

# The impact of high quality audit on the association between goodwill and future cash flows

Accounting  
Master's thesis  
Kiira Waldmann  
2014

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Fall 2014  
Accounting

Approved in the Department of Accounting \_\_\_\_ / \_\_\_\_ 2014 and awarded the grade

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**Author** Kiira Waldmann

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**Title of thesis** The impact of high quality audit on the association between goodwill and future cash flows

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**Degree** Master's degree

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**Degree programme** Accounting

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**Thesis advisor** Hannu Ojala

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**Year of approval** 2014

**Number of pages** 74

**Language** English

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### Abstract

My thesis investigates whether high quality audit can enforce the association between goodwill and future cash flows. This possible association is based on the notion that under high quality audit goodwill is measured more accurately and therefore the association between goodwill and future cash flows is stronger. Audit quality is defined as audit firm size and auditor independence. Big audit firms are considered to have more competence that increases audit quality. Independent auditors are more likely to report the errors found and are therefore of higher quality. The empirical part of this study is conducted as a cross sectional regression analysis with evidence from the US collected from the financial year 2010, and the future cash flows from years 2011-2012. The study contributes to prior literature by replicating previous studies with more recent evidence, and by investigating the impact of audit quality on goodwill accounting. The findings show that there is a positive association between changes in goodwill and one year ahead cash flows. However, no support was found that high quality audit would reinforce this association. Audit quality might be fundamentally high and therefore it might not have an impact on the investigated association.

### Tiivistelmä

Tutkielmani tavoitteena on selvittää, vahvistaako laadukas tilintarkastus liikearvon ja tulevien kassavirtojen välistä yhteyttä. Mahdollinen yhteys perustuu siihen käsitykseen, että laadukas tilintarkastus johtaa täsmällisemmin raportoituun liikearvoon, jolloin yhteys liikearvon ja tulevien kassavirtojen välillä on voimakkaampi. Laadukas tilintarkastus on määritelty tilintarkastajan koolla ja riippumattomuudella. Suurilla tilintarkastusyhteisöillä on enemmän erityisosaamista, joka johtaa korkeampaan laatuun. Riippumattomat tilintarkastajat raportoivat löytämänsä virheet, mikä myös johtaa laadukkaaseen tarkastukseen. Tutkielman empiirinen osa toteutettiin regressioanalyysinä yhdysvaltalaisella aineistolla poikkileikkauksena vuodelta 2010 ja sitä seuraavilla kahden vuoden kassavirroilla. Tutkielman tavoitteena on toistaa aiempi tutkimus tuoreemmalla aineistolla, sekä selvittää laadukkaan tilintarkastuksen vaikutusta liikearvon ja tulevien kassavirtojen väliseen yhteyteen. Tutkimustulokset osoittavat, että valitussa aineistossa liikearvon muutoksen ja sitä seuraavan vuoden kassavirtojen välillä on positiivinen yhteys. Tulokset eivät kuitenkaan osoittaneet laadukkaan tilintarkastuksen vahvistavan tätä yhteyttä. Tilintarkastus saattaa jo lähtökohtaisesti olla niin laadukasta, että sillä ei ole vaikutusta tutkittavaan ilmiöön.

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**Keywords** goodwill, cash flow, audit quality

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# 1. Introduction

## 1.1. Background and motivation

Intangible assets are often the largest value components in entities and acquired goodwill is one of the largest among them. (Bloom 2009) Accounting for goodwill is based on the perception that goodwill generates future economic benefits and therefore it can be recognized as an asset in the balance sheet (FASB 2001).

The fundamental explanation to the nature of goodwill as an asset can be found in the investment theory presented by Modigliani and Miller (1958). The theory explains the reasons behind investments and bases investment decisions on two criteria of rational decision making: the maximization of profits and the maximization of market value. Therefore, an asset is worth acquiring if it increases the net profit of the owners or the value of the owners' equity. (Modigliani & Miller 1958) Therefore, goodwill is recognized as an asset when it has the ability to generate future economic benefits and it meets one of the two criteria of a profitable investment.

According to the Financial Accounting Standards Board (FASB) goodwill is recognized in acquisitions as the excess of the acquisition cost that cannot be assigned to other identifiable assets. Goodwill is recognized in the acquirer's balance sheet to its fair value. The fair value is based on the management's expectations of future cash flows that reflect the value of goodwill. (FASB 2001)

This allows the firm management to express their private information about the future of the company in form of the value of goodwill in the balance sheet (Ramanna & Watts 2009). However, at the same time fair value accounting gives management discretion in determining the value which might lead into opportunistic behavior. This might cause a lower association between goodwill and cash flows (Ramanna 2008). Possible reasons for opportunistic behavior are for example the risk of violating contract covenants if goodwill has to be written down, or the risk that the management might lose their reputation when the expectations are not met and goodwill has to be written down. However, when the cash flow expectations are not met the management might claim

that it is because of factors outside their control. Afterwards it is not possible objectively to claim that the expectations were true or false. (Ramanna & Watts 2009)

In order to ensure the accuracy of financial reporting and accounting for goodwill the financial statements are audited. According to the International Auditing and Assurance Standards Board (IAASB) the purpose of audit is to provide confidence to the users in the financial statements. The audit opinion expresses whether the financial statement is prepared in accordance with the financial reporting framework, and whether it gives a true and fair view of the financial situation of the company. In order to give an opinion the auditor must obtain reasonable assurance that the financial statement doesn't have material misstatements. Misstatements are considered to be material if they are reasonably expected to affect the economic decisions taken on the basis of the financial statement. (IAASB 2009)

In addition, audit can be seen as a solution to the principal-agent problem that emerges when the owner delegates the running of the firm to a firm manager (Jensen & Meckling 1976). Audit services are monitoring the potential conflicts of interests between owners and managers and an audited financial statement is an efficient response to this situation (DeAngelo 1981). As a principal the owner can only see the outcome of the agent-manager's actions but cannot observe the actions taken within the company (Ross 1973 and Grossman & Hart 1983). Therefore the assurance provided by audit will decrease the information asymmetry between the principal and the agent by reducing discretion.

The quality of auditing can affect the quality of the financial statement information and therefore the value of this information. Audit quality is a complex notion that can be studied from different perspectives. Francis (2011) provides a framework with different factors affecting audit quality. First, audits are of higher quality when the auditors are competent and independent, and the evidence from testing procedures is reliable and relevant. Second, the specific tests implemented and the appropriate evaluation of the results by the engagement team affects the audit quality. Good choices and evaluation of the evidence lead into higher audit quality. Third, audit firms have an impact on audit quality, because they develop testing procedures used by the teams and create incentives that affect the audit personnel. Last, the institutions that regulate auditing affect the

incentives of auditors and audit firms by punishing them for misconduct or low quality. The consequence of high quality audit is high quality earnings. This makes earnings an important source of information for the users of financial statements. (Francis 2011) Based on this framework, high quality audit improves the accuracy of reporting.

Goodwill is a significant asset item, but difficult to report because of its intangible nature. Therefore, auditing has an important function in ensuring the accuracy of goodwill reporting. In this case audit quality is an interesting factor, since goodwill reporting is a complex process. High audit competence and independence are expected to lead into more accurate goodwill reporting and therefore into a stronger relation between goodwill and future cash flows.

## 1.2. Research objectives

This study examines the association between goodwill and future cash flows that is whether goodwill can generate future cash flows, and whether high quality audit can enhance this association. The aim of this study is to investigate the economic importance of goodwill and to study the importance of audit quality in the case of goodwill reporting.

The study contributes to prior literature in two ways. First, the study replicates prior studies with more recent and comprehensive evidence. Prior studies (e.g. Jarva 2009) examined the case of goodwill impairments and their ability to predict future cash flows. In this study I will add to this perspective also the case of acquired goodwill. This allows me to study the association between the net changes of goodwill and the future cash flows. Second, the study investigates the impact of audit quality on the association of goodwill and future cash flows. High audit quality is expected to lead into more accurate goodwill reporting and therefore strengthen the studied association.



### 1.3. Definitions of key concepts

The key concepts of this study are goodwill, future cash flows generated by goodwill, and audit quality. This study will be conducted with evidence from the US in order to have variance in audit quality and for the results to be comparable to prior studies. This section provides the relevant definitions.

#### **Goodwill**

Goodwill is recognized as an asset in an acquisition. It is formed in the acquirer's balance sheet based on the assets acquired and the price paid. It is not separately measured. Widely, goodwill can be seen as a premium paid for the acquired company. (Johnson & Petrone 1998) If a buyer pays more than the fair value of the company, it is expected that he pays for an item that is valuable for him (Gore & Zimmerman 2010).

The value of goodwill in the balance sheet is based on goodwill's fair value reflecting future benefits. These benefits are based on the management's expectations of the firm's future performance. (FASB 2001) This leaves room for management interpretation and judgment (Massoud & Raiborn 2003).

The value of goodwill's future benefits is based on synergies that don't have independent existence. Synergies arise from the combination of the companies' assets operating together. Operating synergies are for example lower costs because of economies of scale, higher selling prices because of increased market share, and higher sales because of new channels and markets. Financial synergies can arise from a lower cost of capital and more borrowing capacity because of the increased size and diversity. (Gore & Zimmerman 2010)

The definition of goodwill in this study follows FASB's definition. That is, goodwill is recognized in acquisitions and its value is based on management's expectations of future cash flows.

#### **Future cash flows**

According to FASB (2001) the estimated future cash flows generated by goodwill are the basis for goodwill accounting. Goodwill is valued to its fair value based on the

managements' expectations of future cash flows and amortized when this fair value is lower than the value recognized in balance sheet. (FASB 2001) In this study expected future cash flows are defined as realized cash flows. This is based on the fact that management's expectations about the future are not observable and therefore I will use the realized cash flows. This assumption is also in line with previous studies examining the prediction of future cash flows (e.g. Barth et al. 2001, Jarva 2009).

Various studies examining the economic value of goodwill found that the value relevance of goodwill is declining relatively fast (e.g. Ojala 2007, Bugeja & Gallery 2006). Based on these findings future cash flows are defined as realized cash flows for the following two years.

### **Audit quality**

The last key element of my study is audit quality. The fundamental study about audit quality was conducted by DeAngelo in 1981. She suggested that audit quality is dependent on auditor size even if the auditors would have identical technological capabilities. This is based on the fact that audit technology has significant start-up costs and audit fees earned are comparable to rental payments. In case of an audit failure these payments are lost. Large audit firms have more to lose and therefore they have less incentive to behave opportunistically. This leads into higher audit quality because large auditors will report the errors found and have independence from individual clients. (DeAngelo 1981)

Francis (2011) presented a general framework for reviewing audit quality that consists of the following units affecting quality: audit inputs, audit process, accounting firms, audit industry and audit markets, institutions, and economic consequences of audit outcomes. He states that audit is from higher quality when the auditors are competent and independent, and the evidence is reliable and relevant. This quality affects the processes resulting in good decisions and evaluations of audit evidence. (Francis 2011)

Larger offices have greater expertise and therefore they can deliver higher quality audits (Francis 2011). This expertise on a specific matter is demonstrated for example by PwC, which is one of the Big 4 audit firms. PwC publishes for example commentaries of new accounting standards and of instructions given to these standards. In November 2013

AICPA (American Institute of CPAs) issued a guide for testing goodwill for impairment that provides guidance regarding goodwill impairment testing for accountants, auditors and valuation specialists. PwC made observations about the guide on a more specific and practical level to help the readers to fully comprehend the contents of the guide. (PwC 2013)

Another aspect of audit quality is the level of independence the auditor has from its clients. Independent auditors are more likely to issue a negative report when needed, and are not avoiding losing clients because of a going-concern report. This leads into higher audit quality (Francis 2011). Independence might be compromised because of the auditor's financial dependence of the client or the lack of objectivity under high levels of non-audit services. This is based on the assumption that auditors would sacrifice their independence in order to receive clients that would pay large non-audit service fees. However, there is a cost for this behavior. Loss of reputation and litigation costs might provide an incentive for auditors not to compromise their independence. (DeFond et al. 2002)

In this study audit quality is measured as audit firm size and auditor independence. The proxy for size is audit conducted by the large Big 4 audit companies and the proxy for independence is the ratio between audit service fees and total fees paid by the client firm.

## 1.4. Structure

The paper is organized as follows. The second part includes an introduction about the accounting standards regulating goodwill in the US. In the third part I'm going to review the prior literature relevant to this study. The literature will cover the association between goodwill and future cash flows as well as the relevance of audit quality. In the end of the third chapter I'm presenting my two hypotheses. In the fourth section I'm presenting my research design in form of an empirical model and the data used in this study. In the fifth chapter I'm introducing the findings and analyzing the results. In the sixth chapter I'm discussing the results and the possible limitations of this study. The last chapter concludes the study and provides suggestions for further research.

## 2. Goodwill according to standards

In order to have a comprehensive understanding of accounting for goodwill in US the applicable accounting standards are presented next. SFAS 142 – Goodwill and Other Intangible Assets regulates the recognition and accounting for goodwill and intangible assets (FASB 2001), and SFAS 141 – Business Combinations regulates the reporting of business combinations (FASB 2007).

The reasoning for issuing SFAS 142 is based on the fact that intangible asset are important economic resources and their share from acquired assets is growing. Therefore, the accounting regulation for intangible assets had to be improved in order to produce better information for the users of financial statements. (FASB 2001)

The objective of SFAS 141 is to improve reporting of business combinations and their effects. This includes recognizing the identifiable assets and liabilities acquired, recognizing goodwill acquired, and the reporting of these matters in the financial statement. (FASB 2007)

In the standard concerning goodwill and other intangible assets (SFAS 142) the Financial Accounting Standards Board (FASB) gives this current definition to goodwill:

*‘The excess of the cost of an acquired entity over the net of the amounts assigned to assets acquired and liabilities assumed. The amount recognized as goodwill includes acquired intangible assets that do not meet the criteria in FASB Statement No. 141, Business Combinations, for recognition as an asset apart from goodwill.’*

This definition means that goodwill is recognized in acquisitions as the amount of the price paid that cannot be assigned to other assets and liabilities.

SFAS 141 – Business Combinations (FASB 2007) gives a definition to identifiable assets that should be taken into account when determining the value of goodwill in acquisitions. This means that from the premium paid the acquirer should recognize assets according to SFAS 141 to its balance sheet and the remaining part is recognized as goodwill as long as the acquisition is not overpriced based on non-economic reasons.

The definition for identifiable assets recognized separately from goodwill according to SFAS 141 is:

*‘An asset is identifiable if it either:*

*(1) Is separable, that is, capable of being separated or divided from the entity and sold, transferred, licensed, rented, or exchanged, either individually or together with a related contract, identifiable asset, or liability, regardless of whether the entity intends to do so; or*

*(2) Arises from contractual or other legal rights, regardless of whether those rights are transferable or separable from the entity or from other rights and obligations.*

*An intangible asset is an asset (not including a financial asset) that lacks physical substance. As used in this Statement (SFAS 141), the term intangible asset excludes goodwill.’*

Based on this definition, identifiable assets are reported separately, and therefore excluded from goodwill. (FASB 2007)

According to SFAS 142 goodwill recognized in balance sheet is not systematically amortized. Because goodwill has an indefinite useful life it should be tested for impairment at a reporting unit level. Goodwill is tested at least annually using a two-step process and impaired when its carrying amount exceeds its fair value. Fair value is often based on market prices, but since there isn't any market price for goodwill the fair value is based on management's estimations of future cash flows. (FASB 2001)

The two-step impairment test identifies the potential need for goodwill impairment and measures the amount of impairment loss. The first step compares the fair value of a reporting unit with its carrying amount, including goodwill. If the fair value exceeds the carrying amount, goodwill of the reporting unit is not impaired and the second step is unnecessary. If the carrying amount exceeds the fair value, the testing is continued with the second step. The second step compares the fair value of the reporting unit's goodwill with its carrying amount. If the carrying amount exceeds the fair value, goodwill shall be impaired with this excess. After the impairment loss is recognized, the

adjusted carrying amount is the new accounting basis and a later reversal of the impairment is prohibited. (FASB 2001)

In order to conduct impairment testing, all goodwill acquired in business combinations shall be assigned to reporting units that are expected to benefit from the synergies from the combination. The fair value of goodwill is determined in the same way as in business combinations. That is, the fair value of a reporting unit is allocated to the assets and liabilities as if the reporting unit had been acquired. The excess of the fair value is the value of goodwill. The allocation process is only done in order to test goodwill for impairment, and therefore no other changes in the assets or liabilities are done. (FASB 2001)

The fair value of an asset or liability is based on the market prices in active markets. If quoted market prices are not available, the fair value is based on the best estimate from valuation techniques and the prices of similar assets and liabilities. The present value technique is a good method. The present value is based on estimates of future cash flows. The estimates shall include assumptions that market participants would use, but if this information is not available, a firm might use its own assumptions. (FASB 2001)

In this study the definition of goodwill will follow the definition presented above. That is, goodwill is recognized as an asset in business combinations excluded from the recognizable assets and liabilities, representing future economic benefits. Goodwill is impaired when its carrying amount exceeds its fair value based on estimates of future cash flows.

## 3. Theoretical framework

### 3.1. Goodwill and future cash flows

In the present economy intangible assets such as goodwill are important (Bloom 2009). It has been argued that intangible assets are the basis for company growth and success. The changing conditions of competition require investments in intangible assets since they help companies to perform on challenging markets. (Lev & Zambon 2003) The importance of intangible assets is also noted by standard setters and more comprehensive regulation for intangible assets has been founded (FASB 2001). In this chapter I'm presenting views about the nature of goodwill and its position as an asset.

The basis for the modern definition of goodwill can be found in the study of Johnson and Petrone (1998). At that time as members of the Financial Accounting Standards Board they explored the notion of goodwill and its nature as an asset. They approached goodwill from two different perspectives. First, according to the *top-down* perspective goodwill is considered as a part of a larger asset. Goodwill is a part of an investment based on the acquirer's expectations of future benefits. If the investment is considered as an asset so are its parts as well. Therefore, the investment is divided into smaller items and the remaining part is recognized as goodwill. (Johnson and Petrone 1998)

Second, according to the *bottom-up* perspective goodwill is made up from components. In this case the excess price paid for the investment consists of resources valuable to the acquirer. According to Johnson and Petrone (1998) these core goodwill items are:

- the fair value of going concern
- the fair value of synergy benefits

The fair value of going concern exists before the acquisition and it's based on the notion that a functioning company is worth more than its assets separately. On the other hand the fair value of synergies is based on the combination of the acquirer and the acquiree forming a unique combination of assets functioning together. This was the approach that FASB approved and therefore considered goodwill to be an asset. (Johnson & Petrone 1998)

Goodwill should consist of the two items listed above. However, there is a risk that it will include also irrelevant items that are:

- the excess of the fair value over the book values of the acquiree’s recognized net assets
- the fair value of other net assets not recognized by the acquiree
- the overvaluation of the consideration paid by the acquirer
- the overpayment by the acquirer

These items are not a part of goodwill and they should be included to other intangible assets or written down as expenses, which would be done to overvaluation and overpayment. (Johnson & Petrone 1998)

To determine whether the two items defined as core goodwill meet the definition of assets Johnson and Petrone (1998) compared them to the FASB’s definition of assets. The definition is found in the Concepts No. 6 (FASB 1985):

*‘An asset has three essential characteristics:*

*(a) It embodies a probable future benefit that involves a capacity, singly or in combination with other assets, to contribute directly or indirectly to future net cash inflows.*

*(b) A particular entity can obtain the benefit and control others’ access to it.*

*(c) The transaction or other event giving rise to the entity’s right to or control of the benefit has already occurred.’*

Johnson and Petrone (1998) evaluated the components of core goodwill and concluded that goodwill meets the asset definition of FASB. First, core goodwill has the ability to produce value to the company by generating future cash flows with other assets. Therefore, it contributes indirectly to future benefits. Second, the acquirer has an ownership of financial interests in the acquired entity’s equity, and so controls goodwill. Third, goodwill is based on a past transaction, which is the acquisition. (Johnson & Petrone 1998)



Others have studied the nature of goodwill as well. Henning et al. (2000) investigated the components of goodwill in 1 576 acquisitions in US made between 1990 and 1994, and whether investors value the identifiable components differently. They determined four components of goodwill, which are: (1) the difference between the fair market value of the acquiree's assets and their book value, (2) the acquiree's going concern value, (3) the market's valuation of the synergy benefits, and (4) the overvaluation and/or overpayment for the acquiree. They found that investors value the most the going concern value and the synergy benefits as value adding components. This means that these components have a positive effect on the firm's market value. On the other hand overvaluation or overpayment are considered as value decreasing components and should be written down as expenses on the acquisition year. (Henning et al. 2000) These findings give support to goodwill's nature as an asset and are in line with the conclusion made by Johnson and Petrone (1998).

The core goodwill components, *going concern* and *synergy benefits*, have been studied as well. According to Johnson and Petrone (1998) the value of going concern is based on the notion that the firm's assets are creating more value when they are working together as an entity compared to that they would be valued separately.

Synergy can be based on different benefits. Gore and Zimmerman (2010) suggest that synergy benefits might derive from the economies of scale, a dominating market position, increase of sales based on a larger infrastructure, and an access to lower-priced debt financing. These synergies are valuable for the company but they might not necessary create an asset in the balance sheet. According to Gore and Zimmerman an asset should be identifiable and therefore something that exists independent from its valuation. The current accounting for goodwill might overstate a company's assets and weaken the confidence in financial reporting (Gore & Zimmerman 2010)

Also Chatterjee (1986) studied acquisitions and different types of synergies and their economic value in US. According to his findings from 157 observations during 1969 to 1972, acquisitions create economic value which is based on synergies. He divided synergy benefits into three classes: financial synergies, operational synergies, and collusive synergies. Financial synergies are related to reduction of cost of capital. Operational synergies are related to production or administrative efficiencies, e.g. a cost

efficient production policy might enable the firm to sell its products at a lower price than its rivals. Collusive synergies are related to price and an increased market power. He found that on average collusive synergies are associated with the highest value, and financial synergies are of higher value than operational synergies. (Chatterjee 1986)

Harrison et al. (1991) studied synergy in acquisitions and firm performance in US during 1970-1989. They found that target firms with different but complementary resources might be more likely to create unique synergies than similar acquired resources. Differences in resource allocations had positive effects on post-acquisition performance. (Harrison et al. 1991) This finding also supports the notion that goodwill creates future benefits and might improve firm performance.

Fluck and Lynch (1999) investigated mergers and divestments and found that firms that merge and then divest often perform well. After the merger when the profitability is improved and the synergies end the company divests the assets. Also Kaplan and Weisbach (1992) found that from 282 acquisitions during 1971 to 1982 many are later sold because of improved business or because of the utilized synergies. These statements are also in line with the notion that goodwill can contribute to firm performance.

However, the strongest argument on behalf of goodwill's nature as an asset is its ability to generate future benefits that is future cash flows. An asset is valuable to a firm when it can be used to generate value. Goodwill alone is not generating value, but along with the other assets it is possible. Therefore, the valuation of goodwill is complicated and its expected returns more uncertain compared to other assets. (Johnson & Petrone 1998)

Vance (2010) investigated goodwill's ability to produce a return on assets in North America during 1995-2004 and found results supporting goodwill's nature as an asset. According to Vance (2010) the value of goodwill is generated for example by location or superior market position. According to his findings companies with high goodwill generate a return on assets at least the same level as non-goodwill companies in 84% of the industries analyzed. Therefore, the presence of goodwill can be measured in company returns. (Vance 2010) This finding supports goodwill's nature as an asset that can generate future benefits.

Bugeja and Gallery (2006) examined the aging of goodwill and its effect on the underlying economic value in Australia during 1995-1999. The findings from 475 observations suggest that goodwill acquired more than over two years ago is not considered to be an asset by investors. That is, goodwill older than two years has no future economic benefits. One possible explanation is that over time the acquired synergy benefits are included in normal operations and goodwill loses its value. Another explanation might be that companies cannot achieve the desired improvements in the performance after the acquisition. (Bugeja & Gallery 2006)

Ojala's (2007) findings support these results. He conducted three studies regarding goodwill amortizations. In his first study with evidence from US and UK he found that overly long amortization periods reduce the information value of goodwill to investors. The second study Ojala (2007) conducted with Finnish evidence from years 2001-2004 where the companies may choose an amortization period of five or 20 years for goodwill. He found that goodwill reporting under five-year goodwill amortization period gives more relevant information to investors than amortization within 20 years. The third study tested the accuracy of goodwill reporting. The evidence from US showed that the impairment of goodwill lag from one to two years after investors' opinions. These results suggest that the economic life of goodwill is relatively short. (Ojala 2007)

Hayn and Hughes (2006) found similar results. In their study they investigated goodwill impairments under SFAS 142 and their timeliness during 1988-2004. They found that within 2 852 observations goodwill write-offs are often done after a period of time after the economic cause for impairment was detected. This has an effect on the value of goodwill and the credibility of financial statements. On average, goodwill write-offs lag behind the economic impairments of goodwill from three to four years. (Hayn & Hughes 2006)

The studies presented above suggest that goodwill can be considered to be an asset which contributes to future firm performance. However, this ability is considered to be relatively short. The synergies that are the basis for goodwill's value are utilized or implemented to normal operations and the value of goodwill as an asset declines.

Goodwill accounting under SFAS 142 gives the management an opportunity to act opportunistically. Various studies investigate management discretion in this case, but the results are mixed. Some studies suggest that there is opportunistic behavior among goodwill accounting, but some studies didn't find support to these claims.

Lee (2010) studied the ability of goodwill to predict future cash flows under SFAS 142 and the effects of managerial discretion on this ability. In his study he tested with 13 848 firm-year observations whether SFAS 142 enhances the association between goodwill and the future cash flows from operations by comparing the situation before and after the implementation of the standard. (Lee 2010) SFAS 142 allows discretion in valuing goodwill and therefore according to the standard goodwill should better reflect its value and the future cash flows (FASB 2001). However SFAS 142 also serves as a new source of opportunistic behavior because it allows management to use discretion in reporting in order to achieve desired earnings targets or to signal private information (Lee 2010).

In Lee's (2010) study the future economic benefits are defined as cash flows because they might measure the impact of SFAS 142 better than the market reaction. The markets might misprice long-term accruals such as goodwill (Richardson et al. 2005). In the study Lee (2010) found that unamortized goodwill and goodwill charges under SFAS 142 can better reflect future cash flows compared to systematic amortization tested with one year ahead realized cash flows. In addition, he used two year ahead realized cash flows and the results were similar. The results suggest that the association between goodwill and cash flows might not be significantly sensitive to the time-horizon of cash flows. What comes to managerial discretion, Lee didn't find significant support to opportunistic behavior. As a conclusion Lee (2010) suggests that SFAS 142 has improved goodwill's ability to predict future cash flows. His findings suggest that the future cash flows should reflect the value of goodwill. (Lee 2010)

However, Bens et al. (2011) found opposite results. They studied the stock price effects of SFAS 142 and the information content that write-offs of goodwill and other intangible assets have. They analyzed goodwill write-offs before and after the adaption of SFAS 142 (i.e. period 1996-2006) and found from the sample of 388 observations that information content was lost under the new standard. According to Bens et al.

(2011) standard setters will always have to find a balance between relevance and reliability in accounting information. All though fair market values reflect relevant information, they are hard to verify. (Bens et al. 2011)

Chen et al. (2008) investigated the timeliness of goodwill impairment recognition from the adoption of SFAS 142. That is whether goodwill impairments report timely information under the standard. They found from 1 763 observations during year 2001 that under SFAS 142 the timeliness of goodwill impairments improved compared to prior accounting standards. The main reasons are, that under SFAS 142 goodwill has to be tested annually for impairment and it's measured in fair value. However, the results showed that the timeliness could still be better. (Chen et al. 2008) These results give support to previous studies and suggest that goodwill accounting under SFAS 142 reflects the economic benefits of goodwill.

Beatty and Weber (2006) found opposite results. They investigated the amounts of goodwill write-offs under SFAS 142 in year 2001 and the use of management discretion in goodwill accounting. They found management discretion in the sample of 553 in different cases. First, they found that firms are less likely to do a write-off of goodwill when the debt covenants might be affected. In turn, firms tend to delay the write-offs. Second, firms with more risky business are more likely to write-off goodwill, because of the future market reaction. Third, they also found that the probability of a write-off is smaller for firms with earnings-based bonus plans, because the write-offs might affect the bonuses negatively. Fourth, they found that if a write-off could harm the stock market listing or even cause a delisting, firms are less likely to book a write-off. Beatty and Weber argue that SFAS 142 might lead to misstatement in financial statements. (Beatty & Weber 2006) According to these findings, there might be opportunistic behavior in goodwill accounting.

Ramanna and Watts (2009) studied whether managers will use discretion under SFAS 142 to communicate private information on future cash flows. This is assumed by the standard, while agency theory predicts that managers will use discretion opportunistically. Their findings from 124 observations during years 2003 to 2006 support the agency theory. They found that goodwill impairments decreased when CEO

reputation was compromised or the debt-covenants would be violated. (Ramanna & Watts 2009)

Loh and Tan (2002) investigated managerial incentives and macroeconomic factors behind asset write-off decisions in Singapore during 1983 to 1997. In Singapore also upward revaluations are permitted unlike in the US. They found that the unemployment rate, GDP growth rate and occupancy rate of properties are affecting firm's write-off decisions. The return on assets and the change in chairman are firm-specific factors affecting the decisions. (Loh & Tan 2002) These results suggest that also other reasons influence write-off decisions and might affect the results.

Jarva (2009) studied the association between impairments of goodwill under SFAS 142 and the expected future cash flows over the period 2002-2006. He found from 327 observations that goodwill impairments have a significant ability to predict future cash flows. The results showed a significant positive correlation between the goodwill write-offs and the decline of one and two year ahead cash flows. In addition, he examines firms with contemporary restructuring and found that the association between goodwill impairment and future cash flows is insignificant, which might be due to agency-based motives. Finally he investigates the opportunistic behavior linked to goodwill impairments, but there is no significant evidence of opportunistic avoidance of impairments. According to Jarva (2009) these results give support to the notion that goodwill impairments are more closely related to economic factors than opportunistic behavior. (Jarva 2009)

Lee and Yoon (2012) examined SFAS 142 and the effects of goodwill accounting on informativeness of earnings during the period 1995-2006 with 4 026 firm-year observations. First, they studied how goodwill accounting affects persistence of earnings, and second, whether goodwill accounting affects earnings' ability to predict future cash flows. They found that the ability of earnings to predict future operating cash flows improved under SFAS 142. Their findings support the standards intention to report assets and earnings in a way that they would reflect the economic consequence of goodwill and other intangible assets. (Lee & Yoon 2012)

The results of opportunistic behavior in goodwill accounting are mixed. Some studies suggested that goodwill write-offs are affected by other reasons that are not related to the value of goodwill, but some studies found evidence of goodwill's ability to generate future benefits that supports its nature as an asset. According to FASB (2001) the managerial discretion under SFAS 142 should lead into more accurate goodwill accounting. In this way, management can express their private information about the future (FASB 2001).

### 3.2. Audit quality

Audit quality is defined as auditor competence and independence (Francis 2011). Big 4 audit firms are often used as a proxy for high audit quality (e.g. Francis 2004 and Becker et al. 1998) since larger offices have greater expertise and therefore they can deliver higher quality audits (Francis 2011). Another measure of audit quality is auditor independence that means auditor's independence from its clients (e.g. Francis & Ke 2006). Independent auditors are more likely to issue a negative report when needed, and are not avoiding losing clients because of issuing a going-concern report. This leads into higher audit quality. (Francis 2011) High audit quality results in more precise financial statement information and therefore increases the value of this information. In this section I'm introducing the concept of audit quality and the effects of high audit quality on financial reporting.

Francis (2011) presented a general framework for reviewing audit quality. According to him audit quality is affected by the following units: audit inputs, audit process, accounting firms, audit industry and audit markets, institutions, and economic consequences of audit outcomes. Audit inputs cover the audit test conducted and the audit personnel in the engagement team. Audit processes consist of decisions and judgments made by the engagement team. These teams are working within the accounting firm, which means that these firms hire, train and compensate the auditors, and the audit reports are issued in the name of the firm. Accounting firms constitute an industry, which structure affects the markets. Institutions (e.g. FASB and AICPA) affect the incentives and behavior of individual auditors and accounting firms. In the end audit outcomes affect clients and the users of audited financial information. (Francis 2011)

Francis (2011) states that audits are of higher quality when the auditors are competent and independent, and the evidence used is reliable and relevant. Audit quality affects the processes resulting in good decisions and evaluations of audit evidence. Audit characteristics e.g. size are not direct measures of audit quality. However, by studying whether systematic differences in audit outcomes are conditional to audit characteristics it is possible to find evidence of audit characteristics affecting audit outcomes e.g. earnings quality. (Francis 2011)

Audit firm size and auditor independence are referred in the studies as the measures of audit quality (e.g. Francis 2004). According to Francis (2011) larger offices have greater expertise and therefore they can deliver higher quality. Audit quality can also be reviewed by using the audited financial statements. Studies have shown that earnings are of higher quality when audited by a Big 4 auditor. Therefore, under Big 4 auditors earnings are more useful information for external users. (Francis 2011)

DeAngelo (1981) conducted an important study of audit quality in 1981. She argued that audit quality is dependent on the auditor size even if the auditors would have identical technological capabilities. Audit technology has significant start-up costs and a loss caused by lower quality audit than promised, prevents auditors' opportunistic behavior. This leads into higher audit quality because the large auditors have more to lose in case of failure. Therefore the larger the auditor is the less incentives it will have to behave opportunistically. (DeAngelo 1981)

DeAngelo (1981) determines auditor independence as well. If one client-specific fee becomes too high in an auditor's portfolio it might compromise the auditor's independence regarding this client. However, big audit companies face this situation more seldom than smaller audit firms. Therefore, according to DeAngelo (1981) the larger the auditor as measured by the number of clients and the smaller the client as a part of the auditor's portfolio, the better the quality of the audit is. (DeAngelo 1981)

Francis (2004) conducted a reviewing study of knowledge on audit quality. He found that large audit firms are of higher quality. For example, fees paid for Big 4 auditors are higher than for non-Big 4 auditors. A higher audit fee indicates a higher audit quality, because of more audit effort or greater audit expertise. In addition, Big 4 auditors are



sued or sanctioned relatively less frequently. The studies have shown that Big 4 audited companies have lower abnormal accruals which indicates a higher earnings quality. According to Francis (2004) non-audit services might compromise audit quality, since providing non-audit services might decrease auditors' independence from their clients. (Francis 2004)

Lennox (1999) found consistent results when studying the accuracy of large and small auditors. He suggested that because of reputational reasons large auditors would suffer a greater loss than small auditors and therefore large auditors have more incentive to issue accurate reports. He studied a sample of 976 companies from UK during the period 1987-1994. Based on his findings Lennox (1999) stated that large auditors give significantly more accurate reports than small auditors. Large auditors gave significantly more going concern qualifications to failing companies and clean opinions to non-failing companies. According to Lennox (1999) this might be because of alternative reasons as well. Large auditors might be more competent than small auditors because of client-specific knowledge or experience. (Lennox 1999)

Francis et al. (1999) studied the use of Big 6 auditors in high-accrual firms listed NASDAQ during 1975-1994. Accrual based earnings create uncertainty for outsiders, because they might be managed opportunistically. This might lead into price protection by investors and other third parties. Therefore, the firm managers have an incentive to assure the credibility of their reported earnings by using a high quality auditor. First, Francis et al. (1999) studied whether the use of a Big 6 auditor is increasing in high-accrual firms. Second, they examined whether Big 6 auditors reduce firm's earnings management behavior such as aggressive or opportunistic reporting of accruals. They found that Big 6 auditors are more common among firms with a greater propensity for accruals. In addition, these firms had lower amounts of discretionary accruals and therefore a better earnings quality. Therefore, by hiring a Big 6 auditor firms can signal that their earnings are of higher quality. (Francis et al. 1999) These findings are consistent with the studies presented previously, that Big 4 auditors have higher audit quality than non-Big 4 auditors.

Becker et al. (1998) studied the relation between audit quality and earnings management in US during 1989-1992. In their study they assumed that Big 6 auditors are of higher

quality than non-Big 6 auditors. They examined earnings quality through discretionary accruals with a sample of 12 576 firm-year observations. According to the researchers the firm management has an incentive to manage earnings because of various contracts or situations that are based on the reported numbers e.g. management compensation plans or debt agreements. However, a high quality auditor might have an impact on these incentives. Auditing reduces the information asymmetries between the management and the stakeholders and therefore high quality audit is more likely to detect misreporting. In addition, high quality audit might also prevent misreporting because when detected misreporting might damage management's reputation and reduce firm value. In the study the researchers found that companies with non-Big 6 auditors report significantly larger discretionary accruals than companies with Big 6 auditors. Also the variation in discretionary accruals was larger in companies with non-Big 6 auditors. The results also give support to the claim that non-Big 6 auditors allow more flexibility in management's choice of discretionary accruals. (Becker et al. 1998) The study gives more support to auditor size as a measure of audit quality.

Caramanis and Lennox (2008) studied the effect of audit effort on earnings management in Greece with a sample of 9 738 observations during 1993-2002. They found that low audit hours often refer to larger positive abnormal accruals than high audit hours. In addition, within low audit hours clients are also more likely to manage earnings up. They also found that Big 5 audit firms work more hours than non-Big 5 firms, which suggests that Big 5 firms supply higher audit quality than non-Big 5 firms. (Caramanis & Lennox 2008) Also these results suggest that big audit firms are of higher quality than smaller audit firms.

Krishnan (2003) studied the relation between audit quality and the pricing of discretionary accruals. His sample consisted of 18 658 firm-year observations from the period 1989-1998. Accruals enable managers to communicate their private information and improve the ability of earnings to reflect underlying economic value. However, accruals might be managed opportunistically and therefore high-accrual firms face higher agency costs than low-accrual firms. Auditing can decrease these costs by controlling opportunistic behavior. Krishnan found that firms with Big 6 auditors report lower discretionary accruals than firms with non-Big 6 auditors and the association

between stock returns and discretionary accruals is greater. In addition, under Big 6 auditing the accruals have a greater association with future profitability than under non-Big 6 auditing. The results suggest that Big 6 auditors are of greater quality than non-Big 6 auditors. (Krishnan 2003)

Teoh and Wong (1993) investigated how investors react to earnings reports and whether the response differs among Big 8 and non-Big 8 audited firms. Their research investigates the link between auditor size and the credibility of financial reports among listed companies in the US with a sample of 1 282 observations during 1980-1989. They found that Big 8 audited firms have statistically larger earnings response coefficients than non-Big 8 audited firms. Earnings response coefficient is a measure of the extent to which new earnings information is capitalized in the stock price. A larger earnings response coefficient indicates that the new information is credible and therefore capitalized in the stock price. As a conclusion Big 8 auditors are considered to be more credible than non-Big 8 auditors. (Teoh & Wong 1993) These findings are in line with the studies presented above.

Stokes and Webster (2010) examined the value of high quality audit in enforcing and implementing IFRS and whether accounting for goodwill under IFRS better reflects its economic value in the presence of high quality audit in Australia during 1999-2008. They defined high quality audit as auditing performed by the Big 4 companies. They expected that the presence of Big 4 auditors in implementing IFRS should reduce misreporting and therefore lead to the outcome that goodwill will better reflect its underlying economic value. They measured goodwill's economic value by comparing it to the firm's investment opportunity set which stands for the firm's investment opportunities arising from synergies and advantages not recognized separately. They found among their 1 376 observations that the quality of accounting for goodwill under IFRS depends on a Big 4 auditor issuing a clean audit report. The researchers were able to associate the higher quality of audit in form of Big 4 auditors with a better quality of accounting under IFRS. The better quality of accounting was shown as goodwill that better reflected its economic value. (Stokes & Webster 2010)

Francis and Wang (2008) examined the effect of investor protection and Big 4 audits on earnings quality. They investigated the period 1994-2004 in 42 countries resulting in a

total of 68 167 observations. They found that earnings conservatism increased if a country had a strict investor protection environment and if the company was audited by Big 4 firms. However, among non-Big 4 audited firms for example abnormal accruals were unaffected by the difference in investor protection environment. On the other hand they found that in countries with very weak investor protection there was no difference in earnings quality between Big 4 and non-Big 4 audited firms. (Francis & Wang 2008)

Mansi et al. (2004) found further evidence for audit quality. They studied whether audit quality and tenure matter to investors. They measured audit quality with the use of Big 6 audit firms and audit tenure as the length of the auditor-client relationship. They investigated the economic impact of auditor choice and tenure on bond investors' required rate of return. The sample consisted of 8 529 firm-year observations with a fiscal year ending between January 1974 and March 1998. According to Mansi et al. (2004), the public bond markets are a good examination setting. First, the public debt securities represent one of the largest securities markets in the world and often a significant portion of corporation's value. Second, the pricing of bonds is relatively well defined. They found that auditor quality and tenure do matter to investors. The results showed a negative relation between auditor quality and tenure and the required rate of return, and therefore audits provide value to capital markets. (Mansi et al. 2004)

Francis and Yu (2009) investigated the size of Big 4 audit offices and the audit quality. They studied the period 2003-2005 in US with a sample of 6 568 firm-year observations. They expected that large offices would have more experience and human capital and therefore they would offer higher quality audits. They found that larger offices provide higher quality audits and are more likely to issue a going concern opinions, and that their reports are more accurate. In addition, the clients of larger offices have less aggressive earnings management. The results suggest that there is a variation in audits across Big 4 offices. (Francis & Yu 2009)

According to the studies presented above I suggest that Big 4 auditors can be used as a measure for high audit quality. Since large audit companies have more expertise and specialized personnel they can audit goodwill more accurately. Therefore, Big 4 audited firms can also have a stronger association between goodwill and future cash flows since accurately measured goodwill should reflect future performance more accurately.

Some studies suggest that there is no difference in audit quality between Big 4 and non-Big 4 audit firms. Lawrence et al. (2011) studied the self-selection problem among Big 4 auditors, and reasons why Big 4 and non-Big 4 audit firms could provide comparable audit quality. They used firm-year data from 1988 to 2006. They suggested that the differences in the Big 4 and non-Big 4 proxies would be due to their clients' characteristics. They used three proxies: discretionary accruals, cost of equity, and analyst forecast accuracy. The sample for discretionary accruals consisted of 72 600 observations, for cost of equity the sample was 25 068 observations, and for analyst forecast the sample was a total of 28 037 observations. Their results suggest that differences between these proxies largely reflect client characteristics, especially client size. (Lawrence et al. 2011)

Titman and Trueman (1986) stated that auditor quality provides information about the firm's value. Auditor quality was defined as the accuracy of the information the auditor provides to investors. Therefore, higher quality audit enables the investors to make more precise estimations of the firm's value. According to their analysis, high audit quality leads to a higher assessment of the firm's value. On the other hand, the client with more favorable information about his firm's value will choose a higher quality auditor than the firm with less favorable information. (Titman & Trueman 1986) This result is one example of self-selection.

For example Ireland and Lennox (2002) examined the auditor selection bias on audit fees and suggested that the choice of auditors is endogenous. They conducted the study with a sample of 1 326 companies registered in UK stock exchange during the period March 1 1997 and February 28 1998. They found that the effects of auditor selection on audit fees are statistically and economically significant. Their results suggest that companies that are on average of higher quality and require less than average audit effort choose large auditors. (Ireland & Lennox 2002) This gives support to the previous studies.

There are also studies that suggest that Big 4 auditors would not have higher quality than non-Big 4 auditors. Lawrence et al. (2011) stated reasons why Big 4 and non-Big 4 audit quality could be comparable. First, both auditor groups operate in the same regulatory and professional environment, which could suggest comparable audit quality.

Second, according to Louis (2005) non-Big 4 auditors might have comparative advantages in some specific issues. Third, the non-Big 4 auditors have to increase their audit effort in order to reach the reasonable level of assurance since they cannot obtain the same level of backing from insurance companies as can Big 4 auditors. (Lawrence et al. 2011) This reasoning suggests that Big 4 audit quality might not always be superior to non-Big 4 audit quality.

Like stated above, Louis (2005) suggests that non-Big 4 auditors might have comparative advantages in some areas. In his study he investigated the effect of auditor choice on acquirers' values around merger announcements. He used a sample of 3 707 mergers during 1980-2002. He found that non-Big 4 audited firms performed better than Big 4 audited firms at merger announcements, due to the fact that smaller audit firms have advantage in supporting their clients in mergers. He states that non-Big 4 auditors have superior knowledge of the local markets and better relations with their clients. (Louis 2005)

Ojala et al. (2014) found similar results in their study of audit quality and small private companies in Finland. They tested seven audit benefits, which were improved internal decision making, overall benefits, assurance for the users of financial statements, internal control benefits, advice on changes in regulation, and technical and tax advice. They investigated 642 small private companies and found no significant association between Big 4 auditors and audit benefits. (Ojala et al. 2014)

The results from auditor size as a proxy for audit quality are mixed. Some studies suggested that large auditors defined as Big 4 audit firms can provide higher quality audits than smaller auditors, because of their expertise. However, smaller auditor might have other advantages that increase their value to the client. Also all audit firms work under the same audit standards which give the fundamental quality expectations to the profession.

Another way of measuring audit quality is the level of independence that the auditor has from its clients. Often this is done by comparing the relation of audit service fees and non-audit service fees paid by the client. High non-audit service fees might compromise the auditor's independence and the audit quality. (Francis & Ke 2006) Independence is

an essential feature of auditing and it might be compromised because of the auditor's financial dependence of the client or the lack of objectivity under high levels of non-audit services. The concern about non-audit services is based on the assumption that auditors would sacrifice their independence in order to receive clients that would pay large non-audit fees. However, auditors face costs from this behavior. Loss of reputation and litigation costs might provide an incentive for auditors not to compromise their independence. (DeFond et al. 2002)

DeFond et al. (2002) studied the impact of non-audit service fees on auditor independence. They measured auditor independence with the auditor's willingness to issue a going concern opinion. A going concern opinion indicates that the auditor is objectively evaluating firm performance. They investigated a sample of 1 158 firms in US and found no evidence that non-audit service fees would decrease auditor independence. According to the findings there was no association between going concern opinions and total fees or audit fees paid. Therefore, non-audit service fees do not impact the auditor's going concern opinion. (DeFond et al. 2002)

Also Francis (2006) reviewed studies about non-audit services and found no direct evidence that auditor independence would be compromised by non-audit service fees. There is no link between non-audit services and audit failure. However, non-audit services are problematic for two reasons. First, they might change the auditor's role from an objective outside reviewer to inside adviser and decision maker. Second, the increased fee might create an economic bond and compromise auditor independence. (Francis 2006)

Ashbaugh et al. (2003) investigated whether auditor independence is compromised under high non-audit service fees, because of an increase in the economic dependence of the audit firm on the client. They investigated a sample of 3 170 firms in US from 2001. They found a positive association between the value of firms' discretionary accruals and the fee rate. On the other hand, there was no relation between total fees paid for the auditor and discretionary accruals reported. However, Ashbaugh et al. (2003) found no relation between the income increasing accruals and the fee ratio. Therefore, the researchers suggested that association between discretionary accruals and the fee ratio is driven by the income decreasing accruals. Income decreasing accruals

might reflect conservatism in accounting. Usually the opportunistic behavior is considered to compromise financial statement reliability. According to the findings there was little evidence that non-audit service fees would violate auditor independence. (Ashbaugh et al. 2003)

Francis and Ke (2006) investigated audit and non-audit fees paid for auditors and the market valuation of earnings surprises. They studied 3 133 firms in US during 1999-2002. They found that the market valuation of quarterly earnings surprises was significantly lower for firms that paid high non-audit service fees than for firms with low non-audit fees. Therefore audit independence is relevant information for the markets and reduces investor confidence in the quality of reported earnings, even though audit quality might not be compromised. (Francis & Ke 2006)

The results of auditor independence studies gave mixed results. According to some of the theories presented earlier high non-audit service fees might compromise auditor's independence and reduce the audit quality. On the other hand others didn't find evidence that independence would be compromised under non-audit service fees. In this study audit quality is also measured as auditor independence from its clients as the ratio between audit service fees and total fees.

The studies of audit quality gave mixed results. Audit quality is measured with auditor competence and independence, based on the previous studies. Since large audit firms are considered to have more expertise than smaller audit firms, they are expected to be of higher quality. Therefore, size is the proxy for audit quality regarding competence. The large audit firms are defined as Big 4 audit firms. The second aspect of audit quality is auditor independence. Since independent auditors are expected to report the errors found, they are expected to be of higher quality. Auditor independence is measured as the relation of audit and non-audit service fees received from the client. Audit competence and independence are expected to lead into more accurate financial reporting. Therefore, goodwill that is audited by high quality auditor is expected to be measured more accurately. This would lead into a stronger association between goodwill and future cash flows.



### 3.3. Hypotheses

In this section I'm introducing my hypotheses based on the theoretical framework presented. As stated earlier this study examines the association between goodwill and future cash flows and whether high quality audit can enhance this association. According to previous studies and the standard setters goodwill is recognized as an asset in the balance sheet and its value is based on its ability to contribute to future firm performance measured as cash flows.

According to the presented studies the changes in goodwill should respectively be reflected as changes in the following years' cash flows. Therefore, my first hypothesis is:

*H1. Changes in goodwill are positively associated with future cash flows.*

This means that a decrease in goodwill value would lead into decreased future cash flows and respectively an increase in goodwill should increase future cash flows. That is, an impairment of goodwill should lead into lower cash flows and an acquisition of goodwill should lead into higher cash flows. This will be examined in the fifth chapter.

The purpose of audit is to provide reasonable assurance that the financial statement gives a true and fair view of the financial position of the company. High quality audit is defined as auditor competence and independence which is expected to lead into more accurate reporting. This is why high audit quality is expected to reinforce the positive association between changes in goodwill and future cash flows. Therefore, my second hypothesis is:

*H2. High quality audit reinforces the positive association between changes in goodwill and future cash flows.*

Based on this hypothesis the association between changes in goodwill and future cash flows should be stronger for companies that use high quality auditors compared to companies that don't. This will be examined in the fifth chapter.

## 4. Methodology

### 4.1. Method

In this section I'm introducing my research models and the reasoning behind them. My research design is based on two studies concerning the prediction of future cash flows. The first one was conducted by Barth et al. in 2001 and the second one by Jarva in 2009. Jarva (2009) based his study on the model presented by Barth et al. (2001).

Barth et al. (2001) investigated whether cash flows and accruals from the observation year can predict future cash flows. Accruals were presented in six components: change in accounts receivable, change in inventory, change in accounts payable, depreciation, amortization, and other accruals. They were expecting the components to have different associations with future cash flows: increases in accounts receivable and inventory would have a positive relation, as would a decrease in account payables. Depreciations and amortizations were expected to have a positive association with future cash flows. They found significant results for each of the components consistent with the predicted sign. (Barth et al. 2001)

Jarva (2009) examined the association between future cash flows and goodwill write-offs. He modified the model of Barth et al. (2001) and investigated the goodwill write-offs separately from the total balance of depreciations and amortizations. Depreciations and amortizations are explanatory variables in the Barth et al. (2001) study, and they include goodwill write-offs. Jarva (2009) found a positive association between goodwill write-offs and future cash flows as predicted. This result is consistent with the findings by Barth et al. (2001).

The statistical method used in this study is the linear regression model that is also used in the studies by Jarva (2009) and Barth et al. (2001). The linear regression analysis models the relationship between a dependent variable and multiple explanatory variables. To evaluate the significance of the explanatory variables, I'm using the commonly used significance levels 0.05 and 0.01. (Maddala & Lahiri 2009)

For the purpose of this study I'm using Jarva's (2009) model as a basis and modifying it by taking also goodwill acquisitions into account. Therefore, the goodwill write-off

variable in Jarva's (2009) model is replaced with a variable that measures changes in goodwill. In addition, I'm controlling the industry fixed effects. The firm subscripts are omitted in the following equations. My regression model is as follows:

$$(1) \quad CF_{t+j} = \alpha_0 + \alpha_1 CF_t + \alpha_2 \Delta GW_t + \alpha_3 \Delta AR_t + \alpha_4 \Delta INV_t + \alpha_5 \Delta AP_t + \alpha_6 DEPR_t + \alpha_7 R_{t+1} + \alpha_8 R_{t+2} + \sum_{k=9}^{15} \alpha_k SIC1 + \varepsilon_{t+j}$$

where t represents the year and j ranges from 1 to 2;  $CF_t$  is the operating cash flow;  $\Delta GW_t$  is the change in goodwill;  $\Delta AR_t$  is the change in accounts receivable;  $\Delta INV_t$  is the change in inventory;  $\Delta AP_t$  is the change in accounts payable;  $DEPR_t$  is the depreciation of property, plant and equipment;  $R_t$  is the 12-month stock return ending three months after the fiscal year-end; and SIC controls for industry fixed effects. All accounting variables are deflated by the market value of equity at three months after the fiscal year end t-1.

Model (1) examines whether one and two year ahead cash flows depend from components presented above. Goodwill write-offs are entered into the model as negative values and goodwill acquisitions as positive values. Therefore a positive association means that more negative goodwill write-off leads to a decrease in future cash flows. Respectively a positive association between goodwill acquisitions and future cash flows means that positive changes in goodwill would generate more future cash flows.

In order to test the second hypothesis, two variables are added in the model. First, the  $BIG4_t$  dummy variable explains audit quality measured as Big 4 auditor versus non-Big 4 auditor. The model is structured as follows:

$$(2) \quad CF_{t+j} = \alpha_0 + \alpha_1 CF_t + \alpha_2 \Delta GW_t + \alpha_3 \Delta AR_t + \alpha_4 \Delta INV_t + \alpha_5 \Delta AP_t + \alpha_6 DEPR_t + \alpha_7 R_{t+1} + \alpha_8 R_{t+2} + \sum_{k=9}^{15} \alpha_k SIC1 + \alpha_{16} BIG4_t + \varepsilon_{t+j}$$

Model (2) adds audit quality into the analysis and shows whether Big 4 audit correlates with future cash flows.

To be able to capture the impact of the presence of a Big 4 auditor in the association between changes in goodwill and future cash flows, I create an interaction term, which is:  $BIG4_t * \Delta GW_t$ . This term describes whether Big 4 audit has an impact on the investigated association. The model is designed as follows:

$$(3) \quad CF_{t+j} = \alpha_0 + \alpha_1 CF_t + \alpha_2 \Delta GW_t + \alpha_3 \Delta AR_t + \alpha_4 \Delta INV_t + \alpha_5 \Delta AP_t + \alpha_6 DEPR_t + \alpha_7 R_{t+1} + \alpha_8 R_{t+2} + \sum_{k=9}^{15} \alpha_k SIC1 + \alpha_{16} BIG4_t + \alpha_{17} BIG4_t * \Delta GW_t + \varepsilon_{t+j}$$

The interaction term in model (3) captures the impact of high quality audit on the association between changes in goodwill and future cash flows and tests the second hypothesis. The association should be stronger within the Big 4 observations since high quality audit should prevent discretionary accounting and goodwill should be measured more accurately than within non-Big 4 companies. Therefore, goodwill and its changes should reflect the future cash flows more accurately.

The second hypothesis is tested also with audit independence as a measure of audit quality. For that reason the first model (1) is now enhanced with the auditor independence variable  $AI_t$ , that measures the relation of audit service fees and total fees paid to the auditor. The model is as follows:

$$(4) \quad CF_{t+j} = \alpha_0 + \alpha_1 CF_t + \alpha_2 \Delta GW_t + \alpha_3 \Delta AR_t + \alpha_4 \Delta INV_t + \alpha_5 \Delta AP_t + \alpha_6 DEPR_t + \alpha_7 R_{t+1} + \alpha_8 R_{t+2} + \sum_{k=9}^{15} \alpha_k SIC1 + \alpha_{16} AI_t + \varepsilon_{t+j}$$

Model (4) measures whether auditor independence correlates with future cash flows. However, the model doesn't measure its impact on goodwill accounting.

As stated earlier, in order to find the impact of auditor independence on goodwill accounting, the model needs an interaction term:  $AI_t * \Delta GW_t$ . This term shows whether auditor independence has an impact on the association between changes in goodwill and future cash flows. The model is formed as follows:

$$(5) \quad CF_{t+j} = \alpha_0 + \alpha_1 CF_t + \alpha_2 \Delta GW_t + \alpha_3 \Delta AR_t + \alpha_4 \Delta INV_t + \alpha_5 \Delta AP_t + \alpha_6 DEPR_t + \alpha_7 R_{t+1} + \alpha_8 R_{t+2} + \sum_{k=9}^{15} \alpha_k SIC1 + \alpha_{16} AI_t + \alpha_{17} AI_t * \Delta GW_t + \varepsilon_{t+j}$$

Model (5) captures the impact of auditor independence on the association between changes in goodwill and future cash flows. The association should be stronger under more independent auditors, since more accurately measured goodwill should reflect future cash flows better.

This study will inform us about the relevance of goodwill as an asset and about its economic significance in generating future cash flows. Additionally, we can learn about the value of high quality audit in providing assurance in goodwill accounting.

## 4.2. Data

This study was conducted with US data in order enable the generalizability of the results. US has a big market and therefore comprehensive data is available and it also enables variation in the sample. Many of the studies presented in this study were conducted with US data. The data for this study was collected from year 2010 and the realized cash flows from years 2011 and 2012. Therefore data was needed from a three year period.

According to MarketLine's In-depth PESTLE insights report, year 2010 was a normal year in US after the 2007 sub-prime crisis and the year within the US GDP started to grow after the downturn. Also the unemployment rate started to decrease in 2010. (MarketLine 2013) Therefore, the year 2010 is considered to represent a normal year and can be used as the observation year in this study. This aims at the generalizability of the results.

The accounting standards regulating goodwill have gone through some changes in US. The constitutive accounting standard regulating goodwill, FAS No. 142, was issued in 2001 (FASB 2001). In 2008 FASB issued FAS No. 160 – Noncontrolling Interests in Consolidated Financial Statements that was aimed to improve the relevance, comparability, and transparency of financial information (FASB 2008). Before issuing this standard there was no clear guidance for minority interest reporting and therefore this standard will uniform the reporting. Also this supports the choice of 2010 as observation year.

## 5. Results

### 5.1. Sample selection and descriptive statistics

In this chapter I'm presenting the variables used in this study, and how the final sample was reached. In addition, I'm describing the characteristics of the sample and the initial correlations between the variables.

#### Variable definitions

Table 1 Variable definitions

<i>Variable</i>	<i>Variable definition</i>
MVt-1	Market value of equity, measured three months after the fiscal year end t-1.
$\Delta AP_t$	Change in accounts payable, calculated from balance sheet data $AP_t - AP_{t-1}$ , scaled by MVt-1.
$\Delta GW_t$	Change in goodwill, calculated from balance sheet data $GW_t - GW_{t-1}$ as the net change of increase and impairment of goodwill, scaled by MVt-1.
DEPR <sub>t</sub>	Depreciation, from income statement data, scaled by MVt-1.
$\Delta AR_t$	Change in accounts receivable, calculated from balance sheet data $AR_t - AR_{t-1}$ , scaled by MVt-1.
$\Delta INV_t$	Change in inventory, calculated from balance sheet data $INV_t - INV_{t-1}$ , scaled by MVt-1.
CF <sub>t</sub>	Net operating cash flow from operations, from the statement of cash flows in year t, scaled by MVt-1.
CF <sub>t+j</sub>	Net operating cash flow from operations, from the statement of cash flows in year t+j, scaled by MVt-1.
SIC <sub>t</sub>	Industry specification based on one-digit SIC code.
R <sub>t+j</sub>	Twelve month stock return for the accumulated period beginning three months after fiscal year-end.
BIG <sub>4t</sub>	Audit quality defined as audit conducted by PwC, KPMG, Ernst & Young or Deloitte in year t.
AI <sub>t</sub>	Audit quality defined as auditor independence, measured as a relation audit service fees / total fees.

This table defines the variables used in the models.

Table 1 presents the variables used to test hypothesis 1 and 2. The balance sheet variables ( $\Delta AP_t$ ,  $\Delta GW_t$ ,  $\Delta AR_t$  &  $\Delta INV_t$ ) are counted as the differences between the observation year and the previous year. The values for cash flow variables ( $CF_t$  &  $CF_{t+j}$ ) are collected from the cash flow statements. Depreciation ( $DEPR_t$ ) is measured from the income statement. Stock returns ( $R_{t+j}$ ) are collected from market data. Industry information (SIC) and audit quality data ( $BIG4_t$  &  $AI_t$ ) are collected from the supplementary firm information. The accounting variables are deflated with the market value of equity measured three months after the fiscal year end.

The variable definitions in table 1 mostly follow the definitions used by Jarva (2009). The differences emerge from the improvements made in the regression model and the new variables created in order to find an answer for the hypotheses. The differences compared to Jarva (2009) are that all the balance sheet variables ( $\Delta AP_t$ ,  $\Delta GW_t$ ,  $\Delta AR_t$  &  $\Delta INV_t$ ) are counted as changes in the balance sheet figures and depreciation is from income statement. Jarva (2009) used figures from the statement of cash flows. Additional variables used in this study are the industry information ( $SIC_t$ ), the Big 4 dummy variable ( $BIG4_t$ ), and auditor independence ( $AI_t$ ).

### **Sample selection**

The data was collected from Compustat and CRSP in Wharton Research Data Services. The sample consists of US firms with data collected from year 2010. A total of 7 168 firm observations were found. As in prior research (Barth et al. 2001 and Jarva 2009) financial institutions are excluded from the study because of the special characteristics and regulation of the industry. Also only firms listed in NYSE, AMEX, and NASDAQ were taken into account. In addition, all firm observations with missing data were excluded.

In order to increase the power of the tests I exclude immaterial changes in goodwill as were done in Jarva's (2009) study. Immaterial changes were defined to be less than 0.005 after deflation, which is 0.5 % of the ratio  $\Delta GW_t / MV_{t-1}$ . On average, the value of 0.5 % of the ratio  $\Delta GW_t / MV_{t-1}$  means respectively 0.2 % of the total assets t-1. After the selection process the final sample consists of 510 firm observations. The following table demonstrates the sample selection process.

Table 2 Sample selection criteria

<i>WRDS Compustat</i>	<i>Firm observations</i>
US Companies 2010	7 168
<u>Less:</u>	
Companies not listed in NYSE, AMEX or Nasdaq	-2 477
Financial institutions SIC 6000-6999	-1 537
Negative book value of equity	-167
	<hr/> 2 987
Missing accounts payable	-173
Missing goodwill	-97
No change in goodwill	-1 255
Missing inventory	-15
Missing depreciation	-37
Missing accounts receivable	-25
Missing market value 31.3.2010	-322
Missing cash flow	-2
Data date other than 31.12.2010	-168
Missing auditor	-1
Missing stock return	-38
Immaterial goodwill change <0.005	-324
Outliers in goodwill change	-2
Missing auditor fee data	-16
Outliers in other variables	-2
<hr/> Total sample	<hr/> 510

This table presents the criteria for sample selection and illustrates how the final sample was reached.



The distribution of the sample by industry is shown in table 3. The sample consists of 50 different two-digit SIC industries. The largest industry is SIC 73 *Business services* since it covers 18.0 % of the observations. In the linear regression analysis industry fixed effects are controlled with one-digit SIC codes.

Table 3 Industry distribution of the sample

<i>Panel A: Industry by one-digit SIC codes</i>	<i>SIC code</i>	<i>% of Obs.</i>
Manufacturing	3	32.0 %
Services	7	20.6 %
Manufacturing	2	14.7 %
Transportation and public utilities	4	11.2 %
Health services	8	7.5 %
Wholesale trade and retail trade	5	7.1 %
Mining and construction	1	6.9 %
Unclassified establishments	9	0.2 %
Total		100.0 %

<i>Panel B: Industry by two-digit SIC codes</i>	<i>SIC code</i>	<i>% of Obs.</i>
Business services	73	18.0 %
Instruments and related products	38	8.8 %
Chemicals and allied products	28	7.8 %
Electronic and other electrical equipment	36	7.6 %
Industrial machinery and equipment	35	6.1 %
Communications	48	4.7 %
Health service	80	4.7 %
Transportation equipment	37	3.7 %
Oil and gas extraction	13	3.5 %
Other		34.9 %
Total		100.0 %

This table shows how the sample firms are distributed among industries according to one and two-digit SIC codes.

## Descriptive statistics

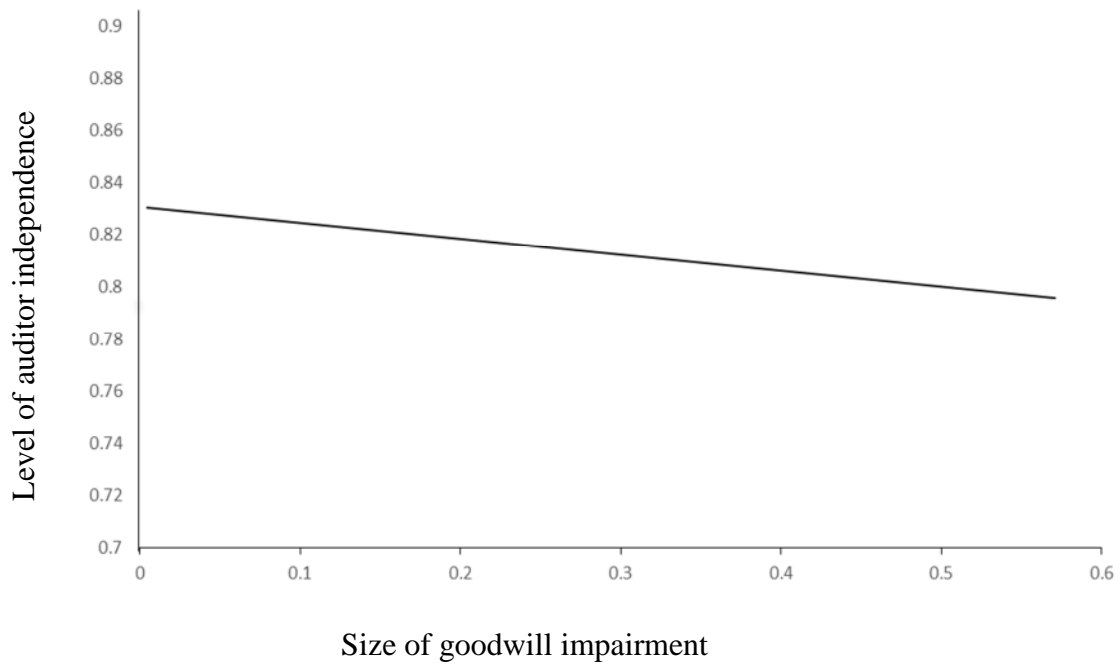
Table 4 Descriptive statistics

<i>Variable</i>	<i>Mean</i>	<i>Median</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
$\Delta AP_t$	0.021	0.007	0.067	-0.320	0.470
DEPR <sub>t</sub>	-0.069	-0.041	0.100	-1.160	0.000
$\Delta GW_t$	0.054	0.016	0.201	-0.571	1.938
$\Delta INV_t$	0.016	0.002	0.070	-1.015	0.478
$\Delta AR_t$	0.038	0.015	0.109	-0.269	1.192
CF <sub>t</sub>	0.108	0.095	0.135	-0.613	1.148
CF <sub>t+1</sub>	0.122	0.103	0.156	-0.416	1.311
CF <sub>t+2</sub>	0.141	0.117	0.204	-1.283	1.688
R <sub>t</sub>	0.345	0.320	0.401	-1.209	2.100
R <sub>t+1</sub>	0.026	0.064	0.367	-1.598	2.328
R <sub>t+2</sub>	0.193	0.211	0.359	-1.602	1.540
BIG <sub>4t</sub>	0.845	1.000	0.362	0.000	1.000
AI <sub>t</sub>	0.834	0.865	0.144	0.000	1.000

This table provides the mean, median, standard deviation, and minimum and maximum values for the sample variables (n = 510). For variable definitions, see table 1. Data is collected from years 2010, 2011, and 2012. Year 2010 is referred as year t in this study.

Table 4 shows the descriptive statistics for the sample. According to the statistics goodwill has increased in 2010 (mean 0.054). Another observation is that the annual cash flows have increased within the observation period when comparing the means between years 2010-2012 (mean 0.108-0.141). Also the change in accounts payable, accounts receivable, and inventory is positive during year 2010.

Figure 1 Relation between auditor independence and goodwill impairments



This figure illustrates the relation between goodwill impairments and auditor independence.

Figure 1 illustrates the relation between goodwill impairments and the level of auditor independence. The level of auditor independence refers to the  $AI_t$  variable defined in table 2 that is the relation between audit service fees and total fees. Therefore, the higher the relation is, the more independence the auditor has from its client. The size of goodwill impairments refers to the  $\Delta GW_t$  variable, but for this purpose only negative changes of goodwill are used ( $n=124$ ). The variable might also include small acquisitions, and therefore this figure is for illustrative purposes only. The figure suggests that the higher the auditor independence is the smaller the goodwill impairments are. This suggests that under independent auditors the impairments are done more often. Therefore the impairments might be timelier under the economic lifetime of goodwill.

Table 5 Correlation matrix

	$\Delta AP_t$	DEPR <sub>t</sub>	$\Delta GW_t$	$\Delta INV_t$	$\Delta AR_t$	CF <sub>t</sub>	CF <sub>t+1</sub>	CF <sub>t+2</sub>	R <sub>t+1</sub>	R <sub>t+2</sub>	BIG4 <sub>t</sub>	Alt
$\Delta AP_t$		-0.213 **	0.280 **	0.500 **	0.540 **	0.017	0.038	0.190 **	-0.096 *	-0.073	-0.027	-0.054
DEPR <sub>t</sub>	-0.530 **		0.049	-0.006	-0.126 **	-0.459 **	-0.448 **	-0.451 **	0.096 *	-0.031	-0.020	-0.009
$\Delta GW_t$	0.393 **	-0.249 **		0.303 **	0.388 **	-0.018	0.022	0.122 **	-0.136 **	-0.112 *	-0.033	-0.046
$\Delta INV_t$	0.434 **	-0.062	0.129 **		0.425 **	-0.115 **	0.035	0.091 *	-0.095 *	-0.033	-0.044	-0.018
$\Delta AR_t$	0.583 **	-0.409 **	0.437 **	0.283 **		-0.057	0.084	0.177 **	-0.096 *	-0.037	-0.112 *	0.067
CF <sub>t</sub>	0.212 **	-0.490 **	0.214 **	-0.066	0.254 **		0.586 **	0.559 **	-0.009	0.026	0.061	-0.001
CF <sub>t+1</sub>	0.340 **	-0.647 **	0.260 **	0.173 **	0.339 **	0.597 **		0.642 **	0.189 **	0.018	0.156 **	0.024
CF <sub>t+2</sub>	0.307 **	-0.552 **	0.238 **	0.000	0.329 **	0.552 **	0.712 **		0.159 **	0.209 **	0.159 **	0.015
R <sub>t+1</sub>	-0.157 **	0.176 **	-0.164 **	-0.011	-0.195 **	-0.063	0.042	0.025		0.246 **	0.052	-0.004
R <sub>t+2</sub>	-0.051	0.010	-0.044	0.000	-0.058	0.002	0.007	0.111 *	0.235 **		0.030	0.062
BIG4 <sub>t</sub>	0.004	-0.052	0.034	-0.004	-0.083	0.068	0.156 **	0.096 *	0.073	0.021		-0.170 **
Alt	0.003	-0.014	-0.038	0.023	0.033	0.002	0.025	-0.007	-0.011	0.057	-0.109 *	

This matrix presents the Pearson (below the diagonal) and Spearman (above the diagonal) coefficients between the variables (n = 510). For variable definitions, see table 1. \*\* stands for a correlation coefficients significant at 1 per cent, and \* stands for 5 per cent.

Table 5 presents both Pearson and Spearman correlations among the variables. The results demonstrate that changes in goodwill ( $\Delta GW_t$ ) correlate positively with future cash flows ( $CF_{t+1}$  and  $CF_{t+2}$ ). The Pearson correlations are significant for both future cash flow variables. This preliminary result is in line with the first hypothesis. A strong positive and significant correlation is found between the current cash flows ( $CF_t$ ) and the future cash flows, since cash flows in year  $t$  explains the cash flows in the following years.

The correlation between audit quality ( $BIG4_t$ ) and changes in goodwill ( $\Delta GW_t$ ) is not significant. Also auditor independence ( $AI_t$ ) has no significant correlation with changes in goodwill. The impact of these two variables on goodwill reporting will be studied more closely with the regression model in the next section.

The correlation between future cash flows ( $CF_{t+1}$  and  $CF_{t+2}$ ) and audit quality ( $BIG4_t$ ) is positive. Audit quality measured as Big 4 audit has a positive and significant correlation with future cash flows, which suggests that Big 4 audited companies have higher future cash flows than non-Big 4 audited companies. However, auditor independence ( $AI_t$ ) has no association with the future cash flows.

Another observation is that the two measures of audit quality are significantly correlated. That is, Big 4 audits ( $BIG4_t$ ) are negatively correlated with auditor independence ( $AI_t$ ). Auditor independence is measured as a relation between audit service fees and total audit service fees. The negative correlation therefore suggests that Big 4 audit companies receive larger non-audit service fees than non-Big 4 audit firms. This was also found in the study by Ashbaugh et al. (2003). They were studying whether firms buying non-audit service fees manage earnings more than other firms and found no evidence supporting this claim. In addition Frankel et al. (2002) found that Big 5 companies receive more income from non-audit services than audit services. The reason might be that since Big 4 audit firms have more specific expertise than non-Big 4 audit firms, they also have resources to offer non-audit services.

## 5.2. Regression results

In this chapter I'm testing the sample with the regression models presented earlier. The findings will show, whether there is evidence supporting the two hypotheses of this study. This chapter consists of two parts following the two hypotheses.

### **The association between changes in goodwill and future cash flows**

Table 6 presents the results from the model (1). The predicted signs are based on Jarva (2009) and Barth et al. (2001). As stated before, changes in goodwill are expected to have a positive association with future cash flows. According to Barth et al. (2001) changes in accounts payable are expected to have a negative impact since accounts payable are expected to be paid during the next period. Similarly, accounts receivable are expected to be received during the next period and therefore the expected sign is positive. Changes in inventory are also expected to have a positive impact on future cash flows as they are expected to generate sales. Depreciations are expected to have a negative impact, that is negative depreciations are associated with higher cash flows. This is based on the notion that depreciations should match the investment in a way that when the investment earns a positive return the generated cash flow will exceed the cost of depreciation. (Barth et al. 2001) The results show that all coefficients have the predicted signs.

Table 6 Results from model 1

<i>Variable</i>	<i>Prediction</i>	<i>Dependent variable</i>	
		<i>CF<sub>t+1</sub></i>	<i>CF<sub>t+2</sub></i>
Intercept	?	0.030	0.028
$\Delta AP_t$	-	-0.283 **	0.030
$\Delta EPR_t$	-	-0.783 **	-0.705 **
$\Delta GW_t$	+	0.057 *	0.052
$\Delta INV_t$	+	0.470 **	-0.126
$CF_t$	+	0.414 **	0.525 **
$\Delta AR_t$	+	0.083	0.214 **
SIC1		0.016	0.018
SIC2		-0.016	-0.001
SIC3		-0.024	-0.020
SIC4		-0.006	-0.030
SIC5		-0.056 *	-0.014
SIC7		-0.015	-0.023
$R_{t+1}$	+	0.073 **	0.066 **
$R_{t+2}$	+		0.055 **
n		510	510
Adj. R <sup>2</sup>		0.584	0.435
Model F-value		55.870	28.956
Model sig.		<0.001	<0.001

This table shows the results from model (1). \*\* stands for a statistical significance at 1 per cent, and \* stands for 5 per cent. For variable definitions, see table 1.

The regression tests whether the explanatory variables are associated with one and two year ahead future cash flows. Changes in goodwill indicate a positive and significant association for one year ahead future cash flow (coefficient = 0.054) but no association for two year ahead cash flows. This result gives support to the first hypothesis, since changes in goodwill can predict the following year's cash flows, even if the association in the second year is not significant.

The results show that changes in accounts payable are not associated with future cash flows. Depreciations are negatively and significantly associated with future cash flows as expected. Changes in accounts receivable are positively associated with future cash flows. Inventory has a positive association with future cash flows as expected, but the association is only significant for the one year ahead cash flows. The cash flow from the examined year has a positive and significant association with future cash flows as expected. Also the one and two year ahead future stock returns showed a positive and significant association with future cash flows as predicted. The SIC control variables for industry characteristics gave one positive and significant result for SIC 5 in one year ahead cash flows.

The models for one and two year ahead cash flows are statistically significant, and their adjusted  $R^2$  values are showing 0.59 for  $CF_{t+1}$  regression and 0.44 for  $CF_{t+2}$  regression. This suggests that the model explains the one year ahead cash flows better than the two year ahead cash flows.

### **The impact of audit quality**

Table 7 shows the results from the model (2) and model (3). These regressions take into consideration the audit quality as Big 4 audits and the relevance of the Big 4 audit on the association between changes in goodwill and future cash flows as an interaction term  $BIG4_t * \Delta GW_t$ . Big 4 audit should lead into more accurately measured accounting variables. Therefore, the interaction term between goodwill changes and high quality audit is expected to have a positive association with future cash flow, since a positive sign would suggest that the association between changes in goodwill and future cash flows is stronger under a Big 4 audit.



Table 7 Results from model 2 and model 3

<i>Variable</i>	<i>Prediction</i>	<i>Dependent variable</i>			
		<i>CF<sub>t+1</sub></i>	<i>CF<sub>t+1</sub></i>	<i>CF<sub>t+2</sub></i>	<i>CF<sub>t+2</sub></i>
Intercept	?	-0.006	-0.007	0.003	0.003
ΔAP <sub>t</sub>	-	-0.287 **	-0.290 **	0.027	0.026
DEPR <sub>t</sub>	-	-0.771 **	-0.775 **	-0.697 **	-0.699 **
ΔGW <sub>t</sub>	+	0.052 *	0.091	0.048	0.063
ΔINV <sub>t</sub>	+	0.464 **	0.464 **	-0.130	-0.130
CF <sub>t</sub>	+	0.407 **	0.407 **	0.520 **	0.520 **
ΔAR <sub>t</sub>	+	0.103	0.101	0.227 **	0.227 **
SIC1		0.018	0.018	0.020	0.020
SIC2		-0.018	-0.019	-0.002	-0.003
SIC3		-0.022	-0.022	-0.018	-0.019
SIC4		-0.001	-0.002	-0.027	-0.027
SIC5		-0.049 *	-0.049 *	-0.009	-0.009
SIC7		-0.012	-0.013	-0.021	-0.021
R <sub>t+1</sub>	+	0.070 **	0.070 **	0.064 **	0.064 **
R <sub>t+2</sub>	+			0.055 **	0.055 **
BIG4 <sub>t</sub>	+	0.041 **	0.043 **	0.028	0.029
BIG4 <sub>t</sub> * ΔGW <sub>t</sub>	+		-0.042		-0.015
n		510	510	510	510
Adj. R <sup>2</sup>		0.592	0.591	0.436	0.435
Model F-value		53.664	50.022	27.228	25.476
Model sig.		<0.001	<0.001	<0.001	<0.001

This table shows the results from model (2) and model (3). For variable definitions, see table 1. \*\* stands for a statistical significance at 1 per cent, and \* stands for 5 per cent.

The results suggest that Big 4 audit has a positive association with future cash flows. This is in line with the results in the correlation matrix, and indicates that Big 4 audited firms have higher cash flows than non-Big 4 audited firms. However, the interaction term between goodwill changes and high quality audit has an insignificant coefficient which indicates that high quality audit does not have an effect on the association between goodwill and future cash flows. Therefore, audit quality measured as Big 4 audits gives no support to the second

hypothesis. The explanation might be that audit quality is fundamentally high and there is no difference between auditors. The significance for the other variables follows the results from model (1).

The models for one and two year ahead cash flows are statistically significant. The adjusted R<sup>2</sup> values vary from 0.60 to 0.44. According to these values the models explain the one year ahead cash flows better than the two year ahead cash flows. This is in line with the model (1) regression results.

Table 8 Results from model 4 and model 5

<i>Variable</i>	<i>Prediction</i>	<i>Dependent variable</i>			
		<i>CF<sub>t+1</sub></i>	<i>CF<sub>t+1</sub></i>	<i>CF<sub>t+2</sub></i>	<i>CF<sub>t+2</sub></i>
Intercept	?	0.018	0.022	0.051	0.046
ΔAP <sub>t</sub>	-	-0.283 **	-0.286 **	0.029	0.034
DEPR <sub>t</sub>	-	-0.783 **	-0.782 **	-0.705 **	-0.707 **
ΔGW <sub>t</sub>	+	0.058 *	0.007	0.050	0.158
ΔINV <sub>t</sub>	+	0.469 **	0.471 **	-0.125	-0.128
CF <sub>t</sub>	+	0.414 **	0.414 **	0.524 **	0.525 **
ΔAR <sub>t</sub>	+	0.082	0.079	0.216 **	0.221 **
SIC1		0.016	0.016	0.018	0.019
SIC2		-0.016	-0.016	-0.002	-0.001
SIC3		-0.023	-0.024	-0.021	-0.021
SIC4		-0.006	-0.007	-0.030	-0.029
SIC5		-0.056 *	-0.056 *	-0.014	-0.013
SIC7		-0.014	-0.015	-0.023	-0.022
R <sub>t+1</sub>	+	0.073 **	0.073 **	0.066 **	0.065 **
R <sub>t+2</sub>	+			0.055 **	0.055 **
Alt	+	0.013	0.010	-0.028	-0.022
Alt * ΔGW <sub>t</sub>	+		0.080		-0.134
n		510	510	510	510
Adj. R <sup>2</sup>		0.583	0.582	0.434	0.433
Model F-value		51.806	48.290	27.012	25.302
Model sig.		<0.001	<0.001	<0.001	<0.001

This table shows the results from model (4) and model (5). For variable definitions, see table 1. \*\* stands for a statistical significant at 1 per cent, and \* stands for 5 per cent.

Table 8 shows the results from models (4) and (5). These regressions analyze the effect of auditor independence as a measure of audit quality. Auditor independence has no association with future cash flows and it doesn't affect goodwill accounting. This might mean that the level of non-audit services provided doesn't affect the accuracy in goodwill accounting or affect the auditor's quality. Therefore, there is no evidence to support the second hypothesis. The other variables have similar results under these models compared to the model (1) results presented earlier.

The models (4) and (5) are statistically significant. The adjusted  $R^2$  values vary from 0.59 to 0.44. According to these values the models explain the one year ahead cash flows better than the two year ahead cash flows. This is also in line with the model (1) results.

Based on these results I'm suggesting that there is an association between goodwill and the future cash flows. However, support was found only for the cash flows generated the following year. This association is not affected by audit quality measured as auditor size or auditor independence. In order to test the reliability of these results some additional test are conducted next.

### 5.3. Robustness analyses

In this chapter I'm testing the empirical findings from the regression models, and determining whether they are robust to further analysis. First, I'm testing the regression models with various subsamples and analyzing whether the results indicate the same conclusion as with the whole sample. After this, I'm analyzing multicollinearity, heteroscedasticity, sample distribution, and outliers.

#### **Subsample analysis – goodwill impairments**

As a sensitivity test I'm testing separately the negative changes of goodwill that is goodwill impairments. The results are presented in table 9. The sample that only consists of decreased goodwill has a total of 124 observations. The test with model (1) is a replication of Jarva's (2009) study of goodwill impairments and their association with future cash flows.

Table 9 Results for goodwill impairments

Panel A: Dependent variable  $CF_{t+1}$

Variable	Prediction	Dependent variable				
		$CF_{t+1}$	$CF_{t+1}$	$CF_{t+1}$	$CF_{t+1}$	$CF_{t+1}$
Intercept	?	-0.014	-0.042	0.007	0.043	0.058
$\Delta AP_t$	-	-0.986 **	-0.969 **	-0.954 **	-0.980 **	-0.988 **
$DEPR_t$	-	-1.152 **	-1.140 **	-1.128 **	-1.147 **	-1.156 **
$\Delta GW_t$	+	0.189 *	0.187 *	0.469 *	0.191 *	0.417
$\Delta INV_t$	+	0.869 **	0.849 **	0.848 **	0.884 **	0.898 **
$CF_t$	+	0.278 **	0.268 **	0.269 **	0.278 **	0.273 **
$\Delta AR_t$	+	0.195	0.208	0.186	0.214	0.200
SIC1		0.085	0.079	0.052	0.087	0.090
SIC2		0.019	0.008	-0.015	0.018	0.022
SIC3		0.021	0.016	-0.009	0.020	0.024
SIC4		0.007	0.002	-0.021	0.005	0.010
SIC5		-0.060	-0.050	-0.063	-0.059	-0.054
SIC7		0.021	0.022	-0.006	0.021	0.028
$R_{t+1}$	+	0.134 **	0.135 **	0.129 **	0.135 **	0.132 **
BIG4t	+		0.040	0.014		
BIG4t * $\Delta GW_t$	+			-0.325		
Alt	+				-0.067	-0.090
Alt * $\Delta GW_t$	+					-0.265
n		124	124	124	124	124
Adj. R <sup>2</sup>		0.746	0.750	0.753	0.747	0.746
Model F-value		28.735	27.425	25.973	27.006	25.073
Model sig.		<0.001	<0.001	<0.001	<0.001	<0.001

This table demonstrates the regression results from models (1), (2), (3), (4) and (5) for  $CF_{t+1}$  using a sample of goodwill impairments only. \*\* stands for a statistical significance at 1 per cent, and \* stands for 5 per cent. For variable definitions, see table 1.

Panel B: Dependent variable  $CF_{t+2}$

Variable	Prediction	Dependent variable				
		$CF_{t+2}$	$CF_{t+2}$	$CF_{t+2}$	$CF_{t+2}$	$CF_{t+2}$
Intercept	?	-0.014	-0.033	-0.036	-0.026	-0.005
$\Delta AP_t$	-	-0.358	-0.347	-0.348	-0.354	-0.342
$DEPR_t$	-	-0.750 **	-0.743 **	-0.744 **	-0.746 **	-0.734 **
$\Delta GW_t$	+	0.111	0.110	0.089	0.113	-0.208
$\Delta INV_t$	+	0.749 *	0.738 *	0.738 *	0.760 *	0.740 *
$CF_t$	+	0.343 **	0.333 **	0.333 **	0.343 **	0.349 **
$\Delta AR_t$	+	0.580 *	0.586 *	0.588 *	0.593 *	0.611 *
SIC1		0.097	0.094	0.096	0.098	0.094
SIC2		0.078	0.072	0.074	0.078	0.073
SIC3		0.037	0.034	0.036	0.036	0.032
SIC4		-0.003	-0.005	-0.003	-0.004	-0.009
SIC5		0.248 *	0.257 *	0.258 *	0.250 *	0.243 *
SIC7		0.012	0.014	0.016	0.012	0.003
$R_{t+1}$	+	0.073 *	0.075 *	0.075 *	0.074 *	0.079 *
$R_{t+2}$	+	0.062	0.058	0.059	0.062	0.060
BIG4t	+		0.027	0.029		
BIG4t * $\Delta GW_t$	+			0.024		
Alt	+				-0.048	-0.016
Alt * $\Delta GW_t$	+					0.377
n		124	124	124	124	124
Adj. R <sup>2</sup>		0.516	0.514	0.510	0.513	0.510
Model F-value		10.380	9.681	8.992	9.652	9.001
Model sig.		<0.001	<0.001	<0.001	<0.001	<0.001

This table demonstrates the regression results from models (1), (2), (3), (4) and (5) for  $CF_{t+2}$  using a sample of goodwill impairments only. \*\* stands for a statistical significance at 1 per cent, and \* stands for 5 per cent. For variable definitions, see table 1.

According to these findings goodwill impairments have a positive and significant association with one year ahead future cash flows. For two year ahead cash flows the association was insignificant. These results are consistent with the main results in this study. The results follow partly Jarva's (2009) findings, since he found a significant association for two year ahead cash flows as well (Jarva 2009). The models testing the impact of audit quality follow the main results. Audit quality has no impact on the association between changes in goodwill and future cash flows.

The differences in the results presented earlier and the results Jarva (2009) found might be due to different reasons. First, the sample in this study was from a different period of time and covered only one observation year while Jarva (2009) analyzed years 2002-2005. Second, the sample was collected from a different data base. The data for this study was taken from Compustat and WRDS which provide accurate data for US studies. In turn, Jarva (2009) used Worldscope and Datastream. Third, in this study the industry fixed effects were controlled, which Jarva (2009) didn't do in his study.

The models for one and two year ahead cash flows are statistically significant. The Adj.  $R^2$  values vary from 0.75 to 0.51 suggesting that the one year ahead cash flows are explained better than the following year's. These findings are consistent with the results from the main tests.

### Subsample analysis – large changes in goodwill

The second sensitivity test is done by dividing the sample into two subsample groups. First we examine the half of the sample with large goodwill changes, and later the other half.

Table 10 Results for goodwill changes larger than the median value

Panel A: Dependent variable  $CF_{t+1}$

Variable	Prediction	Dependent variable				
		$CF_{t+1}$	$CF_{t+1}$	$CF_{t+1}$	$CF_{t+1}$	$CF_{t+1}$
Intercept	?	0.011	-0.016	-0.020	0.009	0.017
$\Delta AP_t$	-	-0.432 **	-0.441 **	-0.447 **	-0.432 **	-0.438 **
DEPR <sub>t</sub>	-	-0.905 **	-0.889 **	-0.899 **	-0.905 **	-0.906 **
$\Delta GW_t > \text{median}$	+	0.075 *	0.069 *	0.150	0.075 *	0.030
$\Delta INV_t$	+	0.418 **	0.411 **	0.412 **	0.418 **	0.422 **
$CF_t$	+	0.455 **	0.449 **	0.449 **	0.455 **	0.455 **
$\Delta AR_t$	+	0.059	0.084	0.076	0.058	0.050
SIC1		0.006	0.009	0.007	0.006	0.005
SIC2		0.017	0.015	0.013	0.017	0.017
SIC3		-0.019	-0.017	-0.018	-0.019	-0.019
SIC4		-0.021	-0.017	-0.019	-0.021	-0.024
SIC5		-0.066 *	-0.060	-0.060	-0.065 *	-0.066 *
SIC7		-0.001	0.000	-0.003	-0.001	-0.002
$R_{t+1}$	+	0.075 **	0.073 **	0.073 **	0.075 **	0.077 **
BIG4 <sub>t</sub>	+		0.034	0.039 *		
BIG4 <sub>t</sub> * $\Delta GW_t$	+			-0.085		
$AIt$	+				0.003	-0.005
$AIt$ * $\Delta GW_t$	+					0.131
n		255	255	255	255	255
Adj. R <sup>2</sup>		0.675	0.678	0.678	0.673	0.673
Model F-value		41.500	39.192	36.592	38.376	35.772
Model sig.		<0.001	<0.001	<0.001	<0.001	<0.001

This table demonstrates the regression results from models (1), (2), (3), (4) and (5) for  $CF_{t+1}$  using a sample of goodwill changes larger than the median value of the sample. \*\* stands for a statistical significance at 1 per cent, and \* stands for 5 per cent. For variable definitions, see table 1.

Panel B: Dependent variable  $CF_{t+2}$

Variable	Prediction	Dependent variable				
		$CF_{t+2}$	$CF_{t+2}$	$CF_{t+2}$	$CF_{t+2}$	$CF_{t+2}$
Intercept	?	0.039	0.016	0.013	0.086	0.083
$\Delta AP_t$	-	-0.046	-0.052	-0.059	-0.060	-0.057
$DEPR_t$	-	-0.771 **	-0.758 **	-0.768 **	-0.775 **	-0.775 **
$\Delta GW_t > \text{median}$	+	0.063	0.058	0.140	0.060	0.107
$\Delta INV_t$	+	-0.477 **	-0.482 **	-0.481 **	-0.481 **	-0.482 **
$CF_t$	+	0.571 **	0.565 **	0.565 **	0.569 **	0.569 **
$\Delta AR_t$	+	0.273 *	0.293 *	0.286 *	0.287 *	0.291 *
SIC1		0.017	0.020	0.017	0.018	0.018
SIC2		0.033	0.031	0.029	0.031	0.031
SIC3		-0.054	-0.052	-0.054	-0.059	-0.059
SIC4		-0.073	-0.069	-0.071	-0.074	-0.073
SIC5		-0.067	-0.062	-0.062	-0.068	-0.067
SIC7		0.000	0.001	-0.002	-0.003	-0.002
$R_{t+1}$	+	0.110 **	0.107 **	0.108 **	0.110 **	0.109 **
$R_{t+2}$	+	-0.016	-0.015	-0.017	-0.016	-0.016
BIG4t	+		0.028	0.033		
BIG4t * $\Delta GW_t$	+			-0.086		
AIt	+				-0.055	-0.051
AIt * $\Delta GW_t$	+					-0.059
n		255	255	255	255	255
Adj. R <sup>2</sup>		0.566	0.566	0.565	0.565	0.563
Model F-value		24.630	23.073	21.595	23.015	21.493
Model sig.		<0.001	<0.001	<0.001	<0.001	<0.001

This table demonstrates the regression results from models (1), (2), (3), (4) and (5) for  $CF_{t+2}$  using a sample of goodwill changes larger than the median value of the sample. \*\* stands for a statistical significance at 1 per cent, and \* stands for 5 per cent. For variable definitions, see table 1.

The results presented in table 10 are in line with the main test. The changes in goodwill are positively associated with one year ahead future cash flows, and audit quality or auditor independence have no effect on this association. The models are statistically significant and



the Adj.  $R^2$  suggests that one year ahead cash flows are explained better by the model than two year ahead cash flows. These findings give support to the main results of this study.

### Subsample analysis – small changes in goodwill

Table 11 Results for goodwill changes smaller than the median value

Panel A: Dependent variable  $CF_{t+1}$

Variable	Prediction	Dependent variable				
		$CF_{t+1}$	$CF_{t+1}$	$CF_{t+1}$	$CF_{t+1}$	$CF_{t+1}$
Intercept	?	0.098	0.063	0.064	0.110	0.135
$\Delta AP_t$	-	0.013	0.001	0.001	0.015	-0.001
DEPR <sub>t</sub>	-	-0.291 *	-0.299 *	-0.299 *	-0.288 *	-0.286 *
$\Delta GW_t < \text{median}$	+	-1.102 *	-1.121 *	-1.290	-1.116 *	-4.136
$\Delta INV_t$	+	0.749 **	0.754 **	0.753 **	0.753 **	0.762 **
$CF_t$	+	0.412 **	0.404 **	0.404 **	0.411 **	0.414 **
$\Delta AR_t$	+	0.139 *	0.148 *	0.148 *	0.138 *	0.142 *
SIC1		0.014	0.016	0.016	0.013	0.015
SIC2		-0.082 **	-0.080 **	-0.079 **	-0.082 **	-0.081 **
SIC3		-0.069 *	-0.065 *	-0.064 *	-0.069 *	-0.068 *
SIC4		-0.024	-0.018	-0.018	-0.024	-0.024
SIC5		-0.067	-0.062	-0.062	-0.067	-0.067
SIC7		-0.062 *	-0.056	-0.056	-0.062 *	-0.061 *
$R_{t+1}$	+	0.076 **	0.074 **	0.074 **	0.075 **	0.074 **
BIG4 <sub>t</sub>	+		0.036	0.034		
BIG4 <sub>t</sub> * $\Delta GW_t$	+			0.211		
AIt	+				-0.014	-0.043
AIt * $\Delta GW_t$	+					3.490
n		255	255	255	255	255
Adj. $R^2$		0.435	0.443	0.441	0.433	0.433
Model F-value		16.052	15.458	14.372	14.856	13.924
Model sig.		<0.001	<0.001	<0.001	<0.001	<0.001

This table demonstrates the regression results from models (1), (2), (3), (4) and (5) for  $CF_{t+1}$  using a sample of goodwill changes smaller than the median value of the sample. \*\* stands for a statistical significance at 1 per cent, and \* stands for 5 per cent. For variable definitions, see table 1.

Panel B: Dependent variable  $CF_{t+2}$

Variable	Prediction	Dependent variable				
		$CF_{t+2}$	$CF_{t+2}$	$CF_{t+2}$	$CF_{t+2}$	$CF_{t+2}$
Intercept	?	0.009	0.003	-0.008	0.109	0.050
$\Delta AP_t$	-	0.199	0.197	0.202	0.225	0.268
DEPR <sub>t</sub>	-	-0.384 *	-0.385 *	-0.376 *	-0.358 *	-0.361 *
$\Delta GW_t < \text{median}$	+	-0.202	-0.205	1.978	-0.325	6.907
$\Delta INV_t$	+	0.848 **	0.849 **	0.870 **	0.876 **	0.851 **
$CF_t$	+	0.472 **	0.471 **	0.472 **	0.467 **	0.460 **
$\Delta AR_t$	+	0.287 **	0.288 **	0.286 **	0.275 **	0.264 **
SIC1		0.048	0.048	0.051	0.045	0.043
SIC2		-0.023	-0.023	-0.025	-0.024	-0.025
SIC3		0.001	0.001	-0.002	0.000	-0.002
SIC4		0.016	0.017	0.013	0.020	0.020
SIC5		0.017	0.018	0.014	0.019	0.018
SIC7		-0.029	-0.028	-0.025	-0.025	-0.027
$R_{t+1}$	+	0.030	0.029	0.029	0.026	0.029
$R_{t+2}$	+	0.151 **	0.151 **	0.149 **	0.157 **	0.161 **
BIG4 <sub>t</sub>	+		0.006	0.023		
BIG4 <sub>t</sub> * $\Delta GW_t$	+			-2.736		
A <sub>It</sub>	+				-0.117	-0.049
A <sub>It</sub> * $\Delta GW_t$	+					-8.358
n		255	255	255	255	255
Adj. R <sup>2</sup>		0.383	0.381	0.385	0.388	0.392
Model F-value		12.263	11.404	10.925	11.737	11.218
Model sig.		<0.001	<0.001	<0.001	<0.001	<0.001

This table demonstrates the regression results from models (1), (2), (3), (4) and (5) for  $CF_{t+2}$  using a sample of goodwill changes smaller than the median value of the sample. \*\* stands for a statistical significance at 1 per cent, and \* stands for 5 per cent. For variable definitions, see table 1.

Table 11 presents respectively the results for the sample of small changes in goodwill. The changes in goodwill are positively associated with one year ahead future cash flows, and audit quality or auditor independence have no effect on this association. The models are statistically

significant and the Adj. R<sup>2</sup> suggests that one year ahead cash flows are explained better by the model than two year ahead cash flows. These findings give support to the main results of this study.

### Auditor independence analysis with high auditor independence

Table 12 Results for auditor independence analysis

<i>Variable</i>	<i>Prediction</i>	<i>Dependent variable</i>			
		<i>CF<sub>t+1</sub></i>	<i>CF<sub>t+1</sub></i>	<i>CF<sub>t+2</sub></i>	<i>CF<sub>t+2</sub></i>
Intercept	?	0.031	0.031	0.034	0.036
ΔAP <sub>t</sub>	-	-0.283 **	-0.283 **	0.030	0.030
DEPR <sub>t</sub>	-	-0.783 **	-0.781 **	-0.704 **	-0.696 **
ΔGW <sub>t</sub>	+	0.057 *	0.054	0.050	0.030
ΔINV <sub>t</sub>	+	0.469 **	0.470 **	-0.129	-0.127
CF <sub>t</sub>	+	0.414 **	0.414 **	0.524 **	0.525 **
ΔAR <sub>t</sub>	+	0.084	0.083	0.219 **	0.211 *
SIC1		0.016	0.016	0.019	0.018
SIC2		-0.016	-0.017	-0.002	-0.003
SIC3		-0.024	-0.024	-0.021	-0.022
SIC4		-0.006	-0.006	-0.030	-0.031
SIC5		-0.056 *	-0.056 *	-0.014	-0.014
SIC7		-0.015	-0.015	-0.023	-0.024
R <sub>t+1</sub>	+	0.072 **	0.073 **	0.065 **	0.067 **
R <sub>t+2</sub>	+			0.056 **	0.056 **
HIGH AI <sub>t</sub>	+	-0.002	-0.002	-0.011	-0.013
HIGH AI <sub>t</sub> * ΔGW <sub>t</sub>	+		0.006		0.041
n		510	510	510	510
Adj. R <sup>2</sup>		0.583	0.582	0.434	0.433
Model F-value		51.781	48.234	27.049	25.343
Model sig.		<0.001	<0.001	<0.001	<0.001

This table demonstrates the regression results from models (2), (3), (4) and (5) for CF<sub>t+1</sub> and CF<sub>t+2</sub> using an auditor independence dummy variable. \*\* stands for a statistical significance at 1 per cent, and \* stands for 5 per cent. For variable definitions, see table 1.

In order to conduct sensitivity test for auditor independence I created a dummy variable from  $AI_t$ . I divided the sample into two groups based on the level of independence. The variable HIGH  $AI_t$  stands for high auditor independence. The results presented in table 12 give support to the main findings. High auditor independence doesn't have an effect on the reporting of goodwill. The models are statistically significant and the Adj.  $R^2$  suggests that one year ahead cash flows are explained better by the model than two year ahead cash flows.

### **Heteroscedasticity**

Heteroscedasticity was analyzed in order to detect unusual characteristics of the data (Cook & Weisberg 1983). This analysis was conducted with a scatter plot of observations to find the possible trends or concentrations among the observation (see appendix A). The scatter plot should have an even distribution and no trends or concentrated points (Maddala & Lahiri 2009). The observations were concentrated in the middle of the scatter plot, except for some outliers. This indicates that the sample has heteroscedasticity. The problem of heteroscedasticity can be solved in different ways (Maddala & Lahiri 2009). In this study, the variables were deflated by a measure of size, the market value of equity.

### **Multicollinearity**

Multicollinearity is a statistical condition which means that the explanatory variables in a regression are correlated with each other. Multicollinearity might affect the model's regression coefficients and give misleading t-values. (Farrar & Glauber 1967) In order to determine the possibility of multicollinearity I analyzed the VIF (variance inflation factor) values. An ideal situation would be one where the variables are not correlated at all. The VIF values compare the actual situation with the ideal situation. (Maddala & Lahiri 2009) I found that no harmful multicollinearity is present in the models, since the VIF values were under 10. The results from VIF testing are shown in appendix B.

### **Normal distribution**

The regression model assumes that the sample has a normal distribution (Maddala & Lahiri 2009). Therefore, the observations were analyzed in a histogram (see appendix C). The observations are normally distributed except for some outliers. The impact of outliers is investigated next.

## **Outliers**

Outliers were excluded from the initial sample (see table 2). In order to review the possible remained outliers in the sample I used the Cook's distance measure (Cook 1977). The maximum value for Cook's distance in the regression tests was 0.9. This suggests that there are no outliers which would affect the results.

## 6. Discussion and limitations

In this chapter I'm discussing the results and their relation and contribution to previous studies. I'm also discussing the limitations of the sample and the research design in this study.

### **Goodwill and future cash flows**

The regression results showed a significant relationship between changes in goodwill and the following year's cash flows. The subsample analysis with only negative changes of goodwill showed similar results. There was no empirical evidence that goodwill changes would affect the two year ahead cash flows. This finding can be analyzed with help from previous literature.

Both Flyck and Lynch (1999) and Kaplan and Weisbach (1992) found that firms that divest after acquisitions are often profitable, because the acquired synergies are utilized and they don't generate future benefits any longer. Their studies suggest that the ability of synergies to contribute to future performance is decreasing with time.

In addition, Bugeja and Gallery (2006) found that goodwill ages relatively fast. Goodwill that is older than two years has no future economic benefits. With time the acquired synergy benefits might be included in normal operations and goodwill loses its value. Another explanation might be that companies cannot fully achieve the desired improvements in the performance after the acquisition. (Bugeja & Gallery 2006)

These findings might explain the result that no association was found between changes of goodwill and the two year ahead cash flows. The acquired goodwill is included in normal operations, or the firm might not be able to fully use the potential of synergies.

There is another explanation for the relationship between two year ahead cash flows and changes in goodwill. The study doesn't take into consideration the changes in goodwill after one year. The changes in that time period might explain the cash flows two years ahead from the observation year use in this study. This same situation is in the study of Barth et al. (2001) and Jarva (2009).

However, the reason for the short economic life of goodwill is interesting, since goodwill is often expected to generate long-term benefits for the company. If the synergy benefits are

included to the operations or the markets change rapidly, goodwill as an asset in the balance sheet loses its value.

### **The impact of audit quality**

According to the findings of this study, audit quality has no impact on the relationship between reported changes in goodwill and future cash flows. Audit quality was measured with audit firm size as Big 4 auditors and with auditor independence by the amount of audit service fees compared to total fees paid for the auditor. Possible reasons for the lack of influence on goodwill accounting can be found in the previous literature.

Lawrence et al. (2011) suggested that size doesn't matter in audit quality. Since Big 4 and non-Big 4 audit firms operate in the same regulatory and professional environment, their quality should be comparable. In addition, non-Big 4 audit companies might have to achieve higher level of assurance and therefore increase their audit effort, because they cannot obtain the same level of backup from insurance companies than Big 4 audit firms. (Lawrence et al. 2011)

Also Louis (2005) states that non-Big 4 audit firms might have comparative advantages in some areas. According to his findings, non-Big 4 audited firms performed better at merger announcements than Big 4 audited firms. Non-Big 4 audit firms could support their clients better, because they have superior knowledge of the local markets and better relations with their clients. (Louis 2005)

The fact that there is no difference in audit quality between Big 4 and non-Big 4 auditors is interesting. This result suggests that the quality is already high because audit standards set the fundamental level of requirements.

Audit independence did not have an impact on the association between reported goodwill values and future cash flows either. The theories suggest that under high non-audit service fees audit quality might be compromised, but no evidence was found in this study. This finding is supported by previous studies.

DeFond et al. (2002) found no evidence that non-audit services would decrease the quality of audit provided. They found no association between fees paid and the issuing of going concern opinions (DeFond et al. 2002). Ashbaugh et al. (2003) found that the association between

discretionary accruals and the non-audit fee ratio was driven by the income decreasing accruals. This reflects conservatism in accounting. According to the researchers there was little evidence that auditor independence would be compromised under non-audit services. (Ashbaugh et al. 2003)

The theory that auditor independence is not compromised under high non-audit service fees is justified with the costs of doing so. Auditors might face loss of reputation and litigation costs that work as incentives not to compromise their independence (DeFond et al. 2002).

Even though audit quality did not have an impact on goodwill reporting I made another finding. According to the results Big 4 auditors and future cash flows had a significant positive correlation. This suggests that Big 4 audited firms have higher cash flows than non-Big 4 audited firms. This is a characteristic of self-selection problem that suggests that firms with a good performance choose Big 4 auditors to verify their performance (e.g. Lawrence et al. 2011). However, since no significant results were found for Big 4 audits affecting the studied association, this was not studied further.

The reason that there is no variation in audit quality regarding goodwill reporting might be due to the fact that the same auditing standards regulate this field of business no matter firm size. If the auditing standards are demanding superior quality, the size of an audit firm is irrelevant. Also the auditor independence might not compromise audit quality for the same reason. Standards are defining the scope within non-audit services can be provided to an audit client. Therefore, also the relation of the two fees might be irrelevant in the case of audit quality.

### **Limitations**

The first limitation of this study arises from the data selection. This study has been performed as a cross-sectional analysis from year 2010. Therefore, a significant amount of companies with goodwill are excluded from the sample, because there are no changes year 2010. In addition, the study doesn't take into consideration the changes in goodwill in year 2011. This might affect the operative cash flows in year 2012 (t+2).

Measuring audit quality is problematic. I used Big 4 audit firms as a proxy for audit quality, which is done in many previous studies as well. However, Lawrence et al. (2011) states that



audit quality measured as Big 4 auditing don't affect the association investigated. Instead the client characteristics of Big 4 audit clients are the main drivers in the regression. (Lawrence et al. 2011) The results from this study suggested that Big 4 audited firms have higher cash flows than non-Big 4 audited firms. Based on these remarks the results might be affected by the different client characteristics among Big 4 and non-Big 4 audited firms. However, since the investigated association between goodwill and future cash flows was not affected by audit quality I will not further investigate self-selection in auditor choices.

## 7. Conclusion

### 7.1. Summary

This study examined the association between goodwill and future cash flows and whether high quality audit can enhance this association. The aim of this study was to provide evidence for the economic importance of goodwill and to examine audit quality in the case of goodwill accounting. The main hypothesis of this study was that under high quality auditing goodwill would be measured more accurately and therefore it would reflect better the future economic benefits. This would lead into a stronger association between goodwill and future cash flows.

Acquired goodwill is the largest item of intangible assets and important for firms' performance. (Bloom 2009) Goodwill is recognized in acquisitions in the acquirer's balance sheet as the excess of the acquisition cost that cannot be assigned to other assets. The fair value of goodwill is based on the management's expectations of the future cash flows. Goodwill that is recognized in balance sheet is not systematically amortized. Instead it is tested for impairment and written off if its carrying amount exceeds its fair value. (FASB 2001 and FASB 2007) The value of goodwill is based on its ability to generate future benefits. The benefits arise from synergies when assets of two companies are working together (Gore & Zimmerman 2010).

The purpose of auditing is to ensure the accuracy of financial reporting. The audit opinion expresses whether the financial reporting gives a true and fair view of the financial situation of the company, and therefore provides confidence to the users in the financial statements. (IAASB 2009) Audit might also relief the principal-agent problem between the owners and the firm management (DeAngelo 1981). Various studies have investigated audit quality (e.g. DeAngelo 1981 and Francis 2004).

The theory suggests that size is a determinant of quality, that is larger audit firms provide higher quality than smaller audit firms (DeAngelo 1981). This is based on the notion that larger audit firms have more expertise and therefore they can provide high quality audits (Francis 2011). Another theory suggests that auditor independence might affect audit quality, meaning that audit quality might be compromised if the auditor is financially dependent from its client (DeFond et al. 2002). This means that independent auditor will report the errors

found, which will lead to a higher quality audit (Francis 2011). In this study audit quality was studied from these perspectives. The auditor size was measured as Big 4 auditors and auditor independence with the ratio between audit service fees and total fees paid for the auditor.

The study consisted of two hypotheses. The first one stated that changes of goodwill are positively associated with future cash flows. This means that a decrease in goodwill would lead into smaller cash flows and respectively an increase in goodwill would generate more future cash flows. The second hypothesis studied the impact of audit quality on this association. It claims that under high quality audit the association between goodwill and future cash flows would be stronger. This is based on the assumption, that under high audit quality goodwill is measured more accurately and therefore it reflects better future benefits.

The empirical part of the study was conducted using a cross-sectional regression analysis with a US sample from year 2010. The empirical model was based on the studies by Barth et al. (2001) and Jarva's (2009). Barth et al. (2001) investigated whether the accruals from the observation year can predict future cash flows. Jarva (2009) extended this study to goodwill impairments. My study took into consideration also goodwill acquisitions. In addition, the impact of audit quality on goodwill accounting was studied, since the valuation of goodwill is based on management's expectations of the future performance and is therefore a challenging item to measure and audit.

Previous studies found mixed results regarding goodwill and its ability to generate future cash flows. Studies found that goodwill can generate future benefits, but its economic life might be relatively short. The synergy benefits that goodwill is based on are e.g. included in normal operations and goodwill loses its value as an asset.

On the other hand many studies investigate Big 4 auditors and audit independence. Big 4 auditors are considered as high quality auditors and many studies found evidence supporting this hypothesis. Auditor independence gave mix results. Some studies found evidence that the presence of non-audit services would affect the independence of the auditor, but some stated that providing non-audit services to the audit client doesn't compromise independence.

The results in my study showed that there is a significant association between changes in goodwill and the cash flows for the following year. This finding was also robust for the

sensitivity tests made. However, there was no evidence found that audit quality would have an impact on this association. That is, neither size nor independence of the auditor affected the studied association.

The findings gave support for the first hypothesis. The association between changes in goodwill and future cash flows was significant for the following year after the change. However, there was no evidence found for the next year's cash flows. The reason might be that the ability of goodwill to generate future benefits decreases with time, and the synergy benefits acquired are implemented to the company's normal operations or utilized (e.g. Bugeja & Gallery 2006 and Kaplan & Weisbach 1992).

This finding should be of interest to firm management, auditors, regulators, and users of financial statements. My result suggests that goodwill has a short financial life and it can generate cash flows for a limited period of time. Therefore, the firm management has to carefully evaluate whether goodwill needs to be impaired earlier and more aggressively. Also auditors should pay attention to the management's view of the future when auditing goodwill valuation. Regulators can use this information in evaluating the need for updates in accounting standards, so that the accounting approach would reflect the true state of goodwill. The users of financial statements might want to interpret the value of goodwill with critical mind, and consider whether its value is relevant or not.

The results did not give support to the second hypothesis. There was no association between audit quality and the accounting for goodwill. Audit quality might be fundamentally high since audit firms operate under the same standard environment. Therefore the auditor's size or the level of independence doesn't affect the outcome. For example Lawrence (2011) states that there is no difference in quality between Big 4 and non-Big 4 auditors and Louis (2005) suggests that non-Big 4 auditors might even be superior in quality in some areas. According to Ashbaugh et al. (2003) and Francis (2006) auditor independence is not compromised under non-audit service fees.

This finding is useful for the users of financial statements and the shareholders when making the choice of an auditor. The users of financial statements can also see non-Big 4 auditors as high quality auditors, since the results did not show any difference in quality regarding

goodwill accounting. Also the shareholders can benefit from these results when choosing the auditor.

The results contribute to the previous literature in two ways. First, they confirm the association between goodwill and future cash flows that was found in the academic literature and noticed by the standard setters. Second, the results suggest that audit quality measured by size or auditor independence does not affect goodwill accounting. The study was conducted with comparable and recent data which enables the generalizability of the results.

## 7.2. Further research

This study left some open research questions that could be studied further. Since this study takes into consideration one year only, another study could expand the time horizon to several years. This would add to the generalizability of results and lead into more comprehensive understanding of the phenomenon.

Future research could also concentrate in the impact of audit quality on the other accruals predicting future cash flows. For example, the results showed that changes in accounts receivable and inventory can explain future firm performance. However, these items are not subject to intensive management discretion and therefore audit quality might not make a difference in this case.

The results suggested that firms with Big 4 auditors have higher cash flows than firms with non-Big 4 auditors. This might be a sign of self-selection in auditor decisions and could be studied more. Also the found correlation between auditor independence and auditor size is interesting. One might want to study further whether the high level of provided non-audit services affects auditor independence among Big 4 audit firms.

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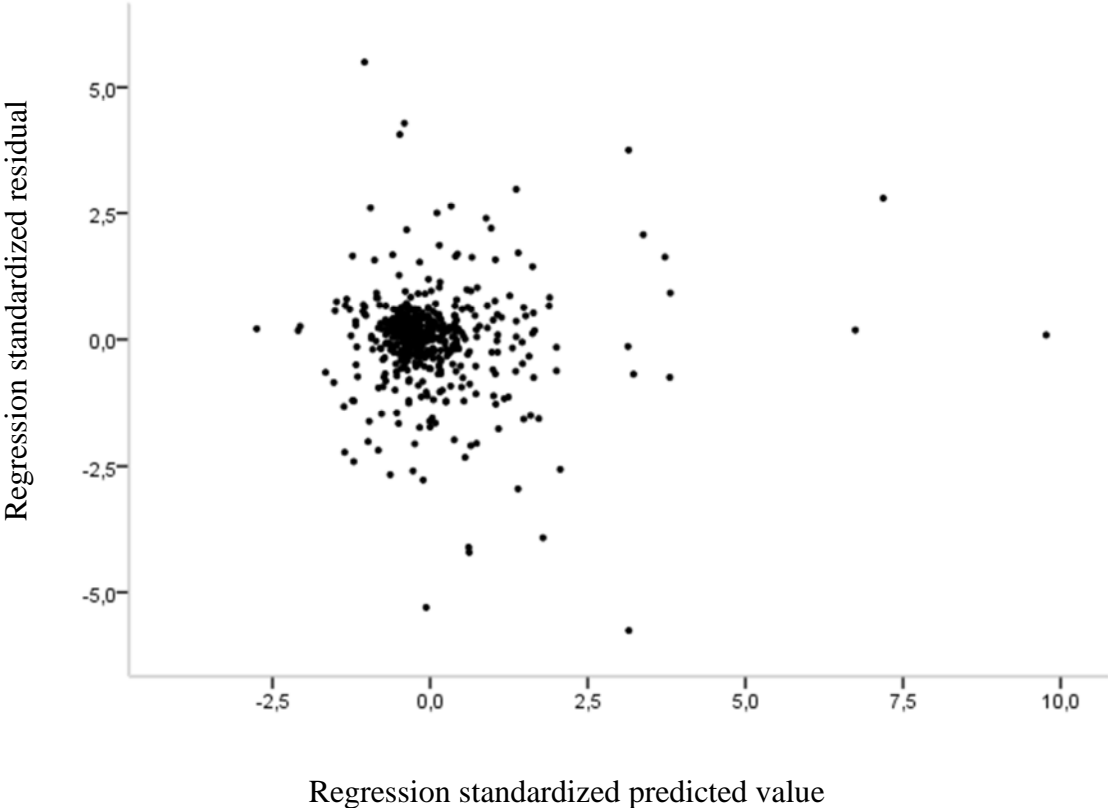
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# Appendix

## Appendix A. Scatterplot of observations



This figure illustrates the heteroscedasticity of observations by showing them in a scatter plot with a dependent variable  $CF_{t+1}$ .

## Appendix B. VIF values

Panel A: VIF values with dependent variable  $CF_{t+1}$

<i>Variable</i>	<i>CF<sub>t+1</sub></i>	<i>CF<sub>t+1</sub></i>	<i>CF<sub>t+1</sub></i>	<i>CF<sub>t+1</sub></i>	<i>CF<sub>t+1</sub></i>
$\Delta AP_t$	2.283	2.283	2.290	2.283	2.290
$DEPR_t$	1.895	1.901	1.927	1.895	1.897
$\Delta GW_t$	1.338	1.343	15.673	1.344	40.094
$\Delta INV_t$	1.377	1.378	1.378	1.377	1.381
$CF_t$	1.390	1.394	1.395	1.391	1.391
$\Delta AR_t$	1.746	1.768	1.775	1.750	1.777
SIC1	1.788	1.790	1.802	1.789	1.793
SIC2	2.566	2.569	2.577	2.569	2.572
SIC3	3.640	3.645	3.654	3.665	3.668
SIC4	2.266	2.276	2.284	2.266	2.279
SIC5	1.888	1.902	1.903	1.888	1.890
SIC7	2.981	2.987	3.003	2.985	2.995
$R_{t+1}$	1.099	1.105	1.106	1.100	1.109
BIG4 <sub>t</sub>		1.054	1.125		
BIG4 <sub>t</sub> * $\Delta GW_t$			15.205		
Alt				1.022	1.078
Alt * $\Delta GW_t$					41.504

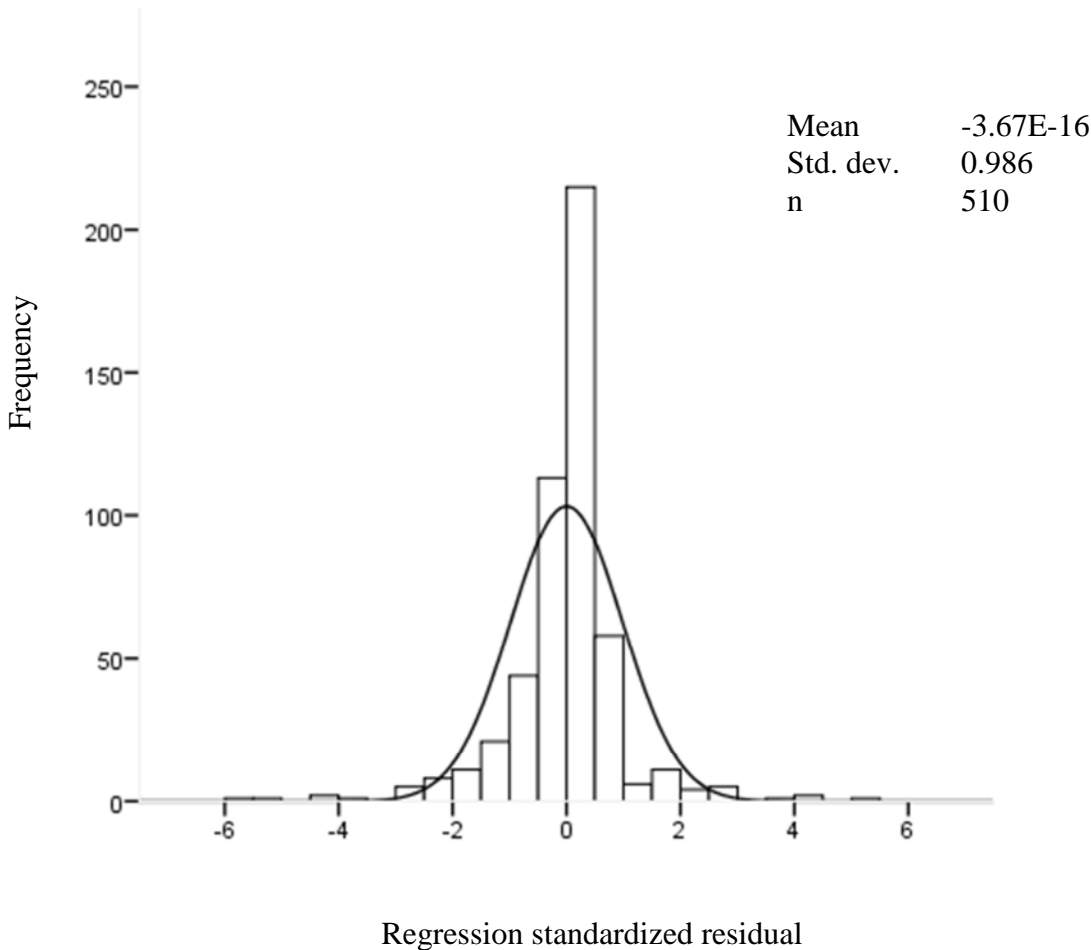
This table shows the VIF values for the regression model explaining variable  $CF_{t+1}$ . For variable definitions, see table 1.

Panel B: VIF values with dependent variable  $CF_{t+2}$

Variable	$CF_{t+2}$	$CF_{t+2}$	$CF_{t+2}$	$CF_{t+2}$	$CF_{t+2}$
$\Delta AP_t$	2.285	2.285	2.293	2.285	2.293
$DEPR_t$	1.897	1.904	1.931	1.897	1.900
$\Delta GW_t$	1.338	1.343	15.802	1.344	40.098
$\Delta INV_t$	1.378	1.378	1.378	1.378	1.381
$CF_t$	1.391	1.394	1.395	1.391	1.391
$\Delta AR_t$	1.746	1.768	1.775	1.750	1.777
SIC1	1.795	1.797	1.811	1.795	1.799
SIC2	2.572	2.574	2.581	2.576	2.578
SIC3	3.647	3.652	3.663	3.670	3.673
SIC4	2.269	2.279	2.286	2.269	2.282
SIC5	1.889	1.904	1.905	1.889	1.892
SIC7	2.983	2.988	3.006	2.987	2.996
$R_{t+1}$	1.152	1.157	1.160	1.152	1.162
$R_{t+2}$	1.089	1.089	1.099	1.092	1.092
BIG4t		1.055	1.125		
BIG4t * $\Delta GW_t$			15.350		
Alt				1.025	1.081
Alt * $\Delta GW_t$					41.507

This table shows the VIF values for the regression model explaining variable  $CF_{t+2}$ . For variable definitions, see table 1.

**Appendix C. Histogram of observations**



This figure shows the observations in a histogram presenting normal distribution with a dependent variable  $CF_{t+1}$ .