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Goodwill hunting?

A study on the proportion of purchase price allocated to goodwill under IFRS

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Abstract:

The principle-based IFRS framework allows for a high level of managerial discretion in the purchase price allocation and in the subsequent impairment testing of goodwill. Hellman et al. (2012) explain how a high allocation to goodwill under IFRS 3 can increase reported earnings since goodwill in many cases never becomes fully impaired, depending on the existence of certain firm characteristics. Few empirical studies have been conducted in an IFRS context on how different types of firm characteristics affect the proportion of purchase price allocated to goodwill. We aim to contribute to filling this gap by conducting a quantitative study on the relationship between the proportion of the purchase price allocated to goodwill and two types of firm characteristics, i.e. the *possibility* to protect goodwill from impairment and the *motive* to increase reported earnings. By analyzing 195 observations between 2007 and 2011, from 62 stock-listed Swedish firms, we find the following: (1) Acquirers with larger *possibilities* to protect goodwill from impairment tend to allocate more to goodwill than otherwise expected. (2) Acquirers which have larger *motives* to increase reported earnings, contrary to expectations tend to allocate less to goodwill than otherwise expected.

Keywords: IFRS 3, goodwill, intangible assets, purchase price allocation, managerial discretion, earnings response coefficient

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1. Introduction

1.1. Introduction

Carl-Didrik is sitting at his desk in his spacious office. The mahogany colored espresso in the antique porcelain cup is now cold since long. He sighs and looks at his golden Rolex watch and sees that it is almost midnight. Another late night working. Recently, there have been many late nights for him. He is tired, but at the same time very excited that the acquisition he has been working on for so long has finally been agreed upon by all the parties involved. The next morning they will make a public announcement, and Carl-Didrik wonders how shareholders and analysts will react to the news. Probably there will be some complaints that the purchase price is too high. But what concerns Carl-Didrik the most is how the company's reported earnings will be affected by the acquisition, before the expected synergies are realized. The company's investors are very demanding and always respond strongly to its quarterly earnings announcements. It seems like they always sell their shares as soon as reported earnings are not what they hoped. Carl-Didrik ponders, how can he make sure that the reported earnings do not decline? Is there a way to avoid that the acquisition will be fully expensed for? What if a large proportion of the price is allocated to goodwill, could the goodwill then remain on the balance sheet, or would the company have to write it all down sooner or later?

Goodwill represents competitive advantages that are expected to enable the company to generate earnings in excess of a "normal" return on investment, or in other words the present value of the future excess earnings. (Jennings et al., 2001) It may be developed internally by building customer loyalty, developing human resources, or using assets more efficiently than competitors. Or goodwill may be purchased when one company acquires another. Given the abstract nature of the goodwill item, the accounting treatment of this item has been much debated and remains controversial. Firms are prohibited from putting internally generated goodwill on the balance sheet, but acquired goodwill can be recognized following an acquisition. Following the adoption of the *International Financial Reporting Standards* (IFRS) and *International Accounting Standards* (IAS), significant changes were introduced for firms in how to account for goodwill and other intangible assets. Most notably, goodwill should no longer be straight-lined amortized but is instead subject to annual impairment tests. Other significant changes come from the standard IFRS 3 *Business combinations*, which regulates how to account for acquisitions. Under IFRS 3, the focus on identifying separable intangible assets at the time of an acquisition has increased, compared to prior practice. Since companies are required to identify more intangibles, and goodwill is reported as the difference between the purchase price and the fair value of net assets of the acquired firm, this implies that companies should have lower amounts of goodwill now than before the introduction of IFRS.

The reasoning that reported goodwill amounts should have decreased after the introduction of IFRS 3 however assumes that companies over time write down the same amounts of goodwill regardless of whether goodwill is subject to impairment testing or straight line amortization. Empirical studies show that goodwill amounts have not decreased. Gauffin and Nilsson (2012) have conducted annual studies on how listed Swedish companies account for their acquisitions since the implementation of IFRS in 2005. In their study on 2011, they noticed that the amounts of goodwill on the balance sheets have increased over time. On average, Swedish firms allocated 24% of the purchase price to net tangible assets, 20% to identifiable intangible assets and 56% to goodwill. Over the past seven years, the total amount of reported goodwill has increased on average with 60-70 billion SEK annually, while the impairments charges have remained at around 10 billion SEK annually. The increasing gap between goodwill being acquired and written-off in a year, means that large amounts of goodwill remain on the companies' balance sheets instead of being expensed for. Due to the relatively low impairment rate of goodwill, Swedish companies in 2011 had goodwill worth 16% of their total asset values, which was all time high despite rather low transaction activity in the years before. (Gauffin & Nilsson, 2012) Hamberg et al. (2011) have found that average goodwill impairment charges under IFRS 3 are lower than the corresponding goodwill amortizations- and impairments reported under the prior Swedish GAAP. They also found that net income levels for acquiring firms have increased with the adoption of IFRS, mainly because of the abolished practice of straight-line amortization of goodwill.

The new IFRS are principle-based and allow for larger flexibility and an increased use of professional judgment by firms in preparing their consolidated financial statements. This means that there is a high use of unverifiable estimates both in connection with identifying separate intangible assets in a purchase price allocation, as well as in the subsequent impairment testing of goodwill. In a paper by Hellman et al. (2012), the authors argue that due to the way in which the standards have been designed, acquired goodwill is in many cases never fully written off. Instead, acquired goodwill remains on the balance sheet even though all future economic benefits that goodwill aims to portray have been realized. Goodwill can be protected from impairment if there is an internal buffer, which size and sustainability depends on e.g. the level of accounting conservatism and growth rate. Some empirical studies find evidence that there are certain firm characteristics, related to a firm's *possibility* to not impair goodwill and *motives* to increase reported earnings that can explain the tendency to allocate a larger proportion to goodwill than expected in purchase price allocations (Shalev, 2007; Zhang & Zhang, 2007, Shalev et al., 2010).

1.2. Purpose

A number of studies have been conducted on how managerial discretion is used under US GAAP for business combinations (SFAS 141) and impairment of goodwill (SFAS 142), relating to firms' *possibilities* to protect goodwill from impairment and *motives* to increase reported earnings. Few empirical studies have however been conducted on how these two types of firm characteristics affect the proportion of purchase price allocated to goodwill in an IFRS context. We aim to contribute to filling this research gap by investigating if companies reporting under IFRS, which have relatively larger *possibilities* to protect goodwill from impairment, tend to allocate more of the purchase price to goodwill. We also fill this research gap by investigating if companies reporting under IFRS, which have relatively larger *motives* to increase reported earnings, tend to allocate more of the purchase price to goodwill. The purpose of our study is:

> *To investigate the relationship between the proportion of the purchase price allocated to goodwill and two types of firm characteristics, for companies reporting under IFRS.*

This study is delimited to investigate the period 2007 to 2011, and includes Swedish companies classified as large cap or mid cap on Nasdaq OMX Stockholm as of spring 2013. With two types of firm characteristics, we refer to the *possibility* to protect goodwill from impairment and the *motives* to increase reported earnings.

1.3. Outline

The thesis will be structured as follows. In *Section 2* we will give an overview of the IFRS regulating goodwill. This will be followed by *Section 3* where we will present the two areas of theories that we build this study on, which are theories on goodwill and theories on earnings concern. Moving on, in *Section 4* we will present empirical studies that have investigated the relationship between firm characteristics and how the managerial discretion is used in purchase price allocation processes and in impairment tests. In *Section 5* we will combine the design of IFRS, theories and previous research, and boil them down into two research questions on which we formulate our five hypotheses. After that we in *Section 6* describe our research approach and methods for collecting data and specifying the regression model. We present our results in *Section 7,* which is followed by *Section 8* where we test and verify the results. In *Section 9* we will discuss our results and explain our findings. The thesis ends with *Section 10* where we summarize our findings and suggest areas for future research.

2. Background

In this section, we will go through the IFRS that prescribe how listed Swedish companies should perform the accounting for acquisitions, and also the subsequent treatment of goodwill and other intangible assets.

2.1. The purchase price allocation

Under IFRS, accounting for acquisitions is mainly regulated by IFRS 3 *Business Combinations.* The standard was mandatory adopted by Swedish stock listed companies in 2005 and replaced IAS 22 *Business Combinations*. IAS 22 stated that the difference between the purchase price and the value of the acquired firm's book value of equity should be recognized as goodwill. IFRS 3, on the other hand, requires an identification of specific intangible assets in the acquired entity. The purchase price allocation (henceforth referred to as the "PPA") is illustrated in *Exhibit 1* below:

The Purchase Price Allocation
Purchase price
- Book value of acquired net assets
- Fair value adjustments of net assets
- Fair value of previously not recognized identifiable intangible assets
+ Deferred tax liabilities
= Goodwill

Exhibit 1. The Purchase price allocation process

An acquirer has to apply the "acquisition method", in which it is required to identify assets and liabilities previously not recognized in the target's financial statements, and measure all assets and liabilities in the target to their fair values. This includes making any necessary fair value adjustments of the target's book values of assets and liabilities. Examples of assets that typically arise when the acquirer identifies assets that are not previously recognized are brand names, patents or customer relationships. If these assets have been internally developed by the target company, they have not been recognized on the target's balance sheet but instead expensed as occurred in the target's income statement, because of the strict recognition criteria IFRS stipulates for internally generated assets under IAS 38 *Intangible Assets*. In connection with an acquisition however, IFRS 3 states that an acquirer should recognize these assets that the target could not recognize itself and determine the fair value of these identifiable intangible assets. Regarding measurement, IFRS 3 does not provide any specific guidance for measuring the fair value of an intangible asset. Apart from determining the value of the newly acquired intangible assets, the acquirer should also estimate their useful economic life, which will be used as basis for subsequent amortization. As a final step in the PPA process, goodwill

is recognized as the residual between the purchase price and the fair value of the target's net assets at the acquisition date.

2.2. Subsequent treatment of goodwill and intangible assets

There are large differences between IFRS and the accounting standards that were previously applicable for Swedish listed companies on how to treat goodwill. Prior to 2002, Swedish accounting standards required goodwill to be amortized over five years unless a longer useful life could be estimated with reasonable certainty. After 2002, companies were permitted to apply an economic life of up to 20 years, although many firms continued to use faster amortization patterns. IFRS 3 differs greatly as it does not permit companies to use straight-line amortization for goodwill at all, but instead obliges companies to test goodwill for impairment. An impairment-based approach is more in line with the high emphasis that IASB puts on relevance. (Hitz, 2007) Given the increased focus on the decision usefulness of accounting, the previous practice of amortizing goodwill was criticized as it was not possible for an acquirer to predict how the economic benefits arising from acquisition were to be realized over time, and the amortization charges of goodwill therefore poorly reflected the realization of the benefits that goodwill was supposed to represent. (Hitz, 2007; Jennings et al., 2001) Impairment testing would allow managers to use impairment charges to convey information on future cash flows, and thus provide better information to stakeholders (Hitz, 2007). As expressed by Wrigley (2008, p.257) "in order to measure a return on invested capital we need to be able to look at the totality of what they [i.e. managers] have spent [on acquiring other businesses]. This necessitates carrying goodwill for as long as management believes that they will earn an adequate return on the investment, followed by a charge against that goodwill if they determine that they have overpaid". There are however mixed opinions on whether the aim of improved decision usefulness has been reached. Some empirical studies have shown that the impairment-based approach has improved the ability to predict future cash flows (Lee, 2011), whereas other researchers argue that it is difficult for analysts to predict goodwill impairments, therefore accounting information has become less useful for valuation and decision making after the change to impairment testing (Johansson, 2008). Apart from increased decision usefulness, another explanation for IASB's action to abandon straight-line amortization of goodwill is the influence from the American standard setter, *Financial Accounting Standards Board* (FASB). Issued in June 2001, SFAS 141 *Business combinations* and SFAS 142 *Goodwill and Other Intangible Assets* were the first to prohibit goodwill amortization (Hamberg et al., 2011).[1] Although not identical, the SFAS 141 and IFRS 3 are considered to be very similar (Ernst &

[1] Note that both SFAS 141 and IFRS 3 have been revised since their first publication, as a result of a major convergence project between FASB and IASB. Further, since 2009, FASB changed their codification system for standards and SFAS 141(R) is now referred to as ASC 805 Business Combinations and SFAS 142 is now referred to as ASC 350 *Intangibles – Goodwill and Other.*

Young, 2011). The previous practice of using the pooling method in relation to an acquisition is now prohibited in both standards, and only the acquisition method is therefore allowed. Under both SFAS 142 and IAS 36, goodwill has to be reviewed at least annually for impairment and more frequently if impairment indicators are present. Further, the standards stipulate that goodwill is to be allocated to cash generating units (IFRS) or reporting units (US GAAP), which are the levels that subsequent impairment tests are conducted on. For a list of significant differences between US GAAP and IFRS, see *Appendix. A.*

IAS 36 presents a list of external and internal indicators that an impairment charge may be in order. If any of the indicators is present, an impairment test has to be conducted. Even if none of the indicators is present, an impairment test should be conducted at least once a year. To understand how an impairment test is conducted, one has to know what cash generating units (hereafter referred to as CGU) are, as they are highly important in impairment testing. At the time of acquisition, IAS 36 requires companies to allocate goodwill to each of the acquirer's cash-generating units, or groups of CGUs, which are expected to benefit from the synergies of the combination. The standard prescribes that a CGU should represent the lowest level within the entity at which goodwill is monitored for internal management purposes, and cannot be larger than an operating segment determined in accordance with IFRS 8 *Operating Segments*. When an impairment test is conducted, the carrying amount of the CGU is compared with the recoverable amount of it. A unit's recoverable value is the larger between the unit's net selling price or value in use, whereas carrying value equals book value (including goodwill). If the carrying amount of the CGU exceeds its recoverable amount, the carrying value should be written down to the recoverable amount. To write down the carrying value of the CGU, the company should write down goodwill insofar as possible, and other assets only when there is goodwill left in the CGU. Even if the recoverable value in relation to carrying value increases significantly in subsequent time periods, an impairment charge can never be reversed. The allocation between CGUs at the time of acquisition is also irreversible. The amount of goodwill that becomes impaired over time does hence not reflect how the value of the acquired goodwill changes over time, but depends on the performance of the entire unit to which goodwill has been allocated to. The guidance on how companies should find the correct CGUs for allocating goodwill is quite limited and thus allow for a high level of managerial discretion.

According to IAS 38 *Intangible Assets*, those intangible assets identified in the purchase price allocation process that are considered to have a finite useful life should be amortized following a pattern that reflects how the future economic benefits from those particular assets are expected to be consumed during the estimated useful life of the intangible asset. The straight-line method is recommended in those cases where it is difficult to determine a pattern, and is the amortization pattern that is most often applied in practice. An acquirer that recognizes an intangible asset should thus

determine its useful life, which should be the period over which the asset is expected to contribute directly or indirectly to the future cash flows of the company. If the precise length is not known, which it very rarely is, the intangible asset should be amortized over the best estimate of its useful life. The high level of uncertainty means that companies are encouraged to estimate the useful life on a prudent basis. (Ernst & Young, 2012) In a Master student thesis by Löfgren and Johard (2012), the authors studied what useful lives 158 Swedish, British and German acquirers assigned to intangible assets in relation to their PPAs. The companies in the sample reported, for most of the intangible asset classes, useful lives that were on average between 6 to 8 years (Löfgren & Johard, 2012).

The following example in *Exhibit 2* illustrates what the effects on earnings are depending on allocation to intangible assets or goodwill and choice of useful life, assuming that goodwill is not impaired:

	Transaction 1	**Transaction 2**
	Allocated value	Allocated value
Intangible assets	200	800
Goodwill	800	200
Intangible Value	1000	1000
	Annual charge	Annual charge
Useful life 5 years	-40	-160
Useful life 10 years	-20	-80

Exhibit 2. Earnings implications of PPA and choice of useful life

As seen in *Exhibit 2*, the impact on reported earnings can differ considerably depending on initial allocation between goodwill and intangible assets. This effect becomes even greater with a shorter useful life assigned to intangible assets. The example however assumes that no impairment occurs.

3. Theoretical framework

In this section, we will go through the theories that can be divided into two main areas: theories related to goodwill and theories related to earnings concern. Together, these two areas of theories form the base for the previous research on how the high level of discretion permitted at the acquisition point in time, and in subsequent impairment testing, is used for earnings management.

3.1. Theories on goodwill

3.1.1. Conceptual definition of goodwill

As mentioned in the *Introduction*, goodwill represents competitive advantages that are expected to enable the company to generate earnings in excess of a "normal" return on investment. It may be developed internally by building customer loyalty, developing human resources, or using assets more efficiently than competitors. Or goodwill may be purchased when one company acquires another. (Jennings et al., 2001) IFRS apply strict recognition criteria for internally developed intangible assets, prohibiting internally generated goodwill from being on the balance sheet, meaning that only acquired goodwill can be placed on the balance sheet of firms (IAS 38). As mentioned, following the PPA, the residual between the purchase price and the fair value of the net acquired assets is recognized as acquired goodwill (IFRS 3.32). However, if all intangible assets are not identified and measured at fair value, or if the purchase price does not equal the fair value of the target, then reported goodwill will include components that should not conceptually form part of goodwill (Johnson & Petrone 1998). The following six components could all form part of reported goodwill:

No	Possible components of goodwill	Conceptually right?
1	Fair values in excess of book values of target's net assets	No
2	Fair values of target's unrecognized net assets	No
3	Fair value of the target's expected excess returns on net assets	Yes
4	Fair value of expected synergies from the acquisition	Yes
5	Over- or under valuation of the transferred payment	No
6	Over- or under valuation by the acquirer – purchase price	No

Exhibit 3. Goodwill components. Extracted from Johnson & Petrone (1998), although slightly adapted

According to Johnson and Petrone (1998) only components 3 and 4 in *Exhibit 3* should conceptually be considered as goodwill. Component 1 and 2 are the two accounting conservatism components, of which component 1 relates to measurement conservatism and component 2 relates to recognition conservatism. In a PPA, none of these two components should form part of goodwill, but should instead be placed on the balance sheet under other, more correct labels. Components 5 and 6 on the other hand should not be recognized as assets at all, regardless of the label. These components do not

result in future cash flows but are losses (if acquirer has overpaid) or gains (if acquirer has underpaid) that should be reported in the income statement immediately instead of activated on the balance sheet.

3.1.2. The inconsistent treatment of goodwill at and after the acquisition date

Hellman et al. (2012) discuss that the two standards mainly regulating how to account for goodwill, i.e. IFRS 3 *Business Combinations* and IAS 36 *Impairments*, are inconsistent with each other. IASB has tried to design the standards in a way so that acquired goodwill should only include the conceptually right components at the acquisition point in time (component 3 and 4, see *Exhibit 3*), by demanding acquirers to recognize and re-measure both net tangible and intangible assets to their fair values insofar as possible. Since IASB prescribes softer recognition principles for acquired intangible assets compared to internally developed assets, assets that could not be recognized by the target itself should in the PPA be recognized separately and thereby not included as goodwill. If the PPA is performed properly so that all intangible assets are identified and correctly measured, reported goodwill at the time of acquisition should only correspond to the conceptually right definition of goodwill, which is henceforth referred to as "core goodwill". Core goodwill should be equal to the net present value of all the target's future residual earnings as well as all future net benefits arising from the realization of synergies. However, despite the design of IFRS 3, in practice there would still be assets that will not be recognized and some assets that will not be measured at fair value at the time of acquisition (Johnson & Petrone, 1998). In that case, at the time of acquisition reported goodwill would consist partly of core goodwill and partly of recognition- and measurement conservatism. It is very common that measurement- and recognition conservatism also arise within the normal course of business because of e.g. the principle to measure tangible assets based on historical costs without adjusting for inflation, the rule to report inventory to the lower of cost or market value, and the prohibition against recognizing internally generated assets such as brands and customer relations. Hellman et al. (2012) argue that over time, when the value of core goodwill declines, measurement- and recognition conservatism arising within the target or acquirer's normal course of business, gradually become subsumed in reported goodwill. The gradual inclusion happens as a consequence of the way in which an impairment test for goodwill is to be conducted. As mentioned in *Section 2.2*, the value of the acquired goodwill item is not estimated directly in an impairment test. Instead it is the carrying value of the entire CGU, to which the acquired goodwill was initially allocated, that is compared with the recoverable value of that CGU. The carrying value of the CGU is understated by the amount of the accounting conservatism i.e. measurement and recognition conservatism, whereas the estimated recoverable value is unaffected by that conservatism. This means that accounting conservatism creates a gap between recoverable value and carrying value, which prevents acquired goodwill from being impaired even though there may have been a decrease in core goodwill. Throughout the thesis we refer to the gap between recoverable- and carrying value as the "internal

buffer". If the total amount of conservatism in a CGU is equivalent to, or larger than, the decrease in core goodwill attributable to it, no impairment charge is reported even though core goodwill has decreased. A high level of accounting conservatism in the combined entity hence means that there is an internal buffer which reduces the likelihood that the company will report an impairment charge. Thus, although accounting conservatism may be beneficial in that it assures investors and creditors that book values are not overstated, it creates problems for impairment tests since these are done by estimating the value of the entire CGU instead of core goodwill directly. Accounting conservatism is always the basis for the internal buffer. Given a certain level of accounting conservatism however, there are some other firm characteristics that could further increase the size of the internal buffer that the company can use for protecting goodwill:

1. CGU structure

It is the degree of the accounting conservatism only in the CGU or CGUs to which goodwill is allocated that will determine the size of its protective internal buffer, as that is the level on which the impairment tests are to be conducted. This means that the composition of CGUs becomes an important determinant for the size of the internal buffer for firms. The internal buffer used in impairment testing will be larger if acquired goodwill is allocated to the CGU which at the acquisition date has the largest discrepancy between carrying and recoverable value, or the largest potential to develop such a discrepancy. Since the magnitude of the discrepancy between carrying and recoverable value ought to be larger in a larger CGU, a company is less likely to impair its goodwill if goodwill is allocated to a large CGU. Thus, companies are more probable to have their goodwill protected by an internal buffer if they have some CGUs that are larger than other CGUs. (Hellman et al. 2012)

2. Cash flow growth

The more the cash flows attributable to a CGU grow over time, the more the internal buffer of the CGU increases. An acquisition often involves costly restructuring expenses in the first years following the acquisition. However, the synergies arising from the combination of firms are not fully realizable in those first years, meaning that an increase in cash flow growth typically occurs a couple of years after an acquisition. When cash flows are closer in time the net present value of them grows, meaning that the recoverable value of a CGU increases. The likelihood that the carrying value of the CGU exceeds its recoverable value, therefore decreases with larger cash flow growth, which consequently reduces impairment risk. (Hellman et al. 2012)

3.1.3. Consequences of the internal buffer

Hellman et al. (2012) argue that the existence of an internal buffer preventing goodwill from ever becoming fully impaired, is a problem for users of financial statements since if an acquisition is never

fully expensed for, it is very difficult for analysts and investors to evaluate the outcome of the acquisition. Furthermore, comparability between companies growing through acquisitions or companies growing organically will be distorted, when acquired goodwill over time increasingly captures components that an organically growing company would not be permitted to activate on the balance sheet, but would have to expense directly. As a consequence, acquiring companies with goodwill protected from impairment, will display artificially high earnings since parts of the purchase price will never be expensed in the income statement. Comparability can also be distorted between firms that perform their PPAs properly and firms that use discretion to allocate more than otherwise expected to goodwill, as the latter group of companies is more likely to only have smaller parts of the acquisition premium paid ever taken through the income statement. These issues related to evaluation- and comparability, reduce decision usefulness of the financial statements which is against the objectives of IFRS. Furthermore, the authors also argue that it seems very unlikely that IASB has taken an active and informed choice to allow that a company can put internally generated intangible assets on its balance sheet by letting those assets become gradually subsumed in goodwill, given IASB's ambition to reduce the existence of subjective and unreliable asset values on the companies' balance sheets by prescribing very strict recognition principles for them. The authors question the effectiveness of applying strict recognition principles for internally generated assets, if internally generated assets can so easily enter the balance sheet anyway although under a different label. Hence, besides the problems created when evaluating an acquisition and comparing companies with different growth strategies and different PPA practices, another problem caused by the current standards design is that when goodwill captures accounting conservatism, it conflicts with IASB's view on asset types that should be permitted on the balance sheet.

3.2. Theories on earnings concern

3.2.1. The relationship between earnings and company valuation

According to shareholder theory, a firm's primary purpose is to serve the needs and interests of the company's owners (Friedman, 1970). In other words, the shareholder theory states that the objective for management is to maximize the market value of equity. Without the effects of trading behavior and investor sentiment, the market value of equity should equal the fair value of equity, which is the net present value of all future operating cash flows less the fair value of net debt (Koller et al., 2010). Hence, it is the generation of cash flows that drive equity value. Many fundamental valuation models, e.g. discounted dividends or discounted cash flow analysis, use different types of cash flows as input. Since neither goodwill amortizations nor impairment charges are tax deductible, the choice between straight-line amortization or impairment testing does not affect cash flows at all but only earnings, and should therefore in theory be irrelevant for corporate value. However, even though firm value

ultimately depends on the realization of cash flows, cash flows provide very limited information to investors about value creation. A company can for example easily increase its cash flows by withdrawing investments, even if the withdrawal is value destructive. Earnings are therefore superior indicators of a company's value creation. Consequently, they are important input for investors and analysts in company valuation. (Penman, 2010)

The strong form of the efficient market hypothesis (EMH) states that stock prices at all times fully reflect all available information since all investors agree on the implications of the information they have been provided, and the less strong forms that prices will do so over time since the investors who understand the information will correct mispricing made by those investors that interpret the information differently (Fama, 1970). EMH assumes that the market can accurately make out the true cash flow implications from accounting information and arrive at the right value. Even when reported earnings through different accounting procedures diverge from actual value creation, the market should be able to correct for this. With this perspective, goodwill treatment will not matter since the market will not be deceived by artificially high or low earnings. In contrast to the efficient market hypothesis stands the functional fixation hypothesis. The functional fixation hypothesis predicts that there are too many investors that will fail to understand the true cash flow implications of accounting data in order for more sophisticated investors to be able to fully correct for the mispricing. This means that reported earnings have great implications for stock prices, since many investors use the reported accounting figures to price securities (Watts & Zimmerman, 1986). Many empirical studies confirm that there is a strong causal relationship between reported earnings and stock prices (e.g. Black, 1993), which supports the functional fixation hypothesis (e.g. Hand, 1990; Sloan, 1996). For example, Hand (1990) studies stock price reactions to quarterly earnings re-announcements about accounting gains related to swap transactions, using US data from 1981-1984. His results suggest that investors perceive the re-announcements of the accounting gains as "real gains", and thus provide empirical evidence of investors' functional fixation on reported earnings. Sloan (1996) also finds that stock prices do not reflect all the available information, suggesting that investors "fixate" on the reported earnings and fail to recognize that changes in earnings can be due to accruals, the less persistent component of earnings. If the functional fixation theory holds in practice, the reported earnings consequences related to the choice of goodwill treatment is an important issue as the market relies too much on reported earnings when assigning a value to a company.

Based on the functional fixation hypothesis together with shareholder theory, it is not surprising that managers are concerned over their reported earnings, and would try to affect the earnings they present to the market on a quarterly basis. Schipper (1989) defines that earnings management occurs when someone intentionally intervenes in the external accounting process for his/her own gain. Another definition is that earnings management occurs when a company's financial accounts do not give an

accurate view because of accounting choices distorting the underlying economic performance (Gunny, 2010). There are many empirical studies conducted that have shown evidence of managers' earnings concern and earnings management. For example, Graham et al. (2005) surveyed over 400 executives in US firms, and found that the majority of executives viewed earnings, and not cash flows, as the most important determinant to the market evaluation of their performance. Their study shows that the two most important earnings benchmarks are quarterly earnings for the same quarter the year before and the analyst consensus estimate. Further, 78% of the executives admitted that they try to smooth earnings, mostly through giving up positive long-term NPV projects to meet short-term earnings benchmarks, and to a lesser extent through accounting manipulations. The importance to meet or beat analysts' earnings estimates is confirmed in the study by Burgstahler and Eames (2006), finding that managers take actions to avoid negative earnings surprises. Through analyzing their sample of around 26,000 observations of actual and forecast annual EPS values for the years 1986 to 2000 on US data, they found that the distribution of earning surprises contained an unusually high frequency of zero and small positive surprises, and unusually low frequency of negative surprises. Bartov et al. (2001) studied approximately 130,000 quarterly earnings surprises made between 1983 and 1997 on US firms. They observed that the companies over the time period more frequently met or beat analysts' estimates, and that investors rewarded firms that met earnings estimates with a market premium, and penalized those that failed. In those cases where firms were likely to have used earnings management to meet analysts' estimates, for example with the use of accrual accounting, they found that companies were still rewarded although a bit less than the companies that were not likely to engage in earnings management. In contrast, Kaznik and McNichols (2001) performed a study based on almost 15,000 US observations between 1986-1993, and found that firms were not likely to receive a market premium for manipulating earnings in a single period to meet market expectations. They found that companies that met analysts' expectations through accelerating earnings had difficulties in meeting expectations in future periods due to the reversal of manipulated accruals. These firms were not given a premium since the market penalized firms that had previously met expectations but failed to do so subsequently. They concluded that the market only rewards firms that consistently meet analysts' expectations. These are perceived as less risky and therefore get a lower cost of equity.

3.2.2. The relationship between goodwill and its effect on company valuation

Jennings et al. (2001) performed a study before IFRS 3, in which they found that earnings *before* goodwill amortization explained significantly more of the distribution of share prices than did earnings *after* goodwill amortization. This indicates that the goodwill amount written down does not matter for company valuation. If the finding is correct, earnings management through goodwill management would be useless as investors add back goodwill-related expenses when valuing companies. As described in *Section 2.1.*, the idea behind the change to an impairment-based approach

was to increase the decision usefulness of accounting. Despite having a favorable view to the impairment test based goodwill treatment in theory, Wrigley (2008) sees it as highly problematic that managers often let goodwill remain on the balance sheet although it should have been impaired. As a consequence, goodwill is too unreliably measured and analysts should therefore tend to ignore it completely for valuation purposes. Hamberg et al. (2009) have investigated stock market reactions to the adoption of IFRS 3 in Sweden. In the test they constructed one portfolio consisting of goodwill-intensive firms and one consisting of firms with no goodwill at all. They compared the portfolio returns during a seven months transition window of IFRS (1 December 2004 to 30 June 2005), when they expected investors to observe changes in earnings caused by IFRS 3. In line with their expectations, they found that goodwill-intensive firms yielded a significantly higher abnormal return than the firms without goodwill after the transition to IFRS. They suggest that their result could be explained by that investors view the goodwill-intensive firms as more attractive when their reported earnings increased. The finding indicates that investors see goodwill write downs as value relevant and thereby focus primarily on 'bottom-line' earnings.

4. Previous research

In this section, we will present empirical studies that investigate the relationship between two different types of firm characteristics, i.e. the possibility to protect goodwill from impairment and motives to increase reported earnings, and how managerial discretion is used in the PPA and subsequent impairment testing of goodwill.

4.1. Overview

The primary objective of the related studies we will present in this section has been to verify whether managers use the degree of discretion inherent in the accounting standards in an opportunistic way. Most studies are based on SFAS 141 and SFAS 142, which are quite similar to IFRS 3 and IAS 36. A list with significant differences is in *Appendix A*. We include studies that investigate how two types of firm characteristics, i.e. the *possibility* to protect goodwill from impairment and *motives* to increase reported earnings, affect the PPA and/or impairment testing. We assume that the relationship between the two firm characteristics and the impairment testing of goodwill should have a corresponding effect on the PPA. The following model illustrates how the previous studies relate to each other, the presented theories and the review of standards.

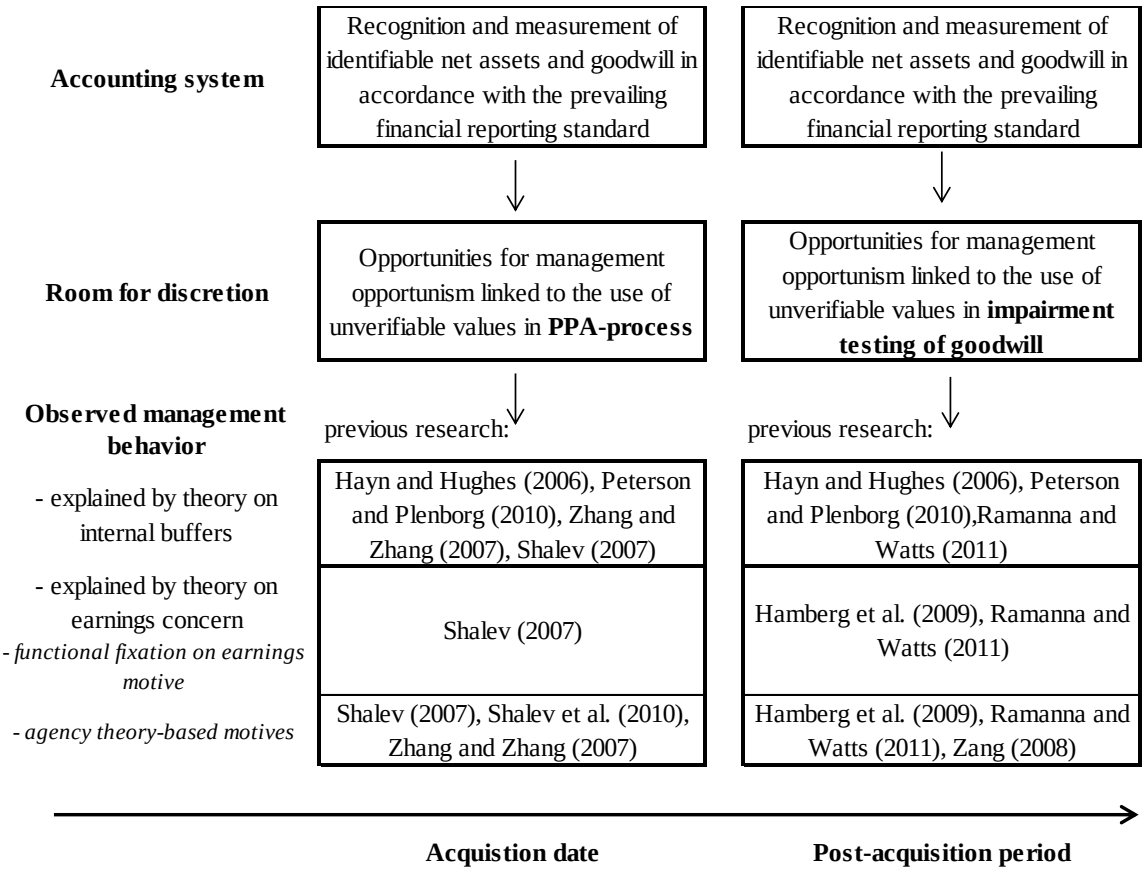


Exhibit 4. Structure of literature, from Hellman et al. (2012) although slightly adapted

4.2. The relationship between the internal buffer and goodwill

The relationship between the internal buffer and impairment testing

Ramanna (2008) identifies three indicators that would afford managers greater flexibility in impairment tests under SFAS 142 impairment rules: 1) multiple reporting units[2] 2) high amount of unverifiable assets 3) high market-to-book ratio. The first two indicators are then used by Ramanna and Watts (2011) for investigating how the presence of an internal buffer can explain goodwill non-impairments under SFAS 142. They have a sample period of 2003-2006 and identify a sample of 124 firms which all have market indications that goodwill ought to be impaired, as all firms have goodwill on their balance sheets and have two successive years with book-to-market ratios above one. They found that the frequency of not reporting an impairment charge is as high as 69% in the sample. The authors hypothesize that the larger (in absolute size) and the more numerous the reporting units a firm has, the greater would management's flexibility in determining future impairment losses be, and the less likely would managers make an impairment of goodwill. They also hypothesize that firms with more unverifiable net assets have greater possibility to manage goodwill impairment losses, since more subjectivity is involved in appraising the fair values of those net assets in the impairment testing of goodwill. In line with their expectations, they find that impairments decrease with the number and size of reporting units and increase with the verifiability of net assets within the unit.

The relationship between the internal buffer and PPA

Zhang and Zhang (2007) use all three indicators suggested by Ramanna (2008) [3], which were partially used by Ramanna and Watts (2011). But unlike Ramanna and Watts (2011), who focus on goodwill impairments, Zhang and Zhang (2007) focus on the accounting choices made by managers at the acquisition point in time. More specifically, they investigate whether an internal buffer can contribute to explain a firm's PPA. Zhang and Zhang (2007) studied 137 acquisitions between July 2001 – October 2005 by US firms, in which both the acquirer and the target were publicly traded, and all the target companies in one single industry, i.e. Business Services. They hypothesize that under SFAS 141 and SFAS 142, managers are more likely to manipulate the allocation towards goodwill when they expect that they can hide future goodwill impairments by exercising discretion in the subsequent impairment tests. In line with their expectations, they find that acquirers with high market-to-book values, unverifiable assets and multiple reporting units, allocate more purchase price to goodwill. Similar to Ramanna and Watts (2011), Zhang and Zhang (2007) find that the relation between

[2] Or cash generating units in IFRS terminology
[3] In their paper, Zhang and Zhang (2007) refers to Ramanna (2006) which is an earlier draft of the published study Ramanna (2008)

multiple reporting units and the allocation to goodwill is sensitive to different robustness controls. However, they find that the association between the market-to-book ratio and the allocation to goodwill is robust to alternative specifications. Contrary to this finding, Shalev (2007) did not find any significant association between high market-to-book values and the proportions allocated to goodwill, when studying 318 acquisitions made by non-financial S&P 500 firms, between July 1, 2001 and December 31, 2004. His findings suggest that acquirers do not consider the risk of future impairment in their PPAs. The indicators for the internal buffer used by Shalev (2007) however differ slightly from the indicators used by Zhang and Zhang (2007), in the way that he uses the acquirer's stock return volatility, acquirer's performance in the years preceding the acquisition and R&D intensity of the consolidated entity instead of multiple reporting units and unverifiable assets. Further, the sample period and sample selection differed between the two studies.

Regarding the structure of reporting units, Hayn and Hughes (2006) find in their study that identifying reporting units and assigning goodwill to them has proven to be one of the most difficult implementation issues of SFAS 142, which raises concerns by both preparers and users of financial statements regarding the complexity, cost, and inconsistency of this process. Similar difficulties in applying IAS 36 have been found empirically. In a large survey of European companies by Ernst & Young (2009), it was found that companies often recognize one CGU for each of its operating segments. A recent survey of Danish firms finds that there are considerable variances in practice with regard to preparer's implementation of impairment tests (Petersen & Plenborg, 2010). The majority of firms in the survey claimed that they had identified a larger number of CGUs than operating segments whereas 25% of the studied firms said that they equate an operating segment to a CGU. Some firms said that they have fewer CGUs than operating segments, and some firms admitted that they allocate goodwill to CGUs based on their desire to reduce write-downs. These two types of behavior are both non-compliant with IAS 36. From this the authors conclude that IAS 36 is interpreted and implemented very differently across companies.

4.3. The relationship between earnings concern and goodwill

The relationship between earnings concern and impairment testing

It has been widely noted in empirical studies that managers are concerned that straight-line amortization of intangibles suppresses reported earnings (e.g. Giacomino and Akers, 2009; Hamberg et al, 2011; Moehrle and Moehrle, 2001). This observed earnings concern may result from managers' belief that investors and analysts fixate on reported earnings (in line with the functional fixation hypothesis discussed in *Section 3.2.*).

Hamberg et al. (2009) investigate the relationship between earnings concern resulting from managers' belief in investors' functional fixation on earnings and how they use the high level of discretion related to goodwill impairment. The study is made on the initial adoption of IFRS 3 in 2005 of 180 firms listed on Nasdaq OMX Stockholm, which all have goodwill in their restated IFRS statements from 2004. They defined equity market concern (EMC) as trading activity on the firm's stock, which they calculated as the value of all traded shares in the year of IFRS restatement divided by the average market value of equity. They hypothesized that firms with high EMC would be more motivated to impair goodwill at the initial adoption of IFRS 3 as they would not have to take that impairment charge through the income statement if impairing at that point in time. These companies would prefer to report an impairment charge without the corresponding earnings effects in order to lower the risk for future impairment charges with earnings effects attached to them. Contrary to their expectations, high EMC companies impaired less in the adoption year, although the effect was not significant. Although constructing their study quite differently, Ramanna and Watts (2011) also obtained insignificant results when they studied whether equity market concerns affect managers' impairment decisions. As mentioned, they studied 124 US companies with market indications that goodwill ought to be impaired. The authors discuss that the insignificant results could be a consequence of that stock prices already reflected goodwill as if goodwill had already been impaired. Thus, managers of companies with high equity concerns were not more motivated than others to hold back impairments as the negative earnings effects of a write-down had already been taken into consideration by investors.

The relationship between earnings concern and PPA

Shalev (2007) investigates this relationship between firms' earnings concern and how the managerial discretion is used in the PPA process, by studying 318 acquisitions made by non-financial S&P 500 firms, between July 1, 2001 and December 31, 2004. He hypothesizes that in catering to investors' functional fixation on earnings, managers who view reported earnings as more central to the evaluation of their performance by outsiders, would tend to allocate a larger portion of purchase price to goodwill. He uses two proxies to measure the earnings concern of the acquirer: the market capitalization of the acquirer's earnings (measured as its P/E ratio) and the frequency of exactly meeting analysts' earnings forecasts. He hypothesizes that the higher P/E ratio an acquirer has, the higher will the market value of the firm change to any earnings changes. As for the proxy of exactly meeting analysts' forecasts, he expects that the higher the frequency of meeting the earnings estimates, the more concerned would the acquirer be over its reported earnings. In line with his expectations, he obtained significant results for both proxies, even after controlling for the different types of investors and the number of analyst following. His interpretation is that acquirers seem to consider the effect that recognized intangible assets would have on their earnings, and suggest that

having high earnings concern steers firms towards strategically allocating more of the purchase price to goodwill.

The relationship between agency-theory based motives and impairment testing or PPA

Apart from the studies based on analysts and investors' functional fixation on reported earnings for company valuation, several studies have listed motives based on agency theory, that could explain how managerial discretion is applied in the PPA or impairment testing (Hamberg et al., 2009; Ramanna and Watts, 2011; Shalev, 2007; Shalev et al., 2010, Zhang and Zhang, 2007; Zang, 2008). Agency theory-based motives include debt contracts with accounting based covenants, earnings-based executive compensation, and the age of managers (as older managers are closer to retirement and therefore expected to be more focused on improving short term earnings than long term earnings). With regard to debt contracting, Shalev (2009) provides evidence that acquirers are concerned with the effects the PPA would have on their ability to secure debt in the future. Although expecting a higher allocation to goodwill for companies with covenant-linked debt contracts, he finds that the allocation to goodwill tends to decrease with acquirers' leverage. An explanation brought forward is that goodwill is less useful than intangible assets as collateral in debt contracts, which would compensate for the negative effect on earnings. Zang (2008) finds that higher leveraged firms tend to report lower initial goodwill impairments upon the adoption of SFAS 142. His explanation is that leveraged firms are more concerned with debt covenants, indicating that their managers would use their discretion to understate the initial impairments under SFAS 142. Hamberg et al. (2009) also investigate the effect of debt covenants on managers' choice to initially impair goodwill upon the adoption of IFRS 3 in Sweden, but do not obtain any significant results at all. Ramanna and Watts (2011) find that managers' debt covenant concerns can explain the avoidance of timely goodwill impairments. Moving on to motives related to earnings-based executive compensation, Shalev et al. (2010) find that allocation to goodwill increases with bonus intensity, i.e. the relative importance of bonus in CEO pay, which they regard as evidence for that CEOs use their discretion in the PPA to increase their bonuses. Hamberg et al. (2009) also investigate the relation between earnings-based compensation and initial impairment charges upon the adoption of IFRS 3 in Sweden, but do not obtain any significant results. Ramanna and Watts (2011) however finds that managers with accounting-based compensations tend to use their discretion to avoid goodwill impairments, but using US data. Finally, regarding the effects of the managers' age, Zhang and Zhang (2007) find that older CEOs tend to allocate more to goodwill.

5. Research questions and hypotheses

Based on the review of the background, theory and previous research in the previous sections, we will in this section present our research questions and formulate our hypotheses to test our research questions.

5.1. Research questions

The purpose of this thesis is to investigate the relationship between the proportion of the purchase price allocated to goodwill and two types of firm characteristics, for firms reporting under IFRS. Based on our review of the relevant accounting standards, theories and previous literature, we find that there are several firm characteristics that could affect the allocation decisions made by the management of the acquiring firm at the time of an acquisition. Those two types of firm characteristics that we are interested in investigating and on which we will base our research questions are as follows: the *possibility* for the acquirer to protect goodwill from impairment of through the use of an internal buffer, and *motive* for the acquirer to increase reported earnings.

Starting with the possibility of the acquirer to protect goodwill from impairment, we assume that acquirers with large pre-existing internal buffers are aware of their possibility to avoid future impairment charges. If this is the case then managers of those firms might make use of the flexibility in the accounting standards when they recognize and measure identifiable intangible assets at the initial stage of the PPA, and consequently allocate a larger than otherwise expected proportion to goodwill relative to other intangible assets. Moving on to acquirers' motives to increase reported earnings, managers of an acquiring firm who face pressure to deliver high earnings, motivated by investors' functional fixation on reported earnings, may allocate a larger than otherwise expected proportion to goodwill relative to other intangible assets in their purchase price allocations.

Based on the reasoning above, we formulate two research questions:

1. *Can the size and sustainability of the internal buffer of the acquirer explain the proportion allocated to goodwill in purchase price allocations performed by companies under IFRS?*
2. *Can the earnings concern of the acquirer, motivated by investors' functional fixation on reported earnings, explain the proportion allocated to goodwill in purchase price allocations performed by companies under IFRS?*

5.2. Hypotheses

In order to answer our two research questions above, we formulate the following sets of hypotheses, which are primarily based on previous research by Ramanna and Watts (2011), Shalev (2007) and Zhang and Zhang (2007).

To capture the potential size and sustainability of the internal buffer of the acquirer, we use three different measures as proxies: the market value in relation to book value, the number of cash generating units and the stock price volatility of the acquirer.

Ramanna (2008) argues that firms with higher reporting unit market-to-book-ratios are likely to have more internally generated goodwill, which could protect the acquired goodwill from being impaired since impairment tests are conducted indirectly on the reporting unit level. According to IAS 36, an impairment test is made through comparing its recoverable amount to the carrying amount of the CGU to which goodwill has been allocated. For simplicity, we assume that market value can be used as a proxy for the recoverable amount, as has been done in previous studies (Ramanna, 2008; Shalev, 2007; Zhang and Zhang, 2007). Another assumption we make is that the market value in relation to the book value on firm level can be used as a proxy for the internal buffer on the CGU level as well. For firms with only one CGU, the market value in relation to book value on a firm level obviously corresponds to that of the CGU level. However, the market value in relation to book value on CGU level is not observable for firms with multiple CGUs, which is the main reason why we made the simplification to use firm-level market value in relation to book value as a proxy, as was done by Zhang and Zhang (2007) in their similar study. This leads to the formulation of our first hypothesis:

> H_{0A}: The proportion allocated to goodwill in purchase price allocations cannot be explained by the market value in relation to the book value of the acquirer.
>
> H_{1A}: The proportion allocated to goodwill in purchase price allocations can be explained by the market value in relation the to book value of the acquirer.

We expect that acquirers with a higher market value in relation to book value prior to the acquisition tend to allocate a larger than otherwise expected proportion to goodwill relative to other intangible assets in their purchase price allocations, since they are predicted to have large internal buffers that protect the acquired goodwill from ever becoming fully impaired.

Ramanna and Watts (2011), Shalev (2007) and Zhang and Zhang (2007) argue that the more numerous reporting units a company has, the larger will management's flexibility be initially in determining future impairment losses.

Considering the following example: A firm' market value is 100 and its book value is 110, of which acquired goodwill is 50. The firm has two CGUs, the first with fair value of 95 and book value of 90, which includes the acquired goodwill of 50. The second CGU has a fair value of only 5 but book value of assets of 20. Since all goodwill has been allocated to the first CGU there is no impairment charge since recoverable value in that CGU exceeds carrying value. If the firm only would have had one CGU however, an impairment charge would have occurred as carrying value would then have exceeded recoverable value.

The example clearly illustrates that with multiple CGUs with differently sized internal buffers, i.e. gaps between recoverable value and the book value, a buffer in one CGU can be isolated from potential value decreases occurring in other CGUs, preventing impairments. Those value decreases would have reduced the buffer if they had occurred in the same CGU as the one in which the buffer is located. In this way, buffers are more sustainable if they are separated from potential value decreases. For extra clarification, we stress that this reasoning hinges on the two assumptions that buffers are not equally sized across the CGUs, and that management to some extent can know which ones the CGUs are that have either pre-existing internal buffers, or high potential for developing such buffers. We see both these assumptions as probable, and therefore use the number of CGUs in a firm as a proxy for the sustainability of the internal buffer. This leads us to the formulation of our second hypothesis:

> H_{0B}: The proportion allocated to goodwill in purchase price allocations cannot be explained by the number of CGUs of the acquirer.
>
> H_{1B}: The proportion allocated to goodwill in purchase price allocations can be explained by the number of CGUs of the acquirer.

We expect that acquirers with numerous CGUs tend to allocate a larger than otherwise expected proportion to goodwill relative to other intangible assets in their purchase price allocations, since they are predicted to have larger flexibility to allocate the acquired goodwill to a CGU with more sustainable internal buffers.

Third, we include volatility as it also captures the sustainability of the internal buffer. Based on the simplifying assumption that market value is a good proxy for recoverable value, we use stock price volatility. Zhang and Zhang (2007) argue that firms with lower stock price volatility are less likely to experience temporary price declines than firms with higher stock price volatility. This means that firms with lower stock price volatility will be less likely to experience a decrease in the size of their internal buffer. If the buffer diminishes so that the recoverable value of the net assets suddenly drops below the carrying value of them, then the company has to report an impairment loss that they cannot

reverse even though the buffer goes back up to its initial value in subsequent time periods. In line with their reasoning, we formulate our third hypothesis:

> H_{0C}: The proportion allocated to goodwill in purchase price allocations cannot be explained by the stock price volatility of the acquirer.
>
> H_{1C}: The proportion allocated to goodwill in purchase price allocations can be explained by the stock price volatility of the acquirer.

We expect that acquirers with low stock price volatility prior to the acquisition tend to allocate a larger than otherwise expected proportion to goodwill relative to other intangible assets in their purchase price allocations. This is because a lower stock price volatility indicates that the internal buffer is more sustainable, lowering the risk for goodwill impairment.

Regarding the earnings concern of acquirers, we focus only on the motive that managers are concerned that investors are functionally fixated on reported earnings, and not on any agency-based motives (e.g. contracting or reputation motives). The main reason why we are not focusing on any agency-based motives is that the construction of such proxies would be too complex and time consuming given the scope of this thesis. To measure the earnings concern motivated by managers' concern that investors are functionally fixated on reported earnings, we use two different proxies: an earnings response coefficient (ERC) and a measure capturing the company's frequency of meeting analyst estimates.

We use ERC as a proxy for the importance of reported earnings of the acquirer firm, following the reasoning of Ramanna and Watts (2011). They argue that managers can have equity market concerns, which might affect their accounting decisions, including their impairment decisions. The ERC indicates how much the share price of the acquirer is affected when the announced quarterly earnings are above or below analysts' expectations. We formulate our fourth hypothesis as follows:

> H_{0D}: The proportion allocated to goodwill in purchase price allocations cannot be explained by the ERC of the acquirer.
>
> H_{1D}: The proportion allocated to goodwill in purchase price allocations can be explained by the ERC of the acquirer.

A large ERC indicates that investors react strongly to earnings surprises. Managers of those firms should be more concerned over their reported earnings since their earnings are more closely related to the share price. This implies that managers would be more keen to allocate a larger than otherwise expected proportion to goodwill relative to other intangible assets in their purchase price allocations, since subsequent impairment testing of goodwill offers more flexibility compared to linear

amortization of other intangible assets. Therefore, we expect a positive impact of ERC on the proportion allocated to goodwill in purchase price allocations.

Second, we also use the frequency of meeting analyst forecasts as a proxy for the acquirer's concern over earnings. The field studies of Bartov et al. (2002) and Graham et al. (2005) document that investors reward firms that meet or exceed analysts' forecasts, and that managers of firms are willing to take actions to achieve this goal. Shalev (2007) uses a proxy in his study on PPA to capture the frequency of exactely meeting analysts' forecasts. He argues that a higher frequency of meeting forecasts indicates that the company is willing to do more to meet the earnings targets of analysts, thus indicating that the company is more likely to engage in earnings management. That a company has a higher frequency of meeting analysts' forecasts could also indicate that there are more analysts following the company, which could explain why the consensus estimates are more accurate. Shalev (2007) argues that a large number of analysts can increase the pressure on the managers of a company to manage its earnings in order to meet the expectations of the analysts. This leads to the formulation of our fifth hypothesis:

> H_{0E}: The proportion allocated to goodwill in purchase price allocations cannot be explained by the acquirer's frequency of meeting analyst forecasts.
>
> H_{1E}: The proportion allocated to goodwill in purchase price allocations can be explained by the acquirer's frequency of meeting analyst forecasts.

We expect that acquirers with high frequency of meeting analyst forecasts tend to allocate a larger than otherwise expected proportion to goodwill relative to other intangible assets in their purchase price allocations, since that a higher frequency of meeting forecasts indicates that the company is more concerned over its reported earnings.

Our two research questions and five hypotheses are summarized in *Exhibit 5* on the next page.

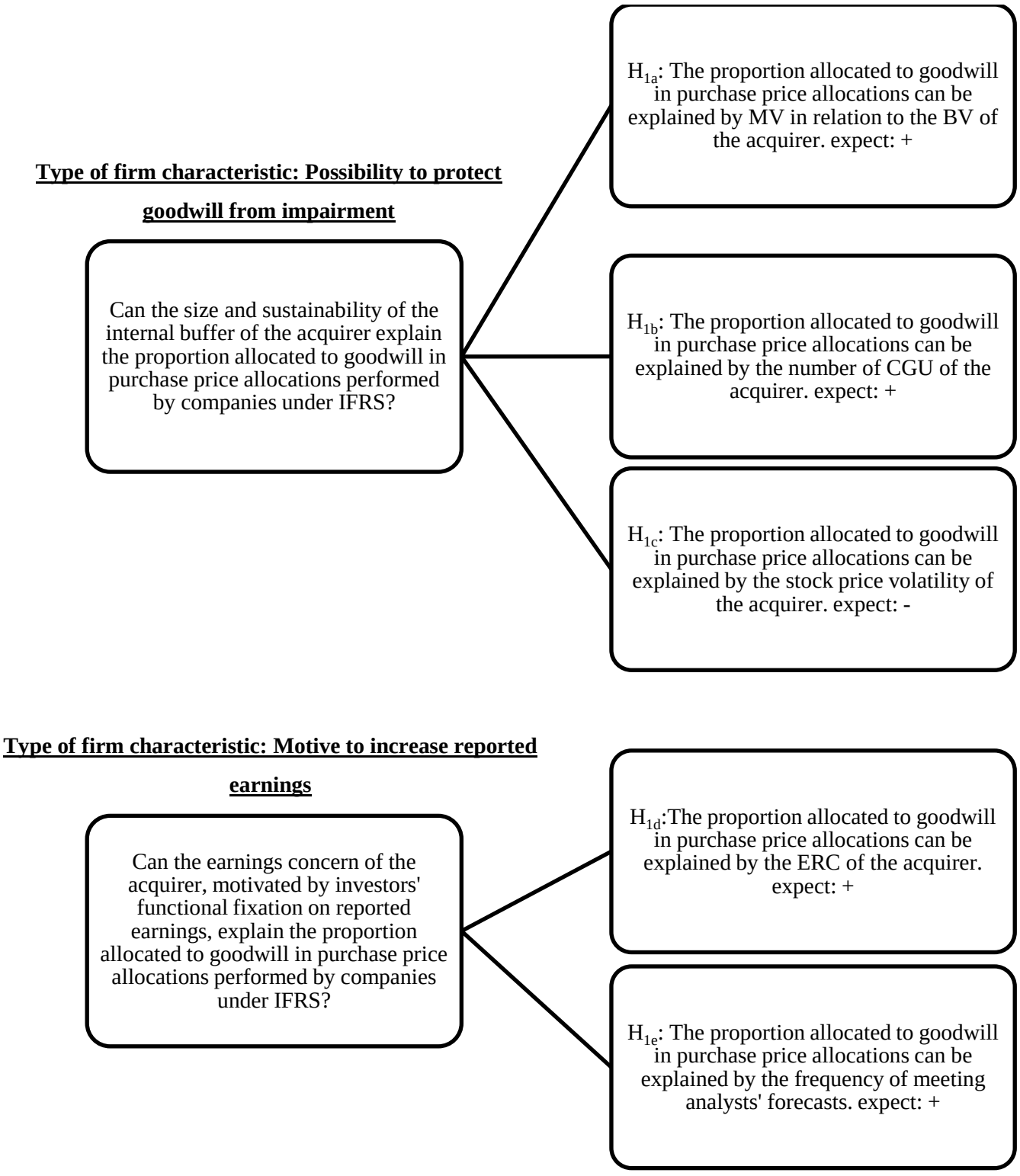


Exhibit 5. Operationalization of theory: from research questions to formalization of hypotheses

6. Method

In this section, we will describe the design of our study. First, we will present our research approach. This will be followed by a description of how we have chosen our sample. Thereafter, we will describe how we have collected the data and constructed our variables. Finally, we will explain the statistical methods for analyzing the data set.

6.1. Research approach

In order to study the relationship between the proportion allocated to goodwill in purchase price allocations by Swedish companies under IFRS and the characteristics of these firms, we have chosen to apply a deductive approach in our research. We first describe the relevant IFRS and then review theory and previous research on what the effects of the standards may be. We then form research questions and hypotheses based on the theoretical frameworks and previous research, and thereafter test our hypotheses statistically to see if we can reject the null hypotheses. We have chosen a quantitative approach as a qualitative approach would have been too time-consuming given our aspiration to gather data from a large number of companies. A quantitative approach is possible for us since most required data can be extracted from firms' externally audited reports which are regarded to be of high quality (Hamberg et al., 2011).

6.2. Sample selection

Given our purpose to study the relationship between the proportion allocated to goodwill in purchase price allocations by firms reporting under IFRS and some of their firm characteristics, all acquisitions performed by IFRS-reporting companies after the introduction of IFRS 3 would be of interest. As a large part of the required data has to be collected by hand from annual reports and we are faced with time constraints, we have chosen to only include Swedish companies classified as large cap and mid cap on Nasdaq OMX Stockholm. The choice to focus on Swedish data is motivated both by data availability and that Swedish accounting is in general considered to be of high quality (Hamberg et al., 2011). This choice narrows down the sample to 126 companies. Our choice to focus on larger companies is based on that they generally perform acquisitions of larger absolute value, indicating that the aggregated purchase prices from transactions made by large companies would be higher compared to that from a sample of small firms. The total earnings effects resulting from how the PPA is performed would thus be larger for a sample of larger firms. For the time dimension, we have chosen to include acquisitions completed during a time period of five years, which we deemed to be manageable given our time constraints. We chose the time period 2007-2011, since the latest available annual report at the time of our data collection is for 2011. The length of our chosen sample period is

in line with previous studies, e.g. Shalev (2007) has a sample period of 3.5 years and Zhang and Zhang (2007) have a sample period of 4.25 years. If all companies in our initial sample perform acquisition every year, we would have a sample of 630 observations. We then narrowed down the sample by excluding acquisitions made by companies classified as *Financials* in the FTSE/DJ Industry Classification Benchmark system (ICB), which is the classification system used by Nasdaq OMX Stockholm. Financial companies have been excluded since investment companies often buy and sell portfolio companies without integrating them into their operational activities. This differs from other kinds of companies, which perform acquisitions primarily in order to benefit from synergies (component 4 of goodwill, *Exhibit 3.* in *Section 3.1*.). Thus PPAs may differ greatly for investment companies. Shalev (2007) and Hamberg et al. (2011) also exclude financial companies in their studies. In the ICB system, 33 of the companies are classified as *Financials*[4], thus leaving us with 465 possible observations. After screening annual reports from 2007 to 2011 for all remaining companies, our initial sample was reduced to 204 observations, covering acquisitions made by 66 companies. Only 16 companies in the sample made acquisitions every year during our sample period. We excluded PPAs with negative goodwill, since these cases do not reflect the type of PPA that we are interested in. We also excluded the rare cases for which there were no values to allocate, which happens when the purchase price is lower than the value of net assets, before identification and re-evaluation of them, as there can in such cases not be any active choices on how to allocate between goodwill and other intangible assets. Four companies (16 observations) had a reporting year not coinciding with a calendar year. For these companies we re-labeled the reporting year to the calendar year to which the majority of the reporting year corresponds. For example, reporting year 1 April 2011 – 31 March 2012 was re-labeled to 2011. This was made to facilitate the data collection of the independent variables to include only five different values on the time dimension. The data availability turned out to be insufficient for constructing the indicators on earnings concern for four companies, reducing our final sample to include 195 observations.[5]

6.3. Data collection and variables construction

6.3.1. Data collection and ratio construction for our dependent variable

The construction of the dependent variable differs in previous studies on PPA. Shalev (2007) used goodwill in relation to purchase price, whereas Zhang and Zhang (2007) related goodwill to the intangible value acquired. We have chosen to apply the latter approach to limit the importance of the amount of net tangible assets in the PPA. This is because the acquirer can only affect the value of tangible assets to a limited extent through fair value adjustments, but have more discretion with

[4] Note that the *Financials* category in ICB also includes real estate companies.
[5] For example CDON and Byggmax which were listed in 2010

regards to identifiable intangible assets. Consequently, the value of net tangible assets depends to a lesser extent than intangible value on managers' self-serving choices, but more on the assets structure of the target company (Zhang & Zhang, 2007). Therefore we define our dependent variable, which we name *GW/IV*, as goodwill divided by intangible value. Intangible value corresponds to the combined value of goodwill and fair values of identified intangible assets.

In order to gather data on *GW/IV*, we went through the PPA-related notes to the consolidated financial statements and entered the numbers into excel. We double-checked all the notes to ensure the quality of our data collection. For those companies that made multiple acquisitions during a reporting year, some of them reported each transaction separately, whereas others report them on an aggregated level. In order to ensure consistency in our data collection, we chose to extract the transactions on an aggregate level for all companies, and therefore aggregated PPAs from individual transactions in those cases where companies reported their transactions separately. We assume that managers are affected by the same factors, the size and sustainability of the internal buffer and motive for earnings concern, and perform the PPAs in the same way for all the acquisitions made during a year. Based on this assumption, the aggregate sum is representative for the separate PPAs. By making this adjustment, we minimize the risk that one company making several acquisitions and reporting them separately becomes over represented in the sample.

We manually entered the values for the purchase price, net tangible assets, intangible assets and goodwill for each observation into excel. When the information was available, we separated intangible assets into six categories: Patents, copyrights and licenses, Customer contracts and relationships, Technology and software, Trademarks and brands, Capitalized development costs and Other intangible assets. In those cases when the company did not specify their intangible assets into classes we included the value in the total value of intangible assets (see *Appendix C3*). For acquisitions that involve a purchase of less than 100% of the target, we have proportionally increased the purchase price and the value of goodwill so that they reflect a 100% stake. This is in order to improve comparability between PPA ratios, as partial acquisitions can be reported using both the purchased- and full goodwill methods.

6.3.2. Data collection and ratio construction for our independent variables

We have two different types of independent variable in our study: explanatory variables and control variables. The explanatory variables are those that we use for answering our two research questions, and are indicators for the size and sustainability of the internal buffer of the acquirer, and indicators for the earnings concern of the acquirer. The control variables are not the focus of our study but are included in order to avoid an omitted variables bias, and are indicators for previous stock return, acquisition, year and size of the acquirer. The construction of the independent variables and data

collection methods are based on the previous research by Ramanna and Watts (2011), Shalev (2007) and Zhang and Zhang (2007), with some modifications made when we have deemed it to be necessary. In line with these previous studies, we have assumed that the purchase price allocations are made in the beginning of the year, which explains why we have collected data on the opening balance of the year of an acquisition.

6.3.2.1 Indicators for the size and sustainability of the internal buffer

Market value in relation to book value of the acquirer

The indicator for market value in relation to the book value of the acquirer is constructed as the proportion of market value that is not explained by book value, labeled as *MB*:

$$MB_{OB} = \frac{(MV_{OB} - BV_{OB})}{MV_{OB}}$$

where MV_{OB} for each observation corresponds to the market capitalization of the acquiring firm as of January 1 for the year of the acquisitions, and BV_{OB} is the book value of the acquiring firm's equity at the same point in time. As mentioned in *Section 5.2.*, due to lack of data on CGU level, we use the firm level market value in relation to book value as a proxy for that of the CGU. This simplification was also made by Shalev (2007) and Zhang and Zhang (2007) in their similar studies.

In order to collect the data to construct our ratios for the size of internal buffer, we used the database Thomson Reuters Datastream. We calculated MV_{OB} by multiplying the closing share price of the last trading day with the number of outstanding shares, for both A- and B-shares. The share prices in Datastream are always reported in SEK whereas book values are in the company's reporting currency, which could be different from SEK. Therefore, we translated the book values reported in another currency into SEK to make the market and book values comparable.

Proxy for the number of Cash Generating Units

Shalev (2007) and Zhang and Zhang (2007) use the number of segments as a proxy for the cash generating units structure. They assume that managers to some extent are aware of in which CGUs the buffers are, and reason that a larger number of units should then give management more flexibility to allocate goodwill to units in which there are buffers to protect goodwill from impairment. Thus, a higher number of segments should, *ceteris paribus*, lead to a higher *GW/IV* since the company then faces less risk of having to acknowledge an impairment charge.

We construct a similar proxy for CGU structure, labeled *SEGMENTS*:

$$SEGMENTS = number\ of\ operating\ segments$$

Although we would prefer to use cash generating units for constructing the variable, we have to use operating segments as a proxy for them, since data on the number and size of cash generating units are not readily available. Companies are required by IFRS 8 *Operating Segments* to identify operating segments and disclose information about their revenues and profits in their annual reports. For all observations we have therefore been able to collect data from the companies' notes on operating segments. We double-checked all the notes to ensure the quality of our data collection. According to IAS 36 *Impairment of Assets*, a cash generating unit cannot be larger than an operating segment, as determined in accordance with IFRS 8 *Operating Segments* (IAS 36.96). Thus, since the number of CGUs always is equal to or larger than the number of operating segments, we are for some companies unfortunately understating the number of cash generating units to some extent. It is nevertheless the best proxy for CGUs given the availability of data. Worth noting is that IFRS 8 *Operating Segments* replaced the previous standard IAS 14 *Segment reporting* in 2009, which could have changed the classification of segments for some firms, reducing comparability between observations before 2009 and observations from 2009 and onwards.

Stock price volatility

Based on the simplifying assumption that market value is a good proxy for recoverable value, we use stock price volatility to capture the added impairment risk if recoverable value fluctuates. Shalev (2007) chose a similar approach and included stock return volatility as an indicator for the proximity of the acquirer to an impairment event. To obtain stock price volatility for our observations, we extracted the data directly from the database Thomson Reuters Datastream, and labeled the variable as *VOL*. The formula Datastream uses in its calculation of volatility is as follows:

$$VOL = 40 \times \frac{\sqrt{\frac{\sum_{i=0}^{n}(x-\bar{x})^2}{n}}}{\bar{x}} + 1$$

where x is the previous stock price at weekly intervals, $\bar{x}$ stands for the mean stock price for the year, and n is 52(i.e. the last year at weekly intervals). Volatility is calculated by dividing the company's standard deviation of weekly stock prices in a year with the mean stock price, and the result is multiplied by 40 to give a figure in the scale from 1 to 20. This corresponds to a standard deviation range of 0 – 50%, so a volatility rating of 10 indicates a standard deviation of 25%. The higher the value is, the higher is the volatility of the stock.

6.3.2.2 Firm characteristics related to the acquirer's earnings concern

Earnings response coefficient

A company's earnings concern, motivated by its managers' concern over investors' functional fixation on reported earnings, can be represented by a variety of indicators. In the previous studies made on PPA, different proxies have been applied. Shalev (2007) uses a company's P/E ratio, while Ramanna and Watts (2011) use a simplified version of an Earnings Response Coefficient (ERC), to capture how sensitive the firms' share prices are to their reported earnings. ERC measures how much the share price is affected when reported earnings are above or below analysts' earnings expectations. A strong relationship between a firm's reported earnings surprise and its stock return indicates that investors perceive reported earnings as important indicators of value, and use that information for trading up or down the share price correspondingly. We have chosen to construct ERC as a proxy for acquirer's earnings concern, and turn to the study by MacKinlay (1997) for inspiration when constructing our variable for ERC. In the extensive study by MacKinlay (1997), the focus is on investigating the relationship between a company's earnings announcements and stock returns by conducting an event study. In an event study, there is one event window for each earnings announcement. In every event window the abnormal return is calculated by comparing the actual stock return to the return, which would normally be expected for the share in that time period. Expected return can be estimated using for example the market model or Fama-French's three factor model. To obtain the ERC, the obtained abnormal returns are then regressed on the earnings surprises.

Given the focus and scope of our thesis, we simplify the model presented by MacKinley (1997) as the benefits of calculating expected return for each company would not compensate for the time required. Hence, for all companies we have assumed that the expected return in every event window is 0%, meaning that abnormal return equals actual return. We then obtain the variable labeled as *ERC_raw* by regressing the stock returns on the earnings surprises. The time period used for calculating the coefficients was 1 January 2009 to 1 October 2011. Most companies in our sample had eleven quarterly earnings announcements during that period. *ERC_raw* is hence constructed as follows:

$$Return = \alpha + \beta_1 \times Relative\ earnings\ surprise$$

$$ERC\_raw = \beta_1$$

In which, *Return* is the share price increase from three trading days before the quarterly earnings announcement to five days after it. If dividends have been paid out during the event window the dividends per share have been added back to the share price. Share price data and dividends per share

were both extracted from Datastream, whereas the dates for the quarterly earnings were found on the company websites, most commonly in the press release archive.

Relative earnings surprise stands for relative surprises that are constructed using consensus analyst estimates on net income for the next quarterly report to be published, and the companies' actual net income from those quarterly reports. Both expected quarterly net incomes and actual net incomes have been extracted from Datastream. The difference between actual and expected net income has been divided with the expected income:

$$Relative\ earnings\ surprise = \frac{Actual\ net\ income - Expected\ net\ income}{Expected\ net\ income}$$

To avoid possible distortion of outliers we employed the principles that the relative earnings surprises had to be in a range from -100% to 100%, and returns -20% to 20%. If not being within these ranges, the numbers were set to be at the ends of the admitted range. For each company we then ran separate regressions. A high value of *ERC_raw* implies that there is a strong relationship between relative surprises and returns and consequently more important for that company to present better than expected earnings, as the share price is affected accordingly. Based on *ERC_raw*, the companies have finally been split into three groups; low, medium and high. This variable, which can assume three different values, is the variable we use in our main regression as a proxy for acquirer's earnings concern, which we label as *ERC*.

Frequency of meeting analyst estimates

Shalev (2007) constructs a variable for the frequency of exactly meeting analysts' estimates, as a proxy for the acquirer's earnings concern. He hypothesizes that a higher frequency of exactly meeting analysts' estimates reflects a willingness to do more in order to meet earnings targets, indicating that managers are more concerned over their reported earnings. In line with this reasoning, we construct a variable to measure the frequency of meeting analyst forecasts, labeled as *MEETEST*. "Meeting estimates" is however a rather vague definition, as companies rarely report earnings that are exactly the same as the analysts' consensus estimates. When constructing *MEETEST*, our definition is that companies meet analyst forecasts when they report earnings that are 0 to 30% higher than the forecasts. We used the same data on relative earnings surprises that we collected to construct the variable *ERC* when we construct *MEETEST*. For every company, we counted the number of earnings surprises that were within the range of 0% to 30% higher than the analyst consensus estimate, and divided that by the total number of estimates. This measure can assume a value between 0 and 1, illustrated on the next page. A number closer to 1 means that the company more frequently "meets" analyst estimates.

$$MEETEST = \frac{No.\ of\ earnings\ surprises\ from\ 0\%\ to\ 30\%}{Total\ no.\ of\ earnings\ surprises}$$

6.3.2.3 Control variables

Recent share price development

In *Section 3.2.*, we described the efficient market hypothesis (EMH), which asserts that a company's share price at all times, or over time if it is the semi-strong or weak version, reflects all the available information about the company. The EMH was contrasted with the functional fixation hypothesis, which assumes that too many investors fail to understand the true cash flow implications of accounting data, in order for more sophisticated investors to correct for their mispricing. This explains why stock market prices are not efficient. But there are other explanations to why market values do not always coincide with economic values, for example the theory that investors do not always act on their beliefs about corporate value but by how they believe that other investors will act. Throughout history, there have been plenty of examples on shares trading at P/E multiples so high that no expected growth rates or risk premiums within reason could justify those price levels (e.g. Shleifer & Summers, 1990). In a study by Poterba and Summers (1987), the authors find that components considered as transitory account for the majority of the variance in monthly stock returns. They also find consistent evidence that stock returns are negatively serially correlated over long horizons, meaning that they fluctuate up and down in cycles. Based on these findings, we expect that the discrepancy between a company's market- and book value can be affected by a recent share price increase which is not motivated by a corresponding increase in the fair- or recoverable value of the company, and which is likely to be reversed in the next time periods. We have therefore constructed a variable that should control for this kind of temporary fluctuation in share price that is not likely to be related to any changes in the fair- or recoverable value of the company. We calculate the variable as follows, and label it *Return*:

$$Return_{average} = \left(\frac{(P_{t-2} - P_{t-1)+} Div_{t-2}}{P_{t-1}} + \frac{(P_{t-1} - P_{t)+} Div_{t-1}}{P_t} \right) /2$$

Where P_{t-2} stands for the stock price two years prior to the acquisition, Div_{t-2} corresponds to the dividend for the stock two years prior to the acquisition, P_{t-1} stands for the stock price one year before the acquisition and Div_{t-1} stands for the dividend for the stock one year before the acquisition. We choose a time frame of two years as Poterba and Summers (1987) in their study shows that the positively autocorrelated time periods often extend over a couple of years. If studying return in isolation without taking into account the impact of other variables, we would expect a positive effect *GW/IV* as an increasing market value indicates that the size of the internal buffer is increasing as well. But when we include *MB* in the regression model, we expect a negative sign since *MB* is already used

as proxy for the buffer. A high value on *RETURN* signals that the buffer indicated by *MB* is overstated, which consequently reduces expected allocation to goodwill.

Acquisition year

We included year dummies indicating which year the acquisition occurred (variables $Year_1$-$Year_5$), to control for differences in the allocation to goodwill in PPA that are due to market conditions rather than factors related directly to firm characteristics. Further, since IFRS 3 has been in use from 2005, it is also probable that companies have improved how they apply the standard over our sample time period, which we want to control for by constructing year dummies. In order to avoid perfect collinearity between our year dummies, we drop $Year_3$ from our regression so that it becomes the baseline.

Industry classification

Previous studies have shown that there could be differences in the allocation of the purchase price due to industry factors (e.g. Ernst & Young, 2009; KPMG, 2010; Shalev, 2007; Zhang and Zhang, 2007). We want to control for this and have therefore grouped our observations into different industries according to the Industry Classification Benchmark (ICB). We chose to use this classification because it is the one used by Nasdaq OMX Stockholm, where our sample observations are listed. Given our sampling decision to exclude companies in the *Financials* industry, we have nine different industry dummies ($Industry_1$-$Industry_9$, see *Appendix C.1. Variable definition* for the list of industries and codes). To avoid perfect collinearity, we dropped *Oil and gas* ($Industry_7$) from our regression so that it becomes the baseline. Also, since we do not have any observations for *Utilities* ($Industry_8$), we dropped it from our regression.

Size

Finally, we have included a control variable for acquirer size since we expect that larger companies have more resources and are better equipped to perform a PPA properly, indicating that they are able to identify more intangible assets. On the other hand, a larger company can afford more expensive acquisitions, which would increase the allocation to goodwill, since the goodwill item is likely to subsume the overpayment. It is very probable that firm size is also correlated with some of the explanatory variables, for example *MB* and *VOL*, increasing the importance of it in order to avoid an omitted variables bias. To construct our variable for the size dimension, labeled *SIZE*, we have calculated the enterprise value of our observations as of January 1, and then used the logarithm of it to reduce the effects of outliers. The data, i.e. market cap and net debt, is collected from Thomson Reuters DataStream. We expect a negative sign since we think that the likelihood that larger firms

have more resources to carry out a proper PPA, outweigh that larger companies can pay higher premiums.

6.4. Specification of the regression model

6.4.1. The regression model

We use a multivariate pooled OLS regression, complemented with year dummies, to test the hypotheses outlined in *Section 5.2.*

$$GW/IV_i = \beta_0 + \beta_1 \times MB_i + \beta_2 \times SEGMENTS_i + \beta_3 \times VOL_i + \beta_4 \times ERC_i + \beta_5 \times MEETEST_i + \beta_6 \times RETURN_i + \beta_7 \times Year_1 + \beta_8 \times Year_2 + \beta_9 \times Year_4 + \beta_{10} \times Year_5 + \beta_{11} \times Industry_1 + \beta_{12} \times Industry_2 + \beta_{13} \times Industry_3 + \beta_{14} \times Industry_4 + \beta_{15} \times Industry_5 + \beta_{16} \times Industry_6 + \beta_{17} \times Industry_9 + \beta_{18} \times SIZE_i + \varepsilon_i$$

[Regression 1. Main regression]

A summary of all variables is provided in *Appendix C.*, whereas more detailed explanations are in *Section 6.3.*

6.4.2. Choosing the regression model

We choose a pooled OLS regression but have also investigated if a panel data model would improve the accuracy of the findings. A pooled OLS regression model hinges on the assumption that the coefficients and intercepts are the same for all firms, with the variance in independent variables, rather than that across forms, explaining the variance in *GW/IV*. If we suspect that differences across companies strongly affect *GW/IV*, a panel data regression would be more correct, even though we are not interested in following any of the firms over time. When looking into the possibility for us to use a panel data regression instead we are confronted with two critical decisions, should we use balanced- or unbalanced data, and should we use fixed- or random effects?

Generally, unbalanced data is regarded as inferior to balanced data as the sample heterogeneity in an unbalanced data set may reduce comparability between variables. For example, the coefficient for a year dummy in an unbalanced data set can be largely affected if that year contains different companies from those companies included in the other years, which has nothing to do with a real difference in the population but only is an effect of sampling. (Wooldridge, 2009) For a panel data regression, we would therefore ideally only use the companies that appear all five years in order to have a balanced data set (i.e. 16 companies out of 62 companies). However, since our sample consists mostly of observations from companies that do not have observations for all five years (115 out of 195 observations), we would only be left with 80 observations if we would restrict ourselves to use a

balanced set of data. Another issue is that the sample would then only consist of large companies, as it is only the larger companies that perform acquisitions on a yearly basis, making potential findings difficult to extend to a more diverse population.

To use a random effects panel data regression, one has to assume that the variation across companies to a large extent is uncorrelated with the independent variables included in the model. If a random effects model is applied but the assumption is wrong, i.e. there are time-invariant and unique effects that are correlated with the independent variables, then the company effects become subsumed in the error terms, leading to biased coefficient estimates. In such a case, a fixed effects model would be preferable since it would not lead to such biased estimators. A fixed effects model however has a major disadvantage in that the standard errors of the coefficients increase, making it difficult to observe any significant results for the independent variables, since the company fixed effects already explain most of the variation in the dependent variable. This is because a fixed effects model requires the estimation of a parameter for each company's coefficient. Consequently, what a fixed effects model does is that it implicitly constructs a full set of company dummies, whereas a random effects model only estimates the mean and standard deviation of the company distribution. Since we have 62 different companies in our sample but only 195 observations, we would lose an extreme amount of degrees of freedom with a fixed effects model.

We prefer to use a pooled OLS model. This is because we are not interested in isolating the firm characteristics from the firm identities. We want to see if firms with high or low values on the various explanatory variables tend to allocate more, not investigate if individual firms allocate more when their values on the explanatory variables change over time. Controlling for firm-specific time invariant effects is furthermore considered as unnecessary and difficult as the majority of the firms have only three or less observations, which implies that firm-effects for them are of very limited usefulness. Controlling for firm-specific time invariant effects would also prove very difficult to do in practice due to the different drawbacks of the fixed- and random effects panel data models.

7. Results

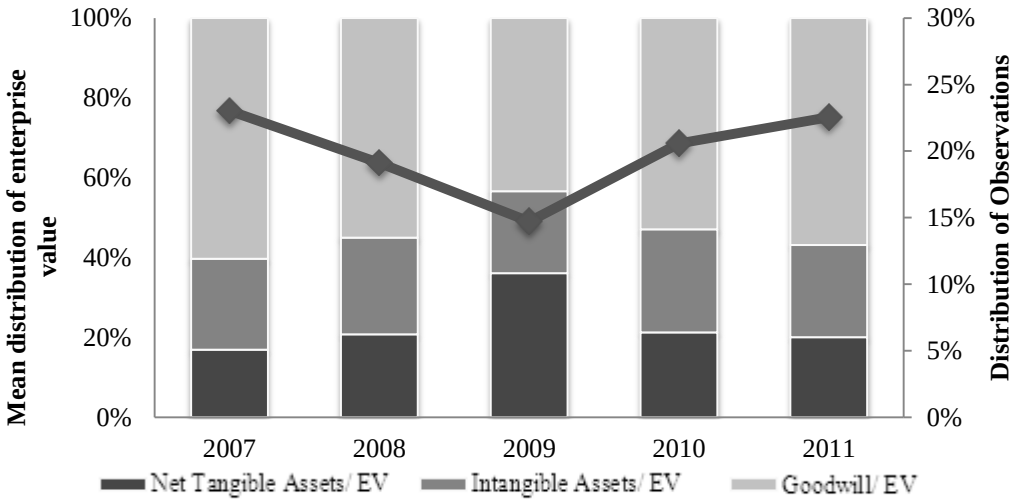
In this section we will first present descriptive statistics of the data we have collected in order to construct the dependent and independent variables. We will then describe how the different variables correlate with each other. Finally, we will present the results from our main regression.

7.1. Descriptive statistics

7.1.1. PPA by different categories

Our total sample consists of 204 observations of purchase price allocations (PPAs) performed during the period of 2007-2011 by 66 companies, currently classified as either large- or mid cap on Nasdaq OMX Stockholm. A list of our sample companies is found in *Appendix B.* We will in the following paragraphs present the data collected on the average allocation of the purchase price by the following categories: acquisition year, industry and the size of the acquirer. We will also present the average purchase price allocations performed by transaction intensive companies. For each category, we will present the average allocation of the purchase price to the following asset categories: net tangible assets (NTA), identified intangible assets (IA) and goodwill (GW) in relation to the enterprise value (EV) of the target as well as IA and GW in relation to the intangible value (IV).

By acquisition year

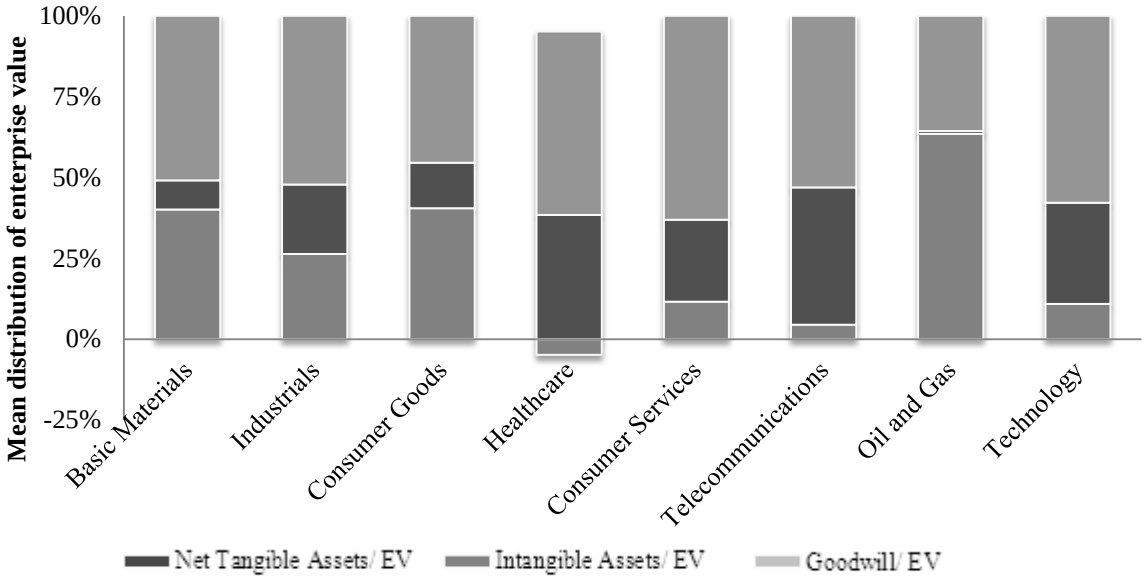


Year	Obs.	NTA / EV	IA / EV	GW / EV	IA / IV	GW / IV
2007	23%	17%	23%	60%	30%	70%
2008	19%	21%	24%	55%	30%	70%
2009	15%	36%	20%	44%	41%	59%
2010	21%	21%	26%	53%	31%	69%
2011	23%	20%	23%	57%	29%	71%

Exhibit 7. Average allocation of the purchase price to different asset categories per year.

In *Exhibit 7* we notice that the average allocation to goodwill, in relation to both the enterprise value[6] and intangible value, varies over the years in a U-shaped pattern. The number of observations changes in a very similar pattern, as it decreases from 47 observations in 2007 to 30 observations in 2009, but then increases to 46 observations in 2011.[7] *IA/EV* is quite stable over the years, whereas the allocation to net tangible assets follows an inverted U-formed pattern. It is noteworthy that *GW/IV* remains much more stable over the years than *GW/EV*, indicating that market conditions have greater effect on valuation of net tangible assets than on intangible assets.

By industry



Industries	Obs.	NTA / EV	IA / EV	GW / EV	IA / IV	GW / IV
1: Basic Materials	3%	40%	9%	51%	17%	83%
2: Industrials	56%	26%	21%	53%	32%	68%
3: Consumer Goods	10%	40%	14%	46%	27%	73%
4: Healthcare	7%	-5%	43%	62%	43%	57%
5: Consumer Services	13%	12%	25%	63%	35%	65%
6: Telecom	4%	4%	43%	53%	46%	54%
7: Oil and Gas	1%	63%	1%	36%	5%	95%
9: Technology	6%	11%	31%	58%	44%	56%

Exhibit 8. Average allocation of the purchase price to different asset classes per industry belonging of the acquirer

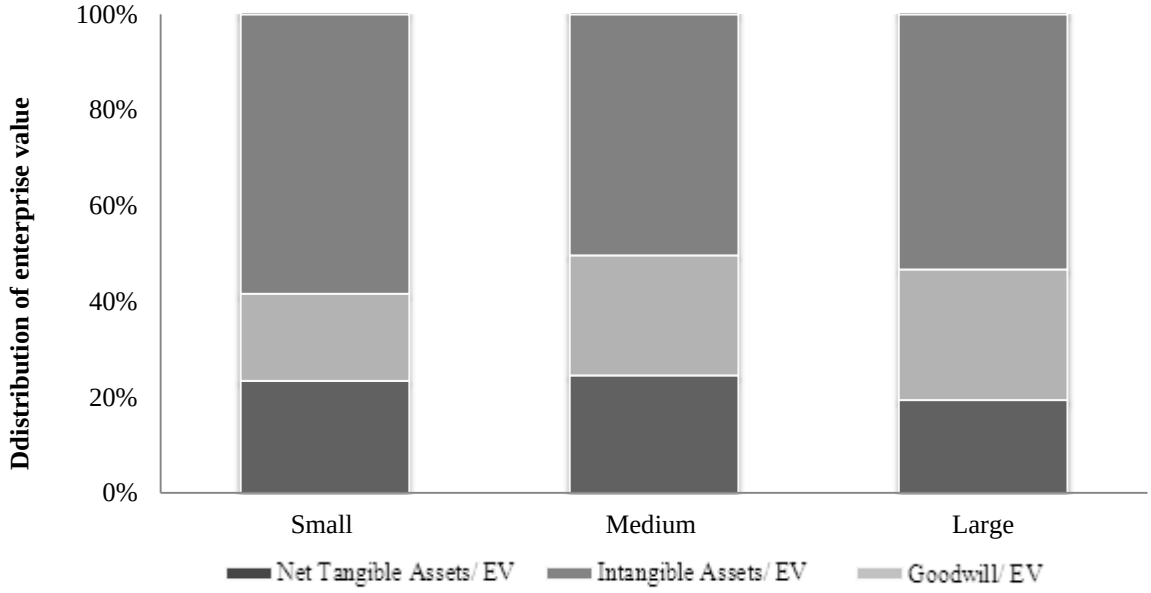
When investigating the grouping by industry based on the companies' ICB codes, we see in *Exhibit 8* that the observations have been quite disproportionately split between the different industry groups. A

[6] The calculation of EV is described in *Section 8.2.3. The dependent variable and impact of asset structures*
[7] The relationship between PPA and transaction activity is elaborated upon in *Section 8.2.2. Year effects*

majority of our observations, 56%, are classified as *Industrials*, whereas *Oil and Gas* only contains 1% of the observations. We did not have any observations at all for *Industry 8 Utilities*.

As seen in *Exhibit 8*, average PPA ratios vary considerably between industries. Goodwill accounts for a mere 36% of target enterprise value for firms within *Oil and Gas*[8] but 63% for firms within *Healthcare* and *Consumer Services*. The proportion allocated to net tangible assets is negative when tangible assets are lower than liabilities, which is the case for *Healthcare*. When goodwill is put in relation to intangible value rather than enterprise value, the allocation ratios look very different. Although *Oil and Gas* has the lowest *GW/EV* in the sample, it has the largest *GW/IV*. Firms classified as *Telecom* have the lowest *GW/IV* with 54%, thus allocating approximately the same amount to goodwill and identifiable intangible assets.

By size



Size	Obs.	NTA / EV	IA / EV	GW / EV	IA / IV	GW / IV
Small	33%	23%	18%	59%	28%	72%
Medium	32%	25%	25%	50%	35%	65%
Large	35%	19%	27%	54%	33%	67%

Exhibit 9. Average allocation of the purchase price to different asset classes by the size of the acquirer

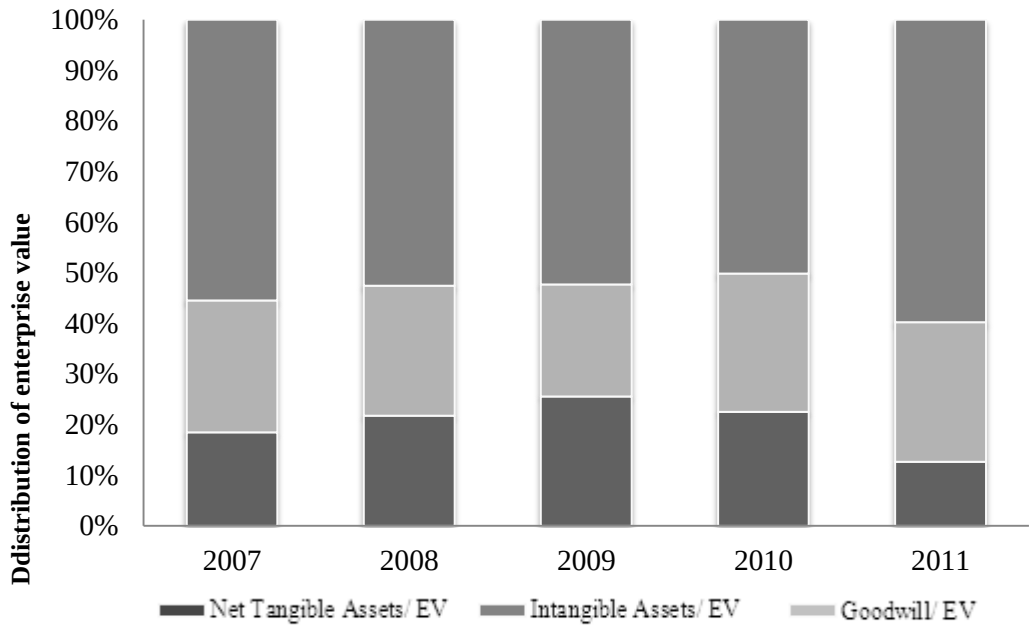
To see how allocation ratios differ depending on size, we divided our observations into three groups based on *SIZE*. As seen in *Exhibit 9*, regardless of whether goodwill is put in relation to intangible value or to enterprise value, we find that small companies tend to allocate slightly more to goodwill than both medium-sized and large companies do, whereas large companies allocate more than

[8] Note that the category *Industry 7* in the main regression only contains the company, Alliance Oil, which has an allocation ratio for *GW/IV* of 1.

medium sized. Hence, there appears to be a slightly U-shaped relationship between size and allocation. This is in line with what we expected, as we reason that there should be effects of having resources in place to perform a PPA properly, but also the opposing effect of large companies being more able to afford higher premiums.

Although there is no linear relationship for goodwill allocation between the different sizes there appears to be such a relationship when looking at allocation to identifiable intangible assets in relation to enterprise value. Large companies have the highest amount of identifiable intangible assets, followed by medium-sized and small companies. Larger companies have the lowest relative amount of net tangible assets.

Transaction intensive companies



Balanced panel ***(Total sample)***	**Obs.**	**NTA / EV**	**IA / EV**	**GW / EV**	**IA / IV**	**GW / IV**
2007	16	18%	26%	56%	33%	67%
	47	*(17%)*	*(23%)*	*(60%)*	*(30%)*	*(70%)*
2008	16	22%	26%	52%	29%	71%
	39	*(21%)*	*(24%)*	*(55%)*	*(30%)*	*(70%)*
2009	16	26%	22%	52%	30%	70%
	30	*(36%)*	*(20%)*	*(44%)*	*(41%)*	*(59%)*
2010	16	23%	27%	50%	37%	63%
	42	*(21%)*	*(26%)*	*(53%)*	*(31%)*	*(69%)*
2011	16	13%	28%	59%	31%	69%
	46	*(20%)*	*(23%)*	*(57%)*	*(29%)*	*(71%)*

Exhibit 10. Average allocation of the purchase price to different asset categories made by transaction intensive companies compared to that of the total sample

In our sample, 16 companies made acquisitions every year during the period 2007-2011.[9] We look at the allocation ratios for this group of companies separately to see if a similar pattern can be observed as the one for our total sample. From *Exhibit 10*, we note for the ratio *GW/EV*, the year differences are much smaller for the transaction intensive companies than for our total sample, with the ratio ranging from 50 to 59% rather than from 44 to 60%. The same effect is present for *GW/IV*, where the range is from 63 to 71% instead of from 59 to 70%. Surprisingly enough, the differences in allocation ratios between the balanced panel and the total sample increase in 2009, which is the year in which the smallest number of unbalanced observations has been added. In that year the more transaction intensive companies appear to reduce their allocation to goodwill more than the other companies do.

7.1.2. *ERC* and *MEETEST*

To construct the proxies for the earnings concern of the acquirer, *ERC* and *MEETEST*, very cumbersome data collection was required. The various steps in the collection process are described in *Section 6.2*. As mentioned in that section, we could not obtain all the necessary information to construct the variables *ERC* and *MEETEST* for four companies[10]. This resulted in a total sample of 62 companies. Since *Appendix C2.* does not give a very good view of how this data look, we present some more detailed information about the data collected related to those two proxies in *Exhibit 11* below:

No. of quarterly results	No. of earnings surprises that are		No. of returns that are		No. of slope coefficients that are		No of times actual NI is within the range of expected NI	
	Positive	Negative	Positive	Negative	Positive	Negative	0 to -30%	0 to 30%
639	327	312	334	288	41	19	196	233

Exhibit 11. Summary of the number of quarterly results, earnings surprises, returns, slope coefficients and instances of reported quarterly earnings being within the selected range of analyst consensus estimates of quarterly net income

There are great differences between companies regarding the number of times that reported net earnings fall within the range 0- 30% from analyst consensus estimates. Some companies are within the selected range every quarter, e.g. Assa Abloy. Other firms are never within the range, e.g. Swedish Orphan Biovitrum.

Regarding the other independent variables, we have provided a summary of descriptive statistics containing means, standard deviations, medians etc., which can be found in the *Appendix C2.*

[9] These 16 companies have been bolded in *Appendix B.*
[10] These four companies have been marked with asterisk (*) in *Appendix B.*

7.2. Correlations

As an initial step when we investigate the relationship between our dependent variable, the purchase price allocation, and the explanatory variables, we examine the pair-wise correlations between the different variables. Examining correlations between the different variables provides interesting information about how they co-move with each other. Further, learning about the individual relationships between the independent variables is also important, since it may cause problems for some of the coefficient estimates if the variables are too correlated. In *Section 8.1.* we discuss whether this is the case in our regression model. We present a summarizing table of the pair-wise correlations for all relevant variables, except for the *Year* and *Industry* dummies, in *Appendix D1.*, and we will now highlight some of the most interesting findings from that table.

There is a strong positive correlation between our dependent variable, *GW/IV* and the explanatory variable *MB* (15%), which is significant at a two tailed, 5% level. There are however no other explanatory variables that are significantly related with *GW/IV*. The lack of strong correlations could indicate that some variables included in our model are irrelevant. Among the independent variables we however observe some strong correlations, in line with our expectations. The strong correlation between *MB* and *RETURN* (35%) is intuitive since a share price increase automatically leads to an increase in *MB* unless there is an offsetting increase in book value. Their strong relationship however supports our decision to include *RETURN* in the regression model, as the main purpose of *RETURN* is to control for that a high *MB* can be due to an inflated share price rather than accounting conservatism. The relationship between *MB* and *MEETEST* (21%) suggests that companies that frequently meet analysts' expectations are rewarded by investors with larger market to book values. The relationship between *MB* and *VOL* (-25%) indicates that volatile companies are punished by investors with lower market values, whereas the relationship between *VOL* and *MEETEST* (-20%) is most likely due to that volatile companies have more unpredictable earnings.

Worth noting is that the correlation coefficients discussed above should however be interpreted with care, since they do not reveal any information of whether there is a causal relationship between the variables. They also do not provide any information about the steepness of the slope of the relationship, i.e. how much the change in a variable affects another variable. Furthermore, to find out how a certain explanatory variable relates to the purchase price allocation variable, the explanatory variable has to be put in relation to other independent variables in a regression model as there might be other factors that are causing the relationship. Therefore we can not only look at correlation coefficients to test our hypotheses but perform a regression model which we present in *Section 7.3*.

7.3. Regression

In order to test the impact of our selected explanatory variables on Swedish companies' purchase price allocations we have performed a pooled OLS regression, which is defined in *Section 6.4.* As described in *Section 6.3*, we have used *2009* (*$Year_3$*) and *Oil and gas* (*$Industry_7$*) as baseline for our main regression, since including them would lead to perfect collinearity. The industry group of *Utilities* (*$Industry_8$*) has also been omitted since there are no observations in that group. The data on which we base this regression consist of 195 observations between 2007 and 2011, from 62 stock-listed Swedish firms classified as large- or mid cap. The summary of the regression output can be seen in *Exhibit 12* below:

Regression 1. Main regression
R^2=0.1594, Adjusted R^2=0.0734

Variables	Coefficient	Std. error	t-value	P>|t|	Sig.[11]
Explanatory variables					
MB	0.143	0.06	2.27	0.024	**
SEGMENTS	0.016	0.01	1.22	0.223	
VOL	0.001	0.01	0.12	0.901	
ERC	-0.072	0.02	-2.92	0.004	***
MEETEST	0.109	0.09	1.18	0.238	
Control variables					
RETURN	-0.100	0.07	-1.53	0.128	
Year1	0.122	0.07	1.69	0.092	*
Year2	0.133	0.07	1.96	0.051	*
Year4	0.047	0.06	0.73	0.469	
Year5	0.111	0.08	1.42	0.159	
Industry1	-0.238	0.26	-0.9	0.371	
Industry2	-0.320	0.25	-1.3	0.195	
Industry3	-0.254	0.25	-1.01	0.314	
Industry4	-0.513	0.25	-2.04	0.043	**
Industry5	-0.421	0.25	-1.67	0.096	*
Industry6	-0.547	0.26	-2.08	0.039	**
Industry9	-0.352	0.26	-1.35	0.178	
SIZE	-0.018	0.01	-1.49	0.139	
Intercept	1.335	0.37	3.61	0.000	

Exhibit 12. Regression output for our main regression – *Regression 1.*

As can be seen in *Exhibit 12*, the coefficient for *MB* is positive and significant at the 5% level. This indicates that Swedish companies with highest discrepancy between market- and book values of

[11] * = significant at 10%, ** =significant at 5%, *** = significant at 1%

equity allocate more to goodwill than to identifiable intangible assets, than what would otherwise be expected. This is in line with our expectations. The negative sign for *ERC* is significant down to the 1% level, and indicates that companies for which investors react more strongly to their earnings surprises allocate less to goodwill than otherwise expected. This result contradicts our expectations and thereby merits further discussion in *Section 9.1*.

SEGMENTS and *MEETEST* are both of the expected signs. Their p-values are however slightly too high for us to be able to conclude that these effects hold for the entire population. The positive sign on *VOL* is not what we expected, but as the sign is not even significant at a 90% level, we cannot make any conclusions at all regarding the effect of it.

Among the control variables, some of the year- and industry dummies have effects on the purchase price allocation which are significant on the 5 or 10% level. In 2007 and 2008, the allocation to goodwill was significantly higher than in 2009, also after the inclusion of the explanatory variables. If a company is classified as *Healthcare, Consumer Services* or *Telecom* it is expected to allocate less to goodwill in relation to intangible assets than if classified as *Oil and Gas* (*Industry*$_7$)[12].

The effects of *RETURN* and *SIZE* are not statistically significant, although none of them are far above the 10% level. The negative sign of *RETURN* is what we expected even though we saw that it was positively correlated with *GW/IV*. As *RETURN* is strongly correlated with *MB* (35%) which has a significantly positive impact on *GW/IV,* it seems like *RETURN* is to at least some extent effective in controlling for that *MB* can be overstated due to factors unrelated to the internal buffer, as it shifts sign when it is included together with *MB.* The negative effect of *SIZE* is also what we expected.

The regression has an R-square value of 0.159. This indicates that only 15.9% of the sample variation in *GW/IV* is explained by the variables included in the model. Hence, it appears that the two types of firm characteristics only explain a small part of the variance in the purchase price allocation ratio. According to Wooldridge (2009), a low R-square does not mean that that a regression is useless. It can still be that the regression accurately measures the *ceteris paribus* relationship between a dependent variable and the independent variables. We are therefore not very worried of the low explanatory power of the regression.

[12] Note that the category *Industry 7* in the main regression only contains the company, Alliance Oil, which has an allocation ratio for *GW/IV* of 1.

8. Testing and verifying the results

In this section, we will first test our main regression for autocorrelation, multicollinearity and heteroskedasticity. Then, we will assess the robustness of the results from our main regression, through modifying variables in various ways, to gain more support for the accuracy of our findings and deepen our understanding of how different factors affect PPA ratios.

8.1. Statistical tests of the OLS regression model

8.1.1. Autocorrelation

Since our data includes a time dimension, there is a risk that we will encounter a problem of autocorrelation. Such a problem arises if the values, for a certain firm's dependent and independent variables, in one time period are correlated with the corresponding values in other time periods. Autocorrelation does not lead to biased coefficients, but may lead to underestimation of the standard deviation of the estimates, which would lead to overestimated t-values. With overestimated t-values the risk increases that we reject the null hypothesis on false grounds, thereby committing a type I error. (Wooldridge, 2009)

Since the time series dimension in our data set is very small, only five years, we should not encounter a problem with autocorrelation. We cannot test for autocorrelation in Stata since there must be more than five different values in the times dimension in order for Stata to perform the test. Given our relatively small time series dimension and large cross-sectional dimension we do not see it worthwhile to proceed further in trying to detect and adjust for potential autocorrelation.

8.1.2. Multicollinearity

Since we have many independent variables there is risk for multicollinearity in our data set. Multicollinearity occurs when one variable can be expressed as an almost (but not perfectly) linear function of one or more independent variables. Such a situation is problematic as some of the variables then capture the same effect on the dependent variable. Multicollinearity can cause problems in estimating regression coefficients, since a high degree of a linear relationship between two independent variables increase the variance terms for the coefficients of the two variables involved. The best case for estimating the coefficient of an independent variable is when that variable cannot be predicted at all by the other independent variables in the model. The risk that there is multicollinearity increases the more one variable can be explained by the other variables. (Wooldridge, 2009)

To investigate the issue we study the variance inflation factors (VIF), which are presented in *Appendix F*. A high VIF for an independent variable indicates that it to a large extent is explained by

other independent variables. There is no universal, critical VIF revealing that multicollinearity is a problem, but a VIF of ten is often chosen in practice. (Wooldridge, 2009) In the table, *Appendix F.*, we note that only industry dummies have values exceeding ten, which is not problematic since we only use them as control variables in order to better isolate the effects of the explanatory variables. All other VIFs are low and we can therefore rule out that multicollinearity is an issue.

8.1.3. Heteroskedasticity

An underlying assumption for an OLS regression model is that the variance of the error term (the difference between an observation's actual and predicted value on the dependent variable) is constant, regardless of the values of the independent variables. Constant variance is called homoscedasticity. If the variance is a function of the independent variables the error term exhibits heteroskedasticity. Heteroskedasticity poses severe problems for an OLS regression, even though it does not make the estimated coefficients biased. The problem is that the standard errors, used for constructing t-statistics and p-values, can no longer be trusted. If using t-statistics from a heteroskedastic OLS regression, there is large risk of committing type I- or type II-errors. With known heteroskedasticity, there may be better estimators than the OLS-estimators. (Wooldridge, 2009)

To investigate if we have a problem with heteroskedasticity, we perform the Breusch-Pagan heteroskedasticity test. In such a test we regress the squared residuals from our main regression on the independent variables, extract the R-square value and multiply that with the number of observations to obtain a LM-statistic. With an LM-statistic of 19.1 and 18 degrees of freedom, the LM-statistic is not significant at any reasonable level. (Wooldridge, 2009) We therefore fail to reject the null hypothesis of constant variance, which means that we do not appear to have a problem with heteroskedasticity.

8.2. Robustness tests and sensitivity analysis

8.2.2. Year effects

In our pooled regression model we use *Year*-dummies to capture the various effects related to the year for which there is an acquisition. These *Year*-dummies are included to control for factors that are unrelated to the two types of firm characteristics we want to investigate, but that can affect the allocation to goodwill. Year-effects could for example capture differences in market sentiment over the years, or that firms have improved their learning of performing PPAs over time. We conduct several tests where we test the results obtained from our main regression for year effects, which we describe in the paragraphs below.

Since the *Year*-dummies are specified in an additive form in our main regression, the coefficients indicate that allocation of purchase price differs between the years, when all other variables are held

constant. We first tried a regression in which we multiplied the *Year*-dummies with *MB* to see if the marginal effect of *MB* differs between years, but we did not observe any year-dependent marginal effects for *MB*.

We also tried to run our main regression entirely without *Year*-dummies. The regression output for this regression is found in *Appendix E2. Regression 2 - Main regression excluding Year-dummies.* From this regression output, we note that without the *Year* -dummies, *MB* is slightly more positive and highly significant at P-value of 0.3% *ERC* remains the same without the inclusion of the *Year*-dummies, being significantly negative at P-value of 0.4%. This means that the *Year* dummies affect the coefficients on *MB* to a large extent, since the result becomes more significant without their inclusion (P-value of 0.3% compared to P-value of 2.4% in our main regression). Furthermore, we investigate the year effects by regressing *GW/IV* on the *Year*-dummies only. The regression output for this regression is found in *Appendix E2. Regression 3 - GW/IV and Year-dummies*. From this output, we observe that all *Year*-dummies have a significant impact when run separately, indicating that *MB* would loose much of its significance due to the inclusion of the *Year*- dummies. These findings made us curious and we decided to investigate the year effect further to see what lies behind it.

The descriptive statistics in *Exhibit 10* in *Section 7.1.* show that 2009 was the year in which *GW/IV* was on average considerably lower than in the other years (59% compared to 69-71%). It was also the year in the sample with the lowest number of transactions (30 observations compared to 39-47 observations). From this we suspect that there is a relationship between the transaction activity and the PPA-ratios. We hypothesize that a more active transactions market is characterized by higher demand, which would likely lead to higher purchase prices, increasing the risk for overpayment by the acquirer. Consequently, this increase in purchase price for target firms will likely lead to larger proportions allocated to goodwill in purchase price allocation. This is because goodwill, measured as the residual, when identified net assets are subtracted from the purchase price, would subsume any overpayment (component 6 of goodwill, *Exhibit 3* in *Section 3*). We therefore create a proxy to capture that company prices might be high in certain years, labeled as *INDEXRET*. We define this variable as the annual return of the stock market index of all shares traded on Nasdaq OMX Stockholm (OMXSPI) during the year of an acquisition. As described in *Section 6.3.*, we assume that acquisitions are made in the beginning of the year when we constructed all other variables. Therefore, we construct *INDEXRET* to capture the market return during the twelve months subsequent to the acquisitions, in order to show whether market prices are traded up or down, which will be an effect of whether market prices are seen as low or high in the beginning of the year. We expect that a low *INDEXRET* indicates that companies' market values might be high in the beginning of a certain year, leading to higher purchase prices and risk for overpayment, meaning that a larger proportion would be allocated to goodwill. To construct the variable we have extracted the data for the annual return of the

stock market index for the five years 2007-2011 from Datastream. In *Exhibit 13*, we plot the five annual returns against the average *GW/IV*, and note that there is a strong relationship between *INDEXRET* and *GW/IV*. The strong relationship indicates that a large part of the year effect may be explained by fluctuations in price levels in the market. For the years in which share prices are decreasing over the year, allocation to goodwill tends to be higher.

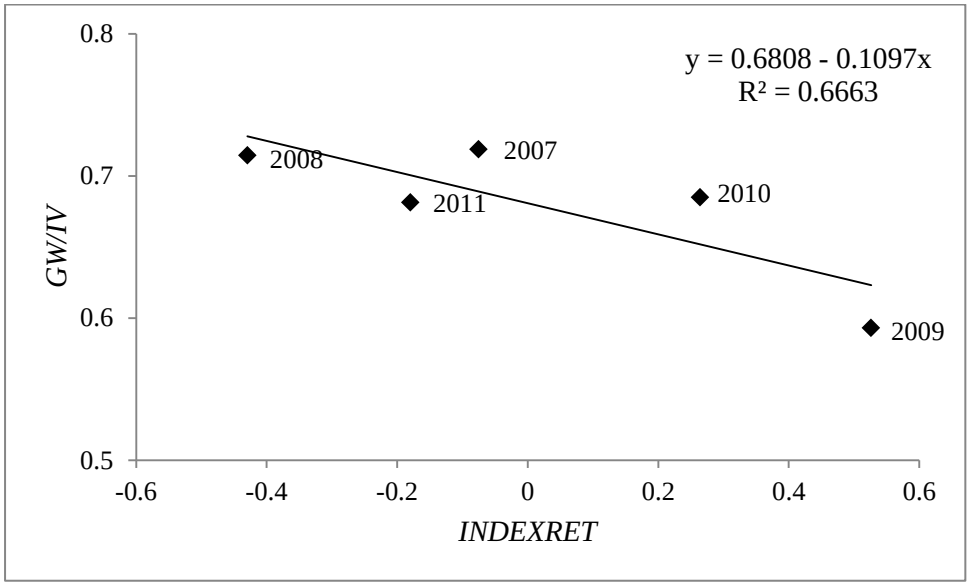


Exhibit 13. *GW/IV* plotted against *INDEXRET*

When looking at the correlations found in *Appendix D1.*, we find that all correlation coefficients between *INDEXRET, MB* and *RETURN* are highly significant. *RETURN* and *INDEXRET* have a correlation coefficient of -0.5, which indicates that increasing stock prices over a two-year period are typically followed by declining stock prices[13]. This is in line with the mean reversion studies we described when explaining the reasoning behind *RETURN* in *Section 6. MB* is strongly correlated with both *INDEXRET* (-0.3) and *RETURN* (0.3), meaning that MB is related to both the previous and subsequent stock price development. To investigate the effect of *INDEXRET* on our results from the main regression, we replace the *Year*-dummies with *INDEXRET*. The regression output for this regression is found in *Appendix E2. Regression 4 – Main regression where Year-dummies are replaced with INDEXRET*. From that regression, we note that *MB* remains highly significant (P-value of 1.2%), whereas *INDEXRET* itself is significantly negative (P-value of 4.3%). *ERC* remains almost the same when replacing the *Year*-dummies with *INDEXRET*, being significantly negative at P-value of 0.3% (compared to significant at P-value of 0.4% in our main regression).

[13] Note that *RETURN* is constructed on firm level whereas *INDEXRET* is on index level.

Finally, we compare the results from our main regression, found in *Appendix E1. Regression 1 - Main Regression*, with the results from the two other versions of the main regression, found in *Appendix E2. Regression 2 – Main regression without year dummies* and *Regression 4 – Main regression where Year-dummies are replaced with INDEXRET*. We find that the coefficient for *MB* is most significant when neither *Year* dummies nor *INDEXRET* are included (P-value of 0.3%), less so when *INDEXRET* is added (P-value 1.2%) and least so with the *Year*-dummies (P-value of 2.4%). We conclude from these tests that, even though we have controlled for previous share price increases through including *RETURN* as a control variable, *MB* seem to remain highly affected by general price levels in the market, thus it may not reflect the internal buffer of our acquirers perfectly. Including *INDEXRET* or *Year*-dummies reduce the impact of these year effects, at least partially.

8.3.3. The dependent variable and the impact of the asset structures

As mentioned in *Section 6.3.*, authors in previous studies on PPA construct their dependent variables in different ways; goodwill in relation to purchase price (Shalev 2007) or in relation to total intangible value (Zhang & Zhang 2007). For our regression model we prefer goodwill as a proportion of intangible value. This is because the value of net tangible assets is not as easily affected by management discretion as intangible value, but instead highly dependent on the assets structure of the target company (Zhang & Zhang, 2007). Given our purpose it is more interesting for us to use a measure on which management opportunism has more observable effects. However, we also construct *GW/PRICE* and *GW/EV*, so that we can examine the effects of choosing the *GW/IV*-measure over the two others.

GW/PRICE is acquired goodwill divided by the purchase price for the target's equity. However, since an acquirer not only pays for the equity but also assumes the net debt of the target, we have also used enterprise value (EV) as the basis of allocation, when constructing the variable *GW/EV*. *GW/EV* is defined as the acquired goodwill divided by the enterprise value of the target. Enterprise value is defined as the sum of the fair value of equity and net debt (Penman, 2010). In this context, the fair value of equity corresponds to the purchase price for the target's net assets plus any previous holdings, which are valued to the new market value implied by the purchase price. Net debt corresponds to debt plus non-controlling interest, less financial assets. We have classified liabilities as debt in those cases where they have been explicitly stated as interest-bearing. In the other cases where there was no information on whether the liabilities were interest-bearing, we included those liabilities in other net tangible assets. Non-controlling interest is included in net debt, since they represent claims on assets. We assume that cash and cash equivalents are financial assets in line with Penman (2010), and have included them in net debt.

When looking at the correlation coefficients between the three different allocation ratios, found in *Appendix D1.*, we note that the correlation between *GW/PRICE* and *GW/EV* is high at around 0.9. However, the correlation coefficient between *GW/IV* and *GW/PRICE* is at 0.6 and the correlation between *GW/IV* and *GW/EV* is also around 0.6. These values can be considered as low, indicating that the measures do capture different things.

In order to study the effects of choosing one allocation base over another, we replace *GW/IV* with *GW/PRICE* as well as with *GW/EV*. The regression output for these two alternative regressions are found in *Appendix E3. Regression 5 - Main regression where GW/IV is replaced with GW/PRICE* and *Regression 6 – Main regression where GW/IV is replaced with GW/EV*. Comparing the results from these two alternative regressions with the resuls from our main regression, we note that the coefficients for *MB* remain positive, but lose their significance entirely in the two alternative regressions. The coefficient for *ERC* also undergoes some changes. It is significantly negative down to the 1% level in our main regression (*Appendix E1. Regression 1 – Main regression*), remains negative but insignificant in the *GW/PRICE* setting, but becomes positive, although not significantly, in the *GW/EV* setting. In line with Zhang & Zhang (2007) who also performed their regression model on different allocation ratios, our results from our main regression are heavily dependent on how we define our dependent variable.

When examining the data set closer we notice that some companies in our sample have a *GW/IV* of 1 but extremely low *GW/PRICE* values. These firms are in general firms with a lot of fixed assets, thus it is likely that they would acquire target companies with a lot of fixed assets too.[14] This makes us curious of the impact of different asset structures. We have included *Industry*-dummies in our main regression to control for differences in asset structures. But given the great differences observed when using *GW/IV*, *GW/PRICE* or *GW/EV*, we suspect that these dummies are not sufficient in capturing asset structure differences. Shalev et al. (2010) construct an asset structure-related explanatory variable for their regression on goodwill to purchase price. They hypothesize that "Firms with less fixed assets likely have more growth opportunities and more unrecognized assets that are recorded as goodwill post acquisitions"(Shalev et al, 2010, p.23) and therefore expect a positive sign on the coefficient. Following their approach, we have constructed a new independent variable, labeled *FIXED*, for which we divide the acquiring company's annual sales with fixed assets. We extracted this data directly from the database Datastream. We then added this new variable, *FIXED*, to our main regression (*Regression 1)* as well as the two alternative regressions where *GW/IV* is replaced by *GW/PRICE* (*Regression 5*) respective *GW/EV* (*Regression 6*). The regression outputs for the three new regressions including *FIXED* are found in *Appendix E3. Regression 7 – Main regression adding*

[14] E.g. Scania 2010, Volvo 2010 and SCA 2008

FIXED, Regression 8 – Main regression where GW/IV is replaced by GW/PRICE and adding FIXED and *Regression 9 - Main regression where GW/IV is replaced by GW/EV and adding FIXED.*

When comparing the results from these three regressions including the new variable *FIXED,* we note that after the inclusion of *FIXED*, the coefficient for *MB* remains positive and significant when using *GW/IV* (*Regression 7*), however it is far from significant in the *GW/EV* and *GW/PRICE* settings (*Regression 8* and *Regression 9*). The coefficients for *FIXED* are significantly positive both in the *GW/PRICE* and *GW/EV* settings with p-values of 2.3% and 0.0% respectively. When using *GW/IV* the coefficient for *FIXED* is much less significant with a p-value of 17.4%. We also note that including *FIXED* in our main regression does not change the coefficient for *ERC*, since it remains significantly negative at a p-value of 0.4%. However, the coefficient for *ERC* is insignificantly negative respectively positive in the alternative regressions when *GW/PRICE* and *GW/EV* are used, both when the variable *FIXED* is included and excluded. From these results, we can confirm what we expected when we defined our dependent variable, which is that asset structure effects are important when goodwill is related to the purchase price or enterprise value, but less relevant in an intangible value context.

8.3.4. Definition of the variable capturing the impact of CGU structure

In our main regression (*Appendix E1. Regression 1 – Main regression*), we use the number of operating segments of the acquirer as a proxy to estimate the impact of its CGU structure. This was also done by Shalev (2007) in his similar study. Although the coefficient for *SEGMENTS* is positive, which is in line with our expectations, it is not statistically significant. To investigate if the lack of significance is because *SEGMENTS* is a poor proxy, we redefine the measure to see if we can obtain different results with another definition. We construct a variant of a Herfindahl-Hirschman Index, and label the alternative variable of CGU structure as *HHI*, thus following the approach of Ramanna and Watts (2011):

$$HHI = \sum_{i=1}^{n} (s_i^2)$$

where *n* is the number of operating segments in the acquirer, s_i is the *i*-th operating segment's ratio of revenues to total revenues of the acquirer. The index ranges from zero to one and shows the concentration of operating segments within a firm. A *HHI* close to zero indicates that an acquirer has many equally sized segments, whereas a value close to one indicates that the firm has few segments of different sizes. The variable may be superior to *SEGMENTS* since *HHI* adjusts for the relative size of the segments. The number of segments does not necessarily provide more flexibility. For example, if there is only one larger sized segment and many small sized segments, then it is only the larger sized

segment that would have a sufficiently sized internal buffer to protect the acquired goodwill from subsequent impairment. Since a low *HHI* indicates that a firm has many segments of equal size, we expect the company to have greater flexibility and can more easily find CGUs for which there are sufficiently large buffers to protect the acquired goodwill against subsequent impairment. We emphasize that "equally sized segments" is not the same as "equally sized internal buffers". If CGUs are equally sized, managerial flexibility increases in finding CGUs with sufficiently large buffers. If the internal buffers are equally sized then flexibility is reduced since it will be difficult to find CGUs for which possibilities to protect goodwill are higher. Thus, we expect a negative sign for the coefficient of *HHI*.

From the regression output, found in *Appendix E4. Regression 10 – Main regression where SEGMENTS is replaced by HHI*, we note that the coefficient for *HHI* is positive, although far from significant. We therefore fail to reject the null hypothesis that *HHI* does not have an impact on *GW/IV*. Possible reasons for why we achieve this surprising result is discussed in the following section.

9. Discussion and limitations

In this section we discuss the results obtained in the statistical tests. We explain the results using the presented theories and relate them to findings in previous research. We will thereafter discuss the limitations to our study in terms of reliability, internal validity and external validity.

9.1. Discussion of results

The purpose of our study has been to investigate how the two different types of firm characteristics contribute to explain the proportion of the purchase price allocated to goodwill. These two types of firm characteristics refer to *possibility* to protect goodwill from impairment and *motives* to increase reported earnings. Based on our purpose, theories and findings from previous studies, we have formulated two research questions and then constructed five different hypotheses in order to answer the questions. We then specified a regression model to investigate the hypotheses. We will now discuss the results, but start with a brief recap to the situation that lies behind our research questions.

An internal buffer is equal to the difference between the recoverable- and carrying value of a certain CGU. The difference typically occurs as internally generated goodwill is not permitted on the balance sheet and many assets have to be measured conservatively. As most companies experience accounting conservatism in one way or another, most companies have internal buffers within their CGUs. Accounting conservatism may be beneficial as it assures investors and creditors that values are not overstated, but makes subsequent impairment testing difficult due to the way in which impairment tests are conducted. The tests are not performed directly on core goodwill but instead conducted by comparing the carrying value of the CGU to the recoverable amount of that unit, which means that an internal buffer can compensate for any actual value decreases of core goodwill. The reported value of acquired goodwill therefore remains unchanged because a part of the internal buffer has replaced the value decrease in core goodwill. As Hellman et al. (2012) point out, the way in which the different standards related to goodwill are currently designed has led to unwanted consequences. One such consequence is that if goodwill is never fully expensed for, it is not possible to properly evaluate whether an acquisition has been accretive for the acquirer. Another consequence is that it reduces comparability between companies that grow either through acquisitions or organically. For an organically growing company, internally generated goodwill and other asset values missing due to conservatism will never appear on the balance sheet. For companies growing through acquisitions however, internally generated goodwill and unrecognized fair value adjustments gradually appear on the balance sheet over time as they become subsumed by the goodwill item. Comparability can also be distorted between firms that perform their PPAs properly and firms that use discretion to allocate

more than otherwise expected to goodwill, as the latter group of companies is more likely to only have smaller parts of the acquisition premium paid ever taken through the income statement.

Research question one: *Can the size and sustainability of the internal buffer of the acquirer explain the proportion allocated to goodwill in purchase price allocations performed by companies under IFRS?*

To capture the size of the buffer we constructed the variable *MB* based on the necessary assumptions that market value is a valid proxy for recoverable value, and that the whole firm is a valid proxy for the CGU to which goodwill is allocated. We expected that the variable should have a positive impact on *GW/IV* in our regression model, which was also obtained. The positive sign of the coefficient for *MB* was significant at a 5% level. We can hence reject the null hypothesis that *MB* does not explain the allocation to goodwill in relation to intangible value. This can be interpreted so that acquirers with higher market-to-book values, *ceteris paribus*, tend to allocate a larger than otherwise expected proportion to goodwill than to other intangible assets in their PPAs. We assume that managers to at least some extent are aware of the size of their buffer and the possibility it gives them to shield a part of the purchase price from full expensing. Based on this assumption, our finding suggests that managers who perceive their future impairment risk as low would tend to allocate more of the purchase price to goodwill, as their subsequent earnings are probably more affected by the PPA than the earnings of companies with higher impairment risk. The increased possibility to improve subsequent earnings consequently affects the PPA performed by managers, and could be an explanation for the significant results that we observe. To confirm the significance of *MB,* we have performed different robustness tests. In every specification the coefficient remains significantly positive also when we include redefined year effects and differences in asset structures. This finding is in line with that obtained by Zhang & Zhang (2007), who also obtained evidence for that acquirers with high market-to-book values allocate more than otherwise expected to goodwill as a proportion of intangible value. The finding is not supported by Shalev (2007) who does not find any significant association between high market-to-book values and the proportion allocated to goodwill. However, since he used goodwill as a proportion of purchase price instead of intangible value as dependent variable, and adjusted the difference between market and book value with the aggregate of purchase prices paid in a year for the independent variable, his regression model is specified quite differently from ours. This difference could, together with sampling differences, explain why his finding differs from that obtained by us and Zhang & Zhang (2007).

The second variable we use as a proxy for the size and the sustainability of an internal buffer is *SEGMENTS*. We expected a positive sign on the coefficient for *SEGMENTS*. It is positive as expected but with a p-value of 22%. As the sign is not statistically significant at any reasonable level, we cannot conclude that firms with more numerous operating segments tend to allocate a larger than

otherwise expected proportion to goodwill relative to intangible assets in their PPA. When we formed the hypothesis we acknowledged that the number of segments could affect the portion allocated to goodwill in both directions, depending on whether the managers of the acquirer are aware of in which CGUs the internal buffers are hidden. To also capture the relative sizes of the CGUs to control for the case in which there are multiple CGUs but with only one, or a few of them, constituting almost the entire company, we constructed *HHI*, which replaced *SEGMENTS* in the regression. The results from that regression did not indicate any positive nor negative effects of fragmentation, as the coefficient had a p-value of 90%. It is in line with Shalev (2007), who also did not find any significant results for number of segments. It is however not in line with Zhang & Zhang (2007) who obtained significant results indicating that the number of segments is taken into account by managers when performing their PPA.

The third variable we use as a proxy for the size and the sustainability of an internal buffer is *VOL*. We expected a negative sign on the coefficient for *VOL*. The coefficient for *VOL* is positive but with a p-value of 90%. With such a high p-value we see no indications of a relationship between share price volatility and allocation. Consequently, we do not see any indications of a relationship between the volatility of the internal buffer and allocation, which is what share price volatility is intended to represent. As none of these results are significant, it appears that managers do not take the CGU structure or volatility into consideration when they perform the PPA. Possible reasons for the lack of results are discussed in *Section 9.2 Limitations*. Volatility was used by Shalev (2007) who obtained a statistically negative effect of the variable, which was exactly what we expected but did not obtain.

Of the three variables we used to measure the size and sustainability of the internal buffers, only *MB* had a statistically significant impact. Some individual firm characteristics related to the size and sustainability of the internal buffers hence help explain the proportion allocated to goodwill.

Research question two: *Can the earnings concern of the acquirer, motivated by investors' functional fixation on reported earnings, explain the proportion allocated to goodwill in purchase price allocations performed by companies under IFRS?*

The first variable we use for representing earnings concern is *ERC*. We expected a positive signs on its coefficient. We however obtain a coefficient for *ERC* with a negative sign at a 1% significance level. This is contrary to our expectations and differs from the results obtained in the previous research. We can reject the null hypothesis that *ERC* does not explain the allocation to goodwill in relation to intangible value, although with a different impact than the hypothesized. This can be interpreted as that acquirers for which investors react more strongly to their earnings surprises, *ceteris paribus*, tend to allocate less than otherwise expected to goodwill and more to identifiable intangible assets in their PPAs. One possible explanation for why *ERC* has a negative impact on allocation to

goodwill is that companies with high *ERC*-scores have obtained their high scores because their earnings announcements attract high attention among investors, who consequently react more strongly to earnings surprises. If the earnings announcements attract such high attention among investors, these companies could be expected to attract higher attention and be more scrutinized also during the PPA-process. They are consequently more pressured to perform a more correct PPA, in which managers would have to identify more intangible assets and thereby allocate less to goodwill. Another possible explanation is that companies which are transparent towards external stakeholders, report earnings which are perceived to be highly reliable by investors. Therefore their investors react more strongly to the earnings of these transparent companies, resulting in a high score on *ERC*. That a company is more transparent towards external stakeholders would however most likely restrict managers' ability to use the PPA for earnings management. Thus, there are some potential explanations for why the coefficient on *ERC*, as it has been defined by us, has turned out to be significantly negative. It is probable that these two and other explanations outweigh the effect of that managers feel stronger pressure of achieving high earnings if their earnings have a larger impact on stock price. However, as this is not predicted by the theory on which we have based our hypothesis, we think this is a finding that merits some further research. Our result is different from the previous study by Shalev (2007) that obtained a significantly positive result when he investigated this relationship between purchase price allocation to goodwill and earnings concern. However, he used the acquirer's P/E ratio as a proxy to capture the earnings concern, while we have used a simplified version of earnings response coefficients.

The second variable we use as a proxy earnings concern is *MEETEST*. Also for this variable we expected a positive sign on the coefficient. The coefficient on *MEETEST*, has a positive sign which is hence in line with our expectations. It is also in line with the results obtained by Shalev (2007), who used a very similar variable in his regression. The sign is however not statistically significant at any reasonable level and we therefore fail to reject the null hypothesis that allocation to goodwill cannot be explained by the acquirer's frequency of meeting analyst forecasts. We can therefore not conclude that firms, for which the actual earnings more frequently meet or exceed analysts' earnings estimates, allocate more than otherwise expected to goodwill than other intangible assets in their PPA.

9.2. Limitations

9.2.1. Reliability

We will now discuss the limitations to our study in terms of reliability. The data we have used are based on reported numbers from the firm's audited consolidated financial statements, which we consider highly reliable. Using external data also facilitates the replicability of our study. As some of our data is hand-collected e.g. data on purchase price allocations and the number and size of operating

segments, there is an element of subjectivity in this method of data collection and a risk for making human errors. We have tried to minimize this risk by being consistent in interpreting the notes on the purchase price allocations and operating segments for all our observations, and by going through all the relevant notes twice. Other data is extracted directly from Thomson Reuters's database DataStream, which minimizes the risk for us making errors when recording them. However, due to time constraints, we have not been able to double-check all the data extracted from Datastream with the primary source (for example the financial statements or stock prices quoted on Nasdaq OMX Stockholm). The reliability of the findings in our thesis thus depends to a large extent on the quality of the data from Datastream. To detect problems with reliability we have conducted a number of spot-checks for each extracted variable. Based on what we saw in the spot-checks, the data from Datastream seems to be of good quality. Overall deem the reliability of our study to be high.

9.2.2. Internal validity

With an R square-value of only 16 percent for our main regression, the joint explanatory power of the studied variables is quite limited. We can therefore not rule out that there are other variables explaining a large part of the variation in the dependent variables. These other variables are unknown to us, and could be problematic if they are correlated with the explanatory variables. In that case they have been erroneously excluded from the regression model. The coefficient of an explanatory variable is affected if there is an omitted variable that explain both the dependent- and the explanatory variable, i.e. an omitted variables bias has occurred. We have tried to prevent that coefficients become biased due to omitted variables by including control variables for factors which we think can impact both allocation and the explanatory variables, but can of course not be completely certain that we have succeeded in avoiding an omitted variables bias. (Wooldridge, 2009)

It can be questioned if all the variables fully capture what we are interested in. Regarding the size and sustainability of the internal buffer, this is a rather abstract concept that in practice is quite difficult to quantify and measure, since nobody can know a CGUs economic value with certainty. In order to study the impact of it, we have had to make some simplifications and critical assumptions. One such assumption is that the recoverable values of our sample firms are reflected in their market values. This assumption might have biased our results. For example, the *MB* could reflect that the share price is inflated or suppressed at a certain point in time, i.e. the price is different from the value of a share. A high stock price that is due to trading behavior rather than corporate value, is obviously a poor proxy for the possibility of the firm to generate the internal rents, or goodwill, that make up the buffer. We have tried to limit this effect by including the control variables *YEAR* and *RETURN* in the main regression, and *INDEXRET* and *RETURN* in the alternative specification. We are aware that even with these control variables in place, the market value does not equal the recoverable value. However, it would have been too time consuming and complex for us to try to assess the recoverable value for

every observation. Therefore, we have followed the approach of other researchers in this area (Ramanna and Watts, 2007; Shalev, 2007; Zhang and Zhang, 2007) and regard the market value as a sufficiently good indicator for recoverable value.

Another critical assumption we have made which could be questionable is that we constructed the variables *MB* and *VOL* on a firm-level basis and not on CGU level, on which subsequent goodwill impairment tests are conducted. This means that for firms with multiple CGUs, the size and sustainability of the pre-existing internal buffer could be over- or understated. What is really relevant is the size and volatility of the CGU to which goodwill is allocated. Thus, we would have wanted to use data on CGU level in order to better capture the size of the internal buffer(s) that could be used to protect the acquired goodwill from impairment subsequently. Due to lack of data on CGU level, we assume for simplicity that the values on firm-level are similar to those on CGU-level.

The lack of data on CGU level also affects the interpretation of the results relating to our variable measuring the number of CGUs, for which we had to use the number of operating segments as a proxy for the number of CGUs. As the number of CGUs is always equal to or larger than the number of operating segments, we probably understate the number of CGUs for many observations. This implies that some observations in reality have more flexibility than it appears when we use *SEGMENTS*. Furthermore, the change in standard from IAS 14 *Segment Reporting* to IFRS 8 *Operating Segments* could have affected the classification of segments for some firms. This would reduce the comparability between observations before 2009 and observations from 2009 and onwards. Despite these two shortcomings of *SEGMENTS*, it is the best proxy for number of CGUs given the availability of data. The validity of *HHI* used in our robustness checks, also suffers from that operating segments are used instead of CGUs. We want the indicator to capture the fragmentation of the internal buffer, but due to the lack of such data we had use fragmentation of sales instead. We do this since a segment's higher sales indicate higher profits, which in turn indicate that there is a larger internal buffer in that segment. These simplifying assumptions were necessary for us, but affect the validity negatively.

Furthermore, the hypothesized beneficial impact of having multiple CGUs is based on that two critical conditions are fulfilled. These are that the internal buffer is not distributed exactly the same across the CGUs, and that managers to some extent know which CGUs that have either internal buffers at the time of acquisition, or high potential for developing them. These two conditions have to be fulfilled in order for there to be an advantage for a company to have multiple CGUs. With managers typically knowing their company well, we find it highly probable that both conditions are fulfilled. We therefore assume that the two conditions are fulfilled for all observation. The validity of these two assumptions could nevertheless be questioned, which would make it doubtful whether the number of CGUs really affects the way in which companies can maximize their use of the internal buffer. If we

drop the assumption that managers have good knowledge of their buffers, so that they are not aware of in which CGUs there are internal buffers, it is possible that they allocate goodwill to CGUs with relatively small buffers. A consequence could be that they have to report an impairment charge that they would have avoided if there was only one CGU in the company. Thus, there could be two opposing effects and it is therefore possible that the effects offset each other, providing an explanation for why we do not obtain any significant result.

The simplifications we made when constructing our variable *ERC* as a proxy for the earnings concern of the acquirer could also affect the interpretation and validity of our results. We defined *ERC* for each firm as the coefficient obtained when regressing the firm's stock returns on earnings surprises, using quarterly data from a time period of 1 Jan 2009- 1 October 2011. We for simplicity had to assume that the actual return for each event window corresponds to abnormal return. We therefore did not adjust the return for the firm's normally expected return, which could have been done using e.g. the market model or Fama-French's three factor model (MacKinlay, 1997). This implies that our abnormal returns are slightly overstated for firms with high normally expected returns. This has biased our results since these firms have higher ERCs than they should have. Constructing expected returns for each event window would however have been far too time-consuming, given the scope of this thesis. Ramanna and Watts (2011), who used ERC as an explanatory variable in their study on goodwill impairments, made similar simplifications as those we did and did not calculate the expected returns

MEETEST is not based on returns but only on earnings surprises, making it less prone to suffer from the validity problems above. The most important decision which can impact its validity negatively was the decision of where to set the cutoff lines for the range, within which the company is considered to have met analyst estimates. Similar to Shalev (2007), we did not want to include all positive earnings surprises since we only wanted to include instances in which the likelihood is high that the company has managed earnings to ensure that they meet analyst expectations. If the range would have been too narrow we would on the other hand risk excluding some of the instances in which earnings are managed to meet expectations. Where to set the upper limit was therefore a very arbitrary choice.

9.2.3. External validity

We will now discuss the external validity of our results, i.e. the extent to which the results can be generalized to other populations and settings. Although previous studies are conducted for time periods similar to the time period we use for building our sample, the length of the time period is quite limited and may have special characteristics due to the financial crisis. However, since IFRS 3 have only been in place for seven years, we could not extend the time period much further. Since we have chosen to on focus companies listed on large cap and mid cap on Nasdaq OMX Stockholm, it is also

questionable whether our results are valid for small firms as well. We have not obtained any statistically significant sign for the coefficient on SIZE, and its inclusion in the regression model has had very limited impact on the other coefficient. This indicates that our results could be generalized to small firms, although we are aware of that there may be a size effect that is not present when comparing firms that are all relatively big, but that enters in a more heterogeneous sample. We have only focused on Swedish firms, which makes it questionable if our results could be further generalized to other national settings as well. Accounting standards before IFRS and differences in national culture can lead to country-level differences in how the principle based standards of IFRS are interpreted and applied. (Löfgren & Johard, 2012) Thus, Swedish companies may not be representative for all companies reporting under IFRS.

The purposes of Shalev (2007) and Zhang and Zhang (2007) are the same as ours, i.e. to investigate whether certain firm characteristics can explain how companies perform their PPAs. Because of the similarities they have had great impact on how we perform our study. Although it might not have direct implications for external validity, we need to discuss the correctness of us relying so heavily on their approaches in selecting and constructing variables, as these studies are conducted on US data under US GAAP. We argue that their approaches are valid also in an IFRS context since the US standards regulating business combinations and treatment of goodwill and other intangible assets are very similar to those under IFRS. Both US GAAP and IFRS allow for substantial discretion at the time of acquisition and in the subsequent treatment of goodwill. Consequently, as we see US GAAP-based results as highly relevant in an IFRS context, one should to a large extent be able to generalize our IFRS-based findings to a US GAAP context as well.

To conclude, we think reliability and external validity is high, but we see some potential sources to problems regarding internal validity. We hope that internal validity is not an issue and our findings therefore trustworthy, but it depends on whether the various assumptions we make are correct.

10. Concluding remarks and future research

Both US GAAP and IFRS allow for a high level of managerial discretion in the purchase price allocation and in the subsequent impairment testing of goodwill. A number of studies have been conducted on how managerial discretion is used under US GAAP on business combinations and impairment of goodwill, relating to firms' *possibilities* to protect goodwill from impairment and *motives* to increase reported earnings. Few empirical studies have however been conducted on how these two types of firm characteristics affect the proportion of purchase price allocated to goodwill in an IFRS context. The purpose of this study, has therefore been to investigate the relationship between the proportion of the purchase price allocated to goodwill and the two types of firm characteristics, for companies reporting under IFRS. With the two types of firm characteristics, we refer to the *possibility* to protect goodwill from impairment and the *motive* to increase reported earnings. In order to study the relationship, we have conducted a quantitative study on a sample of 195 observations from 2007 to 2011. The sample consists of 62 firms, which are all classified as either large- or mid cap on Nasdaq OMX Stockholm.

Our results show that both types of firm characteristics can contribute to explain the proportion allocated to goodwill, although in different ways. The significant positive impact of our proxy for the size of the internal buffer, *MB*, indicates that acquirers with larger *possibilities* to protect goodwill from impairment tend to allocate more to goodwill than what would otherwise be expected. This is in line with our expectations. Our finding suggests that managers might be aware, already at the acquisition point in time, of the company's possibility to protect goodwill from impairment, and therefore use their managerial discretion in an opportunistic manner. If this is the case, the purchase price allocation may result in investors receiving inaccurate measures of the different assets acquired in an acquisition. The significant negative impact of our proxy for earnings concern, *ERC*, indicates that acquirers which have larger *motives* to increase reported earnings, actually tend to allocate less to goodwill than what would otherwise be expected. This finding contradicts the expectations we had after the theory review. A plausible explanation could be that companies, for which earnings announcements attract high attention among investors, are possibly more scrutinized during the PPA-process. Therefore they are more pressured to perform a correct PPA with higher identification of intangible assets. The higher scrutiny could outweigh that managers believe that investors are functionally fixated on reported earnings.

As the finding related to *ERC* is not in line with the theoretical framework, it merits some further research. It would be interesting for future researchers to more closely investigate the effects of earnings concern on purchase price allocations. We speculate that there could be other effects, e.g. higher market scrutiny, possibly outweighing the theory that managers are more motivated to present

high earnings when earnings receive strong reactions. It would therefore be interesting for future research to conduct a similar test as ours, but then trying to isolate the effects of such scrutiny.

The significant results obtained for *MB* also opens up some interesting areas for future research. One area would be to investigate the different components that the internal buffer is comprised of. *MB* aims to capture the effects of both internally generated goodwill and understated book values. It is probable that the latter component is seen by managers as more sustainable over time, and hence taken more into account by the acquiring managers. For quantifying the latter component, a possible approach could be to estimate the permanent measurement bias. The total buffer would be divided into PMB and a remainder that mostly consists of internally generated goodwill. Thereafter tests could be made in order to see how understated book values (PMB) compared to internally generated goodwill (the remainder) affect how companies perform their PPAs.

Since the R square-value is only 16% for our main regression, there should be a lot of other factors explaining differences in PPA among Swedish companies. US studies have investigated the impact on PPA by agency-theory derived factors such as incentive systems to managers, leverage levels and earnings-based covenants in debt agreements. These agency theory-based factors in an IFRS context could all be interesting areas for future research.

11. References

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Appendices

Appendix A. Comparison of US GAAP and IFRS

Below follows brief comparisons of the similarities and main differences between US GAAP and IFRS related to the treatment of business combinations (A1), intangible assets and goodwill (A2) and impairment testing of goodwill (A3). These comparisons are extracted and adapted to a shorter format from the reports made by Ernst & Young (2011) and KPMG (2012).

A1. Business combinations

Similarities between ASC 805 *Business combinations* (formerly SFAS 141) and IFRS 3 (R) *Business combinations*

- The principle guidance for business combinations in US GAAP and IFRS is the result of the first convergence project between the FASB and the IASB.
- All business combinations are accounted for using the acquisition method. This means that upon obtaining control of another entity, the underlying transaction is measured at fair value, which is the basis on which the assets, liabilities and non-controlling interests (NCIs) of the acquired entity are measured
- Identifiable assets acquired and liabilities assumed are recognized separately from goodwill at the acquisition date if they meet the definition of assets and liabilities and are exchanged as part of the business combination
- Goodwill is measured as the residual and is recognized as an asset. When the residual is a deficit (gain on bargain purchase), it is recognized in the profit or loss after re-assessing the values used in the acquisition accounting

Main differences	**US GAAP**	**IFRS**
Measurement of non-controlling interest	Use of full goodwill method, where NCI is measured at fair value, including the non-controlling interest's share of goodwill	Use of full goodwill method or purchased goodwill method, where NCI is either measured at fair value including goodwill or at its proportionate share of the fair value of the target's identifiable net assets, exclusive of goodwill
Fair value measurement	Specific guidance on fair value measurement, including fair value hierarchy and general valuation guidance and disclosure requirements	Limited guidance on the overall approach to measure the fair values of various assets and liabilities, no detailed guidance on valuation methodologies

A2. Intangible assets and goodwill

Similarities between ASC 805 *Business combinations* (formerly SFAS 141), ASC 350 *Intangibles – Goodwill and Other* (formerly SFAS 142) and IFRS 3 (R), IAS 38 *Intangible assets*

- Intangible assets are defined as non-monetary assets without physical substance
- Recognition criteria require that the future economic benefits are probable, and that the costs can be reliably measured
- Goodwill is recognized only in business combination, and measured as the residual

- Except for development costs, internally developed intangibles are not recognized as assets
- Intangible assets are amortized over their estimated useful lives
- Goodwill is never amortized

Main differences	**US GAAP**	**IFRS**
Development costs	Generally, expensed as incurred	Permitted to be capitalized if recognition criteria met
Advertising costs	Permitted to be capitalized if recognition criteria met	Generally, expensed as incurred
Revaluation	Not permitted	Fair value of intangible assets other than goodwill is permitted to be revalued if there is an active market

A3. Impairment testing of goodwill

Similarities between ASC 350 *Intangibles – Goodwill and Other* (formerly SFAS 142) and IAS 36 *Impairment of Assets*

- Goodwill is to be reviewed at least annually for impairment and more frequent if impairment indicators are present
- In the case of an impairment, goodwill should be written down and an impairment loss recognized

Main differences	**US GAAP**	**IFRS**
Allocation of goodwill	Goodwill is allocated to reporting units (RUs) that are expected to benefit from the synergies of the business combination from which it arose. RU is defined as an operating segment or one level below an operating segment	Goodwill is allocated to a cash generating unit (CGU) or group of CGUs that represents the lowest level within the entity to which the goodwill is monitored for internal management purposes, and cannot be larger than an operating segment as defined in IFRS 8, *Operating Segments*
Method of determining impairment	Two step approach: 1. A recoverability test at RU level (carrying amount of RU is compared with its fair value). If the carrying value of RU is greater than its fair value, then, 2. An impairment testing must be performed for goodwill	One-step approach, where impairment test is done at the CGU level by comparing the CGU's carrying amount, including goodwill, with its recoverable amount ((higher of fair value less costs to sell and value in use, which is based on net present value of future cash flows)
Impairment loss calculation	Impairment loss is recognized if the carrying amount of goodwill exceeds the implied fair value of goodwill within its RU	Impairment loss on the CGU level is allocated first to reduce goodwill to zero, and then, other assets in the CGU are reduced pro ratably

Appendix B. List of sample companies

Below is the list of the 66 companies that make up our sample. Companies with an asterisk (*) are included in our sample as they fulfill the sample selection criteria and have performed acquisitions in the relevant time period of 2007-2011. However, since we have not been able to extract ERC data on them, they have been omitted from our main regression. The sixteen companies in bold have performed purchase price allocations every year during our sample period.

Acquirers:

Aarhus Karlshamn	**Mekonomen**
ABB	Millicom
Addtech	MTG
AlfaLaval	NCC
AllianceOil	NewWave
AssaAbloy	**Nibe**
AstraZeneca	Nobia
AtlasCopco	Nolato
Axfood	Peab
BB Tools	Proffice
Beijer GL	Rezidor
Betsson	SAAB
Bilia	**Sandvik**
Byggmax*	**SCA**
CDON*	Scania
Elekta	**Securitas**
Eniro	Skanska
Enquest*	SKF
Ericsson	SOBI
Fagerhult	SSAB
Fenix Outdoor	Stora Enso*
Getinge	**Sweco**
Gunnebo	Swedishmatch
Haldex	Swedol
Hexagon	**Systemair**
Hexpol	Tele2
HiQ	Telia
IFS	Tieto
Indutrade	Tradedoubler
Lindab	Trelleborg
Loomis	Unibet
Meda	**Volvo**
Medivir	ÅF

Appendix C. Variable definitions and summary statistics

C1. Variable definitions and expected signs

Below is a table describing the various variables used in our regressions and their expected signs.

Name	Description	Expected signs
Dependent variable		
GW/IV_i	The amount of the purchase price allocated to goodwill as a percentage of the intangible value for observation *i*.	N/A
Explanatory variables		
Proxies for the size and sustainability of internal buffer of the acquirer:		
MB_i	The difference between the acquirer's market value and book value in relation to its market value as of 1 January for the year of an acquisition	+
$SEGMENTS_i$	The number of operating segments of the acquiring firm as of 1 January for the year of the acquisition	+
VOL_i	The volatility of the stock price of the acquirer one year prior to an aquisition	–
Proxies for the earnings concern of the acquirer:		
ERC_i	The slope coefficient of the acquirer's stock return and earnings surprises (ratio of the difference between the actual reported quarterly net income and the expected quarterly net income forecasted by analysts over the expected quarterly net income forecasted by analysts, during a two years period prior to the acquisition).	+
$MEETEST_i$	Dummy variable where it takes on the value 0 in those cases when the expected quarterly net income falls within 0% to 30% of the actual reported quarterly net income, and takes on the value 1 in the other cases when the difference between the expected quarterly net income is larger than 30% of the actual reported quarterly net income.	+
Control variables		
$RETURN_i$	The average annual stock price return, measured as an average of the two-year period before a acquisition.	–
$Year_{1\text{-}5}$	Dummy variables for the year which the acquisition took place.	+/–
$Industry_{1\text{-}9}$, where:	Dummy variables for the industry that the acquirer belongs to according to ICB.	+/–
$Industry_1$	*Basic Materials*	

$Industry_2$	*Industrials*	
$Industry_3$	*Consumer Goods*	
$Industry_4$	*Healthcare*	
$Industry_5$	*Consumer Services*	
$Industry_6$	*Telecom*	
$Industry_7$	*Oil and Gas*	
$Industry_8$	*Utilities*	
$Industry_9$	*Technology*	
$SIZE_i$	The logarithm of the enterprise value of the acquirer as of the beginning of the reporting year for which there is an acquisition	–
Variables used in robustness tests:		
Alternative dependent variables:		
$GW/PRICE_i$	The amount of the purchase price allocated to goodwill as a percentage of the purchase price	N/A
GW/EV_i	The amount of the purchase price allocated to goodwill as a percentage of the enterprise value.	N/A
Alternative independent variables:		
HHI_i	The concentration of operating segments of the acquirer as of 1 January for the year of the acquisition measured as a Herfindahl-Hirschman Index, ranging from 0 to 1.	–
$INDEXRET_{1-5}$	The annual return of the stock market index of all shares traded on Nasdaq OMX Stockholm (OMXSPI) for the year an acquisition took place.	–
$FIXED_i$	The ratio of total sales to fixed assets of the acquirer as of 1 January for the year of an acquisition.	+

C2. Variables summary statistics

Below is a table summarizing the descriptive statistics of our variables, showing their mean, standard deviation (Std. dev.), minimum value, lower quartile, median, higher quartile, maximum value and the number of observations (No. of obs.). Variables marked with a star (*) are only used when testing for robustness.

Variables	Mean	Std. dev.	Min	Lower quartile	Median	Higher quartile	Max	No. of obs.
Transaction characteristics - purchase price allocation ratios								
GW/IV	0.68	0.25	0.00	0.50	0.73	0.88	1.00	204
*GW/PRICE**	0.52	0.26	0.00	0.33	0.54	0.72	1.30	204
*GW/EV**	0.54	0.29	-0.04	0.33	0.55	0.75	1.60	204
Acquirer characteristics – proxies for the size and sustainability of internal buffer								
SEGMENTS	3.78	1.56	1.00	3.00	4.00	5.00	12.00	204
MVequity (MSEK)	*52 042*	*171 576*	*337*	*3 276*	*9 465*	*44 629*	*2 230 285*	*204*
BVequity(MSEK)	*19 801*	*54 896*	*178*	*1 185*	*3 255*	*17 974*	*680 345*	*204*
MB	0.53	0.36	-1.45	0.45	0.62	0.74	0.94	204
RETURN	0.22	0.38	-0.64	-0.04	0.18	0.46	1.89	201
VOL	4.83	1.67	2.00	4.00	4.00	5.00	12.00	204
Acquirer characteristics - proxies for earnings concern								
ERC - raw	*0.10*	*0.19*	*-0.22*	*-0.02*	*0.06*	*0.16*	*0.77*	*195*
ERC	2.04	0.84	1.00	1.00	2.00	3.00	3.00	195
MEETEST	0.39	0.22	0.00	0.27	0.36	0.55	1.00	195
Acquirer characteristics - size								
EV (MSEK)	*57 277*	*169 339*	*500*	*3 799*	*11 850*	*49 628*	*2 182 589*	*204*
SIZE	23.40	1.65	20.03	22.06	23.20	24.63	28.41	204

C3. Identified intangible assets per separate categories

Although intangible assets were identified in the majority of the 204 purchase price allocations reported during 2007-2011 (88 percent), only 39 percent of the observations show a breakdown of total intangible assets into separate intangible asset classes. As can be seen in table below, the most commonly reported category of intangible assets is Customer contracts, relationships and bases (identified in 23 percent of the observations), followed by Trademarks, trade names and brands (reported in 20 percent of the observations).

Class of intangible assets	**Number of observations**	**Percentage of observations**	**Mean Percentage of Total Intangible Assets**	**Mean percentage of Intangible Value**
Patents, copyrights and licences	24	12	7	3
Customer contracts, relationships and bases	48	23	18	6
Technology and software	12	6	2	1
Trademarks, trade names and brands	41	20	10	3
Capitalized development costs	8	4	1	0
Other Intangible Assets	38	18	7	2

Appendix D. Correlations and scatter plot

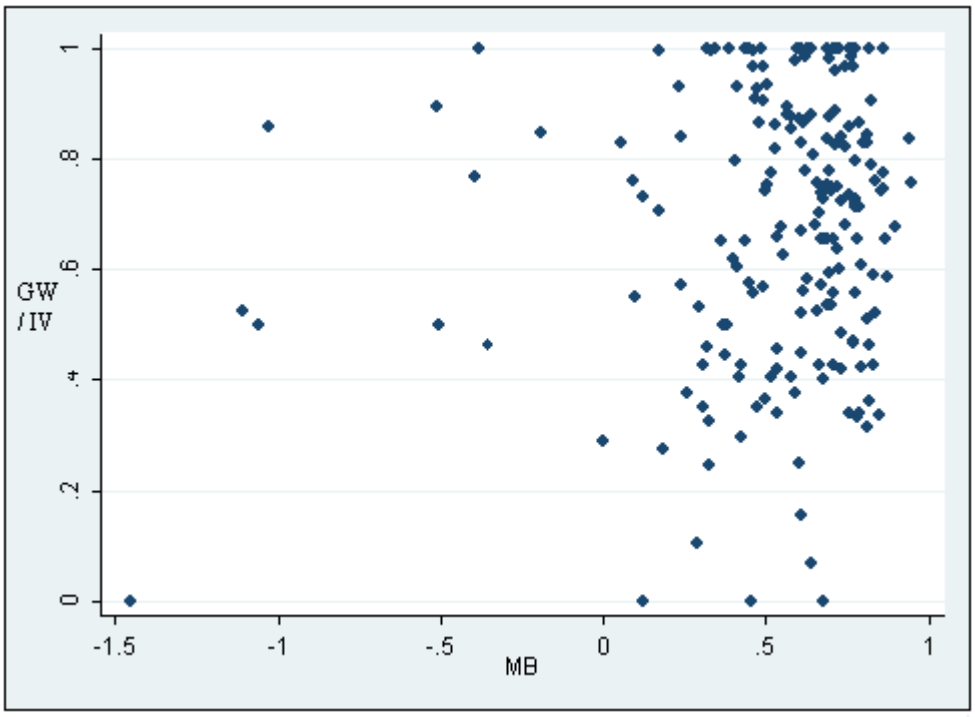
D1. Correlation matrix

*The pair-wise Pearson correlations matrix below is based on the 195 observations on which we perform our main regression. Coefficients in **bold** are significant at the 5% level. Variables marked with a star (*) are only used when testing for robustness. A list with the variables definitions is found in Appendix C1. Variable definitions and expected signs.*

Correlations	*GW/IV*	*GW/PRICE**	*GW/EV**	*SEGMENTS*	*HHI**	*MB*	*RETURN*	*VOL*	*ERC*	*MEETEST*	*SIZE*	*INDEXRET**	*FIXED**
GW/IV	**1.000**												
*GW/PRICE**	**0.623**	**1.000**											
*GW/EV**	**0.638**	**0.874**	**1.000**										
SEGMENTS	-0.022	0.029	-0.008	**1.000**									
*HHI**	0.078	-0.037	-0.026	**-0.603**	**1.000**								
MB	**0.149**	**0.185**	**0.197**	**-0.168**	0.069	**1.000**							
RETURN	0.048	0.117	0.112	-0.073	0.052	**0.345**	**1.000**						
VOL	-0.013	-0.034	-0.021	-0.126	0.077	**-0.252**	-0.010	**1.000**					
ERC	-0.078	-0.022	0.042	0.082	**-0.173**	0.084	-0.140	-0.008	**1.000**				
MEETEST	0.031	0.087	0.066	0.087	-0.086	**0.206**	-0.086	**-0.200**	**0.210**	**1.000**			
SIZE	-0.054	-0.012	-0.041	**0.187**	-0.082	0.118	-0.012	-0.088	-0.114	**0.207**	**1.000**		
*INDEXRET**	**-0.166**	**-0.179**	**-0.147**	0.039	-0.022	**-0.331**	**-0.502**	-0.004	0.056	0.079	-0.102	**1.000**	
*FIXED**	0.139	**0.236**	**0.297**	-0.006	0.047	**0.168**	0.078	0.090	**0.156**	0.044	**-0.340**	-0.026	**1.000**

D2. Scatter plot of *GW/IV* against *MB*

In the scatter plot below, GW/IV is plotted against MB, since these are two of our variables of interest. All GW/IV ratios are between 0 and 1, which is what we expected since we excluded acquisitions with negative goodwill. MB ratios are most often between 0 and 1, but there are some observations with negative values. MB becomes negative when book value of equity is larger than the market value of equity, as the variable measures the part of market value that is not explained by book value.



Appendix E. Regressions

Below are regression output summaries for our main regression (E1) presented in Section 7. Results and the other regressions used in robustness tests (E2 – E4) presented in Section 8. Testing and verifying the results. For every regression output summary (*) means that the result is significant at 10%, (**) means that the result is significant at 5% and (***) means that the result is significant at 1%. A list with the variables definitions is found in Appendix C1. Variable definitions and expected signs.

E1. Main regression

Regression 1. Main regression
Dependent variable: *GW/IV*
Independent variables: *MB, SEGMENTS, VOL, ERC, MEETEST, RETURN, Year1-5, Industry1-9, SIZE*
R^2=0.1594, Adjusted R^2=0.0734

Variables	Coefficient	Std. error	t-value	P>|t|	Sig.
Explanatory variables					
MB	0.143	0.06	2.27	0.024	**
SEGMENTS	0.016	0.01	1.22	0.223	
VOL	0.001	0.01	0.12	0.901	
ERC	-0.072	0.02	-2.92	0.004	***
MEETEST	0.109	0.09	1.18	0.238	
Control variables					
RETURN	-0.100	0.07	-1.53	0.128	
Year1	0.122	0.07	1.69	0.092	*
Year2	0.133	0.07	1.96	0.051	*
Year4	0.047	0.06	0.73	0.469	
Year5	0.111	0.08	1.42	0.159	
Industry1	-0.238	0.26	-0.9	0.371	
Industry2	-0.320	0.25	-1.3	0.195	
Industry3	-0.254	0.25	-1.01	0.314	
Industry4	-0.513	0.25	-2.04	0.043	**
Industry5	-0.421	0.25	-1.67	0.096	*
Industry6	-0.547	0.26	-2.08	0.039	**
Industry9	-0.352	0.26	-1.35	0.178	
SIZE	-0.018	0.01	-1.49	0.139	
Intercept	1.335	0.37	3.61	0.000	

E2. Other regressions used in robustness tests related to year effects

Regression 2. Main regression excluding Year-dummies
Dependent variable: *GW/IV*
Independent variables: *MB, SEGMENTS, VOL, ERC, MEETEST, RETURN, Industry1-9, SIZE*

Variables	Coefficient	Std. error	t-value	P>|t|	Sig.
Explanatory variables					
MB	0.176	0.06	3.00	0.003	***
SEGMENTS	0.016	0.01	1.27	0.208	
VOL	0.002	0.01	0.19	0.847	
ERC	-0.072	0.02	-2.94	0.004	***
MEETEST	0.083	0.09	0.91	0.364	
Control variables					
RETURN	-0.040	0.05	-0.80	0.424	
Industry1	-0.235	0.26	-0.90	0.372	
Industry2	-0.327	0.24	-1.34	0.182	
Industry3	-0.251	0.25	-1.00	0.318	
Industry4	-0.526	0.25	-2.11	0.036	**
Industry5	-0.415	0.25	-1.66	0.099	*
Industry6	-0.562	0.26	-2.16	0.032	**
Industry9	-0.354	0.26	-1.37	0.173	
SIZE	-0.014	0.01	-1.21	0.229	
Intercept	1.320	0.37	3.58	0.000	

Regression 3. GW/IV and Year-dummies
Dependent variable: *GW/IV*
Independent variables: *Year1-5*

Variables	Coefficient	Std. error	t-value	P>|t|	Sig.
Year1	0.144	0.06	2.48	0.014	**
Year2	0.159	0.06	2.63	0.009	***
Year4	0.107	0.06	1.81	0.072	*
Year5	0.123	0.06	2.11	0.036	**
Intercept	0.571	0.05	12.60	0.000	

Regression 4. Main regression where Year-dummies are replaced with INDEXRET
Dependent variable: *GW/IV*
Independent variables: *MB, SEGMENTS, VOL, ERC, MEETEST, RETURN, INDEXRET, Industry1-9, SIZE*

Variables	Coefficient	Std. error	t-value	P>|t|	Sig.
Explanatory variables					
MB	0.151	0.06	2.53	0.012	**
SEGMENTS	0.016	0.01	1.25	0.213	
VOL	0.002	0.01	0.18	0.855	
ERC	-0.072	0.02	-2.97	0.003	***
MEETEST	0.108	0.09	1.18	0.241	
Control variables					
RETURN	-0.086	0.05	-1.59	0.113	
INDEXRET	-0.132	0.06	-2.04	0.043	**
Industry1	-0.231	0.26	-0.89	0.377	
Industry2	-0.318	0.24	-1.31	0.190	
Industry3	-0.251	0.25	-1.01	0.313	
Industry4	-0.510	0.25	-2.06	0.041	**
Industry5	-0.418	0.25	-1.69	0.093	*
Industry6	-0.547	0.26	-2.12	0.035	**
Industry9	-0.346	0.26	-1.35	0.180	
SIZE	-0.018	0.01	-1.50	0.134	
Intercept	1.411	0.37	3.83	0.000	

E3. Other regressions used in robustness tests related to the dependent variable and the impact of asset structures

Regression 5. Main regression where GW/IV is replaced with GW/PRICE
Dependent variable: *GW/PRICE*
Independent variables: *MB, SEGMENTS, VOL, ERC, MEETEST, RETURN, Year1-5, Industry1-9, SIZE*

Variables	Coefficient	Std. error	t-value	P>|t|	Sig.
Explanatory variables					
MB	0.081	0.07	1.19	0.237	
SEGMENTS	0.011	0.01	0.75	0.455	
VOL	0.005	0.01	0.41	0.686	
ERC	-0.012	0.03	-0.44	0.661	
MEETEST	0.153	0.10	1.54	0.125	
Control variables					
RETURN	-0.035	0.07	-0.50	0.618	

Year1	0.186	0.08	2.40	0.017	**
Year2	0.136	0.07	1.86	0.065	*
Year4	0.062	0.07	0.89	0.376	
Year5	0.138	0.08	1.63	0.106	
Industry1	0.005	0.29	0.02	0.987	
Industry2	-0.066	0.27	-0.25	0.805	
Industry3	-0.122	0.27	-0.45	0.655	
Industry4	-0.016	0.27	-0.06	0.954	
Industry5	-0.036	0.27	-0.13	0.893	
Industry6	0.032	0.28	0.11	0.911	
Industry9	0.019	0.28	0.07	0.945	
SIZE	-0.018	0.01	-1.43	0.155	
Intercept	0.767	0.40	1.92	0.056	

Regression 6. Main regression where GW/IV is replaced with GW/EV
Dependent variable: *GW/EV*
Independent variables: *MB, SEGMENTS, VOL, ERC, MEETEST, RETURN, Year1-5, Industry1-9, SIZE*

Variables	Coefficient	Std. error	t-value	P>|t|	Sig.
Explanatory variables					
MB	0.115	0.07	1.54	0.125	
SEGMENTS	0.007	0.02	0.49	0.628	
VOL	0.007	0.01	0.49	0.625	
ERC	0.016	0.03	0.53	0.595	
MEETEST	0.100	0.11	0.91	0.363	
Control variables					
RETURN	-0.001	0.08	-0.01	0.991	
Year1	0.111	0.09	1.30	0.194	
Year2	0.092	0.08	1.14	0.256	
Year4	0.020	0.08	0.26	0.792	
Year5	0.078	0.09	0.84	0.404	
Industry1	-0.056	0.31	-0.18	0.858	
Industry2	-0.101	0.29	-0.35	0.730	
Industry3	-0.164	0.30	-0.55	0.584	
Industry4	0.015	0.30	0.05	0.960	
Industry5	-0.035	0.30	-0.12	0.907	
Industry6	-0.055	0.31	-0.18	0.861	
Industry9	0.017	0.31	0.05	0.957	
SIZE	-0.018	0.01	-1.26	0.210	
Intercept	0.782	0.44	1.78	0.077	

Regression 7. Main regression adding FIXED
Dependent variable: *GW/IV*
Independent variables: *MB, SEGMENTS, VOL, ERC, MEETEST, RETURN, Year1-5, Industry1-9, SIZE, FIXED*

Variables	Coefficient	Std. error	t-value	P>|t|	Sig.
Explanatory variables					
MB	0.120	0.07	1.84	0.068	*
SEGMENTS	0.015	0.01	1.12	0.265	
VOL	0.004	0.01	0.30	0.764	
ERC	-0.071	0.02	-2.89	0.004	***
MEETEST	0.101	0.09	1.10	0.273	
Control variables					
RETURN	-0.108	0.07	-1.64	0.102	
Year1	0.137	0.07	1.89	0.060	*
Year2	0.144	0.07	2.12	0.035	**
Year4	0.057	0.06	0.89	0.377	
Year5	0.124	0.08	1.57	0.118	
Industry1	-0.236	0.26	-0.89	0.372	
Industry2	-0.342	0.25	-1.39	0.166	
Industry3	-0.276	0.25	-1.10	0.274	
Industry4	-0.536	0.25	-2.13	0.034	**
Industry5	-0.475	0.25	-1.87	0.064	*
Industry6	-0.539	0.26	-2.06	0.041	**
Industry9	-0.419	0.26	-1.58	0.115	
SIZE	-0.012	0.01	-0.96	0.338	
FIXED	0.038	0.03	1.36	0.174	
Intercept	1.155	0.39	2.95	0.004	

Regression 8. Main regression where GW/IV is replaced by GW/PRICE and adding FIXED
Dependent variable: *GW/PRICE*
Independent variables: *MB, SEGMENTS, VOL, ERC, MEETEST, RETURN, Year1-5, Industry1-9, SIZE, FIXED*

Variables	Coefficient	Std. error	t-value	P>|t|	Sig.
Explanatory variables					
MB	0.039	0.07	0.56	0.579	
SEGMENTS	0.008	0.01	0.58	0.561	
VOL	0.009	0.01	0.71	0.482	
ERC	-0.010	0.03	-0.38	0.702	
MEETEST	0.139	0.10	1.41	0.160	
Control variables					
RETURN	-0.049	0.07	-0.70	0.486	
Year1	0.214	0.08	2.76	0.006	***

Year2	0.157	0.07	2.15	0.033	**
Year4	0.081	0.07	1.17	0.245	
Year5	0.161	0.08	1.91	0.058	*
Industry1	0.007	0.28	0.03	0.980	
Industry2	-0.105	0.26	-0.40	0.689	
Industry3	-0.161	0.27	-0.60	0.549	
Industry4	-0.057	0.27	-0.21	0.834	
Industry5	-0.132	0.27	-0.49	0.627	
Industry6	0.045	0.28	0.16	0.874	
Industry9	-0.101	0.28	-0.36	0.721	
SIZE	-0.008	0.01	-0.62	0.539	
FIXED	0.068	0.03	2.30	0.023	**
Intercept	0.442	0.42	1.06	0.293	

Regression 9. Main regression where GW/IV is replaced by GW/EV and adding FIXED
Dependent variable: *GW/EV*
Independent variables: *MB, SEGMENTS, VOL, ERC, MEETEST, RETURN, Year1-5, Industry1-9, SIZE, FIXED*

Variables	Coefficient	Std. error	t-value	P>|t|	Sig.
Explanatory variables					
MB	0.044	0.07	0.59	0.558	
SEGMENTS	0.003	0.01	0.23	0.822	
VOL	0.013	0.01	0.97	0.331	
ERC	0.018	0.03	0.65	0.519	
MEETEST	0.076	0.11	0.71	0.477	
Control variables					
RETURN	-0.024	0.08	-0.32	0.751	
Year1	0.159	0.08	1.90	0.059	*
Year2	0.127	0.08	1.62	0.108	
Year4	0.053	0.07	0.71	0.481	
Year5	0.117	0.09	1.29	0.198	
Industry1	-0.052	0.30	-0.17	0.864	
Industry2	-0.169	0.28	-0.60	0.552	
Industry3	-0.231	0.29	-0.80	0.425	
Industry4	-0.055	0.29	-0.19	0.850	
Industry5	-0.199	0.29	-0.68	0.499	
Industry6	-0.033	0.30	-0.11	0.914	
Industry9	-0.188	0.30	-0.62	0.537	
SIZE	-0.001	0.01	-0.04	0.968	
FIXED	0.116	0.03	3.64	0.000	***
Intercept	0.228	0.45	0.50	0.614	

E4. Other regression used in robustness tests related to the explanatory variable *SEGMENTS*

Regression 10. Main regression where SEGMENTS is replaced by HHI
Dependent variable: *GW/EV*
Independent variables: *MB, HHI, VOL, ERC, MEETEST, RETURN, Year1-5, Industry1-9, SIZE,*

Variables	Coefficient	Std. error	t-value	P>|t|	Sig.
Explanatory variables					
MB	0.122	0.06	1.98	0.049	**
HHI	0.012	0.10	0.12	0.907	
VOL	-0.001	0.01	-0.10	0.919	
ERC	-0.067	0.03	-2.67	0.008	***
MEETEST	0.111	0.09	1.20	0.233	
Control variables					
RETURN	-0.098	0.07	-1.49	0.138	
Year1	0.127	0.07	1.76	0.080	*
Year2	0.138	0.07	2.03	0.044	**
Year4	0.056	0.06	0.87	0.383	
Year5	0.121	0.08	1.53	0.127	
Industry1	-0.217	0.27	-0.81	0.418	
Industry2	-0.288	0.25	-1.17	0.244	
Industry3	-0.219	0.25	-0.87	0.387	
Industry4	-0.487	0.25	-1.92	0.056	*
Industry5	-0.378	0.25	-1.50	0.135	
Industry6	-0.480	0.26	-1.84	0.068	*
Industry9	-0.317	0.26	-1.22	0.225	
SIZE	-0.015	0.01	-1.29	0.198	
Intercept	1.307	0.38	3.42	0.001	

Appendix F. Variance inflation factors

In the table below, we present the variance inflation factors for the variables used in our main regression, including Year-dummies and Industry-dummies. . A list with variables definitions is found in Appendix C1. Variable definitions and expected signs.

Industry2	*Industry5*	*Industry3*	*Industry4*	*Industry9*	*Industry6*	*Industry1*	*Year5*	*Year1*
50.20	21.80	20.04	15.39	10.25	9.29	6.02	3.71	3.20
Year2	*Year4*	*RETURN*	*MB*	*ERC*	*MEETEST*	*VOL*	*SIZE*	*SEGMENTS*
2.53	2.19	2.19	1.72	1.41	1.37	1.33	1.33	1.31