The Impact of Unrelated Diversification on Firm Value

Master Thesis Report

Author: J.H.S. Meijer (s0139696)

Study: MSc Business Administration – Financial Management Track

Supervisors: Prof. dr. R. Kabir (University of Twente)

Dr. S.A.G. Essa (University of Twente)

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This document is written as my Master Thesis for my study Business Administration – Financial Management track at the University of Twente. During this study I developed a particular interest in the topics 'Risk Management' and 'Corporate Finance', which lead to the choice of this particular graduation topic.

As a financial management graduate, I made the decision to carry out this graduation project at the department of Finance & Accounting under the supervision of Prof. dr. Kabir. As a proven head of department who also taught appealing finance courses during my study, this choice was easily made. Besides the wish to successfully graduate, it was important for me to acquire knowledge and gain more (finance) skills during the investigation. After finishing my work within the department of Finance & Accounting, I can conclude that all my expectations were fulfilled. Prof. dr. Kabir appeared to be a very patient and skilful supervisor and I want to thank him for all the time and efforts he made for the completion of my graduation project. Furthermore, I want to thank Dr. Essa as my second supervisor for providing me very useful advice and recommendations in the last phase of my graduation project, substantially improving the quality of my thesis. Dr. Essa was also always willing to help, skilful and patient and I'm thankful for the fact that both supervisors were willing to supervise my graduation thesis.

Overall, I'm very pleased to have chosen to graduate as a financial management graduate. I'm confident that the acquired knowledge and skills will be helpful for my future career.

Abstract

This thesis examines the impact of unrelated diversification on firm value for both German and Dutch publicly listed firms. I find that unrelated diversified German conglomerates possess a higher relative value of 0.5% compared to their related diversified counterparts; for the Dutch sample, the results were too inconsistent to draw conclusions with respect to the differences between related and unrelated diversified firms. Besides the differences with respect to the valuation effect between related and unrelated diversification, this thesis also contributes to literature by directly investigating if corporate diversification in general is value reducing or enhancing, and whether this valuation effect is more or less pronounced during the recent financial crisis (2007-2009). I find that as well German and Dutch conglomerates trade, compared to their standalone counterparts, on a relative lower value of on average 20%. This result supports part of literature arguing that diversified firms trade indeed at a discount compared to standalones. With respect to the recent financial crisis (2007-2009), I find that this period can have both positive as negative effects on the firm value of German and Dutch conglomerates (related & unrelated). Conglomerates from both countries can have a relative higher or lower value compared to their standalone counterparts, depending on the choice of method to assess the relative value of as well diversified and standalone firms.

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Chapter 1. Introduction

Corporate diversification and its impact on firm value is a popular and widely discussed topic in literature, and can in general be divided into three categories: 1. Corporate diversification in general will lead to a reduction of overall firm value (Aggarwal & Samwick, 2003; Berger & Ofek, 1995; Hoechle et al., 2012), there is no impact at all (Amman et al., 2012; Zahavi & Lavie, 2013) or a firm value increasing effect due to corporate diversification (Choe et al., 2014; Villalonga, 2004). Overall, it can be stated that there is still no consensus whether corporate diversification is value increasing or reducing firm value. Corporate diversification can also be subdivided in different types. For example, there exists national or international (or called 'global') corporate diversification (Denis et al., 2002), and corporate diversification can for example be in the same industry (related) or in a completely different industry (unrelated) (Erdorf et al., 2013). Different types of corporate diversification and its impact on numerous firm-specific factors [e.g. human resources (Neffke & Henning, 2013), bankruptcy risk (Singhal & Zhu, 2013), etc.] suggest that there are several possibilities to investigate a certain type of diversification and its impact on several firm-specific factors.

As a financial management graduate, the topic concerning the impact of corporate diversification on firm value is most appealing. Recently, a lot of firms are diversified; but does corporate diversification in the end lead to an increase in firm value? There are numerous studies done on why firms diversify and if this diversification increases or destroys firm value. Furthermore, there is a discussion concerning whether the method(s) to measure the impact of corporate diversification on firm value are correct or biased (Rudolph & Schwetzler, 2014). For corporate managers it is important to know if a certain diversification strategy is worthwhile to pursue in terms of an increase in firm value, and will probably depend on several internal as external factors. Therefore, it can be valuable for a certain corporate firm to have (more) relevant information concerning the impact of corporate diversification on firm value. This information can be taken into account to make a more substantiate decision about a corporate diversification decision.

This thesis investigates the impact of unrelated diversification on firm value. The reason to choose unrelated diversification specifically, lies in the fact that this type of diversification seems to be more challenging for a company than related diversification (Doukas & Kan, 2006). With respect to acquisitions, for example, the assumed lack of skills, inexperience and perhaps some specific resources can make much harder to capitalize on a unrelated diversification move than on a related acquisition (Denis et al., 2002).

Using two separate data samples of German and Dutch publicly listed firms from 2005-2013, I firstly document that the relative value of as well German and Dutch conglomerates are on average 20% lower compared to their standalone counterparts, finding support for the fact that diversified firms trade indeed at a discount compared to standalones. Secondly, with respect to related and unrelated diversification, I find that unrelated diversified German conglomerates possess a 0.5% higher relative value compared to their related diversified counterparts. For the Dutch sample, the results were too inconsistent to draw conclusions with respect to the differences between related and unrelated diversified firms. Thirdly, I find that the recent financial crisis (2007-2009) can have both positive as negative effects on the firm value of German and Dutch conglomerates (related & unrelated) and that these conglomerates can trade both at a higher or lower relative value compared to their standalone counterparts; depending on the choice of imputed value calculation and type of firm valuation.

Limitations in this thesis mainly have to do with the used data sample: A bigger data sample (especially The Netherlands) and perhaps an improved categorization whether a firm is related or unrelated diversified can perhaps lead to more reliable and consistent results. A further limitation in this thesis is the lack of further empirical evidence with respect to the relationship between excess values of diversified and standalone firms, and the recent financial crisis (2007-2009).

1.1 Research questions

The research in this thesis is being conducted on German and Dutch publicly listed firms. The reason for this choice is because Germany is the biggest economy in Europe (Greenglass et al., 2014) and has a lot of firms that are active in unrelated diversification activities. The Netherlands is also a prosperous Western-European country with several publicly listed firms engaging in diversification activities, and it is therefore interesting to investigate possible differences between these two countries. Furthermore, there exists (to my knowledge) no literature specifically on both countries (Germany and The Netherlands) with respect to the subject of unrelated diversification and firm value. The first research question is therefore as follows:

RQ1: Does unrelated diversification affect the firm value of publicly listed German and Dutch firms?

Which is raising the following sub questions:

- Are German and Dutch publicly listed firms related/unrelated diversified?

- How can firm value be measured?
- How can the impact of unrelated diversification on firm value be measured?

Germany is also a country that was affected by the recent financial crisis (2007-2009), but in a less way than other European countries (Dungey & Gajurel, 2014; Greenglass et al., 2014). It is therefore interesting to investigate possible differences between both countries with respect to the impact of the recent financial crisis (2007-2009) on the firm value of as well diversified and standalone German and Dutch publicly listed firms. Reasoning for this investigation is as follows: Diversified firms with multiple divisions hold significantly less cash than specialized firms, because they are diversified in their investment opportunities (De La Fuente et al., 2014; Duchin, 2010; O'brien et al., 2014). Holding less cash due to diversification in investment opportunities is associated with efficient flows of funds to the more productive divisions. Such more productive divisions have better investment opportunities and therefore less precautionary cash is needed for the less productive divisions, because the cash will be generated by the productive divisions. Furthermore within multidivisional (diversified) firms, lower cross-divisional correlations in investment opportunity leads to lower cash holdings, because those firms are less likely to encounter multiple investment opportunities in both divisions simultaneously. A lower correlation in investment opportunities across divisions decreased the marginal value of cash holdings, and therefore reduces the precautionary demand for cash. Similarly, when the cross-divisional correlation in cash flow is low, firms are able to optimally hold less cash because they are less likely to experience simultaneous adverse cash flow shocks in both divisions. The reason for this is that investments can be financed using internally generated cash flows without the need to resort to costly cash holdings.

It seems worthwhile to investigate if during the recent financial crisis, corporate diversified firms have a possible advantage over standalone firms due to their better internal finance possibilities. Comparing the firm value of diversified Dutch and German firms to standalone firms in the pre-crisis and crisis period can lead to interesting findings which can eventually help to propose an advice whenever a certain diversification strategy is worthwhile to pursue. Therefore, the second research question is stated as follows:

RQ2: To what extent did the recent financial crisis (2007-2009) have an impact on the difference in firm value between diversified and standalone publicly listed German and Dutch firms?

Raising a sub question as follows:

- How can the impact of the recent financial crisis (2007-2009) on the firm value of publicly listed German and Dutch firms be measured?

1.2 Contribution

Until now, there is still no consensus whether corporate diversification destroys or generates firm value (Erdorf et al., 2013). Recent papers by Rudolph & Schwetzler (2013) and Hautz et al. (2012) use respectively European and solely UK data and argue that it is still indefinite whether corporate diversification destroys or generates firm value. Part of my investigation is therefore analyzing the impact of corporate diversification on firm value using Dutch and German data, and also specifically the impact of unrelated diversification on the firm value of German and Dutch publicly listed firms. It is found in literature that Germany is a country that was affected by the recent financial crisis (2007-2009), but in a less way than other European countries (Dungey & Gajurel, 2014; Greenglass et al., 2014). I try to contribute to this part of literature by investigating if there are indeed significant differences between Germany and a relatively comparable European country (the Netherlands) with respect to firm valuation, to investigate if these findings by Dungey & Gajurel (2014) and Greenglass et al. (2014) are supported.

The second innovative part is to analyze the impact of the recent financial crisis (2007-2009) on the firm value of diversified (both related and unrelated) and standalone firms. Earlier investigation argues that diversified firms have better internal financing possibilities and therefore have a possible advantage during a credit-constrained environment (Duchin, 2010). It is found in literature that diversified firms from a US and Global sample suffered a smaller loss in firm value than standalone firms during the recent financial crisis (2007-2009) (De la Fuente et al., 2014; Kuppuswamy et al., 2010; Rudolph & Schwetzler, 2014). Besides these findings, there exists (to my knowledge) no literature focusing on the impact of the financial crisis on the firm valuation of solely German and Dutch publicly listed firms and is therefore also an innovative aspect of this thesis.

The fact that diversified firms have better internal financing possibilities than standalone firms in a credit-constrained environment, is positively related with the amount of unrelated segments (Hann et al., 2013). These findings also give rise to the question whether there are firm valuation differences between related and unrelated diversified firms during the recent financial crisis (2007-2009). However, there exists until now (to my knowledge), no explicit

research focusing on a possible difference in firm valuation between related and unrelated diversified firms specifically during the recent financial crisis (2007-2009). Even if there exists literature on this specific topic, it is probably still not focusing on solely German and Dutch firms. The third innovative part is therefore the investigation of significant differences with respect to the firm valuation of related and unrelated diversified firms between German and Dutch publicly listed conglomerates.

1.3 Structure of thesis

The remainder of this thesis is organized in the following way: Chapter 2 provides an overview of the literature concerning corporate diversification to obtain a decent understanding. Reasoning behind the found effect(s) of corporate diversification on firm value is being discussed, where a subdivision will be made between literature based on related and unrelated diversification. Earlier found literature with respect to the impact of the recent financial crisis (2007-2009) on firm value will also be threatened.

In chapter 3, hypotheses will be formulated. With the knowledge gained from the literature review these hypotheses will be discussed and substantiated.

In chapter 4, the method used for investigation will be discussed. Knowing which method has the best fit in the unrelated diversification field and what demands/requirements of this method are necessary in order to get reliable results? In this chapter, different models and their advantages/disadvantages will be discussed to justify the model to be used for investigation.

Chapter 5 will present/discuss the characteristics and requirements of the data to be used. In this chapter the data will also be summarized and summary statistics will be discussed in order to get a comprehensive overview of the used data.

In chapter 6, the results of analysing the data will be summarized and the main findings including validity of these results will be discussed.

In the last chapter, chapter 7, conclusions concerning these found results will be drawn, limitations discussed and assumptions with respect to explanations for the found results will be provided.

Chapter 2. Literature review

This thesis is about the valuation effects of corporate diversification on firm value, therefore mainly literature investigating these effects will be discussed as follows:

2.1 Corporate diversification: Definitions and motives

2.2 Effects of corporate diversification on firm value

2.3 Explanations/reasoning valuation effect due to corporate diversification

2.4 Related vs. unrelated diversification

2.5 The value of corporate diversification during the recent financial crisis (2007-2009)

2.1 Definitions

According to Martin et al. (2003), corporate diversification is the combining of business units that operate in different industries under the common control of a single firm. Fauver et al. (2003) argue that corporate diversification is a practice under which a firm enters an industry or market different from its core business and argue in general that corporate diversification is about the process of initiating new businesses.

This broad definition concerning corporate diversification can be narrowed down to certain types of diversification. According to Denis et al. (2002), corporate diversification can be at national and as well on an international (global) level, and defines global diversification as the diversification of a firm's operations across different national markets. Furthermore a firm can expand into additional businesses new to the firm, which is called inter-industry diversification (Zahavi & Lavie, 2013); a synonym for this is the definition industrial diversification, which implies the diversification of a firm's operations across multiple lines of business (Denis et al., 2002). It is also possible for a firm to have more than one market niche or product line within the same single-line industry, this is called intra-industry diversification (Lin & Su, 2008). Furthermore, diversification can as well be related as unrelated (Dhandapani & Upadhyayula, 2015). According to Tanriverdi & Venkatraman (2005) related diversification refers to the extent to which the firm's businesses draw on similar skills or resources and unrelated diversification vice-versa. In this case, skills refer mainly to know-how knowledge which is on one hand acquired by experience a firm has in a certain type of business and on the other hand is obtained by the skills of the employees working in the corresponding firm (Tanriverdi & Venkatraman, 2005). When firms diversify in similar business segments, the already acquired skills and resources can often be easily

transferred to these new obtained business segments because these segments possess similar needs characteristics as the core activities and therefore need similar skills and resources (Tanriverdi & Venkatraman, 2005). This is confirmed by Neffke & Henning (2013), who describes related diversification as diversification strategies that are building on a firm's core skills and resources. Neffke & Henning (2013) argues that the fit of these core skills and resources determines the extent of relatedness of business segments with the firm's core business: A diversification move is regarded as related if there exists a significant fit between an acquired business segment and the firm's core activities.

2.2 Motives

Why do firms diversify? Recalling Modigliani-Miller assumptions, that in perfect capital markets corporate diversification will be irrelevant to firm value. Stockholders can diversify away unsystematic risk by directly diversifying their own (stock) portfolio, so they are perhaps not interested that a firm, from which they are stockholder, diversifies in the first place. Therefore, there should be other explanations why firms diversify. After investigating the literature, the most pronounced reasons why firms do diversify are as follows:

Agency theory

According to Eisenhardt (1989), agency theory involves two parties: An agent and the principal of the agent. In business, the agent is often the manager of a firm, while the principal of the agent is a shareholder or other stakeholder who has financial interests in the firm. In general, two problems can occur within this relationship (Eisenhardt, 1989):

1. The desires or goals of the principal and agent are in conflict
2. It is difficult or expensive for the principal to monitor what the agent is actually doing.

Especially important in case of business problems is the attitude towards risk: The principal and the agent may have a different attitude towards risk, and thus each prefer actions that suit this perceived risk tolerance leading to conflicts between principal and agent (Eisenhardt, 1989). So, regardless of actual investment efficiency from shareholders perspective, a corporate diversification strategy can be in the best interest of management and therefore be a reason why firms diversify in the first place. Aggarwal & Samwick (2003) furthermore found that managers besides private benefits, also want to diversify the firm to reduce their exposure to risk in terms of job security and privately invested wealth.

Debt co-insurance effect

According to Duchin et al. (2010) and Hann et al. (2013), there can be purely financial reasons why firms diversify their business: Different business segments lead to imperfectly correlated cash flows, thereby reducing overall firm risk and decreasing the probability of insufficient debt service. This so-called debt co-insurance effect can lead to a higher (potential) debt capacity and thus less probability for firms to forego positive NPV (Net Present Value)-projects, which are contributing to overall firm value (Doukas & Kan, 2006). This debt co-insurance effect can also lead to an increased firm value through an increased tax shield and substitution of equity with debt-capital (Rudolph & Schwetzler, 2013).

Internal capital markets

The creation of internal capital markets is also often regarded as an important reason why firms diversify (Erdorf et al., 2013). According to Erdorf et al. (2013), the two main aspects of internal capital markets are:

- Assets in one segment can be used as collateral to obtain funding for other segments.
- Cash flows generated by one segment may be used to subsidize investments in other segments (cross-subsidization).

After investigation of literature, internal capital markets in general can as well have positive or negative effects (Berger & Ofek, 1995; Mansi & Reeb, 2002):

Positive: Cross-subsidization can reduce/eliminate costs due to financial constraints; especially when a segment is poor performing and other ones are doing financially very well (Berger & Ofek, 1995).

Negative: Overinvestment in segments with worse prospects and/or less positive NPV-projects and underinvestment in segments with good prospects and/or more positive NPV-projects. Financial constraints in segments and the cross-subsidization needed can result that otherwise correctly invested funds (i.e. in good prospect segments), will be allocated to segments with worse NPV-opportunities (Mansi & Reeb, 2002).

Resource-based view

Barney (1991) argues that firms should strive for valuable, rare, inimitable and non-substitutable (VRIN) resources which can result in an (increased) competitive advantage and perhaps even lead to a sustainable competitive advantage. An increased competitive advantage can lead to a better position and sales in the market the firm is operating, resulting in an increased firm value. VRIN resources can therefore be an important driver of

diversification activities, because firms can obtain these VRIN resources by acquiring other companies who possess these VRIN resources (Wan et al., 2011).

Besides obtaining necessary resources, the allocation of resources can also be a reason why firms want to diversify their business. Diversified firms can allocate resources across divisions and can adjust (in comparison to single-segment firms) this resource allocation in response to industry (demand) shocks, making them less vulnerable (Maksimovic & Phillips, 2008).

Matsuka (2001) draws further on the resource-based view of Barney (1991). He argues that when a firm possess those strategic advantages, it might prove worthwhile to expand into different industries, trying to exploit these advantages also in different industries. This exploitation can also lead to an (increased) competitive advantage and sales in these different industries, resulting in a higher overall firm valuation of the conglomerate. Because the current environment of many firms is fast changing, not only possessing strategic resources, but also the capability to transfer these valuable firm resources into competitive advantages can prove useful if a firm wants to enter different markets. Firms which possess these capabilities and want to profit from them, can do this also outside their own industry, leading to unrelated diversification.

Market power

Another motive why firms diversify, lies in the fact that firms want to increase their market power. According to Villalonga (2000) firms can have anti-competitive motives to increase their market power. Villalonga (2000) argues that these main motives are:

- Profits generated in one industry can be used for predatory pricing in other industries the company is involved. This way a firm can knock out other firms to reduce competition and eventual raise prices once (part of) the competition is gone, increasing revenue and eventually firm value.
- Multi-market competition: Collusion with firms that are also in (the same) multiple markets, so they can maximize profits and also knock out other competition.
- Getting involved in reciprocal buying processes with other large firms, which is lowering cost prices and increasing revenues which eventually lead to a higher firm value. Smaller competitors are furthermore left aside and are not getting involved in this economy of scale, which results in a worse competitive position and perhaps eventually in a default.

2.3 Effects of corporate diversification on firm value

A large part of literature concerning the topic of corporate diversification are dealing with the impact/effect on firm value. Besides the in paragraph 2.1 discussed motivations why firms engage in diversification activities, there is up till today still no consensus whether corporate diversification destroys or generates firm value. Numerous studies (e.g. Berger & Ofek, 1995; Doukas & Kan, 2006; Rudolph & Schwetzler, 2013) examined the effects of corporate diversification on firm value by comparing the value of diversified relative to comparable focused firms. Most of these studies suggest that, on average, firms destroy value by engaging in diversification activities (e.g.. Berger & Ofek, 1995; Hoechle et al., 2012), but there are also studies who argue that firms increase their value due to corporate diversification activities (e.g. Choe et al., 2014; Villalonga, 2004). After investigation of literature, it is clear that corporate diversification itself is not the sole driver of a diversification discount/premium: The effect is heterogeneous across industry settings, governance structures and economic conditions (Erdorf et al., 2013).

In general two approaches, namely cross-sectional and event studies, are used to assess the impact of corporate diversification on firm value (Erdorf et al., 2013).

2.3.1 Cross-sectional studies

Lang & Stulz (1994) were among the first who found a diversification discount for diversified firms compared to a portfolio of comparable single-segment firms, by assessing Tobin's Q for as well the diversified firms and its standalone counterparts. After controlling for R&D-expenses, firm size and access to financial markets, this found discount remains significant. Berger & Ofek (1995) also found a diversification discount for a global sample of diversified firms. According to them, diversified firms trade at a 13-15% discount compared to single-segment firms and that substantially more value is lost when firms engage in earlier discussed unrelated diversification activities. A firm value reduction due to diversification activities is found in several other studies for different countries and different sample periods. The study of Hautz et al. (2012) makes use of an UK sample and found a significant diversification discount for conglomerates. This is in line with a study of Lins & Servaes (1999) who made use of a European sample to investigate the impact of corporate diversification on firm value, and also found a diversification discount for all European firms except Germany. Rudolph & Schwetzler (2013) found relatively similar results for continental European countries, arguing that there exists a diversification discount for these countries with the exception of Germany: For this country the result remains indefinite. Some studies focus solely on US markets and found a significant diversification discount. For example Doukas & Kan (2006) found a

diversification discount of 12% for their 1992-1997 US sample. Most of the studies (e.g. Mansi & Reeb, 2002; Rudolph & Schwetzler, 2014) however make use of a global sample with similar sample requirements like Berger & Ofek (1995). One of such studies is a study by Hund et al. (2010) who found a diversification discount of approximately 11% for their 1978-2005 global sample. Other studies are solely focusing on Asian firms; the studies of Claessens et al. (1998) and Lins & Servaes (2002) found a significant discount or respectively 14% and 16% for their sample consisting out of firms from Asian economies.

Besides diversification discounts, there are also cross-sectional studies which found no evidence of a firm value reduction due to corporate diversification (e.g. Glaser & Müller, 2010; Zahavi & Lavie, 2013) or even found a significant diversification premium (e.g. Lee et al., 2012; Villalonga, 2004). Fauver et al. (2003) found that excess values of diversified firms are close to zero or sometimes even positive in emerging markets. Differences in the development of the country's capital market and level of investor protection (which is low in emerging economies) leads to the fact that the value of diversification can substantially vary across countries. A significant diversification premium is for example also found by Kuppuswamy et al. (2012). Their investigation of a global sample from 38 countries over 15 years leads to a significant premium for diversified firms emerging economies, bringing forth the argument that the in presence of capital market frictions, diversified firms do have an advantage over standalone firms due to better internal financing possibilities. On the other hand, Kuppuswamy (2012) however found that diversified firms in developed countries do however suffer a loss in firm value compared to their standalone counterparts, leading to a diversification discount.

2.3.2 Event studies

It is also possible to investigate how the stock market reacts to a decision of a firm to (further) diversify. These studies have the main idea that diversified firms trade at a discount, relative to what those firms would be worth if they were split in separate single-segment entities. Empirical evidence of a positive reaction to refocusing moves of diversified firms is found by Krishnaswami & Subramaniam (1999). On the other hand, some studies (e.g. Akbulut & Matsusaka, 2010; Chevalier, 2004) found empirical evidence that the stock market reacts positively to diversifying moves of a firm. Chevalier (2004) argues that the event returns are higher if the diversification move is related, while Akbulut & Matsusaka (2010) found no significant difference in returns from related and unrelated diversification moves. Overall, there is also no consensus with respect to event studies whether a diversification move destroys or creates firm value.

2.4 Explanations valuation effect due to corporate diversification

This chapter covers the reasons found by literature as explanation for the found diversification discount/premium. The explanations found in the literature will be assigned to as well value reducing (paragraph 2.4.1) or value enhancing (paragraph 2.4.2).

2.4.1 Value reducing

The value reducing effects can be divided in main drivers, which will be discussed in more detail because they are most pronounced in literature.

Risk-reducing effects

Berger & Ofek (1995) found evidence that diversified firms overinvest more than single-segment firms, affecting the firm value of diversified firms. Furthermore, they also found evidence that cross-subsidization between segments of diversified firms is lowering the overall firm value of the diversified firm. Same results and reasoning are found by Mansi & Reeb (2002), who also argue that cross-subsidize investments in divisions with poor growth opportunities and misallocation of investment funds leads a reduction of positive NPV-projects, lowering overall firm value.

Another risk-reducing effect is found by Amman et al. (2012): They argue that managers of diversified firms become aligned with creditors and therefore reduce firm risk at the expense of shareholders. This has the implication that the market value of equity is lowered due to the fact that positive NPV-projects are ignored or skipped, and thus lowering overall firm value of the diversified firm, causing a diversification discount.

Agency conflicts

Denis et al. (2002) argue that the pursue of private benefits by managers is an important driver of the diversification discount. They argue that managerial compensation tend, on average, be positively correlated with firm size. A manager can for example derive a private benefit in case of diversification: i.e. a manager gets a better career prospect or higher salary in case they run a more diversified firm. According to Denis et al. (2002) this can imply that even though a diversification strategy is not firm value enhancing, a manager will still pursue it due to own private benefits attached to it.

With respect to managerial own private benefits, it can also be the case that, to the extent that cash flows of different segments are imperfectly correlated, diversification reduces the risk of the manager's relatively undiversified personal portfolio (Denis et al., 2002). In general, if the private benefits exceed the manager's private costs, the firm may pursue a value reducing diversification strategy which can lead to agency conflicts (Aggarwal & Samwick, 2003).

Agency conflicts is also regarded as the main driver of the diversification discount in a study by Jiraporn et al. (2006) and Leaven et al. (2007). The latter arguing that their found diversification discount is due to the intensified agency problems associated with monitoring corporate diversified firms.

Corporate governance

Hoechle et al. (2012) argue that corporate diversification in general lowers firm value due to risk-reducing effects and agency problems, but that this diversification discount is also partly caused by bad corporate governance. Hoechle et al. (2012) argue that in case of corporate diversification, better corporate governance is associated with less firm value destruction and vice versa. With respect to ownership structure, Hautz et al. (2013) argue that institutional owners have analytical and informational advantages, providing them an overall advantage in making firm value enhancing decisions (i.e. diversification strategy). With respect to ownership structure, they found that the degree of CEO-ownership has a positive and significant effect on relative firm value, lowering an eventually found diversification discount. A reason for this effect, is that when a CEO has a high private stake in the company, he/she will be more careful in taking potentially value-reducing decisions affecting private wealth. Furthermore, Hoechle et al. (2012) found that institutional ownership also has a positive and significant impact on relative firm value, thereby applying the same reasoning as with CEO-ownership, discussed by Hautz et al. (2013).

Another aspect of corporate governance policy are the incentives/compensation strategy. The relationship between incentives/executive compensation and the valuation effect of corporate diversification is being investigated in the papers of Aggarwal & Samwick (2003) and Choe et al. (2014). Both papers found that firms which rely more on long-term incentives for their executives tend to benefit more from corporate diversification in general. Despite the fact that Choe et al. (2014) found a diversification premium instead of a discount (as found by Aggarwal & Samwick, 2003), the conclusion is the same: Short-term incentives for executives of corporate diversifying firms have a negative effect on (post-diversification) firm value.

Organisational costs

Another reason of a reduction in firm value due to corporate diversification are the organisational costs, as discussed in the papers of Anjos (2010) and Zahavi & Lavie (2013). Anjos (2010) argues that there exist asymmetric corporate restructuring costs associated with spin-offs (specialization moves) and acquisitions (diversification moves). The choice to

diversify is more costly than the choice to (re)focus; therefore Anjos (2010) argues that these asymmetric corporate restructuring costs are the main driver of the diversification discount. Organizational costs incurred by a corporate diversification strategy is also the subject of the paper by Zahavi & Lavie (2013), who conclude that corporate diversification initially undermines firm performance of the diversified firm due to negative transfer effects (i.e. the managerial fail to recognize subtle yet critical differences across the firm's closely related products, especially when developed by the same business unit and of course just misallocation of resources in general). Both Anjos (2010) and Zahavi & Lavie (2013) thus argue that corporate diversification in firm value reducing. Zahavi & Lavie (2013) however also conclude that prior corporate diversification experience by a firm can reduce and even mitigates negative transfer effects, making a future corporate diversification move less firm value reducing.

Biases in valuation methodology

Most of the literature concerning the valuation effect of corporate diversification argues that diversified firms trade at a discount. It is furthermore noticed by several of these papers (e.g. Custodio, 2014; Rudolph & Schwetzler, 2014) that there are concerns with respect to the valuation methodology itself. Some papers argue that there exists a sample selection bias (Campa & Kedia, 2002), while others (e.g. Custodio, 2014; Glaser & Müller, 2010) argue that the accounting implications used to calculate the diversification discount are biased.

Especially the use of book values of debt is an overlapping issue in some papers (e.g. Doukas & Kan, 2006; Mansi & Reeb, 2002), arguing that the use of book values of debt is leading to a bias in calculating the effect of corporate diversification on firm value. The reason for this bias is due to the fact that corporate diversification lowers firm risk. This is the result of a lower shareholder value and an increased bondholder value, with the value effects to shareholders depending on the amount of leverage in the firm (Mansi & Reeb, 2002). Mansi & Reeb (2002) indeed found that shareholder losses (equity, thus firm value) are a function of firm leverage and that the diversification discount does not apply to all-equity firms. Therefore, they conclude that using book-values of debt to compute excess values creates a downward bias for non-all-equity diversified firms. By using market values of debt instead of book values of debt, the calculated diversification discount was reduced.

Literature also part of this subject are the papers of Doukas & Kan (2006) and Glaser & Müller (2010). Triggered by the earlier research of Mansi & Reeb (2002), they also argue that measures of firm value based on book values of debt undervalue diversified firms relative to

focused firms. The argument for this hypothesis is similar to Mansi & Reeb (2002): Corporate diversification should lead to lower firm risk in the case that business units with not perfectly positively correlated cash flows are grouped together. In the concept of debt valuation, lower firm risk will increase bondholder's value at the expense of shareholder value; therefore incorporating book values of debt in firm valuation will lead to a downward bias in the actual firm value. Glaser & Müller (2010) replace book values of debt with market values of debt to calculate the imputed values of the excess value method. This is also done in the study of Ammann et al. (2012): Replacing the book value of debt with the market value of debt also leads to a decrease of the diversification discount in that study. Glaser & Müller (2010) conclude that the diversification discount is indeed reduced in line with Mansi & Reeb (2002) and that the diversification discount does also not apply to all-equity firms. A large part of the remainder of the diversification discount can according to Glaser & Müller (2010) be explained due to the ownership structure of a diversified firm, as discussed earlier.

Ammann et al. (2012) furthermore argue that the role of the estimation technique used in the excess value method should be investigated. They argue that also these estimation techniques itself, (besides replacing the book values with market values of debt) can perhaps also lead to a biased diversification discount.

With respect to disclosured accounting data, Custodio (2014) argues that part of the diversification discount can be explained by using biased accounting implications to calculate excess values: Especially q-based measures of the diversification discount are biased upward by mergers and acquisitions and its accounting implications. Furthermore, Custodio (2014) argues that different accounting measures to calculate the excess value leads to different values of the diversification discount and thus a lack of comparability between firms. According to Custodio (2014), the reason q-based measures are biased are as follows: In case of a merger or acquisition, the assets acquired are reported at their transaction-implied value in the acquirer's balance sheet. It is often the case that the acquirer pays a premium for the assets and the assets are typically acquired at a value higher than was reported in the target's pre-merger book value. This leads to a market-to-book ratio of assets that tends to be lower for the post-merger entity than for the portfolio combining both pre-merger entities. According to Maksimovic & Phillips (2008), conglomerates are more acquisitive than focused firms, so this suggests that their market-to-book ratio (general proxy for Tobin's Q) tends to be lower.

Custodio (2014) concludes that measures of the diversification discount based on Tobin's Q are biased upward by M&A accounting implications. By subtracting goodwill from the book value of assets, a substantial part (not all) of the diversification discount estimated with q-based measures is eliminated. Furthermore they conclude that market-to-sales ratios are not affected by M&A accounting and are therefore not leading to a bias.

2.4.2 Value increasing

The value increasing effects can, just like the value reducing effect, be divided in main drivers, which will be discussed in more detail because they are most pronounced ones in literature.

Institutional factors

The effect of institutional factors on firm value in case of corporate diversification is explicitly being investigated by Fauver et al. (2003) and Kuppuswamy et al. (2012). The latter contributed to this subject, by investigating the impact of institutional factors on the value of corporate diversification. They investigate the influence of several national-level institutional factors on the value of corporate diversification. Their goal is to see whether frictions in a country's labour markets, capital markets and product markets affect the relative firm value of diversified firms. They found that the value of diversified firms relative to their single-segment peers is higher in countries with less efficient capital and labour markets. These findings are consistent with the argument that internal capital allocation is more beneficial in presence of frictions in the external capital markets and also that diversification can be beneficial in the presence of frictions in the labour market. This is a finding consistent with Fauver et al. (2003), who also argue that if the economic and legal environments make it more difficult to contract with other firms, it may be more beneficial to merge related enterprises within the same organization than it is to have them operate on a separate, stand-alone basis. Diversified firms in these countries may also be better able to attract quality employees and better able to lobby or influence the political and regulatory process. Fauver et al. (2003) also argue that the existence of a conglomerate discount (or premium) is dependent on a country's institutional context. Fauver et al. (2003) examine the link between the value of corporate diversification and capital market development, integration, and legal systems, and found a significant premium for diversified firms in less-developed capital markets. They argue that the benefits in such markets of having a more extensive internal capital allocation outperforms the value reducing effects that come along with corporate diversification, like agency problems. Consistent with Fauver et al. (2003), Kuppuswamy et al. (2012) found a significant

premium for diversified firms in countries with segmented and less developed capital markets; and a significant conglomerate (diversification) discount among countries with well-developed and integrated capital markets.

Financial reporting/Data

Villalonga (2004) argues that the use of segment data can be a source driving the diversification discount. Villalonga (2004) actually found a diversification premium due to the use of more fine-grained data. The idea that data can be a driver of the diversification discount is also partly shared by Choe et al. (2014). In their investigation to examine the linkage between corporate governance/executive compensation and the value of corporate diversification, they found that diversified Australian firms are trading at a premium compared to their standalone counterparts. Choe et al. (2014) suggest that this premium can be (partly) explained by sample-selection and different measures of diversification, which has common ground with Villalonga (2004).

The found valuation effect due to corporate diversification from the most appealing papers are summarized in Appendix D. This table is organized whether a diversification discount, multiple results, or solely a premium is found. Correspondingly, main explanations for the finding(s) are provided.

2.5 Related vs unrelated diversification

According to Erdorf et al. (2013), related diversification seems to be more valuable than unrelated diversification, because existing skills and resources can be applied to other related businesses that are part of the firm as a whole. According to Erdorf et al. (2013), related diversification can have advantages for firms over unrelated diversification:

- Related diversifiers can gain more easily a (sustained) competitive advantage due to this more applicable transfer of skills and resources.
- Winner-picking in the internal capital markets of a diversified firms becomes more easier when the segments are related. This has the implication that it will become easier for a firm to reorganize, intervene and allocate funds for cross-subsidization (Stein, 1997).

Berger & Ofek (1995) were one of the first who argued that corporate diversification has a negative effect on firm value. They investigated as well related as unrelated diversification and found that the negative effect of corporate diversification is more pronounced in case of unrelated diversification. In their investigation, they argue that firms' segments are classified

as unrelated if these segments don't share a common two-digit SIC code, and are classified as related otherwise.

Differences with respect to benefits and costs between related and unrelated diversification become clear after further investigation of literature. Knowing the benefits and costs can be beneficial explaining difference in firm value due to corporate diversification between related and unrelated diversification.

2.5.1 Benefits related diversification

Matsusaka (2001) argues that a benefit of related diversification over unrelated diversification are economies of scope, which comes forth out the Resource-Based View (RBV) and Transaction Costs Economies (TCE). Based on these theories, evidence is found that unrelated diversification have weak or no economies of scope, and is costly due to greater learning necessity (Palich et al., 2000).

Economies of scope can furthermore be divided into two sub categories: Synergy and redeployability (Sakhartov & Folta, 2014). Redeployability refers to the fact that related diversified firms also have an option to redeploy resources from one product market to another (related) product market (Capron et al., 1998). According to Sakhartov & Folta (2014) related diversified firms can reduce deployment costs required to retain employees, and more easily adjust equipment and plants to make them applicable in an alternative market. The value-creating mechanisms behind synergy and redeployability are therefore resource-sharing and respectively resource deployment. According to Bryce & Winter (2009) related diversified firms can furthermore generate synergies by sharing resources across businesses with similar resource requirements.

2.5.2 Costs related diversification

As discussed, a benefit of related diversification are the economies of scope: The core business can provide the related segments with necessary resources, for example knowledge and human capital (Teece, 1982). But this advantage can also have a dark-side when there exists a relatively large core business, because a core business tends to enjoy greater power and influence because of its size (Rajan et al., 2000). The core business can exert power on the related segments in the form of internal (between businesses within the firm) and external (with customers and suppliers) transactions in a way the interest of the core business are best served, opposed to the interest of the related segment (Kumar, 2013). In order to make these issues more clear, Kumar (2013) provides two examples:

- A segment may be constrained to buy inputs from the (large) core business. Despite better-quality suppliers, the segment is forced to buy from the core business.
- When a segment shares customers with the core business, this segment can be forced by headquarters to offer discounts to those shared customers because the core business wants to increase volume and derive scale economies.

The consequence of these constrains can be that productivity shifts are necessary in the segment which were not necessary if the firm was autonomous. The result can be that these productivity shifts can create inefficiencies like disincentives to stay productive and influence activities to prevent such shifts, which can incur (coordination) costs for the segment in the related diversified firm (Kumar, 2013).

Coordination costs as a disadvantage of related diversification is also mentioned in the paper of Zhou (2011). Recalling that the (potential) synergies of related diversification can be a benefit; Zhou (2011) argues that in order to realize these synergies, a firm needs to actively manage and coordinate the interdependencies between the different lines leading to increased coordination costs. Particularly, when a firm has complex interdependencies, the coordination costs may increase faster than the obtained benefits from diversification, leading to a limit to the degree of related diversification.

2.6 The value of corporate diversification during recent financial crisis (2007-2009)

According to Erdorf et al. (2013), internal capital markets are a motive for firms to diversify and the effect of corporate diversification depends on the economic conditions. During the peak of the recent financial crisis (2007-2009), new loans to large borrowers declined with almost 50% in comparison to the prior quarter (Ivashina & Scharfstein, 2010). Furthermore, Campello et al. (2010) found that in financial constraint conditions the inability to borrow external capital causes firms to restrict investment opportunities. Such findings suggest that it can be an increased advantage for firms to have a larger and developed internal capital market during financial constraint economic conditions. Diversified firms often have more access to internal capital and are less dependent on external financing (Duchin et al., 2010). Besides cash holdings, Hann et al. (2013) argue that corporate diversified firms have, on average, a lower cost of capital than comparable portfolios of stand-alone firms. Furthermore they argue that diversified firms with less correlated segment cash flows have a lower cost of capital. They found that the reduction of the cost of capital is strongly related to the correlation of

business unit cash flow, consistent with a coinsurance effect. Additionally, Hann et al. (2013) also found evidence that diversified firms facing greater financial constraints benefit more from coinsurance because they tend to have more deadweight costs of external financing. Furthermore, debt constrains managerial discretion over how resources can be deployed, and therefore hinders the degree of corporate diversification (Chatterjee & Wernerfelt, 1991; Kochhar et al., 1996). O'brien et al. (2014) specifically found that the type of debt also has an impact on the potential benefits of corporate diversification: Bank debt does not reduce the benefits of diversification to the extent that bond debt does, because banks form business relationships and in general advice/help a firm taking (diversification) decisions.

Therefore, it is interesting to investigate if the value of corporate diversification is significantly (positively) affected during the recent financial crisis (2007-2009). Kuppuswamy et al. (2010) explicitly investigate the effects of the financial crisis on the excess value of diversified firms. They found that the value of diversified firms significantly increased during the crisis, leading to a diversification premium during the peak of the recent financial crisis (2007-2009). The finding that the value of corporate diversification during the recent financial crisis (2007-2009) leads to an increase in firm value is also found in a study by Rudolph & Schwetzler (2014). Kuppuswamy et al. (2010) and Rudolph & Schwetzler (2014) both argue that the (increased) access to internal capital markets are the reason for this positive effect, but are discussed in more detail by Kuppuswamy et al. (2010). According to Kuppuswamy et al. (2010), the two more detailed effects with respect to internal capital markets are two effects, called the more money and smarter money effect.

- The more money effect refers to the potentially higher debt capacity of diversified firms compared to focused firms, resulting from their lower cash flow volatility (Lewellen, 1971).
- The smarter money effect has to do with the potential beneficial effects of internal capital markets and can be mainly subdivided in the following two characteristics:

1. Allocating capital efficiently across segments.
2. Funding of valuable projects of divisions that would have difficulties to raise this necessary capital as standalone firm.

Empirical evidence of an increase in the relative value of diversified firms during economic downturns [i.e. recent financial crisis (2007-2009)] is also found by Volkov & Smith (2015). They argue that the reason for this increase can be attributed to more efficient internal capital

markets, which is in line with Kuppuswamy et al. (2012) and Rudolph & Schwetzler (2014). Volkov & Smith (2015) however also found additional evidence that most of the improvement in the relative valuation is attributed to firms that were financially constrained at the beginning of a recession. A plausible explanation for this finding is that these firms have less possibilities to make use of external financing possibilities and are heavy relying on their internal capital markets.

Empirical evidence that the recent financial crisis (2007-2009) is lowering firm value (increasing diversification discount) is found by De la Fuente et al. (2014). This finding is contradictory to the studies of Kuppuswamy et al. (2010) and Rudolph & Schwetzler (2014). According to De la Fuente et al. (2014), the reasoning behind this negative effect on firm value is as follows: The lower use of external debt by diversified firms is likely to increase costs arising from cross-subsidization and overinvestment, weakening the potential benefits of corporate diversification in a credit-constrained environment and thus even increasing the under normal circumstances found diversification discount.

Chapter 3. Hypotheses

3.1 Diversified firms trade at a discount

There are several potential sources leading to the fact that diversified, and thus also unrelated diversified firms will trade at a discount compared to their standalone counterparts. The two most pronounced sources are as following:

- Agency conflicts
- Risk-reducing effects

First of all agency conflicts is a much mentioned reason. Theory argues that there can exist a conflict of interest with respect to a diversification decisions between an agent (manager of firm) and principal of the agent (i.e. shareholder), incurring a potential loss in firm value by self-interested managers not acting in the interest of the firm (Eisenhardt, 1989).

Empirical support is found in a paper by Denis et al. (2002). In this paper the authors argue that corporate industrial (i.e. unrelated) diversification in general reduces firm value. They conclude that unrelated diversification is general lowers overall firm value due to agency costs, while refocusing moves increases firm value. Jiraporn et al. (2006) argue that these agency costs are indirectly caused by weak shareholder rights, and are the main driver of the value reduction of diversified firms. The reasoning behind this finding is as follows: When shareholder rights weak, agency costs created by the separation of ownership and control are likely to be more acute, resulting in a (increased) firm value loss. Furthermore, Jiraporn et al. (2006) found evidence that the agency theory explanation is more pronounced for industrial (i.e. unrelated) than for global diversification.

Further empirical support is also found by Berger & Ofek (1995) and Mansi & Reeb (2002). They argue that risk-reducing effects like overinvestment and cross-subsidization are an important driver of the diversification discount for all types of diversification due to the fact that these risk-reducing effects can lead to misallocation of funds and foregoing of (firm) value enhancing projects in the well-performing divisions (Duchin et al., 2010). These risk-reducing actions can therefore be a driver a negative valuation effect due to corporate diversification.

The first hypothesis is therefore stated as follows:

H1: Diversified firms trade at a discount compared to equivalent standalone firms.

3.2 Valuation effect related vs. unrelated diversification

Theory argues that unrelated diversification is more firm value reducing than related diversification, because related diversification has the following overall benefits of diversification with respect to economies of scope and which are less or not relevant for unrelated diversification:

- Synergy
- Redeployability

Related diversified firms can generate synergies by sharing resources across businesses with similar resource requirements. Empirical support for this argument is found by Bryce & Winter (2009), who found evidence that these synergies indeed lead to the fact that unrelated diversification is more firm value reducing than related diversification. Redeployability refers to the fact that related diversified firms also have an option to redeploy resources from one product market to another (related) product market (Capron et al., 1998). Empirical support is found by Sakhartov & Folta (2014), who argue that unrelated diversification is less firm-value reducing than related diversification and arguing that related diversified firms reduce deployment costs required to retain employees and more easily adjust equipment and plants to make them applicable in an alternative market.

Besides the advantage of transferring skills and resources, related diversification also has the advantage implication that it will become easier for a firm to reorganize, intervene and allocate funds for cross-subsidization in case of related segments, making related diversification less (firm) value reducing than unrelated diversification (Stein, 1997).

The second hypothesis is therefore stated as follows:

H2: Unrelated diversification is more firm value reducing than related diversification.

3.3 Valuation effect recent financial crisis (2007-2009)

Literature is indefinite with respect to the impact of the recent financial crisis (2007-2009) on the firm value of (related and unrelated) diversified firms. Some literature (e.g. De la Fuente et al., 2014; Rudolph & Schwetzler, 2014) argues that the recent financial crisis (2007-2009) increased the firm value of diversified firms (i.e. positive effect on diversification discount). From other findings in literature (i.e. De la Fuente et al., 2014; O'brien et al., 2014) can be derived that the detrimental effects of a credit-constrained environment [i.e. during the recent financial crisis (2007-2009)] is still affecting the firm value of diversified firms in a negative way, despite the possible advantage of internal capital markets. During the peak of the recent

financial crisis (2007-2009), new loans to large borrowers declined with almost 50% in comparison to the prior quarter (Ivashina & Scharfstein, 2010), so it can be stated that there existed a credit-constrained environment during the recent financial crisis (2007-2009). Campello et al. (2010) found that in financial constraint conditions the inability to borrow external capital causes firms to restrict investment opportunities. Such findings suggest that it can be an increased advantage for firms to have a larger and developed internal capital market during financial constraint economic conditions. As stated earlier, diversified firms often have more access to internal capital and are less dependent on external financing (Duchin et al., 2010).

So, according to the found theory, diversified firms can have an advantage over standalone firms due to their better internal finance possibilities and therefore lowering the in normal situations hypothesized diversification discount. This is also empirically found in a study by Rudolph & Schwetzler (2013), who found evidence that the diversification discount fell significantly during the financial crisis for firms operating in countries with well-developed capital markets and strong investor rights. Well-developed capital markets can provide firms, besides the available internal capital markets of diversified firms, more and better opportunities to finance also externally. Strong investor rights prevents self-interested managerial behavior, which can cause agency conflicts within a firm's internal capital markets, causing them to be inefficient (De la Fuente et al., 2014). Germany and The Netherlands with well-developed capital markets and strong investor rights (Greenglass et al., 2014), suggesting that the diversification discount should be lowered for both countries during the recent financial crisis (2007-2009)-period.

Further empirical support is found in the paper of Kuppuswamy et al. (2010), who found evidence that the excess value of diversified firms significantly increase during the crisis and even turn into a premium during the peak of the recent financial crisis (2007-2009). Their explanations also involve internal capital markets and argue that diversified firms having a higher debt capacity of diversified firms compared to focused firms, resulting from their lower cash flow volatility. The consequence is that diversified firms can therefore attract more and easier capital from the external market, besides their increased internal financing possibilities compared to standalone firms. With respect to these internal financing possibilities, diversified firms also have an advantage (especially in a credit-constrained environment) that they can more efficiently allocate available internal capital across segments

and are able to fund valuable projects of divisions that would have difficulties raising this necessary capital as standalone firm.

Therefore, the first (and overall third) hypothesis with respect to the effects of the recent financial crisis (2007-2009) is stated as follows:

H3A: The recent financial crisis (2007-2009) has a positive effect on the value of diversified firms.

Contradictory findings are found by De la Fuente et al. (2014). They argue that the lower use of external debt by diversified firms is likely to increase costs arising from cross-subsidization and overinvestment, weakening the potential benefits of corporate diversification in a credit-constrained environment and thus even increasing the under normal circumstances found diversification discount. Therefore, a second (and overall fourth) hypothesis with respect to the valuation effect of the recent financial crisis (2007-2009) is also being set-up and stated as follows:

H3B: The recent financial crisis (2007-2009) has a negative effect on the value of diversified firms.

Little (empirical) evidence thus have been found for hypothesis *H3B*. The theory and empirical evidence suggests that a better developed internal capital market are firm-specific and therefore differences between corporate diversified firms will exist with respect to this issue. Because the composition of the sample of investigation is unknown, it can for example be that this sample exists out of firms which are low corporate diversified and don't or limited have internal capital markets available to leverage these potential benefits over the potential extra constraints implied by a credit-constrained environment, lowering the diversification discount even more during the recent financial crisis (2007-2009).

Chapter 4. Method

After investigation of the literature, there arise two main methods to test the hypotheses. These two most pronounced models are the excess value model first proposed by Berger & Ofek (1995) and the real options model firstly proposed by Morellec et al. (2005).

4.1 Choice of method

The choice of the method to be used in this thesis will be based on the pros and cons of a method. Therefore, in table 4.1 the advantages and disadvantages of the excess value method and real options model are listed as follows:

Table 4.1
The pros and cons of the excess value method and real options model.

Excess value method	
Pros	1. Use of disclosured accounting data (easy accessible)
	2. Understandable method
	3. Proven method (used in top-ranked papers)
Cons	1. Accounting data vulnerable to manipulation (leading to bias)
	2. Method itself can be inaccurate/biased
Real options model	
Pros	1. Less vulnerable to manipulation/biases
	2. Able to distinct whether a specialization or diversification move is favorable
Cons	1. Data difficult to gather due to not using disclosured accounting data
	2. Very diffult to understand and use

The real options model involves data concerning option value calculations which is difficult to gather and several difficult to understand calculations. These arguments concerning the options model and the fact that the excess value method is understandable, makes use of disclosured accounting data and is mostly used in top ranked papers concerning this field of investigation leads to the reason that this method will be used to test the hypotheses.

4.2 Related vs. unrelated diversified conglomerates

4.2.1 Excess value method

The first hypothesis will be tested with use of the so-called excess value method, firstly developed by Berger & Ofek (1995). They developed a widely used method to estimate the diversification effect on firm value. They do this by imputing standalone values for individual business segments of a diversified firm. A business segment is defined as lines of business for which separate accounting disclosures are made by management. Comparing the sum of these imputed stand-alone values to the actual total firm value will give percentual firm value loss or gain due to this diversification, because the sum of the imputed values of a company's segments estimates the value of the firm if all of its segments are operated as stand-alone

businesses. This method is also called excess value measure, and the percentual firm value loss or gain due to corporate diversification is called excess value: If this excess value is positive, a firm will gain value by diversification and if negative a firm will lose firm value due to corporate diversification.

The goal of the first hypothesis is to check whether the (firm) valuation effect is negative due to corporate diversification. Therefore, it must be checked if the value of the diversified firm is lower compared to the total value of its business segments when regarded as standalone entities. Mathematically:

$$FV_{diversified} < \sum FV_{standalonesegments} \quad (1)$$

In order to test (1), it is necessary to calculate the excess value of a diversified firm, because this indicates if (1) is true, which requires that the calculated excess value is negative. The excess value measure is mathematically expressed in (2).

$$EXVAL = ln(FV/I(FV)) \quad (2)$$

Equation (2) thus represents the excess value measure, which is the natural logarithm of the ratio of the firm's actual value to its imputed value. The firm value will be defined as the firm's total capital, which is the book value of equity + book value of debt, therefore the abbreviations are defined as follows:

FV = Firm's total capital (book value of equity + book value of debt)

$I(FV)$ = Imputed value of the sum of a firm's segments as stand-alone firms

So, to clarify again, this excess value method imputes stand-alone values for individual business segments of the diversified firm; comparing the sum of these imputed stand-alone values to the actual firm value will give percentual firm value loss or gain due to this diversification. The sum of the imputed values of a company's segments estimates the value of the firm if all of its segments are operated as stand-alone businesses; If this value is positive, a firm will gain value by diversification and negative otherwise.

The following step is to clarify how the imputed value '$I(FV)$' is going to be calculated. The expression for calculating the imputed value '$I(FV)$' can be seen in (3).

$$I(FV) = \sum_{i=1}^{n} AI_i * (Ind_i(FV/AI)_{mf}) \quad (3)$$

Equation (3) thus mathematically expresses a firm's imputed value, which is built up out of the sum of segment-imputed values. These segment-imputed values are obtained by multiplying an industry median multiplier of total capital ' $Ind_i(FV/AI)_{mf}$ ' to an accounting item by the segment's level/value of this accounting item AI_i. The abbreviations in (3) are as follows:

AI_i = Segments i's value of the accounting item used in the valuation multiple

$Ind_i(FV/AI)_{mf}$ = Individual multiplier: Multiple of total capital to an accounting item for the mean/median single-segment firm in segment I's industry, which is consisting out of multiple firms (mf).

n = Total number of segments in segment i's firm

4.2.2 Imputed value

Three different types of accounting items and two market-based measures will be used to calculate individual multipliers: Total assets, total sales and EBIT as accounting items and market value of equity/total assets (Tobin's Q) and market value of equity/total sales as market-based measures. A remark of calculating imputing values, is that the validity of the multiplier approach depends on management disclosure policies and can thus not always be regarded as very reliable; managers do have the possibility to allocate sales and expenses, so accounting measures can be vulnerable to manipulation (Berger & Ofek, 1995).

For the investigation in this thesis, there are two important points/demands with respect to consolidated data in order to avoid potential bias:

- Accounting items should be as reliable as possible.
- Accounting items are common in disclosure policies and easy to find in accounting reports.

Furthermore, following Amman et al. (2012), observations where the actual firm value is either larger than four times the imputed value or less than one fourth of the imputed value will be excluded.

Accounting items

After investigation of literature it is commonly accepted and validated to calculate excess values based on sales. Sales-based excess values are due to accounting disclosure policies less vulnerable to manipulation (Custodio, 2014) and are available in segment data (Glaser & Müller, 2010). Computing excess values based on sales are therefore probably a sound option

for the investigation of German and Dutch publicly listed firms in this thesis. From investigation of literature can also be detected that excess values based on assets and earnings (i.e. EBIT) are also very common and available in consolidated data. Therefore, the first hypothesis will, next to market-based measures (i.e. Tobin's Q and market value of equity/total sales), be tested on the basis of these three different accounting items: Total assets, total sales and EBIT. For instance, to compute the imputed value based on a sales multiplier, the industry geometric mean or median multiple (both will be used and discussed later) is multiplied with the capital-to-sales for the stand-alone firms in the segment's industry by the segment's sales to obtain the imputed capital of the segment.
It can be concluded that there is some degree of freedom with respect to the choice which accounting items to use in order to calculate the imputed values; furthermore there exists also some controversy about the calculation of a firm's total capital. The excess value method itself is therefore subject of investigation in several papers. Some papers give recommendations for improvement of the original model, while most papers discuss the inputs (i.e. accounting items) to be used for calculation of the excess value.

Market-based measures
Some papers (i.e. Laeven & Levine, 1997; Villalonga, 2004) made use of Tobin's Q to calculate imputed values. Recalling that Tobin's Q is defined as the total market value of equity of a firm divided by the total asset value, so in fact the book-value of that firm:

$$Qratio = \frac{MV_{firm}}{TA_{firm}} \qquad (4)$$

Custodio (2014) argues that Tobin's Q - based measures of profitability are biased, arguing that Tobin's Q - based measures of a (potential) diversification discount are biased upward due to accounting implications. Different accounting measures to calculate the diversification discount lead to different excess value measures and thus a lack of comparability between firms. The reason Tobin's Q - based measures are biased are as following: In case a merger or acquisition, the assets acquired are reported at their transaction-implied value in the acquirer's balance sheet. It is often the case that the acquirer pays a premium for the assets and the assets are typically acquired at a value higher than was reported in the target's pre-merger book value. This leads to a market-to-book ratio of assets that tends to be lower for the post-merger entity than for the portfolio combining both pre-merger entities.

According to Maksimovic & Phillips (2008), multi-segment diversified firms are more acquisitive than focused firms, so this suggests that their market-to-book ratio (general proxy for Tobin's Q) tends to be lower. In order to mitigate this bias, Custodio (2014) subtracts the premium paid for the assets, called 'goodwill' from the book value of assets. This leads to a reduction of the diversification discount based on Tobin's Q – based measures, because incorporation of goodwill leads to an overestimation of a (potential) diversification discount.

Custodio (2014) thus addresses an important bias issue with respect to the calculation of imputed values based on assets (like Tobin's Q). Among others like Lee et al. (2012) and Jiraporn et al. (2006) , Custodio (2014) recommends to use sales ratios to calculate imputed values because these are not (or less) affected. It is therefore interesting to investigate how the choice of accounting items and market-based measures can eventually lead to different results of the calculated excess value. Especially with respect to market-based measures it is interesting to know what the differences in excess value will be by using either market value of equity/total assets (Tobin's Q) or market value of equity/total sales. This way it can be investigated whether Custodio's (2014) findings are supported or rejected in this thesis.

4.2.3 Modifications

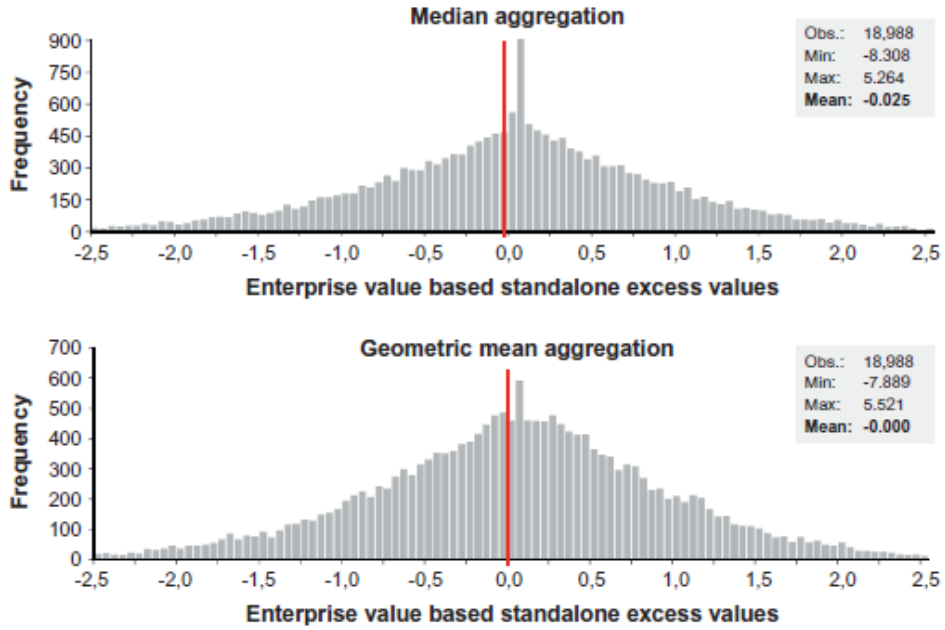
The methodology in this thesis will make use of the excess value method based on the three accounting measures: Total assets, total sales, EBIT; and on the following 2 market-based measures: Market value of equity/total assets (Tobin's Q) and market value of equity/total sales. The market value of a firm will simply be measured as the total market capitalization, that is the number of outstanding shares times their market value at a specific moment in time.

For completeness of this method and the implications that modifications with respect to this method can have on the eventual results, some modifications with respect to the calculation of firm value and the aggregation of multipliers will also be incorporated in this thesis.

Multiplier aggregation

A recent study by Rudolph & Schwetzler (2014) is supporting the idea that geometric mean aggregation seems to be a more accurate choice analyzing conglomerate discounts (Dittmann and Maug, 2006) than median aggregation. Rudolph & Schwetzler (2014) investigation provide clear evidence that that only geometric mean aggregation of imputed values is accurate and is not different from zero, as can be seen in figure 4.1.

Figure 4.1
Geometric mean aggregation is more accurate than median aggregation according to Rudolph & Schwetzler (2014)



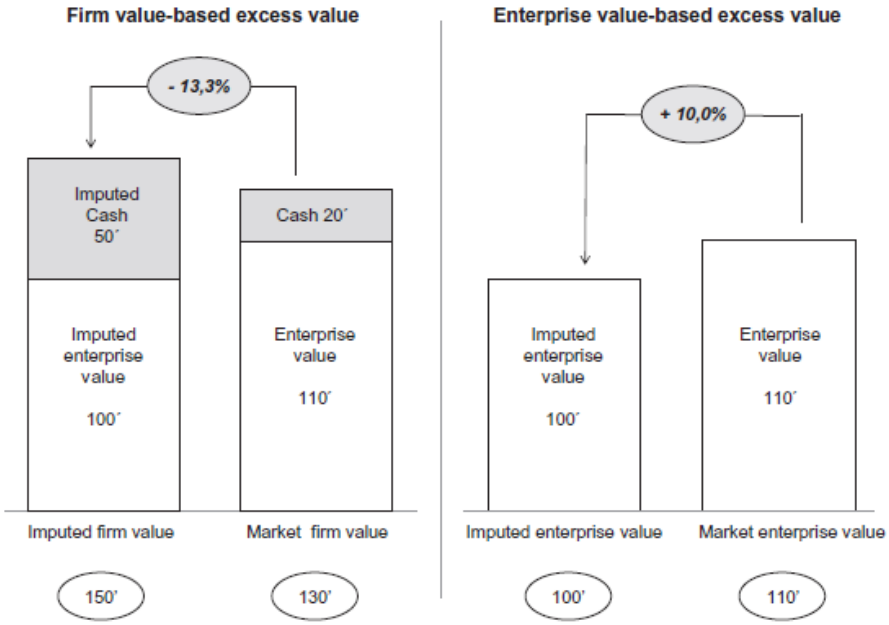
Firm vs. enterprise value

Standalone firms hold significantly more cash (Duchin, 2010), so the imputed cash value is higher than the conglomerate's actual cash value, resulting in a downward biased excess value (Rudolph & Schwetzler, 2010). The empirical evidence provided by Duchin (2010) proves that conglomerates hold significantly less cash than standalone firms, because they are diversified in their investment opportunities and have smaller financing gaps. According to Rudolph & Schwetzler (2014) this cash bias can be solved by replacing total debt by net debt; therefore the conglomerate's imputed value based on standalones contain a higher relative cash position then the conglomerate itself and can therefore be proposed as biased.

Excess values are based on firm values, which is defined as the sum of the book value of equity + book value of debt. Given that diversification leads to lower firm risk, the book value of debt is a more downward biased proxy of the market value of debt for diversified then stand-alone firms. Therefore, according to Rudolph & Schwetzler (2014), there is the need of computing excess values by removing the cash-bias. They do so by computing the enterprise value-based instead of firm value-based excess value. The enterprise value is based on firm value minus security and cash holdings.

In figure 4.2, Rudolph & Schwetzler (2014) illustrated how this cash bias can affect excess values.

Figure 4.2
The difference in excess values based on firm value and enterprise value as found by Rudolph & Schwetzler (2014).



Modified excess value method

Rudolph & Schwetzler (2014) suggestions will therefore be incorporated in the excess value method by Berger & Ofek (1995). The discussed argument that sales-based imputed values, regarded as more reliable will also be incorporated in this method. This way, the excess value methodology with all the discussed improvements incorporated will also be used in this thesis to investigate whether there are large differences in outcomes of between the original method by Berger & Ofek (1995) and the modifications proposed by Rudolph & Schwetzler (2014).

Incorporating the improvements/modifications will lead to the following (modified) mathematical expressions, as in mathematical form known from the earlier discussed expressions provided by Berger & Ofek (1995) but then with different variables:

$$EV = FV - Cash \quad (5)$$

$$IEV = \sum_{k=1}^{n} Sales_k * IndM_k^{EV/sales} \quad (6)$$

$$EEV = ln\frac{EV}{IEV} \quad (7)$$

With the stated abbreviations meaning:

EV = enterprise value

FV = firm value

IEV = imputed enterprise value

IndM = individual multipliers

EEV = excess enterprise value

So calculation of imputed values with use of the original excess value method by Berger & Ofek (1995) will be based on median industry values, while calculation of imputed values with use of the modified excess value method as proposed by Rudolph & Schwetzler (2014) will be based on geometric mean instead of median industry values.

Calculating excess values first and second hypotheses

First hypothesis

In order to test the first hypothesis, there will be four rounds of investigation concerning the calculation of excess values. A comprehensive overview of the four different rounds is provided in table 4.2.

Table 4.2
The four different rounds of to test hypotheses 1 and 2

	Business valuation	**Multiplier aggregation**
Round 1	Firm value	Median
Round 2	Firm value	Geometric mean
Round 3	Enterprise value	Median
Round 4	Enterprise value	Geometric mean

For each round, the used accounting measures are total assets, total sales and earnings before interest & taxes (EBIT). The market based measures used in each round are market value of equity/total assets (Tobin's Q) and market value of equity/total sales.

The results of the four rounds will be compared to notice eventual differences between the two variants of the excess value method and the first hypothesis (*H1*) can be answered. In table 4.3 the definitions of the several variables are provided in short.

Table 4.3
The definitions of the several used variables to calculate excess values

Variables	Definition
EXVAL	excess value = percentual firm value loss or gain due to corporate diversification
FV	firm value = book value of total equity + book value of total interest bearing debt
EV	enterprise value = firm value - security & cash holdings
EEV	excess enterprise value = excess value based on enterprise value
TA	total assets = book value of total assets
EBIT	EBIT = earnings before interest and taxes
TS	total sales = book value of total sales
MV	market value of equity

Second hypothesis

The described two variants of the excess value method are also going to be used to test the second hypothesis. The difference between the first and second hypothesis lies in the fact that for the second hypothesis the difference in relative value between unrelated and related diversified firms should be investigated with respect to as well firm and enterprise value. In case of business valuation based on firm value, this is mathematically expressed as follows:

$$FV_{unrelated} < FV_{related} \quad (8)$$

Recalling that the excess value method is going to be used to investigate this expression, it can also be argued that the excess value (also enterprise excess value) of unrelated diversified firms is lower compared to the excess value of related diversified firms, which can be mathematically expressed as follows:

$$EXVAL_{unrelated} < EXVAL_{related} \quad (9)$$

Besides comparing excess values of unrelated and related diversified German and Dutch firm, additional empirical evidence is needed to draw in the end more substantiate conclusions. Therefore, the relationship between the found excess values and relatedness of diversified firm's segments is investigated. This can be done by assessing a regression analysis, with the excess value measure as dependent variable and the related segments as independent variable (Berger & Ofek, 1995). This regression equation can be mathematically expressed as follows:

$$[EXVAL_{unrelated/related}] = \beta_0 + \beta_1 * [relatedsegments] + \epsilon \quad (10)$$

With the abbreviations defined as follows::

$[EXVAL_{unrelated/related}]$ = Dependent variable

β_0 = Intercept (coefficient of regression model)

β_1 = Coefficient of related segments variable

$relatedsegments$ = independent/explanatory variable

ϵ = Residual error or difference between observed and estimated excess value

The related segments variable is also based on Standard Industry Classification (SIC): Segments of diversified firms are marked as unrelated when they have a different SIC code on the 3-digit level than the diversified firm's core business. The related segments variable will be constructed with use of the total number of segments reported by the diversified firm and its number of unrelated segments; this variable is set to zero when no segments are related, and set to 'number of firm segments minus one' when no segments differ. The requirements with respect to the data which is going to be used will be discussed in detail in chapter 5: Data.

Control variables

It is also necessary to control for other firm specific factors like profitability and size when performing the described regression analysis. These measures will be sample-specific and obtained from disclosured segment data of multi segment firms.

Because firm size, profitability and growth opportunities can have an impact on excess value (Berger & Ofek, 1995), it is important that for these variables is being controlled for (i.e. control variables) when assessing regressions between the dependent variable (i.e. excess value) and independent variable (i.e. related segments).

The control variables representing size, profitability and growth opportunities are presented in table 4.4.

Table 4.4
Control variables representing the measures size, profitability and growth opportunities.

Control variable	Definition	Accounting measure
Size	Natural log of total assets	natural log (ln) TA
Profitability	EBIT to total sales/EBIT to total assets	EBIT/TS, EBIT/TA
Growth opportunities	Capital exp. to total sales/Capital exp. to total assets	Cap.Ex./TS, Cap.Ex/TA

In this table the definitions of the control variables size, profitability and growth opportunities are provided together with their corresponding accounting measure(s).

Summarizing

In table 4.5, all the discussed information concerning the methodology to test hypotheses *H1* and *H2* is summarized.

Table 4.5
A comprehensive overview of methodology for hypotheses *H1 + H2*.

Hypotheses *H1 + H2*		
First step	***Excess values***	
	Excess value calculation basis	**Multiplier items**
	firm value	total sales
		total assets
		EBIT
		market value of equity/total assets
		market value of equity/total sales
	enterprise value	total sales
		total assets
		EBIT
		market value of equity/total assets
		market value of equity/total sales
Second step	***Regressions (for each excess value)***	
	Dependent variable/Independent variable	**Control variables**
	excess value/related segments	natural log of TA, EBIT/TS,
		Cap.Ex./TS

Testing hypotheses *H1* and *H2* is divided in two main steps: First calculating the excess values (first step) and after this the necessary regressions (second step). In the first step, the imputed values will be calculated based on as well mean and median values. Statistical significance for as well the first as second step will be tested with use of a t-test.

4.3 Financial Crisis

In order to test hypotheses *H3A* and *H3B* it is necessary to incorporate pre-crisis, post crisis data and also data corresponding to the height of the recent financial crisis (2007-2009). The first step is to check whether a notable difference in conglomerate excess values is remarked during the years of the recent financial crisis (2007-2009) and the non-crisis period (2005-2006; 2010-2013). which can be reviewed from the results of testing hypotheses *H1* and *H2*. This is done by categorizing the found excess values of conglomerates and standalones for crisis and non-crisis years for as well panel A (Germany) and panel B (The Netherlands). The average excess values for each round of investigation (see table 4.2) for each imputed value accounting item, for recent financial crisis (2007-2009) and non-crisis years (2005-2006; 2010-2013) should therefore be calculated.

Furthermore, all the discussed variables, their definitions and (if applicable) measures are furthermore summarized in Appendix C1.

Chapter 5. Data

A sample of active publicly traded listed firms from the Netherlands and Germany is gathered over the 9 year period from 2005 to 2013. Financial and balance sheet data are collected from the Orbis database and organized in a balanced panel: Necessary data from each firm should be available for each year of the 2005-2013 time period in order to get the most reliable results with respect to the calculation of excess values. Following previous studies, firms with segments in the financial services sector (SIC 6000-6999) and non-classifiable segments (SIC 999) are excluded. As discussed, the balanced panel requires necessary firm data for each year. Therefore, firm-year observations with missing data on total assets total/segment sales, EBIT and market capitalization are excluded because imputed values are calculated based on these four items as discussed in chapter 4. Method. In the next step, faulty sales figures are excluded where the sum of the segment sales is less than 99% or greater than 101% of total sales (Rudolph & Schwetzler, 2013; Hund et al., 2010), which is more accurate than the 5% deviation level used by Amman et al. (2012) who is using less than 95% or greater than 195% criteria on total sales. The described screening procedure results in a total of 450 firms, from which 366 are German and 84 Dutch firms. Table 5.1 provides a detailed overview of the various screening steps and lists the respective number of excluded firms per step.

Table 5.1
Sample selection process

	No. of firms (absolute)			**Percentual (relative)**
	DE	NL	Step result	
Number of active publicly listed firms from Orbis Database	878	187	1.065	100.0%
Exclusion of firms where no SIC-code is available for first segment	-1	0	-1	-0.1%
Exclusion of firms with segments in the financial sector (SIC code 6000-6999)	-228	-48	-276	-25.9%
Exclsusion of firms with insufficient financial information	-176	-37	-213	-20.0%
Exclusion of firms with faulty sales figures	-107	-18	-125	-11.7%
Final Sample	**366**	**84**	**450**	**42.3%**

Data is gathered from the Orbis database. The request is restricted to publicly traded listed Dutch and German firms for a time-period from 2005-2013.

A further breakdown can be made with respect to total assets and total sales, which can be found in more detail in Appendix A. This breakdown is organized in segments with respect to the total assets a firm possesses and the publicly listed firms are organized according to these segments. From the breakdown with respect to total assets (panel A), it is first remarked that the German publicly listed firms are far more equally spread out with respect to the total assets. This is contradictory with respect to the Dutch publicly listed firms, which are far more concentrated in a certain totals assets segment; for instance, 18 of the total of 84 Dutch publicly listed firms can be found in the 1,000,000 to 5,000,000 thousand US$ segment,

which is relatively 21.4%. This segment has also the largest number of firms with respect to the German sample (55 firms), but is relatively smaller (15.0%). Another remark is that the German sample has far more firms in the lowest total assets segment (less than 10,000 thousand US$). From the German sample, 27 firms are in this segment which is relatively 7.4%, while there is only 2 Dutch firm in this segment, which is relatively 2.4%. Besides the differences in this lowest segment, it is also noticed that the number of firms in the highest segment (more than 50,000,000 thousand US$) is also relatively much differing between Germany and the Netherlands. The German sample has 10 firms in this segment, which is relatively 2.7%, while the Dutch sample has only one firm in this segment which is relatively 1.2%.

From the breakdown with respect to total sales (panel B), the first main findings is that for the first total sales segment (0 to 100,00 thousand US$) German publicly listed firms are represented (132 firms) in a much higher number than Dutch publicly listed firms (16). Relatively, this is 36.1% and respectively 19.1%. Very differing results between the German and Dutch sample are also found in the highest total sales segment (more than 50,000,000 thousand US$). The German sample has 13 firms in this segment, while the Dutch sample has only one firm in this segment. Relatively, this is respectively 3.6% and 1.2%.

Overall, the first main conclusion which can be drawn after investigation of the findings is that Germany has relatively more smaller and bigger publicly listed firms with respect to total assets and total sales than the Netherlands. Secondly, it is noticed that German firms are relatively more equally spread across the total assets and totals sales segments than Dutch firms.

In appendix B, the breakdown of the total (B1), the German (B2) and the Dutch sample (B3) in different SIC segments can be found. It is remarked that for as well the German as the Dutch sample SIC segment 73: Business services is the largest group with respectively percentual values of 15.0% and 17.9%. It is furthermore noticed that the German and Dutch sample are both very diverse with respect to SIC segments and that for the Dutch sample, there are only a few firms in the same industry.

A distinction between diversified and standalone firms should be made. Firms are labeled as diversified when they report sales in two or more segments, with the most important segment accounting for less than 90% of total sales. On the other hand, firms are labeled as standalone if they report sales in only one segment or if the most important segment accounts for more

than 90% of their total sales (Glaser & Müller, 2010). This procedure ensures that firms are classified as diversified, although they are mainly active in only one segment with minor operations in others. Other alternatives of labeling a firm as diversified is looking at the average number of business segments (Denis et al., 2001). It is also possible to make use of the sales-based Herfindahl index (Denis et al., 2001), which is in fact a measure of the size of firms in relation to the industry the firm is belonging to. The investigation in this thesis however does use the 'number of segment sales' method because it is most widely used and gives the most reliable results (Rudolph & Schwetzler, 2013). Table 5.2 provides the division of the final sample in diversified and standalone firms for as well The Netherlands and Germany according to the described criteria.

Table 5.2
Distribution of firms into the diversified (conglomerates) and standalone category

	Standalones		**Conglomerates**		**Total**	
	No. of firms	Percentual (relative)	No. of firms	Percentual (relative)	No. of firms	Percentual (relative)
Final Sample	264	58.7%	186	41.3%	450	100.00%
Netherlands	44	52.4%	40	47.6%	84	18.67%
Germany	220	60.1%	146	39.9%	366	81.33%

The final sample is subdivided in a German and Dutch sample. Besides the number of firms representing each country, also its percentual value relative to the total sample is given.

The final sample of 450 firms is divided to conglomerates (41.3%) and standalone firms (58.7%). Comparing this result with other studies, it can be concluded that the percentage of conglomerates is relatively high and on the other hand, the percentage of standalone firms is low. For instance, Rudolph & Schwetzler (2013) who make use of a 12-year period (1998-2009) European sample found values of 21% and 19.5% for respectively the German and Dutch sample. For their total (global) sample they furthermore found that the percentage of conglomerates lies between 10.8% and 22.2%. Some other US-based articles found overall conglomerate percentages twice as much. For instance, Berger & Ofek (1995) found for their 1986-1991 US sample that approximately 32% of the firms are diversified. A more recent study by Amman et al. (2012) provides similar results: For their 1985-2005 US sample they found that 30% of the firms are diversified. Campa & Kedia (2002) on the other hand, found a much lower percentage of diversified firms for their 1978-1996 US sample: 14% of the firms were diversified. These different results suggest that the data set is probably an important factor influencing the found percentage of conglomerates. As shown by Ammann et al. (2012), the relative amount of conglomerates varies strongly over time.

From table 5.2, it is also notable that the relative percentage of conglomerates and standalone firms is not much different between the Netherlands and Germany, which suggests that the two countries are probably quite similar with respect to the structure of their publicly listed firms.

The total number of 186 diversified firms (conglomerates) consist of as well related as unrelated diversified firms. A conglomerate is labeled as 'related' when the SIC codes of all of its segment sales is the same as the SIC code of its core business on the 3-digit level (Denis et al., 2002). Table 5.3 divides the total number of conglomerates into related and unrelated diversified firms.

Table 5.3
The division of German and Dutch conglomerates in related and unrelated ones.

	Related		**Unrelated**		**Total**	
	No. of firms	Percentual (relative)	No. of firms	Percentual (relative)	No. of firms	Percentual (relative)
Final Sample	25	13.4%	161	86.6%	186	100.00%
Netherlands	6	15.0%	34	85.0%	40	21.51%
Germany	19	13.0%	127	87.0%	146	78.49%

From table 5.3 can be seen that for as well the Netherlands as Germany the relative amount of related diversified firms is close to 15% of the total number of conglomerates: From the German and Dutch conglomerates, respectively 13.0% and 15.0% is related diversified. This relative amount is relative a bit higher than a previous study on a 1998-2009 European sample by Rudolph & Schwetzler (2013), who found values of 11.0% and 12.5% of related diversification for their German and Dutch conglomerates respectively. Furthermore, for their Dutch sample they found that 19.5% of their total Dutch sample of 977 firms is diversified. The investigation in this thesis makes use of the same method as Rudolph & Schwetzler (2013) does, but makes use of a different and smaller data sample over another time-period (2005-2013) than the study by Rudolph & Schwetzler (2013) (1998-2009). These differences can perhaps partly explain the relative differences. Another study by Denis et al. (2002) found relatively similar results: For their 1984-1997 time-period US-sample, they found that 17.6% of the conglomerates are related diversified.

Chapter 6. Results

This chapter provides the obtained results from analyzing a balanced panel of financial data as follows:

6.1 Descriptive Statistics

Table 6.1
Summary statistics

Panel A - total sales based						
	Germany			**The Netherlands**		
	Conglomerates (1) Mean (Median)	Standalones (2)	Difference (1)-(2)	Conglomerates (1) Mean (Median)	Standalones (2)	Difference (1)-(2)
No. of observations	1979	1315		396	360	
No. of segments	2.83 (2.00)	1.00 (1.00)		2.86 (3.00)	1.00 (1.00)	
Size	13.14 (12.70)	11.95 (11.94)	1.19** (0.76)**	14.15 (14.06)	12.70 (12.92)	1.45** (1.14)**
Profitability	0.032 (0.057)	0.039 (0.048)	0.007 (0.009)*	0.061 (0.047)	0.037 (0.055)	0.024* (-0.008)*
Cash/total sales	0.146 (0.089)	0.262 (0.118)	-0.116* (-0.029)*	0.100 (0.060)	0.228 (0.083)	-0.128 (-0.023)*
Cap. Ex./total sales	0.031 (0.020)	0.152 (0.036)	-0.121* (-0.016)*	0.044 (0.023)	0.172 (0.058)	-0.128 (-0.035)
Leverage	0.432 (0.404)	0.424 (0.353)	0.008** (0.051**)	0.705 (0.418)	0.729 (0.349)	-0.024** (0.069)**
Sales based Q-ratio	0.773 (0.549)	1.334 (0.793)	-0.561 (-0.244)*	0.819 (0.714)	1.305 (0.646)	-0.486 (0.068)*
Panel B - total assets based						
	Germany			**the Netherlands**		
	Conglomerates (1) Mean (Median)	Standalones (2)	Difference (1)-(2)	Conglomerates (1) Mean (Median)	Standalones (2)	Difference (1)-(2)
No. of observations	1979	1315		396	360	
No. of segments	2.83 (2.00)	1.00 (1.00)		2.86 (3.00)	1.00 (1.00)	
Size	13.14 (12.70)	11.95 (11.94)	1.99** (0.76)**	14.15 (14.06)	12.70 (12.92)	1.45* (1.14)**
Profitability	0.053 (0.059)	0.009 (0.048)	0.044* 0.011**	0.056 (0.063)	0.046 (0.055)	0.010** (0.008)*
Cash/total assets	0.139 (0.096)	0.175 (0.121)	-0.036* (-0.025)*	0.084 (0.061)	0.133 (0.079)	-0.049* (-0.018)*
Cap. Ex./total assets	0.036 (0.019)	0.069 (0.035)	-0.033* (-0.016)*	0.033 (0.030)	0.071 (0.036)	-0.038 (-0.006)*
Leverage	0.533 (0.556)	0.432 (0.394)	0.101 (0.162)*	0.525 (0.468)	0.544 (0.449)	-0.019** (0.019)*
Assets based Q-ratio	0.885 (0.602)	1.212 (0.867)	-0.327* (-0.265)*	0.826 (0.750)	0.779 (0.726)	0.047* (0.024)*

Descriptive statistics on conglomerate and standalone firms for as well Germany as The Netherlands. In this table, panel A is based on total sales, while Panel B is based on total assets. The table depicts summary statistics for 366 German and 84 Dutch publicly listed firms. All variables are defined in Appendix C. Statistical significance is tested with use of a t-test and is indicated at the 1% (***), 5%(**) and 10%(*) level.

From table 6.1 can be seen that the difference between reported mean segments of German and Dutch conglomerates is only marginal: Respectively 2.83 and 2.86. Due to the fact that the Dutch sample has a relative larger amount of standalone firms (47.4%) with respect to Germany (39.9%), the mean no. of segments for Germany is relatively a bit higher (2.10) in comparison to overall mean no. of segments of the Dutch sample (1.97). Overall, it can be concluded that the samples of both countries are quite comparable. As mentioned earlier in this paragraph, Rudolph & Schwetzler (2013) also make use of an European sample. They found that the average number of segments for continental European and British conglomerates are respectively 2.41 and 2.34, which is relatively much lower that the findings in this thesis. This average number of segments is even lower for North American conglomerates which Rudolph & Schwetzler (2013) also investigate: For these conglomerates they found an average number of 2.29. On the other hand, Berger & Ofek (1995) found an average number of segments of 2.89 for their US conglomerates, again indicating that perhaps the choice of the data set can be influencing the found results.

From the calculated mean and median values of the accounting and market-based measures, only the median values will be discussed and compared with prior literature. The reason for this, is that important comparable literature like the paper of Rudolph & Schwetzler (2013) is also only discussing median values, so an comparison can be made only on these median values. The mean values are however also important and are therefore also provided in table 6.1

Size is measured as the natural logarithm of a firm's total assets. Looking at the median values, an important notice is that the size of Dutch listed firms (13.51) are overall greater than German listed firms (12.30). The median total assets value for the German and Dutch listed firms are therefore respectively 219,695 and 736,747 thousand US$, indicating that Germany has a lot more smaller publicly listed firms. Again, comparing this result with a prior study by Rudolph & Schwetzler (2013), they found a median natural logarithm total assets value of 12.10 (corresponding to 179,871 thousand US$) for continental European firms, and a median value of 11.89 (corresponding to 145,801 thousand US$) for British publicly listed firms. With respect to US findings, Hoechle et al. (2012) found that the median total assets value for their 1996-2005 US sample is 356,910 thousand US$.

Profitability is measured as EBIT/total sales and alternatively EBIT/total assets. For both measures, it can be concluded that the median-based profitability of as well the German and Dutch sample of publicly listed firms is quite similar. With respect to the EBIT/total sales

ratio, the found value for the German median sample is 0.053, while 0.051 for the Dutch sample. With respect to German and Dutch conglomerates (respectively 0.057 and 0.047) there is quite a difference in profitability using the EBIT/total sales ratio, with German conglomerates noteworthy more profitable than Dutch conglomerates. Prior investigation by Hoechle et al. (2012), who found relatively quite higher profitability (EBIT/total sales) results for their US sample: 0.079 for conglomerates and 0.070 for focused firms.

Interesting is the fact that when the mean EBIT/total assets is used as profitability measure, Dutch conglomerates are in fact overall more profitable (0.063) than German conglomerates (0.059). With respect to standalone firms, the median values are exactly the same for as well the EBIT/total sales measure as the EBIT/total assets measure, respectively 0.048 and 0.055 for the German and Dutch standalone firms. This indicates that Dutch standalone firms are slightly more profitable than their German counterparts. Prior research by Rudolph & Schwetzler (2013) furthermore found higher profitability results for their continental European and British subsample; respectively 0.061 and 0.067.

Looking at the median cash/total sales and cash/total assets ratios, it can overall be concluded that German firms have relatively far more cash holdings than Dutch firms. With respect to the median cash/total sales, the overall German sample has a value of 0.100 while the Dutch sample has a value of 0.066, which is relatively quite a difference in favor of the German sample. Comparing this result with prior research by Rudolph & Schwetzler (2013), they found median values of respectively 0.058 and 0.082 for the British and Continental European subsample. With respect to the cash/total assets ratio, our sample possesses relatively quite the same values as the cash/total sales ratio for the German and Dutch sample (respectively 0.105 and 0.069). Another remark is the fact that for as well the cash/total sales as the cash/total assets, standalone firms have in general higher cash holdings than conglomerates for as well the German as Dutch sample. This is in line with the much discussed co-insurance effect leading to the fact that standalone firms are in need to possess relatively more cash than multidivisional firms (conglomerates) (Duchin, 2010; Hann et al., 2013). Investigating the difference between German and Dutch firms, it can be concluded that German conglomerates have relatively higher cash holdings than their Dutch counterparts. For the median cash/total sales ratio, German conglomerates possess a value of 0.089 while their Dutch counterparts have a value of 0.066. A similar result is found for the median cash/total assets ratio with a value of 0.096 for German conglomerates and a value of 0.061 for Dutch conglomerates. Looking at standalone firms, there is also a relatively great difference between German and

Dutch standalone firms. The median cash/total sales ratio for German standalone firms has a value of 0.118, while their Dutch counterparts have a value of 0.083. Similar results are found for the median cash/total assets measure, with the German and Dutch standalone firms having a value of respectively 0.121 and 0.079, indicating a large difference in relative cash holdings between standalone firms of both countries.

The next measure is the capital expenditure (Cap. Ex.) relative to total sales and total assets. The most important notion is that Dutch firms (conglomerates and standalone) have a relatively higher capital expenditure than German firms, but this difference is relatively much greater when the Cap.Ex./total sales is used. The mean Cap.Ex./total sales value for the German and Dutch sample is respectively 0.027 and 0.053, while the values for the German and Dutch sample are 0.026 and 0.034 when the median Cap.Ex./total assets is used. With respect to Cap.Ex/total sales, comparable research by Rudolph & Schwetzler (2013) found a value of 0.032 for the British subsample and a value of 0.036 for continental Europe. For our sample, it can be concluded that especially for the Dutch sample, the choice of accounting measure brings forth a significant difference in the eventual found excess values. It is furthermore noticed that the deviation between the outcomes of both accounting measures is almost 0 for as well German standalones and conglomerates. The mean Cap.Ex./total sales values for German conglomerates and standalones are respectively 0.020 and 0.036, while respectively 0.019 and 0.035 for the mean Cap.Ex./total sales accounting measure. With respect to the Cap.Ex./total sales measure, Rudolph & Schwetzler (2013) found Continental European median values of 0.038 for Conglomerates and 0.036 for standalones, also indicating that there is almost no difference between conglomerates and standalones. With respect to US firms, Hoechle et al. (2012) found also similar results for the median Cap.Ex./total sales measure: Respectively 0.038 and 0.041 for diversified and standalone firms.

The leverage ratio is defined as the ratio of the book value of interest bearing debt divided by total sales or total assets. The book value of interest bearing debt is furthermore defined as the sum of:

- non-current liabilities
- other non-current liabilities
- long-term debt
- loans

A first glimpse at the outcomes leads to the notice that the choice of accounting measure of leverage is influencing the outcomes. The median values obtained by using debt/total sales for as well conglomerates as standalone firms are relatively much lower than by using debt/total assets as median accounting measure of leverage. The overall median debt/total sales value for the German and Dutch sample is respectively 0.368 and 0.379. With respect to conglomerates, a median debt/total sales value of respectively 0.404 and 0.418 are found for German and Dutch conglomerates. Median debt/total sales values for standalone German and Dutch firms are also not much differing, with respectively values of 0.353 and 0.349. Prior research by Rudolph & Schwetzler (2013) indicated lower leverage values for Continental European conglomerates and standalones with respect to median debt/total sales values: Respectively 0.230 and 0.208. Rudolph & Schwetzler (2013) even found a lower value of 0.184 for their British subsample of conglomerates and standalone firms. Again the argument that the choice of the data set can be influencing result, seems to be valid when prior research of Hoechle et al. (2012) is investigated. They found leverage values (debt/total sales) of respectively 0.531 and 0.436 for US conglomerates and standalones.

On the other hand, using debt/total assets as leverage measure, the overall median debt/total assets value for the German and Dutch sample is respectively 0.448 and 0.459. Looking more specifically at the differences between conglomerates and standalone firms, it can be noticed for both countries that conglomerates have higher leverage values than standalone firms. As mentioned, the values found by using debt/total assets as measure of leverage are relatively quite higher. With respect to conglomerates, the median debt/total assets value for German and Dutch conglomerates are relatively 0.556 and 0.468, also indicating a relatively much greater difference in value in comparison to the values found by the debt/total sales measure of leverage. The median values found for standalone firms by using debt/total assets are also showing that there exists a much greater difference in leverage than when debt/total sales is used as accounting measure. In this case, the median value found for German standalone firms is 0.394, while the found value for Dutch standalone firms is 0.449, indicating that Dutch standalone firms are more leveraged than their German counterparts. Unfortunately, there is no literature found who also provides values for debt/total assets as leverage measure, so it is not possible to compare these results with other literature.

Having discussed the accounting measures, there are also two market-based measures which need to be discussed. The first market-based measure to be discussed is Tobin's Q. As discussed, Tobin's Q is defined as the market value of equity divided by the corresponding

firm's total assets. Overall, the difference with respect to the found median values of Tobin's Q are not much between the overall German (0.783) and Dutch sample (0.733). However, the difference with respect to German and Dutch conglomerates is noteworthy. Median values of respectively 0.602 and 0.750 for German and Dutch conglomerates are indicating that conglomerates from both countries are relatively underpriced, with German conglomerates having a lower Tobin's Q than Dutch conglomerates. With respect to standalone firms, median values of Tobin's Q for German and Dutch standalone firms are respectively 0.867 and 0.726, indicating that in this case Dutch standalone firms are more underpriced than their standalone German counterparts. Prior research investigating values of Tobin's Q for an European sample is conducted by Ammann et al. (2011). They found a median Tobin's Q value of 1.39 for their 2003-2007 European sample. This value is higher than our findings, but again this can possibly be explained by the choice of the data set. After investigation of median Tobin's Q values in the time-period 2003-2007 for our sample, it is found that the value of this market-based measure is indeed higher: Approximately 1.10 for the Dutch sample and 1.25 for the German sample. A plausible explanation can be that 2003-2007 was a pre-crisis period, and the market value of equity was priced higher than during and after the recent financial crisis (2007-2009), leading to higher values of Tobin's Q. Furthermore, Maury (2005) discusses Tobin's Q for Western European firms specifically. For his 1996-1999 data set, he found a median value of 1.26. With respect to North American data, Gillan & Panasian (2013) investigated values of Tobin's Q for US and Canadian firms. Form their 2005 sample they found median values of respectively 1.69 and 1.63 for US and Canadian firms, which are higher than the 2005 median Tobin's Q values (approximately 1.30) of the discussed European-based literature, and the median 2005 values found in this thesis (approximately 1.20 for the Dutch and 1.30 for the German sample).

Market value of equity/total sales is a second market-based measure also used in this thesis. With respect to this measure, the median values for German and Dutch conglomerates are respectively 0.549 and 0.714. With respect to standalones, the median values are respectively 0.793 and 0.646 for German and Dutch standalones. No direct values with respect to this market-based measure are found nor could be calculated in the obtained literature, so a comparison with other literature was not made with respect to this market-based measure.

6.2 Excess values

The calculated excess values can be found in Appendix E. The tables in this appendix represent the four different rounds as stated in table 4.2, which implies excess values based on

mean/median industry multipliers and firm valuation based on firm/enterprise value. Following Ammann et al. (2012), observations where the actual firm value is either larger than four times the imputed value or less than one fourth of the imputed value are excluded, resulting in winsorizing respectively 126 German and 27 Dutch conglomerates firm-year observations. Leaving a total of respectively 1853 and 342 firm-year observations for the German and Dutch conglomerates. In appendix E1 and E2, respectively the mean and median excess values based on firm values for as well the German (Panel A) as Dutch (Panel B) sample are provided. This is also shown in appendix E3 and E4, but than for excess values based on enterprise value instead of firm value.

With respect to the excess values calculated for the conglomerates, the excess values for unrelated and related diversified conglomerates are also subdivided in each of the tables in appendix E. The German sample contains 114 related diversified firm-year observations (thus 1739 unrelated diversified firm-year observations), while the Dutch sample contains 54 related diversified firm-year observations (thus 288 unrelated diversified firm-year observations).

6.2.1 Conglomerates vs. Standalones

Discussing the found results in appendix E, it is found that the German sample provides different statistical significant results with found excess values ranging between -0.010 and 0.058 for respectively mean-based excess values based on firm value in 2012-2013 and median-based excess values based on enterprise value in 2009-2010. Most remarkable is the fact that during the recent financial crisis-year 2007-2008 as well a statistical significant diversification discount as premium is found. Median-based excess values based on firm value indicate a relatively small discount of 0.005, while mean-based excess values based on enterprise value indicate a relatively small diversification premium of 0.007. This difference indicates that whether to obtain a diversification discount or premium is dependent on the choice of method. With respect to the Dutch sample, only statistical significant premiums were found and the magnitude of a found premium again depends on the choice of method. For example, a statistical significant premium of 0.116 is found for firm-year 2011-2012 in case of median-based excess values based on firm value, while a value of 0.151 is found for the similar firm-year in case of median-based excess values based on enterprise value. Another remark is the fact that in comparison to Germany, no statistical found results were found for firm-years during the recent financial crisis (2007-2009). A recent study by Ammann et al. (2012) found for their 2000-2005 US-based sample a mean conglomerate

diversification discount ranging between 0.099 and 0.139 for sales-based excess values. Similar results were found by Hoechle et al. (2012), who found, for their 1996-2005 US-based sample, discounts of 0.060 and 0.053 for respectively median sales-based and mean sales-based excess values based on firm value. The results of Ammann et al. (2012) and Hoechle et al. (2012) are of approximately the same magnitude as the found results in this thesis, but a different data-set makes it non-comparable. Besides diversification discounts, premiums are also found in literature. Such a significant diversification premium is found by Choe et al. (2014). For their 1988-1998 sample of Australian firms, they found that diversified firms trade on average at a premium of 29% in comparison to standalone firms. This implies that their found sales-based excess values based on firm value have a value of approximately 0.25. This is a relatively much greater value than the highest found significant premium in this thesis (i.e. 0.151 for Dutch conglomerates in 2011-2012 for median-based excess values based on enterprise value).

With respect to the calculated excess values based on total assets, a statistical significant diversification discount is found in each round of investigation for as well Germany and The Netherlands ranging from 0.017 to 0.077. Comparing this result with the US-based study Hoechle et al. (2012), it is noticed that similar results (conglomerate excess values ranging between -0.023 and -0.083) are found for their 1996-2005 sample.

On the other hand, a statistical significant premium (0.011) is also found for The Netherlands during 2009-2010 for mean-based excess values based on enterprise valuation. Investigating mean-based total sales excess values based on enterprise valuation, Rudolph & Schwetzler (2013) found for their European sample (although not statistical significant) a diversification premium for the years 2005-2006 and 2006-2007 of respectively 0.045 and 0.029. This is partly in line with our found results for the German and Dutch sample. The German sample shows also a diversification premium for these two firms years of respectively 0.024 and 0.020, with the first being statistical significant. The Dutch sample shows also a premium for these two firm-years: Respectively 0.026 and 0.050 for 2005-2006 and 2006-2007, with the latter being statistical significant. There exist also differences with the study of Rudolph & Schwetzler (2013): For the financial crisis years 2007-2008 and 2008-2009 Rudolph & Schwetzler (2013) found a (not statistical significant) diversification discount, while the German and Dutch sample show a premium, with a statistical significant result for the German sample in 2007-2008 of 0.007. This result suggests that Dutch and especially German conglomerates were less affected during the recent financial crisis than the average European

conglomerate. A significant diversification premium is also found by Choe et al. (2014). For their 1988-1998 sample of Australian firms, they found that diversified firms trade on average at a premium of 25% in comparison to standalone firms. This implies that their found asset-based excess values based on firm value have a value of approximately 0.22. This is a relatively much greater premium than the found results in this thesis and suggests that institutional factors are perhaps accountable for these differences with respect to the found excess values.

With respect to EBIT multiples, the statistical significant results show a diversification discount for each round of investigation. For the Dutch sample, the greatest diversification discount is found for the mean-based excess values based on firm valuation: For the firm year 2012-2013 a statistical significant diversification discount of 0.138 is found, while the German sample shows in that particular year a diversification discount of 0.113, but this value is not a statistical significant result. The greatest statistical significant diversification discount found for the German sample has a value of 0.100 for the mean-based excess values based on enterprise valuation, for the firm year 2009-2010. Although not statistical significant, the Dutch sample shows a diversification discount of 0.075 for the same firm year.

Two market-based measures were also investigated, providing mixed results. Excess values based on Tobin's Q indicate mostly a statistical significant diversification discount, but also statistical significant diversification premiums were found. With respect to the diversification discount, the highest statistical significant Dutch result has a value of -0.031 for the firm years 2006-2007 and is found for mean-based excess values based on enterprise valuation. With respect to the German sample, the highest statistical significant discount (-0.030) is found for the firm-year 2007-2008 for mean-based excess values based on enterprise valuation. This is suggesting that, despite the advantage of internal capital markets, German conglomerates severely suffered during the recent financial crisis (2007-2009) or that just the use of Tobin's Q is (due to possible biases) responsible for this result, as discussed by Custodio (2014). As mentioned, diversification premiums are also found for excess values based on Tobin's Q. For Germany a small statistical significant premium of respectively 0.004 and 0.031 is found for the firm years 2010-2011 and 2012-2013, for mean-based excess values based on firm valuation. With respect to the firm year 2012-2013, a statistical significant result is also found for the Dutch sample: 0.025 for mean-based excess values based on firm valuation. Villalonga (2004) also calculated excess values based on Tobin's Q. From his 1989-1996 US-sample, he found an significant average diversification discount of 0.160 for diversified firms. By using

'Business Unit Data' instead of segment data, he found a significant average diversification premium of 0.250. Although, the study by Villalonga (2004) is not comparable with the results of the investigation in this thesis, it is worth mentioning that data can perhaps also be a driver of the eventual found result (diversification discount or premium). With respect to emerging economies, Lin & Su (2008) investigate excess values of a Chinese 2000-2002 sample of diversified and standalone firms. They found that mean-based excess values based on Tobin's Q, give the result that diversified firms trade approximately 27% higher value than their standalone counterparts. This result suggests that institutional factors can perhaps play a role in the eventually found excess values.

With respect to market value of equity divided by total sales as market-based measure, not much statistical significant results were found. For Germany a statistical significant diversification discount of 0.030 was found for the firm-year 2009-2010 for median-based excess values based on firm valuation. Even higher statistical significant German diversification premiums were found for mean-based excess values based on firm valuation: 0.044 and 0.046 for respectively 2007-2008 and 2013-2014. These found results are partly in line with Fauver et al. (2003), who also found statistically significant premiums for firms in countries with a German origin [i.e. Germany (Fauver et al., 2003)]. Fauver et al. (2003) calculated firm-value based excess values based on market-to-sales for a 1991-1995 sample for several European countries. They found a premium of respectively 0.014 and 0.027 for median- and mean-based excess values. With respect to the Dutch sample, four statistical significant discounts were found. Median-based excess values based on firm valuation provide statistical significant values of respectively -0.070 and -0.009 for 2007-2008 and 2012-2013. A statistical significant diversification discount of 0.049 is found for the firm-year 2005-2006 for the median-based excess values based on enterprise valuation, while a diversification discount of 0.018 is found for the firm-year 2011-2012 for excess mean-based excess values based on enterprise valuation. Despite diversification discounts, a premium was also found for solely the Dutch sample: A value of 0.100 for mean-based excess values based on firm valuation. Fauver et al. (2003) found mixed results for their English and French oriented firms. A statistical significant discount of respectively 0.086 and 0.082 were found for median- and mean-based excess values for English-oriented [i.e. the United States (Fauver et al., 2003)] conglomerates. In case of French-oriented countries [i.e. The Netherlands (Fauver et al., 2003)], diversification premiums of respectively 0.003 and 0.002 are found for median- and mean-based excess values. Overall, the usefulness of this earlier performed study

by Fauver et al. (2003) is limited: No country-specific excess values (e.g. Germany or The Netherlands) and the use of an outdated data sample, makes the comparison of excess values with the research in this thesis rather limited.

With respect to emerging economies, Lee et al. (2012) found that diversified firms possess excess values which are on average 15% (i.e. corresponding to a difference in excess values of 0.18) higher than their standalone counterparts. Fauver et al. (2003) provides reasoning for the fact that there exist a greater difference between excess values of diversified and standalone firms in emerging economies, compared to developed countries. They argue that it is for firms in emerging markets costly and difficult to raise external capital, and therefore the presence of internal capital markets result in a higher valuation effect for diversified firms, compared to standalone firms.

6.2.2 Unrelated vs. related diversification

Besides the differences between conglomerates and standalones, the differences with respect to conglomerates itself are also investigated with respect to unrelated and related diversified firms. Recalling that a firm is labeled 'related diversified' when they have a different SIC code on the 3-digit level than the diversified firm's core business.

The excess values of the unrelated and related diversified conglomerates are also shown in the tables of appendix E. With respect to these excess values based on total assets, it is noticed that for Germany the related diversified firms have on average a 4% (increased excess value of 0.015) relatively higher value than their unrelated diversified counterparts. An exception is however noticed for mean-based excess values based on firm value for the firm-years 2011-2012, 2012-2013 and 2013-2014: Related diversified firms trade at an average 4.6% discount (lower excess value of approximately 0.010) in comparison to their unrelated counterparts. The Dutch sample gives on the other hand a much more mixed result: Related diversified firms are as well worth less and more, depending on the firm-year and method. It can be concluded that there exists no consistency with respect to the differences between related and unrelated diversified excess values. This notion of inconsistency is also applicable for the other two accounting-based measures (total sales and EBIT). A plausible reason for these inconsistent results with respect to the Dutch sample, can be the fact of the relatively small number of related diversified firms. From the total number of Dutch conglomerates (40) only 6 are related diversified, which is approximately 4.3%. The German sample on the other hand contains a total number of 186 conglomerates, from which 25 are related diversified

(approximately 13%). This difference can perhaps be a reason for the fact that German results are (more) consistent in comparison to the Dutch sample.

With respect to excess values based on total sales, it is noticed for Germany that excess values of related diversified conglomerates are approximately 0.010 higher than excess values of their unrelated diversified counterparts. The most remarkable result is found for median-based excess values based on firm value: In firm-year 2008-2009 (during financial crisis), excess values of respectively 0.101 and 0.073 for unrelated diversified and related diversified firms. This suggests that in a credit-constrained environment [i.e. recent financial crisis (2007-2009)] it is (more) valuable to have related segments within the conglomerates with respect to internal capital allocations. It is furthermore noticed that the outcome of the result is again dependent on the choice of method. For instance, for the firm-year 2008-2009, the median-based excess values based on firm value for the German sample are much differing, as can be seen in table 6.2

Table 6.2
Differences in excess values between related and unrelated diversified firms.

Germany, firm-year 2008-2009	*related diversified*	*unrelated diversified*
total sales	0.101	0.073
total assets	-0.011	-0.029
EBIT	0.005	-0.019
market value of equity/total sssets (Tobin's Q)	-0.004	-0.025
market value of equity/total sales	-0.001	-0.021

The median-based excess values are calculated for the firm-year 2008-2009 and are based on firm value.

From table 6.2 can be concluded that related diversified firms possess higher excess values than their unrelated counterparts, but the difference and magnitude are dependent on the choice of multiplier aggregation.

With respect to Tobin's Q, it is noticed that for the German and Dutch sample the differences with respect to excess values between related and unrelated diversified firms are not consistent for every round of investigation: Investigation of firm years lead to the conclusion that the choice of multiplier aggregation is again an important driver whether to find that related diversified firms possess higher excess values than unrelated diversified firms. This is not the case with respect to the market value of equity/total sales based measures: For as well Germany as The Netherlands it is found that related diversified conglomerates possess higher excess values than unrelated diversified firms of respectively 0.020 and 0.025 (i.e. this

difference is approximately 0.5%) for the German and Dutch sample. This found difference of 0.5% is relatively much lower than the difference between related and unrelated diversified firms found by Lee et al. (2012) for their 2001-2009 Malaysian sample of 2.5%. This suggests that institutional factors play a role in the eventually found result (Lee et al., 2012) or perhaps a reason can be social ties (leading to increased business opportunities and resources) formed by affiliated group firms within these emerging markets (George & Kabir, 2012).

6.2.3 Regressions

In table 6.3, the coefficient estimates of the regressions with respect to mean-based excess values based on firm value as dependent variable and related segments as independent variable are provided. These regressions are regarded as most important due to comparability with other studies (e.g. Fauver et al., 2003; Rudolph & Schwetzeler, 2013). I also performed the same regressions for as well median-based excess values based on firm value and mean-/median-based excess values based on enterprise value. These results will also be discussed and for more clarification, the results can be found in appendix F.

In case of panel A (Germany) the regressions show additional evidence for the support of the second hypothesis (*H2*): Related diversification has indeed a positive effect on excess values. Statistically significant coefficients are found for all rounds of investigation, except for excess values based on EBIT. As only one, coefficients with median-based excess values based on firm value shows a negative relationship (-0.005) with the related segments variable, but this result is however not statistically significant. The highest statistically significant coefficient is found for mean-based excess values based on enterprise value: A positive impact of 0.140 on the related segments variable is measured. For instance, Berger & Ofek (1995) found for their 1986-1991 US-sample a positive impact of 0.026 between median total assets-based excess values based on firm value and the related segments variable, while a positive relationship of 0.098 is found for Germany in this thesis. With respect to the same relationship, but then for total sales and EBIT median-based excess values based on firm value, values of respectively 0.037 and -0.002 were found by Berger & Ofek (1995). For instance, in this thesis values of respectively 0.078 and -0.005 were found for the German total sales and EBIT median-based excess values based on firm value, but the latter not being statistically significant. Overall, it thus can be concluded that a greater positive relationship between excess values and relatedness is found in this thesis for the German sample. These differences perhaps exist due to the fact that in this thesis a smaller, more recent and other country (Germany instead of a US) data sample is used.

On the other hand, no support for the second hypothesis (*H2*) is found for Panel B (The Netherlands): Despite found positive relationships between excess values and the related segments variable, these results were not statistically significant. The non-statistically significant results for the Dutch sample are probably due to the two main limitations of the research in this thesis, namely: A too small Dutch data sample and too strict requirements on the related diversified firm classification system.

Table 6.3
Coefficient estimates from regression of mean-based excess values based on firm value for Panel A (Germany).

Firm value, mean-based multiples						
Panel A: Germany						
Dependent variable: Excess values based on:	Obs.					
	R-squared	intercept	related segments	natural log of total assets	EBIT/total sales	Cap.Ex./total sales
total assets	1259					
	0.053	-0.136	0.121*	-0.019*	1.119	0.029*
total sales	1255					
	0.081	-0.241	0.094**	0.045*	0.705*	0.272**
EBIT	1255					
	0.020	-0.079	0.021	0.013	N.A.	0.092
Tobin's Q	1221					
	0.063	-0.109	0.080	-0.008	1.238*	0.202
market value of equity/total sales	1216					
	0.071	-0.133	0.089*	0.026*	1.398*	0.251*
Firm value, mean-based multiples						
Panel B: The Netherlands						
Dependent variable: Excess values based on:	Obs.					
	R-squared	intercept	related segments	natural log of total assets	EBIT/total sales	Cap.Ex./total sales
total assets	423					
	0.018	-0.118	0.002	-0.016*	1.414*	0.057
total sales	418					
	0.034	-0.022	0.017	0.009	1.067	0.243*
EBIT	390					
	0.011	-0.015	-0.018	-0.020	N.A.	0.341
Tobin's Q	295					
	0.050	-0.122	-0.012	-0.017*	0.998	0.190
market value of equity/total sales	289					
	0.054	-0.187	-0.003	0.005	1.203*	0.207*

Coefficient estimates from regressions of excess values based (dependent variable), on a related segments measure (related segments as independent variable) and control variables (natural log of total assets, EBIT/total sales and Cap.Ex./total sales. The related segments variable is constructed with use of the total number of segments reported by the diversified firm and its number of unrelated segments; this variable is set to zero when no segments are related, and set to 'number of firm segments minus one' when no segments differ. Statistical significance is tested with use of a t-test and indicated at a 1% (***), 5% (**) and 10% (*) level.

6.3 The value of corporate diversification during the recent financial crisis (2007-2009)

It is investigated what the difference in excess values are between conglomerates (as well related as unrelated diversified) and standalones during the recent financial crisis (2007-2009) and non-crisis period. In order to compare the difference between recent financial crisis (2007-2009) and non-crisis period for the total sample of conglomerates and standalones, the difference between the found differences between conglomerates and standalones are also investigated for both periods (crisis and non-crisis). A limitation of the described method is the fact that most of the earlier found excess values are not statistically significant and should therefore not be used. In order to avoid bias and unreliable results, it is chosen to winsorize all these statistically non-significant results. This procedure leads to a very small sample of statistically significant excess values and therefore makes comparing differences between recent financial crisis (2007-2009) and non-crisis excess values (very) limited.

Increased excess values conglomerates during crisis

In table 6.4 the results in favor of hypothesis *H3A* are shown for different rounds of investigation for Panel A (Germany) and Panel B (The Netherlands). Conglomerates possess indeed higher excess values during the recent financial crisis (2007-2009) in comparison to non-crisis years, and are discussed in more detail.

With respect to Panel A (Germany), it is found that for median-based excess values based on firm value that during the recent financial crisis (2007-2009), conglomerates experienced an increase of roughly 40% in excess value in comparison to the non-crisis situation. This results holds for as well excess values based on total assets and total sales multiples. It is furthermore remarked that the complete sample of as well conglomerates and standalone firms has higher excess values of 35% and 25% for respectively the found values based on total assets and market value/total sales during the recent financial crisis (2007-2009). This result is relatively much higher than the results found by Volkov & Smith (2015). For their 1999-2011 US-based sample, they found that the diversification discount is improved during the recent financial crisis (i.e. increased) with 8.8% for as well globally + industrially diversified firms, and 5.8% for purely globally diversified firms.

The greatest difference in conglomerate excess values between the recent financial crisis (2007-2009) and the non-crisis situation is however found for mean-based excess values based on firm value. Besides the finding that conglomerates trade at a diversification premium instead of discount, it is found that this premium is higher during the recent financial crisis (2007-2009) for excess values based on total sales multiples. During the recent financial crisis

(2007-2009), German conglomerates possess 50% higher excess values in comparison to the non-financial crisis situation. The found diversification premiums are 0.076 and 0.116 for respectively the non-financial crisis and recent financial crisis (2007-2009) situation. It is also found that the complete sample of diversified and standalone firms have positive excess values during the recent financial crisis (0.020), while the found excess values are negative (-0.010) during the non-crisis situation. The same, but even higher results are found for median-based excess based on enterprise value: German conglomerates trade approximately 30% higher, possessing excess values of respectively 0.149 and 0.114 for the recent financial crisis (2007-2009) and non-crisis situation. Very small differences are however found for the results based on market value of equity/total sales multiples for mean-based excess values based on firm value: The found excess values during the recent financial crisis (20072-2009) of conglomerates and also from the complete sample are slightly more positive than during the non-crisis situation.

With respect to panel B (The Netherlands), only for mean-based excess values based on enterprise value it is found that conglomerates possess higher excess values during the recent financial crisis (2007-2009) in comparison to the non-crisis situation. With respect to these excess values based on total assets multiples, it is found that Dutch conglomerates trade at a diversification premium of 0.018, while a diversification discount is found (-0.010) during the non-crisis situation. No difference in excess values was found for standalones for the recent financial crisis (2007-2009) and non-crisis situation. It is furthermore noticed that the complete sample of conglomerates and standalones possess higher excess values during the recent financial crisis (a diversification premium of 0.011) in comparison to the non-financial crisis situation (a diversification discount of 0.017).

Rudolph & Schwetzler (2013) also found that conglomerates from their continental European sub sample also possess higher excess values during the recent financial crisis (2007-2009). They found mean-based excess values based on enterprise value of respectively 0.087 and 0.075 during the recent financial crisis (2007-2009) and non-crisis situation in case of total sales multiplier aggregation. The found excess values in this thesis according to the same method (i.e. mean-based, enterprise value and total sales multiplier aggregation) provided different results: For German conglomerates also a diversification premium was found of 0.042 and 0.093 for respectively the recent financial crisis (2007-2009) and non-crisis situation, providing support for hypothesis *H3B.* Although not statistically significant, Dutch conglomerates show on the other hand excess values of 0.085 and 0.093 for respectively the

recent financial crisis (2007-2009) and non-crisis period, indicating the Dutch conglomerates do not trade at higher excess values during the recent financial crisis. It should however be mentioned that there is a lack of comparability between the study of Rudolph & Schwetzler (2013) and the investigation in this thesis due to the fact a much larger and different data sample is used by Rudolph & Schwetzler (2013) with no specific investigation on a purely German and Dutch sample.

Decreased excess values conglomerates during crisis

In table 6.5 the results in favor of hypothesis *H3B* are shown for different rounds of investigation for Panel A (Germany) and Panel B (The Netherlands). These results indicate that conglomerates possess lower excess values during the recent financial crisis (2007-2009) in comparison to non-crisis years, and are discussed in more detail.

With respect to panel A (Germany) it is first of all noticed that solely excess values based on enterprise value are providing support for hypothesis *H3B*. The mean-based excess values calculated with use of total sales- and EBIT-based multiples are showing both that German conglomerates possess a diversification premium during as well the recent financial crisis (2007-2009) situation and non-crisis situation. These premiums were however lowered during the recent financial crisis with approximately 55% and 70% for respectively excess values based on total sales and EBIT multiplier aggregation. There also exists an important difference between these mean-based excess values based on total sales and EBIT multiplier aggregation: The found values based on total sales multiplier aggregation show that conglomerates possess higher excess values than standalone (approximately 20%) during the recent financial crisis (2007-2009), while the found values for German conglomerates based on EBIT multiplier aggregation are only one-fifth of the found excess values for standalones (respectively 0.021 to 0.121). These results are again indicating that the choices made to calculate excess values (i.e. multiplier aggregation accounting items and choice of firm valuation) can seriously have an impact on the eventually found results. This notion is made more clear for median total assets-based excess values based on enterprise value: Instead of a diversification premium, a diversification discount is found (-0.065) for German conglomerates during the recent financial crisis (2007-2009). A diversification discount is also found for standalones (-0.030), but is relatively much lower (more than 50%) than the found diversification discount for conglomerates. Despite differences, similarities are also observed for the found excess values based on enterprise values which support hypothesis *H3B*: The complete sample of German conglomerates and standalones have lower excess

values during the recent financial crisis situation (2007-2009) compared to the non-crisis situation.

For panel B (The Netherlands), support for hypothesis *H3B* is found for median-based excess values based on firm value in case of market value of equity/total sales multiplier aggregation. It is found that Dutch conglomerates possess excess values of -0.058 and -0.025 for respectively the recent financial crisis (2007-2009) and non-crisis situation. The difference with respect to their standalone counterparts are relatively great: Dutch standalones trade at a premium of 0.012 and 0.010 during respectively the recent financial crisis (2007-2009) and non-crisis situation. This result suggests that there exists a limitation with respect to available internal capital markets to leverage these potential benefits over the potential extra constraints implied by a credit-constrained environment, lowering the diversification discount even more during the recent financial crisis (2007-2009). This suggestion will however not be tested in this thesis. In line with panel B (Germany), it is also found that the overall sample of Dutch conglomerates and standalones possess relatively much lower excess values of respectively -0.070 and -0.009 during respectively the recent financial crisis situation (2007-2009) and non-crisis situation.

Overall, it thus can be concluded that this thesis finds support for both hypotheses *H3A* and *H3B*. These mixed findings are also found by Rudolph & Schwetzler (2013), who next to the discussed finding that Continental European conglomerates possess higher excess values during the crisis, also found that the same conclusion can be made for their Asia-Pacific and North American sub sample. For their UK sub sample, Rudolph & Schwetzler (2013) however found that conglomerates possess relatively much lower excess values during the recent financial crisis (-0.017) compared to the non-crisis situation (-0.049).

Table 6.4
The excess values of conglomerates and standalones categorized in the recent financial crisis (2007-2009) and non-crisis period. The results in this table are supporting hypothesis *H3A*.

Firm value, median-based multiples				***Enterprise value, median-based multiples***			
Panel A - Germany				**Panel A - Germany**			
total assets multiples	*Crisis(I)*	*Non-crisis (II)*	*Diff. (II) - (I)*	*total sales multiples*	*Crisis(I)*	*Non-crisis (II)*	*Diff. (II) - (I)*
Conglomerates (1)	-0.027	-0.046	-0.019	Conglomerates (1)	0.149	0.114	-0.035
No. of obs.	172	187		No. of obs.	127	280	
Standalones (2)	-0.001	-0.006	-0.005	Standalones (2)	0.091	0.084	-0.007
No. of obs.	367	310		No. of obs.	251	579	
Diff. (1) - (2)	-0.026*	-0.040*	-0.014	Diff. (1) - (2)	0.058*	0.030*	-0.028
MV of equity/total sales multiples	*Crisis(I)*	*Non-crisis (II)*	*Diff. (II) - (I)*				
Conglomerates (1)	-0.020	-0.034	-0.014				
No. of obs.	127	168					
Standalones (2)	0.010	0.006	-0.004				
No. of obs.	266	294					
Diff. (1) - (2)	-0.030*	-0.040*	-0.010				
Firm value, mean-based multiples				***Enterprise value, mean-based multiples***			
Panel A - Germany				**Panel B - The Netherlands**			
total sales multiples	*Crisis(I)*	*Non-crisis (II)*	*Diff. (II) - (I)*	*total assets multiples*	*Crisis(I)*	*Non-crisis (II)*	*Diff. (II) - (I)*
Conglomerates (1)	0.116	0.076	-0.040	Conglomerates (1)	0.018	-0.010	-0.028
No. of obs.	118	158		No. of obs.	41	40	
Standalones (2)	0.096	0.086	-0.010	Standalones (2)	0.007	0.007	0.000
No. of obs.	235	269		No. of obs.	86	82	
Diff. (1) - (2)	0.020*	-0.010*	-0.030	Diff. (1) - (2)	0.011*	-0.017*	-0.028
MV of equity/total sales multiples	*Crisis(I)*	*Non-crisis (II)*	*Diff. (II) - (I)*				
Conglomerates (1)	-0.034	-0.041	-0.007				
No. of obs.	144	160					
Standalones (2)	0.010	0.005	-0.005				
No. of obs.	294	272					
Diff. (1) - (2)	-0.044*	-0.046*	-0.002				

The found excess values of conglomerates and standalones are categorized for crisis and non-crisis years for as well panel A (Germany) and panel B (The Netherlands). This is done by taking the average excess values for each round of investigation (see table 4.2) for each imputed value accounting item, for recent financial crisis (2007-2009) and non-crisis years (2005-2006; 2010-2013). Statistical significance is tested at the 1% (***), 5% (**) and 10% (*) level

Table 6.5
The excess values of conglomerates and standalones categorized in the recent financial crisis (2007-2009) and non-crisis period. The results in this table are supporting hypothesis *H3B*.

Enterprise value, median-based multiples				***Enterprise value, mean-based multiples***			
Panel A - Germany				**Panel A - Germany**			
total assets multiples	*Crisis(I)*	*Non-crisis (II)*	*Diff. (II) - (I)*	*total sales multiples*	*Crisis(I)*	*Non-crisis (II)*	*Diff. (II) - (I)*
Conglomerates (1)	-0.065	-0.030	0.035	Conglomerates (1)	0.042	0.093	0.051
No. of obs.	167	187		No. of obs.	150	439	
Standalones (2)	-0.004	-0.005	-0.001	Standalones (2)	0.035	0.083	0.048
No. of obs.	312	310		No. of obs.	296	802	
Diff. (1) - (2)	-0.061*	-0.025*	0.036	Diff. (1) - (2)	0.007*	0.010*	0.003
				EBIT multiples	*Crisis(I)*	*Non-crisis (II)*	*Diff. (II) - (I)*
				Conglomerates (1)	0.021	0.079	0.058
				No. of obs.	119	162	
				Standalones (2)	0.121	0.129	0.008
				No. of obs.	234	268	
				Diff. (1) - (2)	-0.100*	-0.050*	0.050
Firm value, median-based multiples							
Panel B - The Netherlands							
MV of equity/total sales multiples	*Crisis(I)*	*Non-crisis (II)*	*Diff. (II) - (I)*				
Conglomerates (1)	-0.058	-0.025	0.033				
No. of obs.	55	55					
Standalones (2)	0.012	0.010	-0.002				
No. of obs.	105	110					
Diff. (1) - (2)	-0.070*	-0.009*	0.061				

The found excess values of conglomerates and standalones are categorized for crisis and non-crisis years for as well panel A (Germany) and panel B (The Netherlands). This is done by taking the average excess values for each round of investigation (see table 4.2) for each imputed value accounting item, for recent financial crisis (2007-2009) and non-crisis years (2005-2006; 2010-2013). Statistical significance is tested at the 1% (***), 5% (**) and 10% (*) level

Chapter 7. Conclusion & Discussion

It is overall found that diversified firms trade at a discount compared to equivalent standalone firms. Comparing the excess values both conglomerates and standalones (as well mean and median) based on firm and enterprise value, it can be concluded that the excess values based on enterprise values are overall, roughly 15%, higher than excess values based on firm value. This is the case for each for each of the three accounting and two market-based measures. This is partly (due to lower found percentage) consistent with the findings of Rudolph & Schwetzler (2014), who argue that excess values based on firm value are biased downwards with roughly 23%. Looking at the differences between excess values (as well firm and enterprise value) based on mean and median multiplier aggregation, it is found that the excess values based on mean multiplier aggregation or overall 5% lower than the excess values based on median aggregation. This is again partly (due to lower found percentage) in line with Rudolph & Schwetzler (2014) who argue that excess values based on median multiplier aggregation deviate 2.5% with respect to excess values based on median multiplier aggregation. Overall, after investigation of the found excess values for as well conglomerates as standalone firms, it can be concluded that both standalone firms from the German and Dutch sample possess on average 20% higher excess values than their conglomerate counterparts. Despite winsorizing excess values based on observations from which the firm value (and thus also enterprise value) is either larger than four times the imputed value or less than one fourth of the imputed value are excluded, a further improvement of results can be made by firstly winsorizing data before calculating the actual excess values. It is found by Loderer & Roth (2005) that small firms trade at a diversification discount due to low liquidity and therefore possibly lead to distorted excess values of the complete sample. By winsorizing firm observations with total sales less than 20 million US$, these possible distortion can be avoided. Due to the relatively small data samples used in this thesis, this data winsorization has not been carried out and therefore remains a limitation in this thesis.

In order to answer the first research question, the differences between excess values of related and unrelated diversified firms are investigated in depth. From this investigation can be concluded that unrelated diversification indeed does affect the firm value of publicly listed Dutch and German publicly listed firms. This affection is however not consistent and it is still indefinite if the impact of unrelated diversification has a positive or negative impact on the firm value of German and Dutch publicly listed firms. The results suggest that this impact is dependent on the choice of method (i.e. mean or median multiplier aggregation and the choice

of firm valuation) and/or which accounting or market-based measures are used. The German sample however does provide more evidence in favor of a positive relationship between related diversification and firm value than the Dutch sample, which holds for all the three accounting-based measures (total assets, total sales and EBIT). A remarkable and important result indicating this more positive relationship is found for median-based excess values based on firm value in case of total sales multiplier aggregation: During recent financial crisis-year 2008-2009 values of respectively 0.101 and 0.073 are respectively found for unrelated diversified and related diversified firms. This result is supporting the argument that in a credit-constrained environment [i.e. during the recent financial crisis (2007-2009)] it can be (more) valuable to have related segments within conglomerates with respect to internal capital allocations, but contradictory results are also found for as well Germany as The Netherlands: During the crisis, unrelated diversified conglomerates possess higher excess values than their related counterparts. The most consistent and similar results for both Germany and The Netherlands are found for the market value of equity/total sales based measure: Related diversified firms trade approximately at a 0.5% higher value than their unrelated counterparts.

Empirical evidence supporting the fact that the amount of related segments have a positive relationship on excess values are provided by the performed regressions. For the German sample additional evidence was found (with the exception of excess values based on EBIT multiplier aggregation), supporting ting the fact that related diversification has a positive effect on excess values. This additional evidence was however not found for the Dutch sample. Even though, some results from the Dutch sample suggest that there also exists a positive relationship between excess values and related segments, but these results were not proved to be statistically significant and therefore no conclusions can be drawn.

Overall, it can be concluded that the German sample provides more consistent and reliable results than the Dutch sample. Plausible explanations for this conclusion can be as follows:

1. The German sample is larger (1853 firm year observations) and contains absolutely more related diversified firms (114 related diversified firm observations) in comparison to the Dutch sample (342 firm year observations from which 54 related).
2. Institutional factors can play a role (Fauver et al., 2003; Kuppuswamy et al., 2012) and it can for example be that the advantage of having related segments with respect to internal capital markets has less advantages for firms situated in The Netherlands.

The first point indicates a limitation of the research in this thesis, which lies in the relatively small percentage of related diversified firms in both the German and Dutch sample. As discussed, a firm's segment is regarded as related when it has the same US sic-code as the firm's core business on the three-digit level. Perhaps, this categorization is too strict and a firm's segment should be regarded as related when it has the same code on the two-digit level with respect to that firm's core segment, which is also used by Berger & Ofek (1995). This change would most probably lead to more conglomerates labeled as related, which in this thesis have been classified as unrelated.

Multiplier aggregation based on total sales thus provides the most consistent and appealing results. It is also noticed that the excess values based on total sales are in general less negative or more positive in comparison to excess values based on the other two used accounting measures (i.e. total assets, EBIT) and the other two market-based measures (Tobin's Q and market value of equity/total assets). As discussed earlier, Custodio (2014) argues that excess values based on total sales are more accurate and thus should provide a more reliable diversification discount/premium. Despite no clear evidence with respect to this pronounced increased reliability in this thesis, it is indeed remarked that the total sales accounting measure indeed provides different results that the other used two accounting and market-based measures.

With respect to the excess values during the recent financial crisis (2007-2009), it can be concluded that this period can both have a positive or negative impact on the value of diversified firms. This results holds for as well the German as Dutch sample. A positive impact is most pronounced for the German sample, where the largest statistical significant differences are again found for multiplier aggregation based on total sales: German conglomerates gain a 40% increase in excess value during the recent financial crisis (2007-2009) compared to the non-crisis situation for mean-based excess values based on firm value. The Dutch sample however shows relatively even a greater increase of 280% of conglomerate excess values during the recent financial crisis, turning a diversification discount (-0.010) during non-crisis situation to a diversification premium (0.018) during the recent financial crisis (2007-2009). A negative relationship of the recent financial crisis (2007-2009) on the excess values of diversified firms is found for as well the German and Dutch sample. It is noticed that in case of the German sample, the results supporting this negative relationship are all excess values based on enterprise value, while in case of the Dutch sample the support for this (negative) relationship is based on firm value. For the German sample, a decrease ranging

between 50% and 200% between the crisis and non-crisis situation was found, while this decrease was about 50% for the Dutch sample. A further limitation in this thesis is the lack of further empirical evidence with respect to the relationship between excess values of diversified and standalone firms, and the recent financial crisis (2007-2009). A multivariate regression analysis with the regression of excess values on a diversification dummy, a crisis indicator, and the interaction between the two, along with several firm-specific control variables would provide additional evidence.

Overall, the most important conclusion which can be drawn from the investigation in this thesis, is the fact that it is still indefinite whether it remains still not completely clear whether unrelated diversification is value-enhancing or reducing. For each hypothesis contradictory evidence is found, which is eventually depending on the choice of method. Furthermore, it can be concluded that the German sample provides more reliable and less contradictory results than the Dutch sample, indicating that perhaps the choice of the data-set is influencing results.

Appendices

Appendix A - Sampling

A1

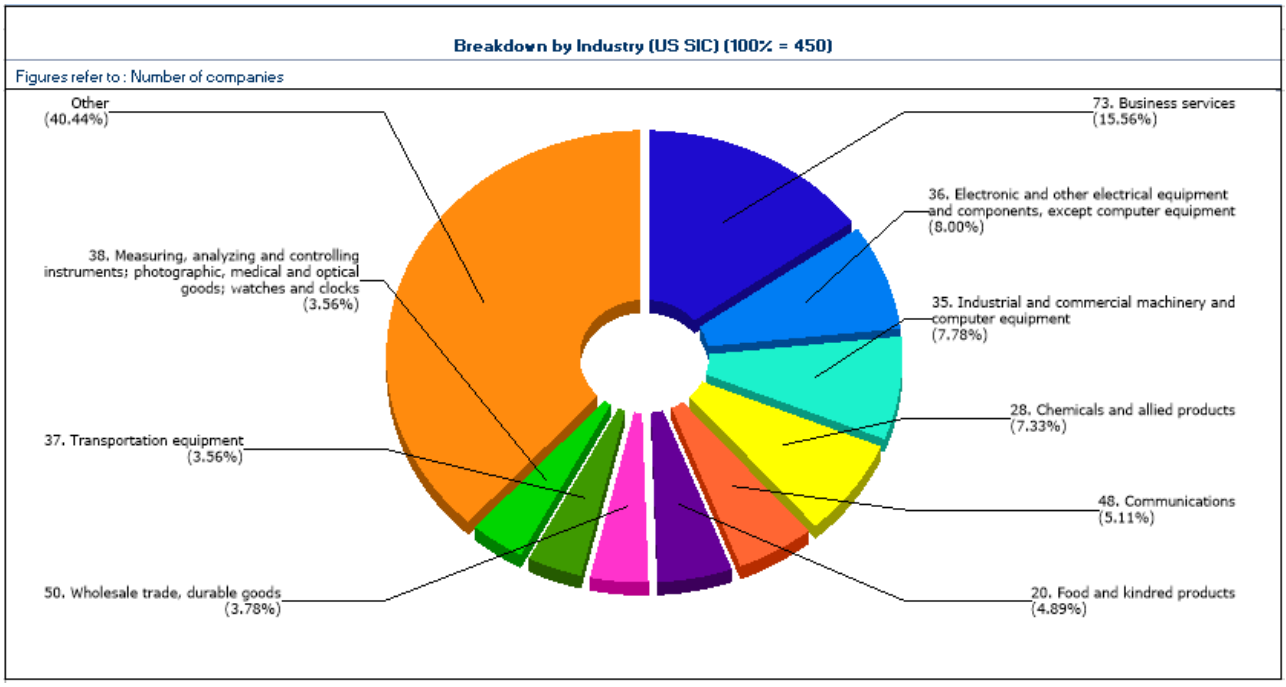
Breakdown of the total sample in a German and Dutch subsample. In panel A the German and Dutch sample are categorized based on total assets, while in panel B the two sub samples are categorized based on total sales.

Panel A	DE		NL
Total assets (th USD)	**Nr. of firms**	**Total assets (th USD)**	**Nr. of firms**
Less than 10,000	27	Less than 10,000	2
From 10,000 to 20,000	23	From 10,000 to 20,000	4
From 20,000 to 50,000	43	From 20,000 to 50,000	8
From 50,000 to 100,000	43	From 50,000 to 100,000	7
From 100,000 to 250,000	58	From 100,000 to 250,000	9
From 250,000 to 500,000	47	From 250,000 to 500,000	8
From 500,000 to 1,000,000	26	From 500,000 to 1,000,000	9
From 1,000,000 to 5,000,000	55	From 1,000,000 to 5,000,000	18
From 5,000,000 to 10,000,000	13	From 5,000,000 to 10,000,000	8
From 10,000,000 to 50,000,000	21	From 10,000,000 to 50,000,000	10
More than 50,000,000	10	More than 50,000,000	1
All	**366**	**All**	**84**
Panel B	DE		NL
Sales (th USD)	**Nr. of firms**	**Sales (th USD)**	**Nr. of firms**
From 0 to 100,000	132	From 0 to 100,000	16
From 100,000 to 250,000	68	From 100,000 to 250,000	10
From 250,000 to 500,000	34	From 250,000 to 500,000	11
From 500,000 to 1,000,000	31	From 500,000 to 1,000,000	7
From 1,000,000 to 3,000,000	42	From 1,000,000 to 3,000,000	16
From 3,000,000 to 5,000,000	19	From 3,000,000 to 5,000,000	7
From 5,000,000 to 10,000,000	7	From 5,000,000 to 10,000,000	7
From 10,000,000 to 25,000,000	14	From 10,000,000 to 25,000,000	6
From 25,000,000 to 50,000,000	6	From 25,000,000 to 50,000,000	3
More than 50,000,000	13	More than 50,000,000	1
All	**366**	**All**	**84**

Appendix B - Sample breakdown

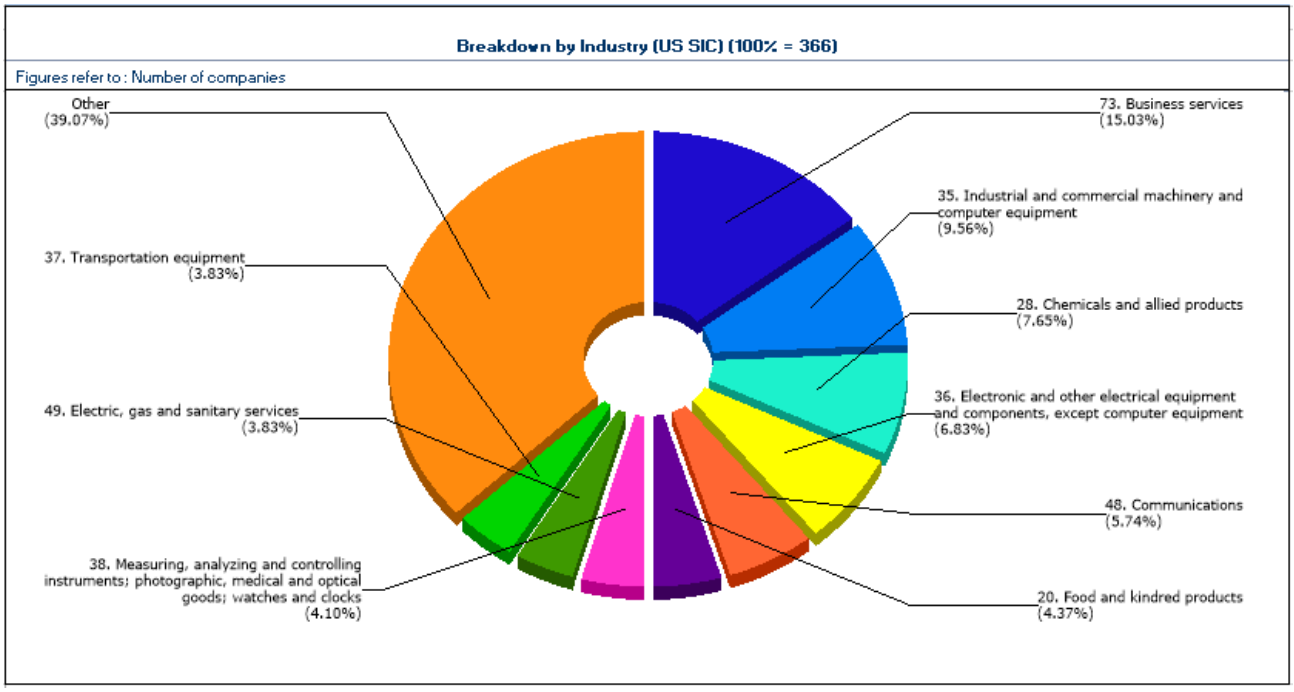
B1

Figure of the breakdown of the final sample of 450 firms in different divisions. The Netherlands (Panel A) and Germany (Panel B) are taken together.



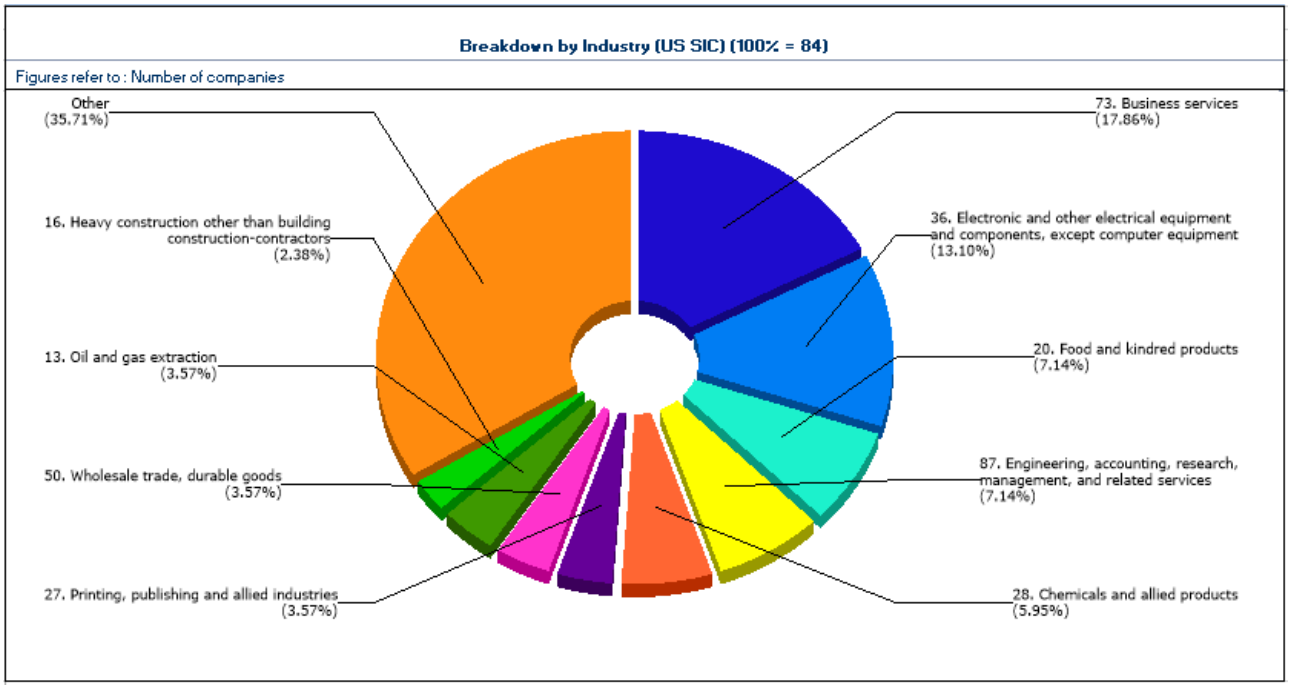
B2

The breakdown of the final sample of 366 German firms (Panel B) in different SIC classified divisions.



B3

The breakdown of the final sample of 84 Dutch firms (Panel A) in different SIC classified divisions.



Appendix C - Definitions

C1

The different used variables, their definitions and if applicable the corresponding measure.

Variables	**Definition**	**Measure**
EXVAL	excess value = percentual firm value loss or gain due to corporate diversification	N.A.
FV	firm value = book value of total equity + book value of total interest bearing debt	N.A.
EV	enterprise value = firm value – security & cash holdings	N.A.
EEV	excess enterprise value = excess value based on enterprise value	N.A.
TA	total assets = book value of total assets	N.A.
EBIT	EBIT = earnings before interest and taxes	N.A.
TS	total sales = book value of total sales	N.A.
MV	market value of equity	N.A.
Leverage	book value of total interest bearing debt to total sales/total assets	Debt/TS, Debt/TA
Cash holdings	book value of total cash to total sales/total assets	Cash/TS, Debt/TA
Size	natural log of total assets	natural log (ln) TA
Profitability	EBIT to total sales/EBIT to total assets	EBIT/TS, EBIT/TA
Growth opportunities	capital exp. to total sales/capital exp. to total assets	Cap.Ex./TS, Cap.Ex/TA
Tobin's Q	market value of equity/total assets	MV/TA
Sales-based Q	market value of equity/total Sales	MV/TS

Appendix D - Literature findings

D1

The outcomes of several papers with respect to the valuation effect of corporate diversification. This table presents the findings and main reasoning of these findings of the reviewed papers with respect to corporate diversification and firm value. Most of the papers found solely a firm value discount as a result of corporate diversification , while only a few found solely a premium. A combination result of no effect, discount and premium is also quite often found in literature

Literature finding solely diversification discount		
Paper	**Finding**	**Main finding(s)**
Graham et al. (2002)	Discount	Diversified firms trade at discount because firms buy already discounted targets
Denis et al. (2002)	Discount	Global and industrial diversified firms trade at discount due to agency costs
Aggarwal & Samwick (2003)	Discount	Diversified firms trade at a discount due to agency theory, especially managerial pursue of private benefits
Jiraporn et al. (2006)	Discount	Diversified firms trade at a discount due to agency theory and is more pronounced for industrial diversified firms
Miller (2006)	Discount	Overall discount, but related diversified firms create more value than single-segment firms due to technological diversity
Laeven & Levine (2007)	Discount	Financial conglomerates trade at a discount to specialized banks due to agency problems
Hund (2010)	Discount	Diversified firms trade at discount due to lower uncertainty about average future profitability
Anjos (2010)	Discount	Diversified firms trade at discount due to asymmetric corporate restructuring costs
Ammann et al. (2012)	Discount	Diversified firms trade at a discount due to risk reducing effects and agency problems
Hoechle et al. (2012)	Discount	Diversified firms trade at a discount due to poor corporate governance
Hautz et al. (2013)	Discount	Diversified firms trade at discount due to agency theory

Rudolph & Schwetzler (2013)	Discount	Diversified firms trade at discount due to agency problems, but this discount was partly mitigated during the recent financial crisis (2007-2009)
Custodio (2014)	Discount	Diversified firms trade at a discount due to accounting implications
Rudolph & Schwetzler (2014)	Discount	Diversified firms trade at a discount due to cash bias in excess value calculation
La Fuente et al. (2014)	Discount	Diversified firms trade at discount due to agency problems, but this discount was partly mitigated during the recent financial crisis (2007-2009)
Literature finding indefinite result/ multiple findings		
Paper	**Findings**	**Main reason findings**
Berger & Ofek (1995)	Discount	Diversified firms have lower operating profitability due to overinvestment/cross subsidization
	Premium	Diversified firms have positive excess value due to Increased debt capacity/tax savings
Campa & Kedia (2002)	No effect /premium	Firm value increased for diversifying firm that actually pursues to diversify; eventual premium depending on firm characteristics
Mansi & Reeb (2002)	Discount	Diversified firms trade at discount due to risk-reducing effects.
	No effect /premium	Corporate diversification does not destroy firm value for (near) all-equity firms
Fauver et al. (2003)	Discount	Diversified firms trade at discount in countries with developed and efficient capital and labor markets (institutional factors)
	Premium	Diversified firms trade at premium in countries with less developed and efficient capital and labor markets (institutional factors)
Doukas & Kan (2006)	Discount	Global diversification does destroy firm value for leveraged firms

	No effect /premium	Global diversification does not destroy firm value for (near) all-equity firms
Glaser & Müller (2010)	Discount	Diversified firms trade at discount due to incorporation of book value of debt to calculate imputed value
	No effect /premium	Corporate diversification does not destroy firm value for (near) all-equity firms
Kuppuswamy et al. (2012)	Discount	Diversified firms trade at discount in countries with developed and efficient capital and labor markets (institutional factors)
	Premium	Diversified firms trade at premium in countries with less developed and efficient capital and labor markets (institutional factors)
Zahavi & Lavie (2013)	Discount	(intra-industry) diversified firms trade at a discount due to negative transfer effects
	No effect	Prior experience in diversification activities can mitigate diversification discount
Literature finding premium		
Paper	**Finding**	**Main reason finding**
Villalonga (2004)	Premium	Diversified firms trade at a premium relative to specialized firms in same industry. Biased data can cause diversification discount
Lin & Su (2008)	Premium	Diversified firms trade at a premium depending on ownership concentration and structure
Lee et al. (2012)	Premium	(industrial) diversified firms trade at a premium depending on ownership concentration and structure
Choe et al. (2014)	Premium	Diversified firms trade at premium due to motivational effects increased executive compensation

Appendix E - Excess Values

The found excess values for as well the complete sample of conglomerates and separately for the unrelated and related diversified conglomerates; the excess values for standalone firms were also calculated. Statistical significance is tested with use of a t-test and indicated at a 1% (***), 5% (**) or 10% (*) level. Panel A shows the results for the German sample, while panel B shows the results for the Dutch sample.

E1

The found mean-based excess values based on firm value for Panel A (Germany) and panel B (The Netherlands).

Firm value, mean-based multiples									
Panel A - Germany									
	05-06	*06-07*	*07-08*	*08-09*	*09-10*	*10-11*	*11-12*	*12-13*	*13-14*
Using total assets multiples									
Conglomerates (1)	-0.020	-0.029	-0.060	-0.021	-0.012	-0.017	-0.034	-0.030	-0.056
No. of obs.	110	138	151	161	120	92	163	159	165
Related	-0.014	-0.026	-0.053	-0.009	-0.014	-0.012	-0.046	-0.042	-0.059
Unrelated	-0.021	-0.029	-0.061	-0.023	-0.012	-0.018	-0.032	-0.028	-0.056
Standalones (2)	0.012	0.010	0.008	0.015	0.014	0.013	0.006	0.001	-0.001
No. of obs.	239	252	297	341	238	261	291	272	276
Difference (1)-(2)	-0.032	-0.039*	-0.068	-0.036	-0.026	-0.030*	-0.040	-0.031	-0.055
Using total sales multiples									
Conglomerates (1)	0.020	0.037	0.036	0.087	0.116	0.103	0.111	0.076	0.081
No. of obs.	111	136	150	160	118	94	163	158	165
Related	0.024	0.045	0.037	0.109	0.120	0.128	0.089	0.069	0.103
Unrelated	0.019	0.036	0.036	0.084	0.115	0.099	0.114	0.077	0.078
Standalones (2)	0.010	0.029	0.034	0.094	0.096	0.072	0.133	0.086	0.095
No. of obs.	239	250	296	340	235	258	288	269	275
Difference (1)-(2)	0.010	0.008	0.002	-0.007	0.020*	0.031	-0.022	-0.010*	-0.014
Using EBIT multiples									
Conglomerates (1)	0.023	0.039	0.003	0.012	0.007	0.063	0.111	0.007	0.018
No. of obs.	111	135	150	160	119	92	161	162	165
Related	0.005	0.029	-0.016	0.007	-0.001	0.075	0.055	0.005	0.019
Unrelated	0.026	0.040	0.006	0.013	0.008	0.061	0.119	0.007	0.018
Standalones (2)	0.113	0.071	0.089	0.055	0.118	0.090	0.149	0.120	0.070
No. of obs.	239	249	296	339	234	256	291	268	275
Difference (1)-(2)	-0.090	-0.032	-0.086*	-0.043	-0.111	-0.027	-0.038	-0.113	-0.052
Using Tobin's Q multiples									
Conglomerates (1)	-0.035	-0.051	-0.024	-0.012	-0.011	0.006	0.002	0.003	-0.017
No. of obs.	109	130	146	157	116	88	156	158	161
Related	-0.026	-0.048	-0.034	-0.001	-0.013	-0.001	0.008	-0.024	-0.021
Unrelated	-0.036	-0.051	-0.023	-0.014	-0.011	0.007	0.001	0.007	-0.016
Standalones (2)	-0.003	-0.012	0.020	0.025	0.018	0.002	0.004	-0.028	0.005
No. of obs.	239	247	295	338	231	253	288	265	274
Difference (1)-(2)	-0.032	-0.039	-0.044	-0.037	-0.029	0.004*	-0.002	0.031*	-0.022
Using MV of equity/total sales multiples									
Conglomerates (1)	-0.069	-0.075	-0.034	-0.011	-0.018	-0.009	-0.020	-0.013	-0.041
No. of obs.	109	130	144	156	116	87	156	158	160
Related	-0.045	-0.008	0.007	0.002	0.003	0.005	0.015	-0.013	-0.009
Unrelated	-0.073	-0.085	-0.040	-0.013	-0.021	-0.011	-0.025	-0.013	-0.046
Standalones (2)	-0.008	-0.012	0.010	0.011	0.009	-0.090	0.009	-0.021	0.005
No. of obs.	239	246	294	337	229	252	286	264	272
Difference (1)-(2)	-0.061	-0.063	-0.044*	-0.022	-0.027	0.081	-0.029	0.008	-0.046*

Firm value, mean-based multiples									
Panel B - the Netherlands									
	05-06	*06-07*	*07-08*	*08-09*	*09-10*	*10-11*	*11-12*	*12-13*	*13-14*
Using total assets multiples									
Conglomerates (1)	-0.014	-0.032	-0.054	-0.003	-0.008	-0.018	-0.032	-0.042	-0.054
No. of obs.	40	48	49	46	41	45	51	51	52
Related	-0.006	-0.037	-0.063	-0.009	-0.004	-0.013	-0.010	-0.044	-0.032
Unrelated	-0.014	-0.032	-0.054	-0.003	-0.008	-0.018	-0.033	-0.042	-0.055
Standalones (2)	0.008	0.010	0.023	0.007	0.006	0.011	0.013	0.002	0.001
No. of obs.	82	84	88	86	86	91	93	93	90
Difference (1)-(2)	-0.022	-0.042	-0.077*	-0.010	-0.014	-0.029	-0.045	-0.044	-0.055
Using total sales multiples									
Conglomerates (1)	0.018	0.030	0.025	0.088	0.118	0.080	0.131	0.094	0.074
No. of obs.	40	47	48	46	41	44	50	50	52
Related	0.022	0.017	0.024	0.106	0.090	0.088	0.118	0.075	0.082
Unrelated	0.018	0.031	0.025	0.087	0.119	0.080	0.132	0.095	0.074
Standalones (2)	-0.004	-0.006	0.011	0.002	0.000	-0.005	0.004	-0.010	-0.021
No. of obs.	102	105	107	107	108	111	110	107	108
Difference (1)-(2)	0.022	0.036	0.014	0.086	0.118	0.085	0.127	0.104	0.095*
Using EBIT multiples									
Conglomerates (1)	0.032	0.04	0.011	0.003	0.036	0.040	0.112	0.001	0.032
No. of obs.	38	44	42	40	36	43	46	50	51
Related	0.013	0.010	-0.007	-0.016	0.014	0.012	0.084	0.007	-0.005
Unrelated	0.033	0.041	0.012	0.004	0.037	0.041	0.113	0.001	0.034
Standalones (2)	0.109	0.086	0.081	0.070	0.113	0.079	0.170	0.139	0.074
No. of obs.	102	103	107	105	106	110	105	107	104
Difference (1)-(2)	-0.077*	-0.046	-0.070	-0.067	-0.077	-0.039	-0.058	-0.138*	-0.042
Using Tobin's Q multiples									
Conglomerates (1)	-0.030	-0.042	0.004	-0.008	-0.006	0.003	-0.005	-0.006	-0.012
No. of obs.	32	34	34	31	29	30	34	36	35
Related	-0.035	-0.050	0.011	-0.001	0.004	-0.014	-0.003	-0.007	-0.031
Unrelated	-0.030	-0.042	0.004	-0.008	-0.006	0.004	-0.005	-0.006	-0.011
Standalones (2)	-0.005	-0.017	0.020	0.023	0.018	0.002	0.001	-0.031	0.011
No. of obs.	91	92	89	94	88	95	91	90	87
Difference (1)-(2)	-0.025*	-0.025	-0.016	-0.031	-0.024	0.001	-0.006	0.025*	-0.023
Using MV of equity/total sales multiples									
Conglomerates (1)	-0.081	-0.091	-0.041	-0.019	-0.013	-0.010	-0.021	-0.018	-0.025
No. of obs.	31	34	34	30	29	29	32	35	35
Related	-0.073	-0.088	-0.017	-0.016	-0.017	-0.012	-0.020	-0.019	-0.024
Unrelated	-0.081	-0.091	-0.042	-0.019	-0.013	-0.010	-0.021	-0.018	-0.025
Standalones (2)	-0.010	-0.151	0.013	0.010	0.016	-0.110	0.012	-0.012	0.010
No. of obs.	90	89	89	94	86	94	90	88	85
Difference (1)-(2)	-0.071	0.060	-0.054	-0.029	-0.029	0.100*	-0.033	-0.006	-0.035

E2

The found median-based excess values based on firm value for Panel A (Germany) and panel B (The Netherlands)

Firm value, median-based multiples									
Panel A - Germany									
	05-06	*06-07*	*07-08*	*08-09*	*09-10*	*10-11*	*11-12*	*12-13*	*13-14*
Using total assets multiples									
Conglomerates (1)	-0.019	-0.034	-0.072	-0.027	-0.012	-0.022	-0.046	-0.036	-0.057
No. of obs.	127	151	167	172	131	102	187	173	176
Related	-0.012	-0.028	-0.055	-0.011	-0.010	-0.009	-0.041	-0.037	-0.053
Unrelated	-0.020	-0.035	-0.075	-0.029	-0.012	-0.024	-0.047	-0.036	-0.058
Standalones (2)	-0.002	-0.002	-0.005	-0.001	-0.001	-0.003	-0.006	-0.008	-0.011
No. of obs.	264	278	312	367	256	289	310	290	303
Difference (1)-(2)	-0.017	-0.032	-0.067	-0.026*	-0.011	-0.019	-0.040*	-0.028	-0.046
Using total sales multiples									
Conglomerates (1)	0.015	0.030	0.026	0.077	0.119	0.105	0.104	0.069	0.072
No. of obs.	131	149	163	168	127	105	180	170	175
Related	0.025	0.037	0.041	0.101	0.113	0.123	0.093	0.075	0.095
Unrelated	0.014	0.029	0.024	0.073	0.120	0.102	0.106	0.068	0.069
Standalones (2)	0.009	0.027	0.031	0.091	0.092	0.071	0.129	0.081	0.094
No. of obs.	266	269	303	350	251	290	308	287	289
Difference (1)-(2)	0.006	0.003*	-0.005*	-0.014	0.027	0.034	-0.025	-0.012	-0.022
Using EBIT multiples									
Conglomerates (1)	0.010	0.028	-0.015	-0.016	0.027	0.059	0.088	-0.014	0.006
No. of obs.	127	147	159	174	128	107	181	169	177
Related	0.002	0.035	-0.018	0.005	-0.006	0.080	0.051	0.002	0.025
Unrelated	0.011	0.027	-0.015	-0.019	0.032	0.056	0.094	-0.016	0.003
Standalones (2)	0.051	0.019	0.028	0.003	0.061	0.032	0.101	0.069	0.015
No. of obs.	261	273	308	359	261	283	311	292	285
Difference (1)-(2)	-0.041	0.009	-0.043	-0.019	-0.034	0.027	-0.013	-0.083	-0.009*
Using Tobin's Q multiples									
Conglomerates (1)	-0.066	-0.072	-0.039	-0.022	-0.041	-0.014	-0.026	-0.021	-0.044
No. of obs.	128	154	163	168	127	99	178	170	167
Related	-0.031	-0.050	-0.032	-0.004	-0.011	0.002	0.005	-0.018	-0.017
Unrelated	-0.071	-0.075	-0.040	-0.025	-0.045	-0.016	-0.031	-0.021	-0.048
Standalones (2)	-0.013	-0.021	0.014	0.018	0.009	-0.010	-0.009	-0.034	-0.002
No. of obs.	271	167	303	345	267	271	303	295	293
Difference (1)-(2)	-0.053	-0.051	-0.053	-0.040	-0.050	-0.004	-0.017	0.013	-0.042
Using MV of equity/total sales multiples									
Conglomerates (1)	-0.073	-0.085	-0.029	-0.018	-0.020	-0.017	-0.028	-0.022	-0.034
No. of obs.	128	154	162	166	127	101	178	169	168
Related	-0.043	-0.010	0.005	-0.001	-0.004	0.008	0.012	-0.015	-0.013
Unrelated	-0.077	-0.096	-0.034	-0.021	-0.022	-0.021	-0.034	-0.023	-0.037
Standalones (2)	-0.009	-0.012	0.011	0.012	0.010	-0.093	0.008	-0.022	0.006
No. of obs.	270	165	299	341	266	269	301	293	294
Difference (1)-(2)	-0.064	-0.073	-0.040	-0.030	-0.030*	0.076	-0.036	0	-0.040*

Firm value, median-based multiples									
Panel B - the Netherlands									
	05-06	*06-07*	*07-08*	*08-09*	*09-10*	*10-11*	*11-12*	*12-13*	*13-14*
Using total assets multiples									
Conglomerates (1)	-0.017	-0.032	-0.055	-0.009	-0.011	-0.020	-0.039	-0.043	-0.047
No. of obs.	47	55	56	51	48	51	59	57	58
Related	-0.004	-0.041	-0.061	-0.008	-0.005	-0.015	-0.009	-0.048	-0.036
Unrelated	-0.018	-0.032	-0.055	-0.009	-0.011	-0.020	-0.040	-0.043	-0.047
Standalones (2)	-0.006	-0.009	0.008	-0.008	-0.004	-0.005	0.001	-0.009	-0.010
No. of obs.	101	105	108	106	106	110	112	105	107
Difference (1)-(2)	-0.011	-0.023*	-0.063	-0.001	-0.007	-0.015	-0.040*	-0.034	-0.037
Using total sales multiples									
Conglomerates (1)	0.011	0.024	0.021	0.084	0.108	0.096	0.118	0.063	0.060
No. of obs.	47	54	55	49	44	52	56	56	57
Related	0.020	0.018	0.026	0.102	0.095	0.099	0.123	0.079	0.078
Unrelated	0.011	0.024	0.021	0.083	0.109	0.096	0.118	0.062	0.059
Standalones (2)	-0.005	-0.008	0.01	0.002	-0.001	-0.007	0.002	-0.011	-0.03
No. of obs.	102	105	107	107	108	111	110	107	108
Difference (1)-(2)	0.016	0.032	0.011	0.082	0.109	0.103*	0.116*	0.074	0.090
Using EBIT multiples									
Conglomerates (1)	0.011	0.015	-0.006	-0.013	0.022	0.044	0.094	-0.019	0.014
No. of obs.	47	53	55	49	48	52	59	57	59
Related	0.016	0.007	-0.010	-0.019	0.015	0.010	0.080	0.005	-0.007
Unrelated	0.011	0.015	-0.006	-0.013	0.022	0.046	0.095	-0.020	0.015
Standalones (2)	0.046	0.023	0.025	0.008	0.057	0.028	0.112	0.083	0.017
No. of obs.	103	106	106	108	107	110	108	110	109
Difference (1)-(2)	-0.035*	-0.008	-0.031	-0.021	-0.035	0.016	-0.018	-0.102	-0.003*
Using Tobin's Q multiples									
Conglomerates (1)	-0.054	-0.072	-0.018	-0.028	-0.024	-0.023	-0.025	-0.015	-0.031
No. of obs.	48	53	54	47	43	50	55	54	54
Related	-0.039	-0.053	0.009	-0.003	0.005	-0.015	-0.006	-0.010	-0.027
Unrelated	-0.055	-0.073	-0.019	-0.029	-0.025	-0.023	-0.026	-0.015	-0.031
Standalones (2)	-0.015	-0.025	0.011	0.016	0.011	-0.009	-0.012	-0.038	0.004
No. of obs.	100	105	106	105	108	110	107	109	109
Difference (1)-(2)	-0.039	-0.047	-0.029*	-0.044*	-0.035	-0.014	-0.013	0.023	-0.035
Using MV of equity/total sales multiples									
Conglomerates (1)	-0.083	-0.109	-0.058	-0.027	-0.017	-0.020	-0.025	-0.023	-0.035
No. of obs.	47	52	55	47	44	49	55	55	54
Related	-0.069	-0.090	-0.019	-0.018	-0.014	-0.015	-0.022	-0.018	-0.027
Unrelated	-0.084	-0.110	-0.060	-0.027	-0.017	-0.020	-0.025	-0.023	-0.035
Standalones (2)	-0.011	-0.150	0.012	0.009	0.015	-0.111	0.010	-0.014	0.009
No. of obs.	100	104	105	103	106	108	110	114	109
Difference (1)-(2)	-0.072	0.041	-0.070*	-0.036	-0.032	0.091	-0.035	-0.009*	-0.044

E3

The found mean-based excess values based on enterprise value for Panel A (Germany) and panel B (The Netherlands)

Enterprise value, mean-based multiples									
Panel A - Germany									
	05-06	*06-07*	*07-08*	*08-09*	*09-10*	*10-11*	*11-12*	*12-13*	*13-14*
Using total assets multiples									
Conglomerates (1)	-0.020	-0.024	-0.048	-0.012	-0.008	-0.012	-0.022	-0.025	-0.048
No. of obs.	110	138	151	161	120	92	163	159	165
Related	-0.011	-0.018	-0.052	-0.023	0.004	-0.003	-0.006	-0.016	-0.035
Unrelated	-0.021	-0.025	-0.047	-0.010	-0.010	-0.013	-0.024	-0.026	-0.050
Standalones (2)	0.013	0.011	0.007	0.013	0.015	0.015	0.007	0.002	0.003
No. of obs.	239	252	297	341	238	261	291	272	276
Difference (1)-(2)	-0.033	-0.035	-0.055	-0.025	-0.023	-0.027	-0.029	-0.027	-0.051*
Using total sales multiples									
Conglomerates (1)	0.035	0.048	0.042	0.109	0.136	0.120	0.131	0.096	0.112
No. of obs.	111	136	150	160	118	94	163	158	165
Related	0.019	0.044	0.047	0.111	0.158	0.141	0.014	0.093	0.111
Unrelated	0.037	0.049	0.041	0.109	0.133	0.117	0.149	0.096	0.112
Standalones (2)	0.011	0.026	0.035	0.091	0.089	0.068	0.137	0.095	0.101
No. of obs.	239	250	296	340	235	258	288	269	275
Difference (1)-(2)	0.024*	0.022	0.007*	0.018	0.047	0.052	-0.006*	0.001	0.011**
Using EBIT multiples									
Conglomerates (1)	0.042	0.050	0.011	0.024	0.021	0.090	0.175	0.079	0.045
No. of obs.	111	135	150	160	119	92	161	162	165
Related	0.019	0.041	-0.005	0.007	0.014	0.059	0.198	0.010	0.012
Unrelated	0.045	0.051	0.013	0.027	0.022	0.095	0.172	0.089	0.050
Standalones (2)	0.120	0.082	0.097	0.066	0.121	0.093	0.151	0.129	0.076
No. of obs.	239	249	296	339	234	256	291	268	275
Difference (1)-(2)	-0.078	-0.032	-0.086	-0.042	-0.100*	-0.003	0.024	-0.050*	-0.031
Using Tobin's Q multiples									
Conglomerates (1)	-0.022	-0.047	-0.013	0.004	0.006	0.012	0.010	0.016	-0.008
No. of obs.	109	130	146	157	116	88	156	158	161
Related	-0.045	-0.072	-0.025	-0.010	-0.018	-0.007	-0.022	-0.013	-0.023
Unrelated	-0.019	-0.043	-0.011	0.006	0.010	0.015	0.015	0.020	-0.006
Standalones (2)	-0.001	-0.009	0.017	0.023	0.022	0.005	0.004	-0.025	0.011
No. of obs.	239	247	295	338	231	253	288	265	274
Difference (1)-(2)	-0.021	-0.038	-0.030*	-0.019	-0.016	0.007	0.006	0.041	-0.019
Using MV of equity/total sales multiples									
Conglomerates (1)	-0.051	-0.060	-0.024	-0.014	-0.011	0.002	-0.018	-0.010	-0.023
No. of obs.	109	130	144	156	116	87	156	158	160
Related	-0.059	-0.053	-0.009	0.004	-0.002	-0.007	-0.015	-0.010	-0.011
Unrelated	-0.050	-0.061	-0.026	-0.017	-0.012	0.003	-0.018	-0.010	-0.025
Standalones (2)	-0.007	-0.011	0.009	0.012	0.013	-0.070	0.010	-0.018	0.006
No. of obs.	239	246	294	337	229	252	286	264	272
Difference (1)-(2)	-0.044	-0.049	-0.033	-0.026	-0.024	0.072	-0.028	0.008	-0.029*

Enterprise value, mean-based multiples									
Panel B - the Netherlands									
	05-06	*06-07*	*07-08*	*08-09*	*09-10*	*10-11*	*11-12*	*12-13*	*13-14*
Using total assets multiples									
Conglomerates (1)	-0.010	-0.022	-0.048	0.006	0.018	-0.004	-0.025	-0.036	-0.040
No. of obs.	40	48	49	46	41	45	51	51	52
Related	-0.013	-0.029	-0.053	-0.010	-0.020	0.003	-0.002	-0.057	-0.024
Unrelated	-0.010	-0.022	-0.048	0.007	0.020	-0.004	-0.026	-0.035	-0.041
Standalones (2)	0.007	0.011	0.020	0.008	0.007	0.010	0.012	0.003	0.002
No. of obs.	82	84	88	86	86	91	93	93	90
Difference (1)-(2)	-0.017*	-0.033	-0.068	-0.002	0.011*	-0.014	-0.037	-0.039	-0.042
Using total sales multiples									
Conglomerates (1)	0.023	0.045	0.033	0.112	0.129	0.111	0.144	0.106	0.093
No. of obs.	40	47	48	46	41	44	50	50	52
Related	0.026	0.037	0.018	0.123	0.103	0.135	0.133	0.063	0.066
Unrelated	0.023	0.045	0.034	0.112	0.130	0.110	0.144	0.108	0.094
Standalones (2)	-0.003	-0.005	0.013	0.003	0.002	-0.003	0.006	-0.009	-0.020
No. of obs.	102	105	107	107	108	111	110	107	108
Difference (1)-(2)	0.026	0.050*	0.020	0.109	0.127	0.114	0.138	0.115	0.113*
Using EBIT multiples									
Conglomerates (1)	0.044	0.048	0.019	0.014	0.044	0.070	0.123	0.026	0.048
No. of obs.	38	44	42	40	36	43	46	50	51
Related	-0.010	0.007	-0.023	-0.010	0.036	0.035	0.106	-0.018	0.003
Unrelated	0.046	0.050	0.021	0.015	0.044	0.072	0.124	0.028	0.050
Standalones (2)	0.113	0.090	0.087	0.080	0.119	0.081	0.175	0.146	0.084
No. of obs.	102	103	107	105	106	110	105	107	104
Difference (1)-(2)	-0.069	-0.042	-0.068	-0.066	-0.075	-0.011	-0.052	-0.120*	-0.036
Using Tobin's Q multiples									
Conglomerates (1)	-0.010	-0.028	0.014	0.008	0.011	0.012	0.010	0.009	0.001
No. of obs.	32	34	34	31	29	30	34	36	35
Related	-0.019	-0.033	0.002	0.006	-0.004	0.010	0.021	0.005	-0.007
Unrelated	-0.010	-0.028	0.015	0.008	0.012	0.012	0.010	0.009	0.001
Standalones (2)	-0.004	-0.015	0.022	0.025	0.020	0.005	0.003	-0.028	0.013
No. of obs.	91	92	89	94	88	95	91	90	87
Difference (1)-(2)	-0.006	-0.013	-0.008	-0.017	-0.009	0.007	0.007	0.037	-0.012
Using MV of equity/total sales multiples									
Conglomerates (1)	-0.065	-0.078	-0.031	-0.007	-0.004	0.003	-0.005	-0.008	-0.010
No. of obs.	31	34	34	30	29	29	32	35	35
Related	-0.023	-0.047	-0.012	0.008	0.021	0.018	-0.005	0.004	0.013
Unrelated	-0.067	-0.079	-0.032	-0.008	-0.005	0.002	-0.005	-0.009	-0.011
Standalones (2)	-0.009	-0.159	0.014	0.011	0.017	-0.119	0.013	-0.011	0.011
No. of obs.	90	89	89	94	86	94	90	88	85
Difference (1)-(2)	-0.056	0.081	-0.045	-0.018	-0.021	0.122	-0.018*	0.003	-0.021

E4

The found median-based excess values based on enterprise value for Panel A (Germany) and panel B (The Netherlands)

Enterprise value, median-based multiples									
Panel A - Germany									
	05-06	*06-07*	*07-08*	*08-09*	*09-10*	*10-11*	*11-12*	*12-13*	*13-14*
Using total assets multiples									
Conglomerates (1)	-0.025	-0.031	-0.065	-0.030	-0.008	-0.010	-0.030	-0.034	-0.055
No. of obs.	127	151	167	172	131	102	187	173	176
Related	-0.013	-0.020	-0.049	-0.022	0.003	-0.001	-0.004	-0.019	-0.039
Unrelated	-0.027	-0.033	-0.067	-0.031	-0.010	-0.011	-0.034	-0.036	-0.057
Standalones (2)	-0.002	-0.002	-0.004	-0.002	0.000	-0.003	-0.005	-0.007	-0.010
No. of obs.	264	278	312	367	256	289	310	290	303
Difference (1)-(2)	-0.023	-0.029	-0.061*	-0.028	-0.008	-0.007	-0.025*	-0.027	-0.045
Using total sales multiples									
Conglomerates (1)	0.016	0.040	0.038	0.098	0.149	0.129	0.122	0.089	0.099
No. of obs.	131	149	163	168	127	105	180	170	175
Related	0.020	0.046	0.048	0.108	0.162	0.144	0.131	0.099	0.105
Unrelated	0.015	0.039	0.037	0.097	0.147	0.127	0.121	0.088	0.098
Standalones (2)	0.008	0.026	0.035	0.093	0.091	0.078	0.132	0.073	0.090
No. of obs.	266	269	303	350	251	290	308	287	289
Difference (1)-(2)	0.008	0.014	0.003	0.005	0.058*	0.051*	0.010	0.016	0.009*
Using EBIT multiples									
Conglomerates (1)	0.009	0.030	-0.019	-0.010	0.035	0.061	0.110	-0.015	0.008
No. of obs.	127	147	159	174	128	107	181	169	177
Related	0.017	0.045	-0.002	0.003	0.011	0.052	0.190	0.003	0.015
Unrelated	0.008	0.028	-0.022	-0.012	0.039	0.062	0.098	-0.018	0.007
Standalones (2)	0.049	0.019	0.026	0.005	0.062	0.029	0.091	0.063	0.011
No. of obs.	261	273	308	359	261	283	311	292	285
Difference (1)-(2)	-0.040	0.011	-0.045	-0.015	-0.027	0.032	0.019	-0.078*	-0.003
Using Tobin's Q multiples									
Conglomerates (1)	-0.052	-0.079	-0.030	-0.017	-0.026	-0.010	-0.021	-0.011	-0.028
No. of obs.	128	154	163	168	127	99	178	170	167
Related	-0.048	-0.069	-0.028	-0.011	-0.019	-0.006	-0.020	-0.014	-0.024
Unrelated	-0.053	-0.080	-0.030	-0.018	-0.027	-0.011	-0.021	-0.011	-0.029
Standalones (2)	-0.012	-0.022	0.011	0.015	0.007	-0.011	-0.010	-0.035	-0.003
No. of obs.	271	167	303	345	267	271	303	295	293
Difference (1)-(2)	-0.040	-0.057	-0.041	-0.032	-0.033	0.001	-0.011*	0.024	-0.025
Using MV of equity/total sales multiples									
Conglomerates (1)	-0.069	-0.080	-0.026	-0.020	-0.025	-0.011	-0.022	-0.016	-0.029
No. of obs.	128	154	162	166	127	101	178	169	168
Related	-0.066	-0.058	-0.005	0.001	-0.004	-0.010	-0.018	-0.009	-0.010
Unrelated	-0.069	-0.083	-0.029	-0.023	-0.028	-0.011	-0.023	-0.017	-0.032
Standalones (2)	-0.008	-0.011	0.009	0.011	0.009	-0.101	0.006	-0.020	0.008
No. of obs.	270	165	299	341	266	269	301	293	294
Difference (1)-(2)	-0.061	-0.069	-0.035	-0.031	-0.034	0.090	-0.028	0.004	-0.037

Enterprise value, median-based multiples									
Panel B - the Netherlands									
	05-06	*06-07*	*07-08*	*08-09*	*09-10*	*10-11*	*11-12*	*12-13*	*13-14*
Using total assets multiples									
Conglomerates (1)	-0.011	-0.030	-0.045	-0.007	-0.006	-0.010	-0.029	-0.040	-0.050
No. of obs.	47	55	56	51	48	51	59	57	58
Related	-0.015	-0.028	-0.056	-0.012	-0.019	0.005	-0.004	-0.061	-0.029
Unrelated	-0.011	-0.030	-0.045	-0.007	-0.005	-0.011	-0.030	-0.039	-0.051
Standalones (2)	-0.005	-0.008	0.007	-0.006	-0.005	-0.004	0.002	-0.007	-0.012
No. of obs.	101	105	108	106	106	110	112	105	107
Difference (1)-(2)	-0.006*	-0.022*	-0.052	-0.001	-0.001	-0.006	-0.031	-0.033	-0.038*
Using total sales multiples									
Conglomerates (1)	0.011	0.028	0.024	0.088	0.140	0.085	0.155	0.076	0.070
No. of obs.	47	54	55	49	44	52	56	56	57
Related	0.029	0.041	0.015	0.115	0.099	0.111	0.129	0.059	0.059
Unrelated	0.010	0.027	0.024	0.087	0.142	0.084	0.156	0.077	0.070
Standalones (2)	-0.004	-0.006	0.014	0.003	-0.002	-0.006	0.004	-0.012	-0.032
No. of obs.	102	105	107	107	108	111	110	107	108
Difference (1)-(2)	0.015	0.034	0.010	0.085	0.142	0.091	0.151*	0.088	0.102
Using EBIT multiples									
Conglomerates (1)	0.010	0.023	-0.016	-0.010	0.027	0.060	0.090	-0.012	0.009
No. of obs.	47	53	55	49	48	52	59	57	59
Related	-0.013	0.005	-0.026	-0.012	0.039	0.038	0.110	-0.019	0.001
Unrelated	0.011	0.024	-0.016	-0.010	0.026	0.061	0.089	-0.012	0.009
Standalones (2)	0.044	0.020	0.024	0.007	0.049	0.019	0.129	0.077	0.013
No. of obs.	103	106	106	108	107	110	108	110	109
Difference (1)-(2)	-0.034	0.003	-0.040	-0.017	-0.022	0.041	-0.039	-0.089*	-0.004*
Using Tobin's Q multiples									
Conglomerates (1)	-0.041	-0.055	-0.019	-0.026	-0.020	-0.009	-0.017	-0.018	-0.035
No. of obs.	48	53	54	47	43	50	55	54	54
Related	-0.020	-0.031	0.004	0.005	-0.002	0.012	0.024	0.006	-0.009
Unrelated	-0.042	-0.056	-0.020	-0.027	-0.021	-0.010	-0.019	-0.019	-0.036
Standalones (2)	-0.014	-0.024	0.010	0.012	0.009	-0.007	-0.010	-0.035	0.003
No. of obs.	100	105	106	105	108	110	107	109	109
Difference (1)-(2)	-0.027	-0.031*	-0.029	-0.038	-0.029	-0.002	-0.007	0.017	-0.038
Using MV of equity/total sales multiples									
Conglomerates (1)	-0.059	-0.085	-0.040	-0.026	-0.011	-0.019	-0.020	-0.021	-0.025
No. of obs.	47	52	55	47	44	49	55	55	54
Related	-0.021	-0.050	-0.010	0.007	0.019	0.020	-0.003	0.001	0.011
Unrelated	-0.061	-0.087	-0.041	-0.027	-0.012	-0.021	-0.021	-0.022	-0.027
Standalones (2)	-0.010	-0.140	0.013	0.008	0.014	-0.131	0.010	-0.012	0.008
No. of obs.	100	104	105	103	106	108	110	114	109
Difference (1)-(2)	-0.049*	0.055	-0.053	-0.034	-0.025	0.112	-0.030	-0.009	-0.033

Appendix F - Regressions

Coefficient estimates from regressions of excess values based (dependent variable), on a related segments measure (related segments as independent variable) and control variables (natural log of total assets, EBIT/total sales and Cap.Ex./total sales. The related segments variable is constructed with use of the total number of segments reported by the diversified firm and its number of unrelated segments; this variable is set to zero when no segments are related, and set to 'number of firm segments minus one' when no segments differ. Statistical significance is tested with use of a t-test and indicated at a 1% (***), 5% (**) or 10% (*) level.

F1

Coefficient estimates from regression of median-based excess values based on firm value for Panel A (Germany) and Panel B (The Netherlands).

Firm value, median-based multiples						
Panel A: Germany						
Dependent variable: Excess values based on:	Obs.					
	R-squared	intercept	related segments	natural log of total assets	EBIT/total sales	Cap.Ex./total sales
total assets	1386					
	0.053	-0.141	0.098*	-0.012*	1.312	0.015*
total sales	1386					
	0.081	-0.223	0.078**	0.031*	0.812*	0.306**
EBIT	1369					
	0.020	-0.098	-0.005	0.008	N.A.	0.107
Tobin's Q	1354					
	0.063	-0.129	0.066*	-0.003	1.102*	0.231
market value of equity/total sales	1353					
	0.071	-0.115	0.070*	0.019*	1.404*	0.298*
Firm value, median-based multiples						
Panel B: The Netherlands						
Dependent variable: Excess values based on:	Obs.					
	R-squared	intercept	related segments	natural log of total assets	EBIT/total sales	Cap.Ex./total sales
total assets	482					
	0.031	-0.212	0.006	-0.020	1.506*	0.071
total sales	470					
	0.047	-0.019	0.024	0.011	1.132	0.282*
EBIT	479					
	0.038	-0.033	-0.015	-0.014	N.A.	0.310*
Tobin's Q	458					
	0.077	-0.170	-0.011	-0.023*	0.945	0.179
market value of equity/total sales	458					
	0.049	-0.193	0.010	0.006	1.222*	0.233*

F2

Coefficient estimates from regression of mean-based excess values based on enterprise value for Panel A (Germany) and Panel B (The Netherlands).

Enterprise value, mean-based multiples						
Panel A: Germany						
Dependent variable: Excess values based on:	Obs.					
	R-squared	intercept	related segments	natural log of total assets	EBIT/total sales	Cap.Ex./total sales
total assets	1259					
	0.059	-0.148	0.140*	-0.031*	1.206	0.011*
total sales	1255					
	0.070	-0.201	0.102*	0.028*	0.689*	0.159*
EBIT	1255					
	0.009	-0.092	0.026	0.018	N.A.	1.104
Tobin's Q	1221					
	0.041	-0.127	0.091	-0.015	1.023	0.368*
market value of equity/total sales	1216					
	0.063	-0.151	0.103*	0.040*	1.229*	0.302*
Enterprise value, mean-based multiples						
Panel B: The Netherlands						
Dependent variable: Excess values based on:	Obs.					
	R-squared	intercept	related segments	natural log of total assets	EBIT/total sales	Cap.Ex./total sales
total assets	423					
	0.009	-0.090	0.008	0.003*	1.132*	0.070
total sales	418					
	0.040	-0.037	0.015	-0.026	0.998	0.207*
EBIT	319					
	0.022	-0.008	-0.021	-0.039	N.A.	0.321
Tobin's Q	295					
	0.039	-0.088	-0.010	0.010	0.827	0.230
market value of equity/total sales	289					
	0.072	-0.168	0.006	-0.012	1.383*	0.184*

F3

Coefficient estimates from regression of median-based excess values based on enterprise value for Panel A (Germany) and Panel B (The Netherlands).

Enterprise value, median-based multiples						
Panel A: Germany						
Dependent variable: Excess values based on:	Obs.					
	R-squared	intercept	related segments	natural log of total assets	EBIT/total sales	Cap.Ex./total sales
total assets	1386					
	0.061	-0.153	0.111*	-0.022*	1.112	0.018*
total sales	1386					
	0.057	-0.281	0.091*	0.025*	0.603*	0.314*
EBIT	1369					
	0.040	-0.079	0,010	-0.002	N.A.	0.097
Tobin's Q	1354					
	0.071	-0.140	0.073	-0.007	0.992	0.273*
market value of equity/total sales	1353					
	0.059	-0.135	0.080*	0.031*	1.304*	0.243*
Enterprise value, median-based multiples						
Panel B: The Netherlands						
Dependent variable: Excess values based on:	Obs.					
	R-squared	intercept	related segments	natural log of total assets	EBIT/total sales	Cap.Ex./total sales
total assets	482					
	0.027	-0.127	0.013	-0.018*	1.394*	0.084
total sales	470					
	0.055	-0.030	0.037	0.030	0.909	0.223*
EBIT	479					
	0.018	-0.021	-0.013	0.012	N.A.	0.365
Tobin's Q	458					
	0.081	-0.144	-0.004	-0.041	1.102	0.144
market value of equity/total sales	458					
	0.039	-0.177	0.015	0.015	1.019*	0.198*

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