'The Influence of XBRL on the Quality of Disclosures'

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August 2011

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Preface

This thesis is the result of my study on XBRL and the quality of disclosures in the U.S.A. With this thesis I will conclude the master's program Accounting & Finance and graduate at the faculty Erasmus School of Economics.

This research has been accomplished as a consequence of the media attention for XBRL. It is an innovative, ambitious new reporting standard with numerous possibilities, which is, in my opinion, still in its infancy. I performed this research since I have a great interest in the digitalization of this world and the consequences for the financial world. Before presenting my research, I would like to express my gratitude to certain people.

I would like to thank my supervisor dr. Maat for his support during the writing of this Master's Thesis. Secondly, I would like to thank Joost for his patience and unconditional encouragement. Finally, I would like to thank my family and friends for the confidence and support that they have given me during my study and this final period.

Kelly van Cauter

Rotterdam, August 2011

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1   Introduction

The American supervisor Security and Exchange Commission (SEC) has mandated all listed companies to report financial statements using XBRL. The 500 largest listed companies have been forced to use XBRL as of fiscal years ending after June 15th 2009. XBRL (Extensible Business Reporting Language) is a communication technique that can be used to send and receive business or financial information in one uniform form. It is based on XML technologies and is fast becoming a standard means of communicating information for businesses. It should simplify the formulating, publishing, exchanging, accumulating, consolidating, analysing, and editing of financial information. Due to these benefits it is believed that the quality of disclosures will increase. This thesis will investigate if the quality of disclosures increases after the decision to file financial reports in the XBRL format.

The main research question will be as follows:

Does reporting in a XBRL format increases the quality of disclosures?

In order to answer the main research question, three sub questions have been formulated. First, the main topic XBRL needs to be clarified. Any research that has been conducted, mainly concerning the quality of disclosures, will have to be reviewed. Second, the term quality of disclosures will need to be defined and examined thoroughly before the research can take place. Furthermore, the methods of measurement will need to be reviewed. Third, the possible association between XBRL and quality of disclosures has to be theoretically based. Finally, the association between XBRL and a possible higher quality of disclosures will be examined. All formulated sub questions will be answered throughout the chapters.

1.   *What does XBRL comprehend and what research regarding XBRL has been conducted?*
2.   *How is quality of disclosures defined and measured?*
3.   *Is there a theoretical association between XBRL and quality of disclosures?*
4.   *Do companies that have implemented XBRL show a greater quality of disclosure?*

The origination of XBRL has extended the world of financial accounting with the technical aspect of the Internet. It might be interesting to learn more about the combination of these two worlds and the economic consequences it has for companies. The motivation for this research is due to the fact that it is very plausible to think that reporting in a XBRL format will be mandated worldwide in the

next few years, since some countries have already implemented this new regulation. Therefore, it is important to understand the consequences of such a transformation in reporting.

The results of this paper could be interesting for companies that consider making use of XBRL. These companies could be interested in the consequences of XBRL, which I will try to determine in this thesis. Furthermore, this kind of research has not been done yet. Therefore, the results could also be useful to regulators among others, since they could be interested in the influence that XBRL has on the quality of disclosures before they decide to mandate XBRL.

Since the use of XBRL is not (yet) obliged for all companies by the regulators, we can mostly speak of early and voluntary adopters. Until now, prior research has mainly focused on the reason why these early adopters have chosen to adopt XBRL. Some studies elaborate on potential issues that need further investigation (e.g. the change in cost of equity capital after the implementation of XBRL or the results for other countries). There hasn't been conducted any research that tries to examine the consequences of XBRL after a company decides to adopt it. As prior research mostly tries to predict when a company is more likely to start using XBRL, this research will focus on the consequences that occur after the decision to use XBRL. The goal of this thesis will be to empirically indicate the association between the change in the quality of disclosures and the introduction of XBRL. In order to accomplish this, the sample will contain listed companies that are mandated to make use of XBRL in the last few years. Within this sample of U.S. companies the data before and after the introduction of XBRL will be used.

The rest of this thesis is structured as follows; the next section will clarify the topic XBRL and therefore answer the first sub question. Section 3 provides the answer to the second sub question by discussing the definition of quality of disclosures, the possible measurement methods and the other factors that could possibly affect these subjects. Furthermore, this chapter will elaborate on the theoretical association between XBRL and quality of disclosures and therefore answer the third sub question. The development of hypotheses and research methodology will be described in section 4 and 5. Section 6 reports the results and analysis of these results and will therefore investigate the fourth sub question if companies that have implemented XBRL show a greater quality of disclosure. It will also elaborate on other factors that could influence the quality of disclosures. Finally, section 7 presents the conclusion.

2   eXtensible Business Reporting Language

This chapter will answer the first sub question:

1.   What does XBRL comprehend and what research regarding XBRL has been conducted?

It will elaborate on XBRL and the accompanying definitions. The chapter begins with the origin of XBRL and taxonomies and follow with the technique that is used to implement this way of reporting. Furthermore, the benefits for users and stakeholders and the consequences for the external auditor will be clarified. Finally, the current situation with regard to XBRL is explained. At the end of the chapter a summary will be provided.

2.1   Origination

Since the introduction of the Internet, the communication between organizations and the outer world has been continuously changing. Due to the possibilities of the Internet, including features like low costs and international reach, corporations have been able to report their financial performances in a new way.

But the problem is that, as the popularity of the Internet grows, the difficulty of locating and navigating to specific information on the Web also grows (Tenenbaum, 1998).

Wagenhofer (2003) investigated the overall consequences of internet financial reporting. He concluded that quantitative information will become more important than it already is and companies will be forced to provide more comparable information. He mainly based this conclusion on the fact that the Internet 'changes the costs of information processes and with it the demand and supply of financial information in capital markets.

To address these inherent problems, Charles Hoffman, an analyst from the U.S.A., began experimenting with XML in April 1998. XML is a meta-language that allows for the classification, comprehension, and manipulation of data. The purpose of XML is to create custom markup languages, though there are no fixed tags for certain information components. The AICPA (American Institute of Certified Public Accountants) later formed the Enhanced Business Reporting Consortium (EBR); a task force charged with the further development and coordination of potential uses of XML for business information reporting (Malhotra and Garritt, 2004).

2.2   Technique

XBRL falls within the scope of the XML family and is a markup language that transforms the output of financial systems into a format that is overall readable, which is accomplished by coding it. XBRL is defined as "a standard-based method with which users can prepare, publish (in a variety of formats), exchange and analyze financial statements and the information they contain" (Malhotra and Garritt, 2004).

XBRL can be applied to existing financial and nonfinancial information. In the transforming process, this information is then tagged and presented in a way that is understood by independent software applications. Using XBRL, organizations are capable of reporting in a standardized and vendor-independent format in which different systems can freely communicate.

The XBRL terminology comprehends the tagging of data. The business concepts that the organization wishes to report, are defined in a taxonomy. Taxonomies are XML schemes and do not contain any data, but simply capture the valid definition of reporting concepts as well as the relationship between those concepts. The XBRL.org group has already developed a family of taxonomies for the reporting of business information, such as annual and quarterly financial statements, general ledger information, and audit schedules (Malhotra and Garritt, 2004). Below you will find a simplified example of an element recorded in a taxonomy (Richards, Smith and Zaeedi, 2006):

```
<element name="NetProfit"/>
```

The tagged data are then stored in instance documents, which can be created by referring to the taxonomies. The instance document can be created using an instance creator. In this instance document, the actual values are used by capturing the data recorded between the tags. If the before mentioned Net Profit example of a taxonomy would be used, the instance document would include the following line:

```
<NetProfit>100000</NetProfit>
```

The recipient of any instance document should be able to understand the content. In order to accomplish this, there is other contextual data added to the instance document. This could include information such as the name of the organization or the time period to which the instance document relates. A company is free to fill the instance document with the data they think is relevant to the user of the instance document. This way, an organization can also carry through modifications of

accounting regulations. This could be necessary, since XBRL does not eliminate differences in GAAP interpretations. Estimates, e.g. the matter if a expenditure should be capitalized or expensed or the rate of depreciation, are still up for discussion. XBRL is indifferent towards the calculation of data. Another point of interest is that the data content (recorded in an instance document) is separated from the presentation (stylesheets).
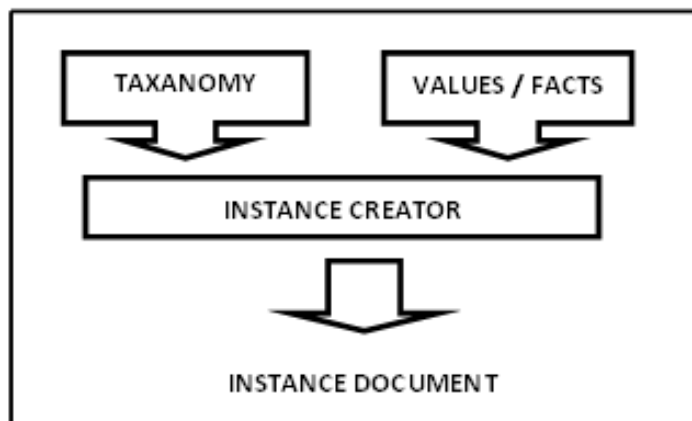
Figure 1. The process of creating an instance document (Chiru, Elefterie and Iatan, 2007)

2.3 Benefits

As explained before, while reporting through the Internet has already simplified the task of timeliness in the last few years, XBRL will also meet the high standards of reliability and accuracy. XBRL will improve the efficiency of the supply chain of data by providing tagged information that has the ability to transform into data that can be used to compare facts within a company or to enhance the comparability of multiple companies. Consequently, stakeholders will be able to extract financial information in a variety of formats they wish to receive. That way, investors and other financial analysts will be able to get easy and quick access to information and could face a diminishing in their costs.

The benefits caused by XBRL can be divided into internal and external benefits. Organizations that have chosen to use XBRL might experience internal benefits after implementing XBRL technique.
First, XBRL could reduce the cost of processing, calculating and formatting financial information. This is due to the fact that data only has to be tagged and formatted the first time a company reports in the XBRL format. After that, they never have to be keyed in a second time or reformatted for any special presentations (Malhotra and Garritt, 2004).

XBRL also appears to have a positive side effect for relatively small entrepreneurs. If such a small company has outsourced all reporting work to an accountant or bookkeeper, this intermediary could benefit by reporting in a XBRL format. Forwarding reports to authorities will be more efficient and the time that is saved could be recharged to the company.

Besides the internal benefits for companies, there are external benefits as well. The users of financial and non-financial information that is reported in the XBRL format could experience benefits for a number of reasons. Before, most companies filed their financial reports in PDF format. Reporting in XBRL format eliminates the search through common search engines and enables stakeholders to access essential information more easily. The main external advantage of XBRL lies in the fact that it allows users of data to acquire and integrate all similar coded information from the financial statements and footnotes. This process is accomplished in different ways, which is discussed by Hodge, Kennedy, and Maines (2004).

First, with assigning uniform data tags to related financial information items, search-facilitating technology can easily capture these items, in spite of their location within the financial report. For instance, if the search instruction 'intangible assets' would be executed, using XBRL it would not only find the information from the balance sheet, but also any information regarding this topic from footnotes.

Second, uniform tagged items offer an indication to users that knowledgeable individuals, such as financial experts who developed XBRL and the firm's managers, believe these items are related. As a consequence, relevant sections and other information can be tagged uniformly so that stakeholders can acquire all comparable and essential information together.

Third, the ability to acquire and present related financial information together, enables search-facilitating technology to draw users' attention toward evaluating items in relation to one another, and reduces the costs of such proceedings. This is a logical result of the second step, since topics and sections can be tagged 'together', it is an effective method for creating attraction of stakeholders.

The fourth and final external benefit lies in the fact that comparisons across organizations are now possible, and therefore makes managers' financial reporting choices more transparent to users and emphasize differences in these choices using search-facilitating technology. The new comparability increases the transparency of decision making since choices can more easily be registered. For instance, an investment decision could simply be explained by showing the consideration between firms.

Hodge, Kennedy, and Maines (2004) already investigated whether using an XBRL-enhanced search engine helps nonprofessional financial statement users acquire and integrate related financial

information when making an investment decision. The authors focused on the benefits of using an XBRL-enhanced search engine for nonprofessional investors because research suggests that this group, rather than professional financial analysts, is more likely to benefit from the XBRL technology since experienced professional investors already possess the knowledge about the nature of financial items and the relations among these items implied by the XBRL tagging system. The authors state that using search-facilitating technology increases the likelihood that users will acquire footnote information and helps users integrate (evaluate and combine) footnote information with information reported on the face of the financial statements. These results provided the first evidence that XBRL is able to influence the decision making process of users and possibly reduce search costs.

An important motivation for this research is derived from the following statement of Malhotra and Garrit (2004): "XBRL documents can be prepared efficiently, exchanged reliably, published more easily, analyzed quickly, retrieved by investors simply – all of which enable smarter investments." The consequence of higher quality of disclosures and possible smarter investments due to the implementation of XBRL is a research topic that has not been examined before due to a lack of data. Now, the number of organizations that report in the XBRL format is sufficient to accomplish the study.

In conclusion, there are several benefits for both users of XBRL and stakeholders that use the information of companies using XBRL. Since there are a number of benefits for the stockholders and analysts and prior research have not focused on this side of the consequences yet, this research will try to empirically indicate if the external benefits for users are an indication for a higher quality of the disclosed information.

2.4   Difficulties and costs of implementation

Besides benefits, XBRL also could have a number of disadvantages or difficulties that will have to be faced in the future. The main issue is that of the incompatibility that could arise among the different taxonomies used by organisations. Due to different organizational needs and various other factors (Williams et al., 2006), it is presumably impossible to create one universal XBRL taxonomy and a uniform context for all organisations. Consequently, there will be heterogeneity in different forms concerning the implementation of XBRL.

First, schematic heterogeneity is distinguished in two sorts of schematic heterogeneity; element naming and element relationship topology. The usage of different element names for the same operating profit concept is an example of naming heterogeneity. To prevent this schematic heterogeneity from happening, there have been proposed solutions (e.g. Zhu and Madnick, 2008), where scheme matchers can semi-automatically identify matching elements to resolve schematic heterogeneity. Furthermore, contextual heterogeneity will likely arise, which refers to the context of a fact that could include the unit of measure, precision, scale factor (e.g., thousands or millions). XBRL has not yet provided a method to automatically integrate these contextual facts with the reports in XBRL format. Finally, ontological heterogeneity refers to the case where the elements in different taxonomies that appear to refer to the same concept actually have subtle differences. There has not yet been introduced a solution for this kind of semantic heterogeneity.

Another possible difficulty could be the differences in taxonomies between industries. For instance, in the health care industry, element names such as the total number of intakes or the contentment of patients could be essential in the disclosures. These elements must be included in the taxonomy for the health care industry, but will not be included in other taxonomies, which could cause a discrepancy. However, the elements concerned will always be industry-specific elements and it will therefore not be needed to compare these elements with other sectors. A similar problem could occur between the taxonomies of different countries, which will be discussed in paragraph 2.6.

Reporting in XBRL format will cause additional costs, which are subdivided into two broad classes: direct and indirect costs (Debreceny et al., 2005). The direct costs include training, infrastructure, and out-of-pocket costs that are caused by software and personnel expenses to help prepare, implement and support the XBRL-technology. Since knowledge and experience grow as time progresses, the direct costs are expected to decline over time.

The indirect costs include the costs of personnel spending time on the implementation of the reports in XBRL-format and temporary put away their regular work. This will mainly occur in the first few years, when companies will likely need to produce two sort of reports: one in the new XBRL-format and one in the regular format.

2.5 Consequences for auditing

The consequences for auditing are not directly relevant for this research since it does not focus on the consequences that XBRL has on rules and regulations. However, in the light of a complete overview, I want to discuss the consequences that XBRL could have on auditing.

The goal of XBRL is not to set new accounting standards, it is only attempting to transform the use of XML-based tags into a standardized usage for business reporting so that the business reports prepared by organizations can be more easily compared and collated for regulatory and other purposes (Richards, Smith and Zaeedi, 2006).

Nevertheless, the implementation of XBRL has consequences for the auditing industry. To formulate an idea of this necessary adaptation and the direct consequences for the activities of auditors, some problematical cases that will need an answer are mentioned below:

- Integration of current procedures and possible adaptation of the sequence of activities. Auditors will be forced to change their procedure from mostly outcome related to more continuous, process-related audits (Wagenhofer, 2003).

- Since data of clients is processed, exchanged and documented electronically under the responsibility of the auditor, security (e.g. of the website) should be improved.

- Timely availability of software that is compatible with data in XBRL format.

- Consideration of the method of communication with the client and determination of the activities that the auditor will accomplish for his client.

- An annual report in XBRL format is a different object of investigation then an annual report on thesis, since the content and presentation is separated in a report in XBRL format. This means that the auditor's report in the current form cannot be used.

- Determination of the criteria for the guarantee of identification, integration and authenticity.

- Determination of the requirements for the auditor with regard to dealing with information in XBRL format. A point of interest is that firms might be tempted to become creative in their tagging process. Pieces of information that a company wishes to hide, could be left out in the tagging or place it in a certain tag. To secure the quality of disclosures, auditors will have to verify the assignment of tags.

2.6   Current situation and discrepancies between countries

Since the business world has come to realize that XBRL could transform financial reporting into a standardized format, many IT companies have developed software specialized in XBRL. This software enables an organization to implement XBRL taxonomies and offers tools for the end users. The end user tools include Microsoft Internet Explorer, Microsoft Excel, Microsoft Access, and Netscape Navigator (Beta) (Malhotra and Garritt, 2004).

In the Netherlands, several applications of XBRL have been developed. Organizations have the option to file their reports in XBRL format to, among others, the Internal Revenue Service (Belastingdienst), Chamber of Commerce (Kamer van Koophandel) and the Central Bureau of Statistics (CBS). In other countries, the progress of possibilities is not necessarily at a similar point in time. Some countries will still have less possibilities regarding communication with institutions and other countries could be further along in the progress.

In the U.S.A., the SEC decided a few years back that all companies that use US GAAP as their regulation and have a public float of $5 billion or more, are forced to use XBRL as of fiscal years ending after June 15th 2009. The further phase-in timetable is as follows:

Filing Status	Phase-in Timetable
Domestic and foreign large accelerated filers using U.S. GAAP with a worldwide public common equity float above $5 billion as of the end of the second fiscal quarter of their most recently completed fiscal year	Quarterly report on Form 10-Q or annual report on Form 20-F or 40-F containing financial statements for a fiscal period ending on or after June 15, 2009
All other large accelerated filers using U.S. GAAP	Quarterly report on Form 10-Q or annual report on Form 20-F or 40-F containing financial statements for a fiscal period ending on or after June 15, 2010
All remaining filers using U.S. GAAP	Quarterly report on Form 10-Q or annual report on Form 20-F or 40-F containing financial statements for a fiscal period ending on or after June 15, 2011
Foreign private issuers with financial statements prepared in accordance with IFRS as issued by the IASB	Annual reports on Form 20-F or 40-F for fiscal periods ending on or after June 15, 2011

Figure 2. Phase-in timetable XBRL in the U.S.A. (source: http://www.aicpa.org, 28/07/2011)

Since the differences between countries cannot be disregarded, this research will only take U.S. companies into account. That way, the organizations included in the sample are comparable.

Several countries (e.g. Canada, China, Korea, U.S.A etc.) have already developed a national taxonomy project to standardize the taxonomy practice. There are also industry sectors within countries that have developed taxonomies for financial reporting, the so-called extension taxonomies. In the U.S.A., several industry taxonomies are already created, such as banking and savings, brokers and dealers, commercial and industrial, insurance and real estate.

XBRL International has developed the General Ledger (GL) taxonomy to support internal reporting, which often requires more detailed information than external reporting (Zhu and Madnick, 2008). The so-called XBRL-Global Ledger should become the worldwide standard that is used on top of the local XBRL General Ledger. The use of XBRL-Global Ledger could lead to the standardization of financial data worldwide.

Bonsón, Cortijo and Escobar (2009) state that it is highly important to develop global accounting standards as a foundation on which the XBRL taxonomies can be established. This way, the annual reports and other financial information from various countries becomes comparable. For that reason, the International Financial Reporting Standards (IFRS-GP) taxonomy is created to establish a common ground for all firms in different countries and create a platform that would enhance the benefits of XBRL. In the meanwhile, according to Cohen (2004), until the available tools reach their potential, 'the business reporting community is faced with a challenge of comparability versus flexibility.'

In conclusion, the implementation of XBRL comprehends benefits for both users and providers, but will also need an adaptation of the auditing industry. This thesis will examine the consequences of implementing XBRL formatted reports, and with that, the possible effect on the quality of disclosures. To consider which research model is most suitable for this research question, a literature research is composed in the next chapter.

2.7 Summary

XBRL is a reporting method in which users can prepare, publish, exchange and analyze financial statements and the information they contain. It can be applied to existing financial and nonfinancial information and comprehends the 'tagging' of data. The business concepts that the organization wishes to report, are defined in a taxonomy. Reporting with XBRL creates a number of internal benefits such as greater timeliness, reliability and accuracy.

The main external advantage of XBRL lies in the fact that it allows users of data to acquire and integrate all similar coded information from the financial statements and footnotes. The consequence of higher quality of disclosures and possible smarter investments will be investigated in this research.

In the U.S.A., the SEC decided a few years back that the largest 500 companies are forced to use XBRL as of fiscal years ending after June 15th 2009. Several other countries have already adopted a national taxonomy.

3 Quality of disclosures

This section will first concentrate on literature that has been published concerning quality of disclosures in paragraph 1. In order to answer the third sub question, the second paragraph will elaborate on the researches that have been accomplished by other authors concerning disclosures, the quality of disclosures and the possible measurement methods that exist. Doing so, the second sub question will be answered:

2.   How is quality of disclosures defined and measured?

Furthermore, the theoretical association between the implementation of XBRL and the effect that it could have on the quality of disclosures will be discussed in paragraph 3, and answers the third sub question:

3.   Is there a theoretical association between XBRL and quality of disclosures?

Finally, paragraph 4 will elaborate on the chosen measurement method for quality of disclosures; the cost of equity capital. In appendix 2 you can find a summary of all prior research discussed. At the end of this chapter, a summary of this chapter will be formulated.

3.1   Definition of quality of disclosures

3.1.1   Literature on quality of disclosures

Corporate disclosure of information can take several forms, the annual report to stockholders is mainly a very important form of periodical disclosure. Disclosing information is overall a mean to communicate the performance and governance of a firm to stakeholders (Healy and Palepu, 2001). Disclosures can be published in different ways. Healy and Palepu (2001) subdivide disclosures in three separate groups. The most common known disclosures are the regulated financial reports, which include the financial statements, footnotes and management discussion. Second, there is the group of additional voluntary communication, such as management forecasts and websites. Finally, there is a group of disclosures by information intermediaries, such as financial analysts, industry experts, and the financial press. Since XBRL only applies on the regulated financial reports, this thesis will focus on that group of disclosures.

Differences in disclosures are common since firms are managed by groups which have different perspectives on managing and discretion in disclosing information to the public. The quality of

corporate disclosure has a great effect on the investment decisions made by investors (Singhvi and Desai, 1971).

However, quality of disclosures is a somewhat intangible concept. The determinant of quality of disclosures and the capital market consequences are the objects of many studies in investigating disclosure. In recent years, the requirements of financial statement users have changed. To meet the information needs of the market and therefore provide the needed information, disclosure have to reflect the transparency and accountability of the firm (Beattie et al., 2004).

Singhvi and Desai (1971) investigated the characteristics of firms that they included in their research. They conclude that quality of disclosures refers to completeness, accuracy and reliability. Since it can be assumed that the quality of disclosures is not an independent variable, the authors investigated other variables that influence the quality. They also state that these variables are likely mutual dependent. The variables that influence the quality of disclosures are further discussed in paragraph 3.4.1. For now, we can conclude that business reporting is becoming more and more consumer-focused, and especially great transparency and accountability is becoming the standard. In this respect, it is assumable that XBRL would create a greater quality of disclosure since it can contribute to the completeness, accuracy and reliability of disclosures. Financial and non-financial information can be provided to stakeholders at any desirable moment, at which the figures are accurate and reliable, since the elements are tagged in an earlier stage.

3.1.2 Factors that affect quality of disclosures

In this thesis, the implementation of XBRL and the consequences that this will have on the quality of disclosures is examined. The assumption here is that the quality of disclosure is not an independent variable. It is more likely that the quality of disclosures is influenced by several variables. To be able to state anything about the change in the quality of disclosures, it is important that any other factors that could have an effect on the quality are recognized. The factors that could affect the measurement method of quality of disclosures, cost of equity capital, will be discussed in paragraph 3.4.1.

Besides the possibility that the implementation of XBRL will influence the quality of disclosures, it is assumable that the content of disclosures will have an effect on the quality. The content of disclosures can be divided into mandatory and voluntary disclosures (Healy and Palepu, 2001). The mandatory disclosures of a firm are determined by the accounting rules and regulations. The voluntary disclosures of a firm are determined by, as the definition already states, the firm itself.

Soderstrom and Sun (2007) state that "the quality of accounting is determined by the quality of the accounting standards chosen". The firms in the sample of this thesis are all listed firms in the U.S.A., which means that they all have to file their financial regulated reports using U.S. GAAP[1], both in financial year 2008 as in financial year 2010. Any changes that are carried through during the research period in the U.S. GAAP, have to be applied by all the firms in the sample. Therefore, all changes in U.S. GAAP during 2008 – 2010 will have an equal effect on all firms in the sample. However, it is not possible to quantify the changes and include them in this research without performing a content analysis. Since it is determined in the next paragraphs that this is not the aim of this thesis, this will remain to be a limitation. It is therefore included in paragraph 5.4, where all limitations are discussed.

The effect that changes in voluntary disclosures have had on the quality of disclosures during the research period is difficult to determine since it is not registered what the quality and quantity of voluntary disclosures of a firm is. The only way to observe the change in quality by voluntary disclosures is to perform a content analysis on all firms. As earlier mentioned, this will remain to be a limitation.

However, these limitations are not expected to influence the results since the sample is large. This means that if there are firms that disclose excessive (voluntary) information, the effect will be marginal.

3.2   Research methods for quality of disclosures

Although it is clear that XBRL has the possibility to provide several benefits, the main question to be answered in this thesis is that of the improved quality of disclosures. To answer this question, this paragraph will elaborate on the different research methods usable for the measurement of quality of disclosures.

Furthermore, there are two major streams of research regarding the quality of disclosures. One stream tries to assess the quality of disclosures by performing a content analysis, which reviews the content of disclosures. The second stream concentrates on the cost of equity capital in a way of capturing the economic consequences. Before the choice for a method will be made, both methods are clarified below.

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[1] United Stated Generally Accepted Accounting Principles

3.2.1 Content Analysis

Content analysis comprehends the classification of text into different categories. These categories come with disclosure scores and are provided by analysts. In order to accomplish a legitimate research, the procedure of classification should be reliable and valid. This is the reason why computer aided content analysis has the preference over human-coded content analysis; the latter method decreases the possibility of achieved reliability during the quantitative assessment (Beattie et al., 2004).

Beattie et al., 2004 have introduced a framework for the content analysis of accounting narratives and explore the complex concept of quality and identify attributes of quality. They conclude that there are two fundamental dimensions in quality of disclosures, namely the amount of disclosure relative to size and complexity and the spread of disclosure across main topics and sub-topics.

In the U.S.A., the disclosure scores of the Association of Investment Management and Research (AIMR) are frequently used for empirical research on quality of disclosures. Although, there are countries where such scores are not published, in which case analysts need to be approached directly. This could be a disadvantage since this is more time consuming. A second issue that is criticized is the subjectivity of the analysts' perceptions and the potential biases that they could apply to these ratings.

Further mentioned limitations of content analysis include the one-dimensionality and the partiality. The one-dimensionality is a disadvantage since disclosure is a complex concept that cannot be captured with a one-dimensional method. This way, only one aspect of the text like absence/presence or topic length is discussed and the combination of different aspects is left out of the analysis. Partiality is mentioned as a limitation because in content analysis either sections of the disclosure are examined or there is a focus on selected items of the index. This way, there is a possibility that the analysis is not thorough enough.

The fact that it is a direct method in assessing the quality of disclosed information could be an advantage. Other advantages that are mentioned include the fact that is allows the benchmarking of practices and the monitoring of changes over time. However, the latter two statements are also applicable to the method of cost of equity capital, which is discussed in the following sub paragraph. Although this type of research could be relevant for this thesis, it does not seem to be the best choice. This is due to the fact that content analysis possibly focuses more on the quantity of disclosures rather than the quality of disclosures. Secondly, large firms could have a higher score due to the disclosure possibilities that these firms have, based on their complex organizational structure

(Botosan, 1997). Furthermore, the potential bias in the disclosure indices is a difficulty that can not be disregarded.

3.2.2 Cost of equity capital

Healy and Palepu (2001) conclude that a number of studies argue that there are three potential affects for firms that publish extensive (voluntary) disclosures: improved liquidity for their stock in the capital market, increased following by financial analysts and reductions in their cost of equity capital. This is a first indication that more qualitative disclosures can lead to a decrease in the cost of equity capital. Cost of equity capital contains the minimal rate of return that is required by a company's common stockholder. It is not directly measurable, but has to be deducted from a formula or calculated.

Other prior research has investigated the relationship between disclosed information and cost of equity capital. Most of this theoretical research concludes that greater disclosure reduces cost of equity capital. However, Botosan (1997) also concludes that for firms with higher analyst following, there is no significant association between greater quality of disclosure and the cost of equity capital. Botosan and Plumlee (2002) find that the cost of equity capital decreases in the annual report disclosure level but increases in the level of timely disclosures.

XBRL International also claims that firms will experience a reduction in their cost of equity capital due to improved, transparent and real-time financial reporting via the Internet and disclosure of data in the XBRL format (Xbrl.org White Paper 2002).

I will assess the quality of disclosures by taking the perceived economic effect of greater quality of disclosure: a decreasing cost of equity capital. The motivation for this decision lies in the fact that content analysis seems to have more limitations in comparison to cost of equity capital as a measurement. The fact that it is measured using the quantity in disclosures is a reason to not choose this method for research, since the focus of this thesis lies in the quality of disclosures, not the quantity.

Furthermore, Kothari et al. (2008) investigated the disclosed reports of more than 100,000 different types of financial press. They used content analysis in order to construct firm-specific disclosure measures. They found that when the outcomes of the content analysis indicated a favourable disclosure, the firm's risk as proxied for by the cost of equity capital declined significantly. In other words, when content analysis indicates that the quality of disclosures is increased, the cost of equity

capital declined simultaneously. Therefore, the choice for the research method will likely not affect the outcomes. In the paragraph 3.4, the different methods for assessing cost of equity capital will be discussed.

3.3   Economic consequences through higher quality of disclosures

The economic consequences and the relationship with the quality of disclosures have been extensively reviewed in the past literature. The consequences of greater disclosures, in the light of this research the implementation of XBRL, can be seen from different perspectives.

3.3.1 Information asymmetry

Brown and Hillegeist (2007) study the aspect of disclosure quality and how it is expected to reduce information asymmetry. This is accomplished through two potential mechanisms: altering the trading incentives of informed and uninformed investors so that there is relatively less trading by privately informed investors, and reducing the likelihood that investors discover and trade on private information. They performed a research among 423 individual firms across 34 industries and find that the negative relation between disclosure quality and information asymmetry is primarily caused by reducing the likelihood that investors discover and trade on private information. The results indicate that information asymmetry is negatively associated with the quality of the annual report and investor relations activities, which means that if information asymmetry is reduced, the quality of disclosures and investment activities increase.

Richardson and Welker (2001) agree on this, they also find that greater disclosure quality reduces the estimation risk or the uncertainty regarding the distribution of return.

Easley and O'hara (2002) have developed an asset pricing model in which both public and private information are taken into account for the effect on asset return. They conclude that investors demand a higher return to hold stock with greater private information. This comprehends that more private information creates a new systematic risk, which implicates that firms can influence their cost of equity capital by increasing the quantity and quality of information available to investors.

Furthermore, Singhvi and Desai (1971) studied the quality of corporate disclosures and the economic consequences on the cost of equity capital. They find that inadequate disclosure in annual reports is likely to widen fluctuations in the market price of a security. This is caused by the fact that

investment decisions are bases on less objective information considering the lack of adequate information. These fluctuations will lead to 'inefficient allocation of capital resources in the economy', since these investment decisions influence the cost of equity capital.

3.3.2 Stock market liquidity

Another stream of research suggests that greater quality of disclosures creates enhanced stock market liquidity. The cost of equity capital is then at a lower level, either through reduced transaction costs or increased demand for a firm's securities (Diamond and Verrechia, 1991). They study the causes and consequences of a security's liquidity, especially the effect of future liquidity on the security's current price-equivalently the effect on its required expected rate of return, its cost of equity capital, using a single-firm economy. The results state that disclosing more public information can reduce a firm's cost of equity capital by creating increased demand from large investors due to increased liquidity of its securities.

Richardson and Welker (2001) also state that increased disclosure reduces transaction costs and therefore creates a greater liquidity of the market. They have tested the relation between financial and social disclosure and the cost of equity capital for the annual reports of 700 Canadian companies from nine different industry sectors. However, they also conclude that there is a significant positive relation between social disclosures and the cost of equity capital. This positive relationship is mitigated among firms with better financial performance.

Overall, there is a lot of support from prior research that greater quality of disclosure creates a decrease in the cost of equity capital. Several other authors have also concluded that more disclosed information overall gives more transparency to stakeholders, which leads to a decrease in the cost of equity capital (e.g. Botosan (2002) and Diamond and Verrechia (1991)).

3.4   Cost of equity capital

Cost of equity capital is a variable that cannot be instantly deducted. It has to be calculated, based on a firm's figures. In order to make this calculation, a consideration of the different alternatives needs to take place. First, the factors that influence the cost of equity capital of a firm, besides the possibility of XBRL, are discussed.

3.4.1 Factors that affect cost of equity capital

In this research it is investigated if the implementation of XBRL is associated with cost of equity capital. This research will be executed by determining the cost of equity capital before and after the implementation of XBRL. The assumption here is that the quality of disclosure and therefore cost of equity capital in annual reports is not an independent variable. It is more likely that cost of equity capital is influenced by several variables. In order to conclude that the quality of disclosures and cost of equity capital are related to each other, it is essential that any other factors that could influence these elements during this period of research are recognized and applied as control variables. The factors that could affect the quality of disclosures are already discussed in paragraph 3.1.2.

Koedijk en van Dijk (2002) have investigated whether or not global factors have to be taken into account when cost of equity capital is estimated. They find that other empirical studies indicate that the global market portfolio and the exchange rate risk factors affect the pricing of assets. The authors studied 3300 firms from nine industrialized countries over the period 1980-1999 and find that the factors that indicate the general economic condition do not have a significant effect in estimating the cost of equity capital.

In contract to these findings, Mirea et al. state that the general economic condition is indeed a factor that (among others) determines the cost of capital. This is explained by the fact that inflation is a deteriorating factor for the purchasing power. In that case, investors will require a higher rate of return to compensate for this loss. This way, it is expected that the economic growth or decline is a factor that influences the cost of capital.

Another primary factor that could influence the cost of equity capital is the market condition (Mirea et al.). An indication for the market condition is the market interest rate. This is due to the fact that if risk increases, the investor requires a higher rate of return. Therefore, when market conditions deteriorate, the risk increases and causes an increase in the required interest rate. Furthermore, it is assumable that if market interest increases, investors will also require a higher return of equity capital. If the return on equity capital would not increase proportionally, the equilibrium between the two forms of financing would be disturbed. Therefore, I expect that the cost of equity capital will rise proportionally if an increase in market interest rate occurs.

Singhvi and Desai (1971) studied the quality of corporate disclosures and the economic consequences on the cost of equity capital. In their research model, the authors used the cost of

equity capital as a measurement method for the quality of disclosures and took several characteristics as control variables.

Asset size is taken as a control variable for two reasons. First, the cost of collecting detailed information is relatively high for smaller firms. Large firms already draw up such information for internal reporting and disclosure of such information is therefore not a costly process for them. Second, smaller firms usually do not raise funds in the securities market and therefore will not realize the possible benefits of better disclosure. Singhvi and Desai (1971) find that there is a positive relationship between the assets size of a firm and the quality of disclosure for the listed and unlisted corporations.

The ownership distribution could have an influence on the quality of disclosure in financial statements, due to two reasons. First, firms with a large number of stockholders tend to get more public attention with the result that there is more pressure for better disclosure. Second, firms with a large number of stockholders may disclose more information due to marketing objectives.

The element whether or not a company is listed is also incorporated. This is due to the fact that the quality of disclosure is frequently affected by the rules and regulations of the stock exchange. Since in this research only listed firms will be included in the sample, this control variable is not relevant and can be left out since this will not change during the research period.

The contracted CPA firm could also have a certain influence on the amount of information disclosed in reports but the degree of influence may differ from one CPA firm to another. CPA firms are bound to a minimum standard of rules. But to a certain extent, this is left to the practical judgement of the individual CPA.

The rate of return is defined as a ratio of net profit to net worth. This rate of return is generally used as to assess good management in a firm. If the rate of return is high, the firm will likely disclose more detailed information in order to support the continuance of its positions and compensations.

Another method to measure a firm's profitability is the earnings margin. Earnings margin is defined as a ratio of net profit to net sales. As the rate of return measures the overall performance of a firm, the earnings margin represents the firm's capacity of to absorb rising costs. The higher the earnings margin, the greater absorption capacity of the firm. This means that a firm is more stable as the earnings margin grows. For this ratio also applies that a firm will likely disclose more information at a higher earnings margin.

Botosan and Plumlee (2002) have included market beta and firm size as control variables in their research. Beta is included in the models for systematic risk. In most prior researches, a positive association between market beta and the implied cost of equity capital is documented.

Firm size is included in the model because prior research documents a significant association between market value and the expected cost of equity capital, which means that it has been documented that larger firms tend to have lower costs of equity capital (Cheng et al., 2006). If these control variables were excluded from the research, it could suggest that market value and beta might induce a correlated omitted variable bias.

Cheng et al (2006) use the control variables firm size, firm leverage, market beta, book-to-market ratio, long-term growth rate, dispersion in analyst' forecasts of a firm's earnings per share and average cost of equity capital in a given firm's industry.

The book-to-market ratio is applied since prior studies suggest that firms with fewer opportunities to grow will also experience a higher cost of equity capital. It is defined as the book value of common equity divided by the market value of equity. The long-term growth rate could also be associated with the (expected) cost of equity capital and is therefore used as a control variable. It is measured as the firm's median forecasted long-term growth rate by I/B/E/S[2]. The dispersion in analyst' forecasts of a firm's earnings per share is used since prior research suggests that dispersion in analysts' forecasts is consistent with greater risk. Therefore, firms with higher earnings variability will experience higher cost of equity capital. It is defined as the standard deviation of the firm's estimated EPS for next fiscal year by I/B/E/S. Finally, Cheng et al. use the average cost of equity capital in a given firm's industry since the cost of equity capital is expected to differ between industries.

Furthermore, Richardson et al. (2001) state that financial disclosure increases with firm size, financial performance, leverage, and the number of analysts following the company. The authors validated their research by examining these relationships. The authors applied firm size as a dummy variable equal to one if the beginning of year market value of equity is above the sample median, and zero otherwise. The financial performance is measured using the return on equity, the leverage by using the debt to equity ratio. Finally, the number of analysts following the firm is set as a dummy variable equal to one if the number of analysts providing a 1-year ahead earnings forecast is above the sample median, and zero otherwise.

In this research, I will use a number of control variables. These will be determined based on prior research. The criteria for a control variable will be that it is used in at least two of the above studies

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[2] Institutional Brokers' Estimate System, which is currently owned by Thomson Reuters.

or the factors that are expected to give significant outcomes. Furthermore, is has to be documented significantly in those prior studies. Therefore, in this thesis, I will use the following control variables:

General Economic Condition

1. Gross Domestic Product (GDP)

It is expected that the economic growth is a factor that influences the cost of capital. In 2007 the economic crunch was a fact and it continued well into 2008. Claessens and Kose (2009) define a recession as a decline in a country's inflation adjusted Gross Domestic product (GDP) for at least two quarters in a row. My expectation is that during 2010 (year t1) the most extreme period of economic decline was over. This could mean that the GDP was significantly different in both years and thus have had an influence on the change in cost of equity capital. I expect that if the general economic conditions improve during the research period, the cost of equity capital will have the opposite effect and therefore decrease.

Market condition

2. Market interest rate

In order to incorporate the market condition in this thesis, the market interest rate will be used as a control variable. I expect that the cost of equity capital will rise proportionally if an increase in market interest rate occurs. Due to the economic crunch, the interest rate could be changes significantly in the research period and therefore have an effect on the change in cost of equity capital.

Operating and financing decisions

3. Firm size

The firm size (measured as the market value) is used in all the above mentioned studies and is also stated to be significant. It has been documented that larger firms tend to have lower costs of equity capital (Cheng, 2006). It will be determined as the natural log of the market equity value (in billions).

4. Firm leverage

In two out of four studies above, the leverage of the firms in the sample is applied as a control variable. Both studies find a significant positive association, since higher leverage implies greater credit risk (Cheng et al., 2006). It is determined as total long-term debt divided by the market value of common equity.

Other factors

5. Market beta

In two out of four of the mentioned researches, the market beta is included as a control variable. In both researches, a significant positive association between market beta and the implied cost of equity capital is documented. It is measured as a firm's market-model beta coefficient.

3.4.2 Measurement methods

Botosan (1997) assesses the relation between cost of equity capital and the disclosure level by regressing firm-specific estimates of cost of equity capital on market beta, firm size and a measure of disclosure level the author developed herself. The author also outlines a number of alternative procedures to approach the cost of equity capital. The most relevant alternatives are discussed below:

Average realized returns

This method uses average realized returns, however, these are highly unreliable since these numbers do not give an accurate measure, but are noisy. Furthermore, the figures of many years would be required to determine that the market beta is a significant risk factor. The difficulty with this approach is that is will likely not be able to provide a strong research considering the limited timeline in this research.

Capital Asset Pricing Model (CAPM)

This asset pricing model defines expected return as the sum of the expected risk free rate $E(r_f)$ and the product of a firm's estimated market beta and the expected risk premium $E(r_m - r)$:

$$r = r_f + \beta \left(E_t \left[r_m - r_f \right] \right)$$

where:

r	denotes expected return
r_f	denotes risk free rate
β	denotes estimates market beta
$E_t\left[r_m - r_f \right]$	denotes expected risk premium

This model has the difficulty that the estimation of market beta can be debatable. Botosan (1997) argues that estimating the firm's market beta is difficult and the model is not descriptive.

Other alternatives that are discussed by Botosan (1997) use the dividend discount formula as a base for their approach of cost of equity capital:

Earnings-to-Price Ratio

With this approach cost of equity capital, 'r' is a function of a constant rate of dividend payout, 'K', a constant rate of growth, 'g_j', and the earnings-to-price ratio t:

$$r_j = K_j \left(1 + g_j\right)\left(\frac{E_t}{P_t}\right) + g_j$$

where:

r_j	denotes cost of equity capital
K_j	denotes constant rate of dividend payout
g_j	denotes constant rate of growth for firm j
$\left(\frac{E_t}{P_t}\right)$	denotes earnings-to-price ratio

Target Price Method

The target price method employs a short-horizon, where the infinite series of future cash flows is truncated at the end of year 5 by inserting a forecasted terminal value. It imposes the assumption that analysts' and the market's forecasts of terminal value are consistent (Botosan and Plumlee, 2005). The formula is as follows:

$$P_0 = \sum_{t=1}^{\infty} (1 + r)^{-t} E_0(dps_t)$$

Where:

P_0	denotes stock price
r	denotes cost of equity capital
E_0	denotes terminal value of stock price
dps_t	denotes forecasted dividends per share

Accounting based valuation formula

This method states that the market price of a firm's stock (P_t) is equal to the sum of expected dividends discounted at the cost of equity capital (r):

$$P_t = \sum_{\tau=1} (\,[(1+r)]^{-\tau} E_t\,[d_{t+\tau}]$$

where:

P_t denotes market price of a firm's stock

r denotes cost of equity capital

$E_t\,[d_{t+\tau}]$ denotes sum of expected dividends

The above three formulas could be used for this research. However, for the latter two methods, the cost of equity capital has to be deducted from the model which makes it more difficult to execute. Therefore, only the Earnings-to-Price method could be useable for this research. However, this method could also provide difficulties in collecting figures for five years.

Cheng et al. (2006) conducted a research regarding the association of shareholders rights and disclosures of financial-related attributes with the cost of equity capital of firms. Their sample included 348 firms of the S&P 500. They conclude that firms with stronger shareholder rights regimes and higher levels of financial transparency are associated with significantly lower costs of equity capital. For their research, the authors used a different method for assessing the cost of equity capital, which is created by Easton (2004):

Expected earnings growth valuation model

Within this model, you obtain estimates of the expected rate of return on equity capital. Easton developed the PEG model as a special case of the Ohlson and Juettner-Naroth (2003) where abnormal earnings growth is constant after year t + 1 and future dividends equal zero. It provides a means of simultaneously estimating the expected rate of return and the rate of change in abnormal growth in earnings, thereby refining the PEG ratio ranking'. Under these assumptions, the PEG model reduces to:

$$r_{peg} = \sqrt{\frac{(EPS_{t+2} - EPS_{t+1})}{P_0}}$$

where:

r_{PEG} denotes cost of equity capital.

EPS_t denotes forecasted earnings per share.

P_0 denotes market price of a firm's stock

The advantage of this model is that the cost of equity capital does not need to be deducted from the model, but is the outcome itself. This way, the formula has the benefit that it is more easy to use.

Gao (2008) defines an alternative type of the expected earnings growth model:

Unconditional expected return on the firm's equity

He focuses on the consequences of disclosure quality; therefore it is important to eliminate the confounding effect of the realization of disclosed accounting information. The author also concludes that his results indicate that cost of equity capital is indeed associated with the level of quality of disclosures, but that is highly dependable on the intensity of the investment effect. Gao shares the idea of Lambert et al. (2007) that studies regarding cost of equity capital mostly only capture the average impact of the investment effect. He states that 'when new investment is possible, resolution of uncertainty of the firm's marginal profitability also guides the firm to adjust its investment level and leads to a higher level of investment on average.' Therefore, both the investment base and the marginal profitability of every unit of investment are affected by disclosure quality. Gao (2008) defines the cost of equity capital as the 'expected return on a firm's capital'. His formula for the cost of equity capital is as follows:

$$E[R] = \frac{E - P}{P}$$

where:

$E[R]$ denotes unconditional expected return

E denotes sum of expected dividends

P denotes market price of a firm's stock

Lambert et al. (2007) also find that the quality of disclosed information can influence the cost of equity capital directly and indirectly. The direct effect is created since greater quality of disclosures

affect the firm's assessed covariances with other firms' cash flows, which is nondiversifiable. The indirect effect takes place since greater quality of disclosures affect a firm's real decisions, which likely changes the firm's ratio of the expected future cash flows to the covariance of these cash flows with the sum of all the cash flows in the market.

After consideration of the above measurement methods, I choose to use the Price Earnings Growth Model for a number of reasons:

- The PEG model is relatively easy to use, the outcome is the cost of equity capital. With several other methods, the cost of equity capital has to be deducted from the model.

- Botosan and Plumlee (2002) have evaluated multiple methods for estimating cost of equity capital, and state that the PEG model is a good research-model. These authors conducted another research in 2005 where they discuss the results of several methods in comparison with risk proxies (market risk, leverage, information risk, firm size and growth). They investigated 12,400 companies within ten years and find that the association among the Target Price Method estimates and the Earnings Growth method estimates and the firm-risk measures are stable across alternative specifications.Therefore, they conclude that only the Target Price Method and the Earnings Growth should be used for studies. The earlier mentioned Earnings-to-Price Ratio is therefore abandoned.

- Easton (2004) states that this ratio takes account of differences in short-run earnings growth. This is an important factor, since the time period in this research (2008-2010) is relatively small.

3.5 Summary

Business reporting is becoming more and more consumer-focused, and especially great transparency and accountability is becoming the standard. In this respect, it is assumable that XBRL would create a greater quality of disclosure since it can contribute to the completeness, accuracy and reliability of disclosures.

The economic consequences and the relationship between the quality of disclosures and the cost of equity capital have been extensively reviewed in past literature. One stream of research states that greater disclosure quality reduces the estimation risk or the uncertainty regarding the distribution of return and therefore is associated with lower cost of equity capital. Another stream of research suggests that the cost of equity capital tends to be at a lower level either through reduced

transaction costs or increased demand for a firm's securities. Overall, there is a lot of support from prior research that greater quality of disclosure creates a decrease in the cost of equity capital.

Concerning research methods, there are two major streams of research regarding the quality of disclosures. One stream tries to assess the quality of disclosures by performing a content analysis, the second stream concentrates on the cost of equity capital in a way of capturing the economic consequences. The latter method will be used for this research.

Cost of equity capital is a variable and has to be calculated, based on a firm's figures. In order to make this calculation, a consideration of the different alternatives has been made. The choice for a method has been made; the Price Earnings Growth Model will be used for this research.

4　Hypotheses development

In the preceding chapter the prior literature regarding XBRL and the quality of disclosures is discussed. This prior research motivates the research that will be conducted in this thesis. In this chapter the hypotheses will be formulated. This will concern the hypotheses that will help answer the main research question:

Does reporting in a XBRL format influences the quality of disclosures?

Paragraph 4.1 concerns the justification of the hypotheses that have been formulated. Subsequently, paragraph 4.2 will formulate the hypotheses that will to be tested. Finally, a summary is formulated.

4.1　Development trough literature

As discussed in the previous chapter, the quality of disclosures has been extensively reviewed in prior literature. We can now state that the majority of prior research concludes that the cost of equity capital decreases when the quality of disclosures increases; cost of equity is therefore negatively associated with quality of disclosures. As mentioned before, Brown and Hillegeist (2007) state that this is primarily caused by two factors; the decline in information asymmetry and the increase of stock liquidity.

Several other authors have also concluded that more disclosed information overall gives more transparency to stakeholders, which leads to a decrease in the cost of equity capital (e.g. Botosan (2002) and Diamond and Verrechia (1991)).

Furthermore, there are two major streams of research regarding the quality of disclosures. One stream tries to assess the quality of disclosures by performing a content analysis. The second stream concentrates on the cost of equity capital in a way of capturing the economic consequences. The choice for cost of equity capital is made in the preceding chapter.

In order to investigate the main research question, the hypotheses that will be used are formulated in the next paragraph.

4.2　Hypotheses to be tested

4.2.1　Main hypotheses

The discussed prior research includes examples of conducted research regarding XBRL and the quality of disclosed information, and it contains an important indication that XBRL increases the

quality of disclosures and that quality of disclosures can best be tested through the cost of equity capital.

Consequently, I will investigate if the implementation of XBRL is associated with a greater quality of disclosures. In order to make the data comparable, I will use data from the period before the implementation of XBRL and data from the period after the implementation.

The expectation is that companies that implement XBRL will experience a decrease in the cost of equity capital, which is a good measurement method for the quality of the disclosures. It is also assumable that the results could be biased by other factors. These factors are determined in paragraph 3.4.1 and will be used as control variables.

In order to answer the above main research question, it will be subdivided into multiple hypotheses. In the previous chapter I have already based the decision to make use of cost of equity capital in order to assess the quality of disclosures. This research will investigate the cost of equity capital before and after the implementation of XBRL as a reporting standard. This motivates the following null hypothesis:

H0:	There is no association between the implementation of XBRL and the cost of equity capital.

After the execution of the first sub hypothesis, the association between XBRL and cost of equity capital will be indicated. In order to answer the main hypothesis, the association between cost of equity capital and the quality of disclosed information still needs to be determined. It is expected that the cost of equity capital will decrease after the implementation of XBRL. This motivates the alternative sub hypothesis that is formulated:

H1:	There is an inverse association between the implementation of XBRL and the cost of equity capital.

The above sub hypotheses will be tested in this research. Together they will provide the answer to the main research question. The method of research and other relevant aspects of this study will be revealed in the subsequent chapter.

4.2.2   Other hypotheses

Another factor that will be investigated is the difference between industries. This factor is also applied in the study of Cheng et al. (2006). These authors do not find a significant correlation between the type of industry and the cost of equity capital. However, it is assumable that different industries represent different levels of risk, and therefore it is expected that the cost of equity capital will also not change equally in each industry. This motivates another hypothesis for this thesis:

H2.0:   There is no association between the industry and the cost of equity capital.

It is expected that the type of industry has an effect on the change in cost of equity capital. It could be that stockholders appreciate the implementation of XBRL more in industries with a high level of risk. The consequence of that could be that this opinion of stockholders is reflected in the cost of equity capital and that it therefore will decrease more than in industries with a lower level of risk. Therefore, the alternative hypothesis is contradictory to the first hypothesis.

H2.1:   There is an association between the industry and the cost of equity capital.

4.3   Summary

We can now state that the majority of prior research concludes that the cost of equity capital decreases when the quality of disclosures increases; cost of equity is therefore negatively associated with quality of disclosures. This chapter therefore contains the justification of the hypotheses that have been formulated. Furthermore, it formulates the hypotheses that will to be tested. The expectation is that companies that implement XBRL will experience a decrease in the cost of equity capital, which is a good measurement method for the quality of the disclosures. The main hypothesis concerns the inverse association between the implementation of XBRL and the quality of disclosures. The second hypothesis addresses any possible differences that could occur for cost of equity capital between the type of industries.

5   Research design

In this chapter the research will be given shape, and therefore will set the fundamentals for answering sub question four:

4.   Do companies that have implemented XBRL show a greater quality of disclosure?

Paragraph 5.1 will formulate the method of research, and paragraph 5.2 will select the sample of research and discusses the process of data collection. Furthermore, paragraph 5.3 discusses the attainability of this research and 5.4 will outline the limitations to this thesis. In the final paragraph a summary of this chapter will be given.

5.1   Methodology

5.1.1 Determining and testing cost of equity capital

In chapter 3 a number of methods in estimating the cost of equity capital are discussed. I choose to use the Price Earnings Growth Model for a number of reasons:

- The PEG model is relatively easy to use; the outcome is the cost of equity capital. With several other methods, the cost of equity capital has to be deducted from the model.

- Botosan and Plumlee (2002) have evaluated multiple methods for estimating cost of equity capital, and find that the association among the Earnings Growth method estimates and the firm-risk measures are stable across alternative specifications.

- Easton (2004) states that this ratio takes account of differences in short-run earnings growth. This is an important factor, since the time period in this research (2008-2010) is relatively small.

$$r_{peg} = \sqrt{\frac{(EPS_{t+2} - EPS_{t+1})}{P_0}}$$

where:

r_{PEG} denotes cost of equity capital.

EPS_t denotes forecasted earnings per share.

P_0 denotes current price per share

Forecasted earnings per share for the current year and future year and current stock price are needed in this approach, which will be deducted from financial databases. The process of data collecting will be described in paragraph 5.2.

In order to answer the main research question, it is important to define the period which will be investigated. I will consider a two-period model. The financial year in which the companies started to use XBRL is year 2009. That way, the year before that can be seen as the 'before' period; period t_0. The financial year 2008 will be considered the year $t0$. The financial year after the year of implementation, the 'after' period, is then period t_1. In this case, all companies in the sample started using XBRL in 2009 at the latest; therefore the financial year 2010 has been used as the period 'after'. In other words, today is when the firm does not use XBRL and tomorrow is the day when the firm is using XBRL.

With regard to the calculation of the formula, this has a number of consequences. First the EPS_1 and EPS_2 have to be determined. EPS_1 concerns the forecasted earnings per share from analysts at the end of period $t0$; 2008. EPS_2 concerns the forecasted earnings per share from analysts at the end of period $t1$; 2010.

As P_0, the stock price in December of period $t0$ (2008) and $t1$ (2009) is included.

The above description of the method that I will be following will investigate the main hypothesis:

H1:	There is an inverse association between the implementation of XBRL and the cost of equity capital.

After the process of data collecting, the association between the implementation of XBRL and the cost of equity capital has to be determined, or in other words, the significance in the change in cost of equity capital has to be determined. I will investigate the significance in the reaction after the implementation of XBRL with the help of a one-sample T-test (Moore et al., 2003) in SPSS. The T-test is a test by which the mean of a normally distributed population has a value specified in a null hypothesis. SPSS is a computer program used for statistical analysis. The test of normality will be performed in the next chapter.

This test will be used to determine if the cost of equity capital as a consequence of reporting in XBRL format significantly differs from 0, or in other words, if there is a significant increase in the quality of disclosures after implementing XBRL. After that, I will be able to conclude if I can reject H0 and therefore accept the alternative sub hypothesis.

Furthermore, I will investigate the second hypothesis:

H2:   There is an association between the industry and the cost of equity capital.

I will determine if the industry of a firm will be significantly correlated to the change in the cost of equity capital. The data for the industries is derived from the Wharton Research Data Service (WRDS). In SPSS a bivariate correlation test will be performed.

5.1.2 Determining and testing the control variables

When the cost of equity capital is determined, it is assumable that there are other factors that affect cost of equity capital. In order to take these factors in account, they will be incorporated as control variables. Below you will find the control variables and the measurement methods.

1. Gross Domestic Product (GDP)

This data will be deducted from the U.S. department of Commerce (Bureau of Economic Analysis). The implicit price deflators for Gross Domestic Product will be used, which means that the gross domestic product is corrected for the overall inflation rate in the economy that year, and leaves the net domestic product. The annual GDP will be deducted for the year 2008 and 2010.

2. Market interest rate

The market interest rates are derived from the FRB H10 and H15 Interest Rate Data of the Wharton Research Data Service (WRDS). This data is deducted from the Federal Reserve Statistical releases. I took the average of the commercial and non-commercial interest rate (1 month maturity), and applied the rate as the average of the year 2008 and 2010.

3. Firm size

Firm size will be determined as the natural log of the market equity value (in billions) in December 2008 and December 2010. The data will be derives from the Wharton Research Data Service (WRDS).

4. Firm leverage

Firm leverage will be determined as total long-term debt divided by the market value of common equity in December 2008 and December 2010. The data will be derived from the Wharton Research Data Service (WRDS).

5. Market beta

Market beta will be measured as a firm's market-model beta coefficient in December 2008 and December 2010. The data is derived from the Wharton Research Data Service (WRDS). However, it appeared that the market beta did not change for any firm in the sample during the research period. Therefore, this control variable is eliminated from the research model.

The above control variables are taken together in a multivariate analysis. The use of multiple forms of voluntary disclosures in a multivariate model is also used by Botosan and Plumlee (2002). The following model is the result:

COC = β_0 + β_1 XBRL + β_2 GDP + β_3 INT + β_4 MVAL + β_5 MBETA + β_6 LEV + ϵ_i

where:

COC	denotes the estimation of the cost of equity capital using the PEG-ratio
β0	denotes an intercept, measures the expected value of the risk free rate if the regressors equal zero; the 'constant' factor
XBRL	denotes the implementation of XBRL (1 equals yes, 0 equals no)
GDP	denotes the Gross Domestic Product in the U.S.A.
INT	denotes the market interest rate in the U.S.A.
MVAL	denotes market value, the proxy for firm size
MBETA	denotes market beta
LEV	denotes the firm's leverage
β1 until β6	denote slope coefficients
ϵ_i	denotes an error term, indicates the variables that influence the cost of equity which are not included in the model

The model will be implemented in a bivariate correlation analysis and a multiple regression test. The correlation defines the direction and strength of the linear relationship between two quantitive variables (Moore et al., 2003). Furthermore, a regression analysis can describe how a dependent variable (cost of equity capital) changes as an explanatory variable (control variables) changes. The multiple regression test allows more than one explanatory variable (Moore et al., 2003).

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Below a summary of all data aspects is given:

Sample	S&P 500
	413 firms across different industries
Cost of equity capital t0	
EPS1	average forecasted earnings per share from analysts at December 18th 2008 for financial year 2009
EPS2	average forecasted earnings per share from analysts at December 18th 2008 for financial year 2010
P0	stock price in December 2008
Cost of equity capital t1	
EPS1	average forecasted earnings per share from analysts at December 16th 2010 for financial year 2011
EPS2	average forecasted earnings per share from analysts at December 16th 2010 for financial year 2012
P0	stock price in December 2010
XBRL	0 in financial year 2008 (not implemented), 1 in financial year 2010 (implemented)
GDP	Gross Domestic Product for financial year 2008 and 2010
Market interest rate	average of the commercial and non-commercial interest rate (1 month maturity) for 2008 and 2010
Firm size	market equity value for financial year 2008 and 2010
Leverage	total long-term debt divided by the market value of common equity in December 2008 and December 2010
Market beta	beta coefficient in December 2008 and December 2010
Statistical analysis	one-sample T-test for the cost of equity capital
	bivariate correlation analysis and multiple regression for dependent and independent variables

Figure 3. Summary of data details

5.2 Data and sample selection

In order to maximize the statistical power, the following conditions have to be met:

- Sufficient variation
- Sufficient large sample

A sufficient large sample can be created by expanding the sample of firms. Since it is already decided that only U.S. firms will be included in this research, the most convenient working method is to take a stock-market in the U.S. Several U.S. stock markets were evaluated, such as the Nasdaq Composite, the Standard & Poors 500 and the Dow Jones. The Dow Jones would create a sample that does not have sufficient variation and size. The Nasdaq could be used a sample, however, I have chosen to use the firms in the S&P 500 stock market, since it holds the most firms of all stock markets. The stocks included in the S&P 500 are those of large publicly held companies that trade on either of the two

before mentioned largest American stock market exchanges: the New York Stock Exchange and the NASDAQ. Furthermore, the 500 largest companies in the U.S. are already mandated to use XBRL, which are included in the firms in the S&P 500.

The firms that are included in the sample are based on the S&P 500 firms (Standard & Poors). In this sample, all large firms from the U.S. are included. Therefore, a sufficient large sample is created, in which no difference is made concerning the variation or industry. The SEC mandated firms with a public float of $5 billion or more to use XBRL as of fiscal years ending after June 15th 2009. All other filers using U.S. GAAP are forced to use XBRL as of fiscal years ending after June 15th 2010. Therefore, it is without doubt that all firms in the S&P 500 are now mandated to use XBRL.

The data for this research will be deducted from a databank. Below you can find the descriptive statistics concerning the sectors of the firms in the sample.

GICS Sector		Total
1	Consumer Discretionary	78
2	Consumer Staples	39
3	Energy	39
4	Financials	82
5	Health Care	49
6	Industrials	58
7	Information Technology	70
8	Materials	29
9	Telecommunications Services	8
10	Utilities	35
Grand Total		487

Figure 4. Industries in sample

The stock prices at fiscal year-end are obtained from the CRSP Monthly Stock at the website of Wharton Research Data Service (WRDS). This data contains the stock prices from December of financial year 2008 and 2010.

The forecasted earnings per share are derived from the summary 2011 I/B/E/S data from Wharton Research Data Service (WRDS). This data contains the summary statistics of forecasts from analysts. I applied the average forecasts from the I/B/E/S file that are released at the third Thursday of December.

Overall, 487 firms are included in the sample, see the table below. The reason that not all firms from the S&P 500 are included in this research is the fact that 13 companies were early adopters of XBRL. They implemented XBRL as a reporting means as of financial year 2006. For the comparable aspect,

these firms were eliminated from the sample. See appendix 1 for an overview of the sample and see below for further details of the definitive sample.

5.3   Attainability

Debreceny et al. (2005) state that 'currently, there are no known empirical studies that examine the effect of XBRL reporting on the cost of capital.' The lack of any empirical research to corroborate the claimed arguments stated above is primarily due to the absence of data.'

Furthermore, Texeira (2007) states that 'XBRL is not yet widely used by entities. Therefore, research opportunities are likely to be relatively limited.'

With regard to the attainability of this research, I did a preliminary investigation to companies that have opted or are mandated to report according the XBRL technique.

As one of the first adopters, in the U.S.A. the 500 largest listed companies have been forced to use XBRL as of fiscal years ending after June 15th 2009. All other companies will be and are mandated according a phase-in timetable. The final phase ends with fiscal years ending after June 15th 2011.

This research will focus on those companies that have already implemented XBRL as a reporting standard. In order to have sufficient data, the sample will contain U.S. listed companies that have filed their reports in XBRL format.

As a consequence, I will have a sample that is sufficient to perform a reliable research.

5.4   Limitations

This study is subject to a number of limitations, which are outlined in this section.

First, the benefits of XBRL may not be automatically used by financial statement users. 'To enable the external benefits of XBRL technology, wide publicity about the benefits of using search-facilitating technology may be needed to induce financial statement users to access, and thereby benefit from, the technology. The presence of search-facilitating technology is not an automatic remedy for eliminating differences between recognition versus disclosure created by cognitive processing.' (Hodge, Kennedy, and Maines, 2004)

Therefore, a limitation of this research is the definition of the time period. When companies start using XBRL to file their reports, it takes a certain amount of time before it has an impact at the cost of equity capital. This period is not set and difficult to determine. It is therefore necessary to make an assumption of that period of time. In this thesis, the period of three years is chosen to be the best estimate, namely one year before the implementation, the year of implementation and the year

after the implementation. The year before (fiscal year 2008) is chosen since the effect of XBRL in that year is not noticeable. The year after (fiscal year 2010) is chosen since it is the only year after that for which all companies have filed their annual reports. The year 2011 is not finished yet and can therefore not be used in the research.

A second limitation could be the difference in quantity of disclosures. Not every corporation discloses an equal amount of reports and other voluntary disclosures. This could create a minor bias in the research since quantity can influence the quality of disclosures, but it is not expected to influence the results since the sample is large. This means that if there are firms that disclose excessive (voluntary) information, the effect will be marginal.

Furthermore, differences in GAAP interpretations could create differences in the quality of disclosures. In this research only U.S. companies are taken into account. However, there are sections within the U.S. GAAP where subjectivity is in place. Therefore, the results are biased since not all companies use the exact same application of the regulations in their financial statements. This could create a minor bias in the research, but it is not expected to influence the results significantly, since the sample is large enough to make the sample normally distributed. This means that the possibilities within U.S. GAAP are represented normally in the sample and that any outliers will not have a significant effect on the outcomes.

5.5   Summary

In this chapter, I choose to use the Price Earnings Growth Model since it is relatively easy to use and other authors state that is a good method in assessing the cost of equity capital. Forecasted earnings per share for the current year and current stock price are needed in this approach, which will be deducted from financial databases.

Furthermore, I will consider a two-period model in which today is when the firm does not use XBRL (2008) and tomorrow is the day when the firm is using XBRL (2010). The stock prices at fiscal year-end are obtained from the CRSP Monthly Stock, the forecasted earnings per share are derived from the summary 2011 I/B/E/S data from Wharton Research Data Service (WRDS). Overall, 487 firms are included in the sample. This research will focus on those companies that have already implemented XBRL as a reporting standard. In order to have sufficient data, the sample will contain U.S. listed companies that have filed their reports in XBRL format. The firms that are included in the sample are

based on the S&P 500 firms (Standard & Poors). Therefore, a sufficient large sample is created, in which no difference is made concerning the variation or industry.

Finally, a number of limitations regarding this research are discussed, in which the most important limitation is the definition of the time period. When companies start using XBRL to file their reports, it takes a certain amount of time before it has an impact at the cost of equity capital. In this thesis, the period of three years is chosen to be the best estimate, namely one year before the implementation, the year of implementation and the year after the implementation.

6   Research results

In this chapter the results of the research will be formulated and analysed, through which sub question 4 will be answered:

4.   Do companies that have implemented XBRL show a greater quality of disclosure?

Paragraph 6.1 will explain the processing of the data. Second, paragraph 6.2 will review the results of the research in an overview. The analysis of these results will be shown in paragraph 6.3. The chapter will end with a summary of the outcomes and the analysis of the outcomes.

6.1   Data-processing

6.1.1 Sample processing

As discussed in chapter 5, the forecasted earnings per share are derived from the summary 2011 I/B/E/S data from Wharton Research Data Service (WRDS). The stock prices at fiscal year-end are obtained from the CRSP Monthly Stock at the website of Wharton Research Data Service (WRDS). The downloads from these data banks consist of the following:

- earnings per share for year 2 as at 18 December 2008
- earnings per share for year 3 as at 18 December 2008
- earnings per share for year 2 as at 16 December 2010
- earnings per share for year 3 as at 18 December 2010
- average stock price in December 2008
- average stock price in December 2010

Next, I collected the above mentioned aspects for all firms in the sample. During the research, a number of issues concerning the sample originated which are explained below.

In paragraph 5.2 I already discussed that there is a group of early adopters of XBRL. These 13 firms started using XBRL as a reporting means in 2006 and are eliminated from the sample due to comparison reasons.

Remarkable is that the data that is found for the financial year 2010 (the year after the implementation of XBRL) is much more extensive than the data for 2008 (the year before the implementation of XBRL). For 14 companies in the Standard & Poors 500 there was not sufficient

data found in the databases. For example, for the firm NextEra Energy Resources (ticker symbol NEE) the necessary data for 2010 is available, but the necessary data for 2008 is not. Only companies for which all needed data is available are taken into account.

Another important reason for this is that the S&P 500 is a variable stock market. This means that S&P updates the listed firms of the S&P 500 periodically, typically in response to acquisitions, or to keep the index up to date as various companies grow or shrink in value.

For example, QEP Resources Inc. (ticker symbol QEP) was not added until June 30, 2010 and can therefore not be used in the sample they were not one of the firms that were mandated to use XBRL as of 2009. Furthermore, the necessary data was not available in the databank which is used (WRDS). Therefore, the companies for which insufficient data could be found are eliminated from the sample.

Another issue that arose during the research is that the Price Earnings Growth Model assumes that the earnings per share (EPS) is an increasing factor. Namely, if the EPS is a decreasing factor, the formula provides a negative outcome of which the square root cannot be calculated. This implicated that the cost of equity capital and therefore the quality of disclosure cannot be measured when the earnings per share decreases over years. For this reason, the 58 firms for who this is applicable are eliminated from the sample.

Below you can find an overview of the development from the 500 firms in the S7P 500 to the final sample of 413 firms.

	number of firms
stock market S&P 500	500
early adopters of XBRL (2006)	-13
unsufficient data	-16
negative growth in EPS	-58
final sample	**413**

Figure 5. Realization of final sample

Before the calculation of the Price Earnings Growth model, I summarized the necessary data for the firms in the final sample. For one year I performed the following steps:

- calculation of EPS_2 minus EPS_1
- calculation of EPS / average stock price in December
- calculation of square root for (EPS / average stock price in December)

The outcome of the third mentioned aspect concerns the cost of equity capital for that year. In order to investigate the change in cost of equity capital after the introduction of XBRL, I performed the above steps for the year 2008 and 2010.

6.1.2 Sample statistics

In this stage of the research the cost of equity capital before and after the implementation of XBRL are known. Next, the outcomes for each company were exported to SPSS. Based on the input the program can make various statistical analyses like the paired sample t-test. The paired sample t-test is used when two groups (samples) are dependently distributed. Groups are dependently distributed when the identical group element is examined twice. This element, for this research it is cost of equity capital, is measured twice and the outcomes are compared. For this research, this test will be used for analyzing the significance of the reaction in the cost of equity capital as a result of XBRL with respect to the period before and after the implementation. It is used since the standard deviation is unknown.

This t-test will determine if the reaction in cost of equity capital in 2010 significantly differs from 2008 and as a consequence will provide an answer to the question if a significant increase in quality of disclosures occurs after the implementation of XBRL.

A significance test is a formal procedure for comparing observed data with a hypothesis whose truth we want to assess. The hypothesis is a statement about the parameters in a population or model. The results of a test are expressed in terms of a probability that measures how well the data and the hypothesis agree.

Overall, the question is if the sample provides sufficient evidence that the mean cost of equity capital for all firms has changed after the introduction of XBRL.

In the sample, some firms experience an increase in their cost of equity capital while others experience a decrease. The mean change for 413 firms in the sample is -0.0255 or -5.2%. See the figures below for further (descriptive) statistics of the definitive sample groups.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
COC2008	413	,0129	1,8010	,128426	,1065083
COC2010	413	,0251	,3135	,102887	,0370643
Valid N (listwise)	413				

Figure 6. Descriptive statistics of final sample

I will compare the P-value with a level that indicates if this level is strong enough. This decisive level is called the significance level, which is denoted by α. I have chosen to use α = 0,05, which means that the data is required to give evidence against H0 so strong that it would happen no more than 5% of the time when H0 is true. When the outcomes will give that P ≤ 0.05 we can say that H0 can be rejected.

6.1.3 Tests of normality

Before analysing the variables, I assume that the results of the variables are normally distributed. With help of SPSS a test of normality can be performed to determine if the sample is normally distributed. For this, the null and alternative hypotheses are formulated:

H0:   The variable cost of equity capital is normally distributed, P > 0.05
H1:   The variable cost of equity capital is not normally distributed, P < 0.05

With tests of normality, the most common used test is the Kolmogorov-Smirnov. For outcomes of this test, see the figure below:

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
COC2008	,202	413	,000	,445	413	,000
COC2010	,117	413	,000	,894	413	,000

a. Lilliefors Significance Correction
Figure 7. Tests of normality

Based on the above result the H1 hypothesis should be rejected. The result of K-S is 0.206 for 2008 and 0.124 for 2010 and has a p-value of 0.000, which is below the level of significance of 0.05. The cost of equity capital in this research (n = 413) is therefore not normally distributed.

However, if the sample size is large enough, it may be presumed that the sample is normally distributed. De Vocht (2009) says that is the sample has 30 'cases' or more, the sample is presumed normally distributed since outliers do not have a significant effect. Moore et al. (2003) state that t-procedures can be safely used even for skewed distributions when the sample is large, roughly above 40. Since this thesis includes a sample of 413, it is assumed that the sample is normally distributed. See below for the histogram and the Q-Q plot of the cost of equity capital. In these figures you can see that the population is not exactly normally distributed and that there are a few outliers. However, overall the normal distribution can be recognized. Therefore, the outliers will not have a significant effect on the outcomes.
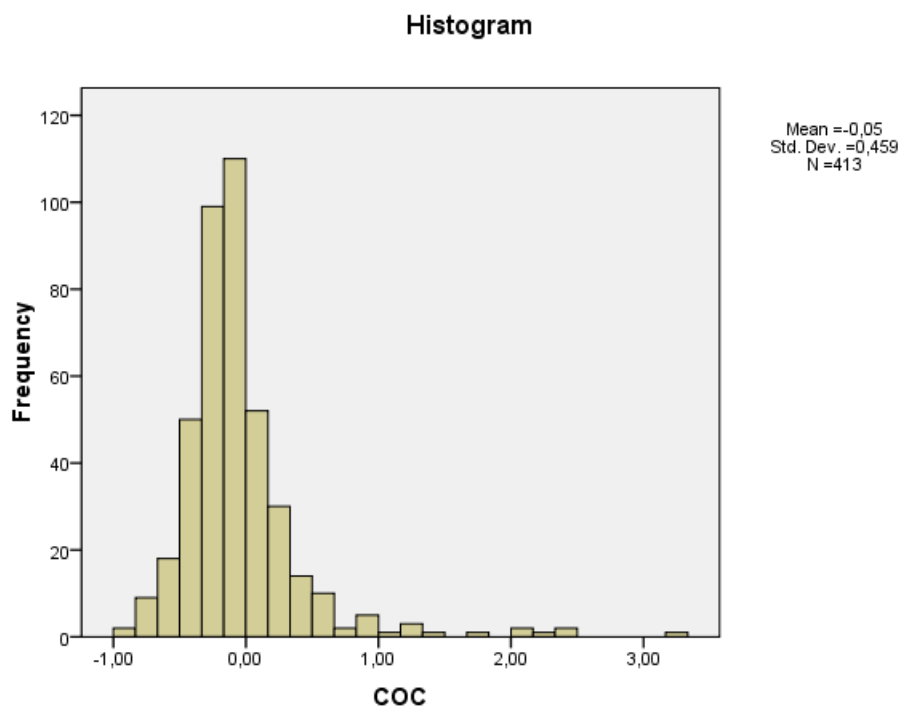
Figure 8. Histogram of cost of equity capital
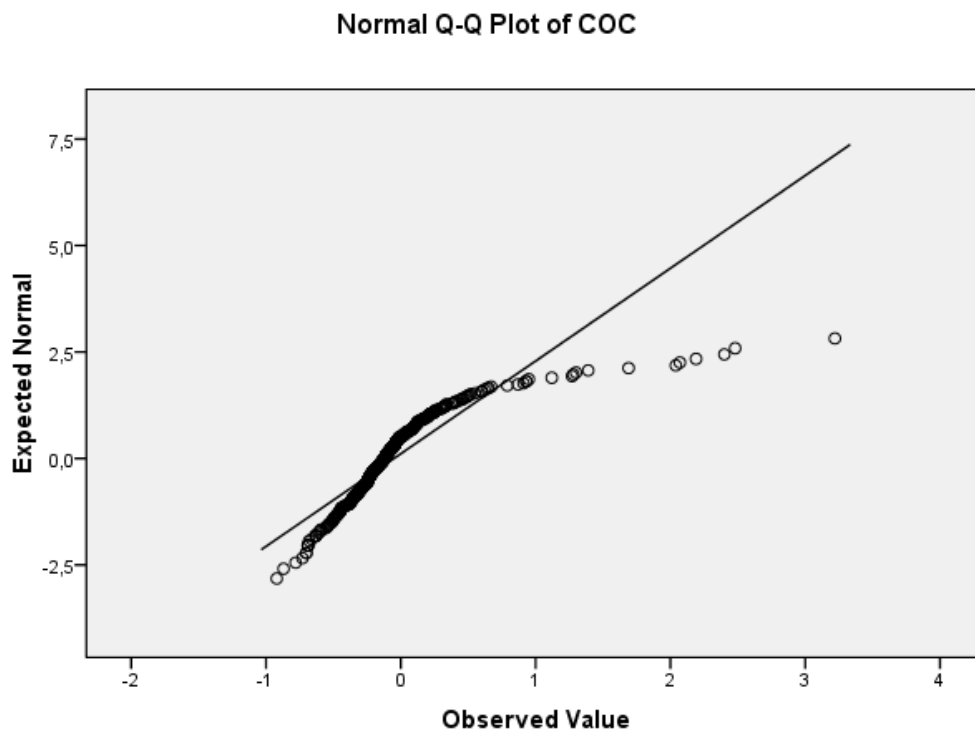
Figure 9. Q-Q Plot of Cost of equity Capital

6.2   Research results

6.2.1   Main hypothesis

Before presenting the outcomes from SPSS, it is important to understand how the previously formulated hypotheses can be converted into statistics. To provide evidence that there is association between the implementation of XBRL and the cost of equity capital, I will investigate the change in cost of equity capital before the implementation (2008) and after the implementation (2010). The statement that will be tested in a test of significance is the null hypothesis, which is formulated in chapter 4:

H0:	There is no association between the implementation of XBRL and the cost of equity capital.

The test of significance is designed to assess the strength of the evidence against the null hypothesis, formulated in the alternative hypothesis:

H1:	There is an inverse association between the implementation of XBRL and the cost of equity capital.

Of the total sample of 413 firms, 289 firms experience a decrease in the cost of equity capital. The other 124 firms experience an increase in the cost of equity capital. The mean change for 413 firms in the sample is -0.0266 in absolute terms or -5.4%, which means that overall there was a decline in cost of equity capital. See the figures below for more statistics.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	COC2008	,128426	413	,1065083	,0052409
	COC2010	,102887	413	,0370643	,0018238

Figure 10. Paired samples statistics

The above figure provides the average cost of equity capital for 2008 and 2010 (the two sample groups). From this figure you can conclude in which year the cost of equity capital is lower, in this case 2010 with an average cost of equity capital of 0.1029, in comparison with the average cost of equity capital in 2008 of 0.1284.

Paired Samples Test

| | | Paired Differences | | | | | | | |
| | | | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | Sig. (2-tailed) |
		Mean			Lower	Upper	t	df	
Pair 1	COC2008 - COC2010	,0255387	,0979281	,0048187	,0160664	,0350111	5,300	412	,000

Figure 11. Paired samples test

At the above figure, where the paired samples test was performed, the answers to the hypotheses can be found. The result for cost of equity capital 2008 -/- cost of equity capital 2010 is positive which means that the cost of equity capital has decreased. The mean for this result is 0.02554. The t-value for this result is 5.300 en the one-sided test is significant at 5% ($p = 0.000 < \alpha = 0.005$).

6.2.2 Explanations for the decrease in cost of equity capital

In order to investigate what factors caused the decrease in cost of capital that was determined in the previous paragraph, I determined a number of possible explanatory variable previously. First, these factors were applied in a bivariate correlation test. See below for the outcomes of this test:

Correlations

		COC	XBRL	GDP	INT	MVAL	LEV
COC	Pearson Correlation	1	-,158**	-,158**	,158**	-,051	,027
	Sig. (2-tailed)		,000	,000	,000	,145	,439
	N	826	826	826	826	826	826
XBRL	Pearson Correlation	-,158**	1	1,000**	-1,000**	,096**	-,108**
	Sig. (2-tailed)	,000		,000	,000	,006	,002
	N	826	826	826	826	826	826
GDP	Pearson Correlation	-,158**	1,000**	1	-1,000**	,096**	-,108**
	Sig. (2-tailed)	,000	,000		,000	,006	,002
	N	826	826	826	826	826	826
INT	Pearson Correlation	,158**	-1,000**	-1,000**	1	-,096**	,108**
	Sig. (2-tailed)	,000	,000	,000		,006	,002
	N	826	826	826	826	826	826
MVAL	Pearson Correlation	-,051	,096**	,096**	-,096**	1	,005
	Sig. (2-tailed)	,145	,006	,006	,006		,890
	N	826	826	826	826	826	826
LEV	Pearson Correlation	,027	-,108**	-,108**	,108**	,005	1
	Sig. (2-tailed)	,439	,002	,002	,002	,890	
	N	826	826	826	826	826	826

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

Where:

COC	denotes the estimation of the cost of equity capital using the PEG-ratio
XBRL	denotes the implementation of XBRL (1 equals yes, 0 equals no)
GDP	denotes the Gross Domestic Product in the U.S.A.
INT	denotes the market interest rate in the U.S.A.

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MVAL   denotes market value, the proxy for firm size

LEV   denotes leverage

The outcomes show that the cost of equity capital is significantly correlated to the implementation of XBRL, the Gross Domestic Product and the market interest rate. XBRL is negatively correlated to the cost of equity capital, as is the GDP. The market interest rate is positively correlated to the cost of equity capital.

Furthermore, I applied all variables in a multiple regression test. The main difference between these two methods is the fact that the correlation analysis determines the relationship between the dependent and the independent variable in the situation of the presence of these two variables exclusively, while the regression analysis is able to determine a relationship between the dependent variable and the independent variable in the situation of the presence of the other independent variables which might have an influence. See below for the outcomes of this test:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,163[a]	,026	,023	,0797826

a. Predictors: (Constant), LEV, MVAL, XBRL

The above figure shows whether the regression model with the independent variables GDP, market interest rate, market value and leverage is capable of predicting the dependent variable cost of equity capital. The R in the model provides an indication for this capability. If R equals 1, this would indicate a 100% fitting model. For this model, the test show a R of 0,163, which means that this model is able to predict 16,3% of the variance of the cost of equity capital.

Excluded Variables[b]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	GDP	,000[a]	,000	1,000	,000	1,373E-14
	INT	,000[a]	,000	1,000	,000	1,713E-14

a. Predictors in the Model: (Constant), LEV, MVAL, XBRL

b. Dependent Variable: COC

There were two variables that are excluded from the test, as you can see in the above figure. This is due to the fact that SPSS does not recognize these independent variables as such. In this figure the standardized weight, that the variables would have if they were included in the model, is presented. The correlation would be 0,000 and the tolerance is very small. The closer the tolerance gets to 1.0, the less risk there is for multicollinearity. In this case, the GDP and market interest rate are highly correlated, which indicates multicollinearity. Therefore, they are excluded from the regression analysis. In the correlation analysis it is already determined that GDP as well as the market interest rate is significantly correlated to the cost of equity capital. It will therefore, despite this exclusion, be incorporated in the analysis and conclusion.

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,142	3	,047	7,445	,000[a]
	Residual	5,232	822	,006		
	Total	5,374	825			

a. Predictors: (Constant), LEV, MVAL, XBRL

b. Dependent Variable: COC

The above figure shows in what way the complete multiple regression model fits by presenting the significance of the entire model. As you can see, the significance equals 0,000, which means that the model is assumed to be significant.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	,129	,004		30,092	,000
	XBRL	-,025	,006	-,154	-4,419	,000
	MVAL	-6,303E-12	,000	-,036	-1,045	,296
	LEV	,000	,001	,011	,303	,762

a. Dependent Variable: COC

The above figure shows the probability level of the control variables. Since I make use of a significance level of 0.05, it is shown that only the implementation of XBRL is significantly correlated to the cost of equity capital. This independent variable has a significance level of 0.000, which is lower than the stated 0.05. This means that the null hypothesis can be rejected. For the market value

and leverage, the significance level is higher than 0.05, which means that the null hypothesis cannot be rejected.

6.2.3   Differences between industries

I investigated the outcomes per sector since it is interesting to find out if the results differ between industries. This is due to the fact that it is assumable that different industries represent different levels of risk, and therefore it is expected that the cost of equity capital will also not change equally in each industry. This factor was earlier stated in a second hypothesis:

H2:	There is an association between the industry and the cost of equity capital.

I performed a correlation analysis in order to investigate the potential association between the different industries in the sample and the cost of equity capital. See below for the outcomes of this test:

Correlations

		COC	INDUS
COC	Pearson Correlation	1	-,049
	Sig. (2-tailed)		,320
	N	413	413
INDUS	Pearson Correlation	-,049	1
	Sig. (2-tailed)	,320	
	N	413	413

In this figure it is shown that the correlation between the industries and the cost of capital has a significance level of 0.320, which is higher than 0.05. This means that the null hypothesis cannot be rejected.

Furthermore, I performed a paired samples t-tests for the cost of capital in financial year 2008 and 2010 for every industry that is represented in the sample.

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Consumer discretionary

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	COC 2008	.1317	71	.05671	.00673
	COC 2010	.1112	71	.03559	.00422

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	COC 2008 – COC 2010	.02049	.03835	.00455	.01141	.02956	4.501	70	.000

The mean cost of equity capital decreased with 16%, and the significance level is 0.000, which means that the cost of equity capital in the consumer discretionary sector significantly decreased after the implementation of XBRL.

Consumer staples

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	COC 2008	.0889	36	.02258	.00376
	COC 2010	.0853	36	.01884	.00314

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	COC 2008 – COC 2010	.00365	.02124	.00354	-.00353	.01084	1.032	35	.309

The mean cost of equity capital decreased with 4%, which means that the cost of equity capital in the consumer staples sector decreased after the implementation of XBRL. However, $p = 0.309/2 = 0.155$, which is higher than the significance level of 0.05. Therefore, the decrease is not significant.

I divide the significance level by two since the test is one-sided, the alternative hypothesis states that the cost of equity capital is significantly lower after the introduction of XBRL.

Energy

Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 COC 2008	.1555	34	.06111	.01048
COC 2010	.1274	34	.02752	.00472

Paired Samples Test

	Paired Differences							
				95% Confidence Interval of the Difference				Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1 COC 2008 – COC 2010	.02804	.06116	.01049	.00670	.04938	2.673	33	.012

The mean cost of equity capital decreased with 18%, which means that the cost of equity capital in the energy sector decreased after the implementation of XBRL. However, p = 0.012/2 = 0.06, which is higher than the significance level of 0.05. Therefore, the decrease is not significant.

Financials

Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 COC 2008	.1798	67	.22000	.02688
COC 2010	.1223	67	.05197	.00635

Paired Samples Test

	Paired Differences							
				95% Confidence Interval of the Difference				Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1 COC 2008 – COC 2010	.05750	.21040	.02570	.00618	.10882	2.237	66	.029

The mean cost of equity capital decreased with 32%, and the p-value is 0.029/2 = 0.01, which is

higher than the significance level of 0.05. This means that the cost of equity capital in the consumer discretionary sector significantly decreased after the implementation of XBRL.

Health care

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	COC 2008	.1057	45	.02629	.00392
	COC 2010	.0939	45	.01666	.00248

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	COC 2008 – COC 2010	.01182	.03182	.00474	.00226	.02138	2.492	44	.017

The mean cost of equity capital decreased with 11%, which means that the cost of equity capital in the health care sector decreased after the implementation of XBRL. However, p = 0.017/2 = 0.09, which is higher than the significance level of 0.05. Therefore, the decrease is not significant.

Industrials

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	COC 2008	.0994	47	.03775	.00551
	COC 2010	.1019	47	.02408	.00351

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	COC 2008 – COC 2010	-.00253	.03613	.00527	-.01314	.00807	-.481	46	.633

In the above outcome for the sector industrials you can see that the cost of equity capital has actually increased with 2,5% in 2010 in comparison to 2008.

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Information technology

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	COC 2008	.1358	58	.11839	.01555
	COC 2010	.0906	58	.03978	.00522

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	COC 2008 – COC 2010	.04520	.09374	.01231	.02055	.06985	3.672	57	.001

The mean cost of equity capital decreased with 33%, and the significance level is 0.001, which means that the cost of equity capital in the information technology sector significantly decreased after the implementation of XBRL.

Materials

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	COC 2008	.1467	27	.07671	.01476
	COC 2010	.1108	27	.04532	.00872

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	COC 2008 – COC 2010	.03591	.07568	.01456	.00598	.06585	2.466	26	.021

The mean cost of equity capital decreased with 24%, and $p = 0.021/2 = 0.01$, which is lower than the significance level of 0.05, which means that the cost of equity capital in the materials sector significantly decreased after the implementation of XBRL.

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Telecommunication services

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	COC 2008	.1049	5	.04510	.02017
	COC 2010	.0864	5	.03003	.01343

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	COC 2008 – COC 2010	.01850	.03324	.01486	-.02277	.05977	1.245	4	.281

The mean cost of equity capital decreased with 17%, which means that the cost of equity capital in the telecommunication services sector decreased after the implementation of XBRL. However, p = 0.281/2 = 0.141, which is higher than the significance level of 0.05. Therefore, the decrease is not significant.

Utilities

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	COC 2008	.0888	25	.02699	.00540
	COC 2010	.0669	25	.01994	.00399

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	COC 2008 – COC 2010	.02188	.02367	.00473	.01211	.03165	4.622	24	.000

The mean cost of equity capital decreased with 24%, and the significance level is 0.000, which means that the cost of equity capital in the utilities sector significantly decreased after the implementation of XBRL.

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6.3   Analysis

With regard to my expectations, in the literature research I discussed the numerous advantages of XBRL. Malhotra and Garrit (2004) stated that "XBRL documents can be prepared efficiently, exchanged reliably, published more easily, analyzed quickly, retrieved by investors simply – all of which enable smarter investments." Based on this and other prior research I expected to find a significant lower cost of equity capital after the year that firms started using XBRL.

As stated earlier, I used a significance level of 5%. Therefore, I will maintain the null hypothesis if $p > 0.05$. If $p < 0.05$, the null hypothesis can be rejected and the alternative hypothesis can be accepted. In figure 11, an overview of the outcomes is given. Here you can see that the cost of equity capital before XBRL is considerably higher than after the implementation of XBRL. Furthermore, the significance level is 0.000, which is lower than the chosen significance level of 0.005. This means that the chance that the results are incorrect is 0%.

The outcomes also show that the cost of equity capital is significantly correlated to the implementation of XBRL, the Gross Domestic Product and the market interest rate. XBRL is negatively correlated to the cost of equity capital, as is the GDP. The market interest rate is positively correlated to the cost of equity capital. This means that the increase in GDP and the 'increase' in XBRL (the implementation went from '0' in 2009 to '1' in 2010) relates to a significant decrease in the cost of equity capital. On the other hand, the decrease in the market interest rate relates to the decrease in the cost of equity capital and is therefore positively correlated. The variables firm size and leverage are not significantly correlated to the cost of equity capital, since the significance level is higher than 0.05.

Furthermore, in the analysis of the multiple regression model, it is shown that only the implementation of XBRL is significantly correlated to the cost of equity capital. This independent variable has a significance level of 0.000, which is lower than the stated 0.05. This means that the null hypothesis can be rejected. For the market value and leverage, the significance level is higher than 0.05, which means that the null hypothesis cannot be rejected.

The results per sector are very different. Overall, there is no significant correlation between the industry and the cost of equity capital. However, all sectors, except for industrials, experience a decrease in their cost of equity capital after the implementation of XBRL. Only the sectors consumer discretionary, financials, information technology, materials and utilities show a significant decrease in their cost of equity capital.

In conclusion, the results find that there is a significant difference between the two measurements for cost of equity capital. This is plausible since the mean of the second measurement in 2010 (0.1029) is much lower than the measurement of the first measurement in 2008 (0.1284). After the accomplishment of the paired samples t-test significant differences are found (t = 5.300, p = 0.000). From these outcomes, we can deduct that the difference between both measurements is significant and that the null hypothesis can be rejected.

6.4   Summary

In this chapter, the final sample is determined. The earlier mentioned sample has decreased due to early adopters, lack of data or a negative growth in earnings per share. In this stage of the research the cost of equity capital before and after the implementation of XBRL are known. Next, the outcomes for each company were exported to SPSS, and a this t-test determined if the reaction in cost of equity capital in 2010 significantly differs from 2008.

I compared the P-value with a level that indicates if this level is strong enough. This decisive level is called the significance level, which is denoted by α = 0,05. Furthermore, the cost of equity capital in this research (n = 413) is normally distributed.

Of the total sample of 413 firms, 289 firms experience a decrease in the cost of equity capital. The other 124 firms experience an increase in the cost of equity capital. The mean change for 413 firms in the sample is -0.02544 or -5.2%, which means that overall there was a decline in cost of equity capital. In the results, the significance level is 0.000, which is lower than the chosen significance level of 0.005. This means that the chance that the results are incorrect is 0%. This overall means that the implementation of XBRL is correlated with the decline in the cost of equity capital.

The correlation test showed that the implementation of XBRL, the Gross Domestic Product and the market interest rate are significantly correlated to the change in cost of equity capital. The multiple regression test has strengthened this, since it also shows a significant relation between XBRL and the cost of equity capital.

The results per sector are very different. Overall, there is no significant correlation between the industry and the cost of equity capital. However, all sectors, except for industrials, experience a decrease in their cost of equity capital after the implementation of XBRL.

7   Conclusion

The following chapter will provide all relevant conclusions based on this research. In paragraph 7.1 the conclusions will be described. Subsequently, paragraph 7.2 discusses the contribution from the conclusions to this research. Finally, a summary of the chapter is given.

7.1 Conclusions

To answer the main research question, a number of sub question were formulated. These sub questions are answered throughout the chapters, as a result through which we now understand what XBRL comprehends, what other research regarding XBRL and quality of disclosures has already been conducted in prior literature and how quality of disclosures can be measured and what the best method for this research is and if firms that use XBRL show a decrease in cost of equity capital.

Now, the main research question, as described in the introduction, will be answered:

Does reporting in a XBRL format influences the quality of disclosures?

In figure 11 in the previous chapter, an overview of the outcomes is given. Here it is shown that the difference between cost of equity capital in 2008 and cost of equity capital in 2010 is negative, which means that the cost of equity capital before XBRL is higher than after the implementation of XBRL. To validate these outcomes and determine if the change is significant, I performed a paired-samples t-test.

With this t-test, I used a significance level of 5%. The outcomes provide a significance level (p-value) of 0.000, which is lower than the chosen significance level of 0.005. Therefore, I rejected the null hypothesis and accepted the alternative hypothesis since $p < 0.05$.

The null hypothesis stated that there is no change in cost of equity capital and therefore, there is no association between the implementation of XBRL and the cost of equity capital. The alternative hypothesis meets my expectations and stated there is a significant decrease in cost of equity capital.

In order to investigate the factors that cause the decrease in the cost of equity capital, I established a number of independent variables and found that the implementation of XBRL, the Gross Domestic Product and the market interest rate are significantly correlated to the decrease in cost of equity capital.

In conclusion, accepting the first alternative hypothesis means that the implementation of XBRL is associated with a decline in the cost of equity capital. However, the increase in the GDP and the decrease in the market interest rate during the research period are also correlated with the cost of equity capital. The answer to the main research question can therefore not be answered positive. It is determined that reporting in a XBRL format influences the quality of disclosures in a positive way since firms experience a significant decrease in their cost of equity capital. However, it cannot be stated that this decrease in cost of capital is exclusively the effect of XBRL.

Furthermore, I determined another hypothesis. There, the null hypothesis states that the industry of a firm is not associated to the cost of equity capital. For this purpose, I performed a correlation test. The outcome shows a significance level of 0.320, which means that the null hypothesis cannot be rejected and there is no correlation between the industry and the cost of equity capital.

I also performed a paired-samples t-test for all industries separately. All sectors, except for industrials, experience a decrease in their cost of equity capital after the implementation of XBRL. However, only the sectors consumer discretionary, financials, information technology, materials and utilities show a significant decrease in their cost of equity capital.

7.2 Research contributions

Botosan (1997) concluded that there is a direct evidence of an association between cost of equity capital and disclosure level. Brown and Hillegeist (2007) agree on this and state that information asymmetry is negatively associated with the quality of the annual report and investor relations activities. The most important contribution of this thesis concerns the conclusion that the quality of disclosures if negatively associated with cost of equity capital. I investigated this in the context of implementing XBRL and I have made a comparison between the quality of disclosures before XBRL and after the implementation, using the cost of equity capital as a measuring method.

The outcomes are in line with my expectations since it was predicted that XBRL will increase the quality of disclosed information. It is determined that firms experience a significant decrease in their cost of equity capital and therefore disclosure information that is of higher quality. However, I could not determine that this decrease in cost of capital is exclusively the consequence of the implementation of XBRL. The economic and market conditions also have a significant affect on the cost of capital. Therefore, I cannot conclude that the implementation of XBRL is associated with an increase in the quality of disclosures.

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7.3 Summary

The implementation of XBRL is associated with a decline in the cost of equity capital. However, the increase in the GDP and the decrease in the market interest rate during the research period are also correlated with the cost of equity capital. Therefore, the answer to the main research question can therefore not be answered positive. The economic and market conditions also have a significant affect on the cost of capital. Therefore, I cannot conclude that the implementation of XBRL is associated with an increase in the quality of disclosures.

Summary

The 500 largest listed companies have been forced to use XBRL as of fiscal years ending after June 15th 2009. XBRL (Extensible Business Reporting Language) is a communication technique that can be used to send and receive business or financial information in one uniform form. IIt can be applied to existing financial and nonfinancial information and comprehends the 'tagging' of data. The business concepts that the organization wishes to report, are defined in a taxonomy. Reporting with XBRL creates a number of internal benefits such as greater timeliness, reliability and accuracy.

The main external advantage of XBRL lies in the fact that it allows users of data to acquire and integrate all similar coded information from the financial statements and footnotes. The consequence of higher quality of disclosures and possible smarter investments are investigated in this research.

The economic consequences and the relationship between the quality of disclosures and the cost of equity capital have been extensively reviewed in the past literature. One stream of research states that greater disclosure quality reduces the estimation risk or the uncertainty regarding the distribution of return and therefore is associated with lower cost of equity capital. Another stream of research suggests that the cost of equity capital tends to be at a lower level either through reduced transaction costs or increased demand for a firm's securities. Overall, there is a lot of support from prior research that greater quality of disclosure creates a decrease in the cost of equity capital.

Furthermore, there are two major streams of research regarding the quality of disclosures. One stream tries to assess the quality of disclosures by performing a content analysis, the second stream concentrates on the cost of equity capital in a way of capturing the economic consequences. The latter method is used for this research.

The expectation is that companies that implement XBRL will experience a decrease in the cost of equity capital, which is a measurement method for the quality of the disclosures. The main hypothesis concerns the inverse association between the implementation of XBRL and the cost of equity capital. The second hypothesis states that there is no association between the industry and the cost of equity capital.

I choose to use the Price Earnings Growth Model since it is relatively easy to use and other authors state that is a good method in assessing the cost of equity capital. Forecasted earnings per share for the current year and current stock price are needed in this approach, which are deducted from financial databases.

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Furthermore, I considered a two-period model in which today is when the firm does not use XBRL (2008) and tomorrow is the day when the firm is using XBRL (2010).

This research will focus on those companies that have already implemented XBRL as a reporting standard. In order to have sufficient data, the sample will contain U.S. listed companies that have filed their reports in XBRL format. The firms that are included in the sample are based on the S&P 500 firms (Standard & Poors).

The most important limitation for this research is the definition of the time period. When companies start using XBRL to file their reports, it takes a certain amount of time before it has an impact at the cost of equity capital. In this thesis, the period of three years is chosen to be the best estimate, namely one year before the implementation, the year of implementation and the year after the implementation.

Of the total sample of 413 firms, 289 firms experience a decrease in the cost of equity capital. The other 124 firms experience an increase in the cost of equity capital. The mean change for 413 firms in the sample is -0.02544 or -5.2%, which means that overall there was a decline in cost of equity capital. In the results, the significance level is 0.000, which is lower than the chosen significance level of 0.005. This means that the chance that the results are incorrect is 0%. This overall means that the implementation of XBRL is associated with the decline in the cost of equity capital.

In order to investigate the cause of the decrease in cost of equity capital, a number of variables were determined. A correlation and multiple regression analysis show that the implementation of XBRL, the Gross Domestic Product and the market interest rate are significantly correlated with the change in cost of equity capital.

There is no significant correlation between the industry and the cost of equity capital, and because of that the second null hypothesis cannot be rejected. However, all sectors, except for industrials, experience a decrease in their cost of equity capital after the implementation of XBRL.

The conclusion of therefore that reporting in a XBRL format influences the quality of disclosures in a positive way since firms experience a significant decrease in their cost of equity capital. However, the increase in the GDP and the decrease in the market interest rate during the research period are also correlated with the cost of equity capital. Therefore, the answer to the main research question can therefore not be answered positive. The economic and market conditions also have a significant affect on the cost of capital and I cannot conclude that the implementation of XBRL is associated with an increase in the quality of disclosures.

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Appendix 1: Overview of sample selection

Abercrombie & Fitch	Ross Stores Inc.	Walgreen Co.	Equifax Inc.
Amazon.com Inc	Scripps Networks Interactive Inc.	Wal-Mart Stores	Equity Residential
Apollo Group Inc	Sherwin-Williams	Anadarko Petroleum Corp	E-Trade
AutoNation Inc	Snap-On Inc.	Apache Corporation	Federated Investors Inc.
AutoZone Inc	Stanley Black & Decker	Baker Hughes Inc	Fifth Third Bancorp
Bed Bath & Beyond	Staples Inc.	Cabot Oil & Gas	First Horizon National
Best Buy Co. Inc.	Starbucks Corp.	Cameron International Corp.	Franklin Resources
Block H&R	Target Corp.	Chesapeake Energy	Genworth Financial Inc.
Cablevision Systems Corp.	Tiffany & Co.	Chevron Corp.	Goldman Sachs Group
Carmax Inc	Time Warner Cable Inc.	ConocoPhillips	Hartford Financial Svc.Gp.
Carnival Corp.	Time Warner Inc.	CONSOL Energy Inc.	Health Care REIT
CBS Corp.	TJX Companies Inc.	Denbury Resources Inc.	Hudson City Bancorp
Coach Inc.	Urban Outfitters	Devon Energy Corp.	Huntington Bancshares
Comcast Corp.	V.F. Corp.	EOG Resources	IntercontinentalExchange Inc.
D. R. Horton	Viacom Inc.	Exxon Mobil Corp.	Invesco Ltd.
Darden Restaurants	Walt Disney Co.	FMC Technologies Inc.	Janus Capital Group
DeVry, Inc.	Whirlpool Corp.	Halliburton Co.	JPMorgan Chase & Co.
DirecTV	Wynn Resorts Ltd	Helmerich & Payne	KeyCorp
Discovery Communications	Yum! Brands Inc	Hess Corporation	Kimco Realty
Expedia Inc.	Avon Products	Marathon Oil Corp.	Legg Mason
Family Dollar Stores	Brown-Forman Corporation	Massey Energy Company	Lincoln National
Fortune Brands Inc.	Campbell Soup	Murphy Oil	Loews Corp.
GameStop Corp.	Clorox Co.	Nabors Industries Ltd.	M&T Bank Corp.
Gannett Co.	Coca Cola Co.	Newfield Exploration Co	Marsh & McLennan
Gap (The)	Coca-Cola Enterprises	Noble Corp	Marshall & Ilsley Corp.
Genuine Parts	Colgate-Palmolive	Noble Energy Inc	MetLife Inc.
Goodyear Tire & Rubber	ConAgra Foods Inc.	Occidental Petroleum	Moody's Corp
Harley-Davidson	Constellation Brands	Peabody Energy	NASDAQ OMX Group
Harman Int'l Industries	Costco Co.	Pioneer Natural Resources	Northern Trust Corp.
Hasbro Inc.	CVS Caremark Corp.	Range Resources Corp.	NYSE Euronext
Home Depot	Dean Foods	Southwestern Energy	People's United Bank
Interpublic Group	Dr Pepper Snapple Group	Spectra Energy Corp.	Plum Creek Timber Co.
Johnson Controls	Estee Lauder Cos.	Sunoco Inc.	PNC Financial Services
Kohl's Corp.	General Mills	Tesoro Petroleum Co.	Principal Financial Group
Leggett & Platt	Heinz (H.J.)	Valero Energy	Progressive Corp.
Lennar Corp.	Hormel Foods Corp.	Williams Cos.	Prudential Financial
Limited Brands Inc.	Kellogg Co.	AFLAC Inc	Public Storage
Lowe's Cos.	Kimberly-Clark	Allstate Corp	Regions Financial Corp.
Macy's Inc.	Kraft Foods Inc-A	American Express Co	Simon Property Group Inc
Marriott Int'l.	Kroger Co.	Ameriprise Financial	SLM Corporation
Mattel Inc.	Lorillard Inc.	Aon Corporation	State Street Corp.
McDonald's Corp.	McCormick & Co.	Apartment Investment & Mgmt	SunTrust Banks
McGraw-Hill	Molson Coors Brewing Company	Bank of America Corp	T. Rowe Price Group
Newell Rubbermaid Co.	Philip Morris International	BB&T Corporation	The Bank of New York Mellon Corp.
News Corporation	Procter & Gamble	Blackrock	Torchmark Corp.
NIKE Inc.	Reynolds American Inc.	Boston Properties	U.S. Bancorp
Nordstrom	Safeway Inc.	Capital One Financial	Unum Group
Omnicom Group	Sara Lee Corp.	CB Richard Ellis Group	Ventas Inc
O'Reilly Automotive	Smucker (J.M.)	Charles Schwab	Vornado Realty Trust
Penney (J.C.)	Supervalu Inc.	Citigroup Inc.	Wells Fargo
Polo Ralph Lauren Corp.	Sysco Corp.	CME Group Inc.	Zions Bancorp
Pulte Homes Inc.	The Hershey Company	Comerica Inc.	Abbott Laboratories

Aetna Inc
Allergan Inc
AmerisourceBergen Corp
Amgen Inc
Bard (C.R.) Inc.
Baxter International Inc.
Becton Dickinson
BIOGEN IDEC Inc.
Boston Scientific
Cardinal Health Inc.
Celgene Corp.
Cerner
CIGNA Corp.
Coventry Health Care Inc.
Covidien plc
DaVita Inc.
Dentsply International
Edwards Lifesciences
Express Scripts
Gilead Sciences
Hospira Inc.
Humana Inc.
Intuitive Surgical Inc.
Johnson & Johnson
Laboratory Corp. of America Holding
Life Technologies
McKesson Corp.
Medco Health Solutions Inc.
Medtronic Inc.
Merck & Co.
Mylan Inc.
Patterson Companies
PerkinElmer
Quest Diagnostics
St Jude Medical
Stryker Corp.
Tenet Healthcare Corp.
Thermo Fisher Scientific
United Health Group Inc.
Varian Medical Systems
Waters Corporation
Watson Pharmaceuticals
WellPoint Inc.
Zimmer Holdings
Amphenol Corp A
Avery Dennison Corp
Boeing Company
C. H. Robinson Worldwide
Caterpillar Inc.
Cintas Corporation
Corning Inc.
CSX Corp.

Danaher Corp.
Dun & Bradstreet
Eaton Corp.
Emerson Electric
Expeditors Int'l
FedEx Corporation
First Solar Inc
Flowserve Corporation
General Dynamics
Goodrich Corporation
Honeywell Int'l Inc.
Illinois Tool Works
Ingersoll-Rand PLC
Iron Mountain Incorporated
L-3 Communications Holdings
Lockheed Martin Corp.
Masco Corp.
Monster Worldwide
Norfolk Southern Corp.
Northrop Grumman Corp.
PACCAR Inc.
Pall Corp.
Pitney-Bowes
Precision Castparts
Priceline.com Inc
Quanta Services Inc.
Raytheon Co.
Republic Services Inc
Robert Half International
Rockwell Automation Inc.
Rockwell Collins
Roper Industries
Ryder System
Stericycle Inc
Textron Inc.
Tyco International
Union Pacific
United Parcel Service
Waste Management Inc.
Adobe Systems Inc
Advanced Micro Devices
Agilent Technologies Inc
Akamai Technologies Inc
Altera Corp
Apple Inc.
Autodesk Inc
BMC Software
Broadcom Corporation
CA, Inc.
Cisco Systems
Citrix Systems
Cognizant Technology Solutions

Computer Sciences Corp.
Dell Inc.
eBay Inc.
Electronic Arts
F5 Networks
Fidelity National Information Services
Fiserv Inc
FLIR Systems
Google Inc.
Hewlett-Packard
Intel Corp.
International Bus. Machines
Intuit Inc.
Jabil Circuit
Juniper Networks
KLA-Tencor Corp.
Lexmark Int'l Inc
Linear Technology Corp.
LSI Corporation
Mastercard Inc.
MEMC Electronic Materials
Molex Inc.
National Semiconductor
NetApp
NetFlix Inc.
Novellus Systems
Nvidia Corporation
Oracle Corp.
Paychex Inc.
QUALCOMM Inc.
Red Hat Inc.
SAIC
Salesforce.com
Symantec Corp.
Tellabs Inc.
Teradyne Inc.
Texas Instruments
Total System Services
Verisign Inc.
Visa Inc.
Western Digital
Western Union Co
Xilinx Inc
Yahoo Inc.
Air Products & Chemicals Inc
Airgas Inc
AK Steel Hldg Corp
Alcoa Inc
Allegheny Technologies Inc
Ball Corp
Bemis Company
Cliffs Natural Resources

Du Pont (E.I.)
Eastman Chemical
Ecolab Inc.
FMC Corporation
Freeport-McMoran Cp & Gld
International Flav/Frag
International Paper
MeadWestvaco Corporation
Monsanto Co.
Nucor Corp.
Owens-Illinois Inc
PPG Industries
Praxair Inc.
Sealed Air Corp.(New)
Sigma-Aldrich
Titanium Metals Corp
United States Steel Corp.
Vulcan Materials
Weyerhaeuser Corp.
American Tower Corp A
AT&T Inc
Frontier Communications
MetroPCS Communications Inc.
Verizon Communications
AES Corp
American Electric Power
CenterPoint Energy
CMS Energy
Consolidated Edison
Dominion Resources
DTE Energy Co.
Duke Energy
EQT Corporation
Integrys Energy Group Inc.
NICOR Inc.
NiSource Inc.
Northeast Utilities
NRG Energy
ONEOK
Pepco Holdings Inc.
PG&E Corp.
Pinnacle West Capital
Progress Energy Inc.
SCANA Corp
Sempra Energy
Southern Co.
TECO Energy
Wisconsin Energy Corporation
Xcel Energy Inc

Appendix 2: Summary literature research

Author, Published year	Object of study	Sample	Methodology	Relevant results
Beattie, McInnes, and Fearnley, 2004	Introduce a framework for the content analysis of accounting narratives and explore the concept the complex concept of quality, identify attributes of quality.	Non empirical	Literature review	The amount of disclosure relative to size and complexity and the spread of disclosure across main topics and sub-topics are two fundamental dimensions of quality.
Botosan, 1997	Examination of the association between disclosure level and the cost of equity capital by regressing firm-specific estimates of cost of equity capital on market beta, firm size and a self-constructed measure of disclosure level.	Annual reports of 1990 for 122 manufacturing firms	Content analysis, market model regression	There is a direct evidence of an association between cost of equity capital and disclosure level, and an indication of the magnitude of its effect.
Botosan and Plumlee, 2002	Examination of the association between the cost of capital and levels of annual report and timely disclosures, and investor relations activities.	668 firms in 43 different industries, period 1986-1996	Dividend discount model	The cost of capital decreases in the annual report disclosure level but increases in the level of timely disclosures.
Brown and Hillegeist, 2007	Examination of two potential mechanisms through which disclosure quality is expected to reduce information asymmetry: altering the trading incentives of informed and uninformed investors so that there is relatively less trading by privately informed investors, and reducing the likelihood that investors discover and trade on private information.	423 individual firms across 34 industries	EKO market microstructure model	The negative relation between disclosure quality and information asymmetry is primarily caused by reducing the likelihood that investors discover and trade on private information. While information asymmetry is negatively associated with the quality of the annual report and investor relations activities, it is positively associated with quarterly report disclosure quality.

Cheng, Collins and Huang, 2006	Research into whether shareholders rights and disclosures of financial-related attributes are associated with firms' cost of equity capital.	348 firms of the S&P 500	Expected earnings growth valuation models/PEG	Firms with stronger shareholder rights regimes and higher levels of financial transparency are associated with significantly lower costs of equity capital.
Diamond and Verrechia, 1991	Study of the causes and consequences of a security's liquidity, especially the effect of future liquidity on the security's current price-equivalently the effect on its required expected rate of return, its cost of capital.	A single-firm economy	Model of liquidity	Under conditions that we identify, reducing information asymmetry reduces the cost of capital. Under other (less typical) conditions, this reduced information asymmetry can have the opposite effect. We use public disclosure of information as the means of changing information asymmetry, but the points are more general.
Easley and O'hara, 2002	Investigating the role of information in affecting a firm's cost of capital. Particular focus on the specific roles played by public and private information.	Non empirical	Multi-asset rational expectations equilibrium model	Private information induces a new form of systematic risk, and in equilibrium investors require compensation for bearing this risk.
Gao, 2008	Interpretation of the mixed empirical findings on the relation between disclosure quality and cost of capital, inform the empirical efforts to measure the economic consequences of accounting disclosure, and add to the ongoing debate on the reform of financial reporting and disclosure regulation.	A single-firm economy	Disclosing-and-then-trading model, unconditional expected return	Cost of capital could increase with disclosure quality when new investment is sufficiently elastic. Cost of capital is not a sufficient statistic for the effects of disclosure quality on the welfare of either current or new investors.
Healy and Palepu, 2001	Providing a framework for analyzing managers' reporting and disclosure decisions in a capital markets setting.	Non empirical	Survey	A number of studies argue that there are three potential affects for firms that publish extensive (voluntary) disclosures: improved liquidity for their stock in the capital market, increased following by financial analysts and reductions in their cost of capital.

Hodge, Kennedy, and Maines, 2004	Investigate whether using an XBRL-enhanced search engine helps nonprofessional financial statement users acquire and integrate related financial information when making an investment decision.	96 second-year MBA students	2 x 2 between subjects design	Using search-facilitating technology increases the likelihood that users will acquire footnote information and helps users integrate (evaluate and combine) footnote information with information reported on the face of the financial statements.
Lambert, Leuz, and Verrecchia, 2007	Examination of whether and how accounting information about a firm manifests in its cost of capital, despite the forces of diversification.	Non empirical	Capital Asset Pricing Model (CAPM) as basis	The quality of accounting information can influence the cost of capital. The direct effect occurs because higher quality disclosures affect the firm's assessed covariances with other firms' cash flows, which is nondiversifiable. The indirect effect occurs because higher quality disclosures affect a firm's real decisions, which likely changes the firm's ratio of the expected future cash flows to the covariance of these cash flows with the sum of all the cash flows in the market.
Richardson and Welker, 2001	Test the relation between financial and social disclosure and the cost of equity capital for a sample of Canadian firms.	For each year from 1990 to 1992, the annual reports 700 Canadian companies from nine industry sectors	Dividend discount model	The quantity and quality of financial disclosure is negatively related to the cost of equity capital for firms with low analyst following. There is a significant positive relation between social disclosures and the cost of equity capital. This positive relationship is mitigated among firms with better financial performance.