{CARs}$ of 1.38% in case of cash offers (4,862 sample) and 0.15% in case of stock offers (2,958 sample). The result were also statistically significant at 1 percent level.

[4]For example, Wansley et al. (1983); Travlos (1987); Franks et al. (1988); Eckbo et al. (1990); Goergen and Renneboog (2004); Antoniou, Arbour and Zhao (2008).
[5]For example, Jensen (1986); Hansen (1987); Fishman (1989); Eckbo et al. (1990).

Although, previous empirical results moreover reported that in cash offers, the abnormal returns to acquirers are often unimportant and in stock offers, the abnormal returns to acquirers are often significant but negative[6]. For example, Frank et al. (1991) studied M&A announcement effects between 1975 and 1984 by using market model and a 11-day event window [-5; +5]. They found an unimportant acquirer $\overline{CARs}$ of 0.83% in cash offers (156 sample) and -3.15% in stock offers (128 sample), the final results are statistically important at 1 percent level. Later on, Chang (1998) also examined short-term effects around M&A announcements from 1981 to 1992 and found consistent results that US acquirer $\overline{CARs}$ of -0.02% in cash payment (101 sample) are not statistically significant, but US acquirer $\overline{CARs}$ of -2.46% in stock payment (154 sample) are statistically significant at 1 percent level. Consistent with earlier results, Andrade et al. (2001) reported US acquirer $\overline{CARs}$ of -1.50% in stock offers (2,194 sample) are statistically significant, but the results are positive and statistically unimportant in non-stock offers (1,494 sample), for the period 1973-1998.

The results of US acquirer $\overline{CARs}$ commonly are assorted between positive and negative, between important and unimportant. For US acquisition targets, the results are normally consistent with statistically significant positive $\overline{CARs}$ in either cash payments or stock payment. Franks et al. (1991) found $\overline{CARs}$ of 22.88% in stock offers and 33.78% in cash offers for the period 1975-1984, and for the period 1973-1998 Andrade et al. (2001) reported $\overline{CARs}$ of 13.00% in stock offers and 20.10% in no stock offers. In addition, Goergen and Renneboog (2004) examined share price performance in Europe by the method of payment from 1993 to 2001. They found strong proof that cash payment M&As trigger higher share price reaction than non-cash payment M&As for shareholders of target firms. However the result was

[6]For example, Wansley et al. (1983); Travlos (1987); Huang and Walkling (1987); Hansen (1987); Bradley et al. (1988); Murphy and Nathan (1989); Amihud et al. (1990); Frank et al. (1991); Berkovitch and Narayanan (1990); Brown and Ryngaert (1991); Faccio and Stolin (2006); Faccio et al. (2006).

opposite to bidders that non-cash offers are associated with higher abnormal return than cash offers to bidding to shareholders of acquirers.

Chapter II. Data and Methodology

2.1 Data Collection and Construction

This research examines the effect of mergers and acquisitions on the shareholder value in the High Technology market in the United States of America. The high-tech industry sectors were based on classifications made by Thomson Reuters namely Financial Macro/Mid Industry Hierarchy and includes the following industries: Computers and Peripherals, Electronics, E-commerce, Hardware, Internet Software and Services, Internet Infrastructure, IT Consulting Services, Semiconductors, Software, and other High Technology.

The research covers companies that have been traded on the US Stock Exchange for the period 2002-2014 and were subject to merger and acquisition. The companies involved in the research are compiled from the PricewaterhouseCoopers Mergers and Acquisitions Reports for the years 2002-2014.

After obtaining the necessary data, the sample contained 464 M&A deals that happened between 1 January 2002 and 31 December 2014. Then, the whole period sample is divided into two sub-periods for further analysis: from January 2002 to December 2007 (Pre-Crisis) and from January 2009 to December 2014 (Post-Crisis). The 2002- 2007 sample period is composed of 277 completed M&A deals, whereas the 2009-2014 sample period includes 143 completed M&A deals.

In particular, the criteria with which the sample data were constructed are as follows:

1.The M&A announcement date is between 1 January 2002 and 31 December 2014. The basis for this period selection is to research the modern effect of M&A announcements after the dotcom bubble that was analyzed by most research during that time.

2.The acquirers and the target firms are public companies as the data availability of stock price returns and accounting information are necessary to undertake this event study. Further, all companies that go public after their respective M&As announcement dates are excluded accordingly during the event study programme running procedure.

3.All deals are completed or successful M&As deals that happened in the United State of America, followed Kohers and Kohers (2000) and Antoniou, Arbour and Zhao (2008).

4.The parties involved (both bidders and targets) are in the high-tech sector in an objective to study and compare the short-term announcement effects in high-tech M&As only.

5.The corporate deal value of each M&A in this sample is over one million US dollars because this screens out the deals that are too small to make a material difference in the returns of the companies involved (Fuller et al., 2002; Moeller, Schlingemann and Stulz, 2004; Moeller and Scholingemann, 2005; Antoniou et al., 2008).

6.Both acquiring and target firms must have at least 270 trading days (equivalent to 54 weeks) of returns data prior to the event date. The reason is that the estimation window of 250 days before the event date is used to estimate normal return. This long estimation window or big sample size is necessary to avoid serial correlation or to have an efficient estimator. The event window primarily totals 31 days (15 pre-event days, event day, and 15 post-event days), and then different event windows are employed in order to study the strength of the result as well as to find out which event window is more suitable and appropriate to capture short-term announcement effects. In addition, Damodaran (2002) suggests that a shorter estimation period should be used if the companies studied are operated in a dynamic environment such as IT industry.

7.The independent market return variable is the value-weighted returns of NYSE/AMEX/Nasdaq which is used by several authors (Kohers and Kohers, 2000; Dong et al., 2006; Fuller et al., 2002).

8.The sample includes the method of payment such as by cash only, stock only or the combination of cash and stock. Excluded from the sample are those transactions where there is no information relating to the method of payment or where the deals are financed by securities other than cash or stock.

9.Some firms have more than one event (M&A), and there might be the issue of confoundedness or clustering within the estimation window which could consequently affect OLS regression or the estimate of normal return, if each event happened near or close to each other. In this conduct, each event can only be kept in the sample as long as each event are 13 months or about 395 days or 220 trading days apart from one another. Besides, the M&As might be announced on a non-trading day which results in the effect being observed one or two days later.

With the above criteria, the total sample size of 464 completed M&A deals between 2002 and 2014 is reduced to approximately 281 deals (for acquirers) and 285 deals (for targets). For the two sub-periods (pre-financial crisis and post-financial crisis), after applying these filters, 154 and 100 events sample are obtained for acquirers, while there are 169 and 114 event sample for the target firms.

Table 2.1 (Table 2.2) shows statistics of the sample by showing the number of mergers and acquisitions completed annually by bidders (targets). It can be seen from the table that the US M&As market experienced the big wave between 2003 and 2008 before the financial crisis, and it started to decrease from 2008 until 2011 and then recover during the last three years. Column 3 totals the deals value in each of the sample year, whereas Column 4 distinguishes the number of deals financed by cash, stock, or the combination of cash and stock for a given calendar year. Overall, almost three quarters of the total number of sample deals are financed by cash, while the

remaining are stock payment and mixed payments with 31 and 35 occurrences for acquirers (26 and 29 for targets) respectively. To make an easy presentation, an illustration in Figure 2 and Figure 3 shows the change in the number of deals each year.

Table 2.1 Summary of Sample Statistics for Acquirers Between 2002-2014

Year	Number of deals	Total value of deals in million USD	Method of Payment		
			Cash	Stock	Mixed
2002	26	4,614.26	16	6	4
2003	30	13,605.41	19	5	6
2004	20	48,890.14	12	5	3
2005	24	13,230.12	17	1	6
2006	21	17,387.26	14	5	2
2007	31	14,556.68	26	2	3
2008	30	43,475.96	27	1	2
2009	24	18,280.06	18	2	4
2010	21	9,233.26	16	3	2
2011	6	1,530.41	5	0	1
2012	20	12,555.39	19	0	1
2013	17	19,708.50	17	0	0
2014	11	12,627.06	9	1	1
Total	281	229,694.51	215	31	35

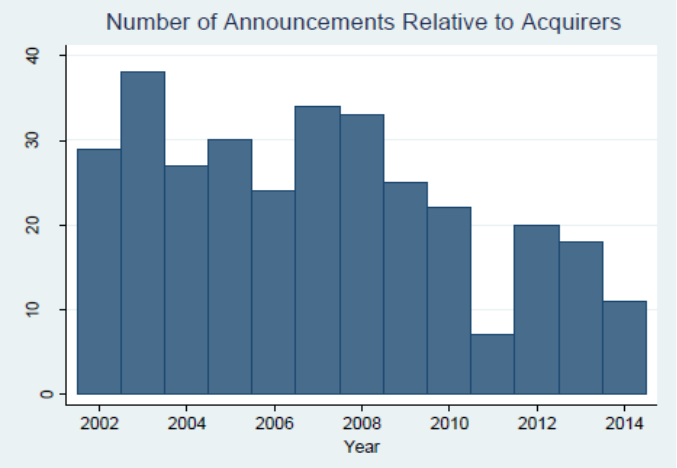


Figure 2- Number of Announcement of Acquirers by Calendar Year

Table 2.2 Summary of Sample Statistics for Targets Between 2002-2014

The sample is composed of the annual number of completed deals for US public targets, total deal value per calendar year in million US Dollars, the considered method of payment used such as by cash, by stock, and a combination of both cash and stock.

Year	Number of deals	Total value of deals in million USD	Method of Payment		
			Cash	Stock	Mixed
2002	6	130.88	5	1	0
2003	16	11,362.48	13	1	2
2004	20	49,207.51	13	5	2
2005	35	24,509.76	24	3	8
2006	28	26,801.03	21	5	2
2007	36	26,369.52	31	2	3
2008	31	64,038.91	27	2	2
2009	24	18,608.11	17	2	5
2010	27	15,481.54	22	3	2
2011	9	2,051.09	8	0	1
2012	21	12,687.24	19	1	1
2013	19	16,916.87	19	0	0
2014	13	17,589.34	11	1	1
Total	285	285,754.28	230	26	29

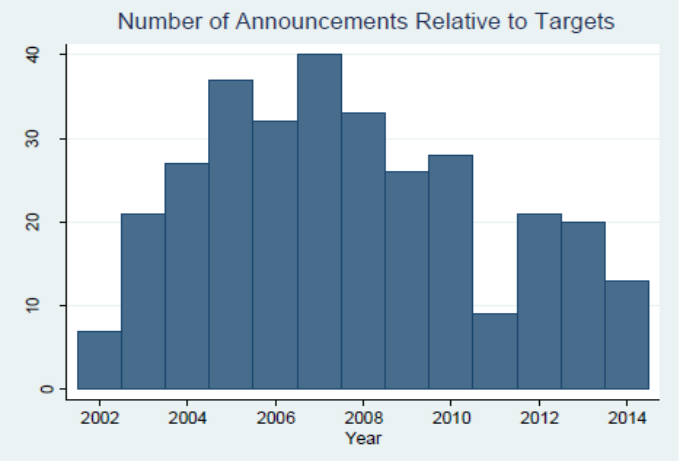


Figure 3 - Number of Announcements of Targets by Calendar Year

2.2 Methodology

To study of mergers and acquisitions on shareholder values as well as to discover any patterns or trends useful for trading, this dissertation will use the event study methodology following Brown and Warner (1985) and MacKinlay (1997). Traditionally, event study methodology involves calculating expected returns, abnormal returns and cumulative average abnormal returns ($\overline{CARs}$), for example the methodology employed by Fama, Fisher, Jensen and Roll (1969).

The purpose of this study is to demonstrate whether firms' announcements of merger decision have any influence on the stock returns of these firms. An event study is a method that measures the impact of a given event on a firm on the price of a stock and is widely used today.

Event study method is to determine whether an event can be obtained about the date of the first announcement to the market. Excess return is higher or lower than normal return to be earned if the news is not announced to the market. These returns are often associated with the performance of the cumulative market index effect on the event date and are called "abnormal returns" (Rao, 1995,pp.189).

The predicted or expected return is computed by an asset pricing model, and abnormal returns is the excess returns, and CAR is the sum of excess return and it may be used to find out how accurate the model is. In other words, this event study is intended to investigate stock prices reactions to M&A announcements whether there are abnormal returns to acquirers and target firms surrounding the announcement period. On the other hand, this event study examines the efficient market hypothesis (EMH) by observing the rationality of market participants. EMH posits that all available information (past, public and private) is reflected in stock prices and investors could not earn excess returns from the market if their trades are based on public or already known information. Even though there is new information, stock prices will adjust quickly because investors are expected to act in a rational manner to maximise profits (Fama et al., 1969). In other words, if the market is efficient and

investors are rational, the M&A announcements would have an impact on or be incorporated into stock prices immediately. Basically, the economic impact of an event could be measured by identifying the abnormal returns surrounding the announcement date over a short time period.

Technically, there is a five steps process: (1) calculating daily normal return (R_{it}) which is the daily expected return with no any event taken place; (2) calculating daily abnormal return (AR) for each firm around M&A announcements; (3) calculating the average abnormal return ($\overline{AR}$) or called abnormal return across firms; (4) calculating cumulative abnormal return (CAR) and (5) finally calculating the sum of the average abnormal returns over the T days in the event window namely the cumulative average abnormal return ($\overline{CAR}$) or cumulative abnormal return across firms.

Commonly there are various models used by researchers to calculate daily normal return such as (1) Market Model; (2) constant mean return model; (3) net-of-characteristic matched portfolio (or matched firm) return; (4) multi-factor models introduced by Fama and French (1993) and Carhart (1997); (5) an equilibrium asset pricing model of Markowitz (1959), called Capital Asset Pricing Model (CAPM). This research will use statistical market model to calculate daily normal return of the security (R_{it}). Then, R_{it} will be used to compare with the actual returns in order to find the daily abnormal return of the security (AR_{it}). Normal return (R_{it}) is the expected return $E(R_{it}|X_t)$ of a security i by assuming there is no occurrence of an event, and abnormal return or excess return ($AR_{i\tau}$) is the actual ex post return of the security i over the event window minus expected return over the same event window. The market model is based on the assumption of a constant linear relation between return of individual asset and return of the market index, and is represented by the equation below:

$$E(R_{it}|X_t) = R_{it} = \hat{\alpha}_i + \hat{\beta}_i R_{mt} + \varepsilon_{it} \quad (2.1)$$

This model is similar to equilibrium model of CAPM, except for intercept $\hat{\alpha}_i$ because it is a constant rather than the risk-free rate that is usually derived from one-month Treasury bill. Market Index return (R_{mt}) is the value-weighted index return from CRSP in period t, and ε_{it} is the error term or idiosyncratic risk or abnormal return of security i at time t. The market model parameters, $\hat{\alpha}_i$ and $\hat{\beta}_i$, are estimated via ordinary least squares (OLS) regression. In this conduct, an estimation window of 250 days, which is from day –270 to day –20 prior to M&A announcement date, is used to estimate the parameters for calculation of predicted returns of security i in the event window (L_2). By assuming return data from 20 days before the announcement are not influenced by the event itself, the estimation window is considered as a normal period. Once $\hat{\alpha}_i$ and $\hat{\beta}_i$ value are estimated, the predicted or normal returns in the event window (L_2) will be determined by plugging in the market return equation (2) below. The announcement date of M&As is the event day (τ) in this event study. The difference between daily normal return and daily actual return for individual security at each point in time during the event window (L_2) is daily abnormal return. The event window in this study is basically from day -15 to day +15 relative to the event date. Given the standard market model, the abnormal return for security i on day t is equal to the realized return (R_{it}) minus the predicted return ($\hat{\alpha}_i + \hat{\beta}_i\ R_{mt}$) which is represented by the equation (2.2) below:

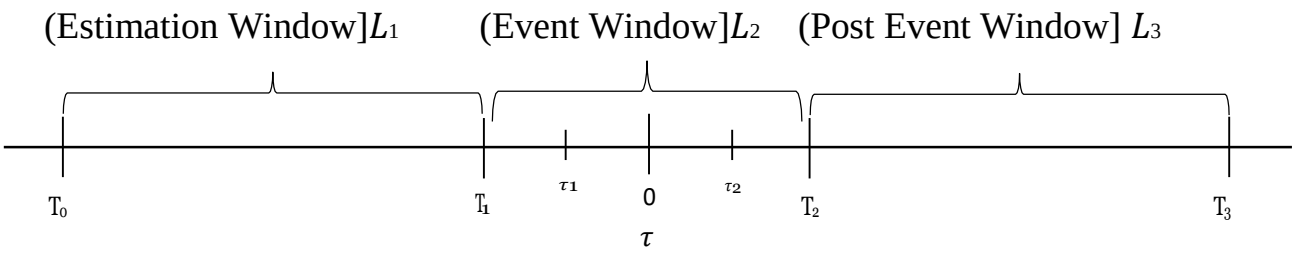
$$AR_{it} = R_{it} - E(R_{it}|X_t) \qquad (2.2)$$

or

$$\varepsilon_{it} = AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt}$$

Conditional on the event window market returns, under the null hypothesis, the abnormal returns are assumed to be normally and jointly distributed with a zero conditional mean and conditional variance. Although there might exist a sampling error in $\hat{\alpha}_i$ and $\hat{\beta}_i$ which could result in serial correlation of abnormal returns, this

additional variance is assumed to disappear or be zero when the number of days in estimation window (L_1) are large enough or longer than 30 days (MacKinlay, 1997). In this regards, an estimation window (L_1) of 250 days is chosen.



(Illustration of Time Span of Estimation Window, Event Window, and Post Event Window)

Next, it is necessary to calculate cumulative abnormal return (CAR_i) of each security i and cumulative average abnormal return ($\overline{CAR}$). In the equation (2.3) CAR_i is the sum of daily abnormal returns of individual security i over event window, particularly from time τ_1 until τ_2 illustrated above. The period in event window for this event study is initially 31 days, which is comprised of 15 pre-event days, the event day, and 15 post-event days.

$$\overline{CAR}_i(\tau_1,\tau_2)=\sum_{\tau=\tau_1}^{\tau_2} AR_{i\tau} \quad \text{or} \quad \sum_{\tau=\tau_1}^{\tau_2}\hat{\varepsilon}_{it} \qquad (2.3)$$

With the variance

$$\hat{\sigma}_i^2(\tau_1,\tau_2)=(\tau_2-\tau_1+1)\hat{\sigma}_{\varepsilon_i}^2 \qquad (2.4)$$

The $\overline{CAR}$ over events (firms) is represented by equation below:

$$\overline{CAR}(\tau_1,\tau_2)=\frac{1}{N}\sum_{i=1}^{N} CAR_i(\tau_1,\tau_2) \qquad (2.5)$$

With the variance

$$\overline{\hat{\sigma}_i^2}(\tau_1,\tau_2) = \frac{1}{N^2}\sum_{i=1}^{N}\hat{\sigma}_i^2(\tau_1,\tau_2) \qquad (2.6)$$

The null hypothesis (H_0) means there is no abnormal returns or abnormal returns are equal to zero. It means M&A announcements has zero impact on stock prices or returns behaviour (mean or variance) of the acquirers and targets firms. The alternative hypothesis (H_1) is abnormal returns are not equal to zero, meaning there is short-term announcement effect on stock prices for bidders and for target firms. To measure the significance of the results of cumulative average abnormal returns, two parametric tests are used (J_1 and J_2).

To calculate J_1 it needs standardised $CARs$ and error variance, represented by $SCAR_i(\tau_1,\tau_2)$ equation below and equation of $\hat{\sigma}^2(\tau_1, \tau_2)$ above.

Test for significance of CAR_i

$$\overline{SCAR_i}(\tau_1,\tau_2) = \frac{\overline{CAR_i}(\tau_1,\tau_2)}{\sqrt{\hat{\sigma}_i^2(\tau_1,\tau_2)}} \qquad (2.7)$$

Test for significance of aggregated $CARs$ (J_1)

$$J_1 = \frac{\overline{CAR_i}(\tau_1,\tau_2)}{\sqrt{\hat{\sigma}_i^2(\tau_1,\tau_2)}} \qquad (2.8)$$

The second significance test (J_2), followed the standardized test of Patell (1976) namely Patell Z, are used in order to have a stronger and more consistent test result. If there is a difference in the number of observations for each firm, due to data

availability, this second test is recommended. To find the value of J_2 it needs the average of $SCAR_i(\tau_1, \tau_2)$ of all firms (See the equation below)

$$\overline{SCAR}_i(\tau_1, \tau_2) = \frac{1}{N}\sum_{i=1}^{N}\overline{SCAR_i}(\tau_1, \tau_2) \qquad (2.9)$$

With the variance of average standardized cumulative abnormal returns ($\overline{SCAR_i}$) over events

$$Var\left[\overline{SCAR}_i(\tau_1, \tau_2)\right] = \frac{1}{N^2}\sum_{i=1}^{N} Var\left[\overline{SCAR}_i(\tau_1, \tau_2)\right] \qquad (2.10)$$

Under the null: $\overline{SCAR_i}(\tau_{1,}\tau_2) \sim N(0, \frac{L_1 - 2}{N(L_2 - 4)})$ asymptotically

Then, under the null, the significance test J_2 is defined as follow:

$$J_2 = \frac{\overline{SCAR_i}(\tau_{1,}\tau_2)}{\sqrt{\frac{L_1 - 2}{N(L_2 - 4)}}} \qquad (2.11)$$

One last note here is that both J_1 and J_2 are two-tailed hypothesis-tests.

2.3 Hypothesis

This study will show short-term M&A announcement effects on abnormal returns of acquirers and targets in the US high-tech sector. This sector, which features the most advanced equipment and engineering techniques, is said to have a high rate of growth and high-risk. In addition, the paper will examine how these features affect the observed value creation of high-tech takeovers. Given the increasingly prominent role of technology industries in the contemporary US economy and the unique features of companies operating in the high-tech sector, this study will provide the most up-to-date findings regarding M&A announcement effects on US firms by testing the following hypothesis:

H1.1 As high-tech targets are believed to have potential growth opportunities and to create value for acquirer companies, there will be statistically significant positive abnormal returns to high-tech acquirers relative to mergers and acquisitions announcements. In other words, there is a short-term announcement effect on stock returns of US high-tech acquirers for the full period sample.

H1.2 As acquisition targets are most likely to gain from being acquired or paid higher value than their current market value (merger premium), its current stock price would increase after the merger or takeover announcement. Therefore, the hypothesis here is that there will be statistically significant positive abnormal returns to high-tech targets relative to mergers and acquisitions announcements. In other words, there is short-term announcement effect on stock returns of US high-tech targets for the full period sample.

H2.1 Cumulative average abnormal returns ($\overline{CARs}$) to high-tech acquirers is statistically significant negative during the pre-crisis (2002-2007) and is statistically significant positive during the post-crisis (2009-2014).

H2.2 Cumulative average abnormal returns ($\overline{CARs}$) to high-tech targets is statistically significant positive in both pre-crisis (2002-2007) and post-crisis period (2009-2014).

H3.1 Previous researches[7] that studied the effect of the payment method in M&As found negative abnormal returns to acquirers in stock offers, and statistically insignificant abnormal returns in cash offers. This hypothesis is that the cumulative average abnormal returns ($\overline{CARs}$) to US high-tech acquirers, for either entire period sample or sub-period sample (both pre-crisis and post-crisis), is statistically significant positive when M&A deals are financed by cash and is negative when the deals are paid by using equity or stock.

H3.2 Since abnormal returns to target firms are generally high and positive in both cash-financed and stock-financed mergers, the hypothesis is the cumulative average abnormal returns ($\overline{CARs}$) to US high-tech targets, for either entire period sample or sub-period sample (both pre-crisis and post-crisis), are statistically significant positive regardless of whatever the method of payment is.

[7]Includes Brown and Ryngaert (1991); Amihud et al. (1990); Berkovitch and Narayanan (1990); Murphy and Nathan (1989); Bradley et al. (1988); Travlos (1988); Huang and Walkling (1987); Hansen (1987); Wansley et al. (1983).

Chapter III. Empirical Result

In this chapter, it will demonstrate the empirical results of this event study (the announcement effects of M&As in US high-tech sector). In part one, the abnormal returns to acquirers and acquisition targets will be shown through the calendar year between January 2002 and December 2014. Secondly the comparison between pre-crisis and post-crisis periods will be considered. Finally, the result will show the announcement effect by the method of payment. In addition, the results will be controlled for different event windows and one deal characteristic namely the method of payment to check the persistence and robustness of the results.

3.1 Cumulative Average Abnormal Returns to Acquirers and Targets

3.1.1 Whole Sample Cumulative Average Abnormal Returns

The previous section shows the equation of the cumulative abnormal return of security i from time τ_1 to time τ_2, denoted by $\overline{CAR}_i(\tau_1, \tau_2)$ and it will be used to calculate cumulative average abnormal return $\overline{CAR}(\tau_1, \tau_2)$ which is the aggregation of the average abnormal returns across firms. This can equally be defined as the average of CAR_i by security and then aggregating through time. The event window spans 15 pre-event days to 15 post-event days, while day zero is the mergers and acquisitions announcement date or press release date of the firm involved. Table 3.1.1 below tabulates the $\overline{CARs}$ as a percentage, and the result also compares the effect and significance tests between the bidders and target firms from 2002 to 2014, which is the full sample period. Panel A shows the $\overline{CARs}$ each day within the event window and the test statistics (J_1 and J_2) for the bidders, when Panel B does show those of the acquisition targets.

As shown in Table 3.1.1, the cumulative average abnormal returns ($\overline{CARs}$) for high-tech acquirers in the US between 2002 and 2004 are insignificant and negative on and after the event date. In other words, the M&A announcements have no impact on the

returns of acquirers when the 31 days event window [-15; 15] is used. For the acquisition targets, however, the results are opposite to those of the bidders. The US high-tech targets report positive $\overline{CARs}$ of 16.59% on the announcement date and it keeps increasing until the end of the event window, and the results are statistically significant from day -11 until day +15. The results presented in Table 3.1.1, using an estimation window [-270 days to -20 days] and an event window [-15 days to +15 days], suggest that the high-tech targets earn highly significant abnormal returns before, on and after the event, whereas the high-tech acquirers exhibit zero impact surrounding the takeover announcement. Compared to the hypothesis mentioned in the previous section, the negative results of acquirer $\overline{CARs}$ are not consistent with H1.1 but the positive results of target $\overline{CARs}$ are consistent with H1.2. On this basis it can be explained that investors look for certainty of profitability or short-term capital gain by buying the stocks of target firms as they generally increase after the announcement. Most importantly, there is general belief that the targets are attractive to the acquirers not only in term of value creation but also potential growth opportunities as well as knowledge and technology transfer. Although there are growth benefits for the acquirers, derived from the integration or combination of two high-tech firms, shareholders and investors might only focus on the rapid and short-term gains by trading the target stocks as generally share prices of target firms offer higher and quicker returns than those of the bidders. Even if the potential growths might have been identified by investors, there is still high-risk as the growth prospects might not be realized due to inherent uncertainty. Besides the investor positive sentiment towards the target firms is transparent and very high due to its significant and positive abnormal returns even before the initial public announcement date. On the other hand, in the case of US bidders, the market might perceive M&As between two publicly traded high-tech companies as not as attractive as M&As between a publicly traded high-tech bidder and a privately owned high-tech target, or between a publicly mature high-tech bidder and a privately young target in its earlier stage of development and growth. Kohers and Kohers (2000) argued that the limited

access to the public funds or capital of the private target companies could prevent them from developing commercially and economically in this advanced and highly competitive industry. Furthermore, investors may have considered that M&As of technology-based companies were not worth the cost or too expensive for the bidder shareholders because normally the bidders tended to pay high premiums for the high-tech targets in order to capture those potential synergy gains. Therefore, stocks of the target firms tends to always be more attractive to the public investors than the long-term growth stocks of the acquirers. What is more is that these results are consistent with many academic researchers[8], who find little evidence to support significant abnormal returns to acquiring firms, but statistically significant and highly positive abnormal returns for the targets surrounding the event date.

3.1.2 Abnormal Returns by Different Event Windows

This sub-section checks the robustness of previous results as well as checking how the short-run abnormal returns change before, on, and after the event day by using different event windows. The finding is that the results are robust for the acquisition targets but not for the acquiring firms. The abnormal returns to acquired firms are still highly positive and statistically significant at 1 percent level across different event windows, whereas the abnormal returns to the acquiring firms are positive and statistically significant only when the event window period is shorter or from one day before the event day and from the event day. Table 3.1.2 summarizes the cumulative average abnormal returns ($\overline{CARs}$) of the high-tech acquirers and targets in the US as the result of M&A announcement effects between January 2002 and December 2014. Panel A shows the bidder $\overline{CARs}$ and its significance test in each event window presented, while Panel B also shows those of the target firms. The sample size (N) used differ according to the event window used and it is provided in each panel and

[8]Asquith (1983), Eckbö (1983), Lang et al. (1989), Morck et al. (1990), Frank et al. (1991), Smith and Kim (1994), Schwert (1996), Mulherin and Boone (2000), Andrade et al. (2001), Bhagat et al. (2005), Ang and Cheng (2006), Hackbarth and Morellec (2008).

in each event window studied. Day 0 is the announcement day or the press release day or the event day. It can be seen from Panel A of Table 3.1.2 that the cumulative average abnormal returns for the acquirers are statistically significant and positive (both J_1 and J_2) for shorter event windows, showing positive but low $\overline{CARs}$. For the acquisition targets in Panel B of Table 3.1.2, $\overline{CARs}$ are highly positive with the lowest $\overline{CARs}$ of 13.53% on the event date and the highest $\overline{CARs}$ of 23.61% for the event window of 31 days. The test statistics of target $\overline{CARs}$ are statistically significant at 1 percent level (both J_1 and J_2) across different event windows. The significance in pre-event day for the targets is consistent with the previous research and explanation that there might be rumour and information leakage relative to the M&A deals. Or the trades in target stocks might be based on insider information. Consequently, the target firms earn significantly high and positive abnormal returns before the announcement date.

Table 3.1.1 Cumulative Average Abnormal Returns and Test Statistics (2002-2014)

Event Day	Acquirers (N =281)			Targets (N = 285)		
	$\overline{CAR}$ (%)	J_1	J_2	$\overline{CAR}$ (%)	J_1	J_2
-15	0.04	0.24	-0.36	0.21	1.20	1.13
-14	0.18	0.79	0.71	0.37	1.53	1.27
-13	0.19	0.70	0.54	0.57	1.92*	1.51
-12	-0.14	-0.44	-0.60	0.71	2.07**	1.49
-11	-0.29	-0.83	-0.93	0.95	2.50**	2.06**
-10	-0.58	-1.52	-1.27	0.90	2.16**	2.20**
-9	-0.69	-1.66*	-1.43	0.93	2.07**	2.21**
-8	-0.69	-1.54	-1.15	0.95	1.96**	2.23**
-7	-0.60	-1.27	-1.07	0.88	1.72*	1.89*
-6	-0.56	-1.13	-1.09	1.25	2.31**	2.47**
-5	-0.92	-1.76*	-1.68*	1.29	2.28**	2.48**
-4	-0.68	-1.24	-1.16	1.82	3.07***	3.71***
-3	-0.77	-1.36	-1.26	2.01	3.27**	3.93***
-2	-0.68	-1.15	-1.06	2.46	3.85***	4.54***
-1	-0.63	-1.03	-1.15	2.82	4.26***	4.99***
0	-0.35	-0.55	-0.16	16.59	24.30***	26.44***
1	-0.55	-0.84	-0.08	21.98	31.24***	33.56***
2	-0.56	-0.84	-0.08	22.20	30.66***	33.00***
3	-0.53	-0.77	0.03	22.25	29.91***	32.13***
4	-0.59	-0.84	-0.02	22.46	29.42***	31.65***
5	-0.49	-0.68	-0.08	22.75	29.08***	31.10***
6	-0.44	-0.60	0.00	22.96	28.67***	30.68***
7	-0.60	-0.79	-0.23	22.77	27.82***	29.74***
8	-0.23	-0.30	0.16	23.04	27.56***	29.38***
9	-0.18	-0.23	0.31	23.23	27.22***	29.14***
10	-0.29	-0.36	0.17	23.10	26.54***	28.41***
11	-0.10	-0.12	0.53	23.49	26.49***	28.43***
12	0.18	0.22	0.80	23.60	26.13***	28.06***
13	0.25	0.30	0.88	23.75	25.84***	27.79***
14	0.20	0.23	0.78	23.81	25.46***	27.32***
15	0.05	0.06	0.73	23.61	24.84***	26.81***

***Significant at the 1 percent level. **Significant at the 5 percent level.*Significant at the 10 percent level.

Table 3.1.1 shows the cumulative average abnormal returns ($\overline{CARs}$) of the acquirers and the target firms relative to merger and acquisition announcement effects. Panel A shows the $\overline{CAR}$ each day in the event window and its test statistics for the bidders, while Panel B also does the same things for the acquisition targets. The sample size is also provided in each Panel. The event window period is 31 days (-15 days before to 15 days after the event). Day 0 is the announcement or the event day.

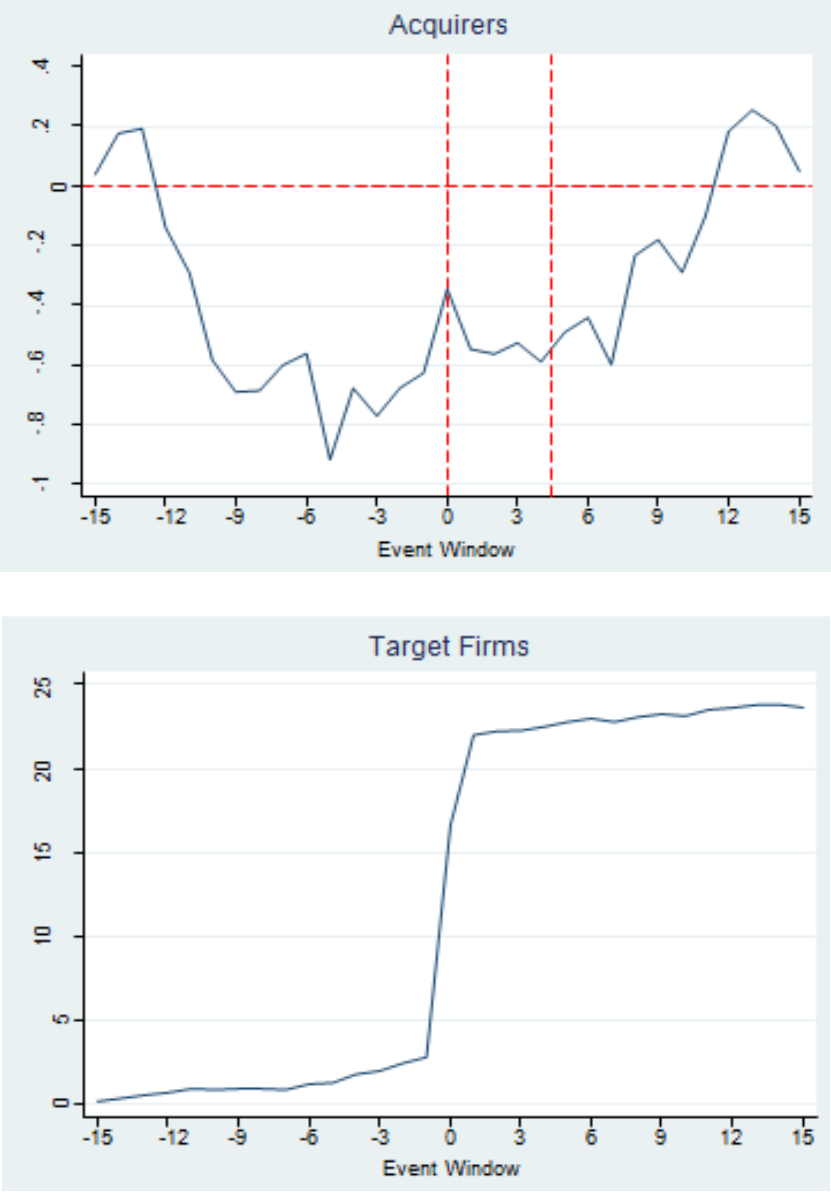


Figure 4- Acquirer and Target $\overline{CARs}$ from day -15 to day +15

Table 3.1.2 $\overline{CARs}$ and Test Statistics by Event Window

Table 3.1.2 shows the cumulative average abnormal returns ($\overline{CARs}$) of high-tech acquirers and high- tech target firms by different event windows. The sample is the merger and acquisition announcements from January 2002 to December 2014. Panel A shows the $\overline{CARs}$ in each event window and its test statistics for the bidders, while Panel B shows those of the targets. The sample size (N) is given in each panel and each event window. Day 0 is the announcement or the event day.

Event Window	Acquirers				Targets			
	N	$\overline{CAR}$ (%)	J_1	J_2	N	$\overline{CAR}$ (%)	J_1	J_2
[-15, +15]	281	0.05	0.06	0.76	285	23.61	24.84***	26.81***
[-15, 0]	281	-0.35	-0.55	-0.16	286	16.35	23.81***	26.28***
[-5, +5]	281	0.07	0.14	0.92	286	21.99	38.63***	40.98***
[-1, +1]	281	0.13	0.47	2.09**	286	19.17	64.47***	69.54***
[-1, 0]	281	0.33	1.48	2.34**	286	13.85	57.07***	62.25***
[0]	281	0.28	1.79*	3.78***	286	13.53	78.81***	85.81***
[0, +1]	281	0.08	0.36	2.89***	286	18.84	77.62***	83.59***
[0, +5]	281	0.14	0.35	1.66*	286	20.50	48.74***	50.88***
[0, +10]	281	0.34	0.65	1.60	285	20.28	35.82***	37.85***
[0, +15]	281	0.82	1.29	2.31**	285	20.79	30.45***	32.49***
*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.								

3.2 Pre-Crisis and Post-Crisis Cumulative Average Abnormal Returns

3.2.1 Pre-Crisis and Post-Crisis $\overline{CARs}$ to Acquirers and Targets

This section examines abnormal returns to acquirers and targets in a shorter event window and considers how the effects of M&A announcements in high technology

industry change before and after financial crisis in 2008. Table 3.2.1 reports the cumulative average abnormal returns ($\overline{CARs}$) of high- tech acquirers and high-tech target firms, relative to M&A announcements, before and after financial crisis. The pre-crisis is the six-year announcements period before the crisis (2002-2007), whereas the post-crisis is the six-year announcements period after the crisis (2009-2014). Panel A shows the acquirer $\overline{CARs}$ in percentage each day within the event window and the test statistics, while Panel B shows those of the acquisition targets. The sample size (N) is provided in each sub-period. These two sub-periods use an event window of 7 days (one pre-event day to five post-event day). Day 0 is the announcement day or press release day or the event day.

By dividing the whole sample period into two six-year periods, an analysis between pre-crisis and post- crisis abnormal returns can be conducted. It is clearly seen in the Table 3.2.1 that there is a similarity and a difference between cumulative average abnormal returns in the pre-crisis and post-crisis period. For the acquirers, the $\overline{CARs}$ during pre-crisis are positive one day before the announcement and negative after the announcement, meaning there is an increase in negative abnormal return to acquirers after the event day. The results are statistically significant at 1 percent level from day +1 until day +4 except for day +5 which is statistically significant at 5 percent level (J_2). The post-crisis $\overline{CARs}$ for acquirers, on the other hand, are negative before the event and but positive since the announcement day, the positive result during the post-crisis is slightly above one or two percent, and these results are statistically significant at 1 percent level from day 0 to day +5. This post-crisis report, for the acquirers, is consistent with the Hypothesis H2.1 mentioned in the previous section which is that there are abnormal returns to acquirers due to M&A announcement effects in the high technology sector. In addition, this result indicates that the financial crisis in 2008 does positively impact the shareholder returns in high-tech firms in the US. Most likely, it might be due to the changes in market perception not only towards the high-tech takeovers but also towards the acquirers' prospects as

investors might observe financial strength of acquirers as well as the qualifications or the ability of experienced managers to survive the credit crisis.

Table 3.2.1 Cumulative Average Abnormal Returns Before and After the Crisis

Table 3.2.1 reports the cumulative average abnormal returns ($\overline{CARs}$) of high-tech acquirers and high-tech target firms, relative to M&A announcements in the US, before and after the financial crisis in 2008. The pre-crisis is the six-year period before the crisis, whereas the post-crisis is the six- year period after the crisis. Panel A shows the acquirer $\overline{CARs}$ in percentage each day in the event window and test statistics, while Panel B also shows of acquisition targets. The sample size is also provided in each sub-period. These two sub-periods use an event window of 7 days (-1 day before to +5 days after the event date). Day 0 is the public announcement day or the event day.

Panel A: $\overline{CARs}$ ***of the Acquirers***

Event Day	Pre-Crisis 2002-2007 (N = 154)			Post-Crisis 2009-2014 (N = 100)		
	$\overline{CAR}$ (%)	J_1	J_2	$\overline{CAR}$ (%)	J_1	J_2
-1	0.05	0.20	-0.05	-0.13	-0.58	-1.38
0	-0.48	-1.44	-0.76	1.14	3.49***	3.81***
1	-1.45	-3.51***	-2.65***	2.24	5.57***	6.41***
2	-1.76	-3.70***	-2.98***	2.48	5.33***	6.05***
3	-1.72	-3.23***	-2.67***	2.41	4.64***	5.51***
4	-1.89	-3.24***	-2.79***	2.67	4.69***	5.43***
5	-1.66	-2.63***	-2.49**	2.47	4.01***	4.49***
*** Significant at the 1 percent level. ** Significant at the 5 percent level						

Panel B: $\overline{CARs}$ ***of the Targets***

Event Day	Pre-Crisis 2002-2007 (N = 169)			Post-Crisis 2009-2014 (N = 114)		
	$\overline{CAR}$ (%)	J_1	J_2	$\overline{CAR}$ (%)	J_1	J_2
-1	0.21	0.78	1.11	-0.23	-0.83	-0.97
0	13.30	35.03***	35.84***	19.18	48.90***	56.20***
1	19.02	40.92***	44.46***	23.34	48.59***	54.95***
2	19.29	35.92***	38.83***	23.45	42.28***	48.06***
3	19.29	32.13***	34.69***	25.77	41.56***	44.57***
4	19.31	29.37***	31.84***	26.06	38.36***	41.12***
5	19.49	27.44***	29.57***	25.92	35.33***	37.88***
*** Significant at the 1 percent level. ** Significant at the 5 percent level						

Table 3.2.2 Pre-Crisis and Post-Crisis $\overline{CARs}$ **by Event Window**

Table 3.2.2 reports the cumulative average abnormal returns ($\overline{CARs}$) of high-tech acquirers and high- tech target firms, relative to M&A announcements, before and after financial crisis. The pre-crisis is the six-year announcements period before the crisis (2002-2007), whereas the post-crisis is the six-year announcements period after the crisis (2009-2014). Panel A shows the acquirer $\overline{CARs}$ in percentage in each event window along with the test statistics, while Panel B shows those for the target firms. The sample size (N) is also given in each event window used. Day 0 is the announcement or the event day.

Panel A: $\overline{CARs}$ of the Acquirers

Event Window	Pre-Crisis (2002-2007)				Post-Crisis (2009-2014)			
	N	$\overline{CAR}$ (%)	J_1	J_2	N	$\overline{CAR}$ (%)	J_1	J_2
[-15, +15]	151	-2.58	-1.92*	-1.54	100	2.82	2.18**	2.34**
[-15, 0]	155	-1.77	-1.87*	-1.43	100	0.93	1.00	0.92
[-5, +5]	154	-1.95	-2.46**	-2.20**	100	2.22	2.89***	3.21***
[-1, +1]	155	-1.46	-3.54***	-2.71***	100	2.24	5.57***	6.41***
[-1, 0]	155	-0.49	-1.47	-0.82	100	1.14	3.49***	3.81***
[0]	155	-0.53	-2.25**	-1.07	100	1.28	5.51***	6.77***
[0, +1]	155	-1.50	-4.46***	-3.25***	100	2.38	7.23***	8.82***
[0, +5]	154	-1.71	-2.92***	-2.67***	100	2.60	4.57***	5.41***
[0, +10]	153	-1.53	-1.93*	-1.63	100	2.82	3.66***	4.09***
[0, +15]	151	-1.37	-1.42	-1.08	100	3.17	3.41***	4.03***

*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

PanelB: $\overline{CARs}$ of the Targets

Event Window	Pre-Crisis (2002-2007)				Post-Crisis (2009-2014)			
	N	$\overline{CAR}$ (%)	J_1	J_2	N	$\overline{CAR}$ (%)	J_1	J_2
[-15, +15]	166	24.21	15.97***	17.22***	113	26.88	17.67***	19.85***
[-15, 0]	170	17.92	16.60***	16.93***	114	21.29	19.19***	22.50***
[-5, +5]	169	21.02	23.61***	25.52***	114	26.84	29.18***	32.00***
[-1, +1]	170	19.15	40.99***	44.59***	114	23.34	48.59***	54.95***
[-1, 0]	170	13.48	35.34***	36.09***	114	19.18	48.90***	56.20***
[0]	170	13.24	49.09***	49.88***	114	19.41	69.98***	80.45***
[0, +1]	170	18.91	49.58***	53.79***	114	23.57	60.09***	67.99***
[0, +5]	169	19.28	29.32***	31.49***	114	26.15	38.50***	41.31***
[0, +10]	168	19.86	22.21***	23.96***	114	24.81	27.38***	29.80***
[0, +15]	166	19.79	18.17***	19.50***	113	25.02	22.89***	25.24***
*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.								

For the acquisition targets, the $\overline{CARs}$ for both sub-periods (pre-crisis and post-crisis) are almost the same, but the post-crisis $\overline{CARs}$ are generally higher after the announcements of M&A deals. The results are statistically significant at 1 percent level from one day before until five days after the event. These findings for the target firms are consistent with the full sample period in the sub-section 4.1 in which the target $\overline{CARs}$ are positively high and statistically significant at 1 percent level. Most importantly, it is consistent with the Hypothesis 2.2. This finding suggests that the financial crisis had positive impact on the short-term abnormal returns to the US target firms. To sum up, the target $\overline{CARs}$ are statistically significant positive and high before the crisis and it is statistically significant positive and higher after the crisis.

Overall, the post-crisis abnormal returns in US high technology sector outperform the pre-crisis abnormal returns, for both parties (acquirer and target), and the results are statistically significant at 1 percent level since the announcement date. These significant results indicate that the M&A announcement effects after the crisis are stronger for not only the returns of the target firms but also those of the acquiring firms, thanks to the positive influence of the financial crisis and optimism towards M&As by the market participants, likewise shareholders and investors. In addition, this outperformance of the post-crisis period may suggest that stocks are relatively cheaper to buy after the crisis. In other words, the market may perceive corporate takeovers are well worth the cost for the acquirers and expect positive return performance after M&As. Moreover, the firms who survived the enormous wave of depression and financial distress during the crisis are not only considered to be financially and operationally sound but also anticipated to commercially exist in business for the long future.

3.2.2 Pre-Crisis and Post-Crisis $\overline{CARs}$ by Event Window

This sub-section tests the robustness of pre-crisis and post-crisis $\overline{CARs}$ results presented above and checks how the short-run abnormal returns change if different event windows are used. The result again indicates that the targets $\overline{CARs}$ is more vigorous and stronger than the $\overline{CARs}$ the acquiring firms, meaning the cumulative average abnormal returns to the targets are still highly positive and statistically significant at 1 percent level across different event windows, whereas the cumulative average abnormal returns to the acquirers are stronger in the post-crisis compared to the pre-crisis. As can be seen, the acquirers $\overline{CARs}$ during pre-crisis (post-crisis) are negative (positive) and statistically significant when the event window is shorter (regardless of whatever shorter or longer the event window). In addition, share prices movement of the acquirers do not seem to react to rumour or information leakage or insider information as the share prices movement of the targets.

3.3 Abnormal Returns and Method of Payment

3.3.1 Whole Period Sample $\overline{CARs}$ by Method of Payment

This sub-section presents the cumulative average abnormal returns ($\overline{CARs}$) of US acquirers and target firms by the deal characteristic namely the method of payment. The whole period sample, from January 2002 to December 2014, is used. The M&A means of transaction could be cash, stock, or the combination of these two. Table 3.3.1 reports the $\overline{CARs}$ of high-tech acquirers and targets firms in percentage terms. Panel A shows the acquirer $\overline{CARs}$ and the test statistics by each method of payment, while Panel B shows those of the target firms. The event window used is the similar as the previous study, which is from one day before the announcement until one week or five trading days after the event [-1; +5]. The sample size (N) is provided in each payment method.

As can be seen, more than three quarters of the deals are financed by cash, whereas the remaining are financed by either stock or a mixture of cash and stock. When cash is used to finance the deals the acquirer $\overline{CARs}$ are positive at 1.90%, but when equity or a combination between cash and stock are used to pay for the deals the result changes, showing negative $\overline{CARs}$ of -4.73% and -6.02%, respectively. These results are statistically significant at 1 percent level both $J1$ and $J2$ parametric tests. These findings are consistent with the hypothesis H3.1 that there are positive abnormal returns to bidders if M&A deals are financed by cash, and there are negative abnormal returns to acquirers if the takeovers are financed by stock. In addition, these results are dependable with previous researches (Wansley et al., 1983; Huang and Walkling, 1987; Travlos, 1987; Franks et al., 1988; Eckbo et al., 1990; Goergen and Renneboog, 2004; Antoniou, Arbour and Zhao, 2008) in that cash payment mergers tend to perform better than stock payment mergers. As cash payments are generally regarded as a positive information signal by market participants, particularly the bidder managers might consider their company shares are undervalued, therefore they

are more likely to make use of cash as the method of payment. However, if the shares of acquirers are thought to be overvalued, acquirer managers would prefer to convert those shares into real value by using their overvalued stocks to pay for the targets.

In terms of target $\overline{CARs}$ they are generally high and positive regardless of whether the deals are financed by cash, stock or a combination of the two, with 19.84%, 25.34%, and 24.58%, respectively. It is worth noting that between 2002 and 2014, the target $\overline{CARs}$ exceeds the bidder $\overline{CARs}$ by approximately 18% when it is a cash financed transaction, and about 30% when it is either a stock financed deal or both cash and stock are employed.

Table 3.3.1 $\overline{CARs}$ by Method of Payment for Full Period Sample

Table 3.3.1 reports the cumulative average abnormal returns ($\overline{CARs}$) of US high-tech acquirers and target firms by the method of payment from January 2002 to December 2014. The means of transaction could be cash, stock, or the combination of these two. Panel A shows the acquirer $\overline{CARs}$ and the test statistics by each method of payment, while Panel B shows those of the target firms. The event window used in this table is from one day before the announcement until one week or five trading days after the event. The sample size (N) is also provided in each payment method.

Event Window	Acquirers				Targets			
	N	$\overline{CAR}$ (%)	J_1	J_2	N	$\overline{CAR}$ (%)	J_1	J_2
Cash	215	1.90	4.43***	4.64***	231	19.84	41.68***	42.24***
Stock	31	-4.73	-2.86***	-3.23***	26	25.34	13.36***	14.34***
Mix	35	-6.02	-4.20***	-4.61***	29	24.58	14.71***	17.78***
*** Significant at the 1 percent level.								

Table 3.3.2 reports the cumulative average abnormal returns ($\overline{CARs}$) of US high-tech acquirers and target firms by the method of payment for two sub-periods: period before and period after the financial crisis in 2008. The pre-crisis is the six-year period before the crisis, whereas the post-crisis is the six-year period after the crisis. The means of transaction could be cash, stock, or the combination of these two. Panel A shows the acquirer $\overline{CARs}$ during pre-crisis and post-crisis together with the test statistics by each method of payment, while Panel B shows those of the target firms. The event window used in this table is from one day before the announcement until one week or five trading days after the event. The sample size (N) used is also given in each method of payment.

Table 3.3.2 Pre-Crisis and Post-Crisis $\overline{CARs}$ by Method of Payment

PanelA: $\overline{CARs}$ ***of the Acquirers***								
Method of Payment	Pre-Crisis (2002-2007)				Post-Crisis (2009-2014)			
	N	$\overline{CAR}$ (%)	J_1	J_2	N	$\overline{CAR}$ (%)	J_1	J_2
Cash	103	0.64	0.97	1.38	84	3.29	5.13***	4.72***
Stock	24	-7.68	-3.93***	-5.13***	6	0.29	0.09	1.25
Mix	24	-5.96	-3.42***	-4.19***	9	-4.60	-1.64	-1.10
PanelB: $\overline{CARs}$ ***of the Target***								
Method of Payment	Pre-Crisis (2002-2007)				Post-Crisis (2009-2014)			
	N	$\overline{CAR}$ (%)	J_1	J_2	N	$\overline{CAR}$ (%)	J_1	J_2
Cash	107	16.32	22.71***	22.82***	97	25.32	34.47***	35.11***
Stock	17	25.75	11.37***	12.13***	7	18.69	4.78***	5.31***
Mix	17	15.70	7.93***	9.43***	10	39.28	11.91***	15.60***
*** Significant at the 1 percent level.								

3.3.2 Pre-Crisis and Post-Crisis $\overline{CARs}$ by Method of Payment

This sub-section will summarize the test results and will comment on the consistency of the result if the whole period sample is divided into two sub-periods. Particularly it is intended to examine how the acquirer and target $\overline{CARs}$ change by method of payment change and by crisis time. Again, the pre-crisis consists of a six-year period between 2002 and 2007, and the post-crisis spans from 2009 to 2014. This comparison used the latest and most contemporary data available for analysis.

According to the Panel A of Table 3.3.2, $\overline{CARs}$ of acquiring firms are positively but small and statistically insignificant when the M&As deals are paid by cash during the pre-crisis period. But when stock or a combination of cash and stock are used as the method of M&A payment, during the same period, acquiring firms exhibit statistically significant (at 1 percent level) $\overline{CARs}$ of -7.68% and -5.96% respectively. This finding is consistent with earlier findings that abnormal returns to acquirers are often insignificant in cash offers and abnormal returns to targets are often significantly negative[9]. During the post-crisis, however, shareholders of acquiring firms earn positive abnormal returns with the statistically significant of $\overline{CARs}$ 3.29% when the announced method of payment considered is cash. However, no evidence of abnormal returns has been found when it is a stock financed M&A or a combined cash and stock payment. The post-crisis result suggest that the bidders who are able to offer a cash as payment method are perceived to be more able in terms of business operations and capital, therefore the market participants would be optimistic about the potentials growth opportunities or the prospects of the firm. Further, it is consistent with general hypothesis and previous research[10] that acquiring firms using cash have a tendency to outperform those offering stock. In a nutshell, abnormal returns to acquirers before the crisis are significantly negative when M&As deals are

[9]For example, Wansley et al. (1983); Travlos (1987); Huang and Walkling (1987); Hansen (1987); Bradley et al. (1988); Murphy and Nathan (1989); Amihud et al. (1990); Frank et al. (1991); Berkovitch and Narayanan (1990); Brown and Ryngaert (1991); Faccio and Stolin (2006); Faccio et al. (2006).

[10]For example, Wansley et al. (1983); Franks et al. (1988); Eckbo et al. (1990); Goergen and Renneboog (2004); Antoniou, Arbour and Zhao (2008).

financed by the non-cash method, but abnormal returns to bidders after the crisis are positive when cash payments are used.

It can be clearly seen from Panel B of Table 3.3.2 that $\overline{CARs}$ of the targets increased from 16.32% in pre-crisis to 25.32% in post-crisis when the deals are cash-financed, and increased from 15.70% to 39.28% when the method of payment involves cash and stock together. However, the target $\overline{CARs}$ declined from 25.75% pre-crisis to 39.28% post-crisis when equity is used to finance the acquisitions. In other words, the target $\overline{CARs}$ are still high and statistically significant positive but abnormal returns are a bit lower in the post-crisis between when the method of payment is by stock. This finding suggests that target firms are not in favor of any deal that involves only stock as the method of payment, as stock payment is generally regarded as negative information signal and stocks might be perceived as being overvalued by the market. In addition, bidders might be short of cash or capital and consequently they would issue stock to finance the deals which makes the stock cheaper and therefore lowers the return. By contrast, the target firms earn significantly higher and positive abnormal returns in post-crisis period when the payment involved is cash. This result might indicate that shareholders and investors are optimistic about future of the firms, especially towards the acquirers when they used cash as the mean of M&A transactions. Moreover, it can be explained that cash financed M&As reflect financially operationally strong acquirers, therefore value-enhancement are expected for both acquirers and target firms.

Conclusion and Recommendations

To summarize, this event study on stock price reaction to mergers and acquisitions announcements of US firms between 2002 and 2014 reveals that generally there are positive but low abnormal returns to acquirers and that there are positive and high abnormal returns to targets. The result is weak for the acquirer because the significance of bidder $\overline{CARs}$ only happened when short event window is used, but the result is strong and robust for the target $\overline{CARs}$ and it is statistically significant at 1 percent level. In addition, this paper also examines the sub-period abnormal returns and see how the magnitude of abnormal returns is affected by certain factors such as the timing of a transaction, whether it happened before or after the financial crisis, and the deal characteristic of whether the M&A transactions are financed by cash or by stock. For the 2002-2007 (pre-crisis) period, the report indicates that the acquirer are statistically significant negative one day after the announcement date and the target $\overline{CARs}$ are statistically significant positive from the announcement date. The consistency of the result is remained for the target $\overline{CARs}$ both two sub-periods, but interestingly the acquirer $\overline{CARs}$ changes from negative during the pre-crisis to positive during the post-crisis, and the results are statistically significant since the announcement date or initial public announcement day. The same as previous literature, this study finds that there is information leakage or rumours of M&As because stock prices of the targets started to react or increase gradually since before the event, with statistically significant $\overline{CARs}$ either full period sample or sub-period sample.

On the other hand, this study also examines how these significant results are influenced by the deal characteristic namely the method of payment: whether cash or stock or both cash and stock. For the entire period sample, there are positive abnormal returns to acquirers when it is a cash-financed merger and negative abnormal returns when it is a stock-financed merger or a combination of cash and stock. For acquisition targets, high and positive abnormal returns are reported

regardless of the method of payment, but it is worth noting that the non-cash method tends to create higher returns than the cash payment method for the full sample studied. Interestingly, when the whole period is divided into two sub-samples (pre-crisis and post-crisis), both the acquirers and target firms evidence some interesting results. While higher and positive abnormal returns of the targets remain statistically significant regardless of the type of payment method for either the full period or the sub-period sample, the pre-crisis $\overline{CARs}$ of acquirers are statistically significant negative when stock is used as the method of payment. However the post-crisis $\overline{CARs}$ of acquirers are statistically significant positive when the acquisitions are financed by cash. These results are consistent with previous research and theory (either the signaling hypothesis or agency theory) that cash-financed mergers should perform better than stock financed mergers[11]. In addition, the acquirers result during pre-crisis is consistent with several pieces of research that in cash offers the abnormal returns to acquirers tend to be positive but insignificant, whereas in stock offers the abnormal returns to acquirers are often significantly negative[12].

To sum up, these findings could be very useful for stock trading, especially a buy and hold strategy. Since target firms generally enjoy stock price increases surrounding the announcements, shareholders or investors could gain short-term abnormal returns if they buy stocks of the targets during M&A announcements between high-tech acquirers and high-tech targets. However, market participants should be more wary when dealing with acquirer stocks as they might not earn short-term abnormal returns or will not earn as high as target stocks during the announcement period, although buying the stocks of acquirers is recommended when cash is used as the method of M&As payment.

Although efforts and focus has been put into this study, there is a lot more to be discovered. A suggestion for further research would be to focus on different aspects

[11]For example, Travlos (1987); Franks et al. (1988); Eckbo et al. (1990); Goergen and Renneboog (2004).
[12]For example, Hansen (1987); Travlos (1988); Bradley et al. (1988); Murphy and Nathan (1989); Berkovitch and Narayanan (1990); Amihud et al. (1990); Frank et al. (1991); Brown and Ryngaert (1991); Faccio and Stolin (2006); Faccio et al. (2006).

of high-tech mergers and acquisitions by controlling for various characteristics and by integrating different components and making comparison. Firstly, as this paper only focuses on M&A announcements between publicly traded high-tech acquirers and targets, non-high-tech and/or privately held targets could be included in a future study. Secondly more deal characteristics such as pending deals, uncompleted or unsuccessful M&As, or method of payment other than cash or stock might prove interesting in the future. Thirdly other accounting variables and ratios such as Tobin's Q, relative size of target firms to acquirers, merger premium, book-to-market ratio, dividend yield and earnings per shares could be fundamental add-ons to this area of research. Next, market sentiment or investor sentiment during the announcement date might be a fascinating topic for research. Lastly, a long-term study of post-merger or takeover performance, or a study in other industries including cross-border or broader sectors rather than limiting to only one industry could prove useful. Above all, all these suggestions might provide a wider view and broaden the horizon of how the market reacts to M&A announcements. In addition to just observing how corporations evolve during M&As wave, external factors such as the presence of new type of financial crisis, enforcement of new regulation relative to corporate takeovers, and other macro-economic phenomenon impact on business practice after corporate integration, might generate curiosity and interest among academic and professional researchers.

References

1. Andrade, G., M. L. Mitchell, and E. Stafford, 2001. New Evidence and Perspectives on Mergers. *Journal of Economic Perspectives*, 15(2), pp. 103-120.

2. AKGÜÇ, Ö. Finansal Yönetim (1998), pp. 865-868.

3. Antoniou, A., Arbour, H., Zhao, H., 2008. How Much Is Too Much: Are Merger Premiums Too High?. *European Financial Management*, 14(2), pp. 268–287.

4. Berkovitch, Elazar, and Narayanan, M.P., 1990. Competition and the Medium of Exchange in Takeovers. *Review of Financial Studies*, 3(2), pp. 153-174.

5. Bhagat, S., Dong, M., Hirshleifer, D. and Noah, R., 2005. Do Tender Offers Create Value? New Methods and Evidence. *Journal of Financial Economics*, 76(1), pp. 3-60.

6. Bradley, M., and Jarrell G.A., 1980. The Economic Effects of Federal and State Regulations of Cash Tender Offers. *Journal of Law and Economics*, 23(2), pp. 371-407.

7. Byrd, J. and K. Hickman, 1992. Do Outside Directors Monitor Managers? Evidence From Tender Offer Bids. *Journal of Financial Economics*, 32(2), pp. 195-214.

8. Chatterjee, Sayan, 1992. Sources of Value in Takeovers: Synergy or Restructuring - Implications for Target and Bidder Firms. *Strategic Management Journal*, 13(4), pp. 267-286

9. Christian Tuch and Noel O'Sullivan "The impact of acquisitions on firm performance: A review of the evidence" (2007)pp.132-155

10. CompTIA. (2015), *United States Tech Industry Employs 6.5 Million in 2014* [online], available from: https://www.comptia.org/about-us/newsroom/press-releases/2015/02 /10/united-states-tech-industry-employs-6.5-million-in-2014

11. 'Creating Value from Mergers and Acquisitions' by Sudi Sudarsanam (2010)

12. Cordeiro, Marcos. (2014). *The seventh M&A wave* [online]. Camaya Parnters. Available from:

http://www.camaya.com.br/site/es/insights/52/2014/09/the_seventh_m&a_wave

13. Damodaran, Aswath. (2005). *The Value of Synergy* [online]. Stern School of Business [online]. Available from: http://pages.stern.nyu.edu/~adamodar/pdfiles/papers/synergy.pdf [Accessed 20/7/15].

14. Dennis, D. K. and McConnell, J. J., 1986. Corporate mergers and security returns. *Journal of Financial Economics*, 16(2), pp. 143-187.

15. DeLong, G. L. 2001. Stockholder Gains from Focusing versus Diversifying Bank Mergers. *Journal of Financial Economics*, 59(2), pp. 221-252.

16. Dodd, P. and Ruback, R., 1977. Tender offers and stockholder returns: An empirical analysis. *Journal of Financial Economics*, 5(3), pp. 351-374.

17. Dong, M., Hirshleifer, D., Richardson, S. and Teoh, S. H., 2006. Does investor misvaluation drive the Takeover market? *Journal of Finance*, 61(2), pp. 725–62.

18. Eckbo, B. E., Giammarino, R. M. and Heinkel, R. L., 1990. Asymmetric information and the medium of exchange in takeovers: theory and tests. *Review of Financial Studies*, 3(4), pp. 651–675.

19. Faccio, M. & Stolin, D., 2006. Expropriation vs. Proportional Sharing in Corporate Acquisitions. *Journal Of Business*, 79(3), pp. 1413-1444, Business Source Alumni Edition, EBSCO*host*, viewed 23 August 2015.

20. Fama, Eugene F., Larry Fisher, Michael C. Jensen and Richard Roll, 1969. The adjustment of stock prices to new information. *International Economic Review*, 10(1), pp. 1-21.

21. Fluck, Z., and Lynch, A., 1999. Why Do Firms Merge and then Divest? A Theory of Financial Synergy. *Journal of Business*, 72(3), pp. 319-346.

22. Franks, J., R. Harris, and S. Titman, 1991. The Postmerger Share-Price Performance of Acquiring Firms. *Journal of Financial Economics*, 29(1), pp. 81-96.

23. Frederikslust, R.A.I., Der Wall, V., and Westdijk, H., 2000. Shareholder Wealth Effects of Mergers and Acquisitions. *MAB*, pp. 264-284.

24. Fuller, K., Netter, J. and Stegemoller, M., 2002. What do Returns to Acquiring Firms Tell us? Evidence from Firms that Make Many Acquisitions. *Journal of*

Finance, 57, pp. 1763-1793.

25. Graham, J., M. Lemmon, and J. Wolf, 2002. Does corporate diversification destroy value? *Journal of Finance*, 57(2), pp. 695-720.

26. Hansen, R., 1987. A theory of the medium of exchange in mergers and acquisitions. *Journal of Business*, 60(1), pp. 75–96.

27. Hodgkinson, Lynn and Partington, Graham H., 2008. The Motivation for Takeovers in the UK. *Journal of Business Finance & Accounting*, 2008, 35(1-2), pp.102-126.

28. Huang, Yeng-Sheng, and Walkling, Ralph A., 1987. Target Abnormal Returns Associated with Acquisition Announcements: Payment Method, Acquisition Form, and Managerial Resistance. *Journal of Financial Economics*, 19(2), pp. 329-350.

29. Jensen, M., and Ruback, R., 1983. The Market for Corporate Control: The Scientific Evidence. *Journal of Financial Economics*, 11(1-4), pp. 5-50.

30. Kaplan, S. and M. Weisbach, 1992. The Success of Acquisitions: Evidence From Divestitures. *Journal of Finance*, 47(1), pp. 107-138.

31. Kohers. N, and Kohers, T., 2000. The Value Creation Potential of High-Tech Mergers. *Financial Analysts Journal*, 56(3), pp. 40-52.

32. Lang, L., Stulz, R, M., and Walking, R, A., 1989. Managerial Performance, Tobin's Q, and the Gains from Successful Tender Offers. *Journal of Financial Economics*, 24, pp. 137-154.

33. Loughran, T., and Vijh, A.M., 1997. Do long-term shareholders benefit from corporate acquisitions? *Journal of Finance*, 52(5), pp. 1765-1790.

34. Malatesta P. H., 1983. The wealth effect of merger activity and the objective functions of merging firms. *Journal of Financial Economics*, 11(1), pp. 155-181.

35. MacKinlay C, A., 1997. Event Studies in Economics and Finance. *Journal of Economic Literature*, 35(1), pp. 13-39.

36. Moeller, S., Schlingemann, F., and Stulz, R, M., 2005. Wealth Destruction on a Massive Scale? A Study of Acquiring-Firm Returns in the Recent Merger Wave. *Journal of Finance*, 60(2), pp. 757-782.

37. Mergers, Acquisitions, and Corporate Restructurings by Patrick A. Gaughan (2007) 4th Edition

38. Mulherin, J.H. and Boone, A.L., 2000. Comparing Acquisitions and Divestitures. *Journal of Corporate Finance*, 6(2), pp. 117-139.

39. Murphy, Austin, and Nathan, Kevin, 1989. An Analysis of Merger Financing. *Financial Review*, 24(4), pp. 551-566.

40. *Owens,* James K. *(2009). Mergers and Acquisitions: The Five Merger Waves* [online]. *Texas* West Texas A&M University. Available from: - http://www.wtamu.edu/~jowens/FIN6320/MERGER%20WAVES.htm

41. Patell, JM., 1976. Corporate forecasts of earnings per share and stock price behavior: Empirical tests. *Journal of Accounting Research*, 14(2), pp. 246-276.

42. Ross et al.: Fundamentals of Corporate Finance, Sixth Edition, Alternate Edition (2002), pp.841-877.

43. Schwert, G.W., 1996. Markup Pricing in Mergers and Acquisitions. *Journal of Financial Economics*, 41(2), pp. 153-162.

44. Shiller, Robert J., 1995. Conversation, Information and Herd Behaviour. *The American Economic Review*, 85(2), pp. 181-185.

45. Thomson Reuters. (2015), *MERGERS & ACQUISITIONS REVIEW: FINANCIAL ADVISORS* [online]. Available from: http://dmi.thomsonreuters.com/Content/Files/4Q2014_Global _MandA_Financial_ Advisory_Review.pdf

46. Tim Koller, David Wessel, Marc Goedhart, Valuation: Measuring and Managing the Value of Companies, 6th Edition (2015),pp. 245-256

47. The impact of acquisitions on firm performance: A review of the evidence, Christian Tuch, Noel O'Sullivan (2007),pp.463-477

48. The Corvair, The Pinto And Corporate Behavior: Implications For Regulatory Reform, Paul J. Halpern (1982) http://onlinelibrary.wiley.com/

49. Travlos, N. G., 1987. Corporate takeover bids, methods of payment, and acquiring firms' stock returns. *Journal of Finance*, 42(4), pp. 943–963.

50. Wansley, James W., William R. Lane, and Yang, Ho C., 1983. Abnormal Returns to Acquired Firms by Type of Acquisition and Method of Payment. *Financial Management*, 12(3), pp. 16-22.

Other resources

PricewaterhouseCoopers , 2003 "Analysis and trends in US high technology M&A activity 2002 reports "

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PricewaterhouseCoopers , 2006 "Analysis and trends in US high technology M&A activity 2005 reports "

PricewaterhouseCoopers , 2007 "Analysis and trends in US high technology M&A activity 2006 reports "

PricewaterhouseCoopers , 2008 "Analysis and trends in US high technology M&A activity 2007 reports "

PricewaterhouseCoopers , 2009 "Analysis and trends in US high technology M&A activity 2008 reports "

PricewaterhouseCoopers , 2010 "Analysis and trends in US high technology M&A activity 2009 reports "

PricewaterhouseCoopers , 2011 "Analysis and trends in US high technology M&A activity 2010 reports "

PricewaterhouseCoopers , 2012 "Analysis and trends in US high technology M&A activity 2011 reports "

PricewaterhouseCoopers , 2013 "Analysis and trends in US high technology M&A activity 2012 reports "

PricewaterhouseCoopers , 2014 "Analysis and trends in US high technology M&A activity 2013 reports "

PricewaterhouseCoopers , 2015 "Analysis and trends in US high technology M&A activity 2014 reports "