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Market reaction to goodwill impairment losses

A study examining the immediate and long-term stock price reactions surrounding and following the announcements of goodwill impairment losses

Abstract

Since 2005 goodwill does not disappear from the balance sheet *as time passes* since it is no longer amortized; instead IFRS require annual impairment tests of goodwill. This paper examines the empirical relation between stock price reactions and reported goodwill impairment losses since the introduction of the new regulatory framework. An event study is conducted on companies listed on Nasdaq OMX Stockholm between 2009 and 2013. Statistically significant cumulative abnormal returns are documented in the event window surrounding announcements, suggesting goodwill impairment losses are value relevant. Using Calendar-Time Portfolio no statistically significant abnormal returns are documented in the long-term, although data indicate minor negative abnormal returns.

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1. Introduction

Since the early 2000s the accounting of goodwill has changed quite drastically. In contrast to earlier standards, goodwill is not amortized over time. Instead companies test for impairment annually (or when other factors indicate impairment). If goodwill is deemed impaired, the company in question must report an impairment charge. Although goodwill impairment charges vary in size, some are very large; SCA, for example, reported a goodwill impairment loss of 4 billion Swedish kronor (almost €0.5bn) in 2012. In this study we examine the stock price reaction following such announcements. We examine both the initial reaction and the long-term post-announcement stock drift following companies' announcements of goodwill impairment losses.

1.1. Purpose of the study

The main purpose of this quantitative study is to cross-sectionally examine the short-term and long-term effects on stock prices from recorded goodwill impairment losses under IFRS 3 and IASB 36. The aim is to establish the empirical connection between stock price reactions and goodwill impairments losses in the Swedish market.

1.2. The study's contribution

A great deal of the studies on the subject of write-downs and impairments were conducted when the regulatory frameworks were significantly different than they are now. By carrying out this study, we contribute to a better understanding of market reaction under the current regulatory frameworks.

The majority of studies conducted under the current frameworks have been on U.S. data. The regulatory framework in the U.S. is slightly different from IFRS. By studying Swedish data, we hope to contribute to a better understanding of the effects of the new IFRS rules, especially so in a Swedish setting.

Very few of the studies use the Calendar-Time Portfolio approach to study the long-term effects. By using this approach, which, by some (e.g. Fama, 1998), is argued to be superior to other approaches, we contribute to the literature. Other such long-term studies have found disparate results; this studies complement their findings.

1.3. Delimitation

The focus of this study is goodwill impairments losses in Swedish companies. We examine the effects of goodwill impairment losses announced between 2009-2013.

We do only study observed goodwill impairment losses from an accounting perspective (and not from a theoretical perspective). As outlined in Section 2.3. there are scenarios where the goodwill post includes other intangible assets that theoretically should not have been allocated to goodwill. Such goodwill losses are included in the study, but actual empirical impairments of other intangible assets are not included. Neither does the study examine how the initial recognition of goodwill[1] influence subsequent goodwill impairments.

The stock performance preceding a goodwill impairment loss is not studied, rather merely observed. This period is studied by others (eg. Bartov, Lindahl and Ricks, 1998) who document significant negative abnormal returns. The ambition of this study is to study the post-event effects of goodwill impairments. This is arguably more important from an investor's perspective as it is only possible to act on new information post-event.

The long-term effects are studied on a one-year basis. We do not study the stock performance after the 12 months following an impairment loss have passed. Other studies have chosen a longer post-event window (e.g. Bartov et al, 1998), in order to study the even longer-term effects.

The study does examine to what extent there are abnormal returns surrounding and following announcements of goodwill impairment losses and if these are significant. It does not provide definite answers *why* this might be the case, but instead draw possible explanations from previous research. Motives and management discretion in the allocation and impairment of goodwill are not studied.

1.4. Definitions

In some studies, the words write-offs, write-downs and impairments are used interchangeably. In this study *write-offs* are associated with the pre-IAS 36 period (or prior to

[1] The allocation between identifiable intangible assets and goodwill; see Section 2.3.

changes to U.S. GAAP in 2001). *Impairments* are associated with the post-IAS 36 period, while *write-down* is not used as an expression at all.

Impairment, *impairment loss* and *impairment charge* are used interchangeably. Unless stated otherwise, they all refer to goodwill impairments.

Most acronyms and abbreviations are spelled out the first time they are used, while a handful are not. You can find a full list of acronyms and abbreviations in the Appendix.

1.5. Disposition

This thesis is outlined as follows: Chapter 2 provides a definition of goodwill followed by a brief background of the rules and regulatory frameworks surrounding goodwill. The allocation and impairment process are explained in order to give the reader a good sense how goodwill can be administered. In Chapter 3 previous literature is discussed. It may seem a bit exhaustive and unconnected at times, but it aims to provide the reader with a sufficient background to understand how and why goodwill can be manipulated. In Chapter 4 general hypotheses are developed, and possible explanations to each potential outcomes are outlined. These explanations are derived from Chapter 3. Chapter 5 explain the methodology, divided into the data collection, the short-term perspective and the long-term perspective. In Chapter 6 the results are presented, while Chapter 7 provide a lengthier discussion of the findings; including sensitivity analyses and robustness checks. The thesis is wrapped up in Chapter 8, where conclusions are stated and suggestions for future research are made.

2. Background

The objective of financial reporting is to provide information that is useful to present and potential investors and creditors (IFRS, 2016). Goodwill today account for a considerable larger part of financial reporting than traditionally has been the case and the portion of goodwill allocated on Swedish companies' balance sheets reached never-seen-before levels in 2014, amounting to 17.5% of total assets (Gauffin, Hagström & Nilsson, 2016). Since 2005, goodwill does not disappear from the balance sheet *as time passes* as it is no longer amortized over time. In this chapter we present a brief introduction of the concept goodwill, covering the regulatory framework with focus on the recognition and impairment of goodwill.

2.1. History

In line with a general trend towards the use of more *fair value accounting*; the practice of measuring assets and liabilities at their current (oftentimes market) value rather than their historical cost, accounting for goodwill has changed significantly. In 2001 U.S. Financial Accounting Standards Board (FASB) brought along changes to the accounting of goodwill and intangible assets under U.S. Generally Accepted Accounting Principles (GAAP) and in 2004 the International Accounting Standards Board (IASB) followed suit with the issuance of IFRS3 *Business Combinations* and the revision of IAS36 – *Impairment of Assets*. FASB and IASB sought to increase the relevance and information value in goodwill reporting.

The most notable change brought along was the change in goodwill amortization. Prior to this, IAS prescribed yearly straight-line amortization of goodwill over its estimated lifetime, not exceeding 20 years. The new rules instead prohibit goodwill amortization, requiring annual impairment tests to evaluate whether the book value of goodwill is accurate. Furthermore, in the allocation phase, more emphasis is put on recognizing intangible assets, that previously were grouped under goodwill, separately. Examples of such items include brands, logos and customer lists. Intangible assets are still amortized over time. From the 1st of January 2005 all companies listed on stock exchanges within the European Union must adhere to uniform IFRS/IAS rules, putting the new accounting rules into practise. Before 2005 most countries followed their respective GAAP, but in order to increase transparency and comparability between firms listed in different countries, European Union harmonized the accounting standards within the union.

Since the adoption of IFRS, contrary to common reasoning, the portion of allocated goodwill in Sweden have not declined, but instead remain fairly steady at half of transaction values (Gauffin et al, 2016). The amount of impairment losses is also significantly lower than amount of combined amortization and write-offs under Swedish GAAP (ibid).

2.2. Definition of goodwill

In consonance with the new framework, IASB defines goodwill as "an asset representing the future economic benefits arising from other assets *acquired in a business combination* that are not individually identified and separately recognized", implying goodwill only can exist after an acquisition has taken place. It is true that goodwill only can be *recognized* following an acquisition, but in academia there are also plentiful of references to *internally generated* goodwill (Bloom, 2009; Massoud & Raiborn, 2003; Wines, Dagwell & Windsor, 2007) indicating academic definitions are disharmonious with IASB's definition. Bloom (2013) confirms the existence of diverse definitions with perhaps the most common factor among the definitions being as vague as the classification of goodwill as intangible[2]. Giuliani and Brännström (2011) also find that the concept of goodwill indeed is blurry and that different definitions not only exist in the academic setting, but also in practice. Instead of giving a clear definition of goodwill, Johnson and Petrone (1998) tackles the problem from a theoretical standpoint. They find that the *residual approach* (i.e. goodwill measured as *transaction price –target's book value*) is simplified and conceptually incorrect. They identify and examine different components that could be allocated to goodwill after a transaction.

Exhibit 1: Goodwill components. Based on Johnson and Petrone (1998)

No	Component	What is it?
1	Fair value of the "going concern" element of existing business	Goodwill
2	Fair value of expected synergies after a transaction	Goodwill
3	Excess of fair values over book values of recognized net assets	Net asset
4	Fair values of non-recognized net assets	Net asset
5	Overvaluation of the consideration paid by the acquirer	Measurement err.
6	Overpayment (or underpayment) by acquirer	Loss/Gain

Component 1 refers to *internally generated goodwill*, defined by Johnson and Petrone (1998) as "the ability of [a company] as a stand-alone business to earn a higher rate of return on an organized collection of net assets than would be expected if those net assets had to be

[2] And not as an *intangible asset*, as the author finds that all do not regard it as an asset

acquired separately". Component 2 refers to synergy effects arising from combining businesses and assets after a business combination has taken place. Component 3 and 4 are assets and should subsequently be allocated to the asset classes they belong (albeit not always allowed due to accounting conservatism). Component 5 refers to a measurement error of a transaction price, while component 6 simply is a loss or a gain and should be recognized as such.

2.3. Recognition of goodwill

There exists a general consensus both in academia and practice that internally generated goodwill should not be capitalized (Bloom, 2013). Thus, all existing book goodwill is derived from some kind of a transaction. In Sweden (and most places outside the U.S.) goodwill is allocated as governed by IFRS 3, using the *acquisition method.* Goodwill is recognized as[3]:

Goodwill = Consideration transferred + Amount of non-controlling interest +
Fair value of net assets – Net assets recognized

where IFRS3 allows accounting flexibility in measuring non-controlling interest. As mentioned above, an emphasis is put on recognizing identifiable intangible assets. An asset is identifiable if it either (i) is *separable* or (ii) arises from a *contractual* or *legal right*. An asset is separable if it can be "separated from the entity and sold, transferred, licensed, rented or exchanged [in itself or in combination with other assets]" (IAS 38). In the previously used frameworks many of these assets were grouped under goodwill (Johnson and Petrone, 1998). After recognizing the identifiable assets, goodwill is allocated to cash-generating units (CGUs). A cash-generating unit is defined in IAS36 as "the smallest identifiable group of assets that generates cash inflows that are largely independent of the cash inflows from other assets or groups of assets". The practice of recognizing goodwill does include substantial manager discretion with choices being difficult to question from an external perspective (Wyatt, 2005; Beatty & Weber, 2006). The allocation of goodwill and intangible assets does affect future impairments and future earnings as summarized in Exhibit 2:

Exhibit 2: Allocation of goodwill versus identifiable intangible assets

Goodwill	**Intangible assets**
Lower amortization amounts	Higher amortization amounts
- *Higher ordinary earnings*	- *Lower ordinary earnings*
Higher risks for impairments	Lower risks for impairments
- *Higher volatility of earnings*	- *Lower volatility of earnings*

[3] Defined as in IFRS3

2.4. Impairment of goodwill

The new rules abandoning straight-line amortization of goodwill for yearly impairment tests have been heavily criticized (IASB, 2014; Bloom, 2013; Johansson, 2008). Under IAS 36 companies have to assess goodwill for impairment on annual basis, or when external or internal factors indicate impairment. Such factors include, but are not limited to, declines in market value, increases in interest rates or physical damage to an asset. The goal of an impairment test is to make sure no assets have a book value higher than their recoverable amount.

When conducting an impairment test the book value of an asset or CGU is compared to the recoverable amount. An asset or CGU is deemed impaired if its book value amount exceeds the recoverable amount, where recoverable amount is the higher of the net selling price and the value in use. The value in use is the net present value (NPV) of future expected cash flows derived from the asset/CGU. IAS 36 offers some guidance in assessing an appropriate discount rate to calculate the NPV. The discount rate should be the rate “the entity would pay in a current market transaction to borrow money to buy a specific asset or portfolio” suggesting market interest rates impact the value in use. Should no such market-determined asset-specific rate be available, the company’s WACC, the incremental borrowing rate or other market borrowing rates can be used as starting points.

If a CGU is deemed to be impaired, an adjustment of the book value is subsequently required. Primarily the book value of goodwill allocated to the specific GCU should be written down to better reflect the recoverable amount; should no goodwill be allocated to the CGU, an adjustment of the remaining assets’ book values is necessary. The amount written down is taken as a charge against earnings, affecting net income for the period. Once a goodwill impairment has taken place it is irreversible.

IAS 36 requires companies to disclose relevant information and assumptions made when conducting impairment tests; for example, discount rates used when determining the value in use are to be disclosed.

3. Previous research

Previous research has focused on mainly three areas regarding assets write-offs and impairments: (i) managerial discretion and motivations, (ii) the value relevance of write-offs and (iii)the announcements effects, (Li et al, 2011). All three will be covered in this chapter. A fair bit of what is covered are studies undertaken on U.S. data where FASB 142 and FASB 144 regulate goodwill. The U.S. framework is very similar to the European although some minor differences do exist[4].

3.1. Management discretion

The study of managerial discretion in write-offs has long been a subject of interest to academia and the evidence for its existence is fairly strong (Strong and Meyer, 1987; Elliot and Shaw; 1998, Zucca and Campbell, 1992). The relevance of the subject has increased with the introduction of IFRS 3, which requires annual impairment tests. IFRS 3 was introduced in order to provide better information value of reported goodwill, but has been heavily criticized on the grounds that it considerably increased the amount of management discretion in the goodwill impairment process (Abughazaleh et al, 2011).

Management discretion can both occur in the allocation phase of goodwill and in the impairment phase of goodwill. As illustrated in Exhibit 2 allocating a higher amount to identifiable intangible assets results in lower *normal* (ex-impairment) earnings while simultaneously reducing the risk of future impairments losses (thus reducing the volatility of earnings). Management discretion does also enter the process in the *formation* of CGUs and the subsequent allocation of goodwill to specific CGUs, which considerable impacts later impairment tests (Abughazaleh et al, 2011). Shalev, Zhang and Zhang (2013) find that companies with CEOs whose compensation packages are linked to earnings are prone to allocate a larger amount of a transaction value to goodwill than companies with CEOs whose compensation packages are not linked to earnings.

Hamberg, Paananen and Novak (2011) find a substantial increase in the amount of recognized goodwill since the implementation of new IFRS rules compared to previous Swedish GAAP. The total value of goodwill impairments is also found to be significantly smaller than previous combined amortization and write-offs. Furthermore, they find weak evidence that the amount of management discretion has increased with the adoption of IFRS

[4] See www.iasplus.com/en-us/standards/ifrs-usgaap/goodwill (available as of 2016-05-05) for a detailed list

3 and that firms with large fractions of goodwill are hesitant to initiate impairment. Abughazaleh et al (2011) conjecture that managers may “overstate, understate or simply not recognize an existing impairment depending on their reporting incentives”. Using U.K. data, they find that managerial discretion is prevalent in the allocation and impairment process.

In the vast majority of cases where Swedish companies conduct impairment tests, they determine the *recoverable amount* as the *value in use* (Gauffin & Thörnsten, 2010). As stated by IFRS, the value in use is the present value of future cash flows generated from a CGU. Watts (2003) states “because [..] future cash flows are unlikely to be verifiable and contractible, they, and valuation based on them, are likely to be manipulated” suggesting management discretion does enter when testing for impairment. Future cash flows are discounted to the present value with the help of a discount rate. Using data on Australian companies (who also adhere to IFRS), Carlin and Finch (2009) independently estimate risk-adjusted discount rates based on CAPM for companies listed on the Australian Stock Exchange. Subsequently they compare the discount rates to the actual discount rates used in impairment tests as reported by the companies. They find a significant discrepancy between the two rates, suggesting that managerial discretion is present in the process.

3.1.1. Earnings management

Healy and Wahlen (1999) defines earnings management as:

> “[something that] occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers”.

Plentiful of evidence suggest a correlation between reported earnings and stock prices (eg. Campbell & Shiller; 1988). Furthermore, companies that continuously beat analysts’ expectation seem to enjoy abnormal equity returns, even when accomplished through earnings management (e.g. Bartov, Givoly & Hayn, 2002), while the market also seem to reward companies with less volatile earnings (e.g. Francis et al, 2004). Consequently, this could act as incentives for managers and CEOs to manage earnings; especially so in cases where compensation packages are linked to stock performance.

Ramanna and Watts (2012) confirms this is the case on U.S. data. They examine companies with a book-to-market ratio over 1, that simultaneously recognize goodwill on their balance sheet, arguing a goodwill impairment is probable in these situations. They conjecture that managers' decisions not to impair goodwill may depend on positive private information about future cash flows, but find no evidence this is the case. Instead they find the principal-agent problem to be present and goodwill impairments to be linked to CEOs' and managers' private motives. The principal-agent problem is a case of moral hazard, wherein the agent (manager, CEO) does act in his/her own best interest rather than in in the interest of the principal (shareholders).

Abughazaleh et al (2011) find newly hired CEOs are more likely to engage in *big bath accounting* in relation to goodwill impairments. Francis, Hanna and Vincent (1996) also find that new management is more likely to report write-offs. Big bath accounting is the practice of taking a big non-recurring loss into a single period in order to be able to report stronger numbers in future periods. The idea is that by taking one excessive goodwill impairment in a period with already low earnings, one can avoid future goodwill impairments and thus boost future earnings. Evidence of the existence of big bath accounting in regards to goodwill impairments in the U.S. is also found by Sevin and Schroeder (2005) and Jordan and Clark (2011). Jordan and Clark (2011) show that companies reporting goodwill impairment losses have depressed ex-impairment earnings, suggesting a company is more likely to report a goodwill impairment loss in quarters where earnings already are low. Both Sevin and Schroeder (2005) and Jordan and Clark (2011) derive their results from comparing the pre- and post-SFAS 142 periods by studying impairments in 2002.

Li and Sloan (2015) find that managers delay goodwill impairments resulting in temporarily inflated stock prices. They find that impairment losses are taken when pre-impairment margins are low and the benefit of the goodwill already is consumed; contrary to what should be the case under U.S. GAAP/IFRS.

The evidence on opportunistic behaviour surrounding goodwill is, however, questioned by some. Jarva (2009) finds no compelling evidence that goodwill impairments are associated with opportunistic behaviour, but rather that goodwill impairments are associated with future cash flows as should be the case under IFRS 3. Neither Lee (2011) finds evidence that managerial discretion is used opportunistically.

3.2. Value-relevance in goodwill allocation and impairment

Barth (2000) defines value relevance as "the ability of the measure to make a difference to decisions of financial statement users". From a conceptual standpoint, an impairment loss can signal either (i) expectations of lower present value of future cash flows than previously were expected or (ii) lower market value of an asset or a CGU. It is herein the information value of impairments lies; intuitively this should be value relevant. As discussed in the next chapter there are compelling evidence on short-time market reaction to goodwill impairments. There are, however, some evidence of the opposite. In Hamberg and Beisland's (2014) regression model they find the impairment coefficient to be insignificant, and thus goodwill impairments not to be value relevant, on Swedish data.

Although Hamberg and Beisland (2014) did not find compelling evidence for the value-relevance of impairments under IFRS using Swedish data, Lapointe, Cormier and Magnan (2009) as well as Abughazaleh et al (2011) find evidence this is the case on Canadian and U.K. data. The difference in value relevance between the pre- and post-SFAS 142 period have been studied by Ahmed and Guler (2007) as well as Lee (2011). Both studies find that the value relevance has increased in the post-SFAS 142 period.

3.3. Announcement effects

3.3.1. Short-term reaction

Bartov, Lindahl and Ricks (1998), Bens, Heltzer and Segal (2011), Cheng et al (2015), Hirchsey and Richardson (2003) and Li et al (2011) all document significant short-term negative abnormal returns following announcements of goodwill impairments and goodwill write-offs. The measurement period and methodology do vary between them, but the negative short-term reaction to goodwill impairment seems to be well established in the literature.

Hirschey and Richardson (2003) find that the size of the reported goodwill write-offs is irrelevant for the subsequent abnormal return. They write that "[their] results suggest that investor regard the *fact* of a goodwill write-off, not necessarily its size, as important from a valuation perspective". Their study is conducted on data prior to the changes to the regulatory framework surrounding goodwill impairments.

Bens et al (2011) try to only measure the unexpected part of a goodwill impairment. They do so by applying the same logic as Ramanna and Watts (2012) (see Section 3.1.), where firms with a book-to-market value over 1 are expected to report an impairment loss in the size of the difference between the book value and the market value.

3.3.2. Long-term reaction

Nobel laureate Eugene Fama (1970) suggested that the market is efficient and ever since, the *efficient market hypothesis* has been ubiquitously debated in financial literature. Its most debated semi-strong form states that market values reflect all current available public information, implying immediate market reaction to new information. A broad body of research does oppose the hypothesis, while other support it. Finding long-term significant abnormal returns does not necessary imply that the efficient market hypothesis does not hold true (Fama, 1998), while consistent and systematically doing so would not be consistent with the efficient market hypothesis. Fama (1991) also highlights the joint hypothesis problem or bad-model problem, referring to the impossibility of testing market efficiency without also having an equilibrium asset pricing model (or perfect proxy for expected returns).

Bartov et al (1998) analyse the long-term stock price returns after announcements of all type of write-offs. They question how it is possible that announcements of write-offs, averaging around 20% of firms' market value, have very limited short-time effects (-1%~) on firms' stock prices. They subsequently conjecture that it is due to an initial underreaction. Their findings reveal a negative post-event abnormal return continuing two years after the announcement. They also find a negative pre-event abnormal return. They do not, however, document goodwill write-offs in isolation, but study a wide-ranging group of write-offs combined.

Hirschey and Richardson (2003) conducted a study on only goodwill write-offs in the U.S in the five-year period between 1992 and 1996. In line with Bartov et al (1998), they also find a market-adjusted cumulative negative return of 11.02% during a twelve-month post-event period. They do not find any correlation between the magnitude of the write-offs and the market reaction.

A more recent study of Cheng, Peterson and Sherrill (2015) on U.S. data juxtapose these findings. Their study includes observations between 2002 and 2011, after the changes to U.S. GAAP occurred. They find a 250-days post-event positive return of 10.86% using a buy-and-hold-approach, but also confirm their results using different methods. They argue the positive post-event return is the result of big bath accounting causing an initial overreaction.

Li et al (2011) observe downward revisions from investors and analysts following a goodwill impairment, which are associated with the size of the impairment loss. Bens et al (2011) also document the same results.

4. Hypothesis development and possible explanations for potential outcomes

In this chapter we derive possible explanations for each of the potential outcomes from previous research as outlined in Chapter 3. General hypotheses are also outlined.

4.1. Short-term reaction

We find two conceivable scenarios: (i) a negative immediate stock-price reaction and (ii) no significant reaction. We do, however, conduct a two-tailed test as this is commonly employed:

$H(S)_0 =$ No abnormal returns exist in the short-term surrounding the announcements of goodwill impairment losses

$H(S)_1 =$Abnormal returns exist in the short-term surrounding the announcement of goodwill impairment losses

4.1.1. Negative reaction

A goodwill impairment may arguably signal deteriorating future conditions. A negative stock reaction is fairly well-documented in the literature (see Sections 3.2 and 3.3.1.). If negative abnormal short-time returns are found, we conjecture it is because goodwill impairments convey new negative information to the market.

4.1.2. No significant reaction

Should the market expect an impairment to occur, the information of the announcement is likely already priced in. If so, the announcement does probably convey any new information and consequently the stock price does may not react. If the market does not react it may also be non-value relevant. Hamberg and Beisland (2014) do not find convincing evidence that announcements of goodwill impairments are value relevant. Are no evidence of abnormal short-term stock-price reactions found, we conjecture it is because the goodwill impairments already were expected (or are non-value relevant).

4.2. Long-term reaction

There are three potential long-term outcomes: (i) Abnormal negative post-announcement drift, (ii) no significant abnormal drift in stock prices and (iii) an abnormal positive long-term change in stock prices. We test against the null hypothesis that no significant abnormal returns are present.

$H(L)_0$ =No abnormal returns exist in the long-term following the announcements of goodwill impairment losses

$H(L)_1$ =Abnormal returns exist in the long-term following the announcements of goodwill impairment losses

4.2.1. Negative long-term effect

Studies of underreaction have a long history. A underreaction to write-offs is documented by Bartov et al (1998) and Hirschey and Richardson (2003). The logic for underreaction is that investors at the time of announcement fail to fully understand the implication of the information and as time passes prices adjust to the correct level (Bartov, 1998). If negative long-term abnormal returns are found, we conjecture it is because an initial short-term underreaction.

4.2.2. No significant long-term effect

According to the efficient market hypothesis the stock prices fully reflect all available information, implying no investor can systematically perform better than the market on a risk-adjusted basis. Proponents of the efficient market hypothesis are many (e.g. its "father" Nobel Laureate Eugene Fama). If the efficient market hypothesis holds true there would be no significant long-term drift (although, as Fama (1998) points out *one* study finding significant long-term drift does not imply market inefficiency). If no significant abnormal long-term effects are found, we conjecture it is because the market reacts correspondingly at the time of announcement.

4.2.3. Positive long-term effect

In Chapter 3 earnings management and big bath accounting were discussed. Compelling evidence that big bath accounting with regards to goodwill impairments does occur is provided (Abuhazaleh et al, 2001; Sevin and Schroeder, 2005; Jordan and Clark, 2011). Cheng, Peterson and Sherrill (2015) conjecture that their findings of positive abnormal long-term returns occur because of an initial overreaction, which is caused by big bath accounting; as an impairment loss is reported, all potential future impairments are packed together into one period, thus avoiding future impairment losses and the market fail to account for this. With this in mind, we conjecture that if positive long-term abnormal returns are found, it is because an overreaction due to the practise of big bath accounting.

5. Methodology

This section presents the methodology utilized and carefully explains the rationale behind chosen methodology. We utilize the event study methodology. Event studies have a long history and have been used since the 1930s (MacKinlay, 1997). The idea of an event study is to measure the impact of an event on, for example, a firm's market value. We both study the short-term and long-term reactions, measuring *abnormal returns*. This chapter is divided into three parts. Part one concerns the data collection while the other two parts consider the measurement of abnormal returns in the short-term and long-term horizon.

5.1. Selection and collection of data

The study is conducted on firms listed on the Nasdaq OMX Stockholm main market from 2009-2013, with the post-event measurement period stretching until the end of 2014. The rationale between choosing 2009-2013 are twofold:

(i) the purpose is to study impairment losses under the new IFRS framework introduced in 2005, thus the pre-2005 period could not be studied. Including events occurring in year 2005 would risk including impairments occurring due to the introduction of the new rules and not because of changes in the underlying goodwill values.

(ii) One of the worst financial crisis in modern times occurred 2007-2008. The stock market arguably behaved distinctly atypical during this period. By studying the post-crisis period, the results will be more relevant to today's conditions. Arguably the first months of 2009 were also atypical, but these are still included in the sample.

We manually collect data on announcements of goodwill impairments by searching for press releases published on Nasdaq OMX Nordic's website[5]; keywords used were *impairment*, impair*, nedskrivning*, skriver ned* and *goodwill.* Many press releases include references to attached reports, in which case we study the reports to find reported impairments of goodwill. The data collection is similar to the technique employed by Bartov et al (1998) and Hirschey and Richardson (2003) who gathered information from the broad tape.

[5] www.nasdaqomxnordic.com/nyheter/foretagsmeddelanden

Nasdaq OMX Nordic's website is considered reliable as all listed companies are required to ensure that all market parties receive price-sensitive information at the same time. In accordance with Swedish Law, *Lag (2007:528) om värdepappersmarknaden*, (based on E.U.'s *Markets in Financial Instruments Directive(MiFID)*) companies should disclose price-sensitive information as soon as possible in a way that it is accessible to the public in a non-discriminatory manner.

Only goodwill impairments that are determined (by the company) to include *price-sensitive information* will be published on the website. By definition, a prerequisite for a market reaction is that the information acted upon is price-sensitive. As we examine market reaction, the inclusion of observations only containing price-sensitive information is ideal. There is, however, possible that observations containing price-sensitive information, where companies determine they do not contain price-sensitive information, are excluded. We do account for this potential bias in our second phase of data collection.

Companies could report price-sensitive impairment losses exclusively in their financial reports, without any reference to our keywords in the press releases themselves. This behaviour would still conform to Swedish Law. To control for such observations and the potential bias mentioned above, we collect annual data on impairment of goodwill from Datastream (Worldscope no. 18224), crosschecking with our sample.

When new observations are detected, we manually find their announcement date and the amount. WC18224 include all goodwill impairment losses regardless of their size. Observations not containing any price-sensitive information could be included; for example, were a company with a market value of 4bn SEK to recognize a goodwill loss of 10k SEK, this would show up in. Arguably, such a small impairment loss is not value-relevant and does not contain any price-sensitive information. To exclude such announcements, we rather arbitrarily require observations found in Datastream to amount to at least 4% of a firm's market value (measured five-days prior to announcement, $t - 5$, collected from Datastream), to be included in our sample. The justification for setting the threshold to 4% is derived from reference studies: Bartov et al (1998) reported a mean of 46.48% and a median of 5.65%, while Bens et al (2011) apply a threshold of 5%. Impairment losses under the threshold are still included in the sample in case there are specific references to one of our keywords in companies' press releases.

In case reported impairments are in a different currency than SEK, reported impairment are converted to SEK at the exchange rate on the announcement day. Other reported numbers/values are also standardized in SEK.

When estimating Fama French factors for the Swedish market (see below) we use all stocks listed on Nasdaq OMX Stockholm. Missing observations vary between years but at most amount to 10.5%. Data has been collected from Datastream.

5.2. Measuring short-term abnormal performance

In this study the event in question is the announcement of a goodwill impairment occurring at $t = 0$.

5.2.1. Size of event window

Oftentimes the measurements of abnormal returns occur in a span surrounding the event, the so-called *event window*. There exists no *correct* length of the event window, but it has to be determined individually in each study by weighing pros and cons (MacKinlay, 1997). It is common to include more than just the event day, to account for (i) the possibility that information reached the market prior to the announcement, (ii) clarifying information released post-event, (iii) the possibility that the market needs more than just one day to comprehend and act on the information and (iv) measurement errors in the data collection (for example when announcements are released in the after-hours, and this is not properly adjusted for). By including more than just the event-day, however, one risks including days where confounding information is released. In this study one day prior and two days after the event are included. The event window is thus defined as t_{-1} through t_{+2}.

The daily abnormal returns are then measured as the daily actual returns minus the daily expected returns should the event not have occurred as:

$$AR_{i,t} = R_{i,t} - E(R_{i,t})$$

where $AR_{i,t}$ is the abnormal return, $R_{i,t}$ is the actual return for the day and $E(R_{i,t})$ is the expected return unconditional on the event. For each individual stock, the daily abnormal returns are then summarized into cumulative abnormal returns over time:

$$CAR_i(t_1, t_2) = \sum_{t=t-1}^{t+2} AR_{i,t}$$

The cross-sectional cumulative average abnormal return, CAAR, is then calculated as the average cumulative abnormal return for all events studied:

$$CAAR(t_1, t_2) = \frac{1}{n}\sum_{i=1}^{n} CAR_i(t_1, t_2)$$

where n is the number of studied events (i.e. the sample size). Inferences about the impact of an event can be drawn from the cumulative average abnormal return, $CAAR(t_1, t_2)$ or the cumulative abnormal returns, $CAR_i(t_1, t_2)$.

5.2.2. Proxy for expected return

In order to measure the abnormal return as outlined in the previous section, the expected return has to be estimated. A wide variety of proxies have been used for the expected return. Perhaps the most common is the market model, which is an empirically motivated model regressing individual past returns against the market's return:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t}$$

where $\varepsilon_{i,t}$ is the error term, α_i is the intercept and β_i is the sensitivity of a stock's performance to the market portfolio's performance. In this study, the market portfolio's return, $R_{m,t}$ is measured as the return of OMX Stockholm All-Share Gross Index and $R_{i,t}$ is individual returns, adjusted for capital changes. For further information about calculation of $R_{i,t}$ and $R_{m,t}$, see sections 5.3.2.1 and 5.3.2.3. We use daily data in the regression as advocated by MacKinlay (1997), but criticised by other (e.g. Jain, 1986) who argue that using daily data can lead to biased and inconsistent estimates of the parameters. The market model is estimated using OLS regression.

After having selected a model for expected return, one must determine the length of the estimation window in which one estimates the parameters of the model The is called the *pre-event window.* Once again, there is no *correct* length of the pre-event window, but it is important that the pre-event window and the event window do not overlap as this can lead to biased parameters (Kothari, 2007). By choosing a longer estimation window one can account for seasonal effects. In estimating betas for stocks it is common to include at least three years, in order to also account for effects arising from the business cycle. Conversely, the longer the estimation window, the higher is the risk that underlying conditions have changed and that the parameters do not represent the current setting. In this study, the pre-event window expands 120 days prior to the event window, stretching from $t-121$ through $t-2$, as suggested by MacKinlay (1997). Given the market model we can calculate the the abnormal returns in the event window as:

$$AR_{i,t} = R_{i,t} - \alpha_i - \beta_i R_{m,t}$$

where $R_{i,t}$ is the observed return, $R_{m,t}$ is the market return and $\alpha_i$and β_i parameters estimated from the market model.

5.2.3. Statistical Robustness

In comparison with longer-term event studies, short-term event studies are better specified and not as sensitive to choice of proxy for expected returns (Kothari, 1997), but there are still problems related to short-term event studies and the proxy for expected returns are one of them.

Volatility can, and tend to, increase with the event and many significance tests do not account for event-induced volatility (Brown and Warner, 1985). In our sample we find that volatility increases at the event day. Daily stock returns do deviate from normality and thus cannot be used for tests assuming normality (ibid.).

We conduct two kind of significance tests; one is a simple *cross-sectional T-Test* and the other is the non-parametric *Generalized Rank Test* developed by Kolari and Pynnönen (2010), which accounts for many of the problems with parametric tests and is shown to have superior power to other tests.

Testing for $H_0: CAAR = 0$ the former way, the test statistic is given by:

$$t_{CAAR\,(t_1,t_2)} = \sqrt{n}\,\frac{CAAR\,(t_1,t_2)}{S_{CAAR}}$$

where $CAAR$ is the cumulative average abnormal return, defined as above, n is the number of observations and S_{CAAR} is the standard deviation of cumulative average abnormal return, defined as:

$$S_{CAAR}: \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(CAR_i - CAAR)^2}$$

The *Generalized Rank test* is too extensive to cover here, but the full approach is presented by Kolari and Pynnönen (2010). In short, all CAR_i's are considered as one point in time and are together with individual $AR_{i,t}$ standardized and subsequently ranked. The test has high power and does account for (i) serial correlation of abnormal returns occurring from time-clustering and (ii) event-induced volatility. By using both methods to test for significance the statistical robustness is enhanced.

5.3. Measuring long-term abnormal performance

There are two commonly used approaches to measure post-event long-term abnormal performance. One is the Buy-and-Hold Abnormal Returns (BHAR) approach where firms that experience an event are matched either against a singular firm or a portfolio of firms that did not experience the event, subsequently comparing holding period returns. The other major approach is the Calendar-Time Portfolio (also known as Jensen's Alpha) which is used in this paper. Under this approach, each month, a portfolio of firms that during the previous *X* months experienced an event (where *X* is the number of post-event months that the researcher seeks to estimate performance during) is constructed. This portfolio is later regressed against a model of expected returns (such as the market model, Fama-French three-factor model or Carhart four-factor model) to calculate abnormal returns (alpha). There is no conclusive evidence on which approach is better and critics on both side point out weaknesses with respective methods (Lyon, Barber, Tsai, 1999; Fama, 1998). However, long-term event studies often are misspecified and have low power (Khotari, 2007); indeed, Fama (1998) concludes that "most long-term return anomalies tend to disappear with reasonable change in technique".

The reasoning for choosing the Calendar-Time Portfolio approach is twofold. Cross-correlation can lead to serious misspecification using the BHAR method (Brav, 2000) and as cross-correlation is likely to be strong in our dataset, as economy-wide and industry-wide effects are inherent factors in impairment tests, the Calendar-Time Portfolio approach is preferable. Furthermore, Mitchell and Strafford (2000) empirically (albeit with a significantly larger sample than we have) show that the Calendar-Time Portfolio has higher power and is preferable to the BHAR approach. This is further confirmed by Ang and Zhang (2015), as well as Nekrasov, Singh, Shroff (2014) who find the Calendar-Time Portfolio approach to have the highest power of the alternatives in random and most non-random samples.

At the start of each month from February 2009 to December 2014, all firms that in the previous 12 months announced a goodwill impairment, are added to a portfolio with an equal-weight. The portfolio in March 2013, for example, includes all firms that announced a goodwill impairment from March 2012-February 2013. One can either construct value-weighted or equal-weighted portfolio; but we argue that equal-weighted portfolios better catch abnormal returns derived from goodwill impairments. Imagine a potential stock exchange with 10 companies; 9 companies have a market cap of 1mn and one company has a market cap of 100mn. All companies take either a (i) large or a (ii) small impairment loss which are randomly assigned between companies; i.e. there is a 50% risk of a small impairment and 50% risk of a large impairment. Connected to a (i) small impairment is a 5% decline in stock price, while (ii) large impairments cause stock prices to decline 15%. If large and small impairments are equally distributed between companies (i.e. 5 companies report small impairment while 5 report large impairments) the equal-weighted portfolio will show a return of -10%. The return of the value-weighted portfolio will depend on whether the company with large market cap has made a small or a large impairment; the return will be either -14.5%~ or -5.5%~. By equal-weighting our portfolio we better catch the effect of the impairments and reduce the volatility of abnormal returns.

Stocks that are delisted in the 12 months' post-event period are included in the portfolio until the month when the delisting occurs.

5.3.1. Proxy for expected return

In order to assess the impact of the event it is necessary to regress the returns on a proxy for expected returns. No one model is, however, a perfect proxy for expected return, giving rise to the so-called bad-model problem (Fama, 1998). Due to nature of long-term event studies the magnitude of the bad-model problem is larger in these studies, as small estimations errors are amplified over time (Khotari, 2007). It is thus important to carefully choose a risk proxy; commonly used is the one-factor market model, the Fama-French three-factor model (hereafter FF-3F) or the Carhart four-factor model. In this study we employ the FF-3F incorporating a size, *SMB(t),* and a book-to-market, *HML(t)* factor. Several modifications have been suggested to improve the empirically motivated FF-3F (with the most notable being the Carhart four-factor model). However, FF-3F remains the most commonly used asset pricing model in comparable studies (Ang & Zhang, 2011) and we thus employ this model.

5.3.1.1. Estimating Fama-French factors

In order to calculate the FF-3F factors, the method by Fama and French (1993) is followed. A list of all companies listed on Nasdaq OMX Stockholm in June each year from 2008 to 2014 is compiled (adding back delisted firms and removing newly listed firms). All stocks are then ranked by size (market value times outstanding shares (MV in Datastream)) with the largest 50% labelled *big* and the other half labelled *small.* We then collect year-end data on stock price (last trading day) and book value per share (Worldscope no. 05476) from Datastream to determine the book-to-market ratio, *BE/ME*. Firms(stocks) with *BE/ME* values in the 70th percentile are labelled *value,* the 30% with the lowest values are labelled *growth* and the rest are labelled *neutral.* Firms with missing data are removed. Six portfolios are then created on the basis of *BE/ME* and *size.*

5.3.2. Regression

The calendar-time portfolio returns minus risk-free returns are used in the regression as follows:

$$\mathrm{R_{pt}} - \mathrm{R_{ft}} = \alpha_\mathrm{p} + \mathrm{b_p}(\mathrm{R_{mt}} - \mathrm{R_{ft}}) + \mathrm{S_p}\,\mathrm{SMB_{pt}} + \mathrm{h_p}\,\mathrm{HML_{pt}} + \varepsilon_\mathrm{pt}$$

Inferences about abnormal returns are drawn from α_p and its statistical significance, where the null hypothesis is $\alpha_\mathrm{p} = 0$. α_p represent the average monthly return over the risk-free rate in the studied post-event period. b_p, S_p and h_p measure how sensitive the portfolio is to the respective factors and ε_{pt} is the error term.

Ensuing sections outline how the factors in the regression model are calculated or estimated, together with a discussion when applicable.

5.3.2.1. Portfolio returns - R_{pt}

Data on individual returns of stocks is gathered from Datastream. Monthly returns are adjusted for capital changes and individual returns are calculated as:

$$R_{i,t} = \frac{P_{i,t+1} - P_{i,t}}{P_{i,t}}$$

where $R_{i,t}$ is the individual return of a stock in a selected month. $P_{i,t}$ is the price of an individual security at the start of month *t*, while $P_{i,t+1}$ is the price of a security, adjusted for capital changes, at the the start of the following month.

Monthly portfolio returns $R_{pt}$are calculated as:

$$R_{pt} = \frac{1}{n_t} \sum_{i=1}^{n_t} R_{i,t}$$

where n_t is the number of securities in a portfolio at time *t* and $R_{i,t}$ is an individual security's return in month *t* as calculated above.

5.3.2.2. Risk-free return - R_{ft}

The risk-free rate of return is the theoretical rate to which an investor can invest without bearing any risk, i.e. the rate of return on a security bearing absolutely no risk. In practice, a completely risk-free return does not exist, but is instead approximated. The most common proxy is treasury bills. In this study we use 1-month Swedish treasury bills. The rate at the first available date of each month is used as the risk-free return for that particular month. Negative yield does not enter our sample. Data is collected from the Swedish's central bank's (Sveriges Riksbank) website[6].

[6] Data is available at www.riksbank.se

5.3.2.3. Market-return - R_{mt}

The return of the OMX Stockholm All-Share Gross Index is used as the market return. The index is value-weighted and include all shares listed on OMX Nordic Exchange Stockholm. The return is gross, i.e. dividends are re-invested. The monthly return, R_{mt}, is calculated as:

$$R_{mt} = \frac{\mathrm{OMX_{t+1}} - \mathrm{OMX_t}}{\mathrm{OMX_t}}$$

where OMX_t is the index's value/price at the first day of a month and OMX_{t+1} is the index's value/price at the start of the following month.

5.3.2.4. Fama French factors - SMB_{pt} and HML_{pt}

The Fama French factors SMB_{pt} and HML_{pt} factors are calculated on the grounds of the formed portfolios outlined in 5.3.1.1. $SMB_{pt}$is the return of a non-investment portfolio consisting of small and big value firms:

$$SMB_{pt} = \frac{1}{3}(SV_t + SN_t + SG_t) - \frac{1}{3}(BV_t + BN_t + BG_t)$$

where SV_t is a portfolio consisting of stocks labelled *small* and *value* at time *t,* SN_t is a portfolio consisting of stocks labelled *small* and *neutral* at time *t* and SG_t is a portfolio consisting of stocks labelled *small* and *growth* at time *t.* BV_t, BN_t and BG_t are named correspondingly, where *B* is big.

HML_{pt} on the other hand, is the difference in returns of value portfolios minus the average of growth portfolios:

$$HML_{pt} = \frac{1}{2}(SV_t + BV_t) + \frac{1}{2}(SG_t + BG_t)$$

where SV_t and BV_t are portfolios with firms labelled *value* at time *t*, while SG_t and BG_t are portfolios consisting of firms labelled *growth* at time *t*.

5.3.3. Statistical Robustness

The Calendar-Time Portfolio approach is criticized on several grounds. As other long-horizon approaches, it is criticized on the lack of power. This is, however, not a feature of the method itself, but rather a consequence of the long-term nature of the test. As discussed above the Calendar-Time Portfolio approach has often been shown to have the highest power among alternatives.

The requirement of a proxy for expected returns is another feature that is shared by a wide range of studies. This problem is exaggerated in longer-horizon event studies. As Mitchell and Strafford (2000) point out by using a model such as the Fama-French 3 factor, the factors loadings will likely vary over time, whereas the regression assumes they are constant.

Each month's portfolio consists of different number of firms and as the numbers of firms vary, the portfolio residual variance may also vary; i.e. we might find heteroscedasticity. Mitchell and Strafford (2000) suggest requiring a minimum of ten firms in the portfolio at each month to mitigate the heteroscedasticity problem. Owing to the fairly limited amount of companies listed on Nasdaq OMX Stockholm, our sample size is, however, fairly small and requiring ten or more firms would disqualify many months.

Another criticism is that the method gives equal weight to each month's portfolio. Loughran and Ritter (2000) argue the method builds on the assumption of market efficiency. They reason that should decision makers (managers, CEOs et cetera) exploit pricing errors in the market by timing their actions, this non-natural time-clustering would have less weight as all months are weighted equally.

As suggested by Fama (1998) this can be corrected for by utilizing weighted least square (WLS) regression, where the weight of each portfolio is the number of securities in the portfolio each month. By weighing each month's portfolio by the number of securities, one will also account for potential heteroscedasticity as Lyon et al (1999) point out. In this study each month is weighted by the number of firms in the portfolio.

6. Results

6.1. Descriptive statistics

We report 99 announcement of impairments (henceforth also *events*). More events take places in the beginning of the study period, while the number of events gradually decrease for each year. In terms of months, the events are distributed fairly unevenly with 8 months having 4 or fewer events, while 28 events are reported in February. Many year-end reports are released in February, explaining why many events take place in February. See Appendix for detailed distribution.

Exhibit 3 - Time of announcement

Year	n	%
2009	31	31%
2010	20	20%
2011	20	20%
2012	16	16%
2013	12	12%
	99	100%

The event-firms come from a variety of sectors. Utilities is the only sector not represented in our sample, which is understandable considering there are only two utility firms currently listed on the Nasdaq OMX Stockholm[7]. More than half of the firms were at the time of announcement listed on the small cap list. 20 firms reported more than one event during the studied period.

Exhibit 4 – Sector classification of event-reporting firms

This table provides a summary of the firms reporting a goodwill impairment loss. Sectors are collected from Compustat and based on the GICS taxonomy. The classifications of companies into Small Cap, Mid Cap or Large Cap is based on data from Datastream. Small Cap is for companies with a market value of less than €150mn, Mid Cap for companies with a market value of €150mn-€1.5bn and Large Cap for companies with a market value over €1.5bn.

	Unique firms		Listed companies			Impairments	
Sector	**n**	**%**	**Small cap**	**Mid cap**	**Large cap**	**n**	**%**
Consumer Discretionary	9	14.3%	6	2	1	20	20.2%
Consumer Staples	4	6.3%	1	1	2	7	7.1%
Energy	1	1.6%	0	0	1	1	1.0%
Financials	7	11.1%	2	3	2	10	10.1%
Health Care	6	9.5%	4	1	1	7	7.1%
Industrials	17	27.0%	8	6	3	23	23.2%
Information Technology	13	20.6%	10	1	2	22	22.2%
Materials	4	6.3%	2	1	1	4	4.0%
Telecommunication Services	2	3.2%	0	0	2	5	5.1%
Total	**63**	**100%**	**33**	**15**	**15**	**99**	**100%**
% of total			**52.4%**	**23.8%**	**23.8%**		

[7] As of 2016-05-10

The size of the impairment ranged widely both in absolute terms and relative terms. Exhibit 5 report the size of the impairments in relative terms. The majority of announcements are fairly small, even though some small impairments are excluded (see Section 5.1). 4 announcements are larger than the companies' market cap. The mean of the absolute size of the event was 585 million SEK, while the median was 90 million SEK. 17 of the announcements were larger than 1bn SEK. See Appendix for absolute sizes of impairments.

Exhibit 5 – Size of impairment
This table provides a summary of the size of reported impairments. Data is collected from Datastream and are reported in relative sizes to (i) the market cap of the company and (ii) the total assets.

Quantity	**% of market cap***		**% of total assets****	
	n	**%**	**n**	**%**
0-2%	35	35%	41	41%
2-5%	10	10%	17	17%
5-10%	17	17%	18	18%
10-20%	11	11%	15	15%
20-50%	16	16%	6	6%
50-100%	6	6%	2	2%
>100%	4	4%		
Total	99	100%	99	100%

* Measured as the market value of all outstanding shares 5 days prior to the event
**Measured as last reported number prior to announcement

In line with other similar studies (e.g. Bartov et al, 1998; Hirschey and Richardson, 2003) the sample is fairly *noisy;* goodwill impairment losses are often published in conjunction with contemporaneous information. 38% of the events were published in conjunction with an earnings announcement. Other conflicting information include, for example, the selling of a subsidiary. Exhibit 6 provide a summary of the type of information announced at the same time as the event. See Section 7.1.1.2. for a detailed discussion about the risks with contemporaneous information.

Exhibit 6 – Contemporaneous information
This table provides a summary of other contemporaneous information at the time of the event. Data is collected manually from Nasdaq OMX Stockholm's website and categorized manually.

Other information	**n**	**%**
Earnings	38	38.4%
Selling business area/subsidiary	16	16.2%
Restructuring program	5	5.1%
Miscellaneous	5	5.1%
No substantial confounding information	35	35.4%
Total	99	100%

6.2. Short-term reaction

For the full sample the associated cumulative average abnormal return (CAAR) is -4.5%. The stock reaction is greatest at *t*=0. The day prior to the event show minor positive abnormal returns as outlined in Exhibit 7, but *t*=0 through *t*=2 show negative abnormal returns.

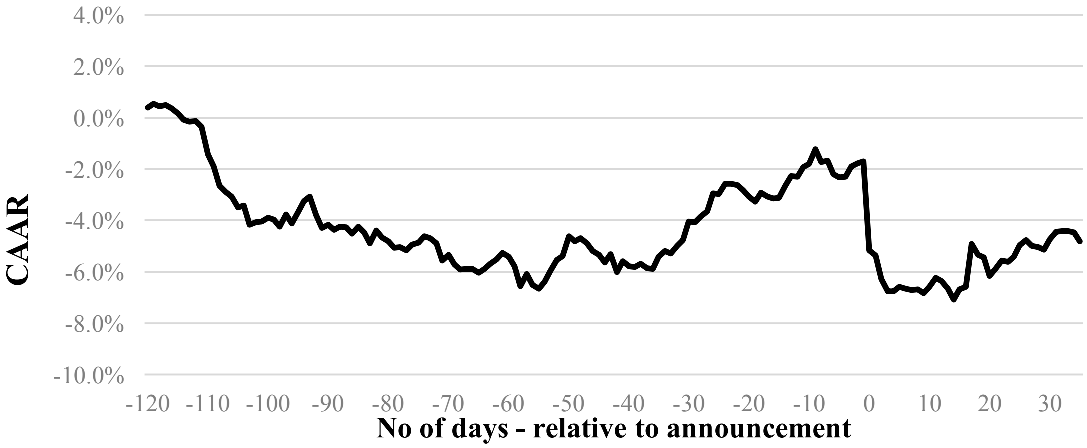
Exhibit 7 – Average abnormal return
This table provides a summary of the average abnormal returns in the event window $t-1$ through $t+2$. All events are included (sample size, n=99).

AAR at time *t*				**CAAR**	**T-statistic (CAAR) (P-val.)**	
t=-1	0	1	2	*t*=-1,…,+2	*G-RANK*	*Cross-sectional*
0.06%	-3.45%	-0.20%	-0.91%	-4.50%	5.19 (<.001)	-5.09(<.001)

The median of the cumulative abnormal return is higher at -2.27%. 27 firms display positive CAR during the period, while 70 firms display negative CAR. The cumulative abnormal returns are statistically significant at the 0.001% level; the reported t-values are -5.09 in cross-sectional T-test 5.19 in the Generalized Rank Test.

In graph below (Exhibit 8) pre-event CAAR along with post-event CAAR are plotted. We observe a pre-event negative return of 2% and a slight post-event upturn.

Exhibit 8 - CAAR over time (full sample)



*as measured by the market model. Returns prior to the event period (t=-1) are measured bythe coefficient ($\boldsymbol{\beta}$) while the intercept is only included in the event and post-event period.

6.3. Long-term reaction

The results from the Calendar-Time Portfolio regression are presented below in Exhibit 9. Inferences about abnormal returns are drawn from the constant, α_p, and its statistical significance. The constant's value of -0.005 translates to a negative abnormal portfolio return of 0.5% per month. The negative abnormal return is, however, not significant. $(R_{mt} - R_{ft})$ is explaining the majority of the movement in the portfolio, and it is also the only factor significant at the 0.01 level. Of the other two Fama French factors SMB is explaining a larger part of the movement in the portfolio than HML is.

Exhibit 9 – Long-term Calendar-Time Portfolio Regression

Coefficients - All companies incl [a, b, c]

Model		Unstandardized Coefficients $\boldsymbol{\beta}$	Unstandardized Coefficients **Std. Error**	Standardized Coefficients $\boldsymbol{\beta}$	**t**	**Sig.**
1	**(Constant)**	-.005	.005		-.996	.323
	Rm-Rf	1.017	.136	.700	7.469	.000
	SMB	.433	.173	.205	2.501	.015
	HML	.347	.227	.140	1.529	.131

a. Dependent Variable: Rp-Rf
b. Weighted Least Squares Regression - Weighted by N of firms in portfolio
c. RSQ, adj-RSQ and Std err of estimates are presented in the appendix

7. Discussion and analysis

In this chapter we briefly comment on the results and discuss issues. We identify several potential flaws in the tests conducted above and divide them into two categories. One concerns the test logic and the models used. The other concerns the input; the data used. To analyse and scrutinise the findings sensitivity analyses and robustness checks are conducted. We aim to to solidify our findings by adjusting and controlling for the flaws identified. To examine how the latter category of flaws affect the outcome, we re-run the tests with appropriate subsamples. There are endless of possibilities to extend the study with variables/subsamples accounting for, for example, size and industry of the reporting company. However, as our sample is fairly small to start with we do not do so.

By trying to adjust for a potential bias (that might be found in similar studies) arising from only including events with reference to our keywords in the press releases, we might have introduced another bias, stemming from the inclusion of some *small* impairments[8] and exclusion of other. Although our data collection was along the line of other similar studies (e.g. Bartov et al, 1998), we find credible arguments to apply the same threshold for all events. Applying the same threshold for all events would, however, significantly reduce our sample; for example, using the same threshold as Bens et al (2011) would almost reduce our already small sample in half. Nevertheless, we do regard our data sources as credible (see discussion in Section 5.1).

By design, the approaches to measure short-term and long-term abnormal returns can, but most often do not, overlap. More often there is a slight gap between the two depending on what time of the month the event occurs. The most extreme case would ensue when a company announces an impairment the first day of a month; the short-term CAR will subsequently be measured until two trading days after the 1st, but the stock will not be included in the long-term portfolio until the beginning of the next month[9]. Should there exist abnormal returns the days immediate after t+2, these returns will be underestimated. Although we have not encountered such studies, a way of overcoming this issue would be to form daily (instead of monthly) portfolios including each stock from T_2+1 to T_3, where T_2 is the end of the event window (in this case t+2) and T_3 is the end of the post-event

[8] Defined as less than 4% of market cap at t-5

[9] Assuming the 2nd and 3rd day of the month are trading days, abnormal returns from the 4th until the 30th/31st will not be included in either the long-term or the short-term measurement period.

measurement period[10]. By doing so, we suspect, however, that the coefficient of determination for the Calendar-Time Portfolio regression would decrease.

We examined the possibility of carrying out a multivariate regression including items such as *Unexpected earnings* to, for example, account for the *noisy* sample, but instead chose to approach our problems with subsamples as shown below. The rationale for doing so is that we did not find sufficiently adequate proxies for variables such as expected earnings[11] and the expectedness of an impairment (see e.g. Section 7.1.1.4). Our view is that by conducting a multivariate regression with many inadequate variable, the reliability of the study would be undermined.[12]

The used data was generally well available for all firms, and in the few cases data was missing it was collected manually; for example, when measuring the size of events, some companies reported missing data for MVC (Market Value for Company) in Datastream. We then used MV[13] (Market Value) and manually assured it only existed one type of share. In estimating the Fama French factors some data was missing; at the most we excluded 10.5% of the observation in one month. Should this missing data not be random, there might be systemic bias in the HML and SMB factors. Overall we regard the findings as fairly valid, although the results might not be applicable to other markets' outside Sweden.

Although there arguably are benefits to trimming the data sample, we do not do so (either by eliminating outliers or by winzorizing) as this may introduce statistical bias and does not mimic investor behaviour.

7.1. Short-term

In the short-term significant negative abnormal returns are found, which support the idea that goodwill impairment losses signal new negative information. The largest abnormal reaction occurs at t=0, which is consistent with the efficient market hypothesis. The returns at t=2 is also considerably negative. This could potentially be because (i) the market needs to digest

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[10] T_3-T_2+1 is then the length of the post-event measurement period (in this case one year).
[11] Only a few firms had data on analysts' expectations in Datastream. Bens et al (2011) use a random walk model for expecting earning where analysts' expectations were missing, but as many firms exhibit high volatility in prior quarterly earnings, we assess that the random walk model to not be an adequate proxy.
[12] For example, we suspect that Hamberg and Beisland (2014) findings of no value relevance in goodwill impairments on Swedish data depend on the fact that they applied a rather extensive multivariate regression
[13] Measured as number of stocks*stock price

the information, (ii) a measurement error, (iii) confounding information is published post-event or (iv) clarifying information is published post-event. The cumulative abnormal average returns were expected to be negative and the results are in line with our expectations. They are quite similar in magnitude to findings of e.g. Hirschey and Richardson (2003).

7.1.1. Sensitivity analyses and robustness checks

A summary of all sensitivity analyses are found in the Appendix.

7.1.1.1. Model for expected returns

As mentioned in 5.2.2 there are several methods for estimating expected return. In estimating the market model parameters, we find that the market model's predictive power varies substantially between observations. R^2 measure the quality of fit and its values range from 0.000 to 0.84 between companies. The mean and median of R^2 are merely 20% and 10%, suggesting the market model is a fairly poor model for estimating abnormal returns. In this section we test other proxies for abnormal returns.

We first estimate β_i (beta) for each individual firm over a 3-year period. We use monthly returns adjusted for capital changes, regressed against monthly returns of the market portfolio (refer to sections 5.3.2.1 and section 5.3.2.3 for how these numbers are calculated). We do not account for the risk-free return as in the Capital Asset Pricing Model (CAPM), but instead conduct a simple ordinary least square linear regression, where $R_{i,t}$ is the dependent variable and $R_{m,t}$ is the independent variable. Abnormal returns in the event window are subsequently measured as:

$$AR_{i,t} = R_{i,t} - \beta_i R_{m,t}$$

where β_i is obtained from the above regression. The R^2 values from the beta-estimation vary from 0% to 68%. The mean and median are 25% and 26% respectively, slightly higher than for the market model.

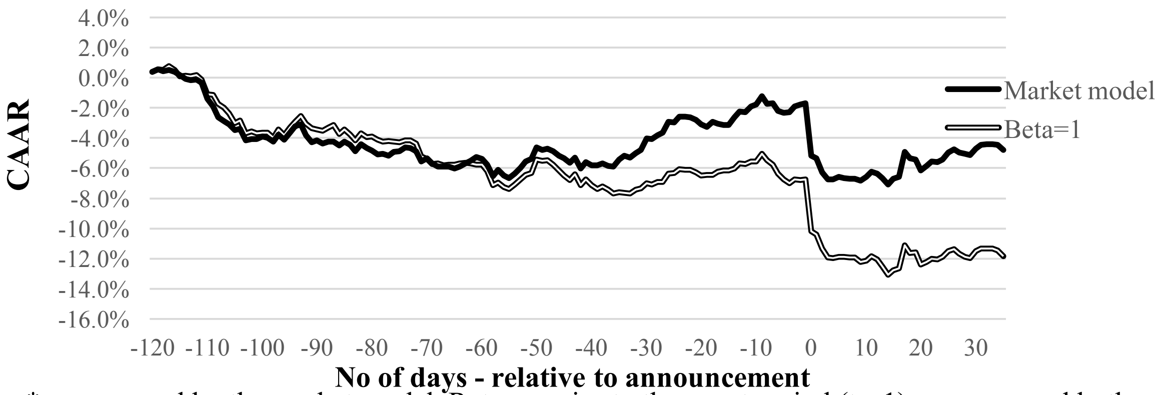
We also measure abnormal returns by assuming $\beta_i = 1$ for all firms. By equalling beta to one, a security's return is expected to move with the market, i.e. if the market returns 5%, the security is expected to return 5%. After having done so we re-measure abnormal returns in the event window. The results are presented below in exhibit 10:

Exhibit 10 – Average Abnormal Returns – change of proxy for expected returns
In this table abnormal average returns (AAR) are presented when the model for estimating expected returns is changed.

	AAR at time *t*				**CAAR**	**T-statistic(CAAR) (P-val.)**	
	t=-1	0	1	2	*t*=-1,…,+2	*G-RANK*	*Cross-sectional*
$\beta_i = 1$	0.11%	-3.50%	-0,23%	-0.88%	-4.50%	4.97(<.001)	-5.33(<.001)
β_i estimated	0.13%	-3.39%	-0.31%	-0.86%	-4.42%	5.36(<.001)	-4.93(<.001)

Ironically, when $\beta_i = 1$, the obtained CAAR is exactly the same as when expected returns are estimated with the market model. In general, the differences are very insignificant, suggesting as other have pointed out (e.g. Kothari, 2007) that event studies aren't particularly sensitive to the modelling of expected returns if the event window is short. As observed in Exhibit 11 below, however, the pre-event returns do differ when setting $\beta_i = 1$.s

Exhibit 11 – AAR for firms reporting large events



*as measured by the market model. Returns prior to the event period (t=-1) are measured bythe coefficient ($\boldsymbol{\beta}$) while the intercept is only included in the event and post-event period.

7.1.1.2. Controlling for contemporaneous information

As outlined in Section 6.1 quite a few of the announcements are published in conjunction with other news. This may lead to a systemic bias in the results. Let's, for example, assume goodwill impairments are more commonly published in together with lower-than-expected earnings than *normal* earnings (as is conjectured by the theory of *big bath accounting*). Lower-than-expected earnings will likely cause abnormal negative stock price reactions. Subsequently, one cannot be sure if measured abnormal returns are the result of goodwill impairment announcements or contemporaneous earnings announcements. The aim of this study is to measure the effect of goodwill impairments in isolation, not goodwill impairments together with earnings. To control for confounding news, we investigate a subsample consisting of the 35 firms who report goodwill impairment losses without any substantial confounding information released at the same time.

Exhibit 12 – AAR for firms with no contemporaneous information
This table provides a summary of the average abnormal returns in the event window $t-1$ through $t+2$. Events are only included if they are published on their own; i.e. with no other contemporaneous information published. *n*=35.

AAR at time *t*				**CAAR**	**T-statistic (CAAR) (P-val.)**	
t=-1	0	1	2	*t*=-1,…,+2	*G-RANK*	*Cross-sectional*
-0.29%	-0.94%	-0.10%	-1.84%	-3.17%	2.54 (0.016)	-2.41(0.021)

The cumulative abnormal average return is smaller, but still negative. The median CAR is lower at -0.97%. Quite surprisingly the largest movement is recorded two days after the announcement. Translating our T-statistics into p-value yields p-values of 0.016 (G-RANK) and 0.021 (Cross-sectional). Although not investigated further, the lower CAAR and higher significance levels in this subsample, indicate that goodwill impairment losses are announced in combination with other events that lead to negative abnormal stock reactions, as is predicted by the theory of big bath accounting. The results also suggest that announced goodwill impairment charges *in themselves* contribute to abnormal negative returns, although the large movement at *t*=2 may raise some concerns about the validity.

7.1.1.3. Controlling for possible non-value relevance

In Chapter 3 the value relevance of goodwill impairments was discussed. Intuitively very small impairments should be less value relevant, although Hirschey and Richardson (2003) find that the size does not matter for the subsequent market reaction. Their study is, however, based on data pre-FASB 142 and as goodwill was amortized over time pre-FASB 142, their sample *likely* contain fewer *small* write-offs[14]. Despite excluding a handful minor observations (see section 5.1), the size of impairments in our sample is not normally distributed, but instead many impairments account for less than 2% of market value at $t-5$. By excluding such observations that potentially are non-value relevant, we hope to better catch the effects of value-relevant goodwill impairments. We examine abnormal returns by only including reported events larger than the median (i.e. the largest 50%), measured as the ratio of event size to the market cap at $t-5$. The results are presented in Exhibit 13 below:

[14] Hirschey and Richardson (2003) do not report their full data set, only the mean is reported. The mean is higher than in this data set

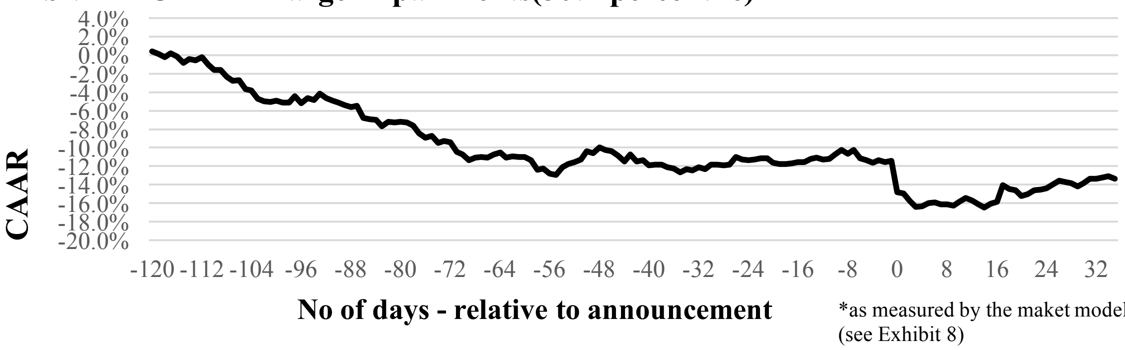
Exhibit 13 – AAR for firms reporting large events

This table provides a summary of the average abnormal returns in the event window $t-1$ through $t+2$. Events are the largest 50%, measured as the size of the event compared to the market cap at $t-5$. n=50

AAR at time t				**CAAR**	**T-statistic (CAAR) (P-val.)**	
t=-1	0	1	2	t=-1,…,+2	*G-RANK*	*Cross-sectional*
0.38%	-4.85%	-0.89%	-1.57%	-6.93%	7.53(<.001)	-6.56(<.001)

In contrast to Hirshey and Richardson (2003) the results suggests that the size of the impairment does matter. The cumulative average abnormal return is lower and the t-statistics are higher than for the full sample. The CAAR over time are presented in the graph on the next page; we observe a noteworthy abnormal pre-event decline in stock prices. This can be interpreted in at least two ways, (i) declines in market values drive large impairments, (ii) the market anticipate the large impairments and adjust accordingly in the pre-event period.

Exhibit 14 - CAAR - Large impairments(50th percentile)



*as measured by the maket model (see Exhibit 8)

7.1.1.4. Controlling for possible expectedness

As discussed in Chapter 3, should the market be efficient, abnormal price reactions should only arise when new information becomes publicly available. Thus, assuming an efficient market, should the event already be anticipated, we would not expect to find any abnormal returns. Ramanna and Watts (2012) and Bens et al (2011) conjecture that companies with book-to-market ratios over 1 are expected to report goodwill impairments[15] and use this as a

[15] For companies with goodwill on their balance sheet. They adjust so the expected goodwill impairment cannot be bigger than the amount of goodwill on the balance sheet.

proxy for the expectedness of goodwill impairments. We see a conceptual flaw in using the book-to-market ratio as the proxy, which is best illustrated by an example: Company A is a listed company with two divisions, Y and X. Y and X are active in different industries. 2 years ago A acquired division X's competitor and subsequently allocated goodwill to CGU's in division X. Division X is today performing very well. The much larger division Y, on the other hand, is not performing well and report big losses, which punishes company A's stock. The depressed stock price means that company A's book-to-market ratio is over 1. Arguably company A should not report a goodwill impairment loss as goodwill is allocated to the part of the company performing well. The same logic follows even if X and Y aren't divisions, but much smaller CGUs.

Still, it is difficult to identify a different proxy measuring the expectedness of a goodwill impairment and we thus use the same proxy as Ramanna and Watts (2012) and Bens et al (2011). We collect data from Datastream on price-to-book values at $t-5$ and invert these numbers to book-to-market ratios. We examine the stock price reactions for companies with a book-to-market ratio over 1. The results are presented below:

Exhibit 15 – AAR for firms with book-to-market ratio over 1

This table provides a summary of the average abnormal returns in the event window $t-1$ through $t+2$. Only events where reporting firms have book-to-market ratios at $t-5$ over 1 are examined. n=35; 25 unique firms.

AAR at time *t*				**CAAR**	**T-statistic (CAAR) (P-val.)**	
t=-1	0	1	2	*t*=-1,…,+2	*G-RANK*	*Cross-sectional*
0.77%	-4.79%	-0.04%	-1.21%	-5.27%	6.28(<.001)	-6.34(<.001)

As we can see, CAAR, is still significantly negative and the negative returns are more pronounced than is the case when examining the full sample. We see two potential scenarios why CAAR is negative, either (i) the events are expected, but negative abnormal returns still follow the announcement, or (ii) book-to-market-ratio is a bad proxy for measuring the expectedness of an event. Scenario (i) would imply a non-efficient market. We rather interpret the results that the book-to-market ratio is an inadequate proxy for measuring the expectedness of announcements of goodwill impairments.

7.2. Long-term

The results found in the long-term horizon are consistent with the efficient market hypothesis as we do not report any significant negative abnormal returns. To find no post-announcement drift was also in line with our expectations, although it is quite different from what others have found. We do find slight indications of negative abnormal returns, but as they are not statistically significant it is impossible to draw inferences from the reported numbers. Nonetheless, 0.5% negative monthly abnormal return translate to 6% annual abnormal return, which is quite substantial. It has been pointed out several times that drawing conclusion from long-horizon event studies necessitate great caution (e.g. Kothari, 2007).

7.2.1. Sensitivity analyses and robustness checks

In comparison with the sensitivity analyses conducted on the short-term results, in the ensuing sections we will not change the model for measuring abnormal returns; see section 5.3. why the calendar-time portfolio is preferred.

7.2.1.1. Controlling for possible non-value relevance

As discussed in Chapter 3, Section 5.1. and Section 6.2.1.3. small impairments might not be value-relevant. Including non-value relevant events would give less weight to value-relevant events causing, yielding results that are more prone to be consistent with the efficient market hypothesis. We examine the long-term effects of larger impairments, by only including the largest 50% of the events. The ambition is to examine whether a post-announcement drift exists, when non-value relevant events are eliminated.

Exhibit 16 – Calendar-Time Portfolio regression – only large events

Coefficients - Long-term horizon – Large impairments [a, b, c, d]

		Unstandardized Coefficients		Standardized Coefficients		
Model		***β***	**Std. Error**	***β***	**t**	**Sig.**
1	**(Constant)**	-.008	.008		-1.054	.296
	Rm-Rf	1.010	.195	.581	5.177	.000
	SMB	.665	.251	.258	2.646	.010
	HML	.328	.326	.110	1.005	.319

a. Dependent Variable: Rp-Rf
b. Weighted Least Squares Regression - Weighted by N of firms in portfolio
c. Included are the largest 50% events, measured as % of market value at *t*-5
d. RSQ, adj-RSQ and Std err of estimates are presented in the appendix

The negative monthly abnormal return is slightly elevated compared to the full sample, but the negative abnormal return of -0.8% is still not statistically significant at any reasonable level. This is consistent with the efficient market hypothesis.

7.2.1.2. Controlling for overlapping impairments

Some companies reported several goodwill impairments during the examined period (see Section 6.1). Aspiro AB, for example, reported 8 goodwill impairments during the period. In 24 cases a subsequent impairment took place during the one-year post-announcement period the reporting company's stock was included in the long-term portfolio; in those scenarios short-time abnormal returns will also be included in the measurement of long-term abnormal return. This does arguably mimic investor behaviour, but in case the two impairments are independent the short-time abnormal return of the second impairment is not, *per se*, a long-term consequence. In this section we exclude companies with more than one reported impairment loss during the period in order to (i) exclude such impairment and (ii) give less weight to individual companies reporting impairments several times. The results are presented below in Exhibit 17:

Exhibit 17 – Calendar-Time Portfolio regression – unique impairments

Coefficients - Long-term horizon – One reported impairment [a, b, c, d]

Model		Unstandardized Coefficients		Standardized Coefficients		
		β	**Std. Error**	**β**	**t**	**Sig.**
1	**(Constant)**	-.004	.007		-.506	.615
	Rm-Rf	.898	.176	.573	5.098	.000
	SMB	.550	.220	.242	2.502	.015
	HML	.595	.306	.214	1.940	.057

a. Dependent Variable: Rp-Rf
b. Weighted Least Squares Regression - Weighted by N of firms in portfolio
c. Only firms reporting one goodwill impairment during the studied period is included
d. RSQ, adj-RSQ and Std err of estimates are presented in the appendix

The constant is still negative (at -0.4%) but still insignificant, and even more so than before. The HML factor seem to explain more of the returns than it does using the full sample. We do, however, not find any significant post-announcement drift and the results are consistent with the efficient market hypothesis.

8. Conclusion

In this paper both short-term and long-term abnormal returns surrounding and following the announcements of goodwill impairment losses are studied. In the short-term a significant negative abnormal return is documented. Furthermore, we conduct tests on various subsample to solidify the findings. We find that negative abnormal returns are smaller in size and less significant when events published together with contemporaneous information are excluded. This suggest two things, (i) goodwill impairment charges in themselves are negatively value-relevant and (ii) goodwill impairment charges are announced in combination with other negative news. We also find that the market reaction is more significant when events are larger in size.

Intuitively it makes sense to try to adjust for the expectedness of an impairment, but we find that the most prevalent proxy for doing so is inadequate. Developing a sufficient proxy for this would be of interest.

In the long-term no significant abnormal returns are documented, although the results indicate negative abnormal returns. No significant abnormal returns are consistent with the efficient market hypothesis, but the results contrast previous findings (Bartov et al, 1998; Hirschey and Richardson, 2003; Cheng, Peterson and Sherrill, 2015). Given the contradictory results in similar studies, it would be interesting to conduct a cross-market study to evaluate the difference between market reactions in different countries. The generalizability of this study outside Sweden would be limited as the results would only be valid on Swedish data.

In the study, we discuss the initial allocation of goodwill, and as is logically explained this may affect subsequent goodwill impairments. For future research it would be interesting to examine how the market reaction differ depending on how the prior allocation is conducted. Having a larger sample would also enable future studies to draw more conclusion about the difference in market reaction depending on firm characteristics, which also would be of relevance.

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Appendix:

Abbreviations and acronyms used:

AR=Abnormal Return
BE/ME= Book Equity to Market Equity
CAAR=Cumulative Average Abnormal Return
CAPM=Capital Asset Pricing Model
CAR=Cumulative Abnormal Return
CEO=Chief Executive Officer
CGU=Cash-Generating Unit
FASB=Financial Accounting Standards Board
GAAP=Generally Accepted Accounting Principles
GICS=Global Industry Classification Standard
HML=High minus Low
IASB= International Accounting Standards Board
IFRS=International Financial Reporting Standards
NPV=Net Present Value
OLS=Ordinary Least Square
SCA= Svenska Cellulosa AB SCA
SEK= Swedish krona
SMB=Small Minus Big
WACC=Weighted Average Cost of Capital
WC=Worldscope
WLS=Weighted Least Square

Data:

Event month		
January	12	12.1%
February	28	28.3%
March	4	4.0%
April	8	8.1%
May	2	2.0%
June	3	3.0%
July	4	4.0%
August	3	3.0%
September	1	1.0%
October	22	22.2%
November	9	9.1%
December	3	3.0%
	99	100.0%

Absolute size of impairment

SEK mn.	n	%
0-5	5	5%
5-10	8	8%
10-25	12	12%
25-50	14	14%
50-100	11	11%
100-250	15	15%
250-500	8	8%
500-1000	9	9%
1000>	17	17%
	99	100%

Short-time horizon:

Comparison of all sensitivity analyses conducted

AAR at time *t*					**CAAR**	**T-statistic(CAAR)**	
	t=-1	0	1	2	*t*=-1,…,+2	*G-RANK*	*Cross-sectional*
All (n=90)	0.06%	-3.45%	-0.20%	-0.91%	-4.50%	5.19	-5.09
Beta=1 (n=90)	0.11%	-3.50%	-0,23%	-0.88%	-4.50%	4.97	-5.33
Beta est (n=90)	0.13%	-3.39%	-0.31%	-0.86%	-4.42%	5.36	-4.93
Pure (n=35)	-0.29%	-0.94%	-0.10%	-1.84%	-3.17%	2.54	-2.41
Large (n=50)	0.38%	-4.85%	-0.89%	-1.57%	-6.93%	7.53	-6.56
BE/ME>1 (n=35)	0.77%	-4.79%	-0.04%	-1.21%	-5.27%	6.28	-6.34

Long-term horizon:

Model Summary - Long-term horizon - All companies incl

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,765[a]	.585	.566	.173881761120569

a. Predictors: (Constant), HML, SMB, Rm-Rf

Model Summary - Long-term horizon- one impairment reported

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,700[a]	.490	.463	.160849889734162

a. Predictors: (Constant), HML, SMB, Rm-Rf

Model Summary – Long-term horizon - Large impairments

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,641[a]	.411	.384	.184147575013772

a. Predictors: (Constant), HML, SMB, Rm-Rf