Mergers & Acquisitions in Practice: The Road to Success for High-Tech Firms

THESIS RAPPORT

R.J.P. Offerman

Delft University of Technology

TU Delft Delft University of Technology

This page is intentionally left blank.

MERGERS & ACQUISITIONS IN PRACTICE: THE ROAD TO SUCCESS FOR HIGH-TECH FIRMS

AN AGGREGATE EUROPEAN STUDY ON THE EFFECT OF MERGERS AND ACQUISITIONS ON HIGH-TECH TARGET FIRM PERFORMANCE

by

R.J.P. Offerman

in partial fulfillment of the requirements for the degree of

Master of Science
in Management of Technology

at the Delft University of Technology,

Student number: 4749138

Thesis committee: Dr.ir. Z. (Zenlin) Roosenboom-Kwee
Dr.ir. R.A. (Rudi) Hakvoort

To be defended in public on 20 December 2019

TU Delft Delft University of Technology

TECHNISCHE UNIVERSITEIT DELFT • MDCCCXLII •

This page is intentionally left blank.

ACKNOWLEDGEMENTS

R.J.P. Offerman
Amsterdam, December 2019

This report is the final deliverable for the Master of Science degree in Management of Technology at the Delft University of Technology. The goal of this thesis is to determine the effects of Merger & Acquisition (M&A) on the performance of firms working in the high-tech industry. Friends and colleagues have always told me that the hardest part to study is to write your master thesis. Whereas I can confirm that the previous period was one of my life's busiest and most difficult times. Sometimes I felt victorious for having an enormous breakthrough, which is similar to the sensation of passing a hard and difficult examination. But there was also times of struggle and backlash where I realised the importance of having good supervisors, friends and families.

After obtaining my bachelor's degree in aerospace engineering, I hesitated for a long time whether I wanted to do a master's degree as well. Afterwards I am glad that I made this choice because it has made my life richer in many ways. I have grown tremendously as a person and learned many things. Therefore, I would like to express my gratitude to the people that helped me through the last period of my student career.

First, I would like to thank my first supervisor Zenlin Roosenboom-Kwee for her patient and always willing to help me. She always responded quickly to my questions and provided critical attitude through the entire development of this research. Zenlin entrusted me adequate freedom to undertake the research myself while guiding me in the correct direction when necessary. Second, I would like to thank the chairman and second supervisor Rudi Hakvoort, for your eloquent ideas and insight during the meetings, always asking critical questions, and giving comprehensive feedback on my work. Last but not least, I would like to thank my family and friends for their never ending support, trust and help during the enitre period.

I hope you will enjoy reading this report. Feel free to contact for any questions. On to the next challenge!

This page is intentionally left blank.

STATEMENT OF ORIGINALITY

By submitting this research the author, Rochustinus Jacobus Pieter Offerman [4749138], declares to take full responsibility for the content of this report. Text and work presented are original and used resources are mentioned in the text and its references. Quotes and citations that were literally taken from publication, or that were in close accordance with the meaning, are indicated as such. The Technology, Policy, and Management [TPM] faculty of the Delft University of Technology is solely responsible for supervising the completion of the research, not the content.

This page is intentionally left blank.

ABSTRACT

In the last decade, Mergers and Acquisitions (M&A) activity steadily enlarged, where global deal making continues to rise. While the M&A activity is increasing, it is the technology sector with the fastest growing number of transitions. Even though M&A are widely used for financial research purposes, there is plenty yet to be uncovered, particularly on an aggregate level and privately held high-tech firms. Europe offer a natural laboratory to study the determinant and consequences of mergers and acquisitions given essential variations in laws and regulations, institutions, traditions, and economic environments across countries, continents and over time. Interestingly, novel data has become recently available meaning that we can see how privately held target firms in Europe behave before and after the takeover.

This thesis report focuses on understanding whether M&A affect target firm's performance. The analysis is conducted on 689 European high-tech target firms, in which 95.26% are privately held, that were acquired in the period from 2011 to 2017. Target firm performance changes are tested with the inclusion of four key accounting performance indicators (e.g., Return on Assets, Operating Margin, Sales Growth and Net Profit), the difference in Intellectual Property measured by the number of patent applications, and three prominent quantitative research methods (Ordinary Least Square model, the Intercept model, and the Difference-in-Difference model). Including several approaches enhances the findings, overcomes weaknesses of the individual methods and addresses endogeneity concerns.

Overall, the results clearly shows that target firms do not benefit from the M&A in terms of performance. In other words, the synergies did not benefit the target firm, whereas multiple potential M&A motives, including diversification, strategic gains, and market power did not lead to a better performance of the target firm. Interestingly, the results indicate that target firms in general tend to under perform to the adjusted control group or their peer firms. The latter implies that acquired firms failed to keep up with the competition and confirm the fact that targets were in need of a way to strategically improve. Further, distinguishing evi-

dence is found between domestic versus cross-border takeovers, whereas domestic deals outperform cross-border deals. Which proves it is easier to transfer assets between parent and subsidiary operating in the same country. Large enterprises perform better after the M&A compared to small and medium enterprises. M&A between SME are more likely to be financed with equity over debt which better process the transaction of tangible and intangible asset what could be in favour of the synergy exploitation's. Also, findings suggest that large firm are more capable to exploit economies of scope and economies of scale.

Firms that enclose a medium or high cultural distance outperform low cultural distance deals an not vice versa. This suggests that, taking into account the fact that bordering countries have similar cultural characteristics, greater cultural dimension between firms expose significant growth opportunities. Precisely because long-distance target firms tend to have benefited substantially from the diffusion of the acquiring firms' know-how, while taking into account that management and organisational styles are obviously significantly different between the two firms. In addition, target firms from the Anglo-Saxon region outperform target firms from the Rhineland region. Firms with an Anglo-Saxon corporate governance orientated firms conversely, are more likely to adopt strategic innovate projects on exploitation and external development. Whereas Rhineland corporate governance are more likely to adopt internal growth and exploratory as strategic renewal trajectories. Further, no compelling differences in performance are found for M&A in the same industry than across industries. In general, the findings presented in this paper provide new insights, while it also complements existing evidence, and on the other hand it contradicts former claims.

Keywords: Mergers and Acquisitions, Accounting Indicators, Innovation, High-Tech, Privately held target firms, Europe, Ordinary Least Squares Model, Intercept Model, Difference-in-Difference Model

List of Tables

List of Acronyms

AF Acquired Firms

AOP Adjusted Operating Profit

AP Accounts Payable

ASP Average Selling Price

APD Average Paired Difference

BEP Break Even Point

BLS Balance Sheet

BvD Bureau van Dijk

B2B Business to Business

CAR Cumulative Abnormal Return

CEO Chief Executive Officer

CD Cultural Distance

CUAS Current Assets

CULI Current Liabilities

DD Difference-in-Difference

ECB European Central Bank

EMPL Employees

EPS Earnings per Share

EU European Union

FIAS Fixed Assets

FX Foreign Exchange Market

GCD Global Cultural Distance

GDP Gross Domestic Product

GP Gross Profit

IAS International Accounting Standards

IoT Internet of Things

IPO Initial Public Offering

IPR Intellectual Property Rules

ISIC International Standard Industrial Class.

LBO Leveraged Buyout

LME Liberal Market Economies

LTDB Long-term Debt

M&A Merger & Acquisition

MOT Management of Technology

NDA Non-Disclosure Agreement

OLS Ordinary Least Squares

OUP Oxford University Press

PE Private Equity

PLBT Profit before Tax

ROA Return on Assets

ROE Return on Equity

ROI Return on Investments

ROS Return on Sales

RJP Rochustinus Jacobus Pieter

R&D Research & Development

S&M Sales & Marketing

SME Small & Medium Sized Enterprises

STATA Statistics and Data

TA Total Assets

TCO Total Cost of Ownership

TSR Total Shareholder Return

TUD Technical University of Delft

TFP Total Factor Productivity

VAR Value at Risk

VAT Value at Tax

VC Venture Capital

YTD Year to Date

CONTENTS

TU Delft Delft University of Technology

1

INTRODUCTION

As the global Merger & Acquisition (M&A) market heats up, it is the technical sector driven by innovation and disruption with the fastest growing value and volume. Technology firms find themselves in a moment of change, where nobody can afford to ignore the impact of advanced technologies, such as Artificial Intelligence (AI), Blockchain, and Internet of Things. For an increasing number of firms, the answer in this heightened competition is to acquire rather than to build. The most significant factor driving tech M&A is the increasing role and prominence of acquirers in non-tech sectors. Tech isn't just for tech firms anymore. Nearly every industry has been affected by digital and advanced technologies, and many have been upended. Time to market and reaching critical mass are key considerations, while firms often don't have the time or the talent - to build up the capabilities they need themselves. In addition, non-tradition tech acquirers such as sovereign wealth funds, venture capitals, and private equity firms have shown an increased activity in technology assets.

Although mergers and acquisitions are commonly used as synonymous terms, there is a subtle difference between the two concepts. In the act of a merger, two companies together form a new company. After the merger, the different owners' companies become jointly owned and obtain a new single identity. In case of an acquisition, an firms purchases another company and sets its power as the individual owner. Even though both terms have a different meaning and this concerns a quantitative study where no clear distinction can be made given the available data are M&A, in line with Cloodt *et al.* [2006]; Bhabra and Huang [2013]; Lee [2017]; Rossi and Volpin [2004]; Schiffbauer *et al.* [2017] throughout this study uttered as equals.

1.1 RESEARCH PROBLEM

There are various reasons and motivations for M&A. An important reason is to reach a goal faster. This can relate to entering a foreign market, vertically integrating within the supply chain or horizontally expanding into other supply chains. The main purpose of a horizontally M&A is to increase revenues by offering an additional range of products to your existing customers. The main objective of a vertical M&A is not to increase revenues, but to improve and reduce costs. During the financial crisis, the market for M&A was virtually stagnant. Now that the economy is picking up again, M&A activity trends are steadily larger and the number of transactions is increasing, while technology rise is the first standout sector shift. Acquisitions of technology firms accounted for a record 17.8% of all M&A deals in 2017 (Boston Consultancy Group, 2018). Additionally, global deal making continues to rise in Europe with 12.3% respectively. Figure 1.1, presents the global value and volume of M&A activity in the technology sector between 1991 and 2018.

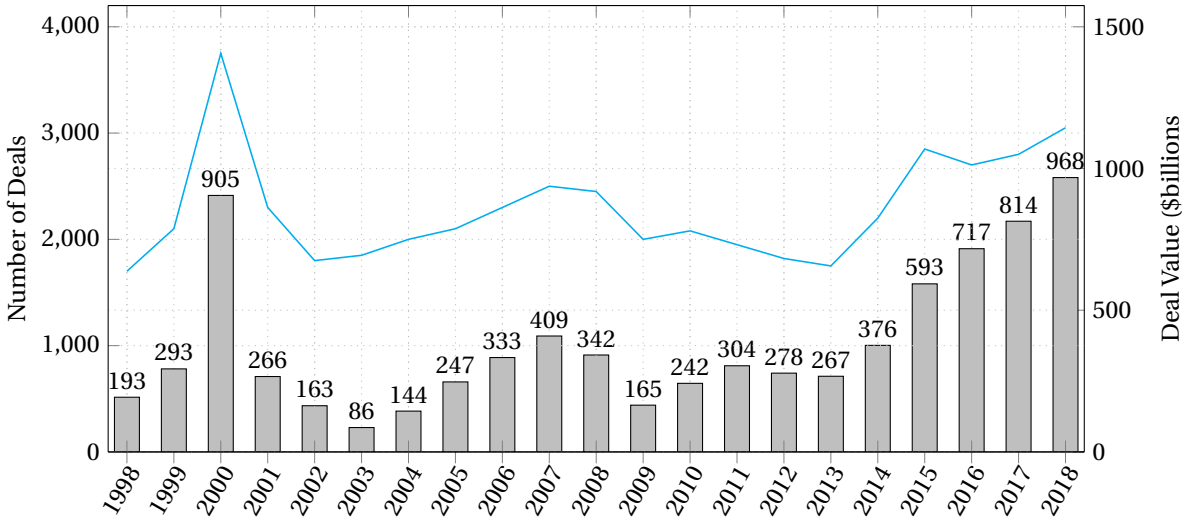

Figure 1.1: Global tech M&A Value and Volume [1]

[1] Source: Thomson One Banker, BCG Analysis. Note: the year 2018 is still a prognoses and not yet confirmed.

Today's tech M&A market is very different from its dot-com predecessor. Back in 2000, internet firms went public or were even sold despite having almost zero revenue. Current young start-ups are profitable, and business models are tested on the market. At the same time, there is also a highly marketplace for small M&A. More than 80% of the volume of tech M&A consists of transactions with a value of €100 million or less. Many start-ups seek corporate support at an early stage of their existence. One form of such support are M&As.

On the other hand, the unapproachable leaders of the technology sector appear vulnerable and suddenly run up against their limits: limits to growth, limits to prices they can charge, and limits to how they run their business. Therefore, the big tech firms choose the flight forward. M&As are a popular strategy for firms interested in the technology industry while they present a vital instrument for strategic expansion. In the near future, you can count on plenty of acquisitions and a flood of new products and services [Pitchbook, 2018]. At the same time, what better way to ensure dominance by acquiring all the smaller competitions which are operating in the same industry? High-tech giants make knowledge acquisitions, such as smaller start-ups to require its resources. But in practice, it appears that not all mergers or acquisitions are a success by any means. Constant high firm performance is often needed to invest in innovation to realise economic growth. Also, the main idea of an M&A is value creation to both the shareholders as well as for the overall community. But in reality, this is not always the case. For example, Moeller *et al.* [2005] show shareholder value destruction when managers are only focused on short-term returns instead of long- term thinking. In other words, M&As do not only occur with practical problems but also address the societal and political aspects.

1.2 RESEARCH OBJECTIVE

This phenomenon leads to the primary objective of this research to find out whether takeovers in Europe affect the high-tech target firm's post-performance when M&As can have an intensive impact on the firm's growth prospects and long-term attitude. Previous literature provides ambiguous results but there is no con-

sensus throughout literature regarding the post- acquisition target firm effects, while the presented results are often time contradictory and puzzling [Healy *et al.*, 1992; Powell and Stark, 2005; Ghosh, 2001]. Some papers argue that the takeovers improved target firm performance, others obtain a decline in performance, and few fail to procure any results [Erel *et al.*, 2015; Desyllas and Hughes, 2010; McCarthy and Aalbers, 2016; Cloodt *et al.*, 2006]. Due to the increasing number of M&A in the technology sector and the fact that research into the technology industry is less pronounced throughout literature, particularly on an aggregate level and privately held high-tech target firms, does the current study aims to contribute to the controversy on M&A post-performance.

1.3 RESEARCH QUESTION

Even though M&A are widely used for financial research purposes, there is plenty yet to be uncovered. The bulk of previous research on M&A activity is confined to the United-States, whereas a European study is less pronounced. Europe offer a natural laboratory to study the determinant and consequences of M&A given essential variations in laws and regulations, institutions, traditions, and economic environments across countries, continents and over time. Interestingly, novel data has become recently available meaning that we can see how target firms behave before and after the acquisition. This is because most European countries require firms to report financial data publicly on unconsolidated bases, even if there are privately held. Moreover, many papers analyse stock returns around acquisitions, whereas an accounting based study on post-acquisition performance changes is less pronounced [Pervan *et al.*, 2015; Moeller *et al.*, 2017] [2]. Accounting-based analysis are build on the firm financial statement to examine performance changes. The use of accounting-based performance indicators has two main advantages. First, they measure the actual results and not investors expectations [Grant *et al.*, 1988]. Second, potential synergies can best be described in ratios such as

[2] Stock returns refers to the market performance analysis. The main variable used to investigate M&A performance are the Cumulative Abnormal Return (CAR) and Average Paired Difference (APD). Firms have to be publicly listed in order to obtain stock data.

the return on assets [Hitt *et al.*, 1998]. In addition, operational performance indicators present explicit firm characteristics and exposures in the business environment, depending on the accounting rules. More interestingly, this study can therefore be used to further investigate what would have happened to the firm if it had not been acquired. All these factors have lead to the main research question of this research which is:

"How do Mergers & Acquisitions affect the post-performance of high-tech target firms in Europe?"

1.4 THESIS OUTLINE

Firms could be listed, delisted, or unlisted. As aforementioned, this research is mainly focused on privately held firms, where Sole Proprietorship (Sole Trader) [3] and partnership [4] constructions are excluded. This has to do that there is no separation between the firm and the owner(s). Also, the owner(s) has unlimited personal liability for any of the firm's debts. That is, if the firm defaults on any debt payment, the lender can (and will) require the owner to repay the loan from personal assets. An owner who cannot afford to repay the loan must declare personal bankruptcy. Further it is difficult to transfer ownership and there is limit ability to raise equity money [Berk and Demarzo, 2014].

This study utilise a combination of three data-sets; Zephyr, Amadeus, and Orbis from Bureau van Dijk (BvD). The match is necessary to have information on financial variables before and, particularly, after the deal. Matching all databases is possible given that firms have a common BvD identifier. One important requirement is that the sample consists of data for at least one year before the deal, and at least one year after the deal. The quantitative analysis require big data investigation that will be executed by computer program Statistics and Data (STATA), which is a statistical software package mostly used by researchers to analyse, manage, and

[3] A sole proprietorship is a business owned and run by one person. Sole proprietorship are usually very small with few, if any, employees. Generally they do not account for much sales revenue in the economy

[4] A partnership is identical to a sole proprietorship except it has more than one owner.

produce graphical visualisations of data. STATA provides multi-variant statistical tests and can support to perform multi variant analysis procedures for large amounts of complex data. Moreover, this paper employs three different benchmark methods, The Ordinary Least Squares (OLS) model, an intercept model, and a Difference-in-Difference (DD) model. Different benchmarks occasionally yield different results, which consequently causes papers to contradict on post-performance changes and therefore lack consensus. Including several approaches enhances the findings, overcomes weaknesses of the individual methods and addresses endogeneity concerns.

The remainder of this thesis report is structured as follows; In the next chapter, a review of the exiting literature on M&A is presented. In chapter 3 are the construction of the hypotheses defined, followed by the performance indicators used for the analysis in chapter 5. Chapter 6 presents the methodology and the different benchmark methods used to obtain a result. Further, the sample construction will be discussed in chapter 4, followed by the interpretation of the results in chapter 7. Chapter 8 consist of the robustness check to increase the validity of the outcomes. The thesis report ends with the concluding remarks in chapter 9 and the discussion/reflection in chapter 10.

2

LITERATURE REVIEW

This chapter presents the rationale behind M&As followed by their post-performance changes exploited from state of the art existing literature and academic publications. Previous research has resulted in a number of theories about the motivation of M&A, where it is important to analyse this information in order to build clear hypothesis. Also, a general theory about the M&A waves is not yet available, although there seems be specific factors that trigger waves, each with its own characteristics and drivers. Moreover, current literature finds contradicting results when looking to the performance changes of target firms. In addition, globalisation and international trade in particular has increased exponentially in recent years and seems to play an important role in a successful deal.

2.1 THE MOTIVATION OF MERGERS AND ACQUISITIONS

Numerous papers in current literature have extensively explained clarifications why firms actively perform M&A. Berkovitch and Narayanan (1993) analysed and summarised the main benefits of M&A that have been suggested in the literature. The first motive is synergy, which proposes the effect created when the value of the two merged firms is greater than the value of the firms individually (Bradley *et al.*, 1998). Damodaran (2005) described three types of synergies, "cost of production related" also known as the operational synergy, "cost of capital related" also called the financial synergy, and "price related" resulting in the collusion synergy. Operating synergies allow firms to increase their operating income from existing assets. Farrell and Shapiro (1990 and 2001) categorised the operating synergies into three drivers that generate efficiency, [1] Economies

of scale, [2] combination of different functional strengths, and [3] greater pricing power. Economies of scale are the cost advantages that firms obtain due to their range of operation. In other words, when the total marginal cost of the firm decreases as the overall production increases. In general, it is expected to see effective economies of scales by firms operating in the same supply chain (horizontal M&A). Furthermore, by putting together different but complementary capabilities, organisational cultures, human capital, patents, or simply know-how will most probably achieve higher functional strengths. Research & Development (R&D) is a powerful non-tradable asset that may increase the firms' joint production possibilities. According to Andrade *et al.* [2001] are high-tech giants making knowledge acquisitions, such as smaller start-ups to require its resources such as technology, intellectual property, workforce, and client data to ensure future success. Also, integrating existing R&D will faster introduce new or better quality products and innovate in cost reducing processes. The last drive behind operating synergy are better growth opportunities in new or existing markets through the combination of the two companies. This may be the case, for example, when a local firm acquires another firms in an emerging market, with an established distribution network and brand name recognition, and uses these strengths to increase sales of its products

Financial synergies arise from the enhanced efficiency of financing activities and are mainly linked to lower cost of capital (discount rate) or higher cash flows. Hellgren *et al.* [2011] explains that increasing the company's size results in better access to cheaper capital. Small firms are often unable to borrow at competitive interest rates because of liquidity problems or asymmetric information on the foreign capital market. As large firms have better access to the international capital market compared to a small ones, the merger would be motivated by the possibility of borrowing more cheaply than independent units. Another advantage of large firms is that they can reduce the systematic risk by investing in unrelated businesses. At the same time, M&A presents an instrument of taking advantage of tax laws. A profitable firm that acquires a money-losing firm is able to use the net operating losses to cut down its tax expenses. Alternatively, a firm that is able to increase its depreciation costs after a M&A can save taxes and increase its value. Besides, when merged firms create

a more stable and predictable cash flow allows them to borrow more money, which in turn lead to tax advantage [Damodaran, 2005]. The last financial synergy lies in the diversification and is related to the *modern portfolio theory* [1]. In contrast to private or closely held firms, is it possible for investors to diversity simpler and at a far lower cost in public traded firms.

The last synergy collusion refers to the case where M&A changes the way of competition into a more implicit or explicit collusive outcome that facilitates the price increase. The reason is that the smaller the number of competitors, the easier to collude on prices. Another feature that facilitates collusion is the elimination of an outsider. An outsider is often seen as a newcomer who is not interested in pursuing collusive arrangements and behaves competitively or as a small business with high innovation and patent assets [Chatterjee, 1986]. Also, a decline in competition and an increase in market share should result in higher margins and operating income. However, these motives may not be pronounced publicly due to conflict with the antitrust law [2].

The second motive that Berkovitch and Narayanan [1993] describes is the agency motive. This implies that the self-interest of the acquirer stakeholders motivates M&A. A frequently occurring agency problem arises when the management of the firm does not act fully to the benefit of its shareholders. Since management in a varied firm does not own a large proportion of the firm shares, they will be more interested in the pursuit of higher compensation, better work conditions and greater control/authority at the expense of the shareholders of the firm, which means that the firm value optimisation is not the primary objective [Piesse *et al.*, 2012]. The third and final motive is the hubris motive, which is the unrealistic belief held by the management of acquirer firm that they can manage the possessions of a target firm more efficiently than the target firms' present management. According to McCarthy [2011], are shareholders too easily persuaded by the management that a certain M&A has to be pushed through, for no other reason than that the money is ready for it.

[1] Modern portfolio theory (MPT) is a theory of how risk-averse investors can construct portfolios to optimise or maximise projected returns based on a certain level of market risk

[2] The antitrust law is a collection of federal and state government laws that regulates the conduct and organisation of business corporations, generally to promote fair competition for the benefit of consumers

McCarthy argues that firms should think more carefully about whether it is more cost-effective to acquirer a firm a abroad or to do it with their own strengths. Another example is whether it is easier to acquirer a new product or to develop one yourself. That this does not always succeed has to do with the fact that the management can hardly do it better in another country or market segment than the acquired company.

On the other hand, M&A can have an intensive negative impact on the firm's growth prospects and long-term attitude. Resolutely participating in M&A does accumulate a significant amount of risk. It is common knowledge that M&A do fail where the rate of successful takeovers is estimated to be roughly 50 percent against their original objectives [Koi-Akrofi, 2016]. Ravenscraft and Scherer [1989] found a decline in the profitability of acquired firms. The reason for this decline is losing the control due to complex and complicated organisational structures and managerial expertise. Other reasons that have been identified in the literature for his seemingly low percentage are; employees, firm size, integration risk following the takeover, over-payment in acquiring the targeted firm, motivation and culture clashes between both firms [Powell and Stark, 2005].

2.2 MERGERS AND ACQUISITIONS WAVES

M&A waves are relatively short periods of heightened and intense M&A activity. The activity in M&A in the past century have occurred in cyclical patterns with different characteristics. Each M&A wave typically coincides with a number of economic, political, and regulatory changes. Economics and scientist usually refer to six specific waves starting from 1983 [Martynova and Renneboog, 2008]. The first two waves were only relevant to the USA market, while the last two waves had more geographical dispersion, affecting the USA, UK, EU, and Asia markets. Lieberman and Montgomery [1988] argue that early movers gain competitive advantages such as developing network effects, secure new technologies, and obtain industry resources. Despite these benefits, moving early into a M&A wave also entails many risks. There may be a great deal of uncertainty about the course of development of the wave, or lack of information regarding possible target [Harford, 2005].

Nonetheless, M&A specialist and historians forecast an enormous increase in the number of M&A transaction over the next years. The accountancy and advisory groups KPMG and EY present new evidence [3], that we are currently in the middle of the seventh M&A wave, while Auguets-Pratsobrerroca *et al.* concludes in a study conducted in 2017 that the seventh wave of M&A is expected to begin shortly. To understand and identify the history about M&A, it is required to discuss the available perspectives about the occurrence behind each M&A wave.

Wave #1: 1897-1904

The first wave, also called the "Great Merger Wave," was a reaction on the economic prosperity started in the 1880s. Another reason was the development of the modern industrial capital stock trading on the NYSE. The wave activity was mostly characterised by horizontal consolidation, which led to the creation of many giant firms in the oil, mining, and steel industries, and exceeded more than 15 percent of the total assets. [Stigler, 1950]. The monopolies created during the first M&A wave culminated in the adoption of the Sherman Act and the Clayton Act. The formation of monopolies was therefore not restricted. The wave came to an end around 1904 when the stock market crashed.

Wave #2: 1916-1929

The second M&A wave started during the time of the first World War and lasted until the world-wide depression in 1929. Due to the government's increased vigilance towards the end of the first M&A wave, resulted in a second wave period that was mostly characterised by oligopolistic rather than monopolistic deals. In contrast to the first wave was the second wave dominated by vertical and conglomerate M&A deals. Vertical integration opened up new opportunities in the existence of networks for exploiting economies of scale, where the primary focus of M&A activity was in the paper, food, iron, and printing industry. The second wave was not

[3] EY's 12th Global Capital Confidence Barometer, a biannual survey of more than 1,600 participants in 54 different countries, concludes that 56% of global companies is intend to acquire in the next year.

so successful as the first one and had an impact of less then 10 percent of the total assets. At the end of the wave, industries were no longer dominated by one large corporation, but rather by two or more [Gugler *et al.*, 2012].

Wave #3: 1965-1969

The third wave was followed after the Second World War in times of significant positive economic growth and development. The strong economy gave several firms the resources necessary to acquire other firms. The wave started in 1965 and resulted in the development of a new business organisation. Where the first and second wave mostly involved [1] horizontal or [2] vertical integration, was the third wave dominated by industrial mass production in consumer good industries through product diversification [Sudarsanam, 2010]. During the third wave, the antitrust enforcers had another critical piece of legislation in their possession - The Celler-Kafauver act[4] - which further strengthened their control. The wave was slowed down in 1969 and eventually emerged in the energy[5] (1970) and oil[6] (1973) crisis.

Wave #4: 1981-1989

The fourth M&A wave began in 1981 and lasted until 1989 when another stock market crash followed. The fourth wave was slightly different than its previous one, where the size of the target firms was significantly more substantial than those of earlier periods. Deals in the billion dollar range became usual, and the concept of Leverage But-Out emerged[7]. Another remarkable phenomenon was the fact that bids were usually hostile, which mean that they did not have the targets management approval. The fourth wave began to dis-

[4] The Celler-Kefauver Act is a federal law passed in 1950 and reaffirmed the Clayton and Sherman acts.

[5] The 1970s energy crisis occurred when the leading industrial countries of the world faces substantial petroleum shortages. This led to a declining economic expansion.

[6] The 1973 oil crisis was triggered when Arab producers claimed an oil embargo cause of output could not keep pace with the increasing demand resulting in major shortages in the United States, especially for heating oil.

[7] In a Leverage Buy-Out (LBO), uses the firms own management large amount of external debt to take over the firm. After the acquisitions, large parts of the assets are sold.

pose the inefficiencies that were created in the previous M&A waves. Stearns and Allan (1996) illustrate that a bid on a competing target firm in the same industry has a positive relationship with the return on the stock market for the shareholder of the bidding firm.

Wave #5: 1994-2000

The fifth M&A wave followed the economic recession of 1991-93, and a globalisation process was starting to develop. Due to globalisation, the number of cross-border M&A increased significantly. Globalisation leads to an extension of markets where the firm expansion was a serious driver behind the M&A activity to realise these growth and global opportunities For this reason, firms started to search outside their domestic border to find an adequate target firm. Just like during the fourth wave occurred large M&A more often. But whereas a lot of the M&A in the fourth wave were executed for short-term profit, was the focus in the fifth M&A wave more on emphasising long-term business strategies. The end of the wave in the year 2000 was once again caused by a crash in the stock markets due the burst of the internet bubble (Morck *et al.*, 1990).

Wave #6: 2003-2008

The sixth and last known completed M&A emerged in 2003, only few years after the fifth M&A cycle. The M&A activity peaked in 2006 with a all time high record number of deals. This was marked by mega-deals, extensive over payment, significant value destruction for acquiring firm shareholders, prevalence of equity financing, and overvaluation of acquiring firms (Auguets-Pratsobrerroca *et al.*, 2017). In addition, Alexandridis *et al.* (2010) argue about the drivers of the sixth M&A wave. The prospering stock prices at that time amid that this wave were based more on sound fundamentals, rather than over optimistic expectations. It also appears that behavioural theories according to which merger waves are more likely to occur as a result of overvalued firms seeking to acquire less overvalued assets. The M&A wave lost his figure approximately in mid-2007, when economics and investors started showing real signs of scepticism about the credit market and their potential effect on the economy as a whole. When the crisis unfolded, the number of deals also collapses.

2.3 MERGERS AND ACQUISITIONS PERFORMANCE

M&A activity in the high-tech sector has expanded substantially in recent years, and the performance of takeovers have been studied using different approaches that have generated a considerable amount of empirical and theoretical studies. This section provides a comprehensive overview of previous research into innovation and accounting based performance along while M&As. Cloodt *et al.* [2006], examined the post-acquisition innovative performance of acquiring firms in four high-tech (aerospace and defence, computers and office machinery, pharmaceuticals, and electronics and communications) industries using data from 2429 deals between 1985–1994. The main focus is confined to the number of successfully granted patents. It turns out that a large relative size of acquired knowledge reduces the innovative performance of the acquiring firm. This indicates that firms should target organisations that are neither too similar nor too unrelated in terms of their knowledge base.

McCarthy and Aalbers [2016] researched the impact of geographic distance and borders on post-acquisition technological performance. The sample consists of 3683 high-tech deals with 1,117,806 patent publications over the period from 2000 to 2012. The results support liability of distance and show that every 1000 km between the acquirer and the target cost as much as 19 lost patent publications. The total number of patent applications increased on average by 15.600 each year. Nonetheless, individual firms present far less favourable results. Only 21 percent of the firms in the sample were more innovative in the year after the deal than they had predicted, 46 percent did not notice any effect from the acquisitions, and even 33 percent made fewer patent publications.

Desyllas and Hughes [2010] explored whether acquirers become more innovate in terms of intensity and productivity and the factors affecting those changes. Innovation performance is measure using R&D expenditure and successful patent applications over a 3-year post-acquisition window of 2624 high technology US takeovers. The R&D intensity is estimated by the ratio of R&D expenditure over total assets, while the R&D

productivity is determined by the ratio of successful patent application to R&D expenditure. Results proof positive R&D intensity changes and marginal R&D productivity changes. Conspicuous, high leverage growth decreases the R&D intensity, which is in line with increased short-term thinking and financial constraints. On the other hand, High leverage increases the productivity gains of R&D, which is following improved monitoring, leading to greater efficiency.

Giovanni [2012] conducted research on innovation performance following the effect of M&As on the number of patent publications (quantity) and the quality. Three measures of quality are considered: generality, originality, and impact. Generality refers to the applicability of a patent in multiple technological areas. The originality of a patent determines the degree to which the intellectual property synthesis various technical inputs. The impact of a patent denotes its effect on future discoveries. The sample consists of 159 deals that were completed between 1988 and 1996. Their obtained results evidently indicated that M&A bring about advantages that utilise a positive effect on the number of patent publication, but increases pressure on the patents' generality, originality, and impact. The latter can be explained that acquirers are only interested in a specific patent with high-quality intellectual property, to build a patent system related to that breakthrough invention.

Healy *et al.* [1992] investigated the 50 largest mergers in the United-States between January 1979 and June 1984 on their post-acquisition accounting performance. Where the sample consists of a significant portion of the total dollar value, is it easier to detect the economic benefits if the target firm is large. The focus relied on pretax operating cash flow generated by the assets to measure advancement in operating performance. While using a cross-sectional regression method, the results implied that there is a strong relation between operating cash flow and abnormal stock returns. This improvement is more significant for firms in overlapping businesses. An interesting detail is that the advancement in post-merger cash flow is not at the expense of long-term performance since the sampled firms maintain their R&D rates and capital expenditures relative to their industries after the merger.

Martynova and Renneboog [2006] used a large sample of 28 continental European countries, Ireland, and the United-Kingdom to conduct research on the takeover market in the period 1984 until 2001. This report is one of the first that fully exploits the aggregate performance of target firms throughout Europe. They characterise the main features of the domestic and cross-border corporate takeovers involving European companies. The research includes the type of takeovers (tender offer or negotiated acquisitions), bid approach (hostile or friendly), method of payment (all-equity, all-cash, or mixed deals), the legal status of the target firm (private or public), takeover strategy (focus or diversification). The results reveal strong evidence that the method of payment has a significant impact on the share prices of both the acquirer, as well as the target firm. Besides, target shareholders encountered higher wealth effects on domestic compared to cross-border M&As. At last, they conclude that poor performance follows the acquisition.

Powell and Stark [2005] investigate acquiring firms post-takeover operating performance improvements estimates. Using two matching procedure similar employed by other papers, in which benchmark firms are selected on various pre-acquisition characteristics. The sample includes 191 M&A completed in the United Kingdom over the period 1985 to 1993. The findings suggest that takeovers had a moderate, yet significant, effect on firm performance[8]. The second matching procedure, which studies the consolidated financial data, suggest more substantial improvements in operating performance[9], which indicate that the synergies were well exploited. Further, the method of payment was found to have an insignificant impact on post-acquisition performance.

Ghosh [2001] explored whether M&As show a difference in operating performance using a benchmark of firms that match on size and performance. The sample consists of 315 pairs of target and acquiring firms during the period 1981 till 1995. The researcher concluded that there couldn't find any evidence that operating performance improves after the takeover. In addition, the payment method (cash or stock) in M&A is

[8] The median increase in post-takeover performance for firms ranged from 0.13% per yr. to a statistically significant 1.78% per yr.

[9] Both target, as well as the combination of target and acquirer, pre-takeover performance, disclose substantial operating performance enhancement, ranging from 0.80% to a statistically significant 3.1%.

analysed. Results implied that operating cash flow increased significantly following cash acquisitions, while a decline was seen following stock acquisitions. Nonetheless, better performance seems to be the result of higher revenue growth and does not seem to be the result of cost reductions. Also, stock acquisitions raise numerous concerns where they fail to realise the promised synergy benefits.

Erel *et al.* [2015] conducted research on target firms' financial constraints, while M&As are expected to relieve these constraints. The sample consisted of 5187 European takeovers occurring from 2001 to 2008. Interesting is the fact that the vast majority of the targets are privately held firms. The findings suggest that the level of cash held by the target firms, the sensitivity of the investment to cash flow, and the sensitivity of the cash to cash flow all dropped. These effects are more significant in deals that are correlated with financing improvements. The results indicate that acquisitions relieve financial friction from the target firm, especially when the target firms are comparatively small. In conclusion, M&A resulted in a positive performance effect for the target firms.

Rashid and Naeem [2017] researched the impact of M&A on accounting performance using data on deals that occurred between the period of January 1995 and December 2012. In order to analyse the impact on profitability, leverage, and liquidity are 25 non-financial acquired firms with 3-year pre- and post-merger average financial ratios included. The variables used are profit margin, return on assets, interest coverage ratio, debt to equity ratio, quick ratio, and current ratio. The OLS regression results proof that M&A do not have any significant impact on the firms' performance. Remarkably, the estimates suggest that M&A have a negative and statistically significant impact on the target firm quick ratio. The latter can be explained by the fact that the assets are considered as a single entity, while this has a dominant impact on the quick ratio [10]. Yet, the current ratio should have significant and comprehensive results subsequently [11]. A substantial increase in inventories following the M&A could be explained by the fact that inventories are often overlooked.

[10] The quick ratio compares cash assets, such as short-term investments and accounts receivable, to current liabilities

[11] The current ratio compares a firm's current asset and current liabilities to assess whether the firm has sufficient working capital to meet its short-term needs

In conclusion, there are several papers available concerning M&A post-performance measured by accounting and innovation performance indicators, yet the bulk of the empirical studies only use one category of acquisitions performance measures, while Das and Kapil [2012] argue that it is necessary to observe multiple measures of performance to explain the value creation objectives of M&A. Also, the benchmark used the same performance methods and indicators such as return on assets and cash flow.

2.4 MERGERS AND ACQUISITIONS; DOMESTIC VERSUS CROSS-BORDER

The performance of M&A can vary widely depending on the different dynamics of the transaction. Borders add an extra component to the matrix of M&A because they are associated with an additional set of frictions that can interfere or facilitate takeovers. This has led to a conceptual distinction between domestic M&As on the one hand, and cross-border M&As, on the other hand. Cross-border acquisitions are those involving where the headquarters of the acquiring firm as well as the target firm are located in different countries of origin [Erel *et al.*, 2012]. Even though a large proportion of worldwide M&A activity involves firms from different countries, is bulk of previous research primarily focused on domestic deals between publicly traded firms, even when the vast majority includes cross-border M&A along with with private firms [Coeurdacier *et al.*, 2009]. Globalisation is one of the reasons why cross-border M&A are becoming a consistent trend in economic cycles. This development is marked by the growing number of M&A deals during the fifth and sixth merger waves [Ellis *et al.*, 2012]. The most frequent determinants of cross-border M&A appear to be, firm-level factors (e.g., firm size, multinational experience, local experience, financial resources, international strategy, and product diversity), country-level factors (cultural distance, exchange rate, market growth in the host country, political uncertainty, Gross Domestic Product (GDP) change, institutional laws), and industry-level factors (e.g., advertising intensity, technological intensity, and sales force intensity) [Reddy, 2015; Boateng *et al.*, 2012]. In contrast, the negotiation or transaction costs for cross-border M&A are significantly higher compared to the costs for domestic M&A, due to the international context and border legislation

relating to legal expense, taxation, and investor protection [Collins *et al.*, 2009; Barkema and Schijven, 2008]. However, many studies argue whether cross-border M&A experience a higher performance than domestic M&A or the other way around. Bertrand and Zitouna [2004] and Piscitello and Rabbiosi [2003] found out that cross-border M&A outperformed domestic deals and improved the total factor productivity of target firms, which proposes that firms reorganise in order to maximise their efficiency at the upstream and downstream level. Other results show that profitability and size have a greater impact on the probability in cross-border M&A rather than domestic M&A [Caiazza *et al.*, 2016]. Moreover, Hasan *et al.* [2017] found evidence that acquirers experience eloquent growth on innovation associated with high-tech transactions in countries with better Intellectual Property Rules (IPR) protection.

On the other hand, Gioia and Thomsen [2004] found contradictory results that cross-border M&A experienced a lower performance than domestic M&A. According to Aw and Chatterjee [2004], it appears that cross-border M&A experience negative cumulative abnormal returns at various significance levels. Also, Moeller and Schlingemann [2005] noticed that firms who acquire cross-border target versus firms that acquire domestic targets experience significant lower variations in operating performance and earn lower stock returns of approximately 1 percent. Besides, Saboo and Gopi [2009] suggest that M&A have a positive impact on accounting performance ratios of firms acquiring domestic firms, while M&A on foreign firms present negative results. Cross-border M&A would also result in a lower return in the long term compared to local deals [Conn *et al.*, 2005]. Nonetheless, other studies argue whether both domestic as cross-border M&A tend to reduce the performance of target firms. Bertrand and Betschinger [2012] examine how different country-level characteristics, moderate the value-destroying effect of acquisitions and conclude that many acquirers suffer from the inability to leverage value due to low M&A capabilities, especially when making cross-border acquisitions. Regarding value creation, a survey by KPMG [12] reported that "only 17% of cross-border acquisitions created shareholder value, where as 53% destroyed it" [Shimizu *et al.*, 2004].

[12] KPMG is an international accounting and consulting firm and, together with EY (Ernst & Young), PricewaterhouseCooper and Deloitte, is part of the so-called Big Four.

A prevalent phenomenon in cross-border literature is cultural distance, and has been found to affect the performance, entry mode, choice of location, and uniformity of procedures [Tihanyi *et al.*, 2005]. Cultural distance pose a huge threat to the success of cross-border M&A. History has shown different examples of break downs and proposes intercultural disagreement as one of the major pointer of failure. Various factors such as, differences in [1] language (e.g., language families, such as the client speaks a tonal language and the clinician an Indo-European language), [2] religions (e.g., Christian and animist religions), [3] family structure (say, polygamous vs. monogamous can create distance), [4] values (e.g., the difference between self-actualising, hedonistic values and conservative, very traditional values), [5] wealth and life style (e.g., the difference between a wealthy jetsetter and a member of a culture of hunters and gatherers), may have a contribution to the performance of M&A [Triandis, 1998]. In order to deal with these challenges businesses need to invest good amount of time and effort to be well aware of the local culture to gel with the employees and other concerned parties.

Several studies assign scores to culture with regard to beliefs, rituals, symbols, and values. One of the earliest and most influential of these was Hofstede's four dimensions of culture. But scientist argue the shortcomings of the Hofstede model and take a more robust approach to analyse culture identities (e.g., Lewis, Barth, Schwartz, Globe, Trompenaars, and Inglehart). Most of these examples ask respondents about there beliefs, values, and feeling, and than aggregated these responses to characterise the national culture [Tsui *et al.*, 2007]. Nonetheless, Agirdag *et al.* [2016] place question marks by the fact that cultures are understood as national trait now a days. The reason for this are the large amount of immigrants with different religiosity and religious identity expressions. As a consequence, various M&A analyses distinguish between geographical regions (e.g. in and out developed economies (often western Europe) or in and out emerging economies (often eastern Europe) [Lebedev *et al.*, 2014]. As well as between regions, a distinction can also be made between systems of social order. Common in literature are the coordinated market economies, compared to the liberal market economies (e.g. Anglo-Saxon, Nordic, and Rhineland model of capitalism) [Cernat, 2004].

3

HYPOTHESIS

Statistical hypothesis in quantitative studies consists of one independent variable, one dependent variable, and a statement about the expected relationship between them. Generally, the independent variable is mentioned first followed by language refer to causality, where after the dependent variable is stated. This chapter defines the hypotheses based on the discussions of the preceding papers explained in the previous section. While providing the paper own view, subsequently expectations about the results are presented. According to the conceptual model, five hypotheses can be formulated to investigate the relationship between M&A on high-tech target firms and accounting/innovation performance, as well as the effect of the moderator variable.

First, as mentioned in the literature review, current research lacks consensus regarding the target post- performance changes. Different models have been used, and various variables have been included for the examination that tends to support the phenomenon that target firm performance improved after a takeover [Erel *et al.*, 2015; Desyllas and Hughes, 2010; Giovanni, 2012; Healy *et al.*, 1992; Powell and Stark, 2005]. As the synergy motive is the most dominant motive for M&A, which support the increase in performance speculations, is there also a lot of evidence that fail to find an indication for performance changes [McCarthy and Aalbers, 2016; Cloodt *et al.*, 2006; Ghosh, 2001; Martynova and Renneboog, 2006]. Overall, M&As allows the target firms to restructure their activities in order to take full advantage of the economies of scales and the opportunities for distribution, production, and financing goods. The negotiating position is also increasing, leading to further cost reductions, including the opportunities for diversification, for example by making use of the internal capital markets and risk management for non-diversified managers [Andrade *et al.*, 2001]. Based on

the presented theories and the overall thought that high-tech target firms obtain revenue synergies and cost synergies, the first hypothesis is formed, in which this thesis report expect to find that performance does increase on average.

Hypothesis 1: High-tech target firm performance increases after the acquisitions

Second, each country has its own practices, rules and regulations. These are partly legal norms. As a results, M&A are often much more complex, and can have major consequences. Bertrand and Zitouna [2004] and Piscitello and Rabbiosi [2003] found that cross-border M&A improve the performance of target firms and outperformed domestic deals. Gioia and Thomsen [2004] on the other hand, failed to find evidence, where takeovers between firms in foreign countries experienced a lower performance compared to domestic deals. Also, Aw and Chatterjee [2004] differentiated the effects of cross-border M&A from those of domestic M&A, but concluded that there are no improvements in performance of the foreign takeovers.

Since the early 1990s, there has been an expansion in the number of cross-border mergers in Europe. In fact, the surge in cross-border M&As is a key feature in the fifth and sixth merger waves, which is also seen as a way of globalisation. Cross-border deals provide access on foreign markets and avoid unfavourable governmental polities of the home country. Moreover, firms can restructure the industry, exclusive retail goods on different markets, transfer technology to these new markets, exploit market inefficiencies, and increase local support to international clients. Besides, next to the economic benefits are firms in a position to absorb, develop, and recombine knowledge in new ways. This contributes to the firms' innovative performance in both the short and long term. Overall, the cross-border versus the domestic deal post-acquisition performance is unquestionably ambiguous as previous research indicates. Nonetheless, research on aggregate European high-tech target firms post-acquisition performance is scarce, and in current literature, there has not been any consensus regarding the cross-border versus domestic M&A differences. In other words, domestic versus cross-border deal post-acquisition performance is unquestionably ambiguous. The second hypothesis in-

cludes research on the economic synergies and the innovation opportunities behind the foreign M&As stated previously. The expectation is to find that domestic deals are more beneficial for target firms than for target firms in cross-border deals:

Hypothesis 2: Domestic Mergers & Acquisitions outperform cross-border deals post the acquisition

A significant body of recent M&A literature focused mostly on the role of the larger firms, and precious little attention has been concerned about the question of Small & Medium Sized Enterprises (SME) [1]. The fourth merger wave was primarily dominated by the large size of the target firms. Due to the fact that SME are most of the time private firms, make it difficult to obtain valid data on their overall performance [Weitzel and McCarthy, 2011]. Yet, Moeller *et al.* [2004] argue that size does matter in M&A, where SME are anything but insignificant. In Europe alone are SME represented about 99% of all firms, with approximately 65 million people working [European Commission, 2005].

SME targets are able to obtain greater operating performance post-acquisition due to flexibility, efficiency, and rapid growth opportunities [Sinani and Meyer, 2004]. It is also a well-known fact that the biggest tech companies are acquiring SME just for their intellectual property to add new capabilities to their in-house production line. On the other hand, large targets tend to be acquired due to sizeable synergies, economies of scale, and the financial synergies. Also, large firms are often better able to take advantage of the market power motive and managerial motive [Linn and Switzer, 2001]. It is common practice for two large firms in the same industry to combine their resources to become market leaders. There are various advantages for a market leader, including the leverage of the firm's reputation in advertising campaigns, more potential investors, better-qualified personnel, and better distribution. Although acquiring a large firm could also lead to a decline in performance, while the formation of large firms requires much effort, a lot of time, and more

[1] SMEs are according to the European Commission standards firms that have either less than 250 employees or less than 50 million EUR turnover. In contrast, large firms are defined as firms having more than 250 employees and more than 50 million EUR turnover.

potential for cultural conflict. The latter is probably since large firms generally operate for a more extended period of time compared to SME and therefore have a deeper-rooted business culture. The novelty of this analysis lies in the fact that it contributes to the understanding of the essential but often ignored SME sector of the economy, by exploring the difference in post-acquisition performance between large and SME, in which it expects that small acquired firms show a more significant improvement in performance compared to SME.

Hypothesis 3: Small and medium high-tech enterprise targets exhibit greater performance improvement than large high-tech enterprise targets after the acquisition.

Cultural distances are essential when analysing cross-border M&A, as different countries are embedded in various and diverse social contexts. The latter effects the overall strategies and the entire organisation itself, while it also creates challenges and implications which need to be correctly managed. To be more precise, as the cultural distance between firms increases, is it most likely that business styles and methods will vary significantly, creating conflicts between recourses. The literature review shows that the 'distance' phenomenon has been included in many recent papers. But despite the increasing interest, there seems no economic consensus regarding the effect of cultural difference on the performance of M&A. Hagendorff and Voss (2010) stress that merging firms with a low level of cultural differences easier share knowledge and resources since the employees and the management team share the same values. In contrast, firms with a high level of cultural differences are most likely to impede the efficient transfer of competences [2]. The level of cultural differences is often measured by means of different dimensions. The cultural foundation of how societies generate and distribute their values is shown by the relationship between the various cultural dimensions. For example, high performance-oriented countries are often more economically prosperous and experience

[2] Low level of cultural distance between two countries is denoted by a total of 0 - 20% difference, medium levels of cultural distance in the 20 - 40% range and a large discrepancy by more than 40%. The country cultural distance scores are based on nine different indicators and can be found in Appendix H

higher levels of human development. The fourth hypothesis aims to contribute to the controversy of culture difference on M&A post-performance and builds forth on the belief that low levels of cultural distance are advantageous to the M&A performance, whereas a medium or high level of discrepancy negatively affects the performance.

Hypothesis 4: Mergers & Acquisitions represented by low levels of cultural distance result in greater performance than Mergers & Acquisitions represented by medium or high levels of cultural distance.

Another question that emerges from the globalisation of the international economy is whether there is a national corporate governance system that performs best in terms of M&A. Corporate governance is a broad term that describes, the customs, processes, institutions, policies, and laws that direct the firm in the way they act, administer, and control their operations [Hall and Soskice, 2001]. In social science represents corporate governance, crucial varieties of capitalism. Two well known and conventional models of capitalism in Europe are the Anglo-Saxon and Rhineland model. The prevailing Angelo-Saxon model is diametrically opposed to Rhineland principles. The claim that one set of institutions should prevail over another is based on several underlying origins. The Angelo-Saxon model is characterised by liberal values such as limited social security, freedom, low barriers to free trade, self-reliance, low tax levels, focus on private initiatives, and less influence of unions. Also known as the Liberal Market Economies (LME), where the government gives priority to a good business climate, wage formation is left to the market, and a flexible labour market provides incentives for employment. Regulation is kept to a minimum where possible in order not to interfere with the business environment and to keep government costs low [Cernat, 2004].

On the other hand, the capitalism practised in the Rhineland countries is characterised by the concept of Social Market Economies (SME), which is associated with firm practices striving for an efficient supply of goods and services in a free market economy, aiming at an equitable distribution of income and benefits at the level of society. Required capital comes from private investors or banks, and employees are seen as

assets which need to be looked after. There are substantial subsidies for households with children, the unemployed, childcare, health care, pension insurance, and post-secondary education.These subsidies are funded by a combination of employee contributions, employer contributions, and government subsidies. In addition, there are provisions to restrain the free market and balancing of the distribution of income growth (e.g., anti-trust code, laws against the abuse of market power, and so on). The latter is also called neo-liberalism, a modern variant of laissez-faire capitalism [Avery and Bergsteiner, 2013]. Firms operating in the Angelo-Saxon or Rhineland philosophy can be found all over the world, but the origins lie in Europe. The Rhineland region is dominated by countries, what the name already implies, through which the Rhine flows (e.g., Netherlands, Belgium, Germany, France, and Austria.) All these countries perform well in global economic competitiveness rankings as well as in global sustainability rankings. The Anglo-Saxon principles are defined by countries such as the United Kingdom, Ireland, Denmark, and Finland. Hence, this study examines which of the two forms of capitalism is performing better after M&As, where it expects that targets acquired in the Anglo-Saxon region evince more significant improvements compared to targets in the Rhineland region.

Hypothesis 5: Mergers & Acquisitions in the Anglo-Saxon region exhibit greater performance improvement than Mergers & Acquisitions in the Rhineland region

Even though firms are trying to get the best out of M&A, founded Koi-Akrofi [2016] evidence that the rate of successful takeovers is estimated to be roughly 50 percent against their original objectives. Post-merger integration is a significant challenge for any M&A deal. A thorough observation can assist identify key employees, important projects and products, impact bottlenecks, and delicate procedures and issues. However, inadequate strategic planning and integration are mainly mismanaged [Cartwright and Cooper., 1996]. Firms value takeovers on project-based results and end up paying a premium when that "potential" does not materialise. It's not like tech firms pursuing deals out of the fine air. Usually, their motive is sensible. Firms may turn to M&A to adopt an emerging market opportunity or to reinvigorate themselves, concerned about their

declining competitive advantage. In other scenarios, a firm may decide that buying new technology is better than developing it or creating a subsidiary firm to enhance its knowledge in the domain. This has resulted in an increasing number of firms acquiring other firms beyond their expertise. Cloodt *et al.* [2006] argue that non-technological M&As seem to have an adverse effect on the acquiring firm post performance. The relationship between the knowledge bases of the target and acquiring firms is having a curvilinear impact on the post-performance of the acquiring firm. This suggests that firms should target M&A 'partners' that are not too unrelated or similar in terms of their knowledge base. This research takes this difference in consideration and investigates the difference between takeovers in the same industry compared to takeovers across industries [3], where it expect to find more significant performance improvement between firms active in the same domain.

Hypothesis 6: Mergers & Acquisitions in the same industry achieve greater performance improvement than Mergers & Acquisitions across industries

For the quantitative study, a research framework is developed as depicted in Figure 3.1. The research framework comprise three main constructs as described in the literature review; motivation, firm characteristic, and the effect of globalisation. With respect to firm characteristics, this study developed measures at two levels; size, and industry. To be more precise, firms are categorised into SME and large enterprises, while size can have different effects on the M&A. In addition, this research takes the industry in which the acquirer and target firm are operating in consideration. In other words, technology is increasingly making a difference to our lives. It is therefore not striking that these new technologies are being adopted by a number of different business operations. With respect to globalisation, this study developed measures at three levels; cross-border, culture and geographic location. Cross-border takeovers and culture differences are closely interrelated. When a firm decides to acquire outside the country's national borders, it also has to deal with

[3]The Bureau van Dijk (BvD) primary industry code(s) are used, while BvD is the vendor of all three databases used.

cultural differences. Of course, the differences are not as substantial as when a firm is taken over in a neighbouring country. Further this study made a distinction between two different regions within Europe that are known for their specific properties regarding the corporate governance system (e.g. Anglo-Saxon, and Rhineland). It can be argued that different way of doing business by mean of a firm or management team influence a takeover.

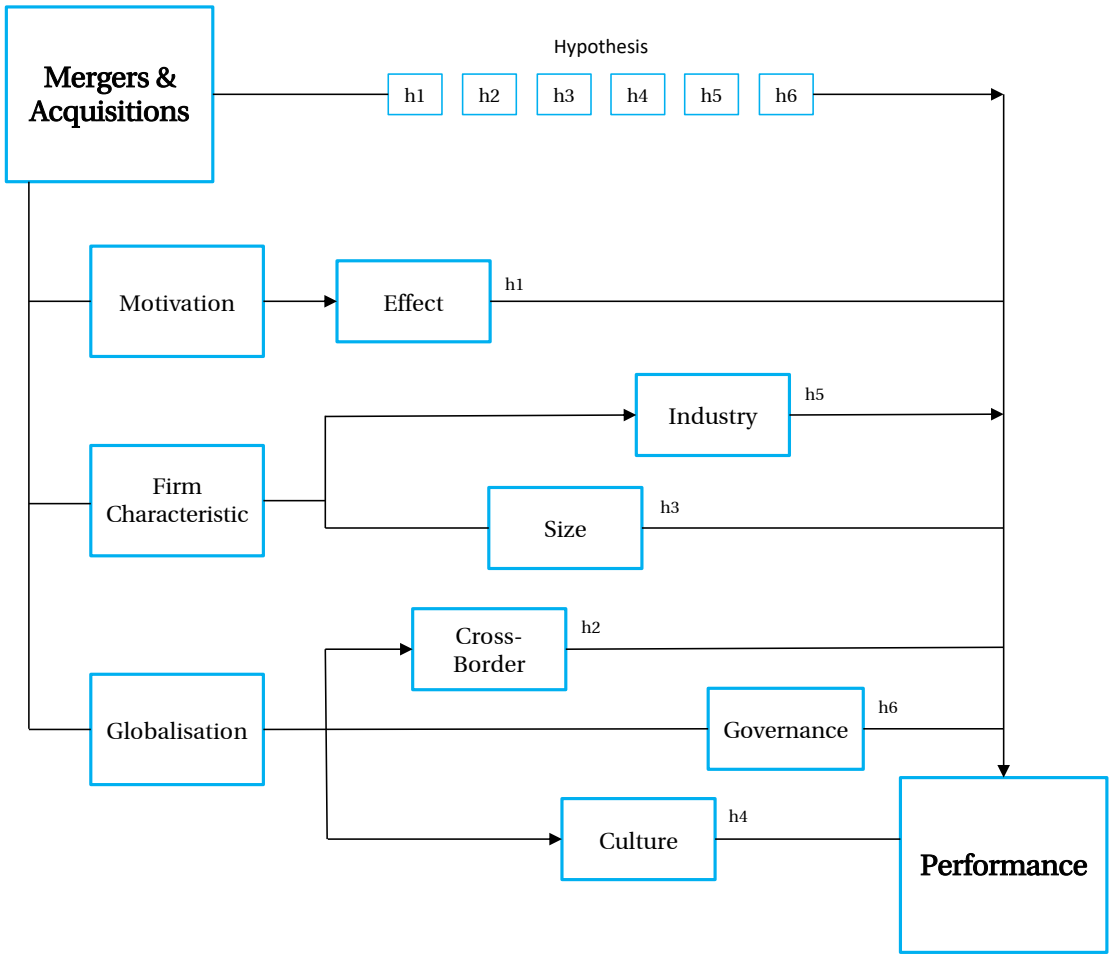

Figure 3.1: Research Framework

4

DATA

This chapter presents the data availability and sample construction which is used to conduct research into M&A in the technology industry. It explains the function and value of the different databases handed down by Bureau van Dijk and clarify the different steps taken in the data preparation process. This chapter concludes with summary statistics tables on the M&As throughout the entire sample, and presents the averages of the two year before and after statistics for the performance indicators estimated using the Wilcoxon-Mann-Whitney test

4.1 DATA AVAILABILITY

To evaluate the magnitude in which financial constrains are affected by M&As, it is important to have access to a sample of M&As financial for which one can measure both the existent of constraints prior- and post-acquisitions of target firms. Reporting and auditing regulations for companies vary bases on its type and the country of residence. Public owned, independent, and listed (those whose securities are traded on a regulated market) firms must comply with a number of requirements concerning the publication and filing of their annual and semi-annual financial reporting. By contrast, private firms are not always obligated to disclose these financials results [Minnis and Shroff, 2017]. Furthermore, firms in most part of the world report their financial data on a consolidated basis, which refers to the collection and integration of assets and liabilities of the parent company and all its subsidiaries on the financial statements. As a result, no distinction can be made between which liabilities and assets belong to which company. Consequently, in 1995 decided the European Commission to work with different reporting basis requirement compared to other countries

worldwide, and follow the International Accounting Standards (IAS) to be sufficiently vigorous for the needs of international capital markets [Perry and Nölke, 2006]. For this reason are firms in the European Union compulsory to report financial data publicly on *unconsolidated* bases, even which are privately (unlisted and delisted) held firms [Larrain *et al.*, 2017]. In addition, countries in Europe have also different filing requirements. In the Netherlands for instance, are firms not obligated to report cash flow data[1].

A conceivable concern is that there are multiple ways to control the financial statements of the acquired target firm, for instance through tariffs strategies, taxes, and transfer pricing [Grubert and Mutti, 1991]. One possibility is that the parent firm merge some of target assets to other current assets and keep them together that appears to consists of only the target firms assets. In order to address these concerns, the total sample of target firms only includes firms in which the total number of employees did not decrease by 50 percent[2]. Additionally, Target firms which the BvD ID number incurs to change post the M&As are not included in the eventual sample, while this indicates that the firms' financials are included at parents' level.

4.2 SAMPLE CONSTRUCTION

In order to conduct research into M&A in the technology industry, does this study relies on three similar statistical databases handed down by Bureau van Dijk (BvD), which monitor M&As deals activity worldwide. The first database; Amadeus, includes standardised annual accounts (consolidated and unconsolidated), explicit financial data, sector activities and ownership data, several options in retrieving the financial of 21 million public and private companies and can be filtered on geographical coverage. The Amadeus database gives the opportunities to create domestic and cross borders analysis and perform detailed financial investigations on

[1] The accounting standards of the Netherlands are based on the Fourth Council Directive of 25 July 1978 on the annual accounts of certain types of companies (78/660/EEC) (OJ L 222, 14.8.1978, p.11)

[2] The change in employees is measured by analysing the average of the two years prior to the acquisition with the average of the two years post the acquisition

individual industries, technology in this case. The second database; Zephyr, is required to extract the deals sample. Zephyr consists of data about M&A, IPO, Private Equity, and Venture Capital deals all around the world. The Zephyr database adds more details than similar deal databases and has the option to search on hundreds of criteria and has currently information on over 1.6 million deals. The third, and last database is the Orbis Intellectual Property, which links global patent data to firms to measure a firms innovation capability, positioning, priorities, and patterns over time. In total, more then 115 million patent application are matched to information on about 300 million firms. Bureau van Dijk is the data vendor of all three databases, which means identical firm identifiers, also known as the Bureau van Dyck ID number. Having identical firm identifiers is a requisite to be able to merge the data sets including all the data requirements consists of the investigated firms financial data, with regard to performance indicators. In total, the Zephyr database consists of 594,948 European M&A. In order to create the final deal set relevant to this research are the following steps undertaken:

- While the Amadeus database is focused on the European Union are only target firm from one of the 28 European countries taken in consideration
- Due to the fact that the Amadeus database only holds a maximum of ten year of financial data per firm, and to allow a M&A to have financial information for at least one-year prior- and one-year post- M&A, only deals occurring between the beginning of 2011 until the end of 2017 are extracted.
- Only completed-confirmed deals are taken in consideration, while announced, assumed and rumoured deals could influence the results.
- The classification of industries by technological intensity is based on research and development expenditures incurred in the production of manufactured goods. Which means that industries with a higher research and development intensity are considered as high-tech industries. This report only includes target firms with a technology classification by the International Standard Industrial Class. (ISIC) endorsed by the Industrial Development Organisation of the United Nations Statistical Commission

[UNIDO, 2010]. Bureau van Dijk makes a distinction of 28 major industry sectors which are presented in **Appendix B**. Every major industry can be subdivided into several sectors which are presented by four digits. To confirm to the Industrial Statistics Guideline are only target firms from the [1811] Chemicals, [1814] Pharmaceutical [21] Industrial, Electric & Electronic Machinery, [22] Computer Hardware, [23] Communications, [2410 t/m 2412 & 2414] Transport manufacturing (Automotive, Avionics, Rail, Space) and [30] Computer Software sectors included.

- Deals in which exits from private equity, leveraged-buyouts, corporate restructuring, and nationalisations are mentioned are excluded.
- Acquiring firms are often larger than target firms. Therefore only target firms with a minimum of five employees and at least a half million euros of total assets worth are included in the sample. In contract, acquiring firms require at least 10 employees and at least one million euros of total assets worth.
- By reason of the fact that this report investigates domestic deals and cross-border deals, are countries with less than five completed deals suspended from the sample. This addresses the possible concern that the performance results reckon a few M&As within their country, which could positive or negative influence the research. Therefore, 23 deals are excluded which targets from Croatia, Lithuania, Estonia, Greece, Latvia, Luxembourg, Slovenia, and Romania. [3].
- Firms with either limited or no financial historical data are dropped with respect to their reporting basis status. This is necessary, while target firms should only have unconsolidated data and acquirer firms consolidated data, whereas firms without these specifications cannot be interpreted correctly.

In conclusion, the constructed sample includes 689 deals, with acquirers from all over the world and targets from 17 European countries. **Appendix C** provides precise information how many deals are dropped in each stage and the M&A activity in each European country.

[3] Number of deals excluded: Croatia [4], Lithuania [3], Estonia [4], Greece [2], Latvia [3], Luxembourg [1], Slovenia [2], and Romania [4]

Table 4.1 present the M&A deal statistics confined to the particular deal completion year. As the table illustrates, the number of deals continues to increase each year with 39 deals in 2011 to 159 deals in 2017, which indicate that the high-tech market is hot and confirms our thoughts on a possible new M&A wave characterised by technology. Interestingly, the mean target's total assets prior to the acquisition, which totals 585 EUR million, is nearly 11 times bigger compared to the median, which equals 20 EUR million. For this reason, it can be assumed that the distribution is clearly heavily skewed.

Table 4.1: Statistics on the M&As throughout the entire sample

The following table shows the statistics on European targets from 2011 till 2017. After cleaning and preparing contains the total sample 689 deals. The European targets have at least two year prior- and post-acquisition financial and patent data available, which are obtained via Amadeus and Orbis. The characteristics are classified by their particular deal completion year. The last three columns represent the statistics of the fiscal year prior to the acquisition.

		Target's Total Assets before the Acquisition (EUR Million)					
Deal Completion Year	No. of Deals	Mean	Median	Domestic Deals (%)	Independent Targets (%)	Private Targets (%)	Public Acquirer (%)
2011	39	196	22.4	28.20%	90.00%	94.87%	23.07%
2012	69	273	15.9	28.98%	86.95%	92.75%	20.28%
2013	67	188	16.9	26.86%	85.07%	95.52%	19.40%
2014	96	392	9.66	35.41%	79.16%	95.83%	16.68%
2015	121	293	21.3	43.80%	78.59%	95.95%	19.00%
2016	138	111	11.5	39.85%	81.15%	98.55%	22.46%
2017	159	174	58.8	20.12%	81.18%	93.39%	20.75%
Total	689	232	20.0	31.88%	83.16%	95.26%	20.53%

The total sample consists of more cross-border deals than domestic deals, while the table points out that of all M&A 31.77% is domestic. Also, the vast majority of the deals are done by independent targets, while 83.15% of all takeovers refer to these firms. Besides, the number of privately-held targets firms represent 95.26% of the total deal sample. The last column reveals that private acquirers do 20.53% for all high-tech M&A in Europe. **Appendix C** contains more country specific insights with regard to the amount of acquirers and targets. As expected, Germany is involved in most target deals which covers 24% of all transactions. Further, the majority of target firms maintain a new European owner where European acquirers made 74% of all deals.

Table 4.2 present the summary statistics on performance indicators and control variable of the targets and acquirers. All variable are calculated on a before and after acquisitions basis, where the intervals are each computed as the average of the two years prior- and post the M&A. The table clearly exposes the significant differences in terms of Total Assets as well ass the number of employees, between the target and acquirer firms where the acquirer firm is much larger in both mean and medium. For both target firms as well as acquiring firms is the median of every variable tested significantly[4]. Besides, each variable is tested at a 1% significance level, except the number of employees and return on assets for target firms which respectively present at a 10% and 5% significance level. Concerning the acquiring firms are the sales growth and the operating margin tested at 5% and 10% significance level. Conspicuously is the significant difference between the mean total assets of the acquiring firms prior- and post the transaction, while only consolidated financials are included. This implies that acquiring firms are combining their assets with the target firms. Remarkably, the targets median of Intellectual Property and Net profit indicate to be negative after the M&A, while the prior period shows positive results. Further, the mean of all targets performance indicators are decreasing, except for the return of assets which shows a slightly raise. The median, however, does not indicate to follow the negative development, yet it is significantly different from the before period where the sales growth of the acquiring firms is twice the size before the takeover while the median, is increasing in the same period.

[4] The level of significance, also referred to as alpha or $alpha$, is a measure of the strength of the evidence to be present in your sample before conclusions can be drawn

Table 4.2: Summary statistics of the Target and Acquirer firms.

The following table shows the summary statistics for the descriptive variables. The averages of the two years before and after the M&A are used. If the firm does not have two years of data available for both periods, then a year before or a year after the acquisition is used depending on data that is missing. Total Assets and Net Profit are measured in Euro million. The mean differences between the before and after period are assessed with the mean difference test, while the differences in medians estimated using the Wilcoxon-Mann-Whitney test. Significance: * 10%, ** 5%, *** 1%.

Targets	Before				After			
Variables	Obs.	Mean	SD	Median	Obs.	Mean	SD	Median
Total Assets	690	570.7	2213	19.27	655	568.3	2117	27.59***
Number of Employees	607	588	2789	89.5	611	385	940	89.5*
Return on Assets	580	0.002	0.246	0.050	580	0.004	0.24	0.044**
Operating Margin	462	1.451	3.299	1.028	436	1.184	0.916	1.033***
Net Profit	467	-0.132	5.538	0.714	466	-0.555	5.375	-0.118***
Sales Growth	352	0.138	0.469	0.053	333	0.091	0.549	0.044***
Intellectual Property	264	1.844	19.08	0.093	238	1.050	3.918	-0.237***
Leverage	627	0.552	0.453	0.485	581	0.535	0.472	0.461***
Acquirers	Before				After			
Variables	Obs.	Mean	SD	Median	Obs.	Mean	SD	Median
Total Assets	512	7839	29920	2976	545	9219	3234	4341***
Number of Employees	483	10366	37556	674	523	11068	39596	689***
Return on Assets	498	0.052	0.112	0.051	524	0.036	0.114	0.045***
Operating Margin	404	1.126	1.100	1.015	422	1.644	7.244	1.015*
Net Profit	397	0.091	4.011	0.170	393	-0.073	3.370	0.027***
Sales Growth	290	9.229	52.36	0.085	283	3.305	17.73	0.097**
Intellectual Property	268	3.348	34.28	0.077	317	9.246	51.744	0.001***
Leverage	499	0.453	0.229	0.444	531	0.475	0.254	0.459***

"Successful enterprises are built from the ground up. You can't assemble them with a bunch of acquisitions."
- Louis V. Gerstner, Jr.

5

PERFORMANCE INDICATORS

This chapter presents the different performance indicators to test the research hypothesis discussed in section 3. By carefully constructing the understanding on performance, this research seeks to comprehensively measure the impact of the targets accounting and operating form on M&A post-performance. First, the different descriptive variables will be explained. The last paragraph consist of the control variables, which are the experimental elements that are constant and unchanged over the course of the research where they could strongly influence the relative relationship of the dependent and independent variables.

5.1 DESCRIPTIVE VARIABLES

M&A performance does not have a well specified analytical framework and some researchers claim that the literature is at risk to fall into a so-called specification trap. Gomes *et al.* [2013] argued in their research that it is too complex and the process to extensive in order to generalise post-performance changes. Meglio and Risberg [2011] examined 169 commonly used journals to provide a refined and thoroughly detailed impression of the M& performance measure development. They belief that the problem rest in trying to compare different indicators as if they were measuring the same feature of the organisation and conclude that it is not possible to talk about M&A performance as if it is a universal construct. This ambiguous construction with a lack of consensus on how to measure M&A performance is also reflected in the results of the study (Figure 5.1). Taken together, the findings show that M&A scholars measure different things in different settings, using broad or narrow definitions. For example, distinction can be made between a financial and a

non-financial domain. The financial domain consist of market and accounting performance indicators while the non-financial domain can be expressed by operational and overall performance indicators.

Figure 5.1: A classificatory scheme of most commonly used M&A performance measures

This research mainly focuses on accounting performance indicators rather than market performance, due to the fact privately held firm's observations are less pronounced in the existing literature. As concluded by Meglio and Risberg in [2011], are the accounting performance indicators dispersed in three different categories; [1] Profitability, [2] Growth and [3] Leverage, Liquidity and Cash flow.

In order to measure the profitability of the target firm after the M&A, this study will include the Return on Assets (ROA), Operating Margin, and Net Profit. ROA is an indicator of how well firms are using its assets to generate earnings and gives the management team or investors/analysts an idea of how profitable a firm is relative to its total assets. ROA is one of the most frequently used financial ratios and cuts to the very feasibility of the firms existence [Kangarlouei *et al.*, 2012] [1].

$$Return-on-Assets = \frac{NetIncome}{TotalAssets} \tag{5.1}$$

The operating margin measures what percentage of total revenues, also known as net sales, is made up by operating income. In other words, the operating margin indicates how much income remains after all variable or operational costs have been paid. Conversely, the operation margin presents what share of the revenue is available to cover non-operating costs. Non-operating expenses are incurred by a firm that does not relate to its main activity (e.g. interest expenses). The operating margin is a key indicators for both creditors and investors because it helps to see how firms are supporting their operations. Firms are usually considered more stable if it can make enough money from their operations to support the business. On the other hand, if a firms requires both non-operating and operating income to cover the operation expenses, it indicates that the firms operating activities are not sustainable.

$$OperatingMargin = \frac{OperatingIncome}{NetSales} \tag{5.2}$$

Lastly, Net Profit reveals the firm's income or earnings. A growth in Net Profit post-acquisitions could indicate two important causal-effects. First, cost deterioration could follow the M&A, while the synergies obtained reduce costs due to the economies of scale and the possibility to share costs between the parent and target companies. Second, increase in turnover due to the fact that the synergies resulting from the M&A are well

[1] Next to Return-on-Assets is also Return-on-Equity (ROE) the most frequently used financial ratio

utilised and more consumers are reached, while the two customer bases are combined. Investors and creditors use Net Profit figures to determine how efficiently firms make money. With the use of the Net Profit it is possible to avoid costly miscalculations and misunderstandings – and create effective long-term strategies. People often refer Net Profit and Net Income as the same thing and are therefor uttered throughout this study as equals. To determine the Net Profit it is necessary to calculate the Gross Profit first;

$$\textit{Gross Profit} = \textit{Net Sales} - \textit{Cost of Goods and Services} \tag{5.3}$$

$$\textit{Net Profit} = \textit{Gross Profit} - (\textit{Operating Expenses} + \textit{Interest} + \textit{Taxes} + \textit{Amortisation} + \textit{Depreciation}) \tag{5.4}$$

Another commonly used indicator to measure profitability is the Return on Investments (ROI) ratio. One way to express the ROI ratio is to quantify the amount spent on R&D. Nonetheless, the Amadeus database, which will be further explained in section 4, does not provide sufficient information on the investment expenses by the acquirer nor the target. Which means a gross investment variable would lack consistency, while too much data is missing. However, studies by Pakes and Griliches [1984] indicate a statistical relationship between R&D and the number of patents applications, where the impact of a patent denotes its influence on future new technologies. These new technologies can eventually lead to improved profitability for firms if they are transformed into actual products and innovations. A patent also provides its owner with the right to exclude others from exploiting the patented technology. This "exclusive right" enables the patent owner to recoup development costs and obtain a return of investment in the development of the patented technology.

Given the rising impact of innovation on the competitive position of firms [Leiblein and Madsen, 2009], and the fact that innovation is shown to be on of the driving forces of the 21^{th} century growth and even characterise the seventh M&A wave [Rossi *et al.*, 2013], it is of importance to take the effect of innovative performance of firms in consideration. This paper includes the number of patent applications as proxy for intellectual property on a yearly basis to measure the difference before and after the M&A. The application date is

preferred to the grant date, because the actual time of inventions is closer to the application date than to the subsequent grant date, which depends upon the review process of the patent office [Hall and Soskice, 2001].

$$IntellectualProperty = \frac{PatentApplications(TURN) - LaggedPatentApplications}{LaggedPatentApplications} \tag{5.5}$$

The second category elicited by Meglio and Risberg [2011] will be measured by the growth in Sales, which is a common metric that gives a rough estimate of how the business is trending over time. Every firm is focused on sales numbers and achieving monthly, quarterly, and annual growth, the larger the sales growth, the better. Without sales growth, firms are at risk of being overtaken by competitors and stagnating. When the performance declines, pressure mounts on the sales teams to deliver results. On the other hand, when the sales growth increases is cause for optimism for all stakeholders such as the investors, creditors and the board of directors. A growth in sales could be the result of various firm improvements. In general, the main firm-improvements causing the increase in Sales is that the synergies reduce the operational costs, increase the firm's production capacity, and enhance overall efficiency. Sales growth is measured by the percentage increase in sales pre- and post the M&A.

$$SalesGrowth = \frac{Sales(TURN) - LaggedSales}{LaggedSales} \tag{5.6}$$

The last category induced by Meglio and Risberg [2011] include Leverage, Liquidity, and Cash flow. Leverage provide an indication of the overall debt compared to the total assets, total equity, operating expenses or income of a firm. It presents how much a firms assets belong to the shareholders rather than creditors. When one refers to a firm as highly leveraged, it means that the firm has more debt than equity. Cash Flow refers to the difference in amount of cash available at the beginning and the end of the fiscal year. If the revenue exceeds the expenditures, this is referred to as positive cash flow. Positive cash flow indicates that firms liquid assets are increasing, available for settle debts, investments, pay expenses, dividend distribution, and afford

a buffer against future financial challenges. firms with low leverage tend to be less financial constrained than firms with a high leverage. In addition, firms with a high leverage ratio have a higher default risk, which results in a reduction in investments exerted. Moreover, these firms had to use external funding to be able to do an investment, consequently increasing their costs even further. Thus, this variable will be added as a control, while it is most likely that financially constrained firms undergo an M&A more promptly than unconstrained firms. In this matter, the variable helps to control for target firms seeking an M&A for financial constraints reasons. The latter is important, while the overall performance of financially constrained firms is most likely to improve drastically. Thus, when this variable is not controlled for, the obtained results for the different hypotheses could be biased towards performance improvements.

$$Leverage = \frac{Long-termdebt + Currentliabilities}{TotalAssets} \tag{5.7}$$

$$Cashflow = \frac{Cashflow(TURN) - Cashflow}{Cashflow} \tag{5.8}$$

5.2 CONTROL VARIABLES

Control variables in scientific research are variables that are held constant and unchanged throughout the course of the experimentation in order that they will not effect the outcome to only access or clarify the relationship between multiple variables of interest. The latter refers to the binary variable *After* and argue if the M&A affected the performance of the target firms. As mentioned in the previous paragraph are both *Leverage* and *Cash flow* used as control variables. Further firm characteristics included as control variables are *Size*, *Employees*, and the *Global Cultural Distance*.

Size, in terms of total assets, matters as small firms tend to be acquired sooner. Also, large firms are most likely to participate in M&A actively. Hence, the variable controls for differences in firm capacity. The vari-

able is also used as a proxy for the firms access to competitive capital, while the assets can be used as security to receive (supplementary) loans. Besides that size is expressed in total assets can it also be exposed to the number of employees. In this manner include the control variable support for the effects on the firm size on ownership transition. The latter keeps the composition of the company constant over time. When the number of employees increases significantly, costs tend to increase, but productivity is also likely to increase significantly - e.g., ROA, Operating Margin, Net Profit, and Sales could all be affected. The latter would undermine the evidence found in the change in performance indicators. In other words, potential evidence of the results made could be overlooked if the number of employees is not controlled for. Both *Employees* and *Size* are heavily skewed and for this reason is the logarithmic transformation included, which is more approximately normal. The inclusion of both control variable will reduce the effects of confounding differences between target firms, which will help to find more evidence or support for the dependent variables itself

The Global Cultural Distance (GCD) will also be included to control how culture vary by regional and country differences between firms. The multi-phase, multi-method, multi-sample GLOBE (Global Leadership & Organisational Behaviour Effectiveness) research program was founded by Robert House in 1991 and examined the interrelationships between societal culture, societal effectiveness and organisational leadership. This variable is necessary, while non-European countries do not have their accounting financials available on the Amadeus database. The GLOBE social entity is a culmination of a ten year quantitative survey-based study by a network of 170 social scientists and management scholars from 61 cultures throughout the world and consist of nine dimension which are further explained in **Appendix A**; [1] Performance Orientation (POI), [2] Assertiveness (ASI), [3] Future Orientation (FOI), [4] Humane Orientation (HOI), [5] Institutional Collectivism (IOI), [6] In-group Collectivism (IGI), [7] Gender Egalitarianism (GEI), [8] Power Distance (PDI), and [9] Uncertainty Avoidance (UAI) [2]. The GCD variable will be constructed as follows [3]; first, the absolute dif-

[2]The indices are retrieved from: `https://globeproject.com/study_2004_2007#data`

[3]In constructing GCD, we employ the methodology outlined in Butler *et al.* (2005). In their paper, they create a liquidity index that comprises the effects of ranking on six different liquidity measures.

ference (CD_{ij}) in dimension score between the target and acquirer is measured where every aforementioned dimension represents a difference between two countries. So, for each deal i, nine cultural distance measurements are computed, each representing a different dimension j[4]. The latter is facilitated by the following equation where D_j denotes the score of the various cultural dimension for each completed deal i:

$$CD_{ij} = | D_j, acquirer - D_i, target | \tag{5.9}$$

Following this procedure, the GCD variable can be formulated that takes all the nine dimensions into account. $Rank_j(CD_{ij}$ is build in rank function, which assigns a fixed rank for each observation in the sample, originating from least different to most different observations. The j represent the number of dimension measures, while the term CD_{ij} is the j^{th} measure of cultural difference for each M&A i in the sample. the term $\frac{1}{J}$ serves as the number of cultural dimensions that are accessible for each country[5]. As the countries in the deal sample make use of all nine dimensions, j is equal to 9. Ultimately, the therm $\frac{1}{N}$ is used to scale the GCD variable ranging from 0 (least different) to 1 (most different). To be more precise, a GCD score close to 1 indicates high cultural distance between two firms, whereas a GCD close to 0 entails a low cultural distance. For domestic deals, the variable will take the value of 0 due to the fact that there is no cultural distance between firms that are stationed in the same country.

$$GCD_i = \frac{1}{N}\frac{1}{J}\sum_{j=1}^{J} Rank_j(CD_{ij} \tag{5.10}$$

[4] Each deal is denoted by i, thus i = 1,..., N, were N = 682 in this paper. In addition, j refers to the dimensions as described by GLOBE. Each dimension (POI, ASI, FOI, HOI, IOI, IGI, GEI, PDI, and UAI) takes values from 1 to 9.

[5] For the countries: Belgium, Bermuda, Lithuania, Luxembourg, Peru, and Virgin Islands no cultural distance dimensions were available. See the **Appendix H** for the overall country GCD scores.

6

METHODOLOGY

As previous mentioned in the literature review, nearly all articles in existing literature use a single test to perform research on pre- and post-acquisition performance changes after M&A. The results are therefore quite hard to generalise, which is one of the reasons why current literature lacks consensus. Furthermore, simply investigating the difference in pre- and post-acquisition performance, using the firm as a benchmark, intent to have significant biases. To overcome potential biases, three different models are used.

For example, using accounting performance measures for experimental purposes is bound to have endogeneity issues, particularly with panel data, which in all research is a fundamental concern. Among the concerns are that it is impossible to conclude the motives of the M&A and this method overlooks industry influences. Essentially, endogeneity happens when the performance measures are correlated with the remaining term (e.g. the independent variables, resulting in biased estimates). The restriction of using the accounting performance variables is therefore that important factors could be unjustifiably tested, affecting the outcomes and consequently biasing the entire research. The latter assumes an incomprehensible model.

The endogeneity issues are addressed by including fixed effects, various performance measures, target-firm clustering and the use of multiple research models. For instance, fixed effects will solve the issues because the degrading transformation will distinguish these fixed effects – e.g., the time-invariant regressors are absorbed by the fixed effects[1]. The propensity score-matching method, for example, also largely overcomes the endogeneity issues. In addition, a separate technique is used to acquire a control group with comparable firm

[1] This study includes a serie of "dummy" variables for the units from which grouped data arise (Fixed Effects) rather than an estimator that assumes unit effect drawn from an underlying, modelled distribution (Random Effects) Clark and Linzer 2014

characteristics for the intercept model approach, which also overcomes endogeneity issues. Furthermore, using peers as a benchmark shows what would have occurred if the target firm would not be obtained. Only then, a clear conclusion could be made regarding the post-effects of the M&A. In the upcoming sections, the three benchmarks models used in this research will be briefly described.

6.1 ORDINARY LEAST SQUARES MODEL

For comparison purposes, this research includes the Ordinary Least Squares (OLS) regression method, including fixed effects and control variables discussed in chapter 5. OLS is a simple, standard and often used linear regression based method, estimating the unknown parameters of a linear function in a set of explanatory variables by the principle of least squares. The smaller the difference between the corresponding points on the regression surface, the better the models fit the data. The following regression will be conducted on the different performance measures:

$$Y_{it} = \beta_0 + \beta_1 After_t + \beta_2 Employees_{it} + \beta_3 Size_{jt} + \beta_4 CashFlow_{kt} + \beta_5 Leverage_{lt} + \beta_6 GCD_{st} + \beta_7 X_{ut} + \gamma_f + \gamma_c + \gamma_y + \varepsilon_{ijklsufcy} \tag{6.1}$$

Where Equation 6.1 generates Y_{it} which represent the different performance measures as described in the previous chapter. The foremost coefficient of concern is indicated by β_1 while this term will evaluate if there is a negative, positive, or no change in pre- and post- acquisition performance. In order to drawn a conclusion from the coefficient with respect to the potential negative, positive or neutral effect, must the After term been tested significantly. Depending on the regression are country fixed effects γ_c, year fixed effects γ_y, and firm fixed effects γ_f included to account for other omitted variable bias, while a panel data set is used. Term X_{ut} is added to the regression as dummy variable in order to examine the six hypothesis as described in chapter 3.

6.2 INTERCEPT MODEL

The second method follows the paper of Ghosh [2001], in which they build forth on the intercept model approach defined by Healy *et al.* [1992]. Healy *et al.* [1992] evaluated changes in performance relative to an industry benchmark, meaning the performance measurement is adjusted to services industry. Ghosh [2001] updated the method exploited by Healy *et al.* [1992], while they overcome potential bias by controlling for acquirer performance prior to the M&A. In the intercept model are acquisition-induced changes in performance estimated as the intercept α of the cross-sectional regression of post-acquisition industry-adjusted performance indicators on prior-acquisition industry-adjusted performance indicator. The estimated equation is as follow:

$$PI_i^{post} = \alpha + \beta * PI_i^{prior} + \varepsilon_i \tag{6.2}$$

Where PI_i^{post} and PI_i^{prior} are the median, post- and prior-takeover, industry- adjusted performance indicators for takeover i. This approach allows the benchmark for post-takeover performance to be a multiple and constant across the sample of prio-takeover performance. This multiple is defined as β. If β is restricted to equal one, performance improvements are estimated as post-acquisition performance less prior-acquisition performance combined, target and acquirer. However, Ghosh [2001] stress that such an approach based on an intercept model from a regression framework inferences are prone to be biased when industry-median firms are used as a benchmark. Measurement errors from using industry-median firms, instead of the desired benchmark, are unlikely to be random, as it is well documented that acquirers are usually larger than their competitors in the industry and tend to acquire after a period of superior results [Morck *et al.*, 1990; Penman, 1991; Franks and Harris, 1989]. A (non) random measurement error will be absorbed in the regression intercept, which will bias the post-acquisition performance of merging firms. Ghosh [2001] confirmed the latter in his research in which he did not find proof of effects on firm performance, while favourable positive outcomes using the methodology outlined by Healy *et al.* [1992].

Accordingly, Ghosh [2001] used the following research design procedure to control for size, industry, and superior prior-acquisition performance. First, the prior-acquisition performance indicators relative to industry performance indicators are defined in equation 5.3, where $PI_{prior,i}$ and $\varepsilon_{pre,i}$ denote last-landing and temporary distinctions in prior-acquisition, between the performance indicators of takeover firms and the performance indicators of industry-median firms. Temporary variations $\varepsilon_{pre,i}$ are separately distributed random errors. Similarly, post-acquisition industry-adjusted performance indicators are defined.

$$ISPAP_{prior,i} + \varepsilon_{prior,i} \tag{6.3}$$

Expected improvements $E(\alpha)$ from the regression of post-acquisition industry-adjusted performance indicators on the corresponding prior-acquisition number is given as the difference between prior and post;

$$E(\alpha) = [E(ISPAP_{post,i}) + E(\varepsilon_{post,i}) - E(ISPAP_{prior,i}) + E(\varepsilon_{prior,i})] \tag{6.4}$$

However, since the random error terms (ε) are independently distributed and uncorrelated with other variables are $Cov(\cdot,\cdot)$ and $\sigma^2(\cdot)$ used to denote co-variance and variance to the slope coefficient defined as;

$$\beta = Cov[(ISPAP_{post,i} + \varepsilon_{post,i}), ISPAP_{prior,i} + \varepsilon_{prior,i})]/\sigma^2(ISPAP_{prior,i} + \varepsilon_{prior,i}) \tag{6.5}$$

In addition, firms will be matched by either their size and prior-performance with other firms from the same industry. To be more precise, matched firms are selected from acquirer and target industries. Based on a firm size filter of between 50% and 150% of the target and acquirer size, the firms are evaluated from one year prior the M&A. To be sure, if this filter is not satisfied, which means that not all firms have enough prospective firms, the filter specification will be expanded to a range of 25% percent and 250%. The firms with the closest performance a year prior to the target acquisition are selected as the benchmark from the

prospective matched firm list acquired by undertaking the former method. The prior-performance is defined by the performance indicators as described in chapter 5. Ghosh [2001] investigated only acquiring firms while this research focuses solely on target firms. It is also presumed that a decrease in efficiency over time is a characteristic of the matched firm.

6.3 DIFFERENCE-IN-DIFFERENCE MODEL

Bertrand and Zitouna [2008] proposed in their paper the Difference-in-Difference (DD) model that is used as a method in this article. The authors make use of this evaluation approach applying a propensity score matching procedure. That way it is possible to predict a potential performance of a target firm. The DD approach analyses the average effect of a treatment on the treated group, with treatment referring to the acquisition of the Acquired Firms (AF). By looking at outcome differences before and after the treatment in relation to the control group (un-acquired firms, (NAF)), a coherent conclusion about the consequences an acquisition or merge can have on target firms can be made.

$$E(Y_{it}^0 / AF = 1, t = 1) - E(Y_{it}^0 / AF = 1, t = 0) = E(Y_{it}^0 / AF = 0, t = 1) - E(Y_{it}^0 / AF = 0, t = 0) \tag{6.6}$$

While Y_{it}^1 refers to the outcome of a firm acquired in time period t, Y_{it}^0 denotes the outcome of an firm that had not been exposed to an acquisition. i indicates the consequence of the M&A for the company in question, that is calculated by Y_{it}^1 - Y_{it}^0. With $E(Y_{it}^0 / AF = 1)$, the average shock can be expressed. In this regard it has to be noted, that presumably macroeconomic shocks influence the treated group as well as the control group in a like manner [Bertrand and Zitouna, 2008]. The model proposed by Bertrand and Zitouna [2008] is expressed in the following way:

$$Y_{it} = \beta_0 + \beta_1 AF_i + \beta_2 After_t + \beta_3 AF_i * After_t + \varepsilon_{it} \tag{6.7}$$

$After_t$ is a binary variable, taking the value of 0 for prior-acquisition firms and the value of 1 for post-acquisition ones. This is the case for target as well as for non-target firms. Furthermore, it controls for time effects on the outcome Y_{it}. AF_i specifies if a firm is a target firm (1) or if it is a non-target firm (0). The interaction between AF_i and $After_t$ is accounted for by the term $AF_i * After_t$ That way the model captures dissimilarities between AFs corresponding to the impacts an acquisition has on financial performance. The resulting coefficient β_3 represents the acquisitions' effects on the AF group and functions as the DD estimator that is represented in table 6.1.

Table 6.1: Difference-in-Difference estimator

	Before	After	Difference
Target firms	$\beta_0 + \beta_1$	$\beta_0 + \beta_1 + \beta_2 + \beta_3$	$\beta_2 + \beta_3$
Control group	β_0	$\beta_) + \beta_2$	β_2
Difference	β_1	$\beta_1 + \beta_3$	β_3

Explanatory variables are added to the model in form of a vector in order to encompass various firm characteristics and to control for differences in AF and NAF in 31 characteristics. With X_{it} as the vector encompassing observable features of firms i at time t. The dummy variable $After_t$ is also included, which results in the following regression equation:

$$Y_{it} = \beta_0 + \beta_1 AF_i + \beta_2 After_t + \beta_3 AF_i * After_t + \Phi X_{it} + \varepsilon_{it} \tag{6.8}$$

Using a comparable matching method by Blundell and Costa Dias [2000], a control group is formed. Blundell and Costa Dias [2000] apply a propensity score matching procedure to remove randomly selected control groups and at the same time achieving a control group with similar features as the target firms. This procedure has various benefits including controlling for endogeneity and firm characteristics that can be observed

after the acquisition [Dehejia and Wahba, 2002]. The probability value is thus estimated as in the following equation, with X_{it} representing the firm characteristic used to match firms with a corresponding control firm, where the firm has to exhibit a similar propensity score as the control firm.

$$Pr(AF_{it} = 1) = F(X_{it} \tag{6.9}$$

While Bertrand and Zitouna [2008] made use of Total Factor Productivity (TFP) and Profit to match firms and ensured size control with turnover measurement, various measures for financial performance are employed in the current article [2]. Here, a logit regression is applied in a comparable way. However, while controlling for firm size with help of turnover, the financial ratio ROA and Profit [3] are used as a basis for the matching procedure. Firm size might influence the probability of an acquisition negatively as due to economic reasons large companies are more difficult to acquire and also not as easy to organise in an already existing business. Therefor, turnover rather than firm size is being used. However, it should also be taken into account that the acquisition of a large company leads to a faster growth of a firm's business activity given the economies of scale and scope, which signals external growth approach. From these considerations, the following logit regression for constructing adequate control groups is used:

$$Pr(AF_{it} = 1) = F(ROA_{it}, Profit_{it}, Turnover_{it}) \tag{6.10}$$

Country-specific effects together with the GCD variable are included in order to control for potential bias in connection with the small countries included in the current study. Small countries bear the difficulty of finding comparable companies due to a potential lack of information which is why consequently similar firms have to be found in different countries. It has to be noted that when looking for adequate control

[2] Total Factor Productivity (TFP), is a measure that is commonly used to evaluate production plants' performance.

[3] Profit refers to profit before tax subtraction as tax rates differ between countries.

groups, major biases might arise. By making use of the ROA and Income of the firms, these biases can be avoided. One of them is related to the fact that for poorly performing firms the probability of being acquired is higher. Companies that are being matched based on other company features like available cash or employee number would not incorporate the latter, while ROA does. A second bias corresponds to the removal of bad managers by an acquisition that can be interpreted as a filtering mechanism. Thus, including Profit this potential concern is addressed accordingly. The included variables capture the result of changes in industrial regulation, while temporal shocks will also be addressed by the inclusion of year fixed effects.

Table 6.2: Propensity Score Set

	Determinants of M&A
ROA	-8.67e05
	(0.000086)
Income	-1.40e-11 ***
	(5.98e-12)
Turnover	-4.03e-11 ***
	(8.45e-12)
Constant	-3.047675***
	(0.010076)
Observations	168,376

Examining the significance or lack of significance of financial variables of the logit model, it can be deduced if these variables can explain the probability of a firm acquisition. While the ROA is negative, its coefficient is not significant. An interpretation is that matched firms are not likely to be comparable with respect to this variable. Regarding Profit, the probability of an M&A is negative and highly significant. In contrast, a large firm indicates to be acquired more likely, while Turnover is highly significant and positive. As a conclusion it can be said that acquired companies tend to be large and at the same time exhibit a low profitability, whereas the ROA indicates to vary depending on the firm.

7

RESULTS

The results are presented in this chapter. First, the most frequently used method is examined as explained in chapter 6. Second, the intercept model followed by Ghosh [2001]. Third, the difference-in-difference approach by Bertrand and Zitouna [2008] used to analyse the impact of M&A. As aforementioned, this research is restricted to target firms, while only consolidated financial data is available from acquiring firms. As Table 4.2 presents, the number of employees and the median of the total assets increased significantly. This implies that after the takeover the financials of the target firm are included at parents level. To be more precise, the performance indicators of acquiring firms will most likely see a significant improvement in regard to the year prior to the takeover.

7.1 ORDINARY LEAST SQUARES MODEL

First is the Ordinary Least Squares (OLS) model used in order to test for post-acquisitions differences. All results can be found in **Appendix D**. The results are divided into five different tables. Each table represent one of the five performance indicators (e.g. Return on Assets, Operating Margin, Net Profit, Sales Growth, and Intellectual Property). In each table there are six columns interpreting the various hypothesis discussed in chapter 3. To measure the results on the several hypothesis are next to the control variable (e.g, Size, Employees, Leverage, and GCD) new variables created. One for each hypothesis, except for the first one as the first hypothesis is a broad question covering the whole field of research. The "Domestic" variable measures the difference in performance between deals taking place in the same country versus deals across countries.

The bulk of the M&A (355, 56%) happened within the national borders. Whereas 301 firms (54%) decided to take over a business abroad. It is noticeable that almost half of the deals are cross-border, which is definitely a characteristic of the sixth M&A wave. The "SME" variable estimates the difference in performance between small and medium enterprises (< 250 employees or, < 50 million turnover) and Large enterprises. The deals sample consist of 166 large target firms (24%), and 523 small and medium target firms (76%).

Domestic vs Cross-border

Domestic	Freq.	Percent	Cum.
0	388	56.31	56.31
1	301	43.69	100
Total	689	100	

Small & Medium Enterprise vs Large Enterprise

SME	Freq.	Percent	Cum.
0	166	24.10	24.10
1	523	75.90	100
Total	689	100	

The "Anglo-Saxon" variable evaluate the difference in performance between target firms in the Anglo-Saxon region (e.g., United Kingdom, Ireland, Denmark, and Finland) compared to the Rhineland region (e.g., Netherlands, Belgium, Germany, France, and Austria). It is remarkable that 76% or the target firms originates from one of the two regions. The remaining 161 target firms are therefore not taken into account in the performance analysis. In addition this research takes the difference in performance between industry code

Anglo-Saxon vs Rhineland

Anglo-Saxon	Freq.	Percent	Cum.
0	204	29.61	29.61
1	324	47.02	76.63
Total	528	76.63	

Same Industry vs Across Industries

Industry	Freq.	Percent	Cum.
0	571	82.88	82.88
1	118	17.12	100
Total	689	100	

into account. In total, 571 target firms are acquired by a firm in a different industry, whereas 118 deals represent takeover in the same industry. This meets the expectations where researchers see an upward trend in the number of technical acquisitions by non-technical firms. This is because the latest technologies are used in different industrial applications. The global cultural distance (GCD) variable assess the difference in performance between target firms with low, medium, and high cultural disparity. #1 represent takeovers between firms with a cultural disparity between 0 and 20% difference, #2 denote deals between firms with a cultural disparity between 20% and 40% difference, and #3 describe M&A between firms with a cultural disparity between 40% and 100% difference. The number of low cultural distance deals is significant larger compared to the deals with medium or high cultural distance because of the 43 percent of domestic M&A.

Table 7.1: Low Cultural Distance vs Medium and High Cultural Distance

Culture	Freq.	Percent	Cum.
1	493	71.54	71.54
2	145	21.03	92.57
2	51	7.43	100
Total	689	100	

Table 7.2 presents the evaluation of the first performance indicator, the Return on Assets. However, no significant result can be detect concerning the change in performance after the M&A. Due to the fact that the After-dummy lacks significance, the coefficient cannot be interpreted. Also the additional dummies, which are included for the remaining hypotheses, do not disclose any distinctions except for the SME and Anglo-Saxon variable. The SME dummy is tested significant at a 1% level as seen in the third column, indicating that these firms are negatively related with the ROA. If the firm is a SME, the growth in ROA is less compared to large firms. The latter is not in line with the expectations, while SME show in most cases more flexibility,

efficiency, and rapid growth opportunities. In addition, the Anglo-Saxon dummy is also tested significant at a 1& level, suggesting that firms in the Rhineland region outperform firms from the Anglo-Saxon region. However, both the Anglo-Saxon and SME After dummy is tested insignificant, so the change in growth does not follow the acquisition itself. Further, domestic vs. cross-border deals disclose no alteration, similar to cultural distance and industry. Also, the Size, Employees, and Leverage control variable are tested significant at a 1% significance level. The Employees and Leverage, measured by the log of the total assets, are negative related withe the ROA of the target firms. On the other hand, the Size is positive which implies the magnitude of the firms does matter for firm performance.

The second performance indicator illustrated as the Net Income, does in line with the ROA not reveal any performance changes after the takeover, while the After dummy lacks significance again. The only variable which indicates to be significant is the control on leverage on the first four hypothesis. Leverage is positive related with the Net Income, hence am increase in leverage would rise the Net Income. In other words, less debt would consequently decrease the interest cost, which results in a growth of the Net Income. The third performance indicators Operating Margin lacks significance on almost all variable. However, the Anglo-Saxon dummy is positive tested significant at a 10% level. Since the after dummy is negative tested significant on the same level it can be interpreted that this is due to the M&A. This suggest that on average deals in the Anglo-Saxon region outperform deals in the Rhineland region.

The fourth performance indicator, again, no difference in pre- and post M&A performance can be seen. While the GCD and size are consistent with the fifth hypothesis. Finally, the Intellectual Property variable does not reveal any significance and remains robust. Looking back to the five performance indicators there's not much to conclude whereas the After dummy remain robust in all regressions except for one. The After dummy also remains insignificant when the standard errors are not clustered at target firm level, whereas a few control variable shift from insignificant to significant. As earlier mentioned, this model has several constraints, so the findings described are justifiable only if comparable outcomes are obtained by the following models.

Table 7.2: OLS regression results on Return of Assets

The following table present the estimates of equation [5.1] predicting the Return on Assets performance indicator. Columns 1 to 6 represent each hypothesis accordingly confined to its particular measure.

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Return on Assets					
After	-0.008	-0.009	-0.008	-0.007	0.003	-0.017
	(0.010)	(0.010)	(0.010)	(0.010)	(0.016)	(0.013)
Size	0.093***	0.085***	0.096***	0.098***	0.005*	0.081***
	(0.016)	(0.017)	(0.016)	(0.017)	(0.003)	(0.024)
Employees	-0.041***	-0.039***	-0.053***	-0.042***	0.012***	-0.035*
	(0.014)	(0.014)	(0.014)	(0.014)	(0.004)	(0.019)
Leverage	-0.171***	-0.169***	-0.171***	-0.179***	-0.215***	-0.198***
	(0.042)	(0.042)	(0.042)	(0.043)	(0.031)	(0.035)
GCD	0.069	0.077	0.053		0.135	0.525
	(0.158)	(0.159)	(0.159)		(0.117)	(0.421)
Domestic		0.007				
		(0.007)				
SME			-0.072***			
			(0.021)			
Low GCD				0.010		
				(0.014)		
Anglo-Saxon					-0.050***	
					(0.015)	
Industry						0.000
						(0.000)
Constant	-1.394***	-1.267***	-1.326***	-1.454***	-0.061	-1.329***
	(0.277)	(0.290)	(0.279)	(0.280)	(0.077)	(0.470)
Observations	4,025	4,005	4,025	4,115	2,698	1,769
R-squared	0.618	0.606	0.619	0.629	0.200	0.645
Firm FE	Yes	Yes	Yes	Yes	No	Yes
Country FE	Yes	No	Yes	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

*Statistical significance at 1%, 5%, and 10% levels are denoted by the symbols ***, **, and * respectively.*

7.2 INTERCEPT MODEL

This section present the intercept benchmark approach, following the methodology described in chapter 6. In line with the previous section are the results summarised in **Appendix** E. Table E.1 and E.4 shows the outcome for panel A and panel B which represent the first two hypothesis. The other hypothesis are exposed in the same order. The post median less prior is the main determinant of importance, while this row reveals the change in performance between the median annual prior-performance and post-performance of the target firm. All performance indicators are included except for the Intellectual Property as there was insufficient data available to perform the intercept benchmark methodology.

First, panel A present similar findings regarding the prior-and post-acquisition comparison of the different performance indicators. Apart of the Return on Assets and Sales growth indicate the other economic variable to perform better compared to the control group which is adjust to industry and size, while the output of two out of four metrics shows positive signs at t=-1. Yet, the post median less prior row suggest that the target firms did not do better after the M&A while only negative signs are shown. Interestingly, all results are statistically significantly different from zero. In conclusion this panel shows that target firms perform worse compared to the control group on average as seen from one year before the takeover. The latter implies that acquired firms failed to keep up with the competition and consequently needed to grow with the help of M&A. Overall the synergies did not benefit the target firm. In almost all consecutive years after the deal remains the performance magnitudes negative. In other words, multiple potential M&A motives, including diversification, strategic gains, and market power, could be arguable. In addition, it is hard to interpret strong strategic drivers when output remains weak relative to the control group. The results suggest that horizontal mergers were the main driver, consequently decreasing the competition in the industries.

Panel B explored whether there is a difference between domestic deals [a] and cross-border deals [b]. The post median less prior magnitude regarding the return on assets is tested significant at a 1% significance level at

cross-border deal-level, whereas domestic deals lack significance prior- and post M&A changes. The negative sign illustrates that the M&A decreased the target firm performance by -2.44 compared to the control group. The operating margin presents a positive and significant results in reference to domestic deals, while cross-border deals show negative, yet insignificant results in the period prior and post-acquisition, whereas on t=-1 a positive result incurred. The domestic deals show a positive post median less prior of 2.93%, whereas cross-border deals show a negative -4.45%. This suggest that domestic deals outperformed the cross-border deals. The net profit utterly show negative results for post median less prior in both cases. In other words, performance decreased slightly. Domestic deals are tested 5% significant and decreased by 1.83. The cross-border deals how a negative post median less prior of 4.00, yet insignificant. Sales growth present results in line with the operation margin. The domestic deals show a positive post median less prior of 0.93%, whereas cross-border deals present a negative -0.63. This again, suggest that domestic deals outperformed cross-border deals. However, both the domestic as well as cross-border deals lack significance when testing the post median less the prior-period. In conclusion, both operating margin and sales growth obtain better results for the domestic deals versus the cross-border deals. While the operating margin is also tested significant.

Panel C examines whether there is a difference in performance between SME and large firms. Interestingly, different performance indicators present contradicting results. Return on assets indicate that SME perform worse compared to large firm, whereas the post median less prior shows a negative decrease of 2.68 while tested significant at a 1% level, compared to a negative 1.74 tested significant at 10% for large firms. Net profit present similar results and illustrate a -2.07 decrease in performance. Surprisingly, large target firms reveals an improvement in net income according to the control group, but lacks significance. The latter implies that the performance of SME decreased after the acquisition, which means either expenses subsequently increased or revenues declined. The same goes for the operating margin with an increase of 6.25 for large target firms, yet insignificant. On the other hand, Sales Growth seem to be better for SME compared to large firms, while an increase is seen of 5.49 testes significant at a 10% level, in contrast to 1.31 and not significant.

Panel D investigates the effect of the cultural distance between countries. Return on assets is tested significant for firms with a low cultural distance. The metrics illustrate a decrease of -2.68 at a 1% significance level. In contrast, deals in which firms with a medium and high cultural distance participate reveals an increase of 0.74 and tested at a 10% significance level. In other words, firms with a medium or high cultural distance perform better compared to firms with low cultural distance. Neighbour countries are predicted to have similar cultural distance levels, so the performance reduction for low cultural distance deals indicates that M&A was mainly undertaken to enter new markets in different countries. Acquiring a local firms in another country with similar cultural dimensions is a logical expansion of business and a relatively easy way to reach another market. In addition, Net profit obtains similar results to return on assets, although both low along medium and high culture distance deals lack significance when testing the post median less the prior-period. Low cultural distance deals show a decrease of -2.48, while medium and high cultural distance deals are illustrated by a 6.74 increase. Interestingly, at t=1 the target firms performed disastrous, as indicated by the -19.5%. It is remarkable that, for both ROA and net profit, the metric one year prior to and post the acquisition show a negative result, whereas after the first year an upward trend is observed. The latter implies that the M&A increased target firms' efficiency or earnings. It could also imply the acquired firm's backward integration, which is a variant of vertical integration economies through synergy gains [1]. Net income growth also present negative figures for both low, medium and high culture differences. Nonetheless the change is not tested significance. Even though the firms with low cultural distance markedly outperform the control group at t=-1. The opposite implies for the sales growth where the results at -1 illustrates a decrease of -5.83. However, the post median less prior magnitude of low culture difference deals is tested 5% level significant and shows an increase of 2.61 compared to the control group. Yet, the medium and high level differences also increase with 6.33. Interestingly, long-distance target firms tend to have benefited substantially from the diffusion of the acquiring firms' know-how, while taking into account that management and organisational styles are obvi-

[1] Backward integration is a form of acquisition in which a firm expands its role in executing tasks formerly completed by firms up the supply chain. Firms often complete backward integration by acquiring a production plant in a country where overall production expenses are lower. In this case both the acquirer as well ass the target firm benefit from a potentially takeover.

ously significantly different between the two firms. In conclusion, firms with low cultural distance perform worse compared to firms with medium and high cultural distance.

Panel E examines whether a difference can be found between two different governance systems representing Anglo-Saxon and the Rhineland model. A noticeable fact is that all performance indicators for both [a] and [b] illustrate to perform worse compared to the control group, except for the operating margin of firms in countries within the Rhineland model. Deals in the Anglo-Saxon region demonstrate positive magnitudes of 0.99 concerning the post median less prior of the return on assets, while takeovers in the Rhineland region show negative a negative sign of -4.27. Both are tested significant at a 5% and 1% respectively. The latter implies that M&A in the Anglo-Saxon region perform better compared to M&A in the Rhineland region. This is in line with our expectations while Anglo-Saxon corporate governance orientated firms are more likely to adopt strategic innovate projects on exploitation and external development, while firms with a Rhineland corporate governance are more likely to adopt internal growth and exploratory as strategic renewal trajectories. The operating margin shows similar results whereas post median less prior of Anglo-Saxon illustrate an increase in performance of 5.80 with a significance of 10%, in comparison to an insignificant decrease of performance in the Rhineland region of -4.48. In regard to the net profit and sales growth no significant results could be found. Rather conspicuously is that both Anglo-Saxon and Rhineland firms indicate to perform worse that the control group prior to the takeover while the output show negative matrices at t=-1. Nonetheless, both also show positive post median less prior results. However, it cannot be concluded that this is due to the M&A.

Panel F investigates the difference between takeovers in the same industry versus across industries. The results confirm our expectations but lacks significance for deals in the same industry. The concrete results that can be concluded on the effect of the M&A are only negative performance outcomes. So is the average return on assets for deals across industries tested significant ($p<0.05$) while it shows a decrease of the performance of -2.40. On the other hand, deals in the same industry also indicate to perform worse compared to the industry adjusted control group (-2.08). However, the return on assets for deals in de same industry lack significance

again. The performance indicator net profit also indicates a decline in performance for deals across industry while it shows a decrease of -9.44 percent and tested significant (1%). Equal to return on assets does the net profit also show negative results for deals in the same industry while tested insignificant. Sales growth presents contradicting results while deals across industries (-1.69) outperform deals in the same industry (10.1). Nevertheless no concrete conclusion can be made while the sales growth of deals in de same industry lack significance. Operating margin does not deliver solid results at all, while deals in the same industry (-5.42) and deals across industry (3.59) at not tested significant. The fact that all significant results indicate a reduction in performance is in line with our expectations. Whereas literature suggest that a substantial difference between the knowledge base of the acquirer and target firm can have negative effect on the performance after the takeover. In conclusion, no compelling results can be concluded on the question whether M&A in the same industry exhibit greater performance improvement compared to M&A across industries.

7.3 DIFFERENCE-IN-DIFFERENCE MODEL

At last, the difference-in-difference benchmark model results are presented. All outcomes can be found in **Appendix F**. In total there are six different tables representing the various hypothesis as discussed earlier in this report. As seen from Table 7.3 on the next page shows the interaction term, described as AF * After, significance for two performance indicators. Both operating margin as well as the sales growth are tested significant at a 10% level and suggest that the M&A decreases the performance of target firms whereas the coefficients are denoted by negative signs. In addition, the AF variable for both net profit and ROA shows negative results and is test significant at a rate of 1%. The latter assumes that target firms performed worse on average compared to their matched firms, while the AF variable takes the value of 0 if the firms were no targets and 1 for target firms. Further, the operating margin variable indicates that target firms performed worse on average when they would not have been acquired whereas the After coefficient is negative and 5% significantly tested.

Table 7.3: H1: Difference-in-Difference model

The following table presents the Difference-in-Difference method confined to the first hypothesis; High-tech Target firm performance increases after the acquisitions. All regressions include Year and Country fixed effects. The After variable is a binary variable that takes the value of 1 if the target firms have been acquired and 0 if they have not been acquired. The AF variable takes the value of 1 for target firms and 0 if the firms were no targets. Standard errors are clustered at target,firm level. Significance: * 10%, ** 5%, *** 1% respectively using a Wilcoxon signed ranks test.

Variables	(1) Return on Assets	(2) Operating Margin	(3) Net Profit	(4) Sales Growth	(5) Intellectual Property
After	0.007	-0.027**	0.112	-0.111	16.851
	(0.011)	(0.022)	(0.210)	(0.288)	(17.017)
AF	-0.015*	0.023	-0.397**	0.096	6.897
	(0.008)	(0.025)	(0.162)	(0.212)	(4.422)
AF * after	0.009	-0.015*	0.114	-0.556*	-22.322
	(0.013)	(0.029)	(0.266)	(0.306)	(17.877)
Size	0.009***	0.074***	-0.029	0.209***	0.314
	(0.003)	(0.013)	(0.051)	(0.061)	(0.500)
Employees	0.004**	-0.105***	-0.058	0.300***	0.975
	(0.002)	(0.015)	(0.055)	(0.109)	(0.663)
Leverage	-0.142***	0.014	-0.031	0.094	1.395
	(0.035)	(0.020)	(0.061)	(0.072)	(1.397)
Constant	-0.099*	0.319**	0.977	-4.064***	-14.501
	(0.053)	(0.157)	(0.739)	(0.980)	(11.324)
Observations	14,075	12,142	10,212	8,564	1,521
R-squared	0.108	0.085	0.004	0.037	0.031
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

*Statistical significance at 1%, 5%, and 10% levels are denoted by the symbols ***, **, and * respectively.*

No compelling changes can be concluded for other outcomes while they lack observable significance. In conclusion, the results suggest that the target firms under perform in accordance to the peer firms. The latter is in line with the results from the intercept benchmark model, in which target performance decreased on average compared to the industry adjusted control group.

Table 13 present the results on the second hypothesis regarding the difference between domestic and cross-border deals. Negative interaction results of -0.904 and -0.064 are found for respectively the sales growth of domestic deals and for operating margin for cross border deals. Which means domestic and cross border target firms performed worse compared to the matched firms that were not acquired. Both coefficient are tested significant on a 5% level. The AF domestic variable of -0.474 implies that target firms performed worse on average according the net profit, while the opposite is true for the sales growth and intellectual property as both the coefficients are tested significant. A clear conclusion between domestic and cross border deals cannot be interpreted as other results do not show any significance.

Similar results are found for the third hypothesis as can be seen in Table 14. The interaction coefficient from operating margin, denoted as AF SME * After, is negative and tested significant at a 5% level. The latter indicates that the M&A has a negative effect on the performance with respect to SME target firms. The large target firms interaction coefficient does not reveal any significance; hence large target show an positive results and therefore outperform SME. In addition, the AF LE variable is 1% tested significant and -1.515 negative for the sales growth, which assumes that target firms on average performed worse compared to their matched firms that were not involved in a M&A. Hence, again no clear distinguishing results are observed, yet still confirmation is found that target firms under perform the peer firms. Table 15 does not show any better results. Where all After, AF low GCD, and AF Low GCD * After coefficients present insignificant findings for each respectively performance indicator. AF Medium and High GCD presents a 10% significant and positive result of 9.06 regarding the intellectual property. The latter implies that target firms on average perform better against their matched firms. Also, AF Medium and High GCD * After shows a 10% significant and negative coefficient of

-0.647 regarding the sales growth, which means that the takeover has a negative effect on the performance of target firms with medium of high cultural distance between the acquirer.

Table 16 present the results on the fifth hypothesis regarding the difference between deals in the Anglo-Saxon region versus deals in the Rhineland region. There are several results tested significant. First of all, the interaction term, described as AF Anglo-Saxon * After presume two significant results at a 10% level. Both the operating margin as the intellectual property shows a negative outcomes of -0.084 and -9.698. On the other hand, the AF Rhineland * After term is also tested significant at a 5% level and suggest a decrease of -3.595. The latter implies that the performance of the target firms decreased after the takeover. Interesting, as of the operating margin and sales growth, the Anglo-Saxon region outperforms the Rhineland region. Whereas the intellectual property suggest the opposite. However, no results are found where both the AF Anglo-Saxon * After coefficient and AF Anglo-Saxon * After coefficient are tested significant. This again, does not allow a clear conclusion to be interpreted. Further are the ROA, operating margin and net profit 5% and 1% tested significant regarding the AF Anglo-Saxon term. ROA and the net profit indicate that the target firms performed worse on average compared to their matched firms while they present a negative results of -0.032 and -0.497 respectively. Operating margin presumes the opposite while it shows a positive result of 0.136. It is remarkable that all target firms in the Rhineland region perform better on average compared to their matched firms whereas all performance indicators present positive results at AF Rhineland. Nonetheless, only ROA is 5% tested significant for 0.047.

At last, are the results on the difference between M&A in the same industry and not presented in Table 17. Unfortunately, no significant results are found for both the interaction term AF industry * After and AF ~~industry~~ * After. Significant results are found for both operating margin (-0.079) and net profit (-0.982) for AF Industry, which means target firms are performing worse in contrast to their matched firms. The same goes for target firms from another industry, whereas sales growth in decreasing -0.649 and tested significant at a 1% level. In addition, sales growth also indicates that target firms would have performed better when they

would not have been involved in a M&A, while the After term is negative (-0.608) and tested significant at a 1% level. Regarding the control variable are the results similar across the different hypothesis. Size and employees are almost all significant and positive related to return on assets, operating margin, and sales growth. For example, bigger targets with more employees and capacity enjoy bigger returns on their assets and outperform smaller targets. In contrast, leverage is tested negative. More debt leads to more constrains, which are detrimental for performance improvement. In the end, no persuasive improvements can be presumed whereas most terms lack any level of significance.

7.4 KEY FINDINGS

After conducing research using three different benchmark methods it is desirable to highlight the key findings with regard to the six different hypothesis. This section primarily concludes the significant results on the various performance indicators.

- **Hypothesis 1:** High-tech target firms perform worse after the M&A, whereas the intercept model present negative results for Return on Assets (-2.86%), Operating Margin (-2.24%), Net Profit (-2.27%), and Sales Growth (-1.82%). In addition, all outcomes are statistically significantly different from zero. The difference-in-difference model supports the latter, while both Operating Margin (-0.015) as well as the Sales Growth (-0.556) are tested significant and suggest a decrease in performance. The OLS model did not support the latter, while no significant results are generated.

- **Hypothesis 2:** The intercept model found a positive and significant effect in domestic deals for Operating Margin, whereas cross-border deals show a significant and negative results. Sales Growth present similar results as the Operation Margin, while the domestic deals show a positive result of 0.93%, and cross-border deals present a negative -0.63% result. The latter suggest that domestic deals outperformed the cross-border deals. Again, OLS and DD results are not tested significant.

- **Hypothesis 3:** This research concludes that Small and Medium Enterprises (SME) perform worse compared to Large Enterprises. Both the SME and large firm shows a decrease in performance in contrast to their control group, but large firms (-1.74%) are doing just a little better by comparison to the SME (-2.68%), tested significant.

- **Hypothesis 4:** A negative and significant effect is found for deals with low cultural distance as seen from the Return on Assets and Net Profit in the intercept model, which the -2.68 and -2.48 signs respectively indicate. In contrast, a positive and significant effect is found for deals with medium or high cultural distance regarding the Return on Assets and Net profit, which the 0.74 and 6.74 metric respectively shows. The difference-in-difference model does not observe clear distinguishing results, yet still confirmation is found that target firms under perform the peer firms. The OLS model does not provide any supplementary insights.

- **Hypothesis 5:** The results implies that high-tech target firms in the Anglo-Saxon region perform better compared to target firms in the Rhineland region. The difference-in-difference model present a negative and significant results of -3.595 for Rhineland target firms in the growth of sales. The findings are backed by the intercept model in which the Return on Assets interaction term of Anglo-Saxon deals is 0.99 positive and tested significant. On the other hand, the performance of Rhineland target firms decreased by -4.27 in relation to the Return on Assets.

- **Hypothesis 6:** This research cannot draw any conclusions as to whether M&A between high-tech firms operating in the same industry exhibit greater performance improvement compared to M&A between firms operating across industries. Same as in all previous cases, the OLS results lack any level of significance. However, this time, no persuasive improvements can be presumed in neither the intercept model as the difference-in-difference method, whereas all coefficients lack significance and therefor cannot be interpreted.

"Much of what is called investment is actually nothing more than mergers and acquisitions, and of course mergers and acquisitions are generally accompanied by downsizing." - Susan Georg

8

ROBUSTNESS

This chapter conduct a sensitivity analysis to examine how the regression coefficient of the variables behave when the regressions parameters are changed. As Lua and White [2013] formulated: "Robustness is necessary for a valid causal inference, in that the coefficients of the critical core variables should be insensitive to adding or dropping variables, under appropriate conditions". Also, Leamer [1983] suggest whether specification errors could influence the results through weak estimates of the regressions. The results from the sensitivity analyses measure the robustness of the findings in the previous chapter and helps to ensure that the study approximate strength is true, accurate, and valid. Due to the fact that in this research multiple benchmark methods are used in combination with various performance indicators, are the results arguably robust. Target firms have been tested based on their own prior- and post-acquisition performance (OLS), bases on firm adjusted industry performance (intercept), and based on a propensity score matching procedure (DD). Accordingly, this research is able to justifiably answer the question what would have happened to the target firms if they had not been not acquired. The robustness check is divided into three different cases. First, the same OLS regression method is performed but this time without control variables and fixed effect. The second case consist of another OLS regression analysis but with the inclusion of moderating effects. The third and last case investigate the difference between Acquisitions and Mergers.

8.1 CASE 1: DISREGARD OF CONTROL VARIABLE & FIXED EFFECTS

As previous mentioned, the first case consists of the Ordinary Least Squares (OLS) benchmark model without the influence of control variables, fixed effect, or moderating pursuance. Figure 8.1 shows the relation by

means of the conceptual model. Interesting, in contrast to the results including the control variable and fixed effects are the outcomes frequently tested significant. However, it must be said that the R-squared coefficient left account for only 2% or less. In other words, the model indicates that the model explain only 2% of the variability of the response date around its mean.

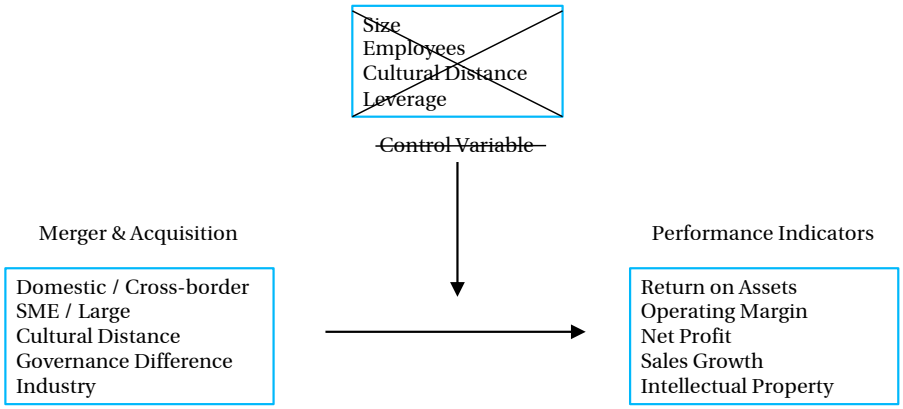

Figure 8.1: Conceptual Model without Control Variable

All results from the robustness check can be found in **Appendix G**. With regard to the first hypothesis, two performance indicator are tested significant at a 1% level. Both net profit (-0.119) and sales growth (-0.079) present a decrease in performance after the M&A. In addition, operating margin and intellectual property also show negative results, whereas return on assets only present positive outcomes. However, last three performance indicators are tested insignificance and cannot be interpreted. The results on the second hypothesis does not reveal any changes after the takeover, while the Domestic coefficient lacks significance. The only variable which indicates to be significant is the After dummy whereas net profit and sales growth present negative results again.

Table 19 presents the results on the third and fourth hypothesis. The coefficient regarding the difference in performance of SME and large enterprises presume contradicting outcomes. Net profit and sales growth are

both tested significant at a 1% level and indicate to be positive, 0.156 and 0.102 respectively. The latter implies that SME outperform large enterprises which is in line with our expectation. On the other hand, the return on assets performance indicator indicated to be negative (-l.056) while also 1% tested significant. This suggest the opposite regarding the other two performance indicators whereas all after dummy variable are tested significant. The results on the fourth hypothesis do only expose significant results on the After and Low GCD dummy for the net profit performance indicator. Results suggest that deals with medium and high culture difference outperform deals with low culture difference while the Low GCD metric report a decrease of -0.057.

While evaluating the fifth hypotheses, no significant results can be observed concerning the improvement of performance after the takeover. Sales growth shows a positive result of 0.254 and is also significant on a 1% level. Normally this would implies that target firms in the Anglo-Saxon region outperform target firms in the Rhineland region. But since the After dummy lack significance, the coefficient cannot be interpreted. Unfortunately, no other significant results are found. On the other hand, the sixth hypothesis does reveal significant results. The Industry metric indicates that deals across industries outperform deals within the same industry while the results shows a decrease of -0.105 and is tested significant at a 1% level. The After dummy is also tested significant at a 1% level, allowing this decrease to be correlated by the M&A.

8.2 CASE 2: INFLUENCE OF MODERATING EFFECTS

As previous mentioned, one cause for the increasing number of cross-border M&A is globalisation. This research included the influence of globalisation in the sense of the effect of cross-border deals, cultural distance and the different national corporate governance systems. However, it could be argued that these variable interact with each other. Therefor case two investigated the influence of cross-border deals as moderating effect on the performance of Angelo-Saxon and Rhineland target firms. According to Zander and Kogut (1995), firm

exploit resources more efficiently in internal market than would be possible through external markets. Therefore, to measure the difference in performance between target firms in the Anglo-Saxon region compared to the Rhineland region are only deals taken in consideration from outside the target corporate governance region. To be more precise, what is the difference in performance between Anglo-Saxon and Rhineland target firms when they are acquired by a firm who conduct business outside their own corporate governance region.

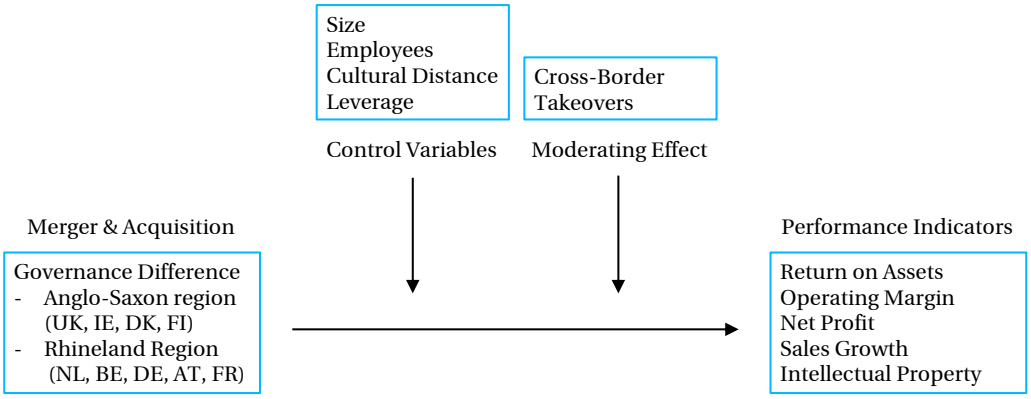

Figure 8.2: Conceptual Model with Moderating Effect

In order to obtain results is the the equivalent OLS regressions method used as discussed in section 5.1. However, this time with the inclusion of the moderating effect. In other words, the model still includes control variable and fixed effects but only takes the cross-region deals in consideration. An overview of the results can be found in **Appendix G**. As can be seen, the target firms from the Rhineland region are doing just a little better in comparison to target firms from the Anglo-Saxon region if you look to the number of performance indicators. Operating Margin, Sales and Intellectual Property present a positive result of respectively 0.140, 0.254, and 0.731. Whereas Return on Assets (-0.033) and Net Income (-0.661) show negative results. Nevertheless no concrete conclusion can be made while non of the performance indicators is tested significant.

8.3 CASE 3: ACQUISITIONS VS. MERGERS

As aforementioned in chapter 1, this study treats Mergers & Acquisitions as equals. Nevertheless, M&A are often treated separately whereas there are substantial differences. Unfortunately, the deal sample can not always make a distinguish between M&A as firms may not always make an official statement about the reconstruction. There are also examples where the deal to the outside world was presented as a merger, where it was actually an acquisition. As for illustration, this can be achieved if the shares are fairly distributed, but the entire board of directors is consists of people from a single firm. A common difference to differentiating a deal is whether the takeover is friendly (merger) or hostile (acquisition). Mergers do not require cash to complete the deal, but mitigate the individual power of each firm. In practice friendly mergers do not take place very frequently. It's uncommon that two firms would benefit from combining forces with two different CEOs agreeing to give up some authority to realise those benefits. When this occurs, the shares of both firms are sold and new stocks are released under the name of a new legal identity. This study has made an assumption whether an acquirer is four time bigger compared to the target firm in terms of total assets, it can be interpret as an acquisition. In contrast, when the target firms is not four time smaller, this study define the takeover as a merger. In total, 177 deals could be characterised as mergers, whereas 512 deals represent the total amount of acquisitions.

Table 8.1: Number of Mergers versus Acquisitions

Acquisition	Freq.	Percent	Cum.
0	177	25.69	25.69
1	512	74.31	100
Total	689	100	

Case 3 is divided into two different approaches. First is the disparity examined as a new hypothesis where the results conclude whether acquisitions or mergers outperform in term of performance. In addition, var-

ious deal sets are created to investigate if target firm performance increases after the acquisition or merger. Results can be found in **Appendix refap:robust**. Unfortunately, in the first approach no significant results are found concerning the change in performance after the M&A. While this time the After dummy of net profit (-0.104) and sales (-0.060) growth present negative results and are tested significant at a 10%, is it the Acquisition coefficient which lacks significance for all performance indicators. In addition, the results suggest contradicting outcomes. Return on assets (-0.001), operating margin (-0.291), and net profit (-0.061) show negative results whereas sales growth (0.097) and intellectual property (0.024) show positive results. Nevertheless, as aforementioned, no compelling outcomes regarding the M&A can be concluded while all performance indicators lack observable significance. Interesting, significant results are observed when the same OLS regression method is performed but this time without control variables and fixed effect.

Table 8.2: Ordinary Least Squares Regression Results on Acquisitions versus Mergers without Control Variable and Fixed Effects

Variables	(1) Return on Assets	(2) Operating Margin	(3) Net Profit	(4) Sales Growth	(5) Intellectual Property
After	0.008	0.171	-0.093***	-0.111***	-0.275
	(0.011)	(0.279)	(0.027)	(0.039)	(0.173)
Acquisition	-0.019*	-0.030	-0.087***	0.136***	0.329*
	(0.011)	(0.299)	(0.028)	(0.041)	(0.175)
Constant	0.024**	-0.109	1.229***	0.093**	0.378**
	(0.010)	(0.274)	(0.025)	(0.037)	(0.151)
Observations	2,001	1,779	1,653	1,439	525
R-squared	0.002	0.000	0.013	0.014	0.011

*Statistical significance at 1%, 5%, and 10% levels are denoted by the symbols ***, **, and * respectively.*

As seen in Table 8.2 are both net profit (-0.087) and sales growth (0.136) tested significant at a 1% level. As for both the performance indicators the after dummy also tested significant at a 1% level it can be concluded this outcomes are the results on the M&A. In addition, the Acquisitions coefficient of the return on assets (-0.019) and intellectual property (0.329) are also tested significant on a 10% level. However, the After dummy lacks significant regarding the last two performance indicators which means no proper conclusion van be drawn. Also, the return on assets and net profit suggest that mergers outperform acquisitions while the opposite is observed with respect to the sales growth and intellectual property.

In the second approach are two different deal sets created to examine if the target firm performance increase after the acquisition or merger respectively. Table 23 presents the effect of a merger on the performance of high-tech target firms. Almost all performance indicators suggest a decline in the performance after the deal; return on assets [-0.043], operating margin [-0.345], sales growth [-0.281], and intellectual property [-0.229]. Only net profit shows a positive results of 0.119. However, only the return on assets is tested significant on $p<0.05$. The latter implies that it can be concluded that the performance decreases after a merger. Table 24 presents the effect of a acquisition on the performance of high-tech target firms. In contrast to mergers does the results suggest an increase of the performance indicators after the deal; operating margin [0.089], net profit [0.042], sales growth [0.054], and intellectual property [0.130]. Nevertheless, the only tested significant performance indicator, return on assets, assumes a decline of the performance after the acquisition. In conclusion, both M&A shows negative results regarding the performance of target firms after the deal.

"Innovation in an existing company is not just the sum of great technology, key acquisitions, or smart people. Corporate innovation needs a culture that matches and supports it." - Steve Blank

9

Discussion & Conclusion

Mergers & Acquisitions (M&A) are a persistent and fascinating field of study for researchers and students, which is demonstrated by the extensive amount of interest. To this day, aggregate European private target firms are remarkably under researched, particularly in relation to the high-tech industry. Current literature has been mostly incoherent and often conflicting findings have been published, also because many articles have limited their studies to a single country. As a result, and to contribute to the latter, this thesis report aimed to investigate whether M&A had an impact on the post-performance of high-tech target firms using an unique deal sample handed down by Bureau van Dyck. In order to reach a conclusion are various key performance indicators, research models, and robustness tests employed. Furthermore, the research incorporates differentiates between target firms that are prone to ongoing discussions. More specifically, performance changes are tested by taken different characterised into consideration such as domestic versus cross-border deals, small and medium enterprises versus large enterprises, low cultural distance versus medium or high cultural distance firm deals, Anglo-Saxon or Rhineland region, or target firm operating in the same industry or across industries.

The analysis of this report shows that the model used, influences the findings due to the fact that different results were seen occasionally for Return on Assets, Operating Margin, Net Profit growth, Sales growth, and Intellectual Property respectively. The vast majority of the findings suggest that there is no significant change in performance, while one measure indicated that performance decreased and one measure found an improvement in performance. Consequently, the various methods used tend to be accurate and remain robust. It can not be concluded that the M&A failed, whereas only target firms are analysed, while the performance

of acquiring firms might have improved. Based on the conducting research into the effect of M&A on 689 high-tech target firm performance this study can conclude the following:

- High-tech target firms perform worse after the M&A, whereas the intercept and difference-in-difference model present negative results. The intercept model reveals negative performance magnitudes in roughly all consecutive years after the deal. In other words, the synergies did not benefit the target firm, whereas multiple potential M&A motives, including diversification, strategic gains, and market power did not lead to a better performance of the target firm. Conspicuously, both the intercept model and the difference-in-difference model imply that high-tech target firms performed worse on average as seen from one year before the takeover compared to their control group or matched firm. The latter implies that acquired firms failed to keep up with the competition and confirm the fact that targets were in need of a way to strategically improve.

- Domestic deals outperform cross-border deals. This is in line with the literature while scientist suggest it is easier to transfer assets between parent and subsidiary operating in the same country. In other words, it is expected that acquired firms exploit synergies at parents' firm level.

- This research concludes that Small and Medium Enterprises (SME) perform worse on average compared to Large Enterprises. This is not in line with the expectations while research argued the fact that M&A between SME are more likely to be financed with equity over debt which better process the transaction of tangible and intangible asset what could be in favour of the synergy exploitation's. Overall, the findings suggest that large firm are more capable to exploit economies of scope and economies of scale due to the fact that the operating margin and net profit show great improvement after the takeover.

- Firms with a medium or high cultural distance outperform low cultural distance deals an not vice versa. This suggests that, taking into account the fact that bordering countries have similar cultural characteristics, greater cultural dimension between firms expose significant growth opportunities. Precisely because long-distance target firms tend to have benefited substantially from the diffusion of the acquiring

firms' know-how, while taking into account that management and organisational styles are obviously significantly different between the two firms. Neighbour countries are predicted to have similar cultural distance levels, so the performance reduction for low cultural distance deals indicates that M&A where mainly undertaken to enter new markets in different countries. Acquiring a local firms in another country with similar cultural dimensions is a logical expansion of business and a relatively easy way to reach another market. The latter implies that the M&A increased target firms' efficiency or earnings. It could also imply the acquired firm's backward integration, which is a variant of vertical integration economies through synergy gains.

- The results implies that high-tech target firms in the Anglo-Saxon region perform better compared to target firms in the Rhineland region. The outcomes are in line with our expectations while firms with a Rhineland corporate governance are more likely to adopt internal growth and exploratory as strategic renewal trajectories. On the other hand, Anglo-Saxon corporate governance orientated firms, are more likely to adopt strategic innovate projects on exploitation and external development.

- This research cannot draw any conclusions as to whether M&A between high-tech firms operating in the same industry exhibit greater performance improvement compared to M&A between firms operating across industries. No persuasive improvements can be presumed in neither the OLS model, the intercept model as the difference-in-difference method, whereas all coefficients lack significance and therefor cannot be interpreted.

Overall, this research finds clear results that, in general, expanding through an M&A does not affect target firm's performance. Therefore, firms looking for a way to grow should not sell the company. Alternatives for target firms are strategic partnerships (e.g., franchising, licensing, and joint ventures), and investing in accelerating innovation (e.g., internal capabilities.). While the total sample consisted of 95.26% privately held firms, another alternative strategy is to go public and raise capital to invest in internal processes.

This page is intentionally left blank.

10

LIMITATIONS & FUTURE RESEARCH

This research, together with almost all academic literature, is susceptible to certain constraints. First point of discussion is the difference between mergers and acquisitions. Even though both terms have a different meaning, they are uttered throughout this study as equals. Logically, a merger can have a very different effect on success compared to an acquisitions. Where, in the case of a mergers, two firms join forces to create a new, joint organisation, are in the event of a takeover, the culture, chain of command, philosophy and values often fully adopted. Of course, this research tried to make a distinction between mergers and acquisitions with the assumption whether an acquirer is four time bigger compared to the target firm in terms of total assets, it can be interpret as an acquisition. In contrast, when the target firms is not four time smaller, this study define the takeover as a merger. However, it can be argued that this does not apply in all cases. Further research can make a clear-cut distinction between each other. Another aspect which can be taken in consideration is the governance structure of each firm. This study addresses this issue on the basis of governance differences between countries, while in the time of globalisation it can also be very different for each firm between the same borders. An opportunity for future research to solve this issue is the use of mixed methods (e.g. quantitative and qualitative data), while this research only takes quantitative data in consideration. With the use of participant observations and in-depth interviews it is possible to create a better understanding of the firm in particular. For example, the governance structure, merger or acquisition, but also in which industry they mostly operate, the culture in the company and the influence of the management in time of the M&A.

Despite the additional benefits of accounting performance indicators, there are also some limitations in measuring the success of M&As. First, accounting-based indicators depend on the financial statements published

by the firms themselves, which in developing economies can be considered unreliable. Second, it is not possible to measure the post-acquisition performance of single takeovers when firms are involved in multiple deals in a short period of time. Third, Minnis and Shroff [2017] argue that accounting-based performance indicators do not always capture post-acquisition changes regarding M&As that are forced by technological and regulatory modifications. Fourth, as mentioned in chapter 5, are many different performance indicators used in previous literature and empirical research, which makes it challenging to compare one and another [Minnis and Shroff, 2017]. In this research, several of the most frequently used performance measures have been used. But literature lacks consensus on what actually defines performance. An event study can be more straightforward, while using CARs as an estimate it is simple to argue that the M&A has benefited that specific firm and its shareholders. The financial accounting-based indicators capture, yet not entirely, a peculiar part of the post-acquisition. Future research can elaborate on existing research by analysing the synergies through non-financial domain performance indicators. For example; market value, productivity, and survival.

Furthermore, a significant limitation of this research is that Amadeus only provides financial information from the last ten consecutive fiscal years. Many private firms do not have all financial information available, which means the respective regressions are not taken into consideration for all firms. Although the findings of this paper are up-to-date with the latest information, the general results are difficult to generalise. Moreover, if this study had been undertaken ten years later, it could be the case that different findings will be observed. In addition, the intentions for conducting M&A have changed over time [Motis, 2007], where the most fundamental characteristic of the last wave was globalisation and cross-border deals M&As. This is also well discussed in the literature review. Nonetheless, the world is constantly changing where the next M&A wave is not yet clear-cut known. Future research must taken the interest and market characteristic which act out at the time into account. In order to deal with the ten year limited financial information is it possible for future research to use different data-set (e.g. ThomasReuter One, Bloomberg). However, there are also disadvantages because other data sets lack financial information on privately held companies.

Another constrain on the research is the Orbis Intellectual Property database. Although all three data-sets used throughout this study are handed down by Bureau van Dijk, is the Orbis Intellectual Property data-set the youngest and most recently released. This may be one of the reasons why lot of information about the publications of patents is missing. The report reveals that firms sometimes only for one year tend to indicate how many patent applications they have made. This is often only the year after the takeover as a result of which it is not possible to make a correct analysis on the effect of M&A. This is also reflected in the number of observations in each benchmark method, which is mostly three or four times less compared to the financial data. In addition, the coefficients result of the Difference-in-Difference method frequently produce a score which is larger than 1. This is likely to happen when there is high multicollinearity among the predictors. Multicollinearity refers to a situation in which two or more explanatory variables in a multiple regression model are highly linearly related. This can increase the variance of the coefficient and make the estimates sensitive to minor changes in the model. The result is that the coefficient estimates are unstable and often not significant. Patent applications are becoming an increasingly important aspect in the world of technology. Future research can create a better understanding what the role of research & development is on the performance after M&As. This can be done by measuring the difference in R&D expenditures before and after the takeover. This will provide better evidence on the synergies after the M&A.

10.1 LINK WITH MANAGEMENT OF TECHNOLOGY PROGRAM

The Management of Technology (MOT) program is based on the fact that firms increasingly need professionals that are acquainted with both technology and management practices. Therefore, the program aims to educate engineers in the area of management and believe that managers should be knowledgeable in their respective technology context. With the help of interactive lectures, papers and examinations student learn to explore and understand technology while it shows how firms use technology to maximise it corporate profitability, productivity, and competitiveness advantages. Mergers and acquisitions play an important role in

the technology sector whereas it often revolves around the purchase or sale of new technology to help firms realise more value from the market and operational synergies that bring businesses together.

Especially, managers are essential during M&A while leadership through the process can significantly affect its outcome. Excellent managers influences employees post-takeover satisfaction. It avoid misunderstanding where employees need clear directions. Also, people can often be resistant to change and do not deal in the same manner with stress and anxiety. Furthermore, by choosing firm strategies, managers can affect the final result of success or failure of the takeover. For example, [Moeller *et al.*, 2004] show shareholder value destruction when managers are only focused on short-term returns instead of long-term thinking.

This master thesis research has specifically been inspired- and facilitated by the courses Financial Management and Technology, Strategy and Entrepreneurship.

BIBLIOGRAPHY

[1] Agirdag, O., Phalet, K. and Houtte, M. van. (2016). European identity as a unifying category: National vs. European identification among native and immigrant pupils. *European Union Politics*, **17** (1), pp. 285-302

[2] Alexandridis, G., Petmezas, D. and Travlos, N. G. (2010). Gains from Mergers and Acquisitions Around the World: New Evidence. *Financial Management*, **39** (4), pp. 1671-1695

[3] Andrade, G., Mitchel, M., and Stafford, E. (2001). New evidence and perspectives on mergers. *Journal of Economic Perspectives*, **15** (1), pp. 103-120

[4] Auguest-Pratsobrerroca, X., Martinez-Blasco, M., and Garcia-Blandon, J. (2017). The sixth merger wave and wealth effects of M&A announcements: an analysis of large European bidding companies. *European Accounting and Management*, **4**, pp. 19-48

[5] Avery, G. C., and Bergsteiner, H. (2013). Rhineland Business Model/Rhineland Leadership. *Encyclopedia of Corporate Social Responsibility*, pp. 1-151

[6] Aw, M. S. B., and Chatterjee, R. A. (2004). The performance of UK firms acquiring large cross-border and domestic takeover targets. *Applied Financial Economics*, **14** (5), pp. 337-349

[7] Barkema, H. G., and Schijven, M. (2008). How do firms learn to make acquisitions? A review of past research and an agenda for the future. *Journal of Management*, **34** (3), pp. 594-634

[8] Berk, J., and Demarzo, P. (2014). Corporate Finance, Thrid Edition. *Pearson Education, Inc.,*, **17**, pp. 3-5

[9] Berkovitch, E., and Narayanan, M. P. (1993). Motives for Takeovers: An Empirical Investigation. *The Journal of Financial and Quantitative Analysis*, Cambridge University Press. **28** (3), pp 347-362

[10] Bertrand, O., and Betschinger, M. A. (2012). Performance of domestic and cross-border acquisitions: Empirical evidence from Russian acquirers. *Journal of Comparative Economics*, **40** (2), pp. 413-437

[11] Bertrand, O., and Zitouna, H. (2004). M&A and target firms' performance: are cross-border M&A different? Some Evidence from French firm-level data. *Applied Economics*, **40** (17), pp. 2221-2238

[12] Bertrand, O., and Zitouna, H. (2008). Domestic versus Cross-Border Acquisitions: Which Impact on the Target Firms' Performance? *Applied Economics*, **40** (18), pp. 2221-2238

[13] Bhabra, H. S., and Huang, J. (2013). An empirical investigation of mergers and acquisitions by Chinese listed companies. *Journal of Multinational Financial Management*, **23** (3), pp. 186-207

[14] Blundell, R. and Costa Dias, M. (2000). *Fiscal Studies*, **21**, pp.427-468

[15] Boateng, A., and Naraidoo, R., and Uddin, M. (2012). An analysis of the inward cross-border mergers and acquisitions in the UK: A macroeconomic perspective. *Journal of International Financial Management & Accounting*, **22** (2), pp. 91-113

[16] Bradley, M., Desai, A., and Han Kim, E. (1998). Synergistic gains from corporate acquisitions and their division between the stockholders of target and acquiring firms. *The Journal of Financial Economics*, **21** (1), pp. 3-40

[17] Butler, A., Grullon, G., and Weston, J. P. (2005). Stock Market Liquidity and the Cost of Issuing Equity. *Journal of Financial and Quantitative Analysis*, **40** (2), pp. 331-348

[18] Caiazza, S., Pozzolo, A. F., and Trovato, G. (2016). Bank efficiency measures, M&A decision and heterogeneity *Journal of Productivity Analysis*, **46** (1), pp.25-41

[19] Cartwright, S., and Cooper, C. L. (1996). Managing Mergers, Acquisitions and Strategic Alliances. *Woburn, MA: Butterworth-Heinemann*, **2**, pp. 1-168

[20] Cernat, L. (2004). The emerging European corporate governance model: Anglo-Saxon, Continental, or still the century of diversity? *Journal of European Public Policy*, **11** (1), pp. 147-166

[21] Chatterjee, S. (1986). Types of synergy and economic value: The impact of acquisitions on merging and rival firms. *Strategic Management Journal*, **7** (2), pp. 119-139

[22] Clark, T., and Linzer, D. (2014). Should I Use Fixed or Random Effects? *Political Science Research and Methods*, **3**, pp. 399-408

[23] Cloodt, M., Hagedoorn, J., and Kranenburg, H. V. (2006). Mergers and acquisitions: Their effect on the innovative performance of companies in high-tech industries. *Research Policy*, **35** (5), pp. 642-654

[24] Coeurdacier, N., Santis, R. A. de, and Aviat, A. (2009). Cross-border mergers and acquisitions and European integration. *Economic Policy, Oxford University Press (OUP)*, **24** (57), pp. 56-106

[25] Collins, J. D., and Holcomb, T. R., and Certo, S. T., and Hitt, M. A., and Lester, R. H. (2009). Learning by doing: Cross-border mergers and acquisitions. *Journal of Business Research*, **62** (12), pp. 1329-1334

[26] Conn, R. L., Cosh, A., and Guest, P. M. (2005). The Impact on UK Acquirers of Domestic, Cross-border, Public and Private Acquisitions. *Journal of Business Finance & Accounting*, **23** (5-6), pp. 815-870

[27] Damodaran, A. (2005). The value of synergy. *New York University – Stern School of Business.*, pp. 1-47

[28] Das, A., and Kapil, S. (2012). Explaining M&A performance: a review of empirical research. *Journal of Strategy and Management*, **5** (3), pp. 284-330

[29] Dehejia, R. and Wahba, S. (2002). Propensity score- matching methods for nonexperimental causal studies. *Review of Economics and Statistics*, **84**, pp. 151-161

[30] Desyllas, P., and Hughes, A. (2010). Do high technology acquirers become more innovative? *Research Policy*, **39** (8), pp. 1105-1121

[31] Ellis, J., Moeller, S., Schlingemann, F., and Stulz, R. (2012). Globalisation, Country Governance, and Corporate Investment Decisions: An Analysis of Cross-Border Acquisitions. *Working Paper Series, Ohio State University.*, **3** (1), pp. 148-173

[32] Erel, I., Jang, Y., and Weisback, M. (2015). Do Acquisitions Relieve Target Firms' Financial Constraints? *Journal of Finance*, **70** (1), pp. 289-328

[33] Erel, I., Liao, R., and Weisback, M. (2012). Determinants of Cross-Border Mergers and Acquisitions. *Journal of Finance*, **67** (3), pp. 1045-1082

[34] European Commission. (2005). The New SME Definition: User Guide and Model Declaration. , (DG Enterprise and Industry Publications.)

[35] Franks, J., and Harris, R. (1989). Shareholder wealth effects of corporate takeovers: the UK experience 1955–1985. *Journal of Financial Economics*, **23** (2), pp. 225-249

[36] Ghosh, A. (2001). Does operating performance really improve following corporate acquisitions? *Journal of Corporate Finance*, **7** (2), pp. 151-178

[37] Gioia, C., and Thomsen, S. (2004). International acquisitions in the Danish Business. Selection and performance. *Applied Economics Quarterly*, **50** (1), pp. 61-88

[38] Gomes, E., Angwin, D. N., and Weber, Y. (2013). Critical Success Factors through the Mergers and Acquisitions Process: Revealing Pre- and Post-M&A Connections for Improved Performance. *Thunderbird International Business Review*, **55** (1), pp. 1096-4762

[39] Grant, R. M., Jammine, A. P., and Thomas, H. (1988). Diversity, Diversification, and Profitability among British Manufacturing Companies 1972–1984. *Academy of Management Journal*, **31**, pp. 771-801

[40] Grubert, H., and Mutti, M. (1991). Taxes, Tariffs and Transfer Pricing in Multinational Corporate Decision Making. *The Review of Economics and Statistics*, **73** (2), pp. 285-293

[41] Gugler, K., Mueller, D. C., and Weichselbaumer, M. (2012). The determinants of merger waves: An international perspective. *International Journal of Industrial Organization*, **30** (1), pp. 1-15

[42] Hall, P. A., and Soskice, D. W. (2001). Varieties of capitalism: The institutional foundations of comparative advantage. *New York: Oxford University Press.*.

[43] Harford, J. (2005). What drive merger waves? *Journal of Financial Economics*, **77** (3), pp. 529-560

[44] Hasan, I., Khalil, F., and Sun, X. (2017). The impacts of intellectual property rights protection on cross-border M&As. *Research Discussion Papers - Bank of Finland*, pp. 85-145

[45] Healy, P. M., Palepu, K. G., and Ruback, R. S. (1992). Does corporate performance improve after mergers? *Journal of Financial Economic*, **31** (2), pp. 135-175

[46] Hellgren, B., Löwstedt, J., and Werr, A. (2011). The reproduction of efficiency theory: The construction of the AstraZeneca merger in the public discourse. *International Journal of Business and Management*, **16** (5), pp. 16-27

[47] Hitt, M., Harrison, J., Ireland, R. D., and Best. A. (1998). Attributes of Successful and Unsuccessful Acquisitions of US Firms. *British Journal of Management*, **9**, pp. 91-114

[48] Kangarlouei, S. J., Motavassel, M., Azizi, A., and Farahani, M. S. (2012). The investigation of the relationship between dividend policies, cash-flow uncertainty, contributed capital mix and investment opportunities: the case of emerging markets (Tehran Stock Exchange). *International Journal of Business and Social Science*, **3** (2), pp. 173-180

[49] Koi-Akrofi, G. (2016). Mergers and Acquisitions failure rates and perspectives on why they fail. *International Journal of Innovation and Applied Studies*, **17**, pp. 150-157

[50] Larrain, B., Tapia, M., and Urzua, F. (2017). Investor Protection and Corporate Control. *Journal of Corporate Finance*, **47** (C), pp. 174-190

[51] Leamer, E. (1983). Let's Take the Con Out of Econometrics. *American Economic Review*, **73** (1), pp. 31-43

[52] Lebedev, S., Peng, M. W., Xie, E., and Stevens, C. (2014). Mergers and acquisitions in and out of emerging economies. *Journal of World Business*, **50**, pp. 651-662

[53] Lee, D. (2017). Cross-border mergers and acquisitions with heterogeneous firms: Technology vs. market motives. *The North American Journal of Economics and Finance*, **42** (C), pp. 20-37

[54] Leiblein, M.J., and Madsen, T.L. (2009). Unbundling competitive heterogeneity: Incentive structures and capability influences on technological innovation. *Strategic Management Journal*, **30** (7), pp. 711-735

[55] Lieberman, M. B., and Montgomery, D. B. (1988). First-mover advantages. *Strategic Management Journal*, **9** (S1), pp. 41-58

[56] Linn, S., and Switzer, J. A. (2001). Are cash acquisitions associated with better post combination operating performance than stock acquisitions? *Journal of Banking & Finance*, **25** (6), pp. 1113-1138

[57] Martynova, M., and Renneboog, L. (2006). Mergers and acquisitions in Europe. *Advances in Corporate Finance and Asset Pricing*, pp. 13-75

[58] Martynova, M., and Renneboog, L. (2008). A century of corporate takeovers: What have we learned and where do we stand? *Journal of Banking & Finance*, **32** (10), pp. 2148-2177

[59] McCarthy, K. J. (2011). Understanding success and failure in mergers and acquisitions: questing for the Holy Grail of economics, finance, and strategic management. *University of Groningen, SOM research school*, pp. 1-222

[60] McCarthy, K. J., and Aalbers, H. L. (2016). Technological acquisitions: The impact of geography on post-acquisition innovative performance. *Research Policy*, **45** (9), pp. 1818-1832

[61] Meglio, O., and Risberg, A. (2011). The (mis)measurement of M&A performance: A systematic narrative literature review. *Scandinavian Journal of Management*, **27** (4), pp. 418-433

[62] Minnis, M., and Shroff, N. (2017). Why regulate private firm disclosure and auditing? *Accounting and Business Research*, **47** (5), pp. 473-502

[63] Moeller, S. B., and Schlingemann, F. P. (2005). Global diversification and bidder gains: A comparison between cross-border and domestic acquisitions. *Journal of Banking & Finance*, **29** (3), pp. 533-564

[64] Moeller, S. B., Schlingemann, F. P., and Stulz, R. M. (2004). Firm size and the gains from acquisitions. *Journal of Financial Economics*, **73** (2), pp. 201-228

[65] Moeller, S. B., Schlingemann, F. P., 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, American Finance Association*, **60** (2), pp. 757-782

[66] Moeller, S. B., Schlingemann, F. P., and Stulz, R. M. (2017). Effects of mergers on corporate performance: An empirical evaluation using OLS and the empirical Bayesian methods. *Borsa Istanbul Review*, **17** (1), pp. 10-24

[67] Morck, R., Shleifer, A., S., and Vishny, R. W. (1990). Do Managerial Objectives Drive Bad Acquisitions? *Journal of Finance*, **45** (1), pp. 31-48

[68] Motis, J. (2007). Mergers and Acquisitions Motives. *Toulouse School of Economics – EHESS (GREMAQ) and University of Crete.*

[69] Motis, J. (2007). Mergers and Acquisitions Motives. *Toulouse School of Economics – EHESS (GREMAQ) and University of Crete*

[70] Pakes, A., and Griliches, Z. (1984). Patents and R&D at the Firm Level: A First Look. *National Bureau of Economic Research, Inc* , pp. 55-72

[71] Penman, S. (1991). An evaluation of accounting rate of return. *Journal of Accounting, Auditing & Finance*, **6** (2), pp. 233-255

[72] Perry, J., and Nölke, A. (2006). The political economy of International Accounting Standards *Review of International Political Economy* , **13** (4), pp. 559-586

[73] Pervan, M., Višić, J., and Barnjak, K. (2015). The Impact of M&A on Company Performance: Evidence from Croatia. *Procedia Economics and Finance*, **23**, pp. 1451-1456

[74] Piesse, J., Lee, C. E., Lin, L., and Kuo, H. C. (2012). Merger and Acquisition: Definitions, Motives, and Market Responses. *Encyclopedia of Finance*, pp. 411-420

[75] Piscitello, L., and Rabbiosi, L. (2003). More Inward Foreign Direct Investment (FDI)? Medium-Term Effects of Foreign Acquisitions on Target Company Productivity. *Applied Economics Quarterly*, **50** (1), pp. 35-51

[76] Pitchbook. (2018). Mergers & Acquisitions, Annual Report, Technology acquisition made across the sectors

[77] Powell, R. G., and Stark, A. W. (2005). Does operating performance increase post-takeover for UK takeovers? A comparison of performance measures and benchmarks. *Journal of Corporate Finance*, **11** (2), pp. 293-317

[78] Rashid, A., and Naeem, N. (2017). Effects of mergers on corporate performance: An empirical evaluation using OLS and the empirical Bayesian methods. *Borsa Istanbul Review*, **17** (1), pp. 10-24

[79] Ravenscraft, D., and Scherer, E. (1989). The Profitability of Mergers. *International Journal of Industrial Organization*, pp. 101-116

[80] Reddy, K. S. (2015). Determinants of Cross-border Mergers and Acquisitions: A Comprehensive Review and Future Direction. *Munich Personal RePEc Archive*, (63969), pp. 1-62

[81] Rossi, M., Tarba, S., and Raviv, A. (2013). Mergers and acquisitions in the hightech industry: A literature review. *International Journal of Organizational Analysis*, **21**, pp. 66-82

[82] Rossi, S., and Volpin, P. (2004) Cross-country determinants of mergers and acquisitions. *Journal of Financial Economics*, **74** (2), pp. 277-304

[83] Saboo, S., and Gopi, S. (2009). Comparison of Post-Merger performance of Acquiring Firms (India) involved in Domestic and Cross-border acquisitions. *Munich Personal RePEc Archive - Bocconi University Milano Italy, Indian Institute of Management Kozhikode*, pp. 1-10

[84] Schiffbauer, M., Siedschlag, L., and Ruane, F. (2017). Do foreign mergers and acquisitions boost firm productivity? *International Business Review*, **26** (6), pp. 1124-1140

[85] Shimizu, K., Hitt, M. A., Vaidyanath, D., and Pisano, V. (2004). Theoretical foundations of cross-border mergers and acquisitions. *Journal of International Management*, **10** (3), pp. 307-353

[86] Sinani, E., and Meyer, K. E. (2004). Spillovers of technology transfer from FDI: the case of Estonia. *Journal of Comparative Economics*, **32** (2), pp. 445-466

[87] Stearns, L. B., and Allan, K. D. (1996). Economic Behavior in Institutional Environments: The Corporate Merger Wave of the 1980s. *American Sociological Review*, American Sociological Association, Sage Publications, Inc. **61** (4), pp. 699-718

[88] Stigler, G. (1950). Monopoly and oligopoly power by merger. *American Economic Review*, **40**, pp. 23-34

[89] Sudarsanam, S. (2010). Creating Value from Mergers and Acquisitions, the Challenges. *Financial Times / Prentice Hall*, **2**, pp. 1-816

[90] Tihanyi, L., Griffith, D. A., and Russell, C. J. (2005). The effect of cultural distance on entry mode choice, international diversification, and MNE performance: a meta-analysis. *Journal of International Business Studies*, **36** (3), pp. 270-283

[91] Triandis, H. C. (1998). Introduction to Diversity in Clinical Psychology. *Comprehensive Clinical Psychology, Pergamon*, pp. 1-33

[92] Tsui, A. S., and Nifadkar, S. S., and Yi, A. (2007). Cross-National, Cross-Cultural Organizational Behavior Research: Advances, Gaps, and Recommendations. *Journal of Management*, **33** (3), pp. 462-478

[93] UNIDO, (2010). Industrial Statistics: Guidelines and Methodology, *Vienna, Austria.*

[94] Valentini, G. (2012). Measuring the effect of M&A on patenting quantity and quality. *Strategic Management Journal*, **33** (3), pp. 336-346

[95] Weitzel, U., and McCarthy, K. J. (2011). Theory and Evidence on Mergers and Acquisitions by Small and Medium Enterprises. *International Journal of Entrepreneurship and Innovation Management*, **14** (3), pp. 1-28

Appendices

A

VARIABLE DESCRIPTIONS

The following table describes the deal-level variables, the firm-level variables, and the country level variables used for the analysis. The firm-level variables are measured at annual recurrence. Deal-level variables are measured from the last-fiscal year-end prior to the completion of the deal.

Panel A: Deal-Level variables (Zephyr database)	
Domestic Deals	A domestic deal refers to a deal between target and acquiring firms if both are from the same country
High-Tech firms	A firm is a high-tech firm if its primary industry classification is 1811, 1814, 21, 22, 23, 2410, 2411, 2412, 2414 or 30 as indicated by Bureau van Dijk
Independent Target	A target firm is independent when it is not a subsidiary of another firm or if the firm has more the 50% of the shares.
Public/Private firm	Target (or acquirer) firms are a public firm if they are listed or delisted

Panel B: Firm-Level variables in Euro's (Orbis Intellectual Property database)	
Intellectual Property	Natural logarithm of the number of patent publications
Knowledge Base	R&D Expenditure / Operating Revenue

Panel C: Firm-Level variables in Euro's (Amadeus database)	
Leverage	[Long-term debt (LTDB) + Current liabilities (CULI)] / Total Assets
Ln (Employees)	Natural logarithm of the number of Employees
Number of Employees	Total amount of Employees (EMPL)
Net Profit	Profit before Tax (PLBT)
Return on Assets	EBITDA / Total Assets
Operating Margin	EBIT / Sales
Sales Growth	(Sales (TURN) - Lagged Sales) / Lagged Sales
Size	Natural logarithm of Total Assets
Total Assets	Fixed Assets (FIAS) + Current Assets (CUAS)

B

Industry Sectors

This appendix presents all 28 major industry sectors defined by Bureau van Dyk. Each sector in turn is divided into several sub-sectors. Since this study only focuses on the high-tech industry are only target firms from the [1811] Chemicals, [1814] Pharmaceutical [21] Industrial, Electric & Electronic Machinery, [22] Computer Hardware, [23] Communications, [2410 t/m 2412 & 2414] Transport manufacturing (Automotive, Avionics, Rail, Space) and [30] Computer Software sectors included.

10 Agriculture, Horticulture & Livestock

- 1010 Cultivation
- 1011 Animal Husbandry
- 1012 Poultry & Aviculture
- 1013 Aqua & Related
- 1014 Beehives and related
- 1015 Fishing
- 1016 Hunting & Trapping
- 1017 Forestry
- 1018 Harvesting & Mowing
- 1019 Business Services

11 Mining & Extraction

- 1110 Oil & Gas
- 1111 Coal Mining
- 1112 Minerals
- 1113 Quarrying
- 1114 Sand
- 1115 Clay
- 1116 Others

12 Utilities

- 1210 Electricity
- 1211 Gas
- 1212 Water & Sewage treatents
- 1213 Water Supply
- 1214 Air Conditioning / HVAC

13 Construction

- 1310 Building
- 1311 Infrastructure
- 1312 Land Development
- 1313 Specialist Construction
- 1314 Engineering

1315 Framing

1316 Masonry

1317 Glazing

1318 Roofing

1319 Building Finishing

1320 Plumbing

1321 Paint & Protection

1322 Flooring

1323 Carpentry

1324 Insulation

1325 Building Contractors

1326 Other Construction

14 Food & Tobacco Manufacturing

1410 Animal Food

1411 Grinding, Milling

1412 Groceries

1413 Edible Oils

1414 Confectionery

1415 Preservatives

1416 Canning

1417 Packaging

1418 Milk Products

1419 Meat Products

1420 Baking

1421 Flavourings, Sauces, Seasoning & Spices

1422 Beverages

1423 Breweries, Distilleries, Wineries

1424 Tobacco

15 Textiles & Clothing Manufacturing

1510 Weaving

1511 Embroidery

1512 Fabric Finishing

1513 Textile & Clothing Accessories

1514 Tailoring

1515 Textile Mills

1516 Leather & Tanners

1517 Footwear

16 Wood, Furniture & Paper Manufacturing

1610 Wood Processing & Treatments

1611 Windows, Doors

1612 Storage Cupboards, Closets

1613 Furniture Fittings, Accessories

1614 Other Office Furniture

1615 Other Household Furniture

1617 Paper

1618 Others

17 Printing & Publishing

1710 Printers

1711 Newspaper, Magazine

1712 Books

1713 Others

18 Chemicals, Petroleum, Rubber & Plastic

1810 Petroleum

1811 Chemicals

1812 Plastics

1813 Rubber

1814 Pharmaceuticals

19 Leather, Stone, Clay & Glass products

1910 Clay

1911 Glass

1912 Cement & Concrete

1913 Others

20 Metals & Metal Products

2010 Iron & Steel

2011 Iron

2012 Steel

2013 Aluminium

2014 Other Metals

2015 Copper

2016 Metallurgy

2017 Metal Products & Manufacturing

2018 Weapons & Ammunition

2019 Metal Coating & Heat Treatment

21 Industrial, Electric & Electronic Machinery

2110 Industrial Machinery & Equipment

2111 Industrial Automation

2112 Medical & Laboratory Appliances

2113 Navigational

2114 Electronic & Electrical Components

2115 Storage Media

2116 Lighting

2117 Home & Kitchen Appliances

2118 Power Distribution

2119 Batteries

2120 Communications Equipment

2121 Others

22 Computer Hardware

2210 Input Devices

2211 Computer

2212 Storage

23 Communications

2310 Communications Equipment

2311 Radio & Television Broadcasting

2312 A/V Devices

2313 Wired Communications

2314 Wireless Communications

2315 SatCOM

2316 Other Telecommunications

24 Transport Manufacturing

2410 Transport Manufacturing

2411 Avionics

2412 Rail

2413 Ship & Boat Building

2414 Space

25 Miscellaneous Manufacturing

26 Wholesale

27 Retail

28 Transport, Freight & storage

2810 Air Transportation

2811 Rail Transportation

2812 Water Transportation

2813 Freight

2814 Road Transportation

2815 Pipelines

2816 Transport Support

2817 Post & Courier

2818 Warehousing

2819 Other Transportation

29 Travel, Personal & Leisure

2910 Travel

2911 Entertainment

2912 Travel Agencies

2913 Personal Care & Grooming

2914 Funeral

2915 Cleaning Services

2916 Pet care

2917 Religious

2918 Personal Rental; Leasing

30 Computer Software

3010 Application Software

3011 Web Hosting & Internet

3012 Software Services

31 Media & Broadcasting

3110 Film & Video

3111 Music

3112 Radio

3113 Television

3114 Satellite

3115 Webcast incl. Digital Broadcasting

32 Banking, Insurance & Financial Services

3210 Banks

3211 Credit & Finance

3212 Transactions, Payment Gateways & Wallets

3213 Securities & Commodities

3214 Investments

3215 Securities

3216 Commodities

3217 Management

3218 Insurance

3219 Funds

3220 Others

33 Property Services

34 Business Services

3410 Research & Testing Services

3411 Repair & Maintenance

3412 Commercial Rental & Leasing

35 Biotechnology and Life Science

3510 R&D Laboratories

36 Information Services

3610 News

3611 Libraries

37 Public Administration, Education, Health Social Services

3710 Schools & Colleges

3711 Vocational Training

3712 Medical

3713 Dentistry

3714 Hospitals

3715 Social Services

3716 Medical Testing

3717 Emergency Services

3718 Emergency Relief

3719 Healthcare

3720 Human Rights

3721 Environment

3722 Civic

3723 Labour

3724 Political

3725 Legislative

3726 Tribal

3727 Justice

3728 Education

3729 Employment

3730 Military

3731 Housing

3732 Transport

3733 Communications Department

3734 Agriculture

3735 Regulatory

3736 Government

3737 Others

38 Waste Management & Treatment

3810 Collection

3811 Disposal

3812 Recycling & Recovery

3813 Others

This page is intentionally left blank.

C

Country Deal List

The following tables illustrates total deals per country, as seen from the acquirers and the target firms. The Zephyr database provided 1306 deals in total. After cleaning and preparing the sample in total 682 deals remained. For instance, countries were excluded in which less than 5 firms were acquired over the given period. As a result, the target firms reside in 17 European countries.

1.	World regions: European Union enlarged (28) (Target)	594,948
2.	Time period: on and after 01/01/2010 and up to and including 31/12/2017	195,154
3.	BvD Sectors: 1811 - Chemicals, Petroleum, Rubber & Plastic / Chemicals, 1814 - Chemicals, Petroleum, Rubber & Plastic / Pharmaceuticals, 21 - Industrial, Electric & Electronic Machinery, 22 - Computer Hardware, 23 - Communications, 2410 - Transport Manufacturing, 2411 - Transport Manufacturing / Avionics, 2412 - Transport Manufacturing / Rail, 2414 - Transport Manufacturing / Space, 30 - Computer Software	52,063
4.	Acquiror financials (m EUR): Total assets: min=1 ; Number of employees: min=10	14,156
5.	Target financials (m EUR): Total assets: min=0.5 ; Number of employees: min=5	6,634
6.	Deal type: Acquisition, IPO, Planned IPO, Capital increase, Joint-venture, Merger, Minority stake, Share buy back	6,412
7.	Sub-deal type: Black Economic Empowerment, Buy & Build, Capital Pool, Contested bid, Debt & cash free basis, Demerger, Demerger Partial, Distressed sales/companies, Dual Track, Follow on offer, Hostile bid, Hostile initially became recommended, Multiple bids, Patent sale, Public takeover, Quaternary Buy Out, Quinary Buy out, Recommended bid, Recommended initially became hostile, Reverse take-over, Scheme of arrangement, Secondary Buy out, Secondary listing, Secondary offer, Securities Financing, Sovereign wealth fund, Start up, Tender offer, Tertiary Buy out, Unsolicited bid	1,306

Country list sample					
Acquirers				**Targets**	
Austria	AT	10	Austria	AT	11
Belgium	BE	131	Belgium	BE	23
Bulgaria	BG	1	Bulgaria	BG	5
Bermuda	BM	2	Czech Republic	CZ	5
Canada	CA	9	Denmark	DK	19
China	CN	10	Finland	FI	43
Czech Republic	CZ	3	France	FR	76
Denmark	DK	6	Germany	DE	168
Finland	FI	36	Hungary	HU	5
France	FR	77	Ireland	IE	6
Germany	DE	67	Italy	IT	92
Italy	IT	51	Netherlands	NL	46
Japan	JP	15	Poland	PL	11
Lithuania	LT	1	Portugal	PT	6
Luxembourg	LU	2	Sweden	SE	31
Netherlands	NL	18	Spain	ES	34
Norway	NO	3	United Kingdom	GB	117
Peru	PE	1			
Poland	PL	13			
Romania	RO	3			
Spain	ES	14			
Sweden	SE	51			
Switzerland	CH	12			
Taiwan	TW	2			
United Arab Emirates	AE	3			
United Kingdom	GB	109			
United States of America	US	137			
Virgin Islands	VG	1			
Total		689	**Total**		689

D

Ordinary Least Squares Results

This appendix presents all the regressions results on target firm performance from the Ordinary Least Squares model. The results are estimates of equation 5.1 predicting the different performance indicators. In each table, column 1 to 6 represent each hypothesis accordingly confined to its particular measure. Appendix A contains information abou the variable descriptions. The estimates rely exclusively on unconsolidated economic information. Fixed effects for firms, years and countries are included if the regression proves a 'Yes' accordingly. The standard errors in parentheses are clustered at target-firm level. Significance: * 10%, ** 5%, *** 1% respectively using a Wilcoxon signed ranks test.

In total there are 5 different tables representing;

1. Return on Assets [ROA]
2. Net Income [IN]
3. Operating Margin [OM]
4. Sales Growth [SG]
5. Intellectual Property [IP]

Table D.1: OLS regression results on Return of Assets

The following table present the estimates of equation [5.1] predicting the Return on Assets performance indicator. Columns 1 to 6 represent each hypothesis accordingly confined to its particular measure.

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Return on Assets					
After	-0.008	-0.009	-0.008	-0.007	0.003	-0.017
	(0.010)	(0.010)	(0.010)	(0.010)	(0.016)	(0.013)
Size	0.093***	0.085***	0.096***	0.098***	0.005*	0.081***
	(0.016)	(0.017)	(0.016)	(0.017)	(0.003)	(0.024)
Employees	-0.041***	-0.039***	-0.053***	-0.042***	0.012***	-0.035*
	(0.014)	(0.014)	(0.014)	(0.014)	(0.004)	(0.019)
Leverage	-0.171***	-0.169***	-0.171***	-0.179***	-0.215***	-0.198***
	(0.042)	(0.042)	(0.042)	(0.043)	(0.031)	(0.035)
GCD	0.069	0.077	0.053		0.135	0.525
	(0.158)	(0.159)	(0.159)		(0.117)	(0.421)
Domestic		0.007				
		(0.007)				
SME			-0.072***			
			(0.021)			
Low GCD				0.010		
				(0.014)		
Anglo-Saxon					-0.050***	
					(0.015)	
Industry						0.000
						(0.000)
Constant	-1.394***	-1.267***	-1.326***	-1.454***	-0.061	-1.329***
	(0.277)	(0.290)	(0.279)	(0.280)	(0.077)	(0.470)
Observations	4,025	4,005	4,025	4,115	2,698	1,769
R-squared	0.618	0.606	0.619	0.629	0.200	0.645
Firm FE	Yes	Yes	Yes	Yes	No	Yes
Country FE	Yes	No	Yes	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

*Statistical significance at 1%, 5%, and 10% levels are denoted by the symbols ***, **, and * respectively.*

Table D.2: OLS regression results on Net Income

The following table present the estimates of equation [5.1] predicting the Return on Assets performance indicator. Columns 1 to 6 represent each hypothesis accordingly confined to its particular measure.

	(1)	(2)	(3)	(4)	(5)	(6)
Variables			Net Income			
After	0.148	0.124	0.142	0.114	0.271	0.351
	(0.429)	(0.435)	(0.428)	(0.420)	(0.384)	(0.624)
Size	-0.173	-0.167	-0.142	-0.268	-0.148	-0.480
	(0.353)	(0.365)	(0.358)	(0.387)	(0.097)	(0.619)
Employees	-0.093	-0.093	-0.227	-0.065	0.156	-0.749
	(0.316)	(0.316)	(0.369)	(0.318)	(0.135)	(0.669)
Leverage	0.938**	0.968**	0.937**	0.940**	0.057	0.422
	(0.388)	(0.389)	(0.389)	(0.370)	(0.223)	(0.674)
GCD	3.603	3.620	3.436		4.110	-11.276
	(4.759)	(4.783)	(4.785)		(3.744)	(20.067)
Domestic		-0.014				
		(0.285)				
SME			-0.795			
			(0.709)			
Low GCD				-0.540		
				(0.663)		
Anglo-Saxon					-0.203	
					(0.319)	
Industry						0.000
						(0.000)
Constant	1.073	0.947	1.826	4.574	-0.442	15.748
	(5.893)	(6.094)	(5.964)	(6.347)	(1.940)	(12.839)
Observations	3,427	3,411	3,427	3,508	2,220	1,556
R-squared	0.186	0.186	0.186	0.186	0.008	0.179
Firm FE	Yes	Yes	Yes	Yes	No	Yes
Country FE	Yes	No	Yes	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

*Statistical significance at 1%, 5%, and 10% levels are denoted by the symbols ***, **, and * respectively.*

Table D.3: OLS regression results on Operating Margin

The following table present the estimates of equation [5.1] predicting the Return on Assets performance indicator. Columns 1 to 6 represent each hypothesis accordingly confined to its particular measure.

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Operating Margin					
After	-0.258	-0.256	-0.261	-0.254	-0.863*	0.031
	(0.227)	(0.233)	(0.227)	(0.222)	(0.447)	(0.069)
Size	-0.755	-0.798	-0.740	-0.724	0.194	-0.255
	(0.540)	(0.573)	(0.529)	(0.511)	(0.232)	(0.180)
Employees	-0.320	-0.316	-0.429	-0.331	-0.673*	-0.094
	(0.307)	(0.306)	(0.379)	(0.311)	(0.381)	(0.121)
Leverage	-0.104	-0.087	-0.118	-0.102	-0.110	-0.469
	(0.483)	(0.490)	(0.478)	(0.449)	(0.447)	(0.455)
GCD	-0.118	-0.005	-0.309		1.224	-0.969
	(1.201)	(1.175)	(1.129)		(1.967)	(2.147)
Domestic		0.148				
		(0.124)				
SME			-0.653			
			(0.479)			
Low GCD				-0.080		
				(0.073)		
Anglo-Saxon					0.257*	
					(0.569)	
Industry						0.000
						(0.000)
Constant	16.890	17.551	17.690	16.355	1.159	6.738**
	(10.500)	(11.124)	(11.029)	(10.362)	(3.515)	(3.000)
Observations	3,278	3,263	3,278	3,358	1,956	1,495
R-squared	0.423	0.423	0.423	0.423	0.026	0.296
Firm FE	Yes	Yes	Yes	Yes	No	Yes
Country FE	Yes	No	Yes	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

*Statistical significance at 1%, 5%, and 10% levels are denoted by the symbols ***, **, and * respectively.*

Table D.4: OLS regression results on Sales Growth

The following table present the estimates of equation [5.1] predicting the Return on Assets performance indicator. Columns 1 to 6 represent each hypothesis accordingly confined to its particular measure.

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Sales Growth					
After	0.045	0.047	0.044	0.047	-0.022	-0.066
	(0.059)	(0.060)	(0.059)	(0.058)	(0.063)	(0.083)
Size	0.138	0.205	0.142	0.211	-0.087***	0.193
	(0.144)	(0.133)	(0.144)	(0.183)	(0.025)	(0.138)
Employees	0.021	0.009	-0.010	-0.018	0.008	0.233
	(0.152)	(0.152)	(0.166)	(0.163)	(0.025)	(0.163)
Leverage	-0.047	-0.083	-0.052	-0.045	-0.058	-0.183
	(0.086)	(0.079)	(0.084)	(0.080)	(0.059)	(0.180)
GCD	-0.628	-0.694	-0.683		1.144**	2.112
	(0.542)	(0.542)	(0.535)		(0.549)	(2.672)
Domestic		-0.040				
		(0.038)				
SME			-0.187			
			(0.194)			
Low GCD				0.032		
				(0.056)		
Anglo-Saxon					0.128	
					(0.117)	
Industry						-0.000
						(0.000)
Constant	-2.156	-3.246	-1.925	-3.565	1.028***	-5.013**
	(2.316)	(2.148)	(2.302)	(2.910)	(0.363)	(2.375)
Observations	2,738	2,724	2,738	2,808	1,538	1,300
R-squared	0.265	0.269	0.266	0.264	0.059	0.270
Firm FE	Yes	Yes	Yes	Yes	No	Yes
Country FE	Yes	No	Yes	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

*Statistical significance at 1%, 5%, and 10% levels are denoted by the symbols ***, **, and * respectively.*

Table D.5: OLS regression results on Intellectual Property

The following table present the estimates of equation [5.1] predicting the Return on Assets performance indicator. Columns 1 to 6 represent each hypothesis accordingly confined to its particular measure.

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Intellectual Property					
After	-1.884	-2.064	-1.988	-1.888	-1.929	-0.034
	(1.988)	(2.093)	(2.034)	(1.950)	(1.587)	(0.338)
Size	-1.620	-1.677	-1.673	-1.477	0.079	0.252
	(2.329)	(2.332)	(2.398)	(2.104)	(0.307)	(0.504)
Employees	-0.752	-0.734	1.660	-0.769	0.536	0.101
	(0.777)	(0.768)	(1.814)	(0.803)	(0.572)	(0.279)
Leverage	1.387	1.452	1.362	1.157	0.460	-0.285
	(1.021)	(1.030)	(1.087)	(0.962)	(0.814)	(0.362)
GCD	-4.121	-8.589	-6.242		-15.030	1.380
	(9.738)	(8.122)	(10.225)		(13.179)	(13.602)
Domestic		2.188				
		(2.102)				
SME			14.128			
			(13.323)			
Low GCD				0.563		
				(0.399)		
Anglo-Saxon					1.871	
					(1.350)	
Industry						-0.000
						(0.000)
Constant	38.256	40.807	19.593	33.460	3.282	-4.958
	(46.438)	(47.736)	(30.500)	(44.071)	(2.619)	(10.790)
Observations	1,551	1,542	1,551	1,566	1,378	449
R-squared	0.126	0.127	0.131	0.126	0.007	0.222
Firm FE	Yes	Yes	Yes	Yes	No	Yes
Country FE	Yes	No	Yes	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

*Statistical significance at 1%, 5%, and 10% levels are denoted by the symbols ***, **, and * respectively.*

E

Intercept Results

This Appendix presents the improvement in performance using the intercept model. All variables are Industry, Size, and Prior-performance adjusted. The performance indicators are are described in chapter 4. The prior- and post-acquisition changes are relative to the book value of assets. Performance indicators denoted as [a] refer to the Domestic deals, Small & Medium enterprises, Low Cultural Distance, Angelo-Saxon countries and firms active in the same industry. In contrast, performance indicators denoted as [b] refer to Cross-border deals, Large enterprises, and Medium/Large Cultural Distance, Rhineland countries and firms not active in the same industry. Significance: * 10%, ** 5%, *** 1% respectively using a Wilcox-on signed ranks test. In total there are 6 different panels representing the different hypothesis discussed in chapter 3.

In total there are six different tables. The first three tables present the Return on Assets and Operating Margin for six different panels each representing a different hypothesis. The last three tables represent the Net Profit and Sales growth.

Table E.1: M&A intercept on target firm performance

The following table presents the improvement in performance using the intercept model with respect to Panel A & B. Performance indicators denoted as [a] refer to the Domestic deals, while performance indicators denoted as [b] refer to Cross-border deals.

		Industry, Size and Prior-performance Adjusted Performance (ISPAP)			
		[a]	[b]	[a]	[b]
	Year	Return on Assets %	Return on Assets %	Operating Margin %	Operating Margin %
Panel A: sample median prior and post-takeover performance measures - H1					
	-1	-0.41		2.46	
	1	-2.96		4.10	
	2	-1.17		-2.85	
	3	-0.71		-1.74	
Median Annual Post-Performance		-2.21		0.36	
Post median less prior		-2.86***		-2.24*	
Panel B: sample median prior and post-takeover performance measures comparing Domestic [a] versus Cross-border [b] deals - H2					
	-1	-0.53	-0.14	-2.39	3.29
	1	-3.52	-3.08	5.21	2.24
	2	-2.35	-0.15	2.07	-6.49
	3	5.51	-3.14	-3.20	-0.40
Median Annual Post-Performance		-0.96	-2.58	0.54	-1.16
Post median less prior		-0.42	-2.44***	2.93***	-4.45

*Statistical significance p<0.01, p<0.05, and p<0.1 levels are denoted by the symbols ***, **, and * respectively.*

Table E.2: M&A intercept on target firm performance

The following table presents the improvement in performance using the intercept model with respect to Panel C & D. Performance indicators denoted as [a] refer to Small & Medium enterprises, and Low Cultural Distances. In contrast, performance indicators denoted as [b] refer to Large enterprises, and Medium/Large Cultural Distances.

		Industry, Size and Prior-performance Adjusted Performance (ISPAP)			
		[a]	[b]	[a]	[b]
		Return on Assets %	Return on Assets %	Operating Margin %	Operating Margin %
Panel C: Large high-tech enterprise targets exhibit greater performance improvement than small and medium high-tech targets after the acquisition - H3					
	-1	-0.44	0.21	0.05	-7.94
	1	-3.93	-2.27	6.42	-1.58
	2	-2.33	-1.21	-9.22	4.62
	3	-1.39	-0.53	-4.83	1.19
Median Annual Post-Performance		-2.99	-1.12	-0.61	-1.69
Post median less prior		-2.55***	-1.33***	-0.63	6.25
Panel D: Acquisitions represented by low levels of cultural distance result in greater performance compared to Mergers & Acquisitions represented by medium or high levels of cultural distance - H4					
	-1	-0.14	-0.60	4.22	-0.69
	1	-3.16	-1.91	3.58	5.77
	2	-2.00	0.43	-3.25	-9.64
	3	-0.83	1.27	-3.72	2.57
Median Annual Post-Performance		-2.82	0.24	0.22	-1.66
Post median less prior		-2.68***	0.74*	-3.99	-0.96

*Statistical significance p<0.01, p<0.05, and p<0.1 levels are denoted by the symbols ***, **, and * respectively.*

Table E.3: M&A intercept on target firm performance

The following table presents the improvement in performance using the intercept model with respect to Panel E & F. Performance indicators denoted as [a] refer to the Angelo-Saxon countries and firms active in the same industry. In contrast, performance indicators denoted as [b] refer to the Rhineland countries and firms not active in the same industry.

		Industry, Size and Prior-performance Adjusted Performance (ISPAP)			
		[a]	[b]	[a]	[b]
		Return on Assets %	Return on Assets %	Operating Margin %	Operating Margin %
Panel E: Mergers & Acquisitions in the Anglo-Saxon region exhibit greater performance improvement compared to Mergers & Acquisitions in the Rhineland region - H5					
	-1	-1.63	-0.50	-0.68	9.11
	1	-2.34	-6.45	2.64	7.37
	2	-0.62	-4.47	0.62	-3.23
	3	2.98	-2.11	-1.31	2.05
Median Annual Post-Performance		-0.62	-4.77	5.11	4.61
Post median less prior		0.99**	-4.27***	5.80*	-4.48
Panel F: Mergers & Acquisitions in the same industry achieve greater performance improvement compared to Mergers & Acquisitions across industries - H6					
	-1	0.03	-0.18	-10.5	-2.07
	1	0.26	-3.70	-1.24	1.84
	2	0.02	-1.99	-7.75	4.48
	3	0.31	-0.18	-11.8	1.14
Median Annual Post-Performance		-2.05	-2.59	-5.08	1.51
Post median less prior		-2.08	-2.40**	-5.42	3.59

*Statistical significance p<0.01, p<0.05, and p<0.1 levels are denoted by the symbols ***, **, and * respectively.*

Table E.4: M&A intercept on target firm performance

The following table presents the improvement in performance using the intercept model with respect to Panel A & B. Performance indicators denoted as [a] refer to the Domestic deals, while performance indicators denoted as [b] refer to Cross-border deals.

		Industry, Size and Prior-performance Adjusted Performance (ISPAP)			
		[a]	[b]	[a]	[b]
		Net Profit	Net Profit	Sales Growth	Sales Growth
		%	%	%	%
Panel A: sample median prior and post-takeover performance measures - H1					
	-1	2.83		-4.44	
	1	-11.4		-3.01	
	2	-1.28		-0.39	
	3	4.46		-3.39	
Median Annual Post-Performance		-5.52		-2.62	
Post median less prior		-2.27***		-1.82**	
Panel B: sample median prior and post-takeover performance measures comparing Domestic [a] versus Cross-border [b] deals - H2					
	-1	2.53	-3.67	-8.08	-5.20
	1	-0.478	-17.4	-3.85	-6.14
	2	-1.26	-1.30	-14.9	-2.36
	3	3.193	1.27	-7.27	-6.43
Median Annual Post-Performance		0.65	-7.67	-7.14	-5.84
Post median less prior		-1.87**	-4.00	0.93	-0.63

*Statistical significance p<0.01, p<0.05, and p<0.1 levels are denoted by the symbols ***, **, and * respectively.*

Table E.5: M&A intercept on target firm performance

The following table presents the improvement in performance using the intercept model with respect to Panel C & D. Performance indicators denoted as [a] refer to Small & Medium enterprises, and Low Cultural Distances. In contrast, performance indicators denoted as [b] refer to Large enterprises, and Medium/Large Cultural Distances.

		Industry, Size and Prior-performance Adjusted Performance (ISPAP)			
		[a]	[b]	[a]	[b]
		Net Profit	Net Profit	Sales Growth	Sales Growth
		%	%	%	%
Panel C: Large high-tech enterprise targets exhibit greater performance improvement than small and medium high-tech targets after the acquisition - H3					
	-1	-1.53	-15.1	-7.36	-4.00
	1	-12.1	-6.92	-1.77	-5.53
	2	-3.57	19.6	-1.29	-0.96
	3	13.5	-7.44	-1.65	-4.29
Median Annual Post-Performance		-3.61	-1.05	-1.86	-2.69
Post median less prior		-2.07	14.1	5.49*	1.31
Panel D: Acquisitions represented by low levels of cultural distance result in greater performance compared to Mergers & Acquisitions represented by medium or high levels of cultural distance - H4					
	-1	1.88	-13.9	-5.83	-7.01
	1	-7.10	-19.5	-4.39	-0.32
	2	3.82	-3.47	-2.02	0.20
	3	13.4	1.56	-1.26	-3.71
Median Annual Post-Performance		-0.59	-7.22	-3.22	-0.68
Post median less prior		-2.48	6.74**	2.61*	6.33

*Statistical significance p<0.01, p<0.05, and p<0.1 levels are denoted by the symbols ***, **, and * respectively.*

Table E.6: M&A intercept on target firm performance

The following table presents the improvement in performance using the intercept model with respect to Panel E & F. Performance indicators denoted as [a] refer to the Angelo-Saxon countries and firms active in the same industry. In contrast, performance indicators denoted as [b] refer to the Rhineland countries and firms not active in the same industry.

		Industry, Size and Prior-performance Adjusted Performance (ISPAP)			
		[a]	[b]	[a]	[b]
		Net Profit	Net Profit	Sales Growth	Sales Growth
		%	%	%	%
Panel E: Mergers & Acquisitions in the Anglo-Saxon region exhibit greater performance improvement compared to Mergers & Acquisitions in the Rhineland region - H5					
	-1	-10.8	-13.4	-2.62	-5.74
	1	-5.10	-21.2	-21.6	-2.14
	2	5.22	-9.84	0.42	0.81
	3	13.8	8.51	-0.62	-2.69
Median Annual Post-Performance		-2.75	-13.2	-5.31	-5.11
Post median less prior		8.07	0.16	-2.69	0.64
Panel F: Mergers & Acquisitions in the same industry achieve greater performance improvement compared to Mergers & Acquisitions across industries - H6					
	-1	-8.44	6.60	-2.30	-0.72
	1	-21.4	3.57	-13.1	-2.54
	2	0.05	4.23	-14.3	0.04
	3	-20.2	12.9	-24.1	-0.97
Median Annual Post-Performance		-12.3	-2.83	-12.4	-2.41
Post median less prior		-3.87	-9.44***	-10.1	-1.69*

*Statistical significance p<0.01, p<0.05, and p<0.1 levels are denoted by the symbols ***, **, and * respectively.*

This page is intentionally left blank.

F

Difference-in-Difference Results

This appendix presents all the regressions results on target firm performance from the Difference-in-Difference model. The results are estimates of equation 5.8 predicting the different performance indicators. In each table, column 1 to 5 represent the different performance indicators as discussed in chapter 4. Fixed effects for countries and years are included if the regression proves a 'Yes' accordingly. The After variable is a binary variable that takes the value of 1 if the target firms have been acquired and 0 if they have not been acquired. The AF variable takes the value of 1 for target firms and 0 if the firms were no targets. Standard errors are clustered at target,firm level. Significance: * 10%, ** 5%, *** 1% respectively using a Wilcoxon signed ranks test. In total there are 6 different tables representing;

1. Hypothesis 1 → High-tech Target firm performance increases after the acquisitions.
2. Hypothesis 2 → Domestic Mergers & Acquisitions outperform cross-border deals post the acquisition.
3. Hypothesis 3 → Large high-tech enterprise targets exhibit greater performance improvement than small and medium high-tech targets after the acquisition.
4. Hypothesis 4 → Mergers & Acquisitions represented by low levels of cultural distance result in greater performance than Mergers & Acquisitions represented by medium or high levels of cultural distance.
5. Hypothesis 5 → Mergers & Acquisitions in the Anglo-Saxon region exhibit greater performance improvement than Mergers & Acquisitions in the Rhineland region.
6. Hypothesis 6 → Mergers & Acquisitions in the same industry achieve greater performance improvement than Mergers & Acquisitions across industries

Table F.1: H1: Difference-in-Difference model

The following table presents the Difference-in-Difference method confined to the first hypothesis; High-tech Target firm performance increases after the acquisitions. All regressions include Year and Country fixed effects. The After variable is a binary variable that takes the value of 1 if the target firms have been acquired and 0 if they have not been acquired. The AF variable takes the value of 1 for target firms and 0 if the firms were no targets. Standard errors are clustered at target,firm level. Significance: * 10%, ** 5%, *** 1% respectively using a Wilcoxon signed ranks test.

Variables	(1) Return on Assets	(2) Operating Margin	(3) Net Profit	(4) Sales Growth	(5) Intellectual Property
After	0.007	-0.027**	0.112	-0.111	16.851
	(0.011)	(0.022)	(0.210)	(0.288)	(17.017)
AF	-0.015*	0.023	-0.397**	0.096	6.897
	(0.008)	(0.025)	(0.162)	(0.212)	(4.422)
AF * after	0.009	-0.015*	0.114	-0.556*	-22.322
	(0.013)	(0.029)	(0.266)	(0.306)	(17.877)
Size	0.009***	0.074***	-0.029	0.209***	0.314
	(0.003)	(0.013)	(0.051)	(0.061)	(0.500)
Employees	0.004**	-0.105***	-0.058	0.300***	0.975
	(0.002)	(0.015)	(0.055)	(0.109)	(0.663)
Leverage	-0.142***	0.014	-0.031	0.094	1.395
	(0.035)	(0.020)	(0.061)	(0.072)	(1.397)
Constant	-0.099*	0.319**	0.977	-4.064***	-14.501
	(0.053)	(0.157)	(0.739)	(0.980)	(11.324)
Observations	14,075	12,142	10,212	8,564	1,521
R-squared	0.108	0.085	0.004	0.037	0.031
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

*Statistical significance p<0.01, p<0.05, and p<0.1 levels are denoted by the symbols ***, **, and * respectively.*

Table F.2: H2: Difference-in-Difference model

The following table presents the Difference-in-Difference method confined to the second hypothesis; Domestic Mergers & Acquisitions outperform cross-border deals post the acquisition.

Variables	(1) Return on Assets	(2) Operating Margin	(3) Net Profit	(4) Sales Growth	(5) Intellectual Property
After	0.006	-0.005	0.173	-0.110	10.856
	(0.012)	(0.025)	(0.209)	(0.286)	(11.139)
AF Domestic	0.003	0.014	-0.474**	0.506*	5.756*
	(0.013)	(0.026)	(0.229)	(0.305)	(3.402)
AF Cross-border	0.004	-0.006	-0.072	-0.172	7.851
	(0.011)	(0.031)	(0.202)	(0.256)	(4.764)
AF Domestic * after	0.013	-0.050	0.315	-0.904**	-14.872
	(0.016)	(0.032)	(0.392)	(0.398)	(11.822)
AF Crossborder * after	0.007	-0.064**	-0.237	-0.322	-16.644
	(0.016)	(0.032)	(0.306)	(0.340)	(11.855)
Size	0.010***	0.073***	-0.028	0.222***	0.357
	(0.003)	(0.013)	(0.051)	(0.061)	(0.471)
Employees	0.004*	-0.105***	-0.058	0.297***	1.069
	(0.002)	(0.015)	(0.056)	(0.109)	(0.676)
Leverage	-0.142***	0.015	-0.029	0.096	1.429
	(0.035)	(0.020)	(0.061)	(0.073)	(1.386)
Constant	-0.122**	0.348**	0.879	-4.266***	-16.080
	(0.055)	(0.159)	(0.735)	(0.993)	(11.041)
Observations	14,075	12,142	10,212	8,564	1,521
R-squared	0.107	0.085	0.004	0.037	0.030
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

*Statistical significance p<0.01, p<0.05, and p<0.1 levels are denoted by the symbols ***, **, and * respectively.*

Table F.3: H3: Difference-in-Difference model

The following table presents the Difference-in-Difference method confined to the third hypothesis; Large high-tech enterprise targets exhibit greater performance improvement than small and medium high-tech targets after the acquisition.

Variables	(1) Return on Assets	(2) Operating Margin	(3) Net Profit	(4) Sales Growth	(5) Intellectual Property
After	0.008	-0.016	0.226	-0.151	14.544
	(0.011)	(0.021)	(0.197)	(0.253)	(14.445)
AF SME	-0.011	0.053	-0.179	0.361	9.540
	(0.013)	(0.035)	(0.212)	(0.267)	(6.126)
AF LE	-0.012	-0.020	-0.191	-1.515***	6.192
	(0.011)	(0.029)	(0.318)	(0.394)	(4.196)
AF SME * After	0.008	-0.081**	-0.289	-0.504	-19.355
	(0.016)	(0.041)	(0.311)	(0.334)	(15.110)
AF LE * After	0.015	0.010	0.419	-0.484	-20.224
	(0.016)	(0.025)	(0.425)	(0.366)	(15.684)
Size	0.010***	0.074***	-0.017	0.231***	0.386
	(0.003)	(0.013)	(0.051)	(0.061)	(0.528)
Employees	0.004*	-0.104***	-0.071	0.367***	1.479**
	(0.002)	(0.015)	(0.056)	(0.116)	(0.697)
Leverage	-0.142***	0.014	-0.032	0.086	1.212
	(0.035)	(0.020)	(0.061)	(0.070)	(1.186)
Constant	-0.111**	0.325**	0.700	-4.684***	-19.799
	(0.052)	(0.160)	(0.737)	(1.022)	(14.244)
Observations	14,075	12,142	10,212	8,564	1,521
R-squared	0.108	0.086	0.004	0.042	0.032
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

*Statistical significance p<0.01, p<0.05, and p<0.1 levels are denoted by the symbols ***, **, and * respectively.*

Table F.4: H4: Difference-in-Difference model

The following table presents the Difference-in-Difference method confined to the fourth hypothesis; Mergers & Acquisitions represented by low levels of cultural distance result in greater performance than Mergers & Acquisitions represented by medium or high levels of cultural distance.

Variables	(1) Return on Assets	(2) Operating Margin	(3) Net Profit	(4) Sales Growth	(5) Intellectual Property
After	0.010	-0.021	0.191	-0.058	13.644
	(0.012)	(0.023)	(0.210)	(0.287)	(13.990)
AF Low GCD	0.002	0.010	-0.376	-0.176	5.014
	(0.013)	(0.032)	(0.235)	(0.281)	(3.170)
AF MH GCD	-0.015	0.028	-0.074	0.384	9.060*
	(0.011)	(0.030)	(0.196)	(0.267)	(5.481)
AF Low GCD * After	0.007	-0.043	0.183	-0.504	-16.270
	(0.016)	(0.036)	(0.349)	(0.367)	(14.257)
AF MH GCD * After	-0.010	-0.008	-0.215	-0.647*	-22.569
	(0.017)	(0.038)	(0.323)	(0.353)	(15.967)
Size	0.009***	0.074***	-0.021	0.215***	0.237
	(0.003)	(0.013)	(0.051)	(0.061)	(0.471)
Employees	0.004**	-0.105***	-0.062	0.297***	0.995
	(0.002)	(0.015)	(0.056)	(0.109)	(0.649)
Fin_leverage	-0.142***	0.014	-0.028	0.096	1.423
	(0.035)	(0.020)	(0.060)	(0.072)	(1.373)
Constant	-0.106**	0.325**	0.738	-4.192***	-13.184
	(0.053)	(0.158)	(0.733)	(0.984)	(10.195)
Observations	14,075	12,142	10,212	8,564	1,521
R-squared	0.108	0.085	0.004	0.037	0.033
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

*Statistical significance p<0.01, p<0.05, and p<0.1 levels are denoted by the symbols ***, **, and * respectively.*

Table F.5: H5: Difference-in-Difference model

The following table presents the Difference-in-Difference method confined to the fifth hypothesis; Mergers & Acquisitions in the Anglo-Saxon region exhibit greater performance improvement than Mergers & Acquisitions in the Rhineland region.

Variables	(1) Return on Assets	(2) Operating Margin	(3) Net Profit	(4) Sales Growth	(5) Intellectual Property
After	0.008	-0.017	0.087	-0.241	3.074
	(0.011)	(0.020)	(0.182)	(0.227)	(4.244)
AF Anglo-Saxon	-0.032**	0.136***	-0.497**	0.470	4.750
	(0.014)	(0.041)	(0.225)	(0.317)	(3.095)
AF Rhineland	0.047**	0.054	0.011	2.718*	1.281
	(0.021)	(0.075)	(0.296)	(1.507)	(1.113)
AF Anglo-Saxon * After	0.004	-0.084*	0.394	-0.265	-9.698*
	(0.017)	(0.046)	(0.361)	(0.385)	(5.637)
AF Rhineland * After	-0.017	-0.126	-0.060	-3.595**	-7.041
	(0.025)	(0.077)	(0.421)	(1.558)	(5.216)
Size	0.008***	0.062***	-0.004	0.246***	0.325
	(0.002)	(0.011)	(0.043)	(0.052)	(0.489)
Employees	0.005**	-0.089***	-0.073	0.238**	0.978
	(0.002)	(0.013)	(0.045)	(0.094)	(0.699)
Leverage	-0.142***	0.017	-0.012	0.080	1.378
	(0.034)	(0.019)	(0.061)	(0.073)	(1.451)
Constant	-0.092*	0.449***	0.490	-4.498***	-11.328
	(0.049)	(0.136)	(0.631)	(0.920)	(8.638)
Observations	14,075	12,142	10,212	8,564	1,521
R-squared	0.098	0.059	0.003	0.029	0.023
Country FE	No	No	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes

*Statistical significance p<0.01, p<0.05, and p<0.1 levels are denoted by the symbols ***, **, and * respectively.*

Table F.6: H6: Difference-in-Difference model

The following table presents the Difference-in-Difference method confined to the sixth hypothesis; Mergers & Acquisitions in the Anglo-Saxon region exhibit greater performance improvement than Mergers & Acquisitions in the Rhineland region.

Variables	(1) Return on Assets	(2) Operating Margin	(3) Net Profit	(4) Sales Growth	(5) Intellectual Property
After	0.010	-0.029	-0.029	-0.608***	-3.580
	(0.010)	(0.020)	(0.181)	(0.195)	(3.724)
AF Industry	0.011	-0.079***	-0.982*	-0.421	0.305
	(0.044)	(0.020)	(0.556)	(0.381)	(2.146)
AF ~~Industry~~	0.015	-0.002	-0.232	-0.649***	-1.271
	(0.013)	(0.025)	(0.247)	(0.171)	(1.982)
AF Industry * After	-0.005	0.025	1.147	0.308	-1.696
	(0.041)	(0.026)	(0.828)	(0.584)	(3.538)
AF ~~Industry~~ * After	0.001	-0.033	0.330	0.409	0.890
	(0.015)	(0.031)	(0.365)	(0.281)	(2.450)
Size	0.010***	0.072***	-0.049	0.220***	0.332
	(0.003)	(0.012)	(0.052)	(0.059)	(0.434)
Employees	0.004*	-0.108***	-0.034	0.222**	0.956
	(0.002)	(0.015)	(0.058)	(0.093)	(0.642)
Leverage	-0.141***	0.009	-0.036	0.033	1.401
	(0.035)	(0.019)	(0.062)	(0.066)	(1.348)
Constant	-0.121**	0.390***	1.056	-3.707***	-8.085
	(0.053)	(0.149)	(0.748)	(0.893)	(7.169)
Observations	14,058	12,118	10,209	8,542	1,521
R-squared	0.104	0.091	0.005	0.027	0.024
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

*Statistical significance p<0.01, p<0.05, and p<0.1 levels are denoted by the symbols ***, **, and * respectively.*

This page is intentionally left blank.

G

Robustness Check Results

This appendix presents all the regressions results on target firm performance from the Robustness Check. Significance: * 10%, ** 5%, *** 1% respectively using a Wilcoxon signed ranks test. In total there are seven different tables representing;

- **Table G.1** Present the Results of the OLS Regression without control variable and fixed effects for hypothesis 1 and 2.
- **Table G.2** Present the Results of the OLS Regression without control variable and fixed effects for hypothesis 3 and 4.
- **Table G.3** Present the Results of the OLS Regression without control variable and fixed effects for hypothesis 5 and 6.
- **Table G.4** Present the Results of the OLS Regression with the inclusion of the moderating effect.
- **Table G.5** Present the Results of the OLS Regression on the difference between Mergers and Acquisitions
- **Table G.6** Present the Results of the OLS Regression on the performance of Mergers
- **Table G.7** Present the Results of the OLS Regression on the performance of Acquisitions

Table G.1: Case 1: OLS Regression without Control Variables and Fixed Effects [H1] & [H2]

The following table presents the results of the first and second hypothesis regarding the first case in the robustness check, where all the control variable and fixed effect have been excluded.

Variables	(1) Return on Assets	(2) Operating Margin	(3) Net Profit	(4) Sales Growth	(5) Intellectual Property
Hypothesis 1: High-tech Target firm performance increases after the acquisitions.					
After	0.010	-0.106	-0.119***	-0.079***	-0.713
	(0.007)	(0.183)	(0.020)	(0.030)	(0.977)
Constant	0.002	-0.100	1.213***	0.185***	1.371**
	(0.004)	(0.114)	(0.012)	(0.018)	(0.560)
Observations	4,834	4,080	3,780	3,107	1,870
R-squared	0.000	0.000	0.009	0.002	0.000
Hypothesis 2:Domestic Mergers & Acquisitions outperform cross-border deals post the acquisition.					
After	0.011	-0.105	-0.123***	-0.073**	-0.640
	(0.007)	(0.184)	(0.020)	(0.030)	(0.990)
Domestic	0.002	-0.008	0.016	0.015	-1.067
	(0.007)	(0.189)	(0.021)	(0.031)	(1.014)
Constant	0.005	-0.102	1.205***	0.173***	1.661***
	(0.005)	(0.133)	(0.014)	(0.021)	(0.628)
Observations	4,803	4,060	3,756	3,092	1,855
R-squared	0.000	0.000	0.010	0.002	0.001

*Statistical significance p<0.01, p<0.05, and p<0.1 levels are denoted by the symbols ***, **, and * respectively.*

Table G.2: Case 1: OLS Regression without Control Variables and Fixed Effects [H3] & [H4]

The following table presents the results of the third and fourth hypothesis regarding the first case in the robustness check, where all the control variable and fixed effect have been excluded.

Variables	(1) Return on Assets	(2) Operating Margin	(3) Net Profit	(4) Sales Growth	(5) Intellectual Property
Hypothesis 3: Large high-tech enterprise targets exhibit greater performance improvement than small and medium high-tech targets after the acquisition.					
After	0.013*	-0.067	-0.127***	-0.085***	-0.714
	(0.007)	(0.184)	(0.020)	(0.030)	(1.016)
SME	-0.056***	-0.227	0.156***	0.102***	-0.210
	(0.008)	(0.206)	(0.021)	(0.032)	(0.975)
Constant	0.042***	0.058	1.106***	0.115***	1.517*
	(0.007)	(0.188)	(0.019)	(0.029)	(0.789)
Observations	4,786	4,042	3,780	3,107	1,793
R-squared	0.010	0.000	0.024	0.006	0.000
Hypothesis 4: Mergers & Acquisitions represented by low levels of cultural distance result in greater performance than Mergers & Acquisitions represented by medium or high levels of cultural distance.					
After	0.011	-0.108	-0.117***	-0.081***	-0.529
	(0.007)	(0.184)	(0.020)	(0.030)	(0.989)
Low GCD	-0.008	0.026	-0.057***	0.047	-1.130
	(0.007)	(0.179)	(0.019)	(0.029)	(0.931)
Constant	0.007	-0.113	1.242***	0.161***	1.834***
	(0.006)	(0.146)	(0.015)	(0.024)	(0.678)
Observations	4,834	4,080	3,780	3,107	1,870
R-squared	0.001	0.000	0.012	0.003	0.001

*Statistical significance p<0.01, p<0.05, and p<0.1 levels are denoted by the symbols ***, **, and * respectively.*

Table G.3: Case 1: OLS Regression without Control Variables and Fixed Effects [H5] & [H6]

The following table presents the results of the fifth and sixth hypothesis regarding the first case in the robustness check, where all the control variable and fixed effect have been excluded.

Variables	(1) Return on Assets	(2) Operating Margin	(3) Net Profit	(4) Sales Growth	(5) Intellectual Property
Hypothesis 5: Mergers & Acquisitions in the Anglo-Saxon region exhibit greater performance improvement than Mergers & Acquisitions in the Rhineland region.					
After	-0.000	-0.175	-0.195***	-0.053	-0.654
	(0.010)	(0.219)	(0.032)	(0.041)	(1.170)
Anglo-Saxon	-0.008	-0.221	0.002	0.254***	1.038
	(0.009)	(0.217)	(0.041)	(0.054)	(1.185)
Constant	0.009	0.034	1.297***	-0.063	0.719
	(0.009)	(0.196)	(0.041)	(0.054)	(1.096)
Observations	3,281	2,681	2,259	1,739	1,601
R-squared	0.000	0.001	0.017	0.015	0.001
Hypothesis 6: Mergers & Acquisitions in the same industry achieve greater performance improvement than Mergers & Acquisitions across industries					
After	0.014	0.164	-0.093***	-0.082**	-0.163
	(0.010)	(0.272)	(0.025)	(0.041)	(0.164)
Industry	0.006	-0.203	-0.105***	-0.068	-0.041
	(0.013)	(0.345)	(0.034)	(0.055)	(0.237)
Constant	0.009	-0.152	1.183***	0.218***	0.606***
	(0.006)	(0.177)	(0.016)	(0.026)	(0.106)
Observations	2,124	1,868	1,751	1,514	568
R-squared	0.001	0.000	0.015	0.004	0.002

*Statistical significance p<0.01, p<0.05, and p<0.1 levels are denoted by the symbols ***, **, and * respectively.*

Table G.4: Case 2: OLS Regression with the Inclusion of the Moderating Effect

The following table presents the results of the second case where the effect of M&A has been analysed with the inclusion of moderating effects

Variables	(1) Return on Assets	(2) Operating Margin	(3) Net Profit	(4) Sales Growth	(5) Intellectual Property
After	0.005	0.234	-0.190***	-0.048	-1.948
	(0.016)	(0.350)	(0.049)	(0.068)	(1.586)
Size	0.003	-0.096	0.075	-0.083***	0.090
	(0.003)	(0.076)	(0.062)	(0.022)	(0.330)
Employees	0.010**	0.089	-0.147**	0.010	0.571
	(0.004)	(0.128)	(0.074)	(0.023)	(0.588)
Leverage	-0.219***	0.050	-0.012	-0.032	0.418
	(0.031)	(0.213)	(0.060)	(0.061)	(0.768)
GCD	0.158	2.676	-0.237	1.067	-19.432
	(0.112)	(3.414)	(0.553)	(0.679)	(16.292)
Domestic = 1	0.012	0.272	-0.053	-0.176	-2.154
	(0.022)	(0.374)	(0.232)	(0.176)	(1.674)
Anglo-Rhineland = 1	-0.041**	-0.039	0.061	-0.034	0.998
	(0.021)	(0.376)	(0.101)	(0.103)	(0.750)
Domestic##Anglo-Rhineland	-0.033	-0.661	0.140	0.254	0.731
	(0.032)	(0.620)	(0.214)	(0.188)	(1.055)
Constant	-0.037	-0.372	0.745	1.100***	6.190
	(0.080)	(1.905)	(0.683)	(0.345)	(4.060)
Observations	2,680	2,200	1,945	1,528	1,367
R-squared	0.207	0.006	0.111	0.079	0.008
Firm FE	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes

*Statistical significance at 1%, 5%, and 10% levels are denoted by the symbols ***, **, and * respectively.*

Table G.5: Case 3: OLS Regression Results on Hypothesis 7: Mergers vs. Acquisitions

The following table present the results regarding the difference between mergers and acquisitions as discussed in case 3 of the robustness check. Columns 1 to 5 represent each performance indicators confined to its particular measure.

Variables	(1) Return on Assets	(2) Operating Margin	(3) Net Profit	(4) Sales Growth	(5) Intellectual Property
After	-0.009	0.261	-0.104*	-0.042	-0.254
	(0.011)	(0.314)	(0.053)	(0.049)	(0.181)
Size	0.002	-0.255	0.147	-0.056	-0.134**
	(0.005)	(0.209)	(0.095)	(0.035)	(0.058)
Employees	0.003	0.129	-0.218**	0.025	0.072
	(0.008)	(0.265)	(0.108)	(0.039)	(0.065)
Leverage	-0.253***	-0.114	0.028	0.065	-0.227
	(0.041)	(0.390)	(0.083)	(0.085)	(0.195)
GCD	-0.156	1.218	-0.153	-0.228	-1.405
	(0.127)	(2.964)	(0.316)	(0.427)	(1.784)
Acquisition	-0.001	-0.291	-0.061	0.097	0.024
	(0.015)	(0.368)	(0.055)	(0.067)	(0.174)
Constant	0.164*	3.309	-0.285	0.997**	3.332**
	(0.092)	(2.639)	(1.044)	(0.442)	(1.290)
Observations	1,670	1,489	1,424	1,243	449
R-squared	0.247	0.013	0.165	0.040	0.032
Firm FE	No	No	No	No	No
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

*Statistical significance at 1%, 5%, and 10% levels are denoted by the symbols ***, **, and * respectively.*

Table G.6: Case 3: OLS Regression Results on the Performance of Mergers

The following table presents the results on the effect of M&A on the performance of Mergers. This study distinguishes mergers when then the acquirer is not bigger in the range of 1 to 4 times in contrast to the target firm in terms of total assets. Columns 1 to 5 represent each performance indicators confined to its particular measure.

Variables	(1) Return on Assets	(2) Operating Margin	(3) Net Profit	(4) Sales Growth	(5) Intellectual Property
After	-0.043**	-0.348	0.119	-0.281	-0.229
	(0.021)	(1.015)	(0.109)	(0.182)	(0.400)
Size	0.049**	-2.945*	-0.279	0.114	-1.072
	(0.023)	(1.512)	(0.199)	(0.151)	(0.973)
Employees	-0.013	0.674	0.015	0.031	0.319
	(0.018)	(0.726)	(0.041)	(0.059)	(0.312)
Leverage	-0.142**	-3.683	-0.455	0.180	1.352
	(0.055)	(3.921)	(0.490)	(0.566)	(1.977)
GCD	0.735	38.570**	-0.115	-1.140	-1.389
	(0.772)	(16.660)	(0.798)	(1.494)	(7.041)
Constant	-1.036*	35.047	6.534*	-1.661	19.240
	(0.527)	(27.014)	(3.753)	(2.964)	(18.656)
Observations	513	403	461	352	159
R-squared	0.418	0.202	0.734	0.228	0.248
Firm FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

*Statistical significance at 1%, 5%, and 10% levels are denoted by the symbols ***, **, and * respectively.*

Table G.7: Case 3: OLS Regression Results on the Performance of Acquisitions

The following table presents the results on the effect of M&A on the performance of Acquisitions. This study distinguishes Acquisitions when the acquirer is four time bigger in contrast to the target firm in terms of total assets. Columns 1 to 5 represent each performance indicators confined to its particular measure.

Variables	(1) Return on Assets	(2) Operating Margin	(3) Net Profit	(4) Sales Growth	(5) Intellectual Property
After	-0.007**	0.089	0.042	0.054	0.130
	(0.018)	(0.742)	(0.028)	(0.074)	(0.507)
Size	0.131***	-0.319	-0.004	0.211*	0.698
	(0.029)	(0.803)	(0.033)	(0.115)	(0.642)
Employees	-0.069**	-0.338	-0.051	-0.204*	-0.523
	(0.033)	(1.223)	(0.072)	(0.112)	(0.852)
Leverage	-0.241***	0.623	-0.021	-0.207	-0.505
	(0.039)	(0.519)	(0.043)	(0.153)	(0.656)
GCD	-0.151	-1.034	0.389**	-0.181	-30.801
	(0.141)	(3.488)	(0.195)	(0.980)	(19.574)
Constant	-1.682***	6.712	1.220**	-2.354	4.460
	(0.421)	(10.324)	(0.471)	(1.897)	(4.631)
Observations	1,149	1,053	951	863	255
R-squared	0.733	0.179	0.622	0.322	0.213
Firm FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

*Statistical significance at 1%, 5%, and 10% levels are denoted by the symbols ***, **, and * respectively.*

H

Global Culture Distance Index

The following table presents the total Cultural Distance score per country. The left side of the table shows the European country scores, whereas the right side shows the non- European country scores.

Country [EU]	ISO	GCD Total Score	Country [Non-EU]	ISO	GCD Total Score
Austria	AT	5.66	Canada	CA	4.36
Czech Republic	CZ	4.11	China	CN	4.44
Denmark	DK	4.22	Hong Kong	HK	4.40
Finland	FI	3.81	Japan	JP	4.24
France	FR	4.11	Malaysia	ML	4.58
Germany	DE	4.17	Russia	RU	4.05
Hungary	HU	3.43	Singapore	SG	4.68
Ireland	IE	4.36	South Korea	KR	4.35
Italy	IT	3.58	Taiwan	TW	4.38
Netherlands	NL	4.32	United States of America	USA	4.24
Poland	PL	3.89	United Arab Emirates	UAE	4.15
Portugal	PT	3.60			
Spain	ES	4.01			
Sweden	SE	3.72			
Switzerland	CH	4.94			
United Kingdom	GB	4.08			

Country Name / Societal Practices	Performance Orientation	Assertiveness	Future Orientation	Humane Orientation	Collectivism I Institutional Collectivism	Collectivism II In-group Collectivism	Gender Egalitarianism	Power Distance	Uncertainty Avoidance
Austria	4.44	4.62	4.46	3.72	4.30	4.85	3.09	4.95	5.16
Czech Republic	4.11	3.69	3.63	4.17	3.60	3.18	3.79	3.59	4.44
Denmark	4.22	3.80	4.44	4.44	4.80	3.53	3.93	3.89	5.22
Finland	3.81	3.81	4.24	3.96	4.63	4.07	3.35	4.89	5.02
France	4.11	4.13	3.48	3.40	3.93	4.37	3.64	5.28	4.43
Germany	4.17	4.64	4.11	3.29	3.68	4.27	3.08	5.39	5.19
Greece	3.20	4.58	3.40	3.34	3.25	5.27	3.48	5.40	3.39
Hungary	3.43	4.79	3.21	3.35	3.53	5.25	4.08	5.56	3.12
Ireland	4.36	3.92	3.98	4.96	4.63	5.14	3.21	5.15	4.30
Italy	3.58	4.07	3.25	3.63	3.68	4.94	3.24	5.43	3.79
Netherlands	4.32	4.32	4.61	3.86	4.46	3.70	3.50	4.11	4.70
Poland	3.89	4.06	3.11	3.61	4.53	5.52	4.02	5.10	3.62
Portugal	3.60	3.65	3.71	3.91	3.92	5.51	3.66	5.44	3.91
Slovenia	3.66	4.00	3.59	3.79	4.13	5.43	3.96	5.33	3.76
Spain	4.01	4.42	3.51	3.32	3.85	5.45	3.01	5.52	3.97
Sweden	3.72	3.38	4.39	4.10	5.22	3.66	3.84	4.85	5.32
Switzerland	4.94	4.51	4.73	3.60	4.06	3.97	2.97	4.90	5.37
United Kingdom	4.08	4.15	4.28	3.72	4.27	4.08	3.67	5.15	4.65

Country Name / Societal Practices	Performance Orientation	Assertiveness	Future Orientation	Humane Orientation	Collectivism I Institutional Collectivism	Collectivism II In-group Collectivism	Gender Egalitarianism	Power Distance	Uncertainty Avoidance
Canada	4.49	4.05	4.44	4.49	4.38	4.26	3.70	5.82	4.58
China	4.45	3.76	3.75	4.36	4.77	5.80	3.05	5.04	4.94
Hong Kong	4.80	4.67	4.03	3.90	4.13	5.32	3.47	4.96	4.32
Japan	4.22	3.59	4.29	4.30	5.19	4.63	3.19	5.11	4.07
Malaysia	4.34	3.87	4.58	4.87	4.61	5.51	3.51	5.17	4.78
Russia	3.39	3.68	2.88	3.94	4.50	5.63	4.07	5.52	2.88
Singapore	4.90	4.17	5.07	3.49	4.90	5.64	3.70	4.99	5.31
South Korea	4.55	4.40	3.97	3.81	5.20	5.54	2.50	5.61	3.55
Taiwan	4.56	3.92	3.96	4.11	4.59	5.59	3.18	5.18	4.34
United Arab Emirates	3.45	4.11	3.78	4.42	4.50	4.71	3.63	4.73	3.99
United States	4.49	4.55	4.15	4.17	4.20	4.25	3.34	4.88	4.15