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The Long Term Effect of Horizontal Takeovers on the Performance of Rival Firms

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Abstract: Most prior research on M&A is focused on the firms which are part of the merger or acquisition. However, to date little is known or researched about what the effects of M&As are on rival firms. This paper contributes to the literature on M&As by challenging the received wisdom that takeovers are always disadvantageous for firms in the industry being left outside the takeover. In order to test the research question, a sample of 331 horizontal European takeovers within the period 2011-2017 is used. The results indicate that horizontal takeovers have a positive long term effect on the performance of rival firms. This indicates that rival firms will gain from horizontal takeovers. Moreover, the effect for rival firms of a horizontal takeover is dependent on the effect of the acquiring firms. The takeover generates a positive signal about growth opportunities if the acquiring firms gain from a horizontal takeover.

Keywords: horizontal takeovers, rival firms, performance, long term

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1. Introduction

The literature on mergers and acquisitions (M&A) can be roughly classified into three fields according to Haleblian, Devers, McNamara, Carpenter, and Davison (2009), namely acquisition outcomes, moderators and antecedents. Regarding acquisition outcomes, the extensive research on this topic yields to the results that the target firm mostly gains from M&As and that the acquirer firm receives M&As as actually value destroying (Bradley, Desai, & Kim, 1988; Leeth & Borg, 2000). Most prior research is focused on the firms which are actually part of the merger or acquisition. However, to date little is known or researched about what the effects of a merger or acquisition are on rival firms. For example, Song and Walkling (2000) have found evidence that an acquisition announcement has the effect that the market bids up the value of rival firms in the industry. Furthermore, there are a few studies who examined the short term effects of an M&A on rival firms and find that M&As have a positive influence on rival firms (Clougherty & Duso, 2009; Fee & Thomas, 2004; Shahrur, 2005). However, the long-term consequences for these firms are not yet clear. For example, Berger, Saunders, Scalise, and Udell (1998) argue that horizontal acquisitions create industry consolidation and decreased commitment from the target firm's existing customers. This might lead to growth opportunities for the remaining firms.

1.1 Research problem

After reviewing the literature on M&As and rival firms, this research attempts to fill the gap in the literature regarding the effects of horizontal takeovers on the performance of rival firms in the long run. The research question is formulated as follows:

How do horizontal takeovers affect the performance of rival firms in the long run?

To answer this question a measure of the rival firm's performance is identified from existing literature, as well as various determinants of long run consequences for rival firms.

1.2 Research method

In order to test the research question, a sample of 331 horizontal takeovers within the period 2011-2017 is used. The acquirers, targets and rivals in the sample are European. Because the takeovers are horizontal, only takeovers are used when the acquirer and target are in the same industry. Additionally, only rivals that are in the same industry as the takeover are used in order to properly examine the effects of takeovers within the same market.

On the basis of a literature overview, hypotheses are formulated to specify the expectations of the M&A effects on rival firms. Control variables based on existing literature are used regarding other determinants of long run consequences. In order to examine the effects, a one-sample t test and an Ordinary Least Squares (OLS) regression are performed. The results suggest a positive relationship between horizontal takeovers and the long term performance of rival firms. Furthermore, a significant relation is found between the performance of acquiring firms and the performance of rival firms, which implies that the performance of rival firms is dependent on the performance of acquiring firms.

1.3 Relevance

It seems that the field could benefit by a research about how and when acquisitions alter the capabilities of or create market opportunities for the remaining firms (Haleblian et al., 2009). This paper contributes to the literature on M&As by challenging the received wisdom that takeovers are always disadvantageous for firms in the industry being left outside the takeover. This paper identifies several explanations. First, a takeover reduces the competitive rivalry in the market which means that all firms in the market have more pricing power. Second, a takeover results in a higher concentration level in the buying industry. All the remaining firms in the market can put pressure on their suppliers and receive lower input prices. Third, many takeovers are actually value destroying and unsuccessful mergers present a competitive opportunity for the rival firms.

Furthermore, after conducting this research, firms that want to engage in a takeover can be more aware of the consequences of the takeover of the market. The firm has more information on how rival firms will react and this can make a difference in the decision making of the firms in the takeover.

1.4 Outline

The structure of this paper is as follows, chapter 2 contains the literature overview which provides an overview of existing literature regarding this topic and its findings. Chapter 3 contains the hypotheses development. Chapter 4 contains the methodology as well as the discussion of the various variables used in this research. Chapter 5 contains the data description and the discussion of the results. Finally, chapter 6 contains the conclusion and discussion.

2. Literature Review

2.1 Introduction

In this chapter, theories on M&A are discussed regarding the effects of takeovers on rival firms. This paper focuses on the consequences of takeovers for the market. However, there are two types of takeovers, first horizontal takeovers which are defined as mergers between firms within the same industry. Second, non-horizontal mergers which are defined as mergers between firms in different industries. To measure the impact on one market, this paper focuses on horizontal takeovers only.

Though there are other motives for takeovers, such as market misevaluation (Jensen, 1986), hubris (Malmendier & Tate, 2008) and agency problems (Shleifer & Vishny, 2003) among others, this paper focuses on the motives that are specific to horizontal takeovers. The collusion theory, productive efficiency theory, buying power theory and value destroying theory are discussed, as these theories are specific to the effects of horizontal takeovers on rival firms. Table 1 in appendix A consists of a comparison of the theories used in this paper. The theories are gathered from Eckbo (1983), Eckbo and Wier (1985) and other studies that examine market reactions to rivals, e.g. Clougherty and Duso (2009); Fee and Thomas (2004); Shahrur (2005). Finally, several diversities in takeover and rival characteristics are discussed to better identify the effects of takeovers on rival firms.

2.2 Collusion theory

The collusion theory describes that horizontal mergers reduce the number of firms in the industry, which reduces the competition and rivalry among the remaining firms. This lowers the costs to monitor collusion and increases the capability of rivals to collude (Stigler, 1964). According to Clougherty and Duso (2009), the merger insiders increase prices and reduce output, this pushes up overall prices in a market. Horizontal takeovers are thus beneficial for the insiders, acquirer and target, and for the outsiders, the rivals. The interests of the acquiring firms and the rivals are intertwined since reduced competition leads to increased market power and this enhances the future profit forecasts of rival firms. Accordingly, the rivalry reducing or collusive elements of horizontal takeover activity yield higher profit opportunities that should create positive performances for rivals (Clougherty & Duso, 2009). Fee and Thomas (2004) refer to this idea as the monopolistic collusion hypothesis.

However, Eckbo (1983) examined the effects of a takeover on rival firms to test the collusion theory. The rival firms are expected to benefit from a collusive merger. The results of

this study are inconsistent with the collusion theory, as the findings suggest that rival firms are not negatively impacted at antitrust announcements that challenge the takeovers (Eckbo, 1983).

Altogether, the collusion theory predicts that rival firms benefit from horizontal takeovers of industry competitors. However, the research of Eckbo (1983) but also of Fee and Thomas (2004) and Shahrur (2005) came to the conclusion that their results are inconsistent with the collusion theory. The main reason for this inconsistency is that the theory does not hold when the takeovers are challenged by antitrust authorities. In this paper, only completed takeovers are considered which are thus unchallenged. Therefore, one can assume that the collusion theory should hold in this paper because the sample consists of completed takeovers.

2.3 Productive efficiency theory

The productive efficiency theory is a view which states that takeovers result in productive efficiency. The reductions in production, marketing, distribution and other costs appear from the elimination of overlapping facilities, greater realization of economies of scale etc. These elements are generally given as sources of gains to horizontal mergers (Fee & Thomas, 2004). According to Eckbo (1983), due to the implementation of a more cost efficient production policy after the takeover, the market value of the merging firms' increases. Furthermore, the productive efficiency theory does not restrict the effect on rival firms. On the one hand, the intensified competition in factor and product markets is likely to result in higher factor prices and lower product prices. This effect yields a negative change in the market value of the rivals. On the other hand, the announcement of a proposed efficient merger can also indicate opportunities for the rival firms to increase their productivity. The firms in the takeover may not be unable to exclude the rival firms from using the same efficiency increasing technology (Eckbo, 1983).

The productive efficiency theory thus gives an unrestricted answer however, the results of Eckbo (1983); Fee and Thomas (2004); Shahrur (2005) indicate that there is a positive effect of the horizontal takeovers for the rival firms. This paper thus assumes that the productive efficiency theory will yield a positive effect.

2.4 Buying power theory

The buying power theory states that an increase in the concentration of the buying industry can result in an offset power that allows buyers to pressure their suppliers (Shahrur, 2005). The research on the buyer size effect can be divided into two categories according to Ellison and Snyder (2010). The first category consists of theories that research the effect of a monopoly

supplier vis-à-vis the size of a buyer on its bargaining power. These papers indicate that there are plausible circumstances under which a large buyer is charged a lower input price. The second category consists of theories that concentrate on tacitly colluding suppliers. The study of Snyder (1996) shows that a merger between two buyers expands their ability to strengthen competition among colluding suppliers. Snyder (1996) also indicates that due to the increased buyer power of the merging firms, rival firms benefit from the intensified post takeover competition among suppliers.

The buying power theory suggests that horizontal takeovers have a positive effect on rival firms. Consistently, the studies of Fee and Thomas (2004); Shahrur (2005) report positive results. This paper assumes, therefore, a positive effect.

2.5 Destroying value theory

Many M&A scholars (Bradley et al., 1988; Leeth & Borg, 2000) indicate that takeovers are actually value destroying for the merging firms and that merging firms often do not deliver the intended synergies. Unsuccessful mergers represent a competitive opportunity for the rival firms. Merged firms do not have an advantage over rival firms if their merger does not include sufficient joining of capabilities and resources (Clougherty & Duso, 2009). The considerable integration challenges of M&A activity may restrict the merged firms with respect to rival firms, as the rival firms are not burdened by considerable integration costs (Birkinshaw, Bresman, & Håkanson, 2000; Larsson & Finkelstein, 1999).

The above theories assume that all takeovers result in a positive effect on the performance of the acquirer's rivals. However, according to Gaur, Malhotra, and Zhu (2013), the failure or success of the takeover must also be considered when assessing the potential growth of the rival firms. Moeller, Schlingemann, and Stulz (2005) argue that when the market reacts positively, it sends out a positive signal regarding the growth potential of rival firms in the industry and the other way around, a negative reaction of the market sends out a negative signal about the growth potential. Therefore, the market reaction to the rival of the acquirer depends on whether the acquisition generates a positive or negative reaction for the acquiring firm (Moeller et al., 2005).

If the takeover generates a positive effect for the acquiring firm, it goes without saying that synergies can be created. These synergies might be collusive, operational or financial and emerge due to environment-specific or firm-specific factors. Collusive synergies emerge if the acquirer drives out competitors and can set higher prices. Operational synergies emerge because

the acquirer and target often exchange resources which improves efficiency. Finally, financial synergies emerge when the cost of capital reduces (Gaur et al., 2013). For horizontal takeovers, the consolidated industry generates market power for all firms and shows potential for more industry consolidation (Brito & Catalão-Lopes, 2006).

If the takeover generates a negative effect for the acquiring firm, it represents a negative signal about the market of the acquirer (Moeller et al., 2005). If the acquirer and target cannot capture value from the takeover due to a lack of synergies, this means that there is also a lack of synergies for other firms in that industry. Therefore is it less likely that other firms engage in a takeover because it does not seem like a legitimate tool to create growth (Gaur et al., 2013).

2.6 Diversity in takeover characteristics

The above theories might be appropriate to explore the overall tendencies of the performance of rival firms, however there are several diversities in takeover characteristics (Gugler, Mueller, Yurtoglu, & Zulehner, 2003). Variation in the product-space and geographic nature must be considered to better identify the effects of takeovers on rival firms.

With regard to geographic diversity, Gugler et al. (2003) have found evidence that there is a variation in takeover activity regarding the cross-border context. Specifically, the impact of takeovers on the sales of the firms in takeovers across countries are different. This suggests that takeover in one country differs from takeovers in other countries. In addition, cross-border takeovers might reveal less market-power elements, which are beneficial to rival firms. This is because the foreign acquirer uses the takeover as an instrument to enter the local market for the first time and accordingly the number of competitors remains stable.

With regard to product market diversity, Gugler et al. (2003) has found strong evidence that takeover activity strongly varies across industries. Specifically, takeovers in the manufacturing industry have a tendency to be less advantageous than takeovers in the service industry (Gugler et al., 2003). Andrade and Stafford (2004) argue that takeovers help both to contract and expand an industry when capacity is in excess or is tight. The manufacturing industry in the developed world has encountered considerable challenges over the last three decades as a result of increased import competition and other factors. Consequently, this industry represents decreasing industries where capacity must be contracted (Andrade & Stafford, 2004). Furthermore, Molnar (2007) argues that a takeover announcement can express a message that an industry is in a decreasing state, and thus decreasing the performance of the firm inside the takeover and outside. Hence, rival firms of a manufacturing industry takeover might be less likely to gain than rivals of a service industry takeover.

2.7 Diversity in rival characteristics

Besides the diversity in takeover characteristics as described above, there also exists diversity in rival firm characteristics. According to Clougherty and Duso (2009), rivals have the ability to differ over various different dimensions. This diversity might render negative outcomes for rival firms in response to takeover activity by industry competitors. Variation in size and industry concentration must be considered to better identify the effects of takeovers on rival firms.

With regard to size diversity, Hannan and Freeman (1984) argue that large firms are less bound by the risk of failure and thus are less vulnerable to competitive pressures. Moreover, small firms involve a liability of smallness, since it is harder for small firms to recruit skilled staff, comply with government rules and raise capital. For that reason, absolutely small rivals are more likely to lose from the takeover of industry competitors than absolutely large rivals will. However, Baum and Korn (1996) argue that the competition between firms of similar size is more intense because they use similar strategies and thus depend on comparable mixes of resources. Therefore, the behaviour of similar size rivals exhibits a greater negative threat to a focal firm, rather than the behaviour of rivals with a different size. Altogether, rivals might lose from a takeover when the rival firms are relatively similar in size or absolutely small to the acquirer.

With regard to industry concentration, various models illustrate that a large number of firms in an industry means that there is greater competition for scarce resources and also higher failure rates (Baum & Korn, 1996; Hannan & Freeman, 1984; Porter, 2008). A lower concentration of firms in an industry leads to a heightened competition and greater losses for the firms in the industry. Also, the effect of an action by one firm in the industry might be too small to be sensed by other firms (Gaur et al., 2013). This dynamic can be translated to the context of this paper, the market-power effects of a takeover, which are profitable for rivals, are more likely to be greater when there are only a few firms in the industry. Consequently, when there are many rivals for one particular takeover, then a particular rival might less likely gain from the takeover than in a situation when there are a few rivals. Altogether, rival firms are more likely to lose from a takeover when there are many rivals in the industry (Clougherty & Duso, 2009).

2.8 Conclusion

The literature review contains a discussion of theories about the effects of horizontal takeovers on rival firms. The main contention that follows from these theories is that rival firms are more

likely to experience a positive rather than a negative performance effect when industry competitors engage in horizontal takeovers. The theories provide the following explanations for this contention. The collusion theory states that a takeover reduces the competitive rivalry in the market which means that all firms in the market have more pricing power (Clougherty & Duso, 2009). The buying power theory argues that a takeover results in a higher concentration in the buying industry. All the remaining firms in the market can put pressure on their suppliers and receive lower input prices (Snyder, 1996). The destroying value theory claims that many takeovers are actually value destroying and unsuccessful mergers represent a competitive opportunity for the rival firms (Clougherty & Duso, 2009). And finally, the productive efficiency theory is the only one which does not give a restrictive answer. On one hand, the intensified competition yields a negative change in the market value of the rivals and on the other hand, the takeover indicates opportunities for rivals to increase their productivity (Eckbo, 1983).

The main contention assumes that all takeovers result in a positive effect for the acquirer's rivals. However, rival firms are expected to receive market returns that are parallel to the market returns of the acquiring firm (Gaur et al., 2013).

To better identify the effects of takeovers on rival firms, several diversities in takeover and rival characteristic were discussed. Regarding to takeover characteristics, there are geographic varieties. Specifically, the rivals of cross-border takeovers are less likely to gain from the takeover of industry competitors (Gugler et al., 2003). Furthermore, there are varieties in the product markets, which yield to the argument that rival firms of a manufacturing industry takeover might be less likely to gain than rivals of a takeover in a service industry (Molnar, 2007).

Regarding to rival characteristics, there are varieties in size. These varieties provide the claim that rivals might lose from a takeover when the rival firms are relatively similar in size or absolutely small to the acquirer (Baum & Korn, 1996; Hannan & Freeman, 1984). Finally, there are different degrees of industry concentration. For that reason, rival firms are more likely to lose from a takeover when there are many rivals in the industry (Clougherty & Duso, 2009).

3. Hypotheses Development

3.1 Introduction

The literature review discussed existing theories concerning the relationship between horizontal takeovers and the reactions of rival firms as well as more specific characteristics of takeovers and rivals. It forms the basis for the hypotheses of this paper. In this chapter, the various hypotheses are elaborated.

3.2 Hypotheses

The main contention that follows from the collusion theory, productive efficiency theory, buying power theory and value destroying theory is that horizontal takeovers result in a positive performance effect for the acquirer's rival firms (Clougherty & Duso, 2009; Eckbo, 1983; Snyder, 1996).

H1: Horizontal takeovers have a positive effect on the performance of rival firms.

The previous hypothesis assumes that all takeovers result in a positive effect for the acquirer's rivals. However, the failure or success of the takeover must also be considered when assessing the potential growth of the rival firms. When the market reacts positively, it sends out a positive signal regarding the growth potential of rival firms in the industry and the other way around, a negative reaction of the market sends out a negative signal about the growth potential. Therefore, the market reaction to the rival of the acquirer depends on whether the acquisition generates a positive or negative reaction for the acquiring firm (Moeller et al., 2005). Consistently, rival firms are expected to receive market returns that are parallel to the market returns of the acquiring firm.

H2: The effect on the performance of rivals of a horizontal takeover is dependent on the effect on the performance of the acquirer, i.e. if the takeover generates a positive (negative) effect for the acquirer's performance, the rivals also experience a positive (negative) effect on the performance.

The first two hypothesis might be appropriate to examine the overall tendencies of the effect on rival firms however, one can explore several diversities in takeover and rival characteristics to better identify the effects of takeovers on rival firms.

Regarding takeover characteristics, there are differences in geographic locations of acquirers and targets. Specifically, the number of competitors remain stable because in a cross-border takeover, the local competitor is replaced by a foreign competitor (Gugler et al., 2003).

Therefore, the rivals of cross-border takeovers are less likely to gain from the takeover of industry competitors (Clougherty & Duso, 2009).
H3: Cross-border takeovers have a negative effect on the performance of rival firms.

Furthermore, there are varieties in the product markets, which yield to the argument that there are different effects for the different industries. Namely, the manufacturing industry represents decreasing industries where capacity must be contracted. Rival firms of a manufacturing industry takeover might be less likely to gain than rivals of a service industry takeover (Molnar, 2007).
H4: Takeovers in the manufacturing industry have a negative effect on the performance of rival firms.

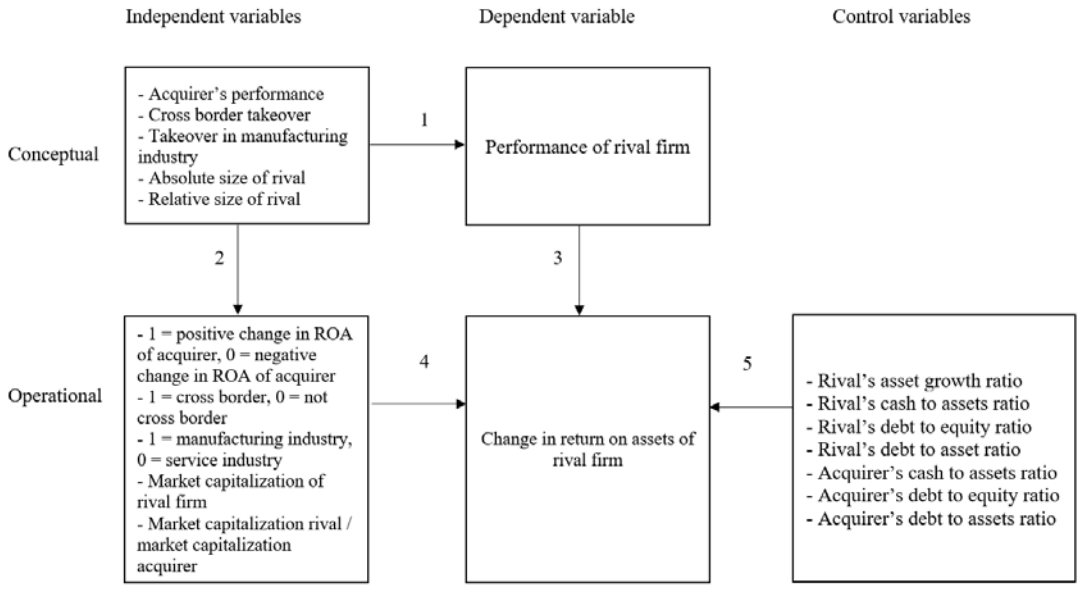
Regarding to rival characteristics, there are varieties in size. The differences in size result in different effects on the rival firms. Specifically, it is harder for small firms to recruit staff, comply with rules and raise capital. Furthermore, firms of similar size have a more intense competition because they use the same strategies. Altogether, rivals might lose from a takeover when the rival firms are relatively similar in size or absolutely small to the acquirer (Baum & Korn, 1996; Hannan & Freeman, 1984).
H5a: Rival firms experience a negative effect on their performance from takeovers when the rivals are relatively similar with respect to the acquirer.
H5b: Rival firms experience a negative effect on their performance from takeovers when the rivals are absolutely small with respect to the acquirer.

3.3 Predictive validity framework

A Predictive Validity Framework based on Libby (1981) is presented in figure 1, in which the dependent, independent and control variables are clearly illustrated. This framework is broadly used and is helpful in constructing a research design.

The upper boxes are the underlying constructs that the theory assumes to have a cause and effect relationship. The bottom boxes represent for every construct a proxy measure. The box on the right indicates the effect of other factors on the dependent variable, these are included as control variables (Libby, 1981).

Figure 1 Libby boxes



3.4 Internal, external and construct validity

Loewenstein (1999) defines internal validity as "the ability to draw confident causal conclusions from one's research". Essentially, it expresses the degree to which the change in the dependent variable is the outcome of the effect of the change in the independent variable. Visually, internal validity can be determined by arrow four from the Libby boxes in figure 1. This paper uses an observational study approach. The quantitative data used is obtained from various external databases and used to estimate the variables and to conduct statistical models. The reliability and accuracy of the data and the constructed variables are therefore questionable. As such, this indicates that the internal validity of this paper is relatively low. An attempt is done to improve the internal validity of this paper by including several control variables. However, it is not possible to control for every factor that has an influence on the dependent variable. Consequently, the possibility of omitted variables is a risk for investigating a potential causality. Therefore, the risk on confounding variables adds to the low internal validity of this paper.

External validity is defined as "the ability to generalise from the research context to the settings that the research is intended to approximate" (Loewenstein, 1999). Visually, external validity can be determined by arrow one from the Libby boxes in figure 1. As this paper uses real-world data, the statistical results of this paper tend to have a relatively high level of external validity. Moreover, since this paper uses a relatively large sample of European takeovers, this

sample is likely to be a good representation for Europe. Therefore, the external validity of this paper is relatively high.

It is important to consider that there exists a trade-off between internal and external validity. It is therefore difficult to obtain a high level of internal and external validity simultaneously.

Construct validity is defined as “the degree of correspondence between constructs and their measures” (Peter, 1981). Visually, construct validity can be determined by arrows two and three from the Libby boxes in figure 1. This paper uses accounting-based measures, which represent the actual and realized performance as reported in the financial statements of the firms. This information is audited and follows the international accounting standards. Therefore, the construct validity of this paper is relatively high.

4. Research Method

This chapter contains the research method and its justification. First, the data sample and the variables are described. Second, the appropriate analysis and the regression are developed. Finally, the robustness checks are described.

4.1 Sample selection

This paper uses a broad sample of firms for the period 2011-2017, the most recent years after the financial crisis, in order to negate the effects of the crisis. Only takeovers are considered in which the acquirer and target are both European. This paper uses only European takeovers rather than a worldwide sample because the European market is more uniform. By using only European takeovers, there should be less influence of country-specific regulations. The following criteria are used in order to construct a dataset.

a) The takeover is horizontal.
b) The rival firms operate in the same industry.
c) The takeover is completed.
d) The acquirer acquirers at least fifteen percent of the total number of target shares outstanding.
e) The initial stake in the target firm is a maximum of fifteen percent.
f) The takeover has a minimum deal value of one million euro.
g) Rival firms are excluded from the sample if they appear in another takeover as an acquirer or target.

To verify if the takeover is horizontal and that the rival firms operate in the same industry, the firms are classified according to SIC codes. Furthermore, the limitation of a minimum deal value of 1 million euro is chosen as large transactions depict economically significant events which are more likely to create market reactions to rival firms (Gaur et al., 2013).

The sample consists of 331 takeovers that met the formation criteria. The dataset on the takeovers is retrieved from the Zephyr Database and the rival firms are collected by the peer analysis of the Eikon database. This sampling approach is in line with other studies that examine market reactions to rivals (Gaur et al., 2013; Shahrur, 2005). Table 2a and 2b in appendix B consist of additional information about the countries in the sample.

The data on the dependent, independent and control variables are retrieved from the Eikon database.

4.2 Dependent variables

The dependent variable is the long run performance of rival firms in the industry. This can be measured in two ways, namely by stock price data (Clougherty & Duso, 2009; Gaur et al., 2013; Shahrur, 2005) and accounting-based measures of profitability, such as return on assets, return on equity, sales and cash flows (Krishnan, Hitt, & Park, 2007; Porrini, 2004; Zollo & Singh, 2004). This paper uses only accounting-based measures of profitability because these measures represent the actual and realized performance as reported in the financial statements of the firms rather than a measure of the expectations investors have for the future (Thanos & Papadakis, 2012). There are several accounting-based measures of profitability such as profit/sales ratio, return on equity and return on assets, however this paper uses return on assets. Return on assets is the most appropriate measure because it is less influenced by the possibility of downward and upward estimation bias caused by changes in bargaining power or leverage emerging from a takeover (Papadakis & Thanos, 2010). Additionally, many studies use return on assets because assets are more constant than net worth (Meeks & Meeks, 1981). And finally, equity can be more deceptive than assets because it is highly influenced by the degree of financial leverage of the firm (Porrini, 2004).

Since this paper aims at determining the effects in the long run, the change in return on assets is used. The change in return on assets is measured for two time periods to make the results robust. The change in return on assets is the difference between the post-acquisition return on assets one and two years after the takeover and the pre-acquisition return on assets the year prior to the announcement date (Porrini, 2004). Return on assets is measured by net income divided by total assets.

$$RROA1 = \frac{ROA_{+1} - ROA_{-1}}{ROA_{-1}}$$

where RROA1 is the change in return on assets from year -1 to year 1 of the rival firm, where year 0 is the year of the takeover.

$$RROA2 = \frac{ROA_{+2} - ROA_{-1}}{ROA_{-1}}$$

where RROA2 is the change in return on assets from year -1 to year 2 of the rival firm, where year 0 is the year of the takeover.

A summary of the dependent variables and their measurements can be found in table 1.

Table 1 – Dependent variables	
Dependent variable	**Measurement**
Rival's change in return on assets (RROA1)	The change in return on assets from year -1 to year 1
Rival's change in return on assets (RROA2)	The change in return on assets from year -1 to year 2

4.3 Independent variables

There are various independent variables identified which have an influence on the effects of takeovers on rival firms. The choice of the independent variables is guided by the hypotheses presented above.

The first independent variable is the performance of the acquirer. This is also measured by the change in return on assets and is measured for two time periods. A positive change in return on assets implies that the market observes the takeover favourably and a negative change in return on assets implies that the market observes a pessimistic view. This variable is measured as a dummy variable, where the variable receives the value 1 if the change in return on assets is positive and the value of 0 if the change in return on assets is negative.

The second independent variable is whether the takeover can be characterized as a cross-border takeover. This variable is measured as a dummy variable, where the variable receives the value 1 if the takeover is cross-border and the takeovers that are not cross-border receive the value 0.

The third independent variable is a dummy variable of the industry in which the takeover took place. There are two industries identified, namely the manufacturing industry and the service industry. The industries are classified according to SIC codes. These SIC codes are retrieved from the Eikon database. SIC codes between 0000 and 3999 are identified as the manufacturing industry and SIC codes between 4000 and 9999 are identified as the service industry. The dummy variable receives the value of 1 if the takeover took place in the manufacturing industry and the value of 0 if the takeover took place in the service industry.

The fourth independent variable is the absolute size of the rival firm. The size of the rival firm is measured by the market capitalization (Gaur et al., 2013). To measure if the rival firm is absolutely small, a dummy variable is created. The variable receives the value 1 if the rival firm is present in the bottom 50 per cent of the size distribution in terms of market

capitalization and the value 0 if the rival firm is present in the top 50 per cent of the size distribution (Clougherty & Duso, 2009).

The fifth independent variable is the relative size of the rival firm with respect to the acquiring firm. The relative size is measured by the market capitalization of the rival firm divided by the market capitalization of the acquiring firm (Gaur et al., 2013). To measure if the rival is relatively similar to the acquirer, a dummy variable is created. The variable receives the value 1 if the size of the rival firm is more than half of the size of the acquirer and less than 150 per cent of the size the acquirer and otherwise 0 (Clougherty & Duso, 2009). A summary of the independent variables and their measurements can be found in table 2.

Table 2 – Independent variables

Independent variable	**Measurement**
Acquirer's change in return on assets (AROADUM1)	Dummy variable equal to 1 if the change in return on assets from year -1 to year 1 is positive and equal to 0 if it is negative.
Acquirer's change in return on assets (AROADUM2)	Dummy variable equal to 1 if the change in return on assets from year -1 to year 2 is positive and equal to 0 if it is negative.
Cross-border (CROSS)	Dummy variable equal to 1 for cross-border takeovers and equal to 0 for none cross-border takeover.
Manufacturing industry (INDUS)	Dummy variable equal to 1 for manufacturing industry and equal to 0 for service industry.
Absolute size (ABS SM)	Dummy variable equal to 1 for rival firms in the bottom 50 per cent of the size distribution and equal to 0 for rival firms in the top 50 per cent of the size distribution.
Relative size (REL SIM)	Dummy variable equal to 1 for rival firms with a size more than half of the acquirer and less than 150 per cent of the size of the acquirer and otherwise 0.

4.4 Control variables

Several control variables are included in the analysis to ensure that the results are not confounded by other M&A effects. These control variables are in line with extant literature, e.g. Gaur et al. (2013), Shahrur (2005) and Song and Walkling (2000). This paper controls for several financial characteristics of the acquiring and rival firms.

Specifically, the rival firm is controlled for the asset growth ratio and the cash status, this is in line with the free cash flow theory. A firm with excess free cash is more likely to invest in future acquisitions and reveal better growth potential. In addition, a firm with a higher asset growth ratio is more likely to grow through future acquisitions (Jensen, 1987). The cash status is measured by cash and equivalents divided by current assets. The asset growth ratio is measured by the percentage growth in total assets (Gaur et al., 2013). These variables are expected to have a positive effect on the rival firm's performance. Furthermore, in line with the acquisition probability hypothesis, the rival firm is controlled for leverage in their capital structure and financial resources. These measures enlarge the acquisition probability of rival firms and can create higher market returns for rival firms (Song & Walkling, 2000). The leverage in capital structure is measured by the debt to equity ratio and the financial resources are measured by debt to asset ratio (Gaur et al., 2013). These variables are expected to have a negative effect on the rival firm's performance.

The acquiring firm is controlled for the same financial measures as the rival firms, except for the asset growth ratio (Gaur et al., 2013). The cash status of acquiring firms is expected to have a negative effect on the rival firm's performance. The debt to equity ratio and the debt to assets ratio is expected to have a positive effect on the rival firm's performance.

All control variables are measured at the end of the year prior to the announcement date. A summary of the control variables and their measurements can be found in table 3.

Table 3 – Control variables

Control variable	**Measurement**
Rival's asset growth ratio (RAG)	Percentage growth in total assets
Rival's cash status (RCS)	Cash and equivalents divided by current assets
Rival's leverage in capital (RDE)	Debt to equity ratio is total debt divided by common equity
Rival's financial resources (RDA)	Debt to asset ratio is total debt divided by total assets

Acquirer's cash status (ACS)	Cash and equivalents divided by current assets
Acquirer's leverage in capital (ADE)	Debt to equity ratio is total debt divided by common equity
Acquirer's financial resources (ADA)	Debt to asset ratio is total debt divided by total assets

4.5 Empirical specification

In order to examine the effect of horizontal takeovers on the performance of rival firms, regression analyses are performed in Stata. To test the first hypothesis a univariate analysis is conducted, specifically a one-sample t test, following Gaur et al. (2013); Gubbi, Aulakh, Ray, Sarkar, and Chittoor (2010); Uhlenbruck, Hitt, and Semadeni (2006). A one-sample t test can be used to determine if a sample of observations is generated by a process with a specific value. In this case, a value which is greater than zero is used (Wooldridge, 2012). To test the other hypotheses, an Ordinary Least Squares (OLS) regression is best to analyse the cross-sectional data. In order to perform an OLS regression, several classical assumptions need to be met (Wooldridge, 2012). First, the variables must be normally distributed. By plotting a graph for each variable one can verify if the variables have a normal distribution. Second, the variance of the error term must be constant for each value of the independent variables, thus is homoscedastic. This assumption can be tested by performing a Breusch-Pagan test. Third, there must be a linear relationship between the dependent and independent variables. A scatterplot can be made to verify if the relationship is linear. The last two assumptions are about the correlations of the independent variables. A Variance Inflation Factor test (VIF) can be done to test for multicollinearity and a correlation matrix can be set up to test for autocorrelation (Wooldridge, 2012). The assumptions of the OLS regression are tested in chapter 5.

4.6 Regression models

The previous section explained that regression models are used to analyse the dataset. There are two regression models used. The first model assesses the effect of horizontal takeovers on the performance of rival firms for one year after the takeover takes place. The second model assesses the effect of horizontal takeovers on the performance of rival firms for two years after the takeover takes place. The specifications for the models are as follows:

(Model 1) The effect of horizontal takeovers on rival firm's performance after one year:

$$RROA1 = \beta0 + \beta1\ AROADUM1 + \beta2\ CROSS + \beta3\ INDUS + \beta4\ ABS\ SM + \beta5\ REL\ SIM + \beta6\ RAG + \beta7\ RSC + \beta8\ RDE + \beta9\ RDA + \beta10\ ASC + \beta11\ ADE + \beta12\ ADA + \varepsilon$$

(Model 2) The effect of horizontal takeovers on rival firm's performance after two years:

$$RROA2 = \beta0 + \beta1\ AROADUM2 + \beta2\ CROSS + \beta3\ INDUS + \beta4\ ABS\ SM + \beta5\ REL\ SIM + \beta6\ RAG + \beta7\ RSC + \beta8\ RDE + \beta9\ RDA + \beta10\ ASC + \beta11\ ADE + \beta12\ ADA + \varepsilon$$

RROA1 and RROA2 present the dependent variable which is the rival's performance. β0 represents the intercept of the regression line with the y-axis. β1 through β5 represent the coefficients for the independent variables and β6 through β12 represent the control variables. ε is the error term, which represents factors other than the estimated coefficients affecting the dependent variable (Wooldridge, 2012).

4.7 Robustness checks

Some additional tests are performed in order to check whether the models presented in the previous section are robust to changes. As mentioned earlier, there are several accounting-based measures of profitability. This paper assumed that return on assets is the best choice, however to make the results more robust, another model is used. This model uses return on equity as a measure of performance. Furthermore, an additional test is performed with the continuous variables of the acquirer's change in return on assets instead of the dummy variables. This is done to see if the results with the continuous variables are in line with the results of the original regressions.

5. Results

This chapter contains the results of the regression analyses, which are conducted in Stata. First, the descriptive statistics of all the variables are presented. Second, a correlation matrix is presented to evaluate if the data has autocorrelation and a VIF test is conducted to assess if the data has multicollinearity. Third, the main regression analyses are performed and the results discussed. Fourth, various robustness checks are done to assess if the models are robust to changes. Lastly, a summary of the results and robustness checks is given.

5.1 Descriptive statistics

In order to conduct an OLS regression, several classical assumptions must be met. First, all individual variables are tested if they are normally distributed by plotting a histogram. The dependent variable and several control variables (RAG, RDA and ADA) are transformed into their natural logarithm, in order to establish a normal distribution (Wooldridge, 2012). Table 3 in appendix C presents summary statistics for all variables used in the regression.

Furthermore, another assumption of the OLS regression is that there must be a linear relationship between the dependent and independent variables (Wooldridge, 2012). To verify this assumption, for each independent variable a scatterplot is made to show the relationship between the independent variable and the dependent variable. The scatterplots show for all variables a linear relationship, therefore the assumption holds.

Another assumption is that the variance of the error term must be constant for each value of the independent variables, thus is homoscedastic (Wooldridge, 2012). To test if the data is homoscedastic a Breusch-Pagan test is performed, the result is presented in appendix D. The null hypothesis of homoscedasticity is rejected, this means that the data show some evidence of heteroscedasticity. Consequently, the validity of the results can be questionable. In order to increase the validity of the results, an OLS regression is used with robust error terms (Studenmund, 2006).

5.2 Correlation

The remaining two assumptions are about the correlations of the independent variables. First, multicollinearity is not allowed, which implies that two or more independent variables have a perfect linear relationship. To test for multicollinearity, a VIF test is done. The results of the VIF test are shown in table 4 in appendix E. All VIF values are below 10, this means that multicollinearity is not a problem in this analysis (Studenmund, 2006).

Furthermore, to test for autocorrelation two correlation matrices are conducted for each model and the results are shown in table 5 and 6 in appendix F. A perfect linear relationship between two variables is when the value in table 5 and 6 in appendix F is -1 or 1 (Wooldridge, 2012). Values closer to zero indicate that there is less correlation between the variables. Most of the variables in table 5 vary between -1.675 and 0.2763. In table 6, the variables vary between -0.1742 and 0.2582. This suggests that there is no or only small correlation between the independent variables in the sample.

5.3 Hypotheses testing

In total six hypotheses have been formulated. As mentioned in chapter 4, the first hypothesis is tested by means of an univariate analysis. To test the other hypotheses an OLS regression with robust error terms is conducted with two models, in which model 1 tested the relationship for one year after the takeover and model 2 tested the relationship for two years after the takeover.

Table 4 presents the results of a one-sample t test, to test hypothesis 1. The one-sample t test examined if the sample of observations is generated by a process with a value which is greater than zero. Hypothesis 1 stated that rival firms experience a positive effect when industry competitors engage in horizontal takeovers. The t-values of the return on assets of the rival firms for the two time periods (logRROA1 and logRROA2) are both significant ($p < 0.01$). This implies that there is a statistically difference between the mean logRROA1 and mean logRROA2 and a positive value. Therefore, hypothesis 1 can be accepted.

Table 4 – One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95%Conf.	Interval]	t-Test (t-value)
logRROA1	2,405	4.604727	0.0016364	0.0802508	4.601548	4.607936	2.8e+0.3***
logRROA2	2,341	4.603786	0.0018152	0.0878242	4.600227	4.607345	2.5e+0.3***

*significant at 10%; ** significant at 5%; *** significant at 1%

Table 5 reports the results of the OLS regression with robust error terms for model 1 and model 2, to test hypotheses 2 to 5b. The expected signs of the coefficients are included in the table, which are in line with the hypotheses. Model 1 is used to test the effects of horizontal takeovers on a period of one year after the takeover. In total 572 observations are included in model 1. The R-squared of model 1 is 0.0031, which means that 3.1% of the variance of the return on assets of the rival firm can be explained by variances of the independent variables in the model (Wooldridge, 2012).

Table 5 – OLS regression with robust error terms			
Dependent variable		*logRROA1*	*logRROA2*
	Expected relation	**Model 1**	**Model 2**
AROADUM1	+	0.00196	
		(0.00505)	
AROADUM2	+		0.000973
			(0.00561)
CROSS	-	-0.00455	0.00319
		(0.00519)	(0.00406)
INDUS	-	-0.00199	-0.00182
		(0.00411)	(0.00396)
ABS SM	-	0.00911*	-0.00633
		(0.00477)	(0.00569)
REL SIM	-	-0.00184	0.00139
		(0.00483)	(0.00518)
logRAG	+	0.00417	0.00217
		(0.00272)	(0.00201)
RCS	+	-0.000200	-3.39e-05
		(0.000125)	(0.000137)
RDE	-	-1.70e-06	-2.11e-06
		(1.97e-06)	(1.60e-06)
logRDA	-	0.000336	0.000318
		(0.00202)	(0.00210)
ACS	-	7.77e-05	-1.99e-05
		(0.000152)	(0.000154)
ADE	+	-1.62e-05	2.21e-06
		(2.30e-05)	(1.51e-05)
logADA	+	0.00413*	-0.00166
		(0.00218)	(0.00226)
Constant		4.589***	4.605***
		(0.0104)	(0.0109)
Observations		572	520
R-squared		0.031	0.008
t statistics in parentheses			
*significant at 10%; ** significant at 5%; *** significant at 1%			

Only the result of the independent variable ABS SM is significant ($p < 0.1$). The variable ABS SM is used to measure the effect of absolute small rival firms on the performance of rival firms. The positive coefficient of ABS SM in model 1 is not in line with hypothesis 5b, which stated that rival firms experience a negative performance effect from takeovers when the rivals are absolutely small. Hypothesis 5b can therefore be rejected. This conclusion contradicts the results of the research of Clougherty and Duso (2009).

Another significant result of model 1 is the control variable logADA, which measures the natural logarithm of the debt to asset ratio of acquiring firms. The positive and significant ($p < 0.1$) coefficient implies that higher debt to asset ratios of the acquiring firms has a positive effect on the performance of rival firms. This is in line with the expectations. A high debt to asset ratio means a higher degree of leverage and consequently financial risk. This implies that when acquiring firms take more financial risk, rival firms will gain.

The independent variable AROADUM1 shows a positive coefficient. AROADUM1 measures the change in the return on assets for acquiring firms for one year after the takeover. The positive sign of the coefficient is in line with hypothesis 2, which stated that the effect for rivals is dependent on the returns for the acquirer, i.e. if the takeover generates a positive effect for the acquirer, the rivals also experience a positive effect. The result of this variable is insignificant which implies that the performance of acquiring firms does not have a significant effect on the performance of rival firms.

The independent variable CROSS shows a negative coefficient. CROSS measures whether the horizontal takeover is a cross-border takeover. The negative sign of the coefficient is in line with hypothesis 3, which stated that rival firms experience a negative effect from cross-border takeovers. The result of this variable is insignificant which implies that the fact that the takeovers are cross-border does not have a significant effect on the performance of rival firms.

The independent variable INDUS shows a negative coefficient. INDUS measures whether the horizontal takeover took place in a manufacturing industry. The negative sign of the coefficient is in line with hypothesis 4, which stated that rival firms experience a negative effect from takeovers in the manufacturing industry. However, the result is insignificant which implies that the type of industry does not have a significant effect on the performance of rival firms.

The last independent variable REL SIM shows a negative coefficient. REL SIM measures if the rival firm is relatively similar to the acquiring firm in terms of size. The negative sign of the coefficient is in line with hypothesis 5a, which stated that rival firms experience a negative effect when the rivals are relatively similar to the acquirer. Nevertheless, the result is insignificant which implies that the relative size of the rival firm to the acquiring firm has no significant effect on the performance of rival firms.

Model 2 is used to test the effects of horizontal takeovers on a time period of 2 years after the takeover. In total 520 observations are included in model 2. The R-squared of model 2 is 0.008, which means that 0.8% of the variance of the return on assets of the rival firm can

be explained by variances of the independent variables in the model (Wooldridge, 2012). The R-squared of model 2 is lower than the R-squared of model 1, which makes sense because there are fewer observations included in the model. Unfortunately, all the results of the variables are insignificant. Therefore, the variables have an insignificant effect on the performance of the rival firms. Furthermore, the signs of the coefficients of AROADUM and INDUS in model 2 are similar to the coefficients in model 1. The same conclusion can be drawn, namely it is in line with hypotheses 2 and 4. However, the performance of the acquirers and the type of industry of the takeover have no significant effect on the performance of rival firms.

The independent variable CROSS shows a positive coefficient. This is not in line with hypothesis 3 and is of the opposite direction of the coefficient in model 1. Moreover, the independent variables ABS SM and REL SIM in model 2 show an opposite sign of the coefficients in model 1. The coefficient AB SM changes sign and become insignificant. The negative sign is in line with hypothesis 5b. The coefficient REL SIM has a positive sign and is not in line with hypothesis 5a.

5.4 Robustness checks

Several robustness checks are performed to increase the validity and reliability of this research. First, an OLS regression with robust error terms is performed in which AROADUM is replaced by the continuous variable of the change in return on assets of the acquiring firms ($AROA_{chg1}$ and $AROA_{chg2}$). Second, a one-sample t-test is performed in which logRROA1 and logRROA2 are replaced by the return on equity of rival firms (logRROE1 and logRROE2). Additionally, an OLS regression with robust error terms is performed with logRROE1 and logRROE2 as the dependent variables.

Table 6 shows the results of the OLS regressions with the continuous variables $AROA_{chg1}$ and $AROA_{chg2}$. In this way, one can examine the difference between the use of continuous values and dummy variables. The results show a weaker impact of the continuous return on assets of acquiring firms. Furthermore, the coefficients are insignificant just like in the original model. The weaker coefficients are in line with the expectations of Wooldridge (2012), namely that it is easier to discover a relationship by using dummy variables rather than continuous variables. The relations of the coefficients show the same directions and the coefficients remain insignificant. This implies that the original model is robust to changes.

Table 6 – OLS regression with robust error terms (continuous AROA variable)

Dependent variable		*logRROA1*	*logRROA2*
	Expected relation	**Model 1**	**Model 2**
$AROA_{chg1}$	+	3.50e-06	
		(5.73e-05)	
$AROA_{chg2}$	+		5.93e-05
			(3.67e-05)
CROSS	-	-0.00449	0.00344
		(0.00524)	(0.00457)
INDUS	-	-0.00217	-0.00162
		(0.00402)	(0.00398)
ABS SM	-	0.00904*	-0.00644
		(0.00472)	(0.00565)
REL SIM	-	-0.00177	0.00157
		(0.00491)	(0.00532)
logRAG	+	0.00417	0.00219
		(0.00272)	(0.00205)
RCS	+	-0.000204*	-2.91e-05
		(0.000121)	(0.000134)
RDE	-	-1.66e-06	-1.98e-06
		(2.00e-06)	(1.46e-06)
logRDA	-	0.000359	0.000381
		(0.00202)	(0.00211)
ACS	-	7.75e-05	-1.50e-05
		(0.000153)	(0.000151)
ADE	+	-1.63e-05	2.38e-06
		(2.32e-05)	(1.46e-05)
logADA	+	0.00421**	-0.00158
		(0.00211)	(0.00194)
Constant		4.590***	4.604***
		(0.0110)	(0.0116)
Observations		572	520
R-squared		0.030	0.008
t statistics in parentheses			
*significant at 10%; ** significant at 5%; *** significant at 1%			

The second robustness check is performed with another measure of performance for rivals and acquirers. A mentioned earlier, there are several accounting-based measures of profitability. However, there is no universal used measure of performance and therefore it can be useful to perform another regression. First, a one-sample t test is performed with logRROE1 and logRROE2 to test hypothesis 1, the results are shown in table 7. The t-values of the return on equity of the rival firms for the two periods (logRROE1 and logRROE2) are both significant

($p < 0.01$). This implies that there is a statistically difference between the mean logRROE1 and mean logRROE2 and a positive value. This is in line with the original one-sample t test. This implies that the original one-sample t test is robust to changes and hypothesis 1 can be accepted.

Table 7 – One-sample t test (return on equity)

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95%Conf.	Interval]	t-Test (t-value)
logRROE1	2,440	4.598698	.0037399	.1847383	4.591364	4.606031	1.2e+03***
logRROE2	2,357	4.601987	.0027498	.1335007	4.596595	4.607379	1.7e+03***

*significant at 10%; ** significant at 5%; *** significant at 1%

In addition, an OLS regression with robust error terms is performed with return on equity as the measure of performance, table 8 shows the results. In contrast with the original regression, there are several differences. In model 1 AROE1 becomes significant at the 10% level and has the expected sign. INDUS and REL SIM both show a different sign for the coefficients, however these results are not statistically significant. In model 2 ABS SM becomes significant at the 10% level and has the expected sign. The variables AROE2 and INDUS show a different sign for the coefficients, however these results are insignificant.

Overall, the regression with return on equity as the measure of performance has two significant variables and these variables show the expected sign for their coefficients. Therefore, it can be concluded that using return on equity does have a substantial influence on the results.

Table 8 – OLS regression with robust error terms (return on equity)

Dependent variable		*logRROE1*	*logRROE2*
	Expected relation	**Model 1**	**Model 2**
AROE1	+	0.0120*	
		(0.00711)	
AROE2	+		-0.00646
			(0.00903)
CROSS	-	-0.00342	0.00311
		(0.00699)	(0.00718)
INDUS	-	0.00343	0.0101
		(0.00877)	(0.0129)
ABS SM	-	0.00734	-0.0209*
		(0.00779)	(0.0125)
REL SIM	-	0.00743	0.0171
		(0.00682)	(0.0130)

logRAG	+	-0.00600	-0.00896
		(0.00897)	(0.0149)
RCS	+	0.000127	3.01e-05
		(0.000242)	(0.000403)
RDE	-	-3.58e-06	5.42e-06
		(1.03e-05)	(6.22e-06)
logRDA	-	0.00265	-4.46e-05
		(0.00246)	(0.00221)
ACS	-	-0.000165	-0.000163
		(0.000122)	(0.000216)
ADE	+	1.63e-05	3.16e-05
		(2.10e-05)	(7.89e-05)
logADA	+	0.00391	0.000424
		(0.00635)	(0.0112)
Constant		4.589***	4.620***
		(0.0127)	(0.0174)
Observations		556	503
R-squared		0.018	0.016
t statistics in parentheses			
*significant at 10%; ** significant at 5%; *** significant at 1%			

5.5 Summary of results

All variables were checked to verify whether their characteristics met the assumptions of the one-sample t test and the OLS regression. Several variables are altered to better match the characteristics of these assumptions. All tests lead to the conclusion that the data is suitable for the tests. However, because there are some signs of heteroscedasticity, an OLS regression with robust error terms is used (Wooldridge, 2012).

First, the relation between horizontal takeovers and the performance of rival firms is significant and positive in both the original test and the additional test. Therefore, hypothesis 1 can be accepted. These results are in line with Clougherty & Duso, 2009; Eckbo, 1983; Snyder, 1996. This means that when industry competitors engage in horizontal takeovers, rival firms will experience a positive effect on their performance. This effect holds for one and two years after the takeover took place.

Second, the relation between the performance of the acquiring firms after a takeover and the performance of rival firms is not significant in the original regression and in the additional test with a continuous value for the acquirer's performance. However, a significant effect is found in model 1 of the robustness check in which return on equity is used as a measure of performance. This result suggests that the effect for rivals of horizontal takeovers is dependent on the performance of the acquirer. Because the coefficients in the original regression show the same direction as the robustness check, hypothesis 2 can be accepted.

Third, the relation between the performance of rival firms and whether the takeover is cross-border, took place in the manufacturing industry and the size of the rival firm is relatively similar as the size of the acquirer show no significant results in all the regressions. Therefore, there be can no conclusions drawn for hypothesis 3, 4 and 5a.

Fourth, the relation between the performance of rival firms and whether the size of the rival firm is absolutely small with respect to the acquirer is contradictory. The results of model 1 of the original model and the results of model 1 of the robustness check with $AROA_{chg1}$ suggest a positive and significant relation. However, in model 2 of the robustness check with return on equity the results suggest a negative and significant relation. The direction of the coefficients of the insignificant results is in line with the coefficients of the significant results. This means that hypothesis 5b can be rejected in model 1, thus for a period of one year after the takeover. Additionally, hypothesis 5b can be accepted in model 2, for a period of two years after the takeover. This conclusion implies that absolutely small rival firms with respect to acquirers experience a positive effect on their performance after one year of the takeover and experience a negative effect on their performance after two years of the takeover.

6. Conclusion and Discussion

This aim of this research was to investigate the effects of horizontal takeovers on rival firms in European countries. The research question of this research is formulated as follows: '*How do horizontal takeovers affect the performance of rival firms in the long run?*' Prior research on this topic examined the short run effects of horizontal takeovers on rival firms (Clougherty & Duso, 2009; Fee & Thomas, 2004; Shahrur, 2005). This research focuses on the long term consequences, by examining the effects for periods of one and two years after the takeover. Prior research on this topic, for example Berger et al. (1998) argue that horizontal acquisitions create industry consolidation and decreased commitment from the target firm's existing customers. This might lead to growth opportunities for the remaining firms. Haleblian et al. (2009) state that this is an interesting topic of research, as apart from the previously mentioned research by Berger et al. (1998), little research has been done in this area.

To answer the main research question, several hypotheses are developed based on prior literature. The hypotheses were tested with a one-sample t test and an OLS regression with robust standard errors. The results indicate that horizontal takeovers have a positive effect on the long term performance of rival firms. This indicates that rival firms will gain from horizontal takeovers. This finding is in line with previous research of Clougherty & Duso (2009); Fee & Thomas (2004); Shahrur (2005) who examine the short term consequences of horizontal takeovers.

It is found that there is a positive relation between the performance of rival firms after a horizontal takeover and the performance of acquiring firms after a horizontal takeover. This suggests that the effect for rival firms of a horizontal takeover is dependent on the effect of the acquiring firms. The takeover generates a positive signal about growth opportunities if the acquiring firms gain from a horizontal takeover. This finding is in line with the research of Gaur et al. (2013) which investigate the short term effects of horizontal takeovers.

There is no significant impact found on cross-border takeovers, takeovers in the manufacturing industry and the relative size of the rival firm with respect to the acquiring firm on the performance of rival firms.

The relation between the performance of rival firms and absolute small rival firms is found to be positive for the period of one year after a horizontal takeover and is found to be negative for the period of two years after a horizontal takeover.

With this research a contribution to a better understanding of the relationship between horizontal takeovers and the performance of rival firms is made. Furthermore, this research is the first to examine this relationship for a long term period. This research contributes to the

literature on M&As by challenging the received wisdom that takeovers are always disadvantageous for firms in the industry being left outside the takeover. The findings of this research can be useful for acquiring parties, targets and rival firms involved in a horizontal takeover. The acquirer might be likely to look further than proposed synergies and their own performance when considering to enter in a M&A. The acquirer can be more aware of the consequences of the takeover of the market. The firm has more information on how rival firms will react and this can make a difference in the decision making of the firms in the takeover.

This research is subject to several limitations. First, this research could also explore the effects of industry concentration on the performance of rival firms. A large number of firms in an industry means that there is greater competition for scarce resources and also higher failure rates. For that reason, rival firms are more likely to lose from a takeover when there are many rivals in the industry (Clougherty & Duso, 2009). However, there was no measure of industry concentration found in the available databases and therefore, this hypothesis was not included in this research. Future research can include this variable to create a more comprehensive impression of the studied relationship.

Second, probably the reason why most coefficients are insignificant in the OLS regression, is that the sample size is too small. When there are more firms used to examine this relationship, there might be a larger number of significant results. For a large part of the takeovers, there were only a few or no rival firms found after the sample criteria were applied. This research used the peer analysis of the Eikon database. Future research might attempt to merge various databases containing a peer analysis. This might lead to a larger sample of rival firms and could enhance the results of the analysis.

Third, another limitation of this research and a probable cause of insignificant results in the OLS regression, is the used time frame of 2011-2017. This relatively short time frame might limit the generalizability of the research. Future research could use a larger time frame and also look at the effect of the various merger waves. These waves have appeared for different reasons in the past and might have an influence on the effect on rival firms.

Finally, this research did not explore whether the takeovers used in the sample were challenged by antitrust authorities. Eckbo (1983) argues that rival firms should experience a negative effect on their performance when the takeover has been subject to an antitrust complaint. This could be a fruitful area of investigation for future research.

Literature

Andrade, G., & Stafford, E. (2004). Investigating the economic role of mergers. *Journal of Corporate Finance, 10*(1), 1-36.

Baum, J. A., & Korn, H. J. (1996). Competitive dynamics of interfirm rivalry. *Academy of Management journal, 39*(2), 255-291.

Berger, A. N., Saunders, A., Scalise, J. M., & Udell, G. F. (1998). The effects of bank mergers and acquisitions on small business lending1. *Journal of financial Economics, 50*(2), 187-229.

Birkinshaw, J., Bresman, H., & Håkanson, L. (2000). Managing the post-acquisition integration process: How the human iintegration and task integration processes interact to foster value creation. *Journal of Management Studies, 37*(3), 395-425.

Bradley, M., Desai, A., & Kim, E. H. (1988). Synergistic gains from corporate acquisitions and their division between the stockholders of target and acquiring firms. *Journal of financial Economics, 21*(1), 3-40.

Brito, D., & Catalão-Lopes, M. (2006). *Mergers and acquisitions: the industrial organization perspective* (Vol. 19): Kluwer Law International.

Clougherty, J. A., & Duso, T. (2009). The impact of horizontal mergers on rivals: gains to being left outside a merger. *Journal of Management Studies, 46*(8), 1365-1395.

Eckbo, B. E. (1983). Horizontal mergers, collusion, and stockholder wealth. *Journal of financial Economics, 11*(1-4), 241-273.

Eckbo, B. E., & Wier, P. (1985). Antimerger policy under the Hart-Scott-Rodino Act: A reexamination of the market power hypothesis. *The Journal of Law and Economics, 28*(1), 119-149.

Ellison, S. F., & Snyder, C. M. (2010). Countervailing power in wholesale pharmaceuticals. *The Journal of Industrial Economics, 58*(1), 32-53.

Fee, C. E., & Thomas, S. (2004). Sources of gains in horizontal mergers: evidence from customer, supplier, and rival firms. *Journal of financial Economics, 74*(3), 423-460.

Gaur, A. S., Malhotra, S., & Zhu, P. (2013). Acquisition announcements and stock market valuations of acquiring firms' rivals: A test of the growth probability hypothesis in China. *Strategic Management Journal, 34*(2), 215-232.

Gubbi, S. R., Aulakh, P. S., Ray, S., Sarkar, M., & Chittoor, R. (2010). Do international acquisitions by emerging-economy firms create shareholder value? The case of Indian firms. *Journal of International Business Studies, 41*(3), 397-418.

Gugler, K., Mueller, D. C., Yurtoglu, B. B., & Zulehner, C. (2003). The effects of mergers: an international comparison. *International journal of industrial organization, 21*(5), 625-653.

Haleblian, J., Devers, C. E., McNamara, G., Carpenter, M. A., & Davison, R. B. (2009). Taking stock of what we know about mergers and acquisitions: A review and research agenda. *Journal of management, 35*(3), 469-502.

Hannan, M. T., & Freeman, J. (1984). Structural inertia and organizational change. *American sociological review*, 149-164.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American economic review, 76*(2), 323-329.

Jensen, M. C. (1987). The free cash flow theory of takeovers: A financial perspective on mergers and acquisitions and the economy.

Krishnan, H. A., Hitt, M. A., & Park, D. (2007). Acquisition premiums, subsequent workforce reductions and post-acquisition performance. *Journal of Management Studies, 44*(5), 709-732.

Larsson, R., & Finkelstein, S. (1999). Integrating strategic, organizational, and human resource perspectives on mergers and acquisitions: A case survey of synergy realization. *Organization science, 10*(1), 1-26.

Leeth, J. D., & Borg, J. R. (2000). The impact of takeovers on shareholder wealth during the 1920s merger wave. *Journal of Financial and Quantitative Analysis, 35*(2), 217-238.

Libby, R. (1981). Accounting and human information processing. In *The Routledge Companion to Behavioural Accounting Research* (pp. 42-54): Routledge.

Loewenstein, G. (1999). Experimental economics from the vantage-point of behavioural economics. *The Economic Journal, 109*(453), 25-34.

Malmendier, U., & Tate, G. (2008). Who makes acquisitions? CEO overconfidence and the market's reaction. *Journal of financial Economics, 89*(1), 20-43.

Meeks, G., & Meeks, J. (1981). Profitability measures as indicators of post-merger efficiency. *The Journal of Industrial Economics*, 335-344.

Moeller, S. B., Schlingemann, F. P., & Stulz, R. M. (2005). Wealth destruction on a massive scale? A study of acquiring-firm returns in the recent merger wave. *The journal of finance, 60*(2), 757-782.

Molnar, J. (2007). Pre-emptive horizontal mergers: theory and evidence.

Papadakis, V. M., & Thanos, I. C. (2010). Measuring the performance of acquisitions: An empirical investigation using multiple criteria. *British Journal of Management, 21*(4), 859-873.

Peter, J. P. (1981). Construct validity: A review of basic issues and marketing practices. *Journal of marketing research*, 133-145.

Porrini, P. (2004). Can a previous alliance between an acquirer and a target affect acquisition performance? *Journal of management, 30*(4), 545-562.

Porter, M. E. (2008). *Competitive strategy: Techniques for analyzing industries and competitors*: Simon and Schuster.

Shahrur, H. (2005). Industry structure and horizontal takeovers: Analysis of wealth effects on rivals, suppliers, and corporate customers. *Journal of financial Economics, 76*(1), 61-98.

Shleifer, A., & Vishny, R. W. (2003). Stock market driven acquisitions. *Journal of financial Economics, 70*(3), 295-311.

Snyder, C. M. (1996). A dynamic theory of countervailing power. *The RAND Journal of Economics*, 747-769.

Song, M. H., & Walkling, R. A. (2000). Abnormal returns to rivals of acquisition targets: A test of theacquisition probability hypothesis'. *Journal of financial Economics, 55*(2), 143-171.

Stigler, G. J. (1964). A theory of oligopoly. *Journal of political Economy, 72*(1), 44-61.

Studenmund, A. (2006). *Using Econometrics: A Practical Guide (5 th)*: Boston, MA: Pearson Education, Inc.

Thanos, I. C., & Papadakis, V. M. (2012). The use of accounting-based measures in measuring M&A performance: a review of five decades of research. In *Advances in mergers and acquisitions* (pp. 103-120): Emerald Group Publishing Limited.

Uhlenbruck, K., Hitt, M. A., & Semadeni, M. (2006). Market value effects of acquisitions involving Internet firms: A resource-based analysis. *Strategic Management Journal, 27*(10), 899-913.

Wooldridge, J. M. (2012). *Introductory econometrics : a modern approach*. Cincinnati, OH :: South-Western College.

Zollo, M., & Singh, H. (2004). Deliberate learning in corporate acquisitions: post-acquisition strategies and integration capability in US bank mergers. *Strategic Management Journal, 25*(13), 1233-1256.

Appendix A

Table 1 – Comparison theories			
Theory	**Focus**	**Assumptions**	**Effect on rival firm**
Collusion	Takeovers reduce the number of firms in the industry which reduces competition and rivalry.	Horizontal takeovers Monopoly rents	Positive
Productive efficiency	Takeovers result in an increase of efficiency for merging firms which lead to more intense competition. Takeovers signal an industry wide increase in productivity.	Horizontal takeovers Implementation cost-efficient production	Unrestrictive
Buying power	Takeovers increase the concentration of the buying industry and an opportunity to pressure suppliers.	Horizontal takeovers Monopsony rents	Positive
Value destroying	Takeovers are value destroying for merging firms and represent a competitive opportunity for rival firms.	Horizontal takeovers Failure merging firms	Positive

Appendix B

Table 2a		
Country rivals	**Freq.**	**Percent**
Austria	56	1.89
Belgium	63	2.13
Switzerland	137	4.63
Czech Republic	1	0.03
Germany	355	11.99
Denmark	100	3.38
Estonia	1	0.03
Spain	120	4.05
Finland	93	3.14
France	346	11.69
United Kingdom	932	31.49
Greece	60	2.03
Ireland	33	1.11
Iceland	6	0.20
Italy	150	5.07
Luxembourg	13	0.44
Netherland	65	2.20
Norway	145	4.90
Poland	3	0.10
Portugal	39	1.32
Romania	1	0.03
Russia	8	0.27
Sweden	233	7.87
Total	**2960**	**100**

Table 2b		
Country acquirers	**Freq.**	**Percent**
Austria	1	0.3
Belgium	10	3.02
Switzerland	2	0.6
Germany	16	4.83
Denmark	15	4.53
Estonia	1	0.3
Spain	22	6.65
Finland	15	4.53
France	25	7.55
United Kingdom	152	45.92
Ireland	8	2.42
Italy	21	6.34
Luxembourg	3	0.91
Netherlands	9	2.72
Poland	1	0.3
Portugal	2	0.6
Sweden	28	8.46
Total	**331**	**100**

Appendix C

Table 3 – Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
logRROA1	2,405	4.604727	.0802508	3.094823	5.989964
logRROA2	2,341	4.603786	.0878242	2.72458	6.438551
AROA1	2,644	.3547655	.4785327	0	1
AROA2	2,468	.4254457	.4945106	0	1
CROSS	2,974	.2579018	.4375532	0	1
INDUS	2,974	.2700067	.4440376	0	1
ABS SM	2,378	.4579479	.4983333	0	1
REL SIM	2,182	.2030247	.402343	0	1
logRAG	1,549	2.343503	1.4645	-4.60517	8.903946
RCS	1,994	40.53432	27.1977	.03	100
RDE	2,188	143.6261	839.2686	-7674.54	23544.56
logRDA	2,148	2.727895	1.583132	-4.60517	11.0739
ACS	2,194	42.29388	29.14151	.05	99.99
ADE	2,339	117.9185	298.6273	-2667.84	5549.44
logADA	2,294	2.608566	1.615651	-4.60517	5.116856

Appendix D

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of logRROA1

chi2(1) = 148.38

Prob > chi2 = 0.0000

Appendix E

Table 4 – Variance Inflation Factor test		
Variable	**VIF**	**1/VIF**
INDUS	1.22	0.816742
RCS	1.22	0.820341
logADA	1.22	0.820855
ADE	1.21	0.828994
logRDA	1.16	0.858539
ACS	1.15	0.868854
CROSS	1.14	0.876215
logRAG	1.11	0.901340
ABS SM	1.09	0.914310
AROA1	1.03	0.966198
RDE	1.02	0.978914
REL SIM	1.01	0.985936
Mean VIF	1.13	

Appendix F

Table 5a – Model 1 correlation matrix						
	logRROA1	**AROA1**	**CROSS**	**INDUS**	**ABS SM**	**REL SIM**
logRROA1	1.0000					
AROA1	0.0262	1.0000				
CROSS	-0.0447	0.0143	1.0000			
INDUS	-0.0304	-0.0713	0.2763	1.0000		
ABS SM	0.0843	-0.0383	-0.0938	-0.1639	1.0000	
REL SIM	-0.0126	0.0138	-0.0057	-0.0115	0.0213	1.0000
logRAG	0.0874	-0.0463	-0.0226	0.0091	0.1149	0.0418
RCS	-0.0423	-0.0951	-0.0455	-0.1048	0.0139	0.0668
RDE	-0.0052	0.0172	-0.0050	0.0172	0.0387	-0.0451
logRDA	0.0171	0.0615	-0.0146	0.0976	-0.1323	-0.0678
ACS	0.0096	-0.0401	0.0129	-0.0852	-0.0468	0.0554
ADE	-0.0436	0.0382	0.1251	-0.1675	-0.1240	0.0243
logADA	0.0615	0.1260	0.0952	-0.0548	-0.1255	-0.0249

Table 5b – Model 1 correlation matrix							
	logRAG	**RCS**	**RDE**	**logRDA**	**ACS**	**ADE**	**logADA**
logRAG	1.0000						
RCS	0.2685	1.0000					
RDE	-0.0064	-0.0925	1.0000				
logRDA	-0.0948	-0.2103	0.0842	1.0000			
ACS	0.1169	0.2304	-0.0587	0.0793	1.0000		
ADE	-0.0689	0.0342	0.0076	0.1287	-0.0184	1.0000	
logADA	-0.0981	-0.0160	-0.0216	0.1701	-0.1683	0.3206	1.0000

Table 6a – Model 1 correlation matrix						
	logRROA2	**AROA2**	**CROSS**	**INDUS**	**ABS SM**	**REL SIM**
logRROA2	1.0000					
AROA2	0.0003	1.0000				
CROSS	0.0259	0.1648	1.0000			
INDUS	0.0035	-0.0405	0.2582	1.0000		
ABS SM	-0.0477	0.0186	-0.1008	-0.1343	1.0000	
REL SIM	0.0111	0.0391	0.0261	-0.0090	0.0338	1.0000
logRAG	0.0468	-0.0737	-0.0338	0.0262	0.0941	0.0530
RCS	-0.0012	-0.0609	-0.0506	-0.0901	-0.0119	0.0635
RDE	-0.0152	0.0302	-0.0070	0.0096	0.0410	-0.0466
logRDA	0.0022	0.0125	0.0149	0.0652	-0.1131	-0.0799
ACS	0.0068	-0.0184	0.0078	-0.1140	-0.0486	0.0560
ADE	0.0054	0.1625	0.1313	-0.1742	-0.1175	0.0254
logADA	-0.0303	0.2451	0.1027	-0.0655	-0.1251	-0.0046

Table 6b – Model 1 correlation matrix							
	logRAG	**RCS**	**RDE**	**logRDA**	**ACS**	**ADE**	**logADA**
logRAG	1.0000						
RCS	0.2531	1.0000					
RDE	-0.0068	-0.0901	1.0000				
logRDA	-0.1019	-0.1965	0.0820	1.0000			
ACS	0.1136	0.2561	-0.0618	0.0733	1.0000		
ADE	-0.0752	0.0305	0.0057	0.1268	-0.0131	1.0000	
logADA	-0.0921	0.0083	-0.0267	0.1680	-0.1476	0.3201	1.0000