

Determinants of Discretionary Asset Write-Offs Under IFRS: Evidence from Sweden

Abstract

Since 2005 countries in the EU adhere to IFRS. This has greatly altered the regulations regarding asset write-offs for Swedish firms. The aim of this bachelor thesis is to investigate the determinants of discretionary asset write-offs under IFRS. I collect data from 176 Swedish firms listed on Nasdaq Stockholm Stock Exchange between 2011-2015. Using a method developed by Francis, Hanna and Vincent (1996), I conduct a univariate and a multivariate analysis of the determinants of asset write-offs. In line with previous research I find that a firm's write-off history and a recent change in top management is significantly correlated with write-offs. I find evidence suggesting that management incentives play a greater role in write-offs of goodwill and intangible assets than in write-offs of PP&E. I also discover that manager's write-offs goodwill and other intangible assets in years with unexpectedly poor earnings suggesting that Swedish managers engage in big bath accounting.

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1. Introduction

The accounting and authoritative guidance regarding asset write-offs has changed drastically in the last decades. Both the US and Europe have seen one regulation replace the other as accounting standard setters have tackled the issue of write-offs. Since 2005 Swedish listed firms have adopted IFRS which has brought along changes not the least for goodwill that is now to be tested for impairment annually instead of amortized over time as previously. Although asset write-offs vary in size, some are very large and have a great economic impact, for example Ericsson reported an asset write-off for the first quarter of 2017 that affected the operating profit negatively with SEK 4 bn. In this study, I investigate the determinants of such asset write-offs. I identify and investigate five different types of asset write-offs, all which to a varying degree are discretionary.

1.1 Purpose of the study

The aim of this quantitative study is to examine the determinants of discretionary asset write-offs in Sweden under IFRS. The aim is to establish an empirical connection between a set of independent variables and the dependent variable “write-offs”. I base my research on firms listed on the Nasdaq Stockholm between the years 2011-2015. I will replicate the method of Francis, Hanna and Vincent (1996). Recognizing that asset write-offs are not homogenous I include a separate test for three types of asset write-offs aiming to explain and map the difference in impairment factors, management incentives and industry trends for different types of asset write-offs.

1.2 The study’s contribution

There have been a great number of studies conducted in the area of asset write-offs during a time when the regulatory setting was different from that of today. In addition to this most of the studies are based on firms in the US, which follow a different set of regulations than Swedish firms. From studying Swedish companies, I hope to make a contribution to a greater understanding of the determinants of asset write-offs in Sweden, under IFRS regulations.

1.3 Scope of investigation

The scope of my investigation is limited to Swedish firms listed on the Nasdaq Stockholm Stock Exchange during 2011 – 2015. I will examine the determinants of discretionary asset write-offs that amount to at least 1% of total opening assets. Due to limitations in databases used, not all types of asset write-offs are investigated and thus conclusions regarding asset write-offs other than those specifically investigated cannot be made. I will simply focus on the determinants of discretionary asset write-offs and not discuss any short or long term consequences of them. I will only investigate firms under IFRS and will thus not make any comparisons with write-offs under Swedish GAAP. I will investigate factors that jointly influence the probability and magnitude of asset write-offs and will therefore not be able to make any comments on determinants that only influence the probability of a write-off and not the amount.

1.4 Definitions

Many studies use the terms Write-offs, Write-downs and Impairments interchangeably. In this paper I will use the term Write-offs to describe the part or full downwards valuation of an asset. Only when referring to “impairment tests” and when describing the regulations put forward by IFRS will I use the term “Impairment” as this is the term used in the regulations. Except from this no other term for write-off will be used, no matter whether describing a write-off that was reported many years ago or even under a different regulatory setting.

2. Background

A write-off can be viewed as a mean for a firm to communicate accurate financial performance to outside stakeholders. Write-offs are generally frequent and economically significant, they enter the income statement as a cost and decrease both the assets and the equity of a firm. Elliott and Hanna (1996) reported a 21% frequency of firms with an asset write-off in excess of 1% of total opening assets in 1993.

2.1 History

In the beginning of 1990 several research papers highlighted the increased frequency and importance of asset write-offs (Elliott and Hanna, 1996; Rees, Gill and Gore, 1996 Smith and Lipin, 1994). The Financial Accounting Standards Board (FASB), the organization issuing accounting standards for US Generally Accepted Accounting Principles (GAAP), responded by issuing SFAS No. 121 which established accounting standards for the impairment of long-lived assets (FASB, 2016). SFAS No. 121 was effective for fiscal years beginning after December 1995 until December 2001 when it was replaced by SFAS No 144 (now renamed to ASC 360-10). SFAS No. 144 put more emphasize on fair value accounting and stated that “*An impairment loss shall be recognized only if the carrying amount of a long-lived asset is not recoverable and exceeds its fair value*” (FASB 2001). The International Accounting Standards Board (IASB) took after FASB’s move towards more emphasize on fair value accounting regarding assets write-offs and issued IFRS 3 in 2014. The move by both IASB and FASB closer to fair value accounting of write-offs was done to try and increase the relevance and the value of information regarding the write-offs of assets in financial reporting.

Before 2005 most firms in the European Union (EU) adhered to the respective GAAP of their country. In an attempt to harmonize the accounting standards between the member states, the EU decided that all member states of the union needed to adopt and comply with IFRS from 2005. For publicly listed firms in Sweden this created a change in the accounting standards of goodwill. Under Swedish GAAP, goodwill was to be amortized annually but with the change to IFRS and according to IAS 36 it after 2005 was to be tested annually for impairment (IFRS, 2004) .

2.2 Definition of a write-off.

The way to identify and calculate an asset write-off has varied over time as a consequence of different regulations. IAS 36 “Impairment of Assets” stipulates that under IFRS an asset write-off is the full or partial downwards valuation of an asset following that an assets recoverable amount falls below its carrying amount. Where the recoverable amount of an asset is defined as the higher of an assets fair value less costs of disposal and its value in use. The carrying amount is defined as the recorded cost of an asset, net of any accumulated depreciation and/or

accumulated impairment losses. Subsequently an asset write-off decreases the value of an asset in the balance sheet and generates a cost in the income statement equal to the difference between the assets recoverable amount and its carrying amount (IFRS, 2004).

2.3 The write-off decision

According to IAS 36 companies utilizing IFRS are compelled to conduct an impairment test where there is an indication of impairment of an asset, with the exception of goodwill and certain other intangible assets for which an annual impairment test is mandated. IAS 36 further stipulates that when making the impairment assessment, as a minimum, the firm is obliged to consider both internal and external factors which are stated in IAS 36.12 and displayed in table 1 (IFRS, 2004).

Table 1 – External and Internal factors to be considered when making an impairment test

External Sources	*Market value declines
	*Negative changes in technology, markets, economy or laws
	*Increases in market interest rates
	*Net assets of the company higher than market capitalization
Internal Sources	*Obsolescence or physical damage
	*Assets is idle, part of a restructuring or held for disposal
	*Worse economic performance than expected
	*For investments in subsidiaries, joint ventures or associates the carrying amount is higher than the carrying amount of the investee's assets or a dividend exceed the total comprehensive income of the investee

There are certain differences between the regulations concerning asset write-offs between GAAP used in the US and IFRS used in Sweden. A difference of particular interest for this thesis lies in the techniques used to determine if a write-off has been realized. Under ASC 360-10 *Impairment and Disposal of Long-Lived Assets* firms are as an initial step forced to test the assets for recoverability, which is done by comparing the carrying amount of the asset with the estimated sum of all future cash flows generated by the asset. As a second step calculating the difference by the assets carrying amount and its fair value generates the amount of the write-off. Where the fair value is the price that would be received to sell an asset in an orderly

transaction between market participants at the measurement date. In contrast to this IAS 36 demands that the firm compares the recoverable amount of the asset with its carrying amount. In the case of the carrying amount exceeding the recoverable amount the asset is to be impaired, resulting in a write-off amounting to the difference between the carrying and the recoverable amount. These two differing techniques results in two slightly different processes where the decision and the amount of the write-off are decided in the same step under IFRS whereas the decision to write-off and the deciding of the amount of the write-off are separated under GAAP (Siggelkow and Zülch, 2009). This might ultimately lead to differing determinants of write-offs under the two regulations.

2.4 Discretion in asset write-offs

The introduction of IFRS has altered the discretion in asset write-offs for managers of Swedish firms. Whereas goodwill was previously amortized annually it is now instead tested for impairment annually. This has given managers the option to not write-off any goodwill at all one year if they estimate that no impairment has taken place. Following the reasoning of Siggelkow and Zülch (2013) there is reason to believe that even though IAS 36 provides extensive instructions of how to estimate the recoverable amount the estimation process entails areas of discretion. This increased discretion introduced by the adoption of IFRS could allow top management to provide more accurate and useful information regarding the underlying economic value of the assets. However research has criticized the amount of the discretion and pointed to the risk of manipulation. For example Henning, Shaw and Stock (2004) show evidence that US firms delay goodwill write-offs. After the adoption of IFRS Swedish managers are now also able to delay goodwill write-offs which was not possible when goodwill was amortized. Following Elliott, Hanna and Vincent's (1996) reasoning that the degree of management discretion regarding timing and amount of write-off is dependent on the amount of available authoritative guidance and market values I provide a short description of the availability of authoritative guidance and market values for the different asset write-offs which I will investigate.

2.4.1 Goodwill:

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*” (FASB 2007). This in extension means that goodwill can only exist after the event of an acquisition. IAS 36 states that goodwill in contrast to earlier when it was amortized annually, under Swedish GAAP, should be tested for impairment at the end of each year. Impairment of goodwill should be done if it is found that the recoverable amount is lower than the carrying amount. In contrast to other assets such as inventories and property, plant and equipment (PP&E) there is often no readily available market value of such things defined by the IASB to be “*the future economic benefits arising from other assets acquired in a business combination*” (FASB 2007). Because of this relatively low availability of authoritative guidance and market values, write-offs of goodwill are likely to be discretionary.

2.4.2 Other Intangible Assets

IAS 38 defines intangible assets as an identifiable non-monetary asset without physical substance. These can generally include items such as brands, logos and customer lists. Further IAS 38 provides guidance for the accounting of intangible assets which are to be separated from goodwill and amortized over time. The authoritative guidance for write-offs of intangible assets is similar to that of goodwill in that it is to be tested annually for impairments but the great difference being that intangible assets also are amortized over time. The lack of market values for assets such as brands and customer lists are much likely, also in parity with goodwill, to be substantial and different from the much larger availability of market values for assets such as inventories and PP&E. Thus, there is reason to regard write-offs of intangible assets as discretionary as those of goodwill.

2.4.3 Restructuring costs:

According to IAS 37 restructuring costs must be recognized if and only if a present obligation has arisen as a result of a past event, payment is probable and the amount can be estimated reliably. Restructuring costs are not an asset write-off but they affect the income statement and the balance sheet in a similar way as a write-off of assets. The restructuring cost enters the

income statement as a cost and creates a liability in the balance sheet which is reduced when the cash outflow has occurred (IFRS, 1998). Due to the absence of clear authoritative guidance and availability of market value for restructuring cost there is reason to regard the discretion in restructuring costs as equal to the discretion of write-offs of goodwill and intangible assets.

2.4.4 PP&E:

The authoritative guidance for write-offs of PP&E is stipulated by IAS 16 which states that an item of property, plant or equipment shall not be carried at more than recoverable amount (IFRS, 2003). Recoverable amount is the higher of an assets fair value less costs to sell and its value in use. These legislations allow managers discretion as to identify if and when the value of a property, plant or equipment has fallen below its carrying amount. However, the availability of market and assessed values to supply managers with counseling, decreases this discretion. Due to this it is reasonable to classify PP&E as less discretionary than write-offs of goodwill, intangible assets and restructuring costs.

2.4.5 Financial Fixed Assets

The authoritative guidance for financial fixed assets under IFRS is stipulated under IAS 32 *Financial Instruments*. Financial fixed assets can often represent investments in group companies and associates. Even though the market value for these are not likely to be as readily available as the market value of a real estate or a certain equipment there are comparable firms and the stock market which provides market values. Due to the availability of authoritative guidance and market values the degree of discretion in write-offs of financial fixed assets are more like that of PP&E than that of goodwill, intangible assets and restructuring costs.

2.5 Earnings management

Earnings management has been defined in many different ways in previous research. Healy and Wahlen (1999) explained that earnings management occurs when managers use judgment in financial reporting and in structuring transaction to alter financial reports to either mislead some stakeholders or to influence contractual outcomes that depend on accounting numbers. Fischer

and Rosenzweig (1995) provided a more specific definition of earnings management as actions by division managers which serve to increase (decrease) current reported earnings of a division without a corresponding increase (decrease) in the long term economic profitability of this division.

The earnings management literature mainly focuses on two types of earnings management, income smoothing and big bath accounting.

2.5.1 Income smoothing

As the term suggests the notion behind income smoothing is largely built on the belief that corporate managers often take actions to dampen the fluctuations in their firms' reported net income. Ronen and Sadan (1981) suggested that one reason for this could be that managers think that investors pay more for a firm with a smoother income stream. Income smoothing suggest that the managers of the firm, choose to take write-offs in years when earnings are unusually high. This action is done to lower earnings in the current year and being able to achieve artificially greater earnings in the following years as write-offs that should have been taken in these years have already been taken in the previous year.

In the aspect of income smoothing's actual occurrence Stice and Stice (2013) write the following:

“... One of GE's financial executives was speaking to a group of accounting professors, one of whom was brazen enough to ask if it were true that GE practiced income smoothing. The GE executive quietly smiled and responded “well, the timing of the recognition of some of our gains and losses have been rather fortuitous” – the implication of the response being that, of course GE did all that it could within the accounting rules, to smooth earnings”

2.5.2 Big bath

Jordan and Clark (2004) defined big bath theory as firms experiencing low earnings in a given year taking discretionary write-offs to reduce even further the current period's earnings. The notion behind this action being that the company and its management will not be punished proportionately more for the big hit it takes in the current year due to its already depressed

earnings. This “clearing of the deck” makes it easier to generate artificially higher profits in later years. The theory behind this at large builds on the belief that there is room for managers to take on discretionary asset write-offs that might not be needed for the current year but by doing so there will not be any need to write-off the assets in the near future.

3. Previous research

Most of the existing literature regarding asset write-offs examines the US market, less research has been done in a different market with a different set of regulations. The existing literature has mainly focused on three distinct areas concerning asset write-offs: (i) Managerial Discretion and Incentives, (ii) Value Relevance of a Write-Off and (iii) Stock Market Reactions to The Announcement of a Write-off.

3.1 Managerial discretion

Lin and Peasnell (2000) defined the revaluation of an asset as discretionary partly because it entailed two separate choices for the managers (i) if to revalue the asset and (ii) when to revalue the asset. Elliott and Shaw (1988) in a similar manner noted that asset write-offs were different from most other financial statement information due to greater discretion as to both their magnitude and timing. Hamberg, Paananen and Novak (2011) suggested the managerial discretion for Swedish firms has been altered considerably with the introduction of IFRS 3 in 2005. This standard has substituted historical cost with fair value measures and by that provided managers with an increased discretion to determine what to be established as a fair value without a well-established market for the asset. The intention with the increased discretion of IAS36 was to enable the managers to provide accounting more closely linked to the underlying economic value of the assets. However many have argued that this freedom has been used by managers through an increase in manipulation. In their research Hamberg, Paananen and Novak (2011) found that the amounts of goodwill write-offs under IFRS were significantly lower than the sum of goodwill impairments and amortizations under Swedish GAAP. Since impairment and amortization of goodwill affects the income statement the adoption of IFRS has thus increased reported earnings for Swedish firms. Lindberg and Bengtsson (2014) also studied Swedish data after the introduction of IFRS and their findings indicated the presence of both

earnings management and fair value accounting as strategies developed by the managers when using their discretion in write-offs of goodwill.

3.2 Management Incentives

3.2.1 Agency theory

Agency theory builds on an assumption that all people act in their own interest for personal gain, even if this might be at the expense of other people (Jensen & Meckling, 1976). Lhaopadchan (2010) argues that in accounting, management is given freedom in what methods to use, and that this freedom provides managers the possibility to make choices solely for personal gain. Agency theory suggests that managers will exploit these possibilities in an opportunistic way to manipulate the firms accounting (Ramanna, 2008). Elliot and Shaw (1988) discussed that the reason for why most write-offs were taken in the fourth quarter was because there was a larger security market reaction to bad news released in the first three quarters of firm's year. Implying that the managers choose to take the write-offs when it benefits them the most. This is further supported by Davis, Schoorman & Donaldson (1997) who reported that when managers are confronted with a choice they will chose that option which maximizes their personal gain.

3.2.2 Income smoothing and big bath

Several past studies hypothesize that due to the lack of authoritative guidance for the accounting of most types of asset write-offs in the beginning of the 1990's many managers used the discretion which they possessed over timing and amount of asset write-offs to manipulate earnings in their favor (Francis, Hanna and Vincent, 1996; Elliot and Hanna, 1996; Rees et al., 1996). Zucca and Campbell (1992) investigated 67 firms that together had reported a total of 77 write-offs with a mean impact of 4% of total assets between the years 1978 and 1983. The authors found that out of 77 write-offs 45 were recorded in a period when earnings were unexpectedly poor, suggesting big bath accounting, whereas 22 out of the 77 write-offs were recorded in a period where earnings were unexpectedly good, suggesting "income smoothing". Francis, Hanna and Vincent (1996) found by investigating US data from 1989 to 1992 that proxies for management incentives constituted a greater determinant of write-offs in

goodwill and restructuring costs than in inventories. They reasoned that this was due to more extensive authoritative guidance and a greater availability of market values for inventories than for goodwill and restructuring costs. In addition, they found that contrary to their expectations write-offs were statistically significantly positively correlated with the magnitude of unusually poor earnings and significantly negatively correlated with the magnitude of unusually good earnings which sharply contrasted Zucca and Campbells (1992) findings and suggested that management did not engage in income smoothing or big bath accounting. After the introduction of SFAS No. 121 in 1995 Riedl (2004) conducted a research to investigate the write-offs of assets pre and post the new regulations on US data. Contrary to the aim of the standard Riedl (2004) found that the quality of the reporting of asset write-offs was lower in the post SFAS-121 period. He further found that after the introduction of SFAS-121 there was a greater association between asset write-offs and “big bath” reporting behavior. By looking at data from U.K. Abughazaleh et al. (2011) found that managerial discretion was not only restricted to the impairment process but also in the allocation of goodwill. They also found that goodwill impairments were likely to be associated with a recent change of CEO, income smoothing and big bath reporting behavior.

3.2.3 Management changes

The notion that asset write-offs are largely associated with management changes is well documented (Strong and Meyer, 1987; Cotter, Stokes and Wyatt, 1998). Moore (1973) argues that there are at least two distinct ways in which a new management can benefit from discretionary accounting which reduce current income. Firstly, reported low earnings could be blamed on the old management and the historical base for future references would then be reduced. Secondly, future years’ earnings would be relieved of those charges, leading to improved earnings in future years. Elliott and Shaw (1988) show that 39% of their sample recorded a change in chief executive officer, president and/or chief financial officer during the year of the write-off. They further support Moore’s (1973) reasoning and argue that a common view is that the new management try to blame the previous management for problems. This is done by consciously overstating losses attributable to their predecessor, so that the benchmark against which the management’s performance will be measured against is lowered. The decision-making literature however provides a different angle for the relationship between changes in management and write-offs. For example Statman and Caldwell (1987) suggest it is

psychologically easier for a new management to cancel old projects, to make a reassessment of the value of existing assets and to initiate new programs. This reasoning suggest that new managers rather than acting opportunistically to benefit themselves have an easier time taking necessary decisions that the previous managers could not due to psychological restrictions. Cotter et al. (1998) investigated asset write-offs in Australian firms, focusing on management incentives. They did find a significant relationship between management changes and magnitude of the write-offs. Contrary to their expectations they also found no significant relationship between governance mechanism such as the existence of an audit committee and auditing by the six biggest firms and the magnitude of write-offs. Blomdahl and Wilson (2009) investigated asset write-offs in Sweden between 2000 and 2008 and found that changes in management were significant in explaining the write-off decision and amount.

3.3 Value relevance of a write off

Barth (2000) used a definition of value relevance as follows “the ability of the measure to make a difference to decisions of financial statement users”. As indicated in table 1 there are primarily two possible signals an asset write-off can send (i) a decreased value in use, represented by an expectation of a lower present value for the future cash flows than previously were expected or (ii) a reduction of fair value, represented by a decrease in market value of an asset. Therefore it is mainly in these two scenarios the value relevance of a write off lies. Riedl (2004) reports that in his sample of publicly quoted firms 16.5% of the firm year observations contain a write-off of a long-lived asset with a mean impact of 2.8% of total opening assets. Francis, Hanna, Vincent (1996) reported that in their sample of 674 PR Newswire announcement of asset write-offs the mean write-off had a magnitude of \$76.2 mn. When Elliot and Hanna (1996) went through the 46 firms that reported the greatest number of special items between the years 1975 and 1994 they found that 19 out of 46 corresponding to 46% of the firms went through a bankruptcy or similar extreme reorganization.

3.4 Impairment factors and history

Bleakley (1995) introduced the phrase ”recurring non-recurring items”, referring to the behavior where the same firms report multiple occurrences of what is supposedly non-recurring items. Following this Elliott and Hanna (1996) investigated the probability of reporting a large write-

off conditioned on the write-off history of each specific firm. They found that if a firm had reported a large write-off in the immediately prior year 27% of the firms reported another large write-off in the current year. At the same time only 7% of the firms that did not report a write-off in the previous year reported a write-off in the current year. Loh and Tan (2002) investigated asset write-offs in Singapore from 1983 to 1997 and found macroeconomic factors such as unemployment rate, gross domestic product growth rate and occupancy rate of properties to be important determinants for a firm's write-off decision. They also found more firm specific factors to be relevant determinants, for example a decreasing return on assets and a recent change in chairman were found to be significantly important.

3.5 Market reaction

It is natural that the stock price of a firm reacts to a write-off. Francis, Hanna and Vincent (1996) noted that the average write-off in their sample amounted to \$1.3 per share, an amount which enters the income statement as a cost and lowers the asset and equity side of the balance sheet. Bartov, Lindahl and Ricks (1998) reported that their findings suggest that the disclosure standards might not be sufficient to allow market agents to fully understand the economic consequences of the write offs and reveal a substantial mispricing which was inconsistent with the efficient market theory. Hirschey and Richardsson (2003) investigated market reaction to the announcement of goodwill write-offs and found statistically significant negative abnormal returns tied to goodwill write-off announcements. Moreover they found a statistically significant link between the magnitude of negative valuation effects during the window of the announcement and the size of negative returns during the post-announcement period. This suggests that announcements of goodwill write-offs are not only important and value reducing during the announcement period but are rather also associated with a deterioration of the company's market value during a subsequent year long period.

Hamberg, Paananen and Novak (2011) studied goodwill write-offs under IFRS and showed that firms did not write-off as much goodwill under IFRS as they did under Swedish GAAP and that firms with substantial amounts of goodwill yielded abnormally high returns despite showing abnormally low earnings. Suggesting that investors viewed the accrual-based earnings increase from the adoption of IFRS 3 as an indication of higher cash flows in the future.

4. Development of research question

I make use of the theoretical background presented above as a framework for the relationship between asset write-offs and its determinants. In broad terms, the goal of this study is to investigate the relationship between a set of independent variables and asset write-offs. Thus I aim to answer the following question:

What are the determinants of discretionary asset write-offs?

As mentioned above, under IFRS it is primarily IAS 36 which provides authoritative guidance for when to report a write-off. IAS 36 stipulates that there is a need for an impairment test if there is reason to believe that an asset may be impaired. In similarity with Siggelkow and Zülch (2013) I make an assumption that the likelihood of having impaired assets is associated with poor firm performance. The logic behind the assumption is for example that a firm which has a declining return on assets (ROA) is likely to have assets which will not generate as much cash in the future as previously expected, corresponding to a worse economic performance than expected which is one of the factors managers must take into consideration when conducting an impairment test. Hence I suspect that poor firm performance is related to asset write-offs.

Following Healy and Wahlen (1999) I recognize different types of incentives for management to take a write-off. As stated by Francis, Hanna and Vincent (1996) new management has incentives to “clear the deck” and terminate projects that can be blamed on the previous management. Because of this I suspect that a recent change in management is related to asset write-offs.

The vast earnings management literature suggests that managers might use their discretion in accounting to manipulate earnings. There is one notion that managers engage in big bath accounting, meaning that in years when earnings are unexpectedly poor they write-off as much as possible to in an artificial way boost the following years’ earnings. If managers receive a bonus based on the firm reaching a certain profit managers have an implicit incentive to engage in this type of behavior if the current year’s profit already has fallen below this threshold. Another well documented, different way to manage earnings is called income smoothing. One reason for why managers would engage in income smoothing is based on the notion that

managers like to please investors by providing a smoother income stream (Trueman and Titman, 1988). Therefore managers take write-offs in years when earnings are already unexpectedly high so that next years' earnings will be relieved of these write-offs. Hence I suspect that there is a relationship between an unexpectedly good profit before write-offs or an unexpectedly bad profit before write-offs, and write-offs.

With respect to Elliott and Hanna's (1996) evidence that the likelihood of a write-off increases if the firm has a history of write-offs I also suspect that there is a relationship between a firm's write-off history and write-offs.

5. Methodology

5.1 Selection and collection of data

The sample of 176 firms over the period 2011-2015 (totaling 829 firm years) is a result of a selection process that started with a collection of 342 firms currently listed on the Nasdaq Stockholm stock exchange and 44 firms that have been delisted sometime during the sample period. This original sample was then reduced to only include firms for which data for the dependent and independent variables was available in Compustat, Retriever or Datastream. With the collection of data from databases I made a deviation from the methodology of Francis, Hanna and Vincent (1996) who hand collected data from write-off announcements published by PR Newswire. The negative consequence of my deviation is that it inhibits me from identifying the exact time the write-off was announced to the market. On a positive note this deviation should result in my sample avoiding the same bias as Francis, Hanna and Vincent (1996) sample which did not entail as many write-offs as reported by Compustat. Thus their sample contained a bias where only write-offs that were communicated through a news announcement were present.

The logic behind collecting data between 2011 -2015 derives mainly from the fact that the main purpose of this research is to investigate the determinants of asset write-offs in Sweden under IFRS. This puts a limit on the time span that could be investigated as IFRS was not introduced

in Sweden until 2005. With respect to Elliott and Hanna's (1996) research showing that the frequency of write-offs is heavily influenced by the number of write-offs in the years preceding the write-offs I wanted to include a variable for this. This variable is a measure of the number of write-offs a firm has taken in the previous five years. For the sample of observations in 2011, data for the variable write-off history constitutes of the number of write-offs taken by the firms in 2006, 2007, 2008, 2009 and 2010. Due to this, observations for the period 2010 could also have been collected but by refraining from this I only collect data regarding write-offs from 2006 giving the firms one whole year to familiarize with the regulation.

5.2 Measuring write-offs.

The data collected for my sample comprises the following five different types of asset write-offs; write-off of goodwill, write-off of other intangible assets, write-off of financial fixed assets, write-off of property, plant and equipment (PP&E), and restructuring costs. Francis, Hanna and Vincent (1996) who conducted a similar study also included write-offs of inventories. The decision to exclude write-offs of inventories in this research is two folded as there was no available data in the data bases used for inventory write-offs and as the main focus of this research is on asset write-offs which are to some extent discretionary. This is similar reasoning as that of Elliott and Shaw (1988) who from an initial sample of negative "special items" excluded non-discretionary asset write-offs such as inventory and receivable adjustments. All write-offs are scaled by total opening asset of the year of the write-off. This is done to get a greater comparability of the economic significance of write-offs from firms with different sizes.

I used a cut-off point where write-offs that amounted to at least 1% of opening total assets were categorized as a write-off, and the firm that reported it was categorized as a write-off firm in that specific year. Write-offs that amounted to less than 1% of total opening assets were not recorded as a write-off and the firm reporting it was categorized as a non-write-off firm in that specific year. This was done to exclude the presence of write-offs with no economic significance. For example, a write-off amounting to SEK 1 mn is of little economic significance when a firm has total opening assets of SEK 100 bn and reported an operating profit before write-offs of SEK 5.0 bn. Additionally, there seems to be little to no incentives for managers to take the write-off to "clear the deck" or engage in earnings management. The use of a cut-off

point at 1% of total opening assets is also in parity with how previous research in the field of asset write offs have done (see for example Elliott and Hanna, 1996; and Francis, Hanna and Vincent, 1996).

5.3 Research method and statistical test

As this study is based on Francis, Hanna and Vincent (1996), I will utilize a similar methodology as their study. To analyze the determinants of discretionary asset write-offs I will conduct a univariate and a multivariate analysis. In the univariate test, I will categorize a firm as a write-off firm or as a non-write-off firm and compare the means of my variables to see if there is any difference in population means for my sample. In the multivariate analysis, I will conduct a Tobit-regression.

5.3.1 Univariate analysis

For the univariate analysis I firstly categorize each of my observations as either a write-off firm or as a non-write-off firm. All observations where a firm has reported an asset write-off which amounts to more than 1% of total opening assets are categorized as a write-off firm and all observations that have not reported a write-off amounting to 1% of total opening assets are categorized as a non-write-off firm. Since I use panel data I have several yearly observations for each firm. I allow a firm to be both a write-off firm in one year and a non-write-off firm in another provided that they reach the requirement stated above. A firm can thus be categorized as a write-off firm in one year and then as a non-write-off firm in the other, however the categories are mutually exclusive so that a firm cannot be both a write-off firm and a non-write-off firm in the same year. As a result of a firm being able to be part of both the write-off and non-write-off sample firm specific effects are accounted for. Since write-off firms and non-write-off firms have not been collected in equal size I rather than use all non-write-off firms select at random an amount equal to the number of write-off firms. To account for the time specific factors an equal number of non-write-off firms is selected at random for each year, for example this means that a random set of 21 non-write-off firms is chosen from the 2011 population and 31 firm observations are chosen from the 2014 population. To determine if there is difference in population means of the independent variables for the two populations I use an

F-test. This procedure is done in order to investigate if the two populations exhibit a statistically significant difference in population means of any of the independent variables.

5.3.2 Multivariate analysis

In the multivariate analysis, I conduct a test where I treat all asset write-offs as homogenous and one where I identify the specific type of write-off reported and conduct a regression only for that type. This is done for write-offs of PP&E and restructuring costs. Since goodwill write-offs and write-offs of other intangible assets are very similar in terms of authoritative guidance and availability of market values I perform a regression for both these types of assets together. Unfortunately, the number of write-offs of financial fixed assets were too few to make a regression on and these are thus not included in the specific regressions. For the tests that treat all write-offs as homogenous I define the write-off amount as the sum of all write-offs taken within that year. Due to this the number of total asset write offs (124) does not equal the sum of all write-offs divided by different types (132). In parity with Francis, Hanna and Vincent (1996) I set the frequency of write-off firms to mimic a 20% frequency in the multivariate analysis. This is done as previous studies (see for example Elliott and Hanna, 1996; and Riedl, 2004) have shown on a write-off frequency around 16.5% to 21% in yearly observations.

5.4 Explanation and predicted signs of independent variables

Just like my reference study Francis, Hanna and Vincent (1996) I use a set of variables to proxy for two types of factors, namely, the likelihood that a firm has impaired assets and management incentives to take a write-off. My predictions for the sign of my independent variables are based on the results of Francis, Hanna and Vincent (1996) except for the variables POOR and GOOD where I base my predictions on the results of Zucca and Campbell (1992)

5.4.1 Measuring likelihood of having impaired assets

The independent variables that have been collected to proxy for the likelihood of having impaired assets are based on an assumed association between having impaired assets and both

poor performance of a specific firm as well as declining industry trends in which the firm operates. The logic behind this assumption is based on the fact that according to IAS 36 and its stipulations shown in table 1 management needs to take both internal and external factors into consideration when conducting an impairment test of an asset. It is these stipulations in table 1 that the proxies for impairment of assets try to relate to.

The first proxy for the likelihood of impaired assets is the firm's stock performance over the last year preceding the year of the write-off. This means a period starting two years prior to the write-off year and ending the last day of the fiscal year preceding the write-off (RET1). The second proxy for the likelihood of impaired assets is the firm's stock performance over the five years preceding the year of the write-off (RET5). To account for stock splits both these variables are calculated using the stock price times the number of outstanding ordinary shares at the end of each year, which is also equal to the market capitalization of the firm. Here I have deviated slightly from the procedure of Francis, Hanna and Vincent (1996) whom measured the variables RET1 and RET5 as the stock return exactly one year respectively five years from the write-off to the day of the write-off. Since my data is collected from a database it is not possible to know the exact date the write-off was communicated to the market. However this is unlikely to impact my results to any great extent since the variables RET1 and RET5 still measure what is intended; the most recent short-term trend of the stock price (RET1) and the longer more general trend of the stock price (RET5). I predict that the poorer the firm's stocks performance has been during the five years preceding the write-off the greater the write-off (defined as a positive number) For example a worse economic performance than expected (which is one of the internal factors mandated by IAS 36 to be considered when testing for impairment) would likely lead to a decreased stock price. I thus expect a negative coefficient between both RET1 and RET5 and the dependent variable write-offs.

I gather data and examine industry adjusted book-to-market ratios (BTM). This measure is generated by taking the firms book-to-market at the fiscal year preceding the write-off less the industry mean at the same point in time. My prediction is that firms with a higher book-to-market than their industry competitors are more likely to have impaired assets, highlighted by the fact that the market values the firm's assets relatively lower than its peers. Acknowledging that an asset may not impair at a discrete point in time but rather follow a general trend of decline in a firm I analyze the mean change in the firm's own book-to-market over the five

years preceding the write-off (ΔBTM). Here I expect that firms that have an increasing book-to-market ratio have a greater likelihood of having impaired assets.

I collect data for each firm's return on assets (ROA) for each year. From this I calculate and examine the mean change in the firms return on assets over the five years preceding the write-off. I predict that write-offs are negatively correlated with this variable. The argument supporting this would be that assets that generate less income than previously thought per definition show sign of worse economic performance than expected.

In order to use variables to capture the performance of the industry in which the firm operates I use the GICS sector codes retrieved from Compustat to divide the firms into industries. I then calculate the average sales growth (IND_GROWTH) and the average change in return on assets (IND_ROA) over the five years preceding the write off year for all firms within the same 2 digit sector. I also analyze the mean change in median book-to-market for all industries over the five years preceding the write-off year ($IND_ \Delta BTM$). My expectation being that firms operating within industries with decreasing industry growth, decreasing industry ROA and increasing book-to-market ratios are more likely to exhibit impaired assets. For example, decreasing industry growth and industry ROA could stem from negative changes in technology, markets, economy or laws which is one of the external sources shown in table 1. An increased book-to-market ratio would put a firm's net assets closer to being greater than the market value of the firms, which is another external source for impairment test showed in table 1.

5.4.2 Measuring management incentives

A set of variables has been collected to proxy for management incentives to take on write-offs. Previous literature and research has mainly discussed two types of incentives for manager to take on write-offs. By taking a large write-off at the start of ones tenure as CEO or chairman one can "clear the deck" and blame the resulting costs on the previous management. I therefore include a variable measuring recent changes in top management in the year or that previous of the write-off ($\Delta MGMT$). My definition of change in top management is if either the chairman of the board or the CEO has changed. The notion of using these two is primarily that the CEO is responsible for the day-to-day business of the firm. The chairman of the board has mainly a responsibility for the long term strategy of the firm. Due to this the change of chairman might

come with a new strategy that requires that the assets of a firm are revalued. I exclude any changes in management for interim CEO's. The logic behind this procedure is that interim CEO's are usually elected to serve only for a shorter period of time until the board can find a new ordinary CEO. Because of this the incentives for interim CEO's to take on a write-off to "clear the deck" and blame it on the previous management ought to be considerably lower. In the same reasoning there does seem to be little incentive to engage in any earnings management as the entire point of doing so is that one can artificially increase future earnings by taking write-offs today. Since the interim CEO generally has this position for a short time this is not something that would benefit her/him. To collect this data, I go through each firm's annual reports from the year 2009 through 2015 to see if there has been any change in top management in any of the years. I then calculate the percentage change as 0% if no change in top management has taken place, 50% if either the CEO or the chairman has changed and 100% if both the CEO and the chairman has changed for each year and observation.

The timing of the write-off decision might also be influenced by the current year's earnings. Agent principal-theory suggests that managers, if compensated with bonuses based on current years earnings are more likely to take on write-offs in years when earnings are already so low that they will miss their bonuses and by this shifting future write-offs into this period. This would suggest a negative coefficient between current year's earnings before write-offs and write-offs. At the same time several studies discussed above indicate that managers smooth income. This means that managers take write-offs in years where earnings are exceptionally good, a possible reason for this could be that earnings are so good that even with the write-off the managers have exceeded the upper bound of their earnings based bonus. To be able to distinguish between these two factors I just like Francis Hanna and Vincent (1996) develop two different variables for when earnings are unusually good and unusually poor. I do define earnings performance as unexpected operating return on assets (UE). This is a measure of operating income before taxes and any write-offs in the year of the write-off less operating income before taxes and any write-offs in the year preceding the write-off, divided by the previous year's closing balance of total assets. Negative values of UE are used as a proxy for poor performance and positive values of UE are to proxy for good performance. For each firm $POOR = UE$ if $UE < 0$ and 0 otherwise and $GOOD = UE$ if $UE > 0$ and 0 otherwise.

5.4.3 Variables for write-off history and control variable

Based on Elliott and Hanna's (1996) findings that the likelihood of a write-off increase if the firm has a history of write-offs I include a measure to capture the firm's propensity to take on write-offs (HIST). This variable is measured as the number of write-offs in excess of 1% of opening balance of total assets the firm has reported in the five years preceding the write-off. The minimum value this variable could take on is thus 0 whereas the maximum is 5. I also include a variable for the firm's industry propensity to take write-offs (IND_HIST). This variable is measured as the average history of write-offs for all firms (less the firm itself) in its industry. Neither of these variables (HIST and IND_HIST) are introduced to proxy for the likelihood of having impaired assets, but are rather introduced as two sets of explanatory variables.

To control for any differences between sizes of firms I include a measure of the size of the firm, (SIZE) defined as the log of sales revenue in the year preceding the write-off.

Exhibit 2 – Expected sign of coefficient for the independent variables.

Independent variables	Expected sign of coefficient
RET1	-
RET5	-
BTM	+
ΔBTM	+
ΔROA	-
IND_GROWTH	-
IND_ΔBTM	+
IND_ΔROA	-
ΔMGMT	+
POOR	-
GOOD	+
HISTORY	+
IND_HIST	+
SIZE	+

5.5 Tobit-regression

There are mainly two factors that have governed my decision to use a Tobit regression, accounting conservatism and the simultaneous decision to write-off and to decide the amount of the write-off under IFRS.

Due to accounting conservatism there is an asymmetric demand to record an asset write down as soon as it occurs whereas there is less demand to immediately establish an upwards revaluation of an asset. In my investigation I will regard a write-off as a correction of an asset's book value departure from its economically underlying value which I will not do for the upwards valuation of an asset. Thus my dependent variable records a non-zero value when an asset write-off occurs, and a zero value when there is no record of a write-off occurring, or a write-up should occur. Due to this I have a left censored sample and the coefficients from a linear regression would be biased.

Also, the choice of using a Tobit-regression implies a simultaneous decision by the firm to not only write off but also to choose the amount of the write-off (Szczesny and Valentincic 2013). As mentioned earlier the decision to write-off and the decision of write-off amount are separated under US-GAAP whereas it is a simultaneous decision under IFRS due to the form of IAS 36 (IBID). By definition, the decision to make a write-off is tied to determining the diminished future cash flows from an investment under IFRS. Even if all write-offs would be completely opportunistic, the justification for a decision to write off an asset would still have to be grounded on an estimation of diminished future cash flows and, hence, both the decision to write off and the magnitude of write-offs would be influenced by the same underlying economic factors.

I use a weighted Tobit-regression to estimate the importance of impairment and management incentives in explaining both the existence and the amount of a firm's write-off decision. Following Francis, Hanna and Vincent (1996) I adjust my sample of write-off and non-write off firms to mimic a 20% frequency of observing a write-off in the population. I deem this reasonable given that this was the procedure of my reference study Francis, Hanna and Vincent (1996)

The regression model used in the Tobit regression is as follows:

$$\begin{aligned}
\text{WRITE_OFF}_i = & \alpha_0 + \alpha_1 \text{RET1}_i + \alpha_2 \text{RET5}_i + \alpha_3 \text{BTM}_i + \alpha_4 \Delta \text{BTM}_i + \alpha_5 \Delta \text{ROA}_i \\
& + \alpha_6 \text{IND_GROWTH}_i + \alpha_7 \text{IND_BTM}_i + \alpha_8 \text{IND_ROA}_i + \alpha_9 \text{MGMT}_i \\
& + \alpha_{10} \text{POOR}_i + \alpha_{11} \text{GOOD}_i + \alpha_{12} \text{HIST}_i + \alpha_{13} \text{IND_HIST}_i + \alpha_{14} \text{SIZE}_i + \varepsilon_i
\end{aligned}$$

Table 3 - Description of Variables

Variables	Definition	Source	Use
WRITE-OFF	WRITE-OFF is the sum of all write-offs a firm reports each year scaled by total assets	Compustat	Dependent variable
RET1	RET1 is the stock price return for a firm from the year t-2 to t-1	Datastream	Independent variable, Proxy for impairment
RET5	RET1 is the stock price return for a firm from the year t-6 to t-1	Datastream	Independent variable, Proxy for impairment
BTM	Firm less industry median book-to-market at the fiscal year preceding a write-off	Datastream	Independent variable, Proxy for impairment
ΔBTM	Mean change of firms BTM over the five prior years of a write-off	Datastream	Independent variable, Proxy for impairment
ΔROA	Mean change of firms return on assets over the five years preceding a write-off	Datastream	Independent variable, Proxy for impairment
IND_GROWTH	Average sales growth for all firms in the same industry the five years preceding a write-off	Compustat	Independent variable, Proxy for impairment
IND_ΔBTM	Industry mean change in median BTM the five years preceding a write off	Datastream	Independent variable, Proxy for impairment
IND_ΔROA	Average change in ROA for all firms in same industry for the five years preceding a write-off	Datastream	Independent variable, Proxy for impairment
ΔMGMT	Percentage of recent changes in CEO and Chairman in the year preceding and in the year of the write-off	Annual reports	Independent variable, Proxy for incentives
POOR	Operating profit before write-offs in t minus operating profit before write-offs in t-1 deflated by opening total assest in t	Compustat	Independent variable, Proxy for incentives
GOOD	Operating profit before write-offs in t minus operating profit before write-offs in t-1 deflated by opening total assest in t	Compustat	Independent variable, Proxy for incentives
HISTORY	Number of years reported a write-off in the five years preceding a write off	Datastream	Independent variable
IND_HIST	The industry less own number of years with reported write-offs the five years preceding a write-off	Datastream	Independent variable
SIZE	Size of the firm measured as log of revenues year preceding a write-off	Compustat	Control variable

6. Results

6.1 Descriptive statistics

I report a total of 124 write-offs from my sample for the period 2011-2015. The distribution is fairly even with a slight increase in number of write-offs in 2014 and 2015. The average magnitude of the write-offs exhibits a somewhat decreasing trend for the sample period, decreasing from 8.57% of total assets in 2011 to 5.98% of total assets in 2015. This represents a decrease of 30%.

Table 4 - Distribution of Write-Offs

Year	n	%	Mean*
2011	21	16.9	8.57
2012	21	16.9	6.14
2013	23	18.5	6.46
2014	30	24.2	6.28
2015	29	23.4	5.98
Total	124	100	n/a

*Mean is calculated as the average of the magnitude of write-offs scaled by the opening balance of total assets

The sizes of the write-offs varied greatly both in absolute terms and when scaled by total opening assets. In table 5 the number of scaled write-offs are reported for each range. Most of the write-offs are relatively small even though some smaller write-offs have been excluded (see section 5.2). Three write-offs amounted to more than 33.33% of the firms total opening assets. 26 of the write-offs amounted to over SEK 1 bn.

Table 5 - Size of Write-Offs

This table shows the summarized distribution of the sizes of reported write-offs. Data for write-offs has been collected from Datastream and is reported deflated by total opening assets in the year of the write-off.

Quantity	% of total assets	
	n	%
1-2%	48	39%
2-5%	36	29%
5-10%	23	19%
10-20%	10	8%
20-50%	6	5%
50-100%	1	1%
Total	124	100%

As can be seen in table 6 the firms that report at least one write-off during the period amount to 67 unique firms. The number of write-off firms varies heavily among different sectors. This is however expected as the absolute number of firms in different sectors varies greatly. The distribution of write-off firms is fairly even across listed markets, where 26 write of firms are listed at the Small Cap the respective number for Mid- and Large-Cap is 18 and 23. During the time span a total of 124 write-offs have been reported from 67 unique firms, meaning that on average each write-off firm reports around 2 write-offs each. In the sector Consumer Goods there have been 8 unique firms reporting a total of 18 write-offs, generating an average of 2.25 write-offs per firm which can be compare to an average of 1.5 write-offs per firm in Health Care.

For most industries write-off firms are reasonably evenly distributed across listed markets. In Telecommunications however there are only three unique firms reporting a write-off all of which are listed on the large cap.

Table 6 - Industry Classification of Write-Off Firms

This table is a summary of the firms that reported an asset write-off. Industry sectors are gathered from Compustat and are based on the GICS taxonomy. The categorization of companies into the respective market places Small Cap, Mid Cap and Large Cap is based on data that has been gathered from Datastream. Firms with a market value between 150-1500 million EUR are listed on Mid Cap and firms with a market value over 1500 million EUR are listed at Large Cap

Industry	Unique firms		Listed Companies			Write-offs	
	n	%	Small Cap	Mid Cap	Large Cap	n	%
Energy	2	2.99	1	0	1	5	4.03
Materials	3	4.48	1	0	2	7	5.65
Industrial	22	32.84	10	6	6	40	32.26
Consumer Discretionary	8	11.94	3	2	3	18	14.52
Consumer Staples	2	2.99	0	1	1	4	3.23
Health Care	10	14.93	3	5	2	15	12.1
Financials	3	4.48	1	1	1	5	4.03
Information Technology	13	19.4	7	3	3	24	19.35
Telecommunications	3	4.48	0	0	3	5	4.03
Utilities	1	1.49	0	0	1	1	0.81
Total	67	100	26	18	23	124	100

Table 7 shows that the even though the average write-off is relatively large (SEK 656 mn, 5.9% of total assets), the median write-off is considerably more modest (amounting to SEK 123.75 mn, 2.7% of total assets). Statistics from both mean and median indicate that the category with the largest write-offs in absolute numbers is PP&E which reports a mean of SEK 1135 mn and a median of SEK 344 mn however this is mainly driven by a majority of firms reporting write-offs of PP&E having a large market capitalization and correspondingly large amount of total assets and PP&E. When measuring write-offs as a percentage of total assets the mean (4.9%) and median (2.98%) for PP&E is considerably lower than that of Goodwill (7.39%; 3.55%) and Other Intangibles (9.71%; 5.92%).

It is evident that restructuring is the most frequent type of write-off appearing 48 times in the sample. The least frequent type of asset write-off is that of financial fixed assets, appearing only 5 times all which amount to between 1-3% of total assets. Write-offs of goodwill are more than twice as frequent in numbers as write-offs of intangible assets occurring 33 respectively 15 number of times.

Table 7 - Frequency and Magnitude of Write-off

This table shows the number of write-offs of each category goodwill, other intangible assets, financial fixed assets, PP&E and restructuring costs. Also included in the table is the mean and median absolute amount (in SEK) of each write-off type. As well as the mean and median write off scaled by total opening asset for each type of write-off. For all write-offs but restructuring costs the mean and median write-off scaled by the opening value of each specific type of assets. For example the amount of goodwill scaled by opening value of goodwill.

Type	Number	Millions (SEK)		% Total Assets		% Specific Assets	
		Mean	Median	Mean	Median	Mean	Median
Goodwill	33	340.54	60	7.39	3.55	22.57	11.83
Other intangibles	15	120.29	20.89	9.71	5.92	23.87	18.19
Financial Fixed	5	364.85	32.4	2.12	1.96	24.93	15.87
PP&E	31	1135	344	4.9	2.98	15.19	11.94
Restructuring	48	763.19	143.89	2.89	1.62	n/a	n/a
Total	132	656.70	123.75	5.9	2.7	n/a	n/a

6.2 Univariate analysis

In table 8 one can observe the difference in population mean for the write-off and non-write-off firms. The test shows at a significance level of 5% a statistical difference in population mean for all variables except average change in industry mean book-to-market, industry mean change in return on assets and unusually good earnings performance. For the variables, RET5, Δ MGMT and HIST I report a difference between population mean at a significance level $< 1\%$. The mean of a firm's write-off history (HIST) is 1.82 for the write-off sample and 0.62 for the non-write-off sample. For industry sales growth (IND_GROWTH) the mean was 3.76% whereas it was 6.23% for non-write-off firms.

Out of 3 variables proxying for management incentives 2 were shown to have statistically significant different means between the samples of write-off and non-write-off firms at a 5% level. The corresponding number for the 8 variables proxying for the likelihood of impaired assets was 4. The means for both firms' write-off history and industry write-off history were statistically different for the two groups at a 5% level.

Table 8 - Univariate Comparison of Determinants of Write-Offs

This table shows the mean and median for all independent variables for the two populations' write-off firms and non-write-off firms. A total of 124 observations of write-off firms and an equal amount of non-write-off firms constitute the two samples. Difference in population means show the significance level for which the mean of the populations are statistically different from one another using an F- test.

Description	Variable	Write-Off Firm		Non-Write-Off Firm		Difference in population means
		Mean	Median	Mean	Median	α -Level
Prior One-Year Return	RET1	8.12	-2.12	15.84	8.27	0.229
Prior Five-Year Return	RET5	22.42	-4.96	76.66	28.97	0.004
Ind.-Adj. Book-to-Market	BTM	16	-3.01	-4.04	-13.42	0.016
Change in Book-to-market	Δ BTM	3.56	1.38	-1.63	-0.36	0.013
Change in Return-on-Assets	Δ ROA	-0.77	-0.32	0.2	-0.161	0.015
Industry Sales Growth	IND_GROWTH	3.76	2.88	6.23	2.88	0.06
Change Ind. Book-to-Market	IND_ΔBTM	0.76	1.37	-0.2	1.37	0.3
Change Ind. Return on Assets	IND_ΔROA	1.09	0.856	1.09	0.86	0.359
Management Change	Δ MGMT	33.06	50	20.56	0	0.003
Unusually Poor Earnings	POOR	-4.27	0	-1.43	0	0.025
Unusually Good Earnings	GOOD	3.84	0.78	3.78	0.69	0.958
Firms Write-off History	HIST	1.82	2	0.62	0	0
Industry's Write-Off History	IND_HIST	0.74	0.79	0.65	0.79	0.014
Log of Prior Years's Revenues	SIZE	3.58	3.48	3.41	3.34	0.173

6.3 Multivariate analysis

The column labeled Generic Tobit describes the regression presented below in table 9 when all write-offs are treated as homogenous. The pseudo R-squared for this generic Tobit regression is substantially lower than that of each one of the specific Tobit regressions. The greatest pseudo R-squared is generated by the Tobit model for goodwill and intangible assets which generated a pseudo R-squared of 0,1804. The result shows that none of the impairment variables are statistically at a 5% level in explaining the write-offs in the generic Tobit regression. On the other side of the spectrum I find that Change in Management, Poor, and Firms Write-Off History all are significant in explaining write-offs at a 5% significance level. Restructuring costs is the only type of asset write-off where a statistically significant coefficient for RET1 is reported at a 5% level.

None of the variables that are used as proxies for management incentives (Δ MGMT, POOR, GOOD), have a statistically significant coefficient with write-offs for write-offs of PP&E. From the specific Tobit model for goodwill and intangible assets it stands to show that the coefficient for Δ MGMT and POOR are 0.139 and -0.3738 both at a significance level $< 1\%$. GOOD is not statistically significant at a 5% level in the specific Tobit model for goodwill and intangible assets. For restructuring costs Δ MGMT has a coefficient of 0.035 at a significance level of 2%. Neither POOR nor GOOD are statistically significant for restructuring costs at a 5% level.

Contrary to predictions and the results of Francis, Hanna and Vincent (1996) my results show a negative coefficient between industry change in median book-to-market and write-offs and a positive coefficient between mean change in industry ROA and write-offs. However these coefficient are not statistically significant. A possible explanation could be derived from the findings of Szczesny and Valentincic (2013) who report that dividend paying firms are more likely to report large amounts conditioned on the decision to write-off. Since dividend paying firms decreases their assets by the same amount they pay out in dividend their return on assets increases compared to if they had retained the cash, all else equal. This could then explain the positive coefficient between mean change in industry ROA and write-offs

Table – 9 Multivariate Analysis of Determinants of Write-offs

Under Specific Tobit models are the results when write-offs are categorized depending on their degree of discretion. Write-offs of goodwill and intangible assets are grouped together depending on similar regulations and degree of discretion. Write-offs of financial fixed assets were too few to be regressed on a stand-alone basis.

		Specific Tobit Models							
		Generic Tobit	P-Value	Goodwill & Intangibles	P-Value	PP&E	P-Value	Restructuring	P-Value
Intercept	?	-15.83492	0.000	-6.346156	0.319	-14.8794	0.029	-9.007346	0.003
RET1	-	-0.0134977	0.293	0.0019945	0.936	0.0267401	0.236	-0.0323787	0.024
RET5	-	-0.0027216	0.594	0.0038985	0.668	-0.0047569	0.638	-0.0064579	0.352
BTM	+	0.0056957	0.645	0.0098196	0.687	0.0317264	0.179	0.0098926	0.331
ΔBTM	+	0.0560203	0.343	0.2216837	0.101	0.0210156	0.831	0.0130504	0.776
ΔROA	-	-0.2124522	0.263	0.1770284	0.584	-0.7073074	0.223	0.0516986	0.791
IND_GROWTH	-	-0.0551314	0.431	-0.6358667	0.182	0.1357844	0.188	0.0114147	0.843
IND_ΔBTM	+	-0.0347316	0.739	-0.1160104	0.529	-0.1541264	0.399	0.0343596	0.674
IND_ΔROA	-	0.1298068	0.445	0.0476507	0.903	-0.5561555	0.146	0.3345054	0.018
ΔMGMT	+	0.0577536	0.002	0.1393586	0.000	0.0143099	0.703	0.0355916	0.011
POOR	-	-0.2713312	0.000	-0.3738032	0.000	-0.1078998	0.312	-0.02158087	0.579
GOOD	+	0.0536285	0.349	0.08082627	0.323	0.02918807	0.783	-0.08959492	0.474
HISTORY	+	3.272512	0.000	6.585083	0.000	6.411467	0.000	1.745726	0.000
IND_HIST	+	0.0439208	0.985	1.503796	0.719	11.13242	0.201	5.482336	0.110
SIZE	+	0.3494125	0.617	-2.449192	0.104	-0.1025531	0.949	0.3221353	0.578
Likelihood Ratio		-605.78		-221.07		-144.84		-184.83	
Pseudo R-squared		0.0935		0.1804		0.1308		0.1637	

7. Discussion and analysis

7.1 Evaluation of results

The aim of this thesis was to investigate the determinants of discretionary asset write-offs. From the univariate analysis, where I compare the mean of the independent variables between write-off firms and non-write off firms, I find that there is a statistically significant (at 1%) difference between the two groups in prior five-year return, management change, unusually poor earnings and firms write-off history. At a 5% significance level I also report a difference between group means for industry-adjusted book to market, change in ROA and industry's write-off history. These findings would suggest that while managers engage in big bath accounting by taking write-offs when earnings are unexpectedly low they do not engage in income smoothing by taking write-offs when earnings are unexpectedly high. My findings sharply contrast Francis, Hanna and Vincent (1996) findings who reported that the mean for unexpectedly good earnings was lower for write-off firms at 6% significant level. On the other hand it is in line with Zucca and Campbell (1992) although their findings suggest that managers engage in both big bath accounting and income smoothing. A possible reason for the different results generated in this thesis and in the research of Francis, Hanna and Vincent (1996) regarding the different means for unexpected poor earnings could be that the data is collected from different times and under different regulations. There is also one notion that Swedish managers experiences less pressure from the stock market than American managers (Segelod, 2002). This fact could possibly result in Swedish managers feeling able to take write-offs in years when earnings are unexpectedly low whereas American managers feel too much pressure from the stock market to do so.

From my data I find that the mean write-off history is significantly (at 1%) different for the sample of write-off firms than for the sample of non-write off firms where the mean for number of write-off's in the five years preceding the write-off is an entire 1,6 more for write-off firms. This finding is similar to the findings of Elliott and Hanna (1996) that the firms' write-off history is significant in determining write-offs in current years. Except for prior five year stock return none of the impairment variables show a significant at 1% level difference in means for write-off and non-write off firms. But these results are only for the univariate analysis and thus not robust enough to make any far drawn conclusions regarding asset write-offs in general.

From the multivariate analysis the results show that the amount of the write-off increases with the occurrence of a change in management, unexpectedly poor earnings and the firm's write-off history. In the univariate analysis there was a statistically significant difference between prior five years return for write-off and none-write-off firms, however the multivariate analysis shows that none of the impairment variables are statistically significant in explaining the amount of the write-off. This could be due to the high correlation among these variables (see table 13 in appendix). The column named "generic Tobit" in table 9 contains the Tobit estimates for the model presented in section 5.7 where I treat all write-offs as homogenous and do not distinguish between them.

Observable from the specific Tobit regression is that in line with predictions the variables designed to proxy for management incentives (Δ MGMT, POOR, GOOD) seem to play a greater role in explaining write-offs in goodwill and other intangible assets (where two of the variables were statistically correlated with write offs) than PP&E where none of the management incentives variables were statistically significant). This suggests that in line with predictions and Francis, Hanna and Vincent (1996) management incentives are a greater determinant of goodwill and intangible assets which are more discretionary write-offs than write-offs of PP&E which are not as discretionary. This contrasts the findings of Blomdahl and Wilson (2009) who found no evidence supporting the hypothesis that the explanatory power of management incentives was higher for more discretionary types of asset write-offs. The different results could perhaps be explained by the fact that I used data from a later time compared to Blomdahl and Wilson (2009). Contrary to expectations none of the variables for unexpected earnings are significant in explaining restructuring costs. This suggests that while managers take goodwill and intangible asset write-offs in years when earnings are unexpectedly low they do not do take restructuring costs in years with unexpectedly low earnings. This indicates that managers do not use restructuring charges and reversals to manage earnings as proposed by Moehrle (2002). A recent change in management is significantly correlated with restructuring costs at a 2% level. Either suggesting that managers do use restructuring charges to clear the deck or as a consequence of it being easier psychologically for new managers to terminate old projects (Caldwell and O'Reilly, 1982). Summarizing, my most interesting finding ought to be that the out of three variables used as proxies for management incentives, two were statistically

significantly correlated with write-offs of goodwill and intangible assets, one was statistically significantly correlated with restructuring costs and none was statistically correlated with write-offs of PP&E. This would suggest that in parity with Francis, Hanna and Vincent (1996) findings, management incentives are a greater determinant of more discretionary write-offs than non-discretionary. However, due to few observations and only one type of write-off categorized as less discretionary one should not draw any conclusions regarding asset write-offs in general based on my findings.

The explained variation for this regression is not large in economic terms. For example the generic Tobit regression yields a pseudo R² of 9,4%. By categorizing the write-offs into different all the specific regression yield a pseudo R² which is higher than that of the generic.

7.2 Evaluation of method

The financial data that has been used in this study has been collected from Datastream, Retriever and Compustat. I have assumed that the data available through these sources are accurate and updated. In addition I have randomly chosen 30 firm observations to verify that the data matches what the firm reported in its annual report. In this process, I detected no deviation between the data retrieved from the data bases and the numbers presented in each firm's annual report. However I could not validate every single one of the observations in my sample and thus I cannot completely eliminate the risk of errors being present in the sample.

To observe if a firm has assets which have a recoverable amount that has fallen below its carrying amount cannot be readily observed unless granted access to information and data restricted to management of a firm I have chosen in parity with many other research (Francis, Hanna Vincent, 1996; Ziggelkow and Zülch, 2013) to make an assumption that the likelihood of having impaired assets is connected to poor firm performance.

Both the univariate and the multivariate analysis is largely affected by the way of measuring a write-off. Since for example a write-off of SEK 1 mn is more or less economically insignificant for a firm that has SEK 100.0 bn in total assets and a total income of SEK 10 bn in a specific

year, it is reasonable to include only write-offs that are economically significant. This is similar to Francis, Hanna and Vincent (1996) who only included write-offs for which firms had sent out a public statement through PR Newswire. By doing this their sample only included write-offs that were deemed by the firms' managers to be economically significant and value relevant for the firms' investors.

7.3 Sample bias

Due to an absence of data for both the dependent and the independent variables in the Tobit regression a great number of observations have been excluded which inflicts a bias in my sample. In particular many of the delisted companies have been excluded due to missing data. This has introduced a survivorship bias and by that made my sample unrepresentative for the population. An asset write-off results in a cost in the income statement and lowers the asset and equity side of the balance sheet. Therefore an asset write-off is negative for a firm's overall performance and could lead to bankruptcy. This is enforced by Elliot and Hanna (1996) findings that 46% of the 44 firms that reported most special items in their sample went through bankruptcy or another extreme reorganization. Hence it is possible to believe that firms that report large write-offs are more likely to go through bankruptcy and be delisted. In addition one could assume that firms that get delisted have a worse firm performance than other firms that survive. Then there is an additional perspective on the bias introduced due to survivorship bias as I use an assumption that bad firm performance is associated with having impaired assets. A possible outcome of having a low representation of delisted companies in my sample is that I could be unable to detect and identify determinants of discretionary asset write-offs which are present in the population.

7.4 Robustness test

Much of the existing research on asset write-offs has excluded firms in the banking and investment sector (GIC sector 40). For example Francis, Hanna and Vincent (1996) excluded these firms as they were during the time where subject to regulations which made their asset write-offs non-discretionary. As this has not been the case for my set of data and to include more observations I chose to include firms in this sector for which there was available data in

Datastream or Compustat. However in order to control for the importance of including these firms I conducted a sensitivity test where I performed the generic Tobit-regression with the exclusion of firms in GIC sector 40. The resulting model can be seen in table 13 in appendix. The results showed that after the exclusion of firms in GIC sector 40 I report a total of 120 write-offs. Also noted is that the reported coefficients between write-offs and the independent variables, management changes, write-off history and unexpected poor earnings that were statistically significant in the original model are so even for the altered model. Overall the results from the two models are very similar. This suggest that the inclusion of firms in the financial industry has not altered or biased my results considerably.

7.4.1 Heteroscedasticity

To test the key assumptions of a Tobit-regression of no autocorrelation and homoscedasticity I apply a couple of diagnostic checks. The post-estimation tests for a Tobit regression are somewhat different than those of an OLS-regression. Because I have censored data the fitted values and residuals do not share the properties of their ordinary regression counterparts as shown by Cameron and Trivedi (2005)

To test for heteroscedasticity in my sample I perform an auxiliary regression to test for heteroscedasticity with the null hypothesis that all residuals (e_i) have the same variance (are homoscedastic) against the alternative hypothesis stating that the variance of the error terms are not the same variance across observations (are heteroscedastic). With a Wald Chi-square value of 35.79 I reject the null hypothesis of homoscedastic error terms in favor for the alternative hypothesis of heteroscedastic error terms at $p = 0.011$.

The presence of heteroscedasticity in my sample is worrisome however Arabmazar and Schmidt (1981) investigated the robustness of the Tobit estimator to heteroscedasticity and concluded that even though heteroscedasticity in a Tobit regression causes inconsistency it is less than in the corresponding truncated model. Their research further suggested that moderate heteroscedasticity is not likely to cause substantial inconsistency unless the sample is heavily censored. Thus I conclude that even though heteroscedasticity is a potential problem that could cause inconsistency it is not likely to be substantial.

7.4.2 Autocorrelation

Autocorrelation occurs in panel data when the error terms correlate across time. The presence of autocorrelation generates coefficients that become inefficient as standard errors become understated however this does not result in any bias of the coefficients (Woolridge, 2012). To test for autocorrelation in my panel data I perform a Woolridge test with the null hypothesis that there is no autocorrelation in my sample and the alternative hypothesis of there being autocorrelation across error terms in my sample. The F-value for the test is 0.15 and the p-value is 0.7. Hence I conclude that there does not seem to be any first-order autocorrelation in my data and this will not have to be controlled for in my analysis.

7.4.3 Multicollinearity

When independent variables are correlated with one another in the sense that the variation of one variable can be explained by the variation of another variable the regression is subject to multicollinearity. In order to check if my generic Tobit-regression is subjected to multicollinearity I calculate the variance inflation factor for this model. As shown in table 14 in appendix all my independent variables have a VIF-value below two. This indicates that there is no problem with multicollinearity for my model.

8. Conclusion

The purpose of this study is to examine the determinants of discretionary asset write-offs under IFRS. This study focuses on five types of asset write-offs that have been categorized as discretionary due to the limited availability of authoritative guidance and market values of the assets. I focus on firms listed on the Nasdaq Stockholm stock exchange between the years 2011-2015 and use proxies for management incentives and impairment factors to identify possible determinants. Finally I both compare mean values of the different independent variables

between write-off firms and non-write-off firms and conduct a Tobit-regression for my dependent variable write-offs and the independent variables. My main finding is that a firm's write-off history, a recent change in management and unexpectedly poor earnings seem to have a statistically significant relationship with write-offs. By treating write-offs as heterogeneous and performing separate Tobit-regressions my results suggest that variables that proxies for management incentives are more important in explaining write-offs of goodwill, other intangibles and restructuring costs than write-offs of property, plant and equipment. This could be explained by the increased availability of market prices for PP&E compared to goodwill, other intangibles and restructuring costs, meaning that these are more discretionary types of asset write-offs than PP&E. None of the variables which proxy for the likelihood of having impaired assets are statistically significant in determining asset write-offs. A possible reason for this could be that the assumption of having impaired assets is linked to bad firm performance might not be correct or it could be because of some other reason not captured by my model. Overall my findings suggest that management incentives and a firm's asset write-off history are important in order to determine current year's asset write-offs. These determinants become even more statistically robust as write-offs are categorized into different types where those types that are seen as more discretionary show a greater correlation at a greater significance level of being relevant in determining write-offs.

8.1 Theoretical contribution

I believe that this study mainly contributes to the existing theoretical literature through two ways. Firstly, to the best of my knowledge there is no other study investigating asset write-offs on Swedish firms focusing solely on the period after the introduction of IFRS. As mentioned above the great majority of studies relating to asset write-offs focus on data from the US, in a regulatory setting much different from that of Sweden today. Secondly, by dividing asset write-offs into different types I believe to shed some light on the determinants and their differing impact and importance in explaining different types of asset write-offs. It ought to be interesting for investors, analysts and regulatory setters to find that asset write-offs that to a varying degree are discretionary might possibly not be determined by the exact same factors.

8.2 Future research

An area of great interest for future research to explore could be to investigate determinants of discretionary asset write-offs for private firms. This was not possible for this paper due to data unavailability. However it is possible that the factors influencing the probability and magnitude of asset write-offs is different for private firms than public since private firms are more likely to use financial reporting for tax and dividend reasons than public firms (Ball and Shivakumar, 2005). Further there is often less agency problems between owners and managers of private firms and one can even envision a possibility that these are the same person in many private firms.

Another interesting angle would be to incorporate corporate governance into determinants of asset write-offs as this could be predicted to have a mitigating effect. This are would be of interest firstly by an assumption that firms that engage in corporate governance are less likely to have impaired assets and secondly due to the uniqueness of Swedish corporate governance comply or explain principle.

Lastly the effect on the stock market is an area that could be of interest for future research. More specifically one could investigate the market response to different types of asset write-offs under IFRS. Since write-offs are not homogenous stock market is likely to react differently to different types of write-offs and it would be very interesting to find if write-offs that to a greater extent can be explained by management incentives have a greater or less impact on the stock market than other write-offs that seem less discretionary.

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Appendix

Table 10 - Frequency of firms over years

Year	Observations	Percentage
2011	163	19,7%
2012	163	19,7%
2013	164	19,8%
2014	168	20,3%
2015	171	20,6%
Total	829	100,0%

Table 11 - Absolute size of write-off

SEK mn.	n	%
0-5	6	5%
5-10	9	7%
10-25	14	11%
25-50	9	7%
50-100	20	16%
100-250	14	11%
250-500	15	12%
500-1000	11	9%
1000>	26	21%
Total	124	100%

Table 12 - Robustness Test

This table shows the results from the robustness test
 where firms in the GIC sector 40 (financials)
 have been excluded

		Generic Tobit	P-Value
Intercept	?	-13,49749	0
RET1	-	-0,0091664	0,468
RET5	-	-0,002752	0,587
BTM	+	0,0044077	0,715
ΔBTM	+	0,0607774	0,237
ΔROA	-	-0,1735851	0,363
IND_GROWTH	-	-0,0796627	0,296
IND_ΔBTM	+	-0,0461086	0,357
IND_ΔROA	-	-0,0415313	0,787
ΔMGMT	+	0,0547835	0,004
POOR	-	-0,2866525	0
GOOD	+	0,049129	0,351
HISTORY	+	3,219103	0
IND_HIST	+	-1,029676	0,719
Likelihood Ratio		-605.78	
Pseudo R-squared		0.0935	

Table 13 - Pearson Correlation

	RET1	RET5	BTM	ΔBTM	ΔROA	IND_GROWTH	IND_ΔBTM	IND_ΔROA	HISTORY	IND_HIST	SIZE	ΔMGMT	POOR	GOOD
RET1														
RET5	0.123**													
BTM	0.183**	-1.46**												
ΔBTM	0.111**	-	0.426**											
ΔROA	0.160**	0.206**	-0.004	-0.017										
IND_GROWTH	0.08	0.053	0.009	-0.088*	0.023									
IND_ΔBTM	0.07	0	0.022	0.49**	-0.61	-0.137**								
IND_ΔROA	0.115**	0.039	-0.005	-0.013	0.004	-0.086*	-0.022							
HISTORY	-0.012	0.144**	0.257**	0.104**	-0.083*	-0.133**	0.059	-0.012						
IND_HIST	0.029	0.021	-0.003	0.006	0.006	-0.473**	0.189**	-0.032	0.069					
SIZE	-0.027	0.032	-0.076	-0.035	-0.035	-0.053	0.036	-0.079*	0.109**	0.012				
ΔMGMT	-0.120**	-0.034	0.132**	0.074	-0.055	-0.01	-0.035	-0.018	0.093*	-0.036	-0.068			
POOR	0.07	0.067	-0.008	-0.008	0.104**	-0.008	-0.017	-0.018	-0.098*	0.018	0.176**	-0.171**		
GOOD	0.069	0.04	-0.022	-0.087*	0.147**	-0.075	-0.240**	-0.014	0.004	0.008	0.278**	-0.045	0.109**	

****.** Correlation is significant at the 0.01 level (2-tailed)

***.** Correlation is significant at the 0.05 level (2-tailed)

Table 14 - VIF Multicollinearity Test

Variable	VIF	1/VIF
RET1	1.131	0.884
RET5	1.133	0.882
BTM	1.463	0.683
ΔBTM	1.763	0.567
ΔROA	1.097	0.911
IND_GROWTH	1.362	0.734
IND_ΔBTM	1.554	0.643
IND_ΔROA	1.045	0.957
ΔMGMT	1.083	0.924
POOR	1.118	0.895
GOOD	1.248	0.801
HISTORY	1.161	0.861
IND_HIST	1.333	0.750
SIZE	1.206	0.829