Does accounting quality impact the cost of capital? An empirical study on the German capital market

Martin Knipp* and Jochen Zimmermann

Faculty of Business Studies and Economics,
University of Bremen,
Max-von-Laue Straße 1,
28359 Bremen, Germany
Email: martin.knipp@uni-bremen.de
Email: jzimmermann@uni-bremen.de
*Corresponding author

Abstract: In this paper we examine whether the accounting quality has an impact on the cost of capital of listed German firms from 1995 to 2014. The accounting quality is approximated by the amount of earnings management executed by the firms' management. Earnings management is operationalised by measures according to Leuz et al. (2003) and the cost of capital is estimated by the capital asset pricing model (CAPM). By using fixed-effects regressions and variance analyses on portfolios referring the research area of accounting quality and the cost of capital, we find that firms with high accounting quality and a low level of earnings management have averagely significant lower cost of capital than firms with low accounting quality and a high level of earnings management.

Keywords: accounting quality; disclosure quality; earnings management; cost of capital.

Reference to this paper should be made as follows: Knipp, M. and Zimmermann, J. (2021) 'Does accounting quality impact the cost of capital? An empirical study on the German capital market', *Int. J. Economics and Accounting*, Vol. 10, No. 1, pp.1–26.

Biographical notes: Martin Knipp works as a researcher at the Department of Business Administration, Accounting and Control at the University of Bremen (Germany). He studied at the University of Bremen and at the San Diego State University (USA). He graduated from the University of Bremen in 2016 with a Master's degree in Business Studies. His main areas of research are related to international accounting, empirical accounting research and the financing of small and medium-sized companies.

Jochen Zimmermann is a Professor of Business Administration, Accounting and Control at the University of Bremen. He received his Doctoral degree from the University of Mannheim (Germany). His first professorial appointment took him to the London Business School (University of London) from where he left to take up the Chair of Business Administration, Accounting and Control in Bremen. In 2008, he received an honorary doctorate from the Tbilisi State University for his commitment in reforming the economic studies. His research interests are international accounting, empirical accounting research, regulation of accounting as well as insurance.

1 Introduction

The relevance of the capital market is increasing due to financial globalisation. Firms as well as investors are now operating across borders. Evermore firms are using the capital market as a financing source and an increasing number of investors are obtaining a return by lending their money to companies. In recent history, lots of events and scandals have taken place that shocked the stock exchanges around the world. Investors have a lowered degree of confidence in companies and the stock market due to accounting scandals such as *Enron*, *Worldcom*, *Parmalat* but also *Flowtex* in 2000, *Comroad* and *Bankgesellschaft Berlin* in 2002, leading to the necessity of high quality accounting standards (Böcking et al., 2015; Scott, 2015). Hence firms have to communicate via high quality disclosure in order to gain and to ensure the investors' confidence and finally to attract capital. The relationship of managers and investors is accompanied by information asymmetries that can lead to misallocation of invested capital and to market failures. In this situation of unequally distributed knowledge between investors and managers, financial reporting serves as an important instrument of communication and high quality financial statements improve this communication (Scott, 2015; Healy and Palepu, 2001; Akerlof, 1970). It is the main task of international accounting to provide decision useful information to investors by presenting a true and fair view of the firms' assets, liabilities, financial position and profit and loss (IAS 1.15 from 11/30/2008). Thus, accounting functions as a corrective dissolving information asymmetries.

When earnings are managed instead of presented fairly, the question of decision usefulness and accounting quality arises (Barth et al., 2008; Kühnberger, 2014; Gros and Wallek, 2015). The quality of financial statements can be measured and defined according to the level of decision usefulness of the information passed on to investors (Ball and Shivakumar, 2005). Earnings management leads to a lower level of decision usefulness and thus to a lower quality of financial statements. Hence a smaller extent of earnings management produces a higher level of decision useful information and a high quality of accounting (Barth et al., 2008). High quality accounting reduces insecurities and leads to more confidence among investors, resulting in a lower risk premium required by investors and consequently, leading to lower cost of capital for firms (Levitt, 1998; Foster, 2003). In this publication, we therefore examine the level of accounting quality and its impact on attracting capital by analysing the cost of equity capital. Earnings management can be identified with measures according to Leuz et al. (2003) and the cost of capital can be estimated by using the capital asset pricing model. Methodologically, we use a fixed-effects regression and a variance analysis with sample splits following Barron and Qu (2014).

Until today, various studies have examined the impact of the disclosure quality on the cost of capital, such as Welker (1995), Botosan (1997), Francis et al. (2004), Gietzmann and Ireland (2005), Hail and Leuz (2009), Barth et al. (2013) and many more as outlined in Section 2. The majority of these studies present a negative association between accounting quality and cost of capital. Past literature has mostly used the Dechow and Dichev (2002) model, the Jones (1991) or modified Jones model as a proxy for the accounting quality. We use income smoothing to define the level of earnings management and accounting quality. Also most of the studies are done on the US market, thus, in our opinion, the German capital market is not examined sufficiently. The method of approximating and operationalising the variables and also the examination of the German capital market from 1995 to 2014 are an innovative approach to one of the most

important topics in accounting and we therefore valuably contribute to the ongoing accounting discourse concerning the disclosure level of listed companies and their therewith connected cost of capital.

This paper is organised in the following way. In Section 2, we provide a review of existing literature concerning accounting quality and the cost of capital as well as present our motivation and research question. Section 3 follows a description of our research design, the measurement of accounting quality and cost of capital and finally an explanation of the model specification. In Section 4, we present the sample, descriptive statistics and also demonstrate and explain our empirical results of the examination. Section 5 concludes the paper.

2 Literature review and motivation

The effect of accounting information on the cost of capital is considered as one of the most important and relevant topics in accounting research (Lambert et al., 2007). This issue is therefore not only relevant and significant from an econometric point of view but also from an economic point of view. Correspondingly, a lot of studies have already examined the impact of accounting quality on the cost of capital or adjacent parameters such as the level of accounting and disclosure information and the information asymmetry as well as liquidity. Hence we include important selected studies into the literature review that have tested effects of accounting quality on the cost of capital.[1] The majority of the empirical literature provides evidence of a negative relationship between accounting quality and the cost of capital. The impact of disclosure level on the market liquidity measured by bid-ask spreads has been examined by Welker (1995). By using regression models, Welker examines the US capital market from 1983 to 1990, resulting in 1,639 observations from 427 firms out of 28 different industries. The disclosure efforts of firms are measured by the analysts' rating published by the Association for Investment Management and Research Corporate Information Committee (CIC). The authors' findings indicate an inverse relation between disclosure level and bid-ask spreads, which represent information asymmetries. Bid-ask spreads and information asymmetries, respectively, reduce the cost of capital if being low.

Botosan (1997) concludes that firms with a high level of disclosure are associated with lower cost of capital on the US capital market. As a proxy for disclosure level, Botosan uses a self-provided index measuring the amount of information provided by 122 manufacturing companies in their annual reports in 1990. The cost of capital is calculated by a valuation formula by Edwards and Bell (1961), Ohlson (1995) and Feltham and Ohlson (1995). By building portfolios in terms of the amount of analysts following, the author observes that the empirical findings only apply to firms that attract a low analyst following. Consequently, the results are not proven for firms with high analyst following. Dechow and Dichev (2002) develop a new measure of accruals quality and examine 15,234 firm years out of 136 industries on the US capital market from 1987 to 1999. They argue that a lower accrual quality increases the estimation risk and finally leads to higher cost of capital. Francis et al. (2005a) use the Dechow and Dichev (2002) model enhanced with variables from the modified Jones model for measuring accruals quality on the US capital market from 1970 to 2001 for 91,280 firm-year observations.[2] By using regressions, the cost of capital are estimated by the one-factor and three-factor

asset pricing model. The results of Dechow and Dichev (2002) can be confirmed by the findings of Francis et al. (2005a) in terms of higher cost of capital due to an increased estimation risk for firms with lower accruals quality. Francis et al. (2004) show a negative relation between earnings quality measured by earnings attributes and the cost of capital on the US capital market from 1975 to 2001 for an average of 1,471 firms per year. The earnings attributes consist of market-based and accounting-based measures: accrual quality, persistence, predictability, smoothness, value relevance, timeliness and conservatism. It is shown that especially accruals quality, earnings persistence, smoothness and value relevance have a big impact on the cost of capital.

The effect of disclosure quality on the cost of capital has also been examined by Gietzmann and Ireland (2005). Their investigation of UK firms listed at the London Stock Exchange covers 301 firm-year observations from 1993 to 2002. They implement a new measure of disclosure by focusing on timely disclosure and accounting choices via discretionary accruals. By performing OLS regressions of cost of capital against their disclosure quality measure, Gietzmann and Ireland find a significant negative relationship between disclosure quality and cost of capital. Accordingly, firms with a high level of disclosure quality are associated with low cost of capital. Findings of Francis et al. (2008) also show a negative link between disclosure quality and the cost of capital. Firms with high earnings quality have a bigger amount of voluntary disclosure than firms with low earnings quality. The analysis results indicate that more voluntary disclosure leads to lower cost of capital. The researchers examine 677 firm-year observations in 2001 on the US capital market using self-constructed scores. The proven effect cannot be attested when altering the proxies in terms of disclosure level.

Hail and Leuz (2009) investigate the effect of cross-listing on the cost of capital from 1990 to 2005 by observing 40,497 firm-years for a large panel of companies from 45 countries. Due to cross-listing in the USA, firms are exposed to higher regulation, enforcement and disclosure requirements resulting in high quality financial reporting (Lang et al., 2003a, 2003b; Bailey et al., 2006). In addition, firms that are cross-listed know more about their investors and potentially have a bigger set of investors. Hail and Leuz's (2009) findings therefore indicate that cross-listed firms benefit from lower cost of capital. Such as other studies, the authors provide support for the hypothesis that high accounting quality lowers the cost of capital. These findings are consistent with an earlier study of Hail and Leuz (2006) who indicate that firms which are resided in countries with stronger securities regulation have significantly lower cost of capital. The impact of earnings management on the cost of capital has been examined by Kim and Sohn (2013). They investigate a broad sample consisting of US companies with 30,276 firm-year observations from 1987 to 2011. Kim and Sohn (2013) approximate earnings management by proxies equal to Roychowdhury (2006) who focuses on methods of manipulating real operational activities with the objective to increase the communicated earnings at short notice. They use an average measure of the implied cost of capital models by Claus and Thomas (2001), Gebhardt et al. (2001), Gode and Mohanram (2003) and Easton and Monahan (2005). By finding a positive relation between earnings management and cost of capital, their results indicate that firms with high earnings management activities have higher cost of capital due to the increasing risk premium demanded by investors.

Barth et al.'s (2013) study aims to determine the relationship between earnings transparency and the cost of capital. Therefore, the authors observe 51,612 firm-years of US firms from 1974 to 2000. The cost of capital is estimated by using the Fama-French

and momentum four-factor model. Earnings transparency is measured by utilising the explanatory power of the returns-earnings relation. The study's results indicate that entities, which are equipped with more earnings transparency have lower cost of capital since earnings transparency is significantly negatively associated with cost of capital. Core et al. (2015) investigate the effect of disclosure quality on the cost of capital and examine the role of inside ownership in this relation. Their analysis extends from 1990 to 2004 and observes 50,201 firm-years from 35 countries. The cost of capital are estimated by realised returns and by an average implied cost of capital estimate following Claus and Thomas (2001), Gebhardt et al. (2001), Ohlson and Juettner-Nauroth (2005) and Easton (2004). The disclosure quality is measured with a proxy for disclosure regulation following La Porta et al. (2006). The authors find that disclosure quality has a direct negative impact on the cost of capital being weakened by about 20% due to the indirect positive impact via ownership effects.

However, there is also prior research which is not able to provide evidence for an inverse link between the quality of financial reporting and the cost of capital. The study conducted by Cohen (2008) is one of the studies not supporting the hypothesis of firms enjoying lower costs of capital if they are equipped with high quality accounting. Cohen (2008) investigates the relationship between financial reporting quality and the cost of capital. The study consists of 18,264 firm-year observations from 1987 to 2003. For measuring disclosure quality, Cohen uses methods based on the model shown in Barth et al. (2001) and in Francis et al. (2005a) that are using an altered version of the method used by Dechow and Dichev (2002). Implied cost of capital are estimated with an averaged proxy determined by models provided by Claus and Thomas (2001), Gebhardt et al. (2001), Ohlson and Juettner-Nauroth (2005) as implemented in Gode and Mohanram (2003) and Easton (2004). The author provides evidence for a significant negative relation between accounting quality and idiosyncratic risk. The empirical results present no evidence that firms with high quality financial reporting have lower cost of capital. The study of Core et al. (2008) takes its place alongside of the findings of Cohen (2008). Core et al. (2008) voice criticism concerning the study undertaken by Francis et al. (2005a) because the authors are not able to find similar effects when replicating the model of Francis et al. (2005a). They execute their examination over a period from 1975 to 2001 with 21,979 firm-year observations. Core et al. (2008) find no empirical evidence that accounting quality has an effect on the cost of capital. Hence the results do not indicate support for the hypothesis that the quality of financial reporting is priced. At this point it has to be noted again that Botosan's (1997) results are only applicable for firms attracting a low analyst following and not for firms with high analyst following.

Overall, prior literature shows that the majority of studies find a negative relationship between accounting quality and the cost of capital. In contrast, there are also studies such as Cohen (2008) and Core et al. (2008) that do not support the findings of other studies. In addition, there are studies as Botosan (1997) and Francis et al. (2008) that provide evidence for lower cost of capital due to high quality accounting but show inconsistent and different results for distinct subsamples and proxies. The reason for these different results is founded in the fact that every study uses different proxies for measuring accounting quality and cost of capital. Additionally, every study uses different periods and focuses a different amount of firm-year observation and therefore has its unique study sample. Most of the studies are conducted on the US market and there are also some on different markets but nevertheless, in our opinion, the German capital market is

underrepresented in this research area. Even though research as well as theory suggests an inverse relation between accounting quality and the cost of capital, there are still ambiguity and no general empirical confirmation of this claim (Gietzmann and Ireland 2005). Following the results of prior research and the opinion of Lambert et al. (2007), who argue that there is a need for research in that particular field, we are eager to test the effect of accounting quality on the cost of capital on the German capital market.

Research question

- Does high quality accounting lower the cost of capital on the German capital market?

By testing our hypothesis, we also answer to the claim of Core (2001) that future research has to be conducted in examining accounting quality and cost of capital. Therefore, we use a different approach for approximating accounting quality and test it in a new setting of contextual variables. We extend the existing literature in the following ways. First, we use income smoothing as a measure of accounting quality, which is new in terms of the cost of capital context. Second, we provide empirical evidence for an inverse relationship of the accounting quality and the cost of capital by using residuals of our sample. We therefore provide a different approach to examine the relationship of accounting quality on the cost of capital. Third, we contribute to the small body of studies examining the impact of financial reporting quality on the cost of equity capital on the German capital market. Fourth, our study adds existing literature in providing current results of a long examination period for one of the most discussed and relevant topics in accounting.

3 Research design

3.1 Measuring accounting quality

The quality of financial reports is of interest to those, who base their decisions upon firms' financial reporting (Gros and Wallek, 2015). Since it is not possible to measure the quality of financial reporting directly, we use earnings management as a proxy for accounting quality (Barth et al., 2008; Gros and Wallek, 2015; Böcking et al., 2015). For operationalising earnings management, we use an income smoothing measure according to Leuz et al. (2003).[3] Consequently, the amount of earnings management executed by a firm serves as an indicator for accounting quality as well as in Burgstahler et al. (2006). Consistent with Healy and Wahlen (1999) and Schipper (1989), we define earnings management as an intentional adjustment of the firms' reported economic performance. We therefore consider earnings management as an opportunistic act, which is associated with negative consequences.[4] Earnings management serves as a useful indicator for the accounting quality because it is known that a high level of earnings management negatively affects the quality of financial reporting information provided for potential investors (Barth et al., 2008; Gros and Wallek, 2015).

According to Leuz et al. (2003), managers and owners have incentives to amend the financial reports in order that the true economic performance of the firm is not shown correctly and thereby private information are not observable by outsiders. These actions occur due to the collision of interests and information asymmetries between insiders and outsiders as discussed in the agency theory literature by Jensen and Meckling (1976) and Akerlof (1970). Leuz et al. (2003) also view earnings management as something negative

and develop different proxies for measuring earnings management. To determine the level of earnings management we base our measure on the income smoothing model of Leuz et al. (2003). Formula (1) shows the measurement model of income smoothing as reported by Leuz et al. (2003).

$$Income\ smoothing = \frac{\sigma(OpInc)}{\sigma(CFO)} \tag{1}$$

where

$OpInc_{it}$ operating income for firm *i* in year *t*

CFO_{it} operating cash flow for firm *i* in year *t*.

Leuz et al. (2003) use EM1 at country level, while we calculate the measure at firm level. In addition, both variables operating income and operating cash flow are scaled by lagged total assets. The formula captures the degree to which extent insiders smooth earnings and reduce the variability of the reported earnings by altering accruals, respectively. The measurement detects income smoothing of reported operative income through accruals based on the ratio of the standard deviation of operative income and operative cash flows. Low values of this measurement indicate that earnings have been managed. Cash flows are determined indirectly by subtracting the accruals component of earnings. Leuz et al. (2003) identify the accruals component of earnings according to Dechow et al. (1995) as follows:

$$Accruals_{it} = (\Delta CA_{it} - \Delta Cash_{it}) - (\Delta CL_{it} - \Delta STD_{it} - \Delta TP_{it}) - Dep_{it} \tag{2}$$

where

ΔCA_{it} change in total current assets for firm *i* in year *t*

$\Delta Cash_{it}$ change in cash/cash equivalents for firm *i* in year *t*

ΔCL_{it} change in total current liabilities for firm *i* in year *t*

ΔSTD_{it} change in short-term debt included in current liabilities for firm *i* in year *t*

ΔTP_{it} change in income taxes payable for firm *i* in year *t*

Dep_{it} depreciation and amortisation expense for firm *i* in year *t.*

By using the measure for income smoothing, we are able to identify the amount of earnings management executed by the firms' management and therefore, we are capable to assess the related accounting quality.

3.2 Estimating cost of capital

The cost of capital is of particular interest to firms, investors and society. Due to that fact, a lot of previous studies have already examined the cost of capital.[5] The importance of the cost of capital are not only shown by the vast number of empirical research but also by the highlighting statements from Levitt (1998) and Foster (2003) referring to high quality accounting and the associated reduced cost of capital. Additionally, the European Union aims to strengthen the capital markets and reduce the cost of capital by an increase of comparability and transparency of financial reporting through implementing the

International Financial Reporting Standards (IFRS) [Regulation (EC) No. 1606/2002].[6] The cost of capital can be defined as the return requirement of investors for transferring capital to the firms (Botosan, 2006). Therefore, the cost of capital can also be seen as firms' financing costs.

Economically, the cost of capital is an opportunity cost due to the fact that an investor is not willing to make a specific investment if there is a more profit-yielding alternative available while the risk level remains (Pratt and Grabowski, 2010; Daske et al., 2006).

We employ the Capital Asset Pricing Model for estimating the cost of capital as it is a widely used model in research and practice.[7] The CAPM is based on the portfolio theory of Markowitz (1952). In the 1960s, the CAPM has been independently developed by Sharpe (1964), Lintner (1965), Treynor (1962) and Mossin (1966).[8] Even though this model based upon assumptions that might not all be met in the real world, the CAPM refers to the systematic risk in order to explain the cost of capital (Pratt and Grabowski, 2010).[9] According to the CAPM, the expected return rate is positively and linearly associated with the market risk, which is also known as the systematic risk (Daske et al., 2006).

Formula (3) presents the model and its particular components to estimate stock returns and cost of capital.

$$CAPM_{it} = r_{ft} + \beta_i * MRP = r_{ft} + \beta_i * \left[E(r_{mt}) - r_{ft} \right] \tag{3}$$

where

$CAPM_{it}$ cost of capital

r_{ft} risk free rate

β_i beta coefficient

$E(r_{mt})$ expected return of the market portfolio

MRP market risk premium.

According to Botosan (2006), the cost of capital $CAPM_{it}$ of a firm i in the year t are estimated by risk free rate r_{ft} plus a risk premium and based on Sharpe (1964) and Lintner (1965). This risk premium consists of the product of the systematic risk β_i for firm i and the market risk premium MRP. MRP is defined as the difference of the expected return $E(r_{mt})$ and the risk free rate r_{ft}. Compliant with the formula of the CAPM, cost of capital are determined by the components beta coefficient, risk free rate and market premium.

The risk free rate is a rate of an investment not being exposed to a default risk (Pratt and Grabowski, 2010). Since there is no investment without a default risk, the risk free rate can only be approximated. Usually government securities serve as a proxy for the risk free rate. In accordance with Artmann et al. (2012), we use the one-month money market rate provided by Deutsche Bundesbank (BBK01.SU0104). As our examination period reaches from 1995 to 2014 and the one-month money market rate is only available up to May 2012, we afterwards use the European Interbank Offered Rate (EURIBOR) (BBK01.SU0310) as a reference value. The EURIBOR is suitable because it shows a correlation to the one-month money market rate provided by Deutsche Bundesbank of 99.7% for the period of January 1999 to May 2012. The market risk premium is the part of the return exceeding the risk free rate in order to compensate investors for their assumed risk by investing in the asset (Pratt and Grabowski, 2010). Following Artmann

et al. (2012), we use the Composite DAX (CDAX) General Performance Index (CDAXGEN) as a proxy for the market risk premium (Artmann et al., 2012) and generate the ten year mean of the return of the CDAX as in Zimmermann and Meser (2013) reduced by the risk free rate as the market risk premium. The systematic risk or market risk is represented by the beta coefficient for which we employ the DS Historical Beta Local Index (897E) obtained via Datastream.

3.3 Methodological approach and model specification

To answer our research question we apply the following methodological approach. The accounting quality is approximated with the amount of earnings management performed by firms' management. Earnings management is operationalised by a measure compliant with Leuz et al. (2003) that identifies the amount of income smoothing. The cost of capital is estimated by using the Capital Asset Pricing Model. The cost of capital (COC_{it}) is the dependent variable in our examination model and is calculated by a combination of the risk free rate and a risk premium. Thereby the risk premium is the product of the systematic risk and the market risk premium.

First, we determine the firms' amount of earnings management by the income smoothing measure. Second, we use the measure of income smoothing for building two portfolios following Barron and Qu (2014). Firms with a high amount of income smoothing and an associated low accounting quality are sorted into the portfolio AQ_{low} and firms with a low amount of income smoothing and a high accounting quality can be found in AQ_{high}. The sample splits are executed according to the median of the income smoothing measure. Consequently, the effect of high accounting quality and also the effect of low accounting quality on the cost of capital are examined. Third, we estimate the cost of capital through the CAPM. Fourth, we run fixed effects regressions as presented in formula 4. We thereby control for the effects of the independent variables so that accounting quality remains as the only possible explanation in our regression model, represented by the residuals as indicated by epsilon. Therefore, the residuals are relevant values adjusted by the control variables and hence, describe the effects which are not captured by the independent variables. Due to the fact that the residuals are firm-specific, they can be matched to each company and also categorised into the according portfolio. Fifth, we calculate a t-test of the two groups of residuals to check whether the groups' means are significantly different from each other.

$$\begin{aligned} COC_{it} = {} & \beta_0 + \beta_1 BETA_{it} + \beta_2 SIZE_{it} + \beta_3 VOLATILITY_{it} + \beta_4 LEVERAGE_{it} \\ & + \beta_5 ASSETGROWTH_{it} + \beta_6 GDP_t + \beta_7 ROA_{it} + \beta_8 MTB_{it} \\ & + \beta_9 TURNOVER_{it} + \varepsilon_{it} \end{aligned} \tag{4}$$

COC_{it}	is the cost of capital for firm *i* in year *t* estimated by using the CAPM
$BETA_{it}$	is the systematic risk, downloaded as the DS HISTORICAL BETA LOCAL INDEX, for firm *i* in year *t*
$SIZE_{it}$	is total assets for firm *i* in year *t*
$VOLATILITY_{it}$	is the unsystematic risk, calculated as the yearly standard deviation of daily stock returns, for firm *i* in year *t*

$LEVERAGE_{it}$	is the percent value of total debt divided by total assets for firm i in year t
$ASSETGROWTH_{it}$	is the asset growth rate for firm i in year t
GDP_t	is the constant annual gross domestic product (GDP) of year t
ROA_{it}	is return on assets, calculated as net income divided by lagged total assets for firm i in year t
MTB_{it}	is the market-to-book ratio, calculated as the average market capitalisation for firm i in year t, divided by the book value of common equity
$TURNOVER_{it}$	is share turnover, calculated as the value of all shares traded divided by the market capitalisation for firm i in year t.

In the following, we clarify why we use the control variables that have already proven to be effective in prior research concerning cost of capital studies and what directions of effects we are expecting.

The beta factor ($BETA_{it}$) represents the systematic risk for firm i in year t and is included in the examination model as first control variable referring to Botosan (1997), Kim and Sohn (2013) and Cohen (2008). We use the DS Historical Beta Local Index obtained via Datastream as estimation for the beta factor.[10] We expect a positive relation between the systematic risk and the cost of capital as in Kim and Sohn (2013), Cohen (2008), Francis et al. (2004, 2008) and Ashbaugh-Skaife et al. (2009). A higher risk should be associated with a higher risk premium demanded by investors.

The firms' size ($SIZE_{it}$) is established as our second control variable. Fama and French (1992) determine a negative relation between a firms' size and the cost of capital. Botosan (1997), Francis et al. (2004, 2008), Cohen (2008) and Ashbaugh-Skaife et al. (2009) confirm this negative correlation of those two variables. We therefore expect as well a negative relation of $SIZE_{it}$ and cost of capital on our analysis. The fims' size is calculated by total assets for firm i in year t.

Besides the systematic risk, various studies provide evidence for a connection between the unsystematic risk ($VOLATILITY_{it}$) and the cost of capital. The volatility of stock returns as a measure of the unsystematic risk is therefore included as the third control variable in our model such as in studies of Kim and Sohn (2013), Hail and Leuz (2006) and Ben-Nasr et al. (2012). On the one hand the studies have shown a positive relation between volatility and cost of capital. On the other hand a high volatility could be associated with an increase in share turnover implying lower information asymmetries, thus, a negative relation could also be considered (Meser et al., 2015). Hence, in this study, a positive as well as a negative sign of the coefficient is expected. Based on Meser et al. (2015), the volatility is calculated as yearly standard deviation of daily stock returns for firm i in year t. In this study we therefore use the price volatility obtained through Datastream.[11]

Additionally, we include the potential effect of a firms' capital structure ($LEVERAGE_{it}$) into our regression model as the fourth control variable. According to Modigliani and Miller (1958), the cost of capital represents an increasing function of their leverage (Modigliani and Miller, 1958). With an increasing leverage, the default risk of the entity rises (Francis et al., 2005b) and results in higher risk premiums demanded by investors. Studies executed by Fama and French (1992), Cohen (2008), Francis et al.

(2008) and Kim and Sohn (2013) approve these findings. As a consequence, we expect a positive relation of leverage and the cost of capital. Leverage is calculated as the percent value of total debt divided by total assets for firm *i* in year *t*. On account of this leverage is obtained via Datastream in our study.[12]

We also include asset growth ($ASSETGROWTH_{it}$) as fifth independent variable in our examination model. Fu et al. (2012) and Gode and Mohanram (2003) find a positive association of asset growth and cost of capital. The positive relation is explained with the high risk by which fast growing firms are associated (Gode and Mohanram, 2003). Hence a positive relation is also anticipated in this study. Analogous to Meser et al. (2015), the asset growth is determined as growth rate of the assets of firm *i* in year *t*.

As the sixth control variable, we include the constant annual gross domestic product of year *t* (GDP_t) to ensure that the results are not driven or biased by macroeconomic effects. Ben-Nasr et al. (2012) find a negative impact of the gross domestic product on the cost of capital. We also expect a negative relation between the two variables. We use the gross domestic product on our examination and obtain the constant annual gross domestic product as published from the Deutsche Bundesbank via Datastream.

Furthermore, return on assets (ROA_{it}) is considered as control variable seven of our regression model. Francis et al. (2005a, 2008) and Artmann et al. (2012) already employ return on assets as a control variable in their studies. We anticipate a negative or a positive sign of the coefficient. Return on assets is calculated following Meser et al. (2015) as net income divided by lagged total assets for firm *i* in year *t*.

Control variable eight of our analysis is the market-to-book ratio (MTB_{it}). Ben-Nasr et al. (2012) find a negative relation between the market-to-book ratio and the cost of capital. These findings are consistent with Fama and French (1992) and Gebhardt et al. (2001). We therefore expect a negative effect on the cost of capital as well. The market-to-book ratio is determined as the average market capitalisation for firm *i* in year *t*, divided by the book value of common equity.

Table 1 Expected impact of the control variables

Control variables	*Expected impact*
Internal control variables	
$BETA_{it}$	+
$SIZE_{it}$	–
$VOLATILITY_{it}$	+/–
$LEVERAGE_{it}$	+
$ASSETGROWTH_{it}$	+
ROA_{it}	+/–
MTB_{it}	–
$TURNOVER_{it}$	–
External control variables	
GDP_t	–

Note: This table presents the expected impact of the independent variables used in the final sample.

The firms' share turnover ($TURNOVER_{it}$) is included in our regression model as the ninth independent variable. Hail and Leuz (2006) note that share turnover has an impact on

firms' cost of capital and Fu et al. (2012) show a negative relation. Thus in our study we expect a negative relation of share turnover and the cost of capital. Following Fu et al. (2012), we calculate share turnover as the value of all shares traded divided by the market capitalisation for firm *i* in year *t*.

Table 1 summarises the expected impact of the independent variables. The internal control variables are firm-specific measures which are calculated by relevant numbers of the entity. The external control variable is not firm-specific and ensures that the results are not driven by macroeconomic influences.

4 Data and empirical results

4.1 Data, sample and descriptive statistics

As already mentioned, the majority of evidence from empirical studies concerning financial reporting quality and cost of capital are based upon US data. The advantages of data deriving from the US capital market are composed of the good availability of data as well as the large number of listed companies. Nevertheless, this advantage is accompanied by a disadvantage. Due to the fact that a lot of studies are based on the same data, the findings of all studies may be driven in the same way by certain regularities in the data structure, resulting in outcomes not being unique and innovative (Artmann, 2011). Studies of other countries and capital markets than the USA are not affected by this problem of data mining but often data availability is causing difficulties (Lo and MacKinlay, 1990; Artmann, 2011). The analysis in terms of the impact of accounting quality on the cost of capital executed in this study refers to the German capital market and is therefore not affected by data mining. All listed companies of the Frankfurt Stock Exchange from the data basis for our study, resulting in 2,310 unique and listed firms obtained from Thompson Reuters Datastream. The data consists of annual accounting data and monthly price data. Following Cohen (2008), the sample is adjusted by excluding firms of the financial sector.[13] Additionally we restrict the study to companies not having any missing data for the variables needed for our empirical analysis. After adjusting the data, it remains 2,566 firm-year observations in the final sample. Due to data availability we use the 1995–2014 period for our study. Table 2 shows the firm-year observations of our study sample distributed over the study period. It can be seen that the sample consists of very few observations in the first years and continuously consists of over 100 firm-year observations beginning from 1999.

Table 3 presents descriptive statistics of our examination for the dependent variable in panel A and for the independent variable in panel B, respectively. We find average cost of capital (COC_{it}) in the amount of 6.23%, which is estimated by the capital asset pricing model. Additionally, we find a standard deviation of 4.06% median, 25% quantile and 75% quantile values of 5.31%, 3.44% and 8.21%. The systematic risk ($BETA_{it}$) has a mean of 0.6182, a standard deviation of 0.5264 and a median of 0.5200. The firms' size ($SIZE_{it}$) is on average €6,196,734 with a standard deviation of €24,100,000 and a median of €230,048. The average value for the volatility ($VOLATILITY_{it}$) is 30.08%, the standard deviation yields 12.46% and the median reaches a value of 27.82%. The leverage ($LEVERAGE_{it}$) yields an average proportion of 22.38%, has a standard deviation of 109.05% and we find a median value of 16.91%. The average asset growth rate ($ASSETGROWTH_{it}$) reaches a value of 4.5936 and the standard deviation reaches a value

of 121.5593. When having a look at the 25% quantile with a value of –0.1904 and a 75% quantile with a value of 0.9020 it can be concluded that there are some firms with a negative asset growth and few firms with an extremely high asset growth rate. This conclusion can be seen as reasonable as the median is 0.1026. Furthermore, we find an average gross domestic product (GDP_t) of €2,518 billion, the standard deviation yields a value of €132.0761 billion and the median is €2,513 billion. The return on assets (ROA_{it}) averagely is –17.31% and the standard deviation yields a value of 13.2607. The median is 3.51%, the 25% quantile is 0.24% and the 75% quantile is 9.39% indicating that some outliers are the reason for the negative sign of the average value. The market to book ratio (MTB_{it}) is on average 9.2461, the standard deviation yields a value of 166.6694 and the median reaches a value of 3.9445. Finally, we find an average value for the companies' share turnover ($TURNOVER_{it}$) of 0.0156, a standard deviation of 0.3035 and the median is 0.0022.

Table 2 Firm-years over the sample period

Year	*Number of companies*
1995	7
1996	7
1997	2
1998	2
1999	106
2000	135
2001	125
2002	132
2003	147
2004	186
2005	195
2006	189
2007	175
2008	185
2009	161
2010	171
2011	175
2012	159
2013	166
2014	141
Total	2,566

Note: This table presents the firm-years of the final sample distributed over the examination period.

Table 3 Descriptive statistics

Panel A: Dependent variables	*N*	*Mean*	*Std. Dev.*	*Median*	*P25*	*P75*
COC_{it}	2,566	0.0623	0.0406	0.0531	0.0344	0.0821
Panel B: Independent variables	*N*	*Mean*	*Std. Dev.*	*Median*	*P25*	*P75*
$BETA_{it}$	2,566	0.6182	0.5264	0.5200	0.2300	0.9250
$SIZE_{it}$	2,566	6,196,734	24,100,000	230,048	63,000	1,328,500
$VOLATILITY_{it}$	2,566	30.0832	12.4596	27.8150	21.3100	37.3800
$LEVERAGE_{it}$	2,566	22.3845	109.0503	16.9050	3.5300	30.7400
$ASSETGROWTH_{it}$	2,566	4.5936	121.5593	0.1026	–0.1904	0.9029
GDP_t *(in billions €)*	2,566	2,518	132.0761	2,513	2,396	2,623
ROA_{it}	2,566	–0.1731	13.2607	0.0351	0.0024	0.0939
MTB_{it}	2,566	9.2461	166.6694	3.9445	2.2241	7.3390
$TURNOVER_{it}$	2,566	0.0156	0.3035	0.0022	0.0005	0.0074

Notes: This table provides descriptive statistics for the dependent variable (Panel A) and for the independent variables of the final sample (Panel B). COC_{it} is the cost of capital for firm *i* in year *t* estimated by using the CAPM; $BETA_{it}$ is the systematic risk, downloaded as the DS HISTORICAL BETA LOCAL INDEX, for firm *i* in year *t*; $SIZE_{it}$ is total assets for firm *i* in year *t*; $VOLATILITY_{it}$ is the percent value of the unsystematic risk, calculated as the yearly standard deviation of daily stock returns, for firm *i* in year *t*; $LEVERAGE_{it}$ is the percent value of total debt divided by total assets for firm *i* in year *t*; $ASSETGROWTH_{it}$ is the asset growth rate for firm *i* in year *t*; GDP_t is the gross domestic product (GDP) change rate in real terms as of calendar year *t*; ROA_{it} is return on assets, calculated as net income divided by lagged total assets for firm *i* in year *t*; MTB_{it} is the market-to-book ratio, calculated as the average market capitalisation for firm *i* in year *t*, divided by the book value of common equity; $TURNOVER_{it}$ is share turnover, calculated as the value of all shares traded divided by the market capitalisation for firm *i* in year *t*.

Table 4 reports the Pearson correlation coefficients of the variables we have used in our examination model for measuring the impact of accounting quality on the cost of capital. Many correlations are statistically significant with an error probability of 1%. Less frequently observable are correlations with an error probability of 5% and 10%.

4.2 Empirical results

For answering the research question whether accounting quality has an impact on the cost of capital, we run a fixed-effects panel regression on the German capital market from 1995 to 2014 using sample splits concerning the quality of the companies. We approximate accounting quality via the level of earnings management measured by the amount of income smoothing and the cost of capital is estimated by the CAPM. Table 5 shows the regression results. The outcomes of the regression for the dependent variable COC_{it} indicate that 33.36% of the changes are accounted for by our examination model. The control variables show the expected signs with the exception of leverage ($LEVERAGE_{it}$),[14] because the coefficient on leverage is not positive as expected, but negative. Further, we expected a positive or a negative coefficient on return on assets

(ROA_{it}) and on volatility ($VOLATILITY_{it}$). The findings display a positive coefficient on return on assets and a negative one on volatility. The coefficients on the systematic risk ($BETA_{it}$), volatility (($VOLATILITY_{it}$) and gross domestic product (GDP_t) are significant at the 1% level. F-Statistics present a value of 113.910 and is also significant at the 1% level. Therefore, our regression model shows a highly significant explanation for the cost of capital.

Next we address the t-test of the residuals as shown in Table 6. We exercise a one-sided t-test to test whether the mean of the two portfolios residuals are significantly different from each other. The firms being tested are separated by the median of the income smoothing variable, so that respectively 1,283 companies are sorted in each portfolio. Firms with a high level of income smoothing are considered to have low accounting quality and therefore can be found in portfolio AQ_{low}. Entities with a low level of income smoothing are considered to have high accounting quality and are consequently sorted into portfolio AQ_{high}. Firms with high accounting quality have an average value of 0.0029 and a standard deviation of 0.0255. In contrast, firms with low accounting quality have an average value of –0.0029 and a standard deviation of 0.029. The findings indicate that firms with high accounting quality and less earnings management are on average associated with lower cost of capital than firms with low accounting quality and a higher level of earnings management. The results are significant at the 1% level.

Figure 1 shows the impact of different accounting quality on the cost of capital by presenting a graphical description of the cost of capital in the form of a box plot. Companies with high income smoothing have a value of EM1 below 0.8694 and are therefore sorted into portfolio AQ_{low}. Companies with low income smoothing have a value of EM1 above 0.8694, hence they can be found in portfolio AQ_{high}. We observe that the median cost of capital is lower for firms of portfolio AQ_{high} in comparison to firms of portfolio AQ_{low}.

Table 7 illustrates the impact of different levels of accounting quality on the cost of capital by showing the descriptive statistics concerning the cost of capital. It can exactly be seen that the average cost of capital of firms with high accounting quality (*COC_high*) are associated with lower cost of capital than the average cost of capital of firms with low accounting quality (*COC_low*). The mean cost of capital of low accounting quality firms amount to 6.66% with a standard deviation of 4.14% and a median of 5.74%. The mean cost of capital of high accounting quality entities are 5.79% with a standard deviation of 3.93% and the median cost of capital amounting to 4.83%. Consequently, firms that do not manage earnings in terms of income smoothing, which are therefore related to high accounting quality are associated with on average 0.87% lower cost of capital than firms that do manage earnings.

Results of our regression and t-test indicate that firms with high financial reporting quality and low earnings management on average benefit significantly lower cost of capital than firms with a high level of earnings management and low financial reporting quality. At this point, we therefore are able to confirm our research question. Our findings are consistent with previous studies such as Welker (1995), Botosan (1997), Francis et al. (2004, 2008), Hail and Leuz (2009) and Barth et al. (2013).

Table 4 Pearson correlations

Pearson correlations	COC_{it}	$BETA_{it}$	$SIZE_{it}$	$VOLATILITY_{it}$	$LEVERAGE_{it}$	$ASSETGROWTH_{it}$	GDP_t	ROA_{it}	MTB_{it}	$Turnover_{it}$
COC_{it}	1.0000									
$BETA_{it}$	0.7531***	1.0000								
$SIZE_{it}$	0.0824***	0.0915***	1.0000							
$VOLATILITY_{it}$	0.3861***	0.5879***	–0.0975***	1.0000						
$LEVERAGE_{it}$	–0.0156	0.0058	0.0157	0.0560***	1.0000					
$ASSETGROWTH_{it}$	0.0609***	0.0621***	0.0036	0.0343*	–0.0015	1.0000				
GDP_t	–0.0826***	0.1063***	0.0671***	0.0594***	0.0202	0.0342*	1.0000			
ROA_{it}	–0.0606***	–0.0670***	0.0080	–0.0045**	0.0011	–0.9422***	–0.0188	1.0000		
MTB_{it}	0.0116	0.0191	–0.0082	0.0041	0.0018	–0.0015	0.0290	0.0004	1.0000	
$TURNOVER_{it}$	0.0073	–0.0114	–0.0103	0.0144	0.0148	–0.0006	–0.0546***	0.0005	–0.0025	1.0000

Notes: This table reports Pearson correlations for all variables used in the final sample. COC_{it} is the cost of capital for firm *i* in year *t* estimated by using the CAPM; $BETA_{it}$ is the systematic risk, downloaded as the DS HISTORICAL BETA LOCAL INDEX, for firm *i* in year *t*; $SIZE_{it}$ is total assets for firm *i* in year *t*; $VOLATILITY_{it}$ is the percent value of the unsystematic risk, calculated as the yearly standard deviation of daily stock returns, for firm *i* in year *t*; $LEVERAGE_{it}$ is the percent value of total debt divided by total assets for firm *i* in year *t*; $ASSETGROWTH_{it}$ is the asset growth rate for firm *i* in year *t*; GDP_t is the gross domestic product (GDP) change rate in real terms as of calendar year *t*; ROA_{it} is return on assets, calculated as net income divided by lagged total assets for firm i in year *t*; MTB_{it} is the market-to-book ratio, calculated as the average market capitalisation for firm *i* in year *t*, divided by the book value of common equity; $TURNOVER_{it}$ is share turnover, calculated as the value of all shares traded divided by the market capitalisation for firm *i* in year *t*; the significances of *t*-tests at the 1%, 5% and 10% levels are indicated by *, ** and ***, respectively.

Table 5 Impact of the accounting quality on the cost of capital

	COC_{it}
$BETA_{it}$	0.0638***
	(30.220)
$SIZE_{it}$	0.0000
	(–0.130)
$VOLATILITY_{it}$	–0.0011***
	(–8.690)
$LEVERAGE_{it}$	0.0000
	(–1.210)
$ASSETGROWTH_{it}$	0.0000
	(1.050)
GDP_t	0.0000***
	(–10.270)
ROA_{it}	0.0001
	(0.820)
MTB_{it}	0.0000
	(–0.150)
$TURNOVER_{it}$	–0.0010
	(–0.510)
N	2.566
Within R^2	0.3336
F-statistics	113.910***

Notes: This table presents results from the regression examining the effect of accounting quality on the cost of capital. COC_{it} is the cost of capital for firm *i* in year *t* estimated by using the CAPM; $BETA_{it}$ is the systematic risk, downloaded as the DS HISTORICAL BETA LOCAL INDEX, for firm *i* in year *t*; $SIZE_{it}$ is total assets for firm *i* in year *t*; $VOLATILITY_{it}$ is the percent value of the unsystematic risk, calculated as the yearly standard deviation of daily stock returns, for firm *i* in year *t*; $LEVERAGE_{it}$ is the percent value of total debt divided by total assets for firm *i* in year *t*; $ASSETGROWTH_{it}$ is the asset growth rate for firm *i* in year *t*; GDP_t is the gross domestic product (GDP) change rate in real terms as of calendar year *t*; ROA_{it} is return on assets, calculated as net income divided by lagged total assets for firm *i* in year *t*; MTB_{it} is the market-to-book ratio, calculated as the average market capitalisation for firm *i* in year *t*, divided by the book value of common equity; $TURNOVER_{it}$ is share turnover, calculated as the value of all shares traded divided by the market capitalisation for firm *i* in year *t*; the significances of *t*-tests at the 1%, 5% and 10% levels are indicated by *, ** and ***, respectively.

Table 6 *t*-test of the residuals

	Observations	*Mean*	*Std. error*	*Std. deviation*
AQ_{low}	1,283	0.0029	0.0007	0.0255
AQ_{high}	1,283	–0.0029	0.0008	0.0290
t-value	5.3701***			

Notes: This table shows the results of the t-test of the residuals; AQ_{low} are companies with an EM1 value below 0.8694; AQ_{high} are companies with an EM1 value above 0.8694; the significances of *t*-tests at the 1%, 5% and 10% levels are indicated by *, ** and ***, respectively.

Figure 1 Impact of different levels of accounting quality on the cost of capital

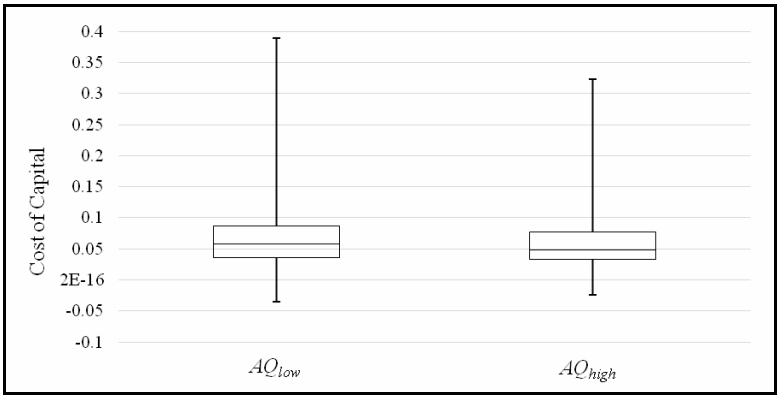

Table 7 Impact of different levels of accounting quality on the cost of capital

Costs of capital	*N*	*Mean*	*Std. Dev.*	*Median*	*P25*	*P75*
COC_low	1,283	0.0666	0.0414	0.0574	0.0364	0.0875
COC_high	1,283	0.0579	0.0393	0.0483	0.0329	0.0767

Note: This table provides descriptive statistics for the cost of capital.

4.3 Robustness check

We perform a robustness check to test whether the effect of accounting quality on the cost of capital still applies if parameters of the examination are altered. We implement this robustness check to provide further evidence to our results. Thus, to confirm the validity of the examination model, we run regressions and t-tests within different industry groups.

Following Barth et al. (1998) and Easton and Pae (2004), we create industry cluster to sort the companies into different groups by means of their primary SIC codes. Due to the small sample size, we do not apply such detailed classifications as used by Barth et al.

(1998) and Easton and Pae (2004). Therefore, we are oriented towards the broader industry classification of the SIC division structure.[15] Table 8 gives an overview on the composition of the industry cluster and their allocation in the study sample.

Table 8 Composition of the industry cluster

Industry cluster	*Primary SIC codes*	*Firm years*	*Percentage of observations*
Agriculture	1–999	15	0.5846
Mining	1000–1499	37	1.4419
Construction	1500–1799	73	2.8449
Manufacturing	2000–3999	1,548	60.3274
Utilities	4000–4999	239	9.3141
Trade	5000–5999	174	6.7810
Services	7000–8900	480	18.7062
Public	9100–9999	0	0.0000
Total		2,566	100.0000

For testing the impact of accounting quality on the cost of capital within the industry groups, we run regressions and t-tests separately. Table 9 reports the results of the fixed-effects regression for each industry group.[16] The majority of the results are consistent with the findings of the full sample because most of the coefficients have the same sign. Significant results can be found in the industries construction, manufacturing, utilities, trade and services. The insignificant results of the other industry clusters can be explained by the small sample size in the regarding industry. The regressions mostly perform equally reasonable and fine in explaining the variance of the dependent variable, except the industry groups agriculture and mining, which suffer from small sample sizes, no significant coefficients and very high coefficients of determination.

Further, we review the t-tests for answering our research question. Table 10 reports the outcomes of the t-tests for each industry cluster. It can be seen that the coefficients of AQ_{high} are negative and therefore lower than the positive coefficients of AQ_{low} in all industry groups, indicating that firms sorted in the portfolio associated with high quality accounting benefit from lower cost of capital. The outcomes of the industries agriculture, construction and utilities are insignificant. The results of the industries mining and trade are significant at the 5% level and the outcomes of the industries manufacturing and services are significant at the 1% level. 2,239 significant firm-year observations representing 87.26% of the sample face 327 insignificant firm-year observations representing 12.74% of the sample. Therefore, we conclude that we hereby provide further empirical evidence of the impact of accounting quality on the cost of capital within industry groups. Hence the negative relation of accounting quality and the cost of capital has been confirmed through this robustness check.

Table 9 Impact of the accounting quality on the cost of capital within industry cluster

Industry cluster	*Agrar*	*Mining*	*Construction*	*Manufacturing*	*Utilities*	*Trade*	*Services*
	COC_{it}	COC_{it}	COC_{it}	COC_{it}	COC_{it}	COC_{it}	COC_{it}
$BETA_{it}$	0.1044	0.0454	0.0371**	0.0640***	0.0682***	0.0586***	0.0628***
	(1.160)	(1.650)	(1.950)	(23.020)	(8.360)	(6.270)	(14.310)
$SIZE_{it}$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000*
	(0.240)	(0.730)	(0.240)	(0.790)	(–1.000)	(0.100)	(–1.760)
$VOLATILITY_{it}$	–0.0070	–0.0031	–0.0046***	–0.0014***	–0.0010**	–0.0003	–0.0007**
	(–1.620)	(–1.600)	(–3.250)	(–8.570)	(–2.040)	(–0.680)	(–2.470)
$LEVERAGE_{it}$	0.0006	0.0011	0.0011	–0.0001	–0.0005**	–0.0001	0.0000
	(0.150)	(1.380)	(1.410)	(–1.360)	(–2.170)	(–0.390)	(–1.470)
$ASSETGROWTH_{it}$	0.0005	0.0029	–0.0004	0.0000	0.0006	–0.0004	0.0000
	(0.040)	(1.100)	(–0.370)	(0.340)	(0.780)	(–0.730)	(1.300)
GDP_{t}	–0.0001	–0.0001	–0.0001***	0.0000***	0.0000**	0.0000*	0.0000**
	(–0.670)	(–1.430)	(–2.910)	(–7.140)	(–2.280)	(–1.950)	(–2.310)
ROA_{it}	0.9219	–0.0097	0.0120	0.0002	–0.0104	–0.0009	–0.0001
	(0.700)	(–0.300)	(0.370)	(0.300)	(–1.440)	(–0.210)	(–0.110)
MTB_{it}	0.0169	0.0002	–0.0001	0.0000	0.0000	0.0000	0.0000
	(0.940)	(0.140)	(–1.440)	(–0.050)	(0.190)	(0.930)	(–1.210)
$TURNOVER_{it}$	8.3216	0.4251	0.0261	–0.0012	0.5651**	0.2189*	0.1347**
	(1.330)	(1.690)	(0.680)	(–0.590)	(2.470)	(1.700)	(2.220)
N	15	37	73	1.548	239	174	480
Within R^2	0.8326	0.6361	0.2954	0.3124	0.3859	0.3893	0.4662
F-statistics	1.660	4.080***	2.280**	63.950***	12.710***	8.780***	33.760***

Note: The significances of *t*-tests at the 1%, 5% and 10% levels are indicated by *, ** and ***, respectively.

Table 10 t-test of residuals within industry cluster

Industry cluster		*Observations*	*Mean*	*Std. error*	*Std. deviation*
Agrar	AQ_{low}	8	0.0048	0.0019	0.0053
	AQ_{high}	7	–0.0055	0.0104	0.0274
	t-value	1.038			
Mining	AQ_{low}	19	0.0058	0.0038	0.0164
	AQ_{high}	18	–0.0061	0.0052	0.0220
	t-value	1.862**			
Construction	AQ_{low}	37	0.0027	0.0058	0.0355
	AQ_{high}	36	–0.0028	0.0051	0.0304
	t-value	0.717			
Manufacturing	AQ_{low}	774	0.0032	0.0010	0.0268
	AQ_{high}	774	–0.0032	0.0011	0.0303
	t-value	4.359***			
Utilities	AQ_{low}	120	0.0021	0.0023	0.0252
	AQ_{high}	119	–0.0021	0.0025	0.0269
	t-value	1.233			
Trade	AQ_{low}	87	0.0037	0.0019	0.0174
	AQ_{high}	87	–0.0037	0.0026	0.0238
	t-value	2.321**			
Services	AQ_{low}	240	0.0038	0.0016	0.0254
	AQ_{high}	240	–0.0038	0.0017	0.0271
	t-value	3.133***			

Notes: This table shows the results of the t-test of the residuals within the different industry clusters; AQ_{low} are companies with an EM1 value below 0.8694; AQ_{high} are companies with an EM1 value above 0.8694; the significances of *t*-tests at the 1%, 5% and 10% levels are indicated by *, ** and ***, respectively.

5 Conclusions

In this study we examine the impact of accounting quality on the cost of capital on the German capital market from 1995 to 2014. Our results indicate that firms with high accounting quality are associated with lower cost of capital than firms with low accounting quality. Prior research already suggests a negative relation between the quality of financial reports and the cost of capital (Welker, 1995; Botosan, 1997; Francis et al., 2004; Barth et al., 2013). The majority of studies present negative effects for mostly US capital markets, but there are some studies which are not able to confirm these prior results (Cohen, 2008; Core et al., 2008). However, we have tested the effect for the German capital market by using an innovative approach. We have therefore approximated accounting quality via the amount of earnings management executed by firms' management following Leuz et al. (2003) and estimated the cost of capital by using the CAPM. We have executed fixed-effects regressions and variance analyses for

determining whether the accounting quality has an impact on the cost of capital. Additionally, we constructed portfolios in terms of accounting quality following Barron and Qu (2014) for testing residuals of the groups after adjusting for other influences with control variables. Our empirical research suggests that the amount of income smoothing and the associated accounting quality do have an impact on the cost of capital. Firms with high quality accounting benefit significantly lower cost of capital than firms with low quality accounting. Our results are consistent with prior literature because we find similar results for the German capital market. Our findings have also been confirmed in alternative specifications in terms of industry cluster.

Consistent with Core (2001), future research should be conducted in the field of accounting quality and the cost of capital by modifying various cost of capital models. Especially models with implied cost of capital could add to the small body of research on the German capital market. Furthermore, also different measures of accounting and earnings quality such as used in Francis et al. (2008) focusing on the earnings attributes could be executed. Different point of views of earnings management should be considered as well. Following Healy and Wahlen (1999) and Schipper (1989), we have assessed earnings management as something negative but in contrast, there are other views which assume a good side of earnings management in terms of signaling such as Beneish (2001) who refers to the information perspective deriving from Holthausen and Leftwich (1983). Besides examining different capital markets and comparing effects on different capital markets could bring new insights to this important topic in accounting.

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Notes

1 The studies included may approximate and examine the accounting quality and cost of capital in a broader sense.

2 The Jones (1991) model has been modified by Dechow et al. (1995).

3 Barth et al. (2008), Tendeloo and Vanstraelen (2005), Böcking et al. (2015) and Zimmermann and Goncharov (2003) refer to the study of Leuz et al. (2003) in terms of measuring earnings management.

4 Cf. Ronen and Yaari (2008) for differentiated points of view of earnings management.

5 Cf. i.a. Welker (1995), Botosan (1997), Gietzmann and Ireland (2005) and Francis et al. (2004).

6 Cf. Regulation (EC) No 1606/2002 of the european parliament and of the council of 19 July 2002 on the application of international accounting standards.

7 The Institute of Public Auditors (IDW) recommends the use of the CAPM (IDW S1 version of 2008, marginal number 92) and more than 75% of investment managers apply the CAPM for estimation purposes in terms of risk-return ratio. Cf. (Kaminskyi, 2015).

8 Treynor has written a draft in 1962, which has been finally published in 1999.

9 Cf. Elton et al. (2014) for the assumptions underlying the CAPM.

10 DS historical beta local index (mnemonic = 897E).

11 Price volatility (wc08806).

12 Leverage (wc08236).

13 Companies in SIC codes 6000–6999 (financial institutions, insurance and real estate firms) are excluded from the sample.

14 Cf. total values of variables unapparent in Table 5 due to rounding: $SIZE_{it}$ = –0.00000000000745, $LEVERAGE_{it}$ = –0.00000627, $ASSETGROWTH_{it}$ = 0.0000147, GDP_t = –0.0000493, MTB_{it} = –0.000000548.

15 Cf. SIC division structure, division F (wholesale trade) and division G (retail trade) are grouped to trade. We have excluded companies of division H (finance, insurance and real estate). For purposes of presentation in the tables we shortened the name of division E and use utilities, instead of transportation and public utilities.

16 Due to the fact that there are no companies of the industry group public included in our sample, we have excluded this industry from Tables 10 and 11.