

A Work Project, presented as part of the requirements for the Award of a Master Degree in Management from the NOVA – School of Business and Economics.

Chinese Acquisitions in Germany - Assessing the Short-Term Impact on Profitability on Acquired German Companies

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A B S T R A C T

The level of Chinese Outbound M&A has risen significantly during recent years, with German companies being the main target within Europe. This Work Project explores this phenomenon, by assessing the short-term impact on profitability of acquired German companies pre-acquisition versus post-acquisition, whereby the results show statistically insignificant differences. Moreover, the study portrays the Chinese M&A activity in Germany during the period 2011-2014 and shows that many companies of key German industries were acquired; Private Equity companies played an important role as sellers, and both Chinese acquirers from the same industries as well as from different industries as the target firm were represented.

Key Words: Mergers and Acquisitions, Cross-Border, China, Germany, Financial Statement Analysis

1. Introduction

“China buys up the world” (The Economist, 2010), “China Hits Record High M&A Investments in Western Firms” (Shepard, 2016), “German Angst over Chinese M&A” (Chazan, 2016). These headlines reflect the importance of recent outbound M&A activity of Chinese companies in the Western world. As a matter of fact, the number of deals in Europe has risen drastically, with Germany being the most significant country in terms of quantity of acquisitions by Chinese companies. Whereby, between 2005 and 2010 only six acquisitions of German firms by Chinese companies were conducted in average (Sun & Kron, 2016), this number has reached a record high in 2016 with 56 deals (Heuking, 2017). Besides that, not only has the respective transaction volume multiplied by a large factor, being well below EUR one billion in 2005 vs. EUR nine billion in 2016 (Chazan, 2016), also have the target industries changed substantially. In contrast to before 2010, when large parts of Chinese acquisitions in Germany were targeted at Transportation & Construction, Energy and Industrial Equipment companies, the investment activity of Chinese acquirers has significantly broadened and in recent years also targeted Services Industries such as Information and Communication Technology and the Automotive Sector, which contributes to a very significant part of Chinese acquisitions in Germany since

2011 (Hanemann & Huotari, 2015). Important questions that naturally arise considering this sharp increase, are with respect to the financial situation of acquired German companies pre-*versus* post-acquisition as well as concerning important deal characteristics. Taking into consideration both the sheer size of the number of acquisitions, the total deal volume and the fact that Chinese companies heavily acquire companies that are active in key German industries (e.g. Automotive), the significance of studying this issue is crucial. However, to the best of our knowledge, still it is unknown how Chinese acquisitions affect German companies in terms of profitability in the short term. Thus, this Work Project aims at assessing the short-term impact on profitability of acquired German companies pre-acquisition *versus* post-acquisition.

The Work Project proceeds as follows. Section 2 provides an introduction to M&A (Mergers & Acquisitions) in general and presents drivers of the Chinese M&A activity in Germany from both the Chinese and German perspectives. Section 3 reviews the empirical literature about the effects of M&A activity. Section 4 outlines the research questions, and describes the methodology and data collection as well as the statistical tools applied in the research. Besides that, the section elaborates on the selection of key variables (Revenues, Variable Cost Margin, EBITDA Margin, Return on Assets) for the quantitative analysis and presents the corresponding hypotheses. Section 5 discusses the results of the research. On the one hand, it presents a descriptive summary of the hand-selected data with respect to relevant deal characteristics (such as affected industries, majority vs. minority deals etc.). On the other hand, it shows the results of the analysis of the key variables. Finally, Section 6 concludes and presents an outlook. Besides that, the section gives suggestions for future research.

2. Drivers for recent Chinese acquisition activity in Germany

Mergers and acquisitions are forms of corporate takeovers and are typically referred to as M&A, whereby both transaction types have different characteristics. Acquisitions are defined as purchases of another company or parts of a company and the subsequent integration within the

acquirer's company group. In the case of a merger, two (previously legally independent) companies are combined to a new company, which means that at least one company loses its legal independency (Wirtz, 2003). The reasons to conduct M&A is on the one hand the aim for growth (Hooke, 2014). Increase of revenues can be for instance due to access to more advanced technologies, higher skilled employees, an improved product portfolio as well as cross-selling opportunities or access to new markets (Bamford & Chickerman & Kosmowski, 2012). On the other hand, cost synergies are of major importance in M&A deals and are generally expected to be exploited significantly easier than revenue synergies (Dringoli, 2016) and can be for instance due to the combination of sales forces or relocation of manufacturing facilities to the acquirers (low production cost) country (Weber & Tarba & Oberg, 2014).

To understand what drives the recent developments in Chinese M&A activity in Germany it is, on the one hand, important to understand the major drivers for increase in Chinese outbound acquisition activity, namely economic, and political trends in China. On the other hand, the motivation of German companies to agree on the acquisition by Chinese companies must be analyzed as well.

China's transformation to a market oriented economy

Due to far-reaching reforms in the late 1970s, China has evolved into the world's second largest economy, by becoming a major low cost manufacturing hub and export economy, respectively (The World Bank, 2017). Fact is however that labor costs (in manufacturing) in China have increased (as of 2015) by the factor of four in comparison to 2006, thus endangering China's main competitive advantage (Bulloch, 2017). Besides that, the real estate costs have risen significantly as well due to minimum prices for land imposed by the Chinese government, while costs for electricity are growing at a substantial rate either. Further problematic factors are increased corporate income tax for non-Chinese companies, whereas intellectual property rights also remain to be a main concern for foreign companies. Additionally, other countries (e.g.

Southeast Asian countries like Indonesia and Vietnam) are increasingly becoming more popular as low cost manufacturing hubs for foreign companies), whereas many companies consider relocating production facilities in order to decrease supply chain complexity, as a reaction to e.g. increased volatility of raw material prices (Copulsky & Cutten, 2013). These alterations are also reflected in a decreased growth rate of the Chinese economy (The World Bank, 2015). Consequently, this puts significant pressure on China to change from an emerging to a developed market and to switch from (low cost) manufacturing to a service oriented economy to stay competitive. The composition of the Chinese Gross Domestic Product (GDP) has changed significantly over the last decade, whereas Agriculture accounted for 12.12% in 2005 vs. 9% in 2015, Industry accounted 47.37% in 2005 vs. 40.5% in 2015 and Services accounted for 40.51% in 2005 vs. 50.5% in 2015 (Statista, 2016). This change is also reflected in the foreign direct investment of Chinese companies in Germany, whereby the Chinese investment focuses in Germany has broadened significantly. China's recent overseas investments in both advanced manufacturing as well as services are representative for its officially declared ambition (Made in China 2025) to catch up with developed countries, particularly with respect to intelligent manufacturing, which is also referred to as Industry 4.0 (Wübbeke & Conrad, 2015). In fact, most Chinese manufacturing companies are currently operating on technologically backward processes, while the industry robot to industry worker ratio amounts to about 14 to 10.000 in China vs. 282 to 10.000 in Germany (Sendler, 2013).¹ The need for advanced technology is thus very high, and German companies present highly promising opportunities for Chinese bidders to acquire the necessary the knowledge and assets.

¹ The use of industry robots in the context of manufacturing processes is classified as Industry 3.0, thus most producing Chinese companies are operating according to Industry 2.0, which implies the use of assembling lines and electricity. However, China is currently already the largest sales market for industry robots worldwide, basically due the sheer size of the country (Mercer, 2011).

China's less regulations and greater political incentives

Chinese companies have traditionally been subject to strict regulations with regard to Foreign Direct Investment (FDI). In recent years, they were obliged to go through a rigorous administrative process in order to get approval for an investment (e.g. acquisitions) in a foreign company. However, in the context of the five-year plan from 2011 to 2015, Chinese government loosened these restriction to a great extent to push its agenda of becoming a more innovational and service-oriented country (Hanemann & Huotari, 2015).

China's beneficial financial environment

Chinese companies are furthermore facing very endorsing financial conditions, whereas the People's Bank of China (PBOC) undertook several measures (e.g. lowering of reserve requirement ratio) to grant domestic companies easier to access to financing. This is linked to the agenda of the government to advance China's economy and guaranteeing funds is an important strategic step to enable companies to seize growth opportunities and undertake acquisitions, both internationally and domestically (JP Morgan, 2016).

German's investment rationale: Gaining access to the Chinese market

Between 2011 and 2014, Chinese acquisitions of German companies were mostly in the industrial machinery & industrial products as well as in the automotive industry (Hanemann & Huotari, 2015). In fact, China remains the largest automobile market (in sales terms) in the world as of 2016 and has shown annual double digit growth. The German automobile industry on the other hand, is the number one automotive market (production and sales) in Europe and the largest premium car producer in the world (41%). Besides that, Germany is home to the largest part of Original Equipment Manufacturers (OEM) in Europe, while the countries Original Equipment Manufacturers (OEM) market share was more than 50 per cent in 2015 in relation to Western Europe (Germany Trade & Invest, 2017). The linkage of the German and Chinese automotive industry is extremely strong, whereby for instance Daimler's sales in China

account for 10 per cent of its total sales figure as of 2016 (Daimler Annual Report, 2016). However, acquisitions in the automotive industry do not refer to vehicle producers (with exception in very few cases like Artega), but to OEM. German automotive suppliers are traditionally very strong and broadly positioned in high-quality components, accounting for about 75 per cent of the global premium automotive market (Germany Trade & Invest, 2017). In contrast to that, the Chinese automotive market has long been characterized by large demand for low cost vehicles and rather low quality components, respectively (EU SME Centre, 2015). However, the dynamics in the Chinese automotive market have changed significantly in recent years. Not only has China's upper class increased strongly, but also its middle class is becoming larger. This is affecting the demand for higher priced vehicles positively and consequently creating a massive opportunity for German automotive suppliers to get "a piece of the cake". Thus, German companies raise the question concerning the most effective and efficient way to realize this. Traditionally companies used to enter the Chinese market by means of joint ventures. This form of partnership was partially chosen by companies due to the lack of alternatives in the past with respect to governmental restrictions for inbound M&A in China as well as administrative difficulties for outbound M&A (Hanemann & Huotari, 2015). Since this has now changed (at least referring to Chinese outbound (M&A), partnerships in form of acquisitions by Chinese companies, can offer certain benefits to German companies in comparison to other market entry strategies.

3. Literature Review

This section reviews the literature about M&A and focuses on studies that assessed the impact on the target firm. Additionally, research that deals with Chinese firm as buyers is presented and put in contrast to this Work Project.

The effects of acquisitions on company's financial performance has been intensively discussed in the academic world. The evaluation of the post-acquisition performance is a way for

determining if the aftermath of acquisitions is beneficial for the acquiring firm and the target company. Company transactions are (usually) executed due to supposed synergies between both companies, both revenue or cost synergies, whereby synergies from acquisitions can take long to realize and potentially even result in value destruction. Most studies about the post-acquisition performance have evaluated the impact on the acquirer's performance or focused on merged companies. Few research focused on the impact on acquired firms that continued to operate separately. To the best of our knowledge, no quantitative study has been conducted on the post-acquisition growth and profitability of German companies after being taken over by Chinese companies.

Quantitative M&A studies are typically either event or accounting studies. Event studies are based on the measurement of capital market return (abnormal returns as result of announcement) to shareholders and therefore assess the stock prices of the affected companies. These types of studies were performed by Kaplan & Weisbach (1992), DeLong (2001), Houston et al. (2001), and Eije & Wiegerinck (2010). The latter is a China related event based studies which analyzes abnormal returns on Chinese acquired firms. Accounting based research such as Healy, Palepu & Rubak (1990), Ghosh (2001) and Oosting et al. (2006) use accounting data, collected from the financial reports of merged firms. In this stream of research, Pervan & Višić & Barnjaka (2015) analyzed the performance of target firms. Based in accounting data based methodology, these authors assessed the pre-and post-acquisition performance of companies that continued to exist standalone after the acquisition. With the help of T-Paired-Sample-Tests, the authors evaluated changes of costs and profitability ratios (e.g. EBITDA/Revenues, ROA) and concluded there were no statistically significant differences pre- vs- post-acquisitions regarding all assessed variables.

More recently, empirical studies on cross-border M&A that involved Chinese firms as buyers emerged. Chari & Chen, & Dominguez (2012) examined the effect of acquisitions by

developing-market companies on acquired US firms by means of a difference-in-differences method and propensity score matching. The study analyses accounting figures in order to assess profitability in multiple acquirer countries, but does not focus on China, therefore not allowing for explicit conclusions regarding post-acquisition performance of companies that were acquired by Chinese firms. Sun et. al. (2010) conducted an examination on cross-border M&A by multinational enterprises in China (and India) and created a comparative ownership advantage framework. Especially about China M&A is the research by Zhou & van Witteloostuijn & Zhang (2014), who examined how industrial characteristics in the host country influence overseas acquisition of Chinese companies. Yang & Deng (2015) studied the level of Chinese outbound M&A in advanced countries, and found correlation of macro-level factors (e.g. level of strategic assets). Also, Elia & Santangelo (2015) studied the relationship of the level of outbound M&A activity of multinational companies in China and the innovational capacity of both the acquirers as well as the targets country. Jongwanich & Brooks & Kohpaiboon (2013) analyzed how the financial development in China affects the level of outbound M&A activity. However, to the best of our knowledge, no study was performed concerning the analysis of the acquirees growth and profitability post-acquisition.

The purpose of this Work Project is to determine to what extent the acquisitions by the Chinese companies have affected the profitability of the acquired German companies in the short term (one year after acquisition). Besides that, this Work Project contributes to portraying the acquisition activity of Chinese companies in German between 2011-2014.

4. Methodology, Sample and Data

4.1 Research Questions

The purpose of this Work Project is to analyze how German companies were impacted in terms of profitability in the short term after they were acquired by Chinese companies. Additionally,

this study explores important characteristics of M&A activity of Chinese firms in Germany between 2011 and 2014.

In detail, the specific research questions are the following:

RQ1: Which are the characteristics of acquisitions of German companies by Chinese companies?

RQ2: Do acquisitions by Chinese companies impact the profitability of acquired German companies positively or negatively in the short-term?

The research uses univariate analyses to provide insights about the characteristics of the Chinese acquisition of German companies (RQ1), namely, to which industries those companies belong; if acquirers were from the same industry; if companies were sold out of distressed; if there were any hostile takeovers; what were the stakes acquired; who were the sellers and how were the company valuations. To analyze if acquisitions by Chinese companies create value/synergies in terms of profitability (RQ2), measurement by means of specific key financial variables, namely Revenues Change, Variable Cost Ratio, Earnings before Interest, Taxes, Depreciation and Amortization (EBITDA) Margin, and Return on Assets, for the acquired German firms. With regard to this, both parametric tests (Paired-Sample T-Tests) and non-parametric tests (Wilcoxon-Sign-Rank-Tests) are conducted.

4.2. Variables

To gain a better understanding of the relevance of the considered variables, it is elaborated in the following why certain numbers and ratios were chosen to conduct this analysis and what adjustments were conducted. The corresponding hypotheses are developed as well.

Revenues

Acquisitions by Chinese companies allow German companies to gain access to the Chinese market. For example, by making their distribution network and salesforce available to the products of the German companies, facilitating them access to the Chinese market without the

struggle of setting up their own distribution network in China. Therefore, it is expected that revenues of the acquirees in the post-acquisition scenario are higher than in the pre-acquisition scenario. It is worth notice that all financial reports were reviewed for special effects that might distort the analysis. This is particularly referring to first-time consolidations and M&A activity (besides the Chinese acquisition). This is important since some German companies conducted acquisitions between $t-1$ and $t+1$ or undertook first time consolidations.² To normalize these effects, post-acquisitions revenues data were adjusted accordingly, whereby appropriate adjustments were applied on other influenced figures as well.^{3 4} Thus, in the following, Revenues refer to Normalized Revenues, Variable Cost Ratio refers to Normalized Variable Cost Ratio, EBITDA Margin refers to Normalized EBITDA Margin and ROA refers to Normalized ROA:

The corresponding hypotheses for revenues is as following:

H0: Revenues of acquired German companies have not changed in the post-acquisition scenario

H1: Revenues of acquired German companies have changed in the post-acquisition scenario

Variable Cost Ratio

The Variable Cost Ratio (VCR) captures changes in the costs for raw materials and expenses for procured services by dividing the company's variable manufacturing costs by revenues.

² For instance, Putzmeister Holding GmbH acquired Intermix GmbH and KACO GmbH & Co. KG first time consolidated KACO USA.

³ E.g. in the case of KACO, the costs for purchased material was also adjusted.

⁴ It was also considered to adjust revenues regarding segment revenues and to only take into consideration revenue changes with regard to the China business of the German company. Since this study wants to find out changes in revenues of German firms that are due to acquisitions by Chinese companies, it may be reasonable to suggest normalization e.g. for changes in revenues that are because of increased business activity in the home country or other countries of the Germany company. However, screening of the company reports revealed that in several cases the strategic rationale (from the German perspective) was (also) to sell the products of the acquirer through their own distribution channel. In this case, increased revenues in e.g. Germany may in fact be due to the acquisition by the Chinese company (this was for example the case for Format Tresorbau GmbH & Co. KG or for Medion AG). Thus, normalization would not be appropriate. Since not enough information was revealed in most cases with regard to revenue drivers, adjustments could not be conducted.

$$VCR = \frac{\text{Costs of raw materials and procured services}}{\text{Revenues and services rendered}} \quad [1]$$

The VCR ratio serves the purpose of assessing if the partnership with the Chinese company has resulted in any cost advantages in the procurement of the German company. The analysis of costs has to be assessed in relation to revenue and thus as a function of the variable cost ratio. This procedure avoids misleading conclusions regarding changes in revenues that naturally result in corresponding changes in variable costs. It is reasonable to assume that German companies potentially benefit from the acquisition since they might be able to save costs for instance because of access to Chinese suppliers that deliver certain components at a cheaper rate or since they gain access to Chinese production facilities.⁵ Thus following hypothesis is tested:

H0: Variable Cost Ratios of acquired German companies have not changed in the post-acquisition scenario

H1: Variable Cost Ratios of acquired German companies have changed in the post-acquisition scenario

EBITDA Margin

It is furthermore crucial to assess the operating profitability of the companies, whereas operating income is defined as Earnings before Interest and Taxes (EBIT). However, EBITDA delivers better insight regarding the operating performance of the company, also being a close proxy for operating cash flow (Barker, 2002). It is useful since companies may differ with respect to depreciation methods, which can make numbers less comparable.

$$\frac{\text{Earnings before Interest and Taxes (EBITDA)}}{\text{Revenues}} \quad [2]$$

One must keep in mind that in some cases, EBIT is a more appropriate measure for operating performance when comparing companies against each other. This can be the case if companies

⁵ This was for example the case for Preh GmbH and Kiekert AG. Both companies stated the intention to produce in China to save costs.

differentiate with regard to leasing methods for example, whereas operating leasing leads to capturing of costs above EBITDA in operating expenses, while financing leasing results in capturing the corresponding expenses in the context of depreciation. The company reports and corresponding footnotes of the analyzed companies have been assessed regarding this matter and it was concluded that EBITDA is an appropriate measure due to similarities amongst the companies regarding this issue.⁶ Thus, the corresponding Hypotheses was set:

H0: EBITDA Margins of acquired German companies have not changed in the post-acquisition scenarios

H1: EBITDA Margins of acquired German companies have changed in the post-acquisition scenarios

Return on Assets

Return on Assets is another way of measuring profitability and is oftentimes computed by dividing net income by total average assets (Needle & Powers, 2011). It can be beneficial to apply pre-tax ROA to normalize for tax differences due to e.g. varying tax legislations. This is particularly important regarding the impact assessment of acquisitions on the profitability of acquirees since an acquired company's ROA may solely change due to the integration in the acquirer's corporation, which has a lower tax rate, for instance since it is located in a less heavily taxed region/country (Damodaran, 2012). However, the companies observed in this study all have continued to operate as separate legal entities and are thus subject to equal taxation according to the German tax system. Therefore, post-tax ROA can be considered adequate. Furthermore, one needs to consider if it is more powerful to divide operating income (in this study represented by EBITDA), as also supported by Bergevin and MacQuenn (2010), by total average assets.

$$\text{Return on Assets (ROA)} = \text{EBITDA} / \text{Total Average Assets} \quad [3]$$

⁶ The footnotes in the corresponding financial statement were screened for indications concerning operating leasing, however it was not clearly determined in all cases if operating leasing was relevant or not. This is also because this study deals with private companies that generally publish less information than public companies.

This approach eliminates distortions that occur due to varying capital structures and different tax treatment that may occur due to loss carryforwards.⁷ Thus, EBITDA was chosen to measure operating profit instead of EBIT. It can also be advantageous to adjust for current liabilities and non-interest bearing liabilities, respectively to come up with a number that potentially reflects the return on assets more adequately (Damodaran, 2002). However, in this study total average assets is applied. Thus, the Hypotheses tested is the following:

H0: ROA of acquired German companies have not changed in the post-acquisition scenario

H1: ROA of acquired German companies have changed in the post-acquisition scenario

4.3. Statistical analysis

The statistical data analysis was performed with various tools in XLSTAT (Statistics Add-on for Excel). On the one hand, Paired-Sample T-Tests were conducted, which belong to the most common methods to evaluate pre-and post-acquisition data, as performed by Pervan et al. (2015). It requires normally distributed data and equal variances among the tested groups (Kault, 2003). Therefore, the data (each group of variables) must be tested regarding these requirements. The normal distribution is tested with the help of Shapiro-Wilk tests, which is recommended for smaller samples (De Muth, 2006).⁸ The equality of variances is tested by means of Fishers F-Tests. Oftentimes, Paired-Sample T-Tests are not recommended for small samples, however, if the assumption of normality holds, the conduction of these tests is still reasonable. Nevertheless, the explanatory power of the test is limited due to the small sample size. In fact, several references recommend non-parametric tests for small sizes, that can be performed independently of normal distribution and equality of variances (Merrill, 2016). The

⁷ Also, to gain a deeper understanding of the drivers of the ROA it is advantageous to calculate this figure by means of multiplying profit margin with asset turnover. By doing that, it can deliver valuable insights if an increase in ROA is due to higher asset utilization/productivity or because of raised profitability. However, since this study considers EBITDA instead of net income, it is not possible to apply this method for computing ROA.

⁸ However, it must be mentioned that tests for normal distribution might lead to false conclusion in the case of small samples since normality tests might not be able to reject the zero hypothesis (H0= variables are normally distributed) and therefore falsely suggest that normal distribution exists (Field, 2013).

non-parametric equivalent to the Paired-Sample T-Tests is the Wilcoxon Sign Rank Test, which potentially results in a more robust outcome in this case than Paired-Sample T-Tests. Even though, this test does not require normal distribution it is but sensitive to heavily skewed data, which is particularly important in the context of this study since companies with size large differences were assessed. That is why tests for skewness were conducted as well. All tests were conducted with a level of confidence 95% and thus with a level of significance of 5%. Besides that, two-sided tests were conducted. Even though it is assumed, that figures tend to improve post-acquisitions, the opposite might be possible as well.⁹ Thus, two-sided tests are adequate in the context of this assessment. Besides that, outliers were eliminated from the analysis for certain variables.¹⁰

4.4. Source of data and sampling

Data collection

The list of Chinese acquisitions in Germany was retrieved from two databases to ensure completeness, namely Bloomberg and Thompson Reuters. Besides that, deal specific characteristics such as name of acquirer, name of seller, stakes acquired, valuation multiples were extracted from these data bases. Regarding geographical restriction, the search filter was set to deliver results for German companies that have been acquired by Chinese companies (main land China) and companies whose parent company is Chinese (there are few cases of Hong Kong based companies that are controlled by mainland Chinese companies; these companies are included as well since control is exercised by main land Chinese firms).^{11 12} Only

⁹ This was for example the case for the acquisition of ThyssenKrupp Tailored Blanks GmbH, whereby the revenue post-acquisition significantly decreased, in fact, as stated in the company's report, due to the acquisition by Chinese Wuhan Iron and Steel Company Limited (further elaboration in section 5.1).

¹⁰ E.g. for the Variable Cost Ratio tests, Meta Motoren- und Energie-Technik GmbH was excluded due to extreme values.

¹¹ For instance, AVICEM HK Ltd. (Hong Kong based) is a subsidiary of AVIC Electromechanical System Co. (based in Beijing, China). The company acquired Kokinetics GmbH in 2014.

¹² An advantage of focusing on acquisitions and respective target companies from only one country is the elimination of potential discrepancies and confounding variables between different countries with regard to general economic and political influence factors.

acquisitions were evaluated, also since pre- and post-merger data is a lot more complex to evaluate since the post-merger numbers have to be normalized for the parent company's data. In this case, this would be particularly difficult since Chinese financial reports are oftentimes neither accessible nor published in English.¹³ Another requirement was that minimum 25 per cent of the German company was acquired to assure that the Chinese company has significant influence on the German company.¹⁴ Furthermore, a constraint has been applied with respect to the relevant time window. Taking into consideration deals before 2011 may result in distortions because of the 2007/2008 financial crisis.¹⁵ Because of the nature of the methodology, it is also necessary to disregard the years after 2014 due the lack of availability of financial statements for the years 2015 and 2016.¹⁶ Consequently, the relevant time window for the company selection is between 2011 and 2014.

The search resulted in an initial sample of 47 acquisitions between 2011 and 2014 (see Exhibit 1). However, 27 acquisitions could not be considered for the financial analysis due to distressed/insolvency cases (11 companies), change of accounting standards (one company), sales to private investor (three companies), lack of information in company reports (10 companies).¹⁷ Consequently, the final sample for the financial analysis amounts to 20 companies (see Exhibit 2). Most target companies are private, and thus the information which can be extracted with respect to financials from databases like Bloomberg or Thomson Reuters is oftentimes very limited. In fact, the necessary information to compute the key variables, were mostly not

¹⁴ In Germany, the blocking minority is reached when a company owns 25 per cent of another company. This means, that the company can block important decisions.

¹⁵ Naturally, data after this period may still be affected, however it was assumed the normalization was sufficient for 2011-2014 data with regard to financial performance etc.

¹⁶ Private companies in Germany oftentimes publish their annual reports in the first quarter two years after the reporting year (e.g. Putzmeister Holding GmbH published their 2015 annual report in March 2017). Also, there are limited publication requirements for companies, if (at least) one person is fully and personally reliable. Besides that, companies that were acquired in the second half of 2015 could have potentially not been assessed as well since this would require financial reports from 2016, which are oftentimes not even available for publicly listed companies in the first quarter of the subsequent year. Due to these reasons, the year 2015 was not considered for this analysis.

¹⁷ For instance, AWECO Appliance Systems GmbH & Co. KG (acquired by Zhejiang Sanhua Intelligent Controls Co., Ltd) changed from HGB (German accounting standard) to IFRS post-acquisition.

available. All financial data for the sample of 20 companies was therefore hand collected (see Exhibit 3) from annual consolidated company reports from the Federal Gazette (in German *Bundesanzeiger*)¹⁸. With regard to these acquisitions, data has been collected for each target firm for the years $t-1$ and $t+1$, whereas t represents the date of deal completion. Thus, $t-1$ stands for the period before the acquisition, while $t+1$ represents data for the period next to the one in which the acquisition took place.¹⁹ With respect to $t+1$, it is important to take into consideration that companies need some time to realize synergies after acquisitions. For instance, if a company has been acquired in December of 2011, it is not appropriate to use the 2011 annual statement for $t+1$, since cost reduction effects etc. might not be realized yet and therefore not be reflected in the corresponding financials. Therefore, this study considers annual financial statements of the same year of the completion data as $t+1$ if the transaction was completed within the first two quarters of same year (correspondingly the previous year was chosen for $t-1$). If the completion date was in the fourth quarter, the data for $t+1$ was gathered from the annual statements of the next year (and the year of completion was considered as $t-1$). If the completion data is in the third quarter, it was assumed that there is a certain probability that the financials are affected by the acquisition, but we can also not make a solid assumption that the acquisition is “fully” captured. That is why in this case, the annual statement of the next year and one year before are considered.²⁰ It can be argued that $t+1$ is enough to realize synergies and comparable studies such as Pervan et al., 2015 have not considered more periods either.²¹

¹⁸ The Federal Gazette is a service offered by the German Federal Ministry of Justice and Consumer Protection and allows access to company reports, financial statements, and official announcement (https://publikations-plattform.de/sp/wexsservlet?page.navid=to_push_service_start&global_data.designmode=eb&dest=wexsservlet&session.sessionid=41d45c20830b9ccb7b48fd8f7e131a71).

¹⁹ Since this study assesses private companies that are not legally obliged to publish quarterly or semi-annual results, there is no other possibility than to collect the data for $t-1$ from the closest annual statement. Ideally, would be Last Twelve-Month (LTM) data, however, it is not possible to gather this data for companies that are not publicly listed.

²⁰ E.g. if the acquisition took place in July of 2012, the post-acquisition period was 2013, and the pre-acquisition period was 2011.

²¹ The assumptions made are also to some extent backed up by a post-merger study conducted by Deloitte in 2014. Deloitte (strictly speaking a market research firm mandated by Deloitte) polled more than 800 executives at U.S. companies regarding the realization of synergies in the post-acquisition/merger period (firms that engaged in a merger or acquisition over the last 24 months or were planning to engage in M&A in the next 12 months). In the

Limitations

Another question that needs to be raised is to what extent pre-deal data should be taken into consideration. Potentially, it might be beneficial for normalizing for potential ongoing upward/downward trends of the company. For example, if the target company's revenue or operating margin was already growing steadily before the acquisition. Thus, an increase in those key figures post-deal could potentially be simply due to an ongoing trend and not due to the acquisition. However, to make an assessment regarding that, it would be necessary to go back at least two more periods prior to the deal completion. However, the data might potentially be distorted due to the 2008/2009 crisis. Another important issue to consider is the implementation of a control group. Assuming, that there would be for instance a positive difference in profitability post-acquisition, this might not be due to the acquisition, but rather due to improved general economic conditions in the target company's sector/industry. Thus, to eliminate potential confounding variables a normalization would be adequate. However, the selection of a solid control group and the necessary data is extremely difficult in this case since this study is mostly dealing with private companies. This is therefore out of scope of the study at hand. For future research however, it is recommended to pay special attention to identify solid peer groups for every company and apply an adequate normalization. Besides future studies will be more powerful since they will be able to analyze more than one post-acquisition period.

5. Results

This section consists of two parts. Firstly, it summarizes the Chinese-German acquisition activity between 2011 and 2014 (47 acquisitions) with regard to relevant deal characteristics that are important to gain a comprehensive understanding of the Chinese M&A activity in

context of this study, 42.9% of executives stated that it took six months or less to realize synergy targets, 30.8% said that it took seven to twelve months to realize synergy targets. 60% were domestic transactions, 40% were cross-border transactions, whereas two out of three involved private companies with manufacturing accounting for the biggest portion with 24% and revenues of involved companies ranging from 100 Mio. until 1 Billion. Since the sample in this study is referring to Chinese-German cross border deals that mainly involve privately held companies as target companies, the study is not perfectly comparable, ensures however, a certain level of validity for the assumptions made.

Germany regarding this time window. Secondly, the section presents the results of the assessment of profitability on a sample of 20 companies. Therefore, it presents a brief elaboration regarding the conducted tests on the variable and presents the results of the statistical analysis and puts the results into context.

5.1. Summary of Chinese-German deal activity 2011-2014 (RQ 1)

In total, 47 acquisitions of German companies by Chinese firms took place between 2011 and 2014. Forty three percent of acquired firms were active in the automotive industry, 24% in the industrial machinery and industrial products and services industry, 11% in the energy (mostly alternative energy, e.g. solar), as shown in Exhibit 4. Furthermore, in 57% of the cases, the acquirer was from the same industry as the acquiree. In the case of automotive deals, 55% of acquirers were from the same industry.²² As for industrial machinery and product and services 45% were from the same industry and in the case of Energy, 80% were also active in the energy industry. With respect to energy industry, the number of acquisitions out of distressed situations and insolvencies amounted to 80%, whereby this mostly referred to firms that were active in the solar/photovoltaic industry.²³

Among all 47 companies, 23% were acquired out of insolvency or distresses situations. As for the acquired companies that were public, hostile takeovers (e.g. in the form of tender offers) were the not the case, implying willingness to sell to Chinese companies.²⁴ While deal volumes and stakes respectively, were mostly not disclosed (40%), in 36% of cases 100% was acquired, in 11% of cases between 50% and 75% was acquired and in 13% of cases between 25% and 50% was acquired. Regarding selling companies, it is important to mention that in 28% of the

²² An interesting example in the automotive industry is the acquisition of German Kokinetics by Chinese AVIC, whereas Kokinetics manufactures high-tech precision products for the automobile industry, while AVIC produces aviation products.

²³ For instance, in the case of the acquisition of German Sunways by Chinese LDK Solar (deal completed in 2012), the declared investment rationale according to the companies was to “link German high technology with China’s low-cost advantage” (Bryant, 2012).

²⁴ A recent example of a German company acquired in the context of a tender offer is KUKA, which was bought by Chinese Midea (however this acquisition took in place in 2016 and is out of scope for this research).

deals, private equity companies were the sellers.²⁵ Another relevant topic is the multiples assessment of the corresponding deals.²⁶ In fact, some German were acquired with high valuations like for example Hazemag & Epr GmbH that was acquired by Sinoma International Engineering Co Ltd with a Total Deal Value / Revenue multiple of 2.45 vs. 0.44 for comparable transactions and a Total Deal Value / EBIT multiple of 28.47 vs. 16.02 for comparable transactions. Another example is ThyssenKrupp Tailored Blanks GmbH that was acquired by Wuhan Iron and Steel Company Limited for 1.13 Total Deal Value / Revenue (vs. 0.07 for comparable transactions) and 136.84 Total Deal Value / EBIT (vs. 6.94 for comparable transactions).²⁷

5.2. Assessment of profitability pre- vs. post-acquisition (RQ2)

Revenues

The variables for revenues did not pass the Shapiro-Wilk-Test for normality which means that Paired-Sample T-Tests could not be performed. This is due to significant size differences of the companies and the revenue variables, respectively. As for the non-parametric equivalent of the Paired-Sample T-Tests, the Wilcoxon test, the data needs to be checked for skewness. The skewness factors are in fact very high for pre- as well as post- acquisition revenues (3.73; 3.52). For this reason, logarithmic variables were taken into consideration. Based on the results of the Wilcoxon test, H0 (*Revenues of acquired German companies have not changed in the post-acquisition scenarios*) could not be rejected.

²⁵ Interesting would furthermore be the assessment of funds cycles of the involved private equity companies and the acquisitions dates of the German companies by the investment firms to figure out if divestitures took place in the context of common disinvestment phases or potentially prematurely (maybe since Chinese enable the firms to exit with above average multiples).

²⁶ A comprehensive assessment of relevant multiple such as Total Deal Value / EBITDA was not possible due to not disclosed data.

Table 1: Statistical tests for Revenue

Shapiro-Wilk-Test for Revenue		Wilcoxon Sign-Rang-Test for Log Revenue	
W	0,455	V	55
p-value (both sided)	< 0,0001	Expected value	105,000
		Variance	717,500
		p-value (both sided)	0,065
alpha	0,05		

With median increases of 6% in revenues post-acquisition, the results do not show statistically significant differences. However, some companies have in fact massively increased revenues due to the acquisition. For instance CSR New Material Technologies increased revenues by 224% post-acquisition, which showed revenues growth in the Asia/Pacific region with China as main driver from TEUR 37.185 pre-acquisition revenue to TEUR 116.617 post acquisition revenue. Also, Meta Motoren- und Energie-Technik increased revenues by 196%, due to “takeover by Chinese consortium in the automotive sector”, which enabled the company to acquire many new customers in China. However, other companies such as ThyssenKrupp Tailored Blanks GmbH reported significant revenues decrease following the acquisition. The company report states that “[...] revenue decreased due to customer’s insecurity due to acquisition [...] customer held back on new orders.”).

Variable Cost Ratios

Paired-Sample T-Tests could be performed for Variable Cost Ratios since the requirement for normal distribution was fulfilled (see Exhibit 5) and since it passed the test for equal variances (see Exhibit 6). Additionally, Wilcoxon-Sing-Rang-Tests were conducted. Based on the results of both tests H0 (*Variable Cost Ratios of acquired German companies have not changed in the post-acquisition scenarios*) could not be rejected.

Table 2: Statistical Tests for Variable Cost Ratio

Paired-Sample T-Test Variable Cost Ratio		Wilcoxon Sign-Rank-Test Variable Cost Ratio	
Difference	-0,951	V	115,000
t value	-0,947	Expected Value	95,000
t (critical value)	2,093	Variance (V)	617,375
FG	19	p-value (both sided)	0,433
p-value (both sided)	0,356	alpha	0,05
alpha	0,05		

65% of companies reduced their material costs, however the median decrease only amounts to -0.32%. In fact, many companies stated in their company reports that production facility relocation to China is a strategic rationale behind the acquisition. However, potentially this has not been accomplished yet, thus there is no significant decrease in variable cost ratio.

EBITDA Margins

Paired-Sample T-Tests could be performed for EBITDA Margin since the requirement for normal distribution was fulfilled (see Exhibit 7) and since it passed the test for equal variances (see Exhibit 8). In addition, Wilcoxon-Sing-Rang-Tests have been performed. The results show that H_0 (*EBITDA Margin of acquired German companies have not changed in the post-acquisition scenarios*) could not be rejected.

Table 3: Statistical tests for EBITDA Margin

Paired-Sample T-Test EBITDA Margin		Wilcoxon Sign-Rank-Test EBITDA Margin	
Difference	-1,356	V	65
t (observed value)	-0,1005	Expected value	95.000
t (critical value)	2,101	Variance (V)	617.000
FG	18	p-value (both sided)	0,235
p-Wert (both sided)	0,328	alpha	0,05
alpha	0,05		

Even though, the majority of companies (70%) improved EBITDA Margin, the median increase amounts to 0.51%. The maximum increase showed Meta Motoren- und Energie- Technik with 158 %, which is line with their large increase in revenues. Even though, there was no statistically significant difference for revenues as well as for variable cost ratio, EBITDA Margin might have potentially shown statistically significant difference due to reduced fixed costs such salaries (potentially due to use of acquirer’s company’s sales force). However, this is not the case and potentially point towards non-completed post-acquisitions integration processes.

ROA

Paired-Sample T-Tests could not be performed for ROA since the variables it did not pass the test for normal distribution. However, the Wilcoxon-Sing-Rang-Tests was performed. The results show that H0 (*ROA of acquired German companies have not changed in the post-acquisition scenarios*) could not be rejected.

Table 4: Statistical Tests for ROA

Shapiro-Wilk Test ROA		Wilcoxon-Sign-Rank-Test ROA	
W	0.869	V	68
p-value (both sided)	0,014	Expected value	95.000
alpha	0,05	Variance (V)	617.500
		p-value (both sided)	0,286
		alpha	0,05

60% of companies improved ROA. However, the median increase only amounts to about 1%. Since ROA was calculated with EBITDA in the nominator, this is a logical consequence. However, less companies showed higher ROA than increased EBITDA margin. This might be due to an increased asset, whereby the median increase in total assets amounted to 8% across all companies.

Conclusion

The purpose of this Work Project was to assess the short-term impact on profitability of Chinese acquisitions on German target companies. Out of 47 deals between 2011 and 2014, twenty companies were eligible for an analysis of pre-acquisition *versus* post-acquisition data.

The analysis has delivered statistically insignificant differences between pre- and post-acquisition data of the companies with respect to the assessed variables. Therefore, it cannot be concluded that Chinese acquisitions affect acquired German companies positively or negatively in terms of profitability in the short term. Comparable studies such as Pervan et. al. (2015) have not shown statistically significant differences pre- *versus* post-acquisition either (they assessed a sample of more than 100 deals, of which 56% were of domestic nature). However, the observed time frame is short and post-M&A integration is more complex for cross-border deals in comparison to domestic deals and thus may require more time to be reflected in the financials of the acquiree. Because most assessed firms are private, whereby data is oftentimes not accessible or insufficient, the study at hand has been conducted with a small sample. This logically affects the explanatory power of all performed statistical tests. Nevertheless, this study shows that some companies have indeed benefited greatly in the short term for instance by utilizing the acquirer's distribution network (e.g. Meta Motoren- und Energie-Technik), whereby other companies have explicitly suffered drawbacks because of the acquisition (e.g. ThyssenKrupp Tailored Blanks GmbH).

Furthermore, this Work Project contributed to portraying the acquisitions of Chinese companies in Germany between 2011 and 2014 and showed that multiple key German industries are affected, such as Automotive or Industrial Machinery. Also, the study presented that Private Equity companies played a significant role as sellers of German companies to Chinese bidders. Besides that, it showed that both, Chinese buyers from the same industry as the target as well as Chinese buyers from different industries as the acquired firms were largely represented. This

implies that both vertical integration as well as horizontal integration is of importance from the perspective of Chinese acquirers.

Future research on the impact of Chinese company acquisitions on acquired German companies is likely to produce more statistically significant outcome, since the “big Chinese M&A wave” has only started in 2011 and since 2016 marked a record year for Chinese acquisitions in Germany.

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Appendix

Exhibit 1: List of acquired German companies that were acquired by Chinese between 2011 and 2014

Target Mr. Company	Completion Date	Acquiring Company	Selling Company	Private Equity/Investment firm as Seller (yes/no)	Private/Public (Target)	Industry Sector Target	Industry Sector Acquirer	Relevant for Pre-Post Deal Comparison	Reason why not relevant
5. BOBEAS Energie GmbH (solar farm project)	05/09/2011	Zhejiang Sunflower Light Energy Science & Technology Co., Ltd.	BOBEAS Energie GmbH	no	Private	Energy	Energy	no	Assets sale
6. Conergy Solar Module GmbH & Co KG Conergy Solar (Zhejiang) Co., Ltd. CSR (New Material Technologies GmbH (BOBE Elasmetal GmbH, BOBE Rubber & Plastics Group	13/12/2013 01/09/2014	Conergy Solar (Zhejiang) Co., Ltd. Zhouhou Times New Material Technology Co., Ltd.	Conergy Global Solutions GmbH ZF Friedrichshafen AG	no no	Private Private	Energy Automobiles	Energy Chemicals and materials	no yes	Assets sale -
8. CYBEX GmbH	30/01/2014	Goodbaby International Holdings Limited	unknown	n/a	Private	Automobiles	Consumer	yes	-
9. EHG AG Holding GmbH	26/11/2010	Jiangsu Jinsheng Industry Company Limited	unknown	n/a	Private	Automobiles	Industrial machinery	yes	-
10. FZL Formertechnik Zulieferer GmbH	01/04/2012	Ningbo Huaiyang Electronic Co., Ltd.	unknown	n/a	Private	Industrial Machinery	Automobiles	no	No data/small sized
11. FLEX Elektronenwerkzeuge GmbH	30/09/2013	Chenon Holdings Ltd.	Flex Beteiligungs GmbH	yes	Private	Manufacturing (other)	Manufacturing (other)	no	No data/small sized
12. Golden Tulip Hotel (Frankfurt)	04/04/2013	New Century Tourism Group Co., Ltd.	unknown	n/a	Private	Hotel	Hotel	no	No data/small sized
13. Grohe AG	21/03/2013	Jianshe Cai (Private Investor, Jilin Cai (Private Investor)	unknown	n/a	Public	Appliances	Individual investor	no	Private investor
14. Guestrower Wärmepumpen GmbH	03/03/2011	SmartHeat Inc.	unknown	n/a	Private	Appliances	Appliances	no	No data/small sized
15. Hazemag & Epr GmbH	31/12/2014	Sinoma International Engineering Co Ltd	Schmidt Kranz & Co.	no	Private	Industrial Machinery	Industrial Machinery	yes	-
16. HB-Tim Part Solutions Buchs GmbH & Co. KG	28.05.2013	Ningbo Huaiyang Electronic Co., Ltd.	Mutares AG	yes	Private	Automobiles	Automobiles	no	Distressed case
17. Kiebert AG	12/09/2012	North Lingyun Industrial Group Co., Ltd.	Morgan Stanley	yes	Private	Automobiles	Automobiles	yes	-
18. KON Group AG (Linde Hydraulics)	27/12/2012	Weichai Power Co., Ltd.	unknown	n/a	Public	Automobiles	Automobiles	yes	-
19. KSL Weilmann Sondermaschinenbau GmbH	31/07/2013	Shang Gong Group Co., Ltd.	Private investor	n/a	Private	Industrial products and services	Industrial products and services	no	No data/small sized
20. KSM Castings GmbH	20/10/2011	OTTC Dicastal Wheel Manufacturing Co., Ltd.	Majority Equity Partners	yes	Private	Automobiles	Automobiles	bid	No data/small sized
21. Kupfer- und Rollenherstellung Leipzig GmbH	03.05.2013	Wafangdian Bearing Group Corp	BIK GmbH (Private Equity Firm)	yes	Private	Metal Processing	Metal Processing	yes	-
22. Medion AG	01/08/2011	Lerovo Group Limited	unknown	no	Public	Electronics	Electronics	yes	-
23. mechatronics technik gmbh	20/12/2013	Zoomlion Heavy Industry Science and Technology Co., Ltd.	unknown	n/a	Private	Industrial products and services	Industrial products and services	yes	-
24. MHH Metallwerk Heinsdorf GmbH	30/04/2011	Yohio Group Co., Ltd.	unknown	n/a	Private	Manufacturing (other)	Consumer	no	Distressed case
25. PACOM GmbH	06/08/2014	JIC Investment Co Ltd (Private Equity firm)	unknown	no	Private	Industrial Machinery	Financial Services	no	Acquired by investment firm
26. Preh GmbH	25/12/2012	Ningbo Joyson Electronic Corp.	Private investor (DBAG Fund)	yes	Private	Automobiles	Automobiles	yes	-
27. Pulzmeister Holding GmbH	27/04/2012	Sany Heavy Industry Co Ltd, CITIC Private Equity Funds Management Co Ltd	Private investor	n/a	Private	Industrial Machinery	Industrial Machinery	yes	-

Target Mr. Company	Completion Date	Acquiring Company	Selling Company	Private Equity/Investment firm as Seller (yes/no)	Private/Public (Target)	Industry/Sector Target	Industry/Sector Acquirer	Relevant for Pre-Post Deal Comparison	Reason why not relevant
28 Roth & Rau CTF Solar GmbH	24/08/2011	China Triumph International Engineering Co. Ltd.	Meyer Burger (Germany) AG	no	Private	Energy	Building Construction	no	Distressed case
29 SaarGummi GmbH	06/06/2011	Chongqing Light Industry & Textile Holding (Group) Co., Ltd.	unknown	n/a	Private	Automobiles	Automobiles	no	Distressed case
30 Saurer AG	04/07/2013	The Jiangsu Jinsheng Group	OC Ceriflon Corporation AG	no	Public	Automobiles	Textile products	no	No data/small sized
31 Schwing GmbH	06/06/2012	XCMG Construction Machinery Co Ltd	unknown	no	Private	Industrial Machinery	Machinery and Construction	yes	-
32 SGL Rotec GmbH & Co. KG	31/12/2013	Chou Patrick Hsiao-Po (Private Investor)	SGL Carbon SE	no	Private	Industrial Machinery	Consumer Retail	no	Private Investor
33 Solibro GmbH	26/09/2012	Hareny Holdings Group Limited	Hanwita & CELLS	no	Private	Energy	Energy	no	Distressed case
34 Sunways AG	25/04/2012	LDK Solar Co. Ltd	unknown	n/a	Public	Energy	Energy	no	Distressed case
35 Thielert AG	22/05/2013	Techny Motors GmbH/AVIC International Holding Corporation	unknown	n/a	Public	Automobiles	Aerospace	no	Distressed case
36 ThyssenKrupp Tailored Blanks GmbH	28/09/2012	Wuhan Iron and Steel Company Limited	ThyssenKrupp AG	no	Private	Automobiles	Steel producers	yes	-
37 TLT Turbo GmbH	11/02/2014	Power Construction Corporation of China	Siemens AG	no	Private	Industrial Machinery	Industrial Machinery	no	No data/small sized
38 Viscon Bus GmbH	01/08/2012	China Youngman Automobile Group Co., Ltd.	unknown	n/a	Private	Automobiles	Automobiles	no	Distressed case
39 WUMAG TEXROLL GmbH & Co. KG	12/04/2012	Yan Siyou (Private Investor)	unknown	n/a	Private	Automobiles	Individual Investor	no	Private Investor
40 MNH Metallwerk Helmstadt GmbH	30/04/2011	Yotrio Group Co., Ltd	unknown	no	Private	Manufacturing (other)	Consumer Other	no	Distressed case
41 OPS-INGERSOLL Funkenrosion GmbH	15/10/2011	Greatoo Intelligent Equipment Inc.	IKB Invest GmbH	yes	Private	Industrial Machinery	Automobiles	yes	-
42 Format Tesorbar GmbH & Co. KG	25/05/2011	Dutech Holdings Ltd	Droege Capital GmbH	yes	Private	Metal Processing	Fabricated metal & hardware	yes	-
43 SchmitzGroup AG	18/02/2011	Anhui Zhongxing Holding (Group) Co., Ltd.	unknown	n/a	Public	Automobiles	Automobiles	yes	-
44 Kolmetics GmbH	28/05/2014	AVIC Electromechanical Systems Co. Ltd.	Endurance Capital AG	yes	Private	Automobiles	Aerospace/Defense	yes	-
45 KACO GmbH & Co. KG	30/04/2014	Anhui Zhongxing Sealing Parts Co Ltd	Fundo de Investimento em Participações Ilimitadas	yes	Private	Automobiles	Automobiles	yes	-
46 Htera Mobilfunk GmbH	26/07/2011	Htera Communications Co. Ltd.	Rohde & Schwarz	no	Private	Cellular Telecom	Cellular Telecom	yes	-
47 Meia Motoren- und Energie-Technik GmbH	29/05/2014	China Automobil Development United (Beijing) Technology Investment Co.	unknown	n/a	Private	Automobiles	Automobiles	no	-

Exhibit 2: Final sample

Target Company	Completion Date	Acquiring Company	Selling Company	Private Equity/Investment firm as Seller (yes/no)	Private/Public (Target)	Industry/Sector Target	Industry/Sector Acquirer
CSR New Material Technologies GmbH(BOGE Elastmetall GmbH, BOGE Rubber & Plastics Group)	01/09/2014	Zhuzhou Times New Material Technology Co., Ltd.	ZF Friedrichshafen AG	no	Private	Automobiles	Chemicals and materials
CYBEX GmbH	30/01/2014	Goodbaby International Holdings Limited	unknown	n/a	Private	Automobiles	Consumer
EMAG Holding GmbH	26/11/2010	Jiangsu Jinsheng Industry Company Limited	unknown	n/a	Private	Automobiles	Industrial machinery
Hazemag & Epr GmbH	31.12.2014	Sinoma International Engineering Co Ltd	Schmidt Kranz & Co.	no	Private	Industrial Machinery	Industrial Machinery
Kiekerf AG	12/09/2012	North Lingyun Industrial Group Co., Ltd.	Morgan Stanley	yes	Private	Automobiles	Automobiles
KION Group AG (Linde Hydraulics)	27.12.2012	Weichai Power Co. Ltd.	unknown	n/a	Public	Automobiles	Automobiles
Kugel- und Rollenlagerwerk Leipzig GmbH	03.05.2013	Wafangdian Bearing Group Corp	BWK GmbH (Private Equity Firm)	yes	Private	Metal Processing	Metal Processing
Medion AG	01/08/2011	Lenovo Group Limited	unknown	no	Public	Electronics	Electronics
m-tec mathis technik gmbh	20/12/2013	Zoomlion Heavy Industry Science and Technology Co., Ltd.	unknown	n/a	Private	Industrial products and services	Industrial products and services
Preh GmbH	25.12.2012	Ningbo Joyson Electronic Corp.	Private Investor / DBAG Fund	yes	Private	Automobiles	Automobiles
Putzmeister Holding GmbH	27.04.2012	Sany Heavy Industry Co Ltd, CITIC Private Equity Funds Management Co Ltd	Private Investor	n/a	Private	Industrial Machinery	Industrial Machinery
Schwing GmbH	06.06.2012	XCMG Construction Machinery Co Ltd	unknown	no	Private	Industrial Machinery	Machinery and Construction
ThyssenKrupp Tailored Blanks GmbH	28.09.2012	Wuhan Iron and Steel Company Limited	ThyssenKrupp AG	no	Private	Automobiles	Steel producers
MWH Metallwerk Helmstadt GmbH	30/04/2011	Yotrio Group Co., Ltd	unknown	no	Private	Manufacturing (other)	Consumer: Other
OPS-INGERSOLL Funkenerosion GmbH	15.10.2011	Greatoo Intelligent Equipment Inc.	IKB Invest GmbH	yes	Private	Industrial Machinery	Automobiles
Format Tresorbau GmbH & Co. KG	25.05.2011	Dutech Holdings Ltd	Droege Capital GmbH	yes	Private	Metal Processing	Fabricated metal & hardware
SchmitterGroup AG	18.02.2011	AnHui Zhongding Holding (Group) Co., Ltd.	unknown	n/a	Public	Automobiles	Automobiles
Kokinetics GmbH	28.05.2014	AVIC Electromechanical Systems Co., Ltd.	Endurance Capital AG	yes	Private	Automobiles	Aerospace/Defense
KACO GmbH + Co. KG	30.04.2014	Anhui Zhongding Sealing Parts Co Ltd	Fundo de Investimento em Participações Mênfis	yes	Private	Automobiles	Automobiles
Hytera Mobilfunk GmbH	26.07.2011	Hytera Communicatios Co. Ltd.	Rohde & Schwarz	no	Private	Cellular Telecom	Cellular Telecom
Meta Motoren- und Energie-Technik GmbH	29.05.2014	China Automobil Development United (Beijing) Technology Investment Co.	unknown	n/a	Private	Automobiles	Automobiles

Exhibit 3 (1): Financials in period t-1 for m-tec mathis technik gmbh until OPS Ingersoll

Company Name	m-tec mathis technik gmbh	Putzmeister Holding GmbH	Wisco (before: ThyssenKrupp Tailored Blanks GmbH)	KION Group AG	Preh GmbH	Kiekert AG	Medion AG	EMAG Holding GmbH	CYBEX	OPS-INGERSOLL Funkenerosion GmbH
Industry	Industrial products and services	Industrial Machinery	Automobiles	Industrial Machinery	Automobiles	Automobiles	Electronics	Automobiles	Automobiles	Industrial Machinery
Year t-1	2013	2011	2011/2012	2012	2012	2011	2010	2010	2013	2011/2012
Financials										
Revenues	30,108,466.42	570,169,600.00	209,285,000.00	4,726,700,000.00	462,270,000.00	532,985,096.90	1,638,737,000.00	260,903,000.00	57,974,695.51	33,543,505.97
Increase/(Decrease) inventories etc.	61,257.84	-13,335,700.00	668,000.00	-	2,487,000.00	9,667,450.65	-	9,771,000.00	-	1,681,998.73
Other operating income	933,394.71	25,592,100.00	1,577,000.00	297,000,000.00	9,488,000.00	23,773,287.40	4,740,000.00	9,275,000.00	596,118.30	210,138.64
Activated assets	-	7,445,600.00	-	-	10,365,000.00	2,170,897.81	-	6,093,000.00	-	-
Total Output (including other operating assets)	31,103,118.97	589,871,600.00	211,530,000.00	5,023,700,000.00	484,610,000.00	568,596,732.76	1,643,477,000.00	286,042,000.00	58,570,813.81	35,436,643.34
Variable cost ratio	0.63	0.55	0.86	0.73	0.58	0.71	0.89	0.50	0.53	0.53
Variable cost ratio (in %)	62.93	54.57	85.58	72.58	57.53	71.25	88.84	50.41	52.70	53.08
SGA Expenses (cost of sales accounting)	-	-	-	1,000,200,000.00	-	-	-	-	-	-
Purchases/expenses for raw materials	18,406,064.30	303,409,500.00	179,113,000.00	3,430,800,000.00	265,932,000.00	366,647,463.59	1,455,899,000.00	116,031,000.00	29,684,063.97	17,091,852.59
Expenses for procured service	541,653.35	7,710,700.00	0.00	0.00	0.00	13,110,254.77	0.00	15,487,000.00	869,653.62	712,227.47
Salaries	6,839,254.41	95,840,700.00	20,018,000.00	0.00	110,932,000.00	77,390,229.64	48,468,000.00	80,868,000.00	5,799,550.95	6,855,621.05
Social expenses	1,413,158.14	19,723,200.00	-	0.00	0.00	16,162,601.53	0.00	15,268,000.00	1,855,482.13	1,227,331.54
Depreciation/Amortization	332,549.33	16,337,400.00	7,018,000.00	365,300,000.00	25,500,000.00	14,653,322.30	4,387,000.00	9,289,000.00	267,219.28	1,211,567.17
Other operating expenses	3,558,293.24	115,567,000.00	11,211,000.00	59,500,000.00	52,456,000.00	55,895,561.67	106,607,000.00	39,392,000.00	17,364,967.26	5,764,116.65
Total operating expenses	31,090,972.77	558,588,500.00	217,360,000.00	4,490,500,000.00	454,820,000.00	543,859,433.50	1,615,361,000.00	276,335,000.00	55,840,937.21	32,862,716.47
EBIT	12,146.20	31,283,100.00	-5,830,000.00	533,200,000.00	29,790,000.00	24,737,289.26	28,116,000.00	9,707,000.00	2,729,876.60	2,572,926.87
EBITDA	344,695.53	47,620,500.00	1,188,000.00	898,500,000.00	55,290,000.00	39,390,621.56	32,503,000.00	18,996,000.00	2,997,095.88	3,784,494.04
EBITDA Margin (in %)	1.14	8.35	0.57	19.01	11.96	7.39	1.98	7.28	5.17	11.28
ROA (EBITDA) (in%)	1.59	9.53	1.06	14.63	18.44	16.70	4.61	8.31	16.44	14.17

Exhibit 3 (2): Financials in period t+1 for m-tec mathis technik gmbh until OPS Ingersoll

Company Name	m-tec mathis technik gmbh	Putzmeister Holding GmbH	Wisco (before: ThyssenKrupp Tailored Blanks GmbH)	KION Group AG	Preh GmbH	Kiekert AG	Medion AG	EMAG Holding GmbH	CYBEX	OPS-INGERSOLL Funkenerosion GmbH
Industry	Industrial products and services	Industrial Machinery	Automobiles	Industrial Machinery	Automobiles	Automobiles	Electronics	Automobiles	Automobiles	Industrial Machinery
Year t+1	2014	2012	2012/2013	2013	2013	2013	2012/2013	2011	2014	2013/2014
Financials										
Revenues	28,943,808.47	675,465,709.50	148,131,000.00	4,494,600,000.00	520,300,000.00	612,756,766.92	1,652,404,000.00	381,056,860.77	74,207,473.63	36,763,526.89
Increase/(Decrease) inventories etc.	300,815.35	-208,787.62	-428,000.00	-	10,300,000.00	7,237,249.91	-	29,027,408.87	-	915,000.56
Other operating income	582,036.98	26,421,522.49	1,597,000.00	121,700,000.00	7,200,000.00	34,368,595.75	5,406,000.00	32,553,322.77	4,028,000.44	606,110.85
Activated assets	-	8,421,894.64	184,000.00	-	14,800,000.00	3,048,217.61	-	6,704,685.71	-	-
Total Output (including other operating assets)	29,826,660.80	710,100,339.01	149,484,000.00	4,616,300,000.00	552,600,000.00	657,410,830.19	1,657,810,000.00	449,342,278.12	78,235,474.07	38,284,638.30
Gross Profit	11,332,717.99	272,652,200.89	21,863,000.00	1,239,400,000.00	222,500,000.00	169,520,523.61	190,912,000.00	174,267,509.45	35,272,372.21	18,367,428.14
Variable cost ratio	0.61	0.60	0.85	0.72	0.57	0.72	0.88	0.54	0.52	0.50
Variable cost ratio (in %)	60.85	59.63	85.24	72.42	57.24	72.33	88.45	54.27	52.47	50.04
SGA Expenses (cost of sales accounting)	0.00	0.00	0.00	941,800,000.00	0.00	0.00	0.00	0.00	0.00	0.00
Purchases/expenses for raw materials	17,066,766.93	381,680,368.83	126,268,000.00	3,255,200,000.00	297,800,000.00	429,838,309.98	1,461,492,000.00	181,079,178.95	37,349,475.44	17,632,465.70
Expenses for procured service	544,323.55	21,133,139.78	0.00	0.00	0.00	13,397,933.33	0.00	25,710,172.37	1,586,625.98	763,633.05
Salaries	7,117,556.03	108,636,660.93	20,963,000.00	0.00	127,600,000.00	87,803,385.57	52,847,000.00	102,051,661.16	9,925,135.13	7,870,308.22
Social expenses	1,441,499.99	23,336,880.31	0.00	0.00	0.00	18,029,927.99	0.00	18,253,357.95	1,614,312.93	1,318,840.60
Depreciation/Amortization	285,894.95	14,559,521.67	8,251,000.00	335,000,000.00	28,800,000.00	14,923,778.06	3,784,000.00	10,194,477.91	822,520.29	1,055,193.81
Other operating expenses	3,409,904.07	122,608,290.08	9,433,000.00	46,700,000.00	56,700,000.00	59,318,925.10	105,690,000.00	51,674,211.33	20,230,152.95	6,480,389.52
Total operating expenses	29,865,945.52	671,954,861.60	164,915,000.00	4,243,700,000.00	510,900,000.00	598,091,905.09	1,623,813,000.00	388,963,059.67	71,527,222.72	35,120,830.90
EBIT	-39,284.72	38,145,477.41	-15,431,000.00	372,600,000.00	41,700,000.00	59,318,925.10	33,997,000.00	60,379,218.45	6,708,251.35	3,163,807.40
EBITDA	246,610.23	52,704,999.08	-7,180,000.00	707,600,000.00	70,500,000.00	74,242,703.16	37,781,000.00	70,573,696.36	7,530,771.64	4,219,001.21
EBITDA Margin (in %)	0.85	7.80	-4.85	15.74	13.55	12.12	2.29	18.52	10.15	11.48
ROA (EBITDA) (in %)	1.31	10.08	-6.06	11.56	21.10	25.06	5.57	26.52	30.20	15.36

Exhibit 3 (3): Financials in period t-1 for Hytera Mobilfunk GmbH until Schwing GmbH

Company Name	Hytera Mobilfunk GmbH	Format Tresorbau GmbH & Co. KG	SchmitterGroup AG	Meta Motoren- und Energie-Technik GmbH	KOKINETICS GmbH	KACO GmbH + Co. KG	CSR New Material Technologies GmbH (Boge Elastmetall GmbH)	Hazemag & Epr GmbH	Kugel- und Rollenlagerwerk Leipzig GmbH	Schwing GmbH
Industry	Cellular Telecom	Metal Processing	Automobiles	Automobiles	Automobiles	Automobiles	Automobiles	Industrial Machinery	Metal Processing	Industrial Machinery
Year t-1	2011	2011	2010	2014	2013	2013	2014	2014	2012	2011
Financials										
Revenues	20,100,000.00	19,010,899.35	57,881,479.05	2,245,000.00	36,966,000.00	136,981,000.00	228,594,000.00	119,380,000.00	19,494,994.45	178,934,492.24
Increase/(Decrease) inventories etc.	114,385.90	114,385.90	39,879.17	68,000.00	921,000.00	-	-	-2,169,000.00	526,774.23	4,360,369.50
Other operating income	-	392,164.78	1,773,570.48	1,099,000.00	2,054,000.00	1,202,000.00	2,980,000.00	3,503,000.00	638,316.89	13,474,522.38
Activated assets	-	-	277,826.16	-	32,000.00	-	-	757,000.00	-	313,275.07
Total Output (including other operating)	20,100,000.00	19,517,450.03	59,972,754.86	3,412,000.00	39,973,000.00	138,183,000.00	231,574,000.00	121,471,000.00	20,660,085.57	197,082,659.19
Variable cost ratio	0.38	0.58	0.63	0.01	0.62	0.75	0.89	0.56	0.46	0.72
Variable cost ratio in %	37.90	57.69	62.55	1.02	62.02	75.05	88.51	56.42	45.80	71.66
SGA Expenses (cost of sales accounting)	-	-	-	-	-	23,535,000.00	28,519,000.00	-	-	-
Purchases/expenses for raw materials	7,617,800.39	10,570,146.34	31,486,749.39	23,000.00	21,587,000.00	102,806,000.00	202,320,000.00	67,354,000.00	7,863,973.40	126,145,054.13
Expenses for procured service	0.00	396,602.92	4,715,752.45	0.00	1,339,000.00	0.00	0.00	0.00	1,064,883.45	2,071,387.51
Salaries	6,525,929.42	5,242,709.03	15,050,393.29	4,681,047.81	8,562,000.00	0.00	0.00	26,922,000.00	6,150,491.96	36,408,278.14
Social expenses	1,223,772.22	1,171,913.96	3,371,801.30	723,961.10	1,515,000.00	0.00	0.00	0.00	1,205,721.38	6,480,734.15
Depreciation/Amortization	1,048,522.90	1,758,348.13	1,861,499.15	207,777.97	1,779,000.00	283,000.00	15,441,000.00	2,726,000.00	2,277,719.46	1,234,298.34
Other operating expenses	6,755,568.18	3,862,204.88	6,804,499.29	1,492,771.18	4,352,000.00	1,037,000.00	1,729,000.00	20,874,000.00	2,765,677.42	26,040,069.42
Total operating expenses	23,171,593.11	23,001,925.26	63,290,694.87	7,128,558.06	39,134,000.00	127,378,000.00	232,568,000.00	117,876,000.00	21,328,467.07	198,379,821.69
EBIT	-3,071,593.11	-3,484,475.23	-3,317,940.01	-3,716,558.06	839,000.00	10,805,000.00	-994,000.00	3,595,000.00	-688,381.50	-1,297,162.50
EBITDA	-2,023,070.21	-1,726,127.10	-1,456,440.86	-3,508,780.09	2,618,000.00	11,088,000.00	14,447,000.00	6,321,000.00	1,609,337.96	-62,864.16
EBITDA Margin (in %)	-10.07	-9.08	-2.52	-156.29	7.08	8.09	6.32	5.29	8.26	-0.04
ROA (EBITDA) (in %)	-12.48	-18.44	-2.52	-34.42	13.25	14.81	15.65	8.96	13.54	-0.01

Exhibit 3(4): Financials in period t+1 for Hytera Mobilfunk GmbH until Schwing GmbH

Company Name	Hytera Mobilfunk GmbH	Format Tresorbau GmbH & Co. KG	SchmitterGroup AG	Meta Motoren- und Energie-Technik GmbH	KOKINETICS GmbH	KACO GmbH + Co. KG	CSR New Material Technologies GmbH (Boge Elastmetall GmbH)	Hazemag & Epr GmbH	Kugel- und Rollenlagerwerk Leipzig GmbH	Schwing GmbH
Industry	Cellular Telecom	Metal Processing	Automobiles	Automobiles	Automobiles	Automobiles	Automobiles	Industrial Machinery	Metal Processing	Industrial Machinery
Year t+1	2013	2012	2011	2015	2014	2014	2015	2015	2013	2013
Financials										
Revenues	29,722,410.07	18,403,707.65	59,075,427.78	6,654,000.00	32,569,242.96	150,728,000.00	739,657,000.00	110,540,000.00	19,462,269.59	182,025,320.12
Increase/(Decrease) inventories etc.	245,159.89	178,371.68	177,607.32	614,000.00	813,844.64	-	-	-4,133,000.00	210,547.54	12,073,630.71
Other operating income	936,606.09	417,715.27	1,426,535.21	627,000.00	4,068,676.76	960,000.00	8,652,000.00	2,837,000.00	513,385.68	17,268,251.24
Activated assets	1,966,770.87	-	297,575.46	-	305,695.06	-	-	536,000.00	7,103.08	2,390,182.60
Total Output (including other operating)	32,870,946.92	18,999,794.60	60,977,145.77	7,300,000.00	37,757,459.42	151,688,000.00	748,309,000.00	109,780,000.00	20,193,305.69	213,757,384.67
Gross Profit	14,476,331.68	8,908,641.87	23,698,968.26	6,206,000.00	11,020,963.65	39,205,771.27	97,744,000.00	49,327,000.00	11,093,916.45	37,594,106.20
Variable cost ratio	0.51	0.52	0.60	0.07	0.66	0.74	0.87	0.55	0.43	0.79
Variable cost ratio (in %)	51.29	51.59	59.88	6.73	66.16	73.99	86.79	55.38	43.00	79.35
SGA Expenses (cost of sales accounting)	0.00	0.00	0.00	0.00	0.00	25,051,000.00	96,328,000.00	0.00	0.00	0.00
Purchases/expenses for raw materials	9,474,914.00	9,162,439.73	30,432,293.12	448,000.00	20,096,329.54	111,522,228.73	641,913,000.00	61,213,000.00	7,813,080.48	140,619,272.15
Expenses for procured service	5,771,164.39	332,626.05	4,944,166.40	0.00	1,451,949.77	0.00	0.00	0.00	555,272.66	3,811,941.77
Salaries	8,128,031.74	4,859,175.05	13,961,506.44	4,650,090.79	7,428,609.02	0.00	0.00	27,284,000.00	6,159,822.24	42,713,064.14
Social expenses	1,506,307.69	1,065,871.71	3,022,418.23	724,567.48	1,128,990.33	0.00	0.00	0.00	1,246,889.44	6,515,790.42
Depreciation/Amortization	885,845.47	544,890.10	1,685,977.42	332,157.83	1,678,892.14	262,783.22	44,500,000.00	4,622,000.00	2,265,445.69	952,072.63
Other operating expenses	7,590,198.51	3,807,162.25	7,384,839.43	1,307,125.34	3,434,367.06	2,082,000.00	6,347,000.00	21,840,000.00	2,802,003.30	43,160,345.67
Total operating expenses	33,356,461.80	19,772,164.89	61,431,201.04	7,461,941.44	35,219,137.86	138,655,228.73	744,588,000.00	114,959,000.00	20,842,513.81	237,772,486.78
EBIT	-485,514.88	-772,370.29	-454,055.27	-161,941.44	2,538,321.56	13,032,771.27	3,721,000.00	-5,179,000.00	-649,207.92	-24,015,102.11
EBITDA	400,330.59	-227,480.19	1,231,922.15	170,216.39	4,217,213.70	13,295,554.50	48,221,000.00	-557,000.00	1,616,237.77	-23,063,029.48
EBITDA Margin (in %)	1.35	-1.24	2.09	2.56	12.95	8.82	6.52	-0.50	8.30	-12.67
ROA (EBITDA) (in %)	1.42	-2.80	5.18	2.01	18.59	14.40	7.93	-0.53	7.21	-7.33

Exhibit 4: Target firms by industry

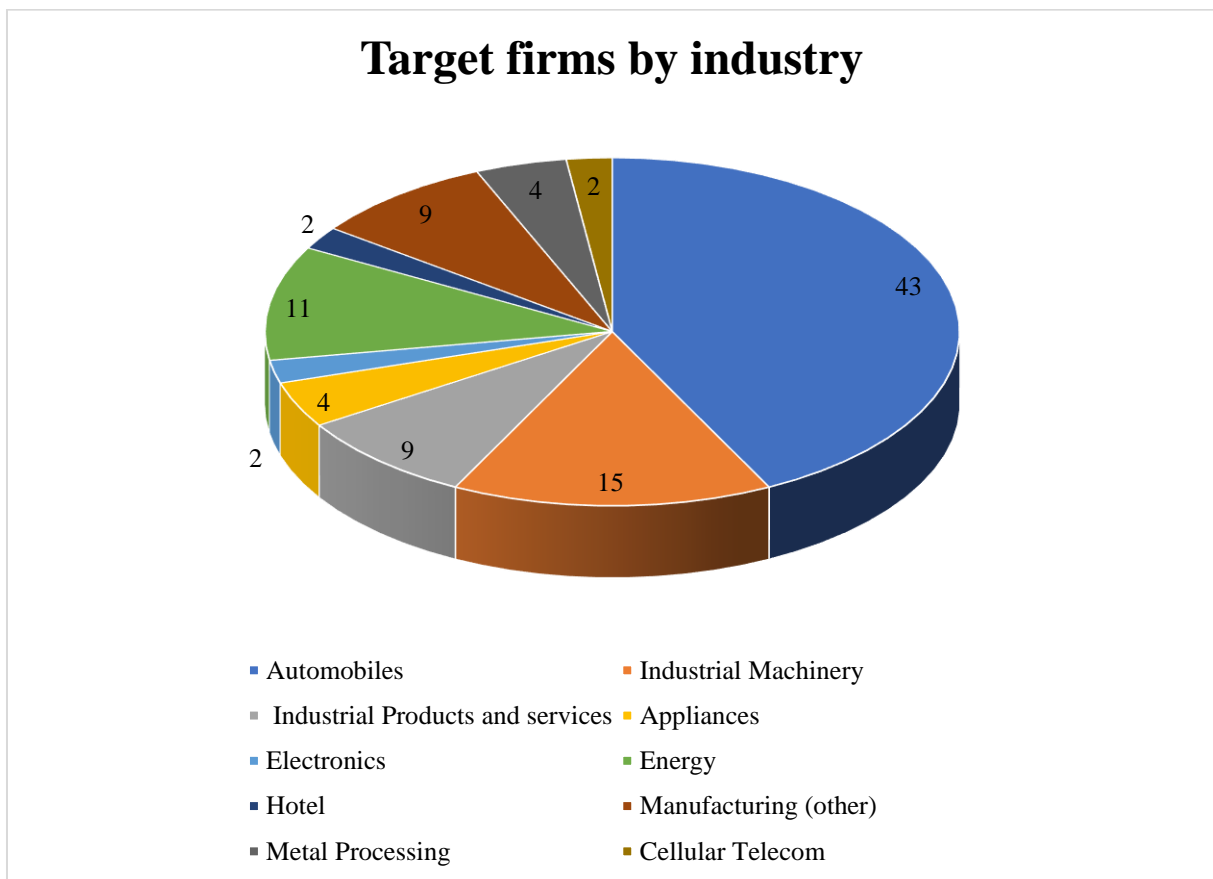


Exhibit 5: Shapiro-Wilk-Test Variable Cost Ratio

W	0,954
p-Wert (both sided)	0,461
Alpha	0,05

Exhibit 6: F-Test Variable Cost Ratio

Relation	0,906
F Test	0,906
F critical value	2,596
FG1	18
FG2	18
p-Wert (both sided)	0,837
alpha	0,05

Exhibit 7: Shapiro-Wilk-Test EBITDA Margin

W	0.947
p-value (both sided)	0.350
alpha	0.05

Exhibit 8: F-Test EBITDA Margin

Relation	0.803
F (observed value)	0.803
F (critical value)	2.596
p-value (both sided)	0.646
alpha	0.05