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Audit firm rotation, investor protection and audit quality

A QUANTITATIVE STUDY ON THE EFFECT OF INVESTOR PROTECTION ON THE RELATIONSHIP BETWEEN AUDIT FIRM ROTATION AND AUDIT QUALITY

MASTER THESIS

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Abstract

This study explores the relationship between audit firm rotation, investor protection, and audit quality. Existing research on this topic provides mixed results. One factor that could explain these mixed results is investor protection. Using a dataset consisting of 196 listed firms from eight European countries in 2014-2016 and both absolute discretionary accruals and audit fees as proxies for audit quality, the results show that audit firm rotation does not influence audit quality for both strong- and weak investor protection countries. Further, investor protection is found to negatively influence audit quality based on accruals, but only in countries with weak investor protection. This negative effect disappears when a strong level of investor protection is obtained. Finally, the combined effect of audit firm rotation and investor protection is found to decrease audit quality based on accruals and audit fees, but only for the companies in weak investor protection countries. The findings suggest that countries with strong investor protection, in contrast to countries with weak investor protection, protect outside investors enough with their laws and regulations currently in place and guarantee a sufficient level of audit quality. Thus, the introduction of mandatory audit firm rotation is suggested to be reconsidered, especially for countries with weak investor protection. Further, a possible adaptation of other options such as SOX regulation should be examined. Finally, the difference between strong- and weak investor protection countries should not be ignored in future research.

Table of Contents

1. Introduction

Large accounting scandals such as the Enron, WorldCom, Parmalat, and Royal Ahold cases led to increased attention and debate by regulators, professional bodies, and academics on auditor independence and audit quality (Ball, Tyler, & Wells, 2015; Geiger & Raghunandan, 2002). Furthermore, the demand for high-quality external auditors increased as well (Dao & Pham, 2014) which indicates that there is a re-emergence of public concerns about the credibility of audited financial statements (Hohenfels, 2016). High-quality external auditors are independent, exercise professional skepticism, and have the necessary experience to audit a specific firm. It is shown that firms involved in accounting scandals are often characterized by a long auditor tenure (Hohenfels, 2016), besides there was, among other things, also a lack of appropriate management, miscommunication, and bad corporate culture. Consequently, the effect of auditor tenure on audit quality gained increased attention because the accountants involved in these scandals failed to or just did not disclose their concerns. This shows there were low-quality external auditors.

Regulators are concerned that long auditor tenure makes auditors more likely to compromise on their client's accounting and reporting choices because of familiarity with the management, known as social bonding, and also because they want to retain the client's business, known as economic bonding (Brooks, Cheng, Johnston, & Reichelt, 2017; Chen, Lin, & Lin, 2008). When the independence of the auditor is compromised, it is argued that they do not add enough value (Knechel, Salterio, & Ballou, 2006).

These concerns resulted in the 2010 Green Paper in which the European Commission issued a set of legislative proposals regarding the role of the auditor and his or her independence. Mandatory auditor firm rotation was one of the proposals for enhancing auditor independence (Brooks et al., 2017; Cameran, Prencipe, & Trombetta, 2016; ICAS, 2012). The reasoning behind mandatory audit firm rotation is that the threat of familiarity is avoided which contributes to auditor independence and eventually higher audit quality (Nashwa, 2004). For the U.S. these concerns lead to the adoption of the Sarbanes-Oxley Act (SOX) in 2002 (Dull, Gelinas, & Wheeler, 2012), which shows the U.S. and Europe differ in their approach to increase auditor independence.

Proponents of mandatory auditor firm rotation argue that 'economic' dependence will decrease and subsequently results in an increase in audit quality (Ball et al., 2015; Casterella & Johnston, 2013; ICAS, 2012; Lennox, 2014; Myers, Myers, & Omer, 2003). Also, rotation

brings a fresh perspective to an engagement (Ball et al., 2015; ICAS, 2012; Lennox, 2014). Finally, proponents argue that competition between audit firms increases because of an increased frequency of auditor firm rotation (Lennox, 2014). On the other hand, opponents of mandatory auditor firm rotation state that rotation results in the loss of valuable client specific knowledge that the auditor has accumulated over time (Casterella & Johnston, 2013; ICAS, 2012; Lennox, 2014), which could lead to a potential increase in audit failures (Myers et al., 2003). Also, changing auditors is rather costly for both the auditor and the client, as more time is needed to get to know the client resulting in higher audit fees (Bell, Causholli, & Knechel, 2015; ICAS, 2012; Lennox, 2014).

The literature provides mixed results, which appear to depend on the different types of data used (voluntary or a mandatory rotation environment) (Casterella & Johnston, 2013). Also noteworthy is that the majority of the research in this field predominantly focusses on countries outside Europe, such as the U.S., Australia, Taiwan, and Korea (Casterella & Johnston, 2013; ICAS, 2012) whereas audit firm rotation applies mainly to Europe, as the U.S. has SOX regulation for example. Furthermore, most studies use one of the following types of proxies to measure audit quality: audit opinions, going-concern opinions, audit failures, and accruals (Bell et al., 2015; Casterella & Johnston, 2013; M. DeFond & Zhang, 2014; ICAS, 2012). The use of different proxies indicates that audit quality is difficult to measure (Francis, 2004). This study proxy's for audit quality by using audit fees and also by using two models that are based on accruals; the Modified Jones Model and the Ball and Shivakumar (2006) model. The use of more than one model provides a more thorough approach to measuring accruals and thus audit quality. Further, using different models to measure the same proxy makes it possible to compare the outcomes. Finally, by using audit fees as a proxy for audit quality as well, this study takes into account a more complete measure for audit quality as is recommended by DeFond and Zhang (2014).

Several studies have concluded that, due to an increased level of legal sanctions and litigation as a consequence of regulation, their results do not hold (Brooks, Cheng, & Reichelt, 2012; Chu, Dai, & Zhang, 2016; Davis, Soo, & Trompeter, 2009). Also, costs related to litigation or the loss of reputation may mitigate any benefit auditors receive when they compromise their independence (DeFond, Raghunandan, & Subramanyam, 2002; Schatzberg & Sevcik, 1994). Thus, one factor that could explain these mixed results is a country's level of investor protection. Investor protection has not been taken into account yet. For this reason, this study examines the effect of investor protection on the relationship between audit firm rotation and

audit quality. Investor protection stands for the regulations and laws which protect outside investors (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000). Therefore, the level of a country's investor protection is argued to interfere in the relationship between audit firm rotation and audit quality. A higher level of investor protection could provide audit firms with the incentive to supply a high quality audit. This partly stems from the risk of litigation when a possible audit failure is detected which could damage the auditor's reputation (Tendeloo & Vanstraelen, 2008). DeFond, Raghunandan, and Subramanyam (2002) state that the possible loss of reputation and the risk of litigation and its costs likely provide strong incentives for the auditor to maintain their independence, which is in line with earlier research from DeFond et al. (2002) and Schatzberg and Sevcik (1994). Consistent with DeFond et al. (2002), Choi, Kim, Liu and Simunic (2008) document that when there is no support and discipline of the auditor in place from institutions, an auditor might be incentivized to impair independence. This subsequently leads to a lower level of audit quality. Furthermore, Leuz, Nanda, and Wysocki (2003) and Francis and Wang (2008) find in their studies that the amount of earnings management decreases the stronger the investor protection becomes. This indicates that audit quality increases with better levels of investor protection. Thus, it is possible that a certain level of investor protection forces the auditor to provide an adequate level of audit quality in order to prevent possible litigation (Cameran et al., 2016) and loss of reputation. This could result in audit quality not falling below a certain threshold.

Investor protection is analyzed by using the study of La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998). Rules concerning investor protection come from different sources, such as company, security, bankruptcy, takeover and competition laws. These rules can also come from stock exchange regulations and accounting standards (La Porta et al., 2000). The fact that there are different regulators that constitute the investor protection shows countries could differ significantly in their approach to protect outside investors. In this study, data from Europe is used as it consists of different countries and these countries are covered by the audit firm rotation rule.

By taking into account the level of investor protection of European countries and two different audit quality proxies this study's contribution to the literature on the effect of audit firm rotation on audit quality and the literature on the effects of investor protection are twofold. First, this study takes into account investor protection, which has not been done before. Nelson (2009) states that the role of the civil litigation system in relation to audits of public companies is still unquestioned. Furthermore, Francis (2011) argues that there is still a

limited understanding of the role of institutions, which he mentions is a very important direction for future research. Second, this study takes into account two models to measure accruals and serve as proxy for audit quality. This study also looks at audit fees to proxy for audit quality which results in a more complete measurement of audit quality. Absolute discretionary accruals are measured by using the Modified Jones Model (Dechow, Sloan, & Sweeney, 1995) and the Ball and Shivakumar (2006) as used in other studies such as in Bruynseels and Cardinaels (2014). The insights gained from this study could provide an explanation for the mixed results or show that that the level of investor protection does have a significant effect to a certain extent so that it cannot be ignored in future research.

The practical contribution of this study is that it provides insights into the effects of investor protection and therefore provides regulators and policy makers with new insights on the relationship between audit firm rotation and audit quality. These insights could show that an introduction of mandatory audit firm rotation is only beneficial for a select number of countries with a certain level of investor protection. Furthermore, the insights from this study could also show that the introduction of a mandatory audit firm rotation rule needs to be tailored toward the level of investor protection of a country in order to be effective.

The remainder of this study is structured as follows. Chapter 2 provides an overview of the existing literature and includes the hypotheses for this study. Chapter 3 elaborates on the research methodology used in this study. Chapter 4 provides the results of the analyses. Finally, chapter 5 contains the conclusion and discussion of this study and provides implications for future research.

2. Literature review and hypotheses

2.1 Agency theory

The importance of the audit profession can be explained using agency theory and the associated information asymmetry problem arising from the separation of ownership and management. The separation of ownership and management is a well-known and frequently occurring principal-agent situation, where the shareholders are the principals and management is the agent. Most owners of a firm do not possess the necessary knowledge, which is required to make the right decisions. Therefore, management manages the organization and has the authority to make decisions. This separation does however involve agency costs, which are defined as the sum of monitoring expenditures by the principal, bonding expenditures by the agent, and residual loss (Jensen & Meckling, 1976). The management of an organization could have incentives to act in their own self-interest instead of the shareholders' interest, because the financial consequences of this possible opportunistic behavior are faced by the owners and not by management. This risk of opportunistic behavior by management is called moral hazard. Another type of information asymmetry arises from the fact that management is closer to the day-to-day activities and therefore has more information at hand than the owners. In this case, management could use information, unknown to outsiders, to sell or buy shares of the organization because they know what the influence of their decisions could be on the share price. This type of information asymmetry is called adverse selection and can be seen as behavioral risk. The role of the auditor is to mitigate these types of information asymmetry by assuring that the financial statements provide a true and fair representation of the organization. The assurance provided by the auditor assures the owners and other stakeholders of an organization that the information provided by management shows a faithful and true representation of an organization's performance.

2.2 Audit quality

The quality of an auditor's assurance, or audit quality, should be as high as possible because this leads to an increase in the value of the assurance provided. The classical definition of audit quality comes from DeAngelo (1981) and states that it is 'the market-assessed joint probability that a given auditor will both discover a breach in the client's accounting system, and report the breach'. More recent research from DeFond and Zhang (2014) provides a more concise definition of audit quality; 'higher audit quality is greater assurance of high financial reporting quality'. In line with this definition, Corbella, Florio, Gotti, and Mastrolia (2015) argue that audit quality is dependent on the auditor's education, training, knowledge of

professional standards, independence and objectivity, knowledge of the client's business operations and industry, and the working relationship with the client company's management. Nowadays there are concerns about these different aspects of audit quality. In particular, the independence, objectivity and the working relationship with the client company's management are of great concern. This concern can be mainly attributed to the large accounting scandals of the last century. In order to improve audit quality regulators have come up with different measures. In the U.S., the Sarbanes Oxley Act (SOX) and the Public Company Accounting Oversight Board (PCAOB) were called into life. On the other hand, in Europe the European Parliament approved and called into life the mandatory audit firm rotation (MAFR) measurement proposed by the European Commission. This measurement imposes a maximum length of 10 years of the auditor-client relationship for firms of public interest.

2.3 Audit firm tenure

An increase in auditors' independence is one of the main arguments of audit firm rotation proponents (Cameran et al., 2016; Casterella & Johnston, 2013; ICAS, 2012; Lennox, 2014). Low auditor independence would mean that the auditor is less likely to report material misstatements and is less likely to exercise the necessary skepticism with regard to a client's management. The rotation of audit firms is argued to prevent such social- and economic bonding concerns because of an increase in auditor independence. There is evidence that longer auditor-client relationships negatively influences audit quality. Gonzalez-Diaz et al. (2015) show that the probability of a qualified audit report decreases after a tenure of 5 years and continues to decrease thereafter, indicating that audit quality decreases with longer auditor-client relationships. Vanstraelen (2000) provides similar results, indicating that the probability of issuing a qualified audit opinion decreases the longer the auditor-client relationship becomes. Furthermore, Knechel and Vanstraelen (2007) and Carey and Simnett (2006) find that the probability of issuing a going-concern audit opinion decreases after a tenure of 3 years, which also indicates a decrease in audit quality the longer the auditor-client relationship becomes. These findings are in line with Nelson (2009), as he mentions that auditors learn over time to assume non-error explanations and not pursue critical missing information and therefore greater frequency knowledge can actually undermine an auditor's professional skepticism. This decrease in professional skepticism consequently leads to a decrease in audit quality. These studies indicate that auditor independence and subsequently audit quality decrease with increasing auditor-client relationships.

There is also evidence showing an increase in audit quality with long auditor tenure. Myers et al. (2003) report that the use of accounting accruals decreases with longer auditor tenure, thus audit quality increases with longer auditor tenure. Later studies from Monterrey and Sánchez-Segura (2007) and Chen et al. (2008) find similar results, also indicating that use of accounting accruals decreases with longer auditor tenure. The available literature on auditor tenure reports both supporting and non-supporting evidence for mandatory audit firm rotation.

Studies looking at the relationship between auditor tenure or audit firm rotation and the perception of audit quality also provide mixed results. Mansi, Maxwell, and Miller (2004), Ghosh and Moon (2005), and Lowensohn et al. (2007) all report a positive relation when looking at the required return of bondholders, the earnings response coefficient (ERC), and reporting quality reviews respectively. On the other hand, the studies from Jennings, Pany, and Reckers (2006) and Daniels and Booker (2011), which examine the relation between audit firm rotation and perceived audit quality, find that perceptions of auditor independence and thus perceived audit quality are enhanced when an audit firm rotation measurement is in place. This shows that an increase in auditor tenure does not lead to a decrease in the perceived quality of an audit. Despite the lack of a conclusive answer with regard to (perceived) audit quality and long auditor tenure, the European Parliament called mandatory audit firm rotation into life.

2.4 Audit firm rotation

Studies that have examined the relationship between audit firm rotation and audit quality also lack a conclusive answer (Casterella & Johnston, 2013; Lennox, 2014). Cameran, Prencipe, and Trombetta (2008) find that mandatory rotation of auditors tends to hamper audit quality. Ruiz-Barbadillo, Gómez-Aguilar, and Carrera (2009) find that the market enforces auditors to act independently in order to prevent a potential loss of reputation. Thus, they show that there is no need for mandatory audit firm rotation. The study from Blouin, Grein, and Rountree (2007) finds, by examining mandatory audit firm rotation for former Arthur Andersen clients, that financial reporting quality did not improve after auditor rotation. Furthermore, Kwon, Lim, and Simnett (2014) find that income-increasing accruals increase in the first year of tenure after an audit firm had been rotated, which shows that audit quality decreases. These studies obtained their data from Italy, Spain, the U.S., and South Korea respectively.

On the other hand, there are also studies that provide evidence supporting audit firm rotation. Corbella et al. (2015) find results indicating that audit quality, measured as abnormal accruals,

improves following mandatory audit firm rotation but only for companies audited by a non-Big 4 audit firm. Kim, Lee, and Lee (2015) find evidence supporting the argument that mandatory audit firm rotation improves audit quality. They report an increased likelihood that an auditor will report a going-concern opinion to financially distressed companies. In addition, after a mandatory rotation firms had a lower number of discretionary accruals and a higher quality of accruals. Harris and Whisenant (2012) find that the quality of earnings improve after mandatory audit firm rotation had been introduced because of an improvement in auditor independence. These studies obtained their data from Italy, South Korea, and Brazil/South-Korea/Italy respectively. The results of these studies provide evidence that audit firm rotation increases auditor independence and subsequently increases audit quality.

However, these studies differ in their data. Data from the U.S. and other non-SOX countries differs significantly in for example the amount or type of regulation and therefore results from SOX and non-SOX countries are not easily comparable. In addition, the studies differ in their way of measuring audit quality, which also makes it difficult to compare the different results and therefore could provide for the mixed results. Finally, these and other studies on the topic of audit firm rotation differ in their conclusions. The studies focusing on mandatory audit firm rotation mainly report evidence supporting mandatory audit firm rotation. On the other hand, the studies focusing on voluntary audit firm rotation mainly report evidence that does not support mandatory audit firm rotation.

2.5 Investor protection and hypotheses

Available literature on audit firm rotation does not provide a conclusive answer and therefore it cannot be said if the effect is positive or negative. The positive effect can be largely attributed to an increase in auditor independence. The negative effect on the other hand can be mostly attributed to the loss of client specific knowledge. Based on the above, the first hypothesis of this study is as follows:

Hypothesis 1: *Audit firm rotation has an effect on audit quality on the short term*

This study argues that the mixed results of the currently available studies are because none of these studies has taken into account the possible moderating effect of a country's level of investor protection. Francis (2011) argues that the incentives of accounting firms and individual auditors to produce high-quality audits are affected by the institutions that regulate auditing and punish accounting firms and individual auditors for misconduct and low-quality audits. Gramling, Jenkins, and Taylor (2010) state that in general, studies show that auditors

exhibit more professional skepticism as the level of exposure to litigation and reputation loss increases. Furthermore, some studies also show that concerns over the retention of an auditor's client might sway auditor judgment more when the risk of litigation is low (Gramling et al., 2010). Investor protection stands for the regulations and laws which protect outside investors (La Porta et al., 1998). This means that investor protection serves as protection for low-quality audits and accounting firms' and individual auditors' misconduct. The study of La Porta et al. (1998) reports that there are cross-country differences in the legal protection of investor rights. There is among other things a clear difference in the level of investor protection between North-European countries and South-European countries.

The following studies all report that their results are affected by characteristics of investor protection. Davis, Soo, and Trompeter (2009), who studied auditor tenure and its effect on audit quality, show that a long auditor tenure is associated with greater auditor tolerance for earnings management. However, these results apply to the pre-SOX period in the U.S. Davis et al. (2009) find that the results do not persist into the post-SOX period. They argue that the reason for this difference is due to increased scrutiny and the threat of legal sanctions, which relates to the level of investor protection. In line with Davis et al. (2009), Chu, Dai, and Zhang (2016) also report that longer auditor tenure is associated with a decrease in audit quality. They also identify that this finding is due to an increased risk of litigation to auditors, which again can be related to the level of investor protection. The sample of the Chu et al. (2016) study consisted of all firms that were included in the Compustat Global database for the years 1988 to 2006. This means U.S. firms were also included, and because of the period that was taken into account the sample also included the pre- and post-SOX period. The transition to SOX is therefore a good example of an increased risk of litigation for auditors and thus better level of investor protection. Finally, Brooks, Cheng, and Reichelt (2012) find that long auditor tenure has a negative effect on audit quality, however they also find that due to the adoption of SOX and the corresponding increase in litigation risk for auditors, the negative effect of auditor tenure is extended. These studies show that regulations and laws protecting outside investors have an effect on the relation between auditor tenure and audit quality. Therefore, the second hypothesis of this study is as follows:

Hypothesis 2: *The level of investor protection has a significant effect on audit quality.*

Existing studies on the relationship between investor protection and audit quality report a positive effect. Ball (2001) finds that investors are better protected in countries with a higher level of investor protection, because the quality of accounting information is better

guaranteed. Francis, Khurana, and Pereira (2003) find that firms in countries with low investor protection demand a lower audit quality, which suggests that a low level of investor protection has a negative effect on audit quality. Furthermore, Leuz et al. (2003) find that investor protection has a big role in explaining differences in earnings management. They report that earnings management decreases with the level of investor protection and therefore more earnings management is found in countries with weak investor protection, which confirms their hypothesis that there is less earnings management in countries with strong investor protection. Consistent with Leuz et al. (2003), Francis and Wang (2008) show that the quality of earnings increases with the level of investor protection. They find that as investor protection becomes stronger, large accounting firms (Big 4) have more incentives to protect their reputation and subsequently the quality of audits improve. Finally, a more recent study of Liu and Elayan (2015) finds that higher levels of litigiousness enhance the association between information asymmetry and conservatism, which leads to an increased audit quality. These studies show the relationship between investor protection and audit quality is positive. Important to note is the fact that these studies use different proxies for audit quality. Nevertheless, a higher level of investor protection provides investors with more power to sue management and auditors for violation of their duties (Gul, Zhou, & Zhu, 2013; La Porta et al., 1998; Shleifer & Vishny, 1997). A lower level of investor protection increases the risk of opportunism with earnings management (Leuz et al., 2003). The level of investor protection is thus found to have a positive effect on audit quality, it is therefore hypothesized that investor protection influences the relationship between audit firm tenure and audit quality. If on the one hand audit firm rotation is found to have a negative effect on audit quality, investor protection could influence this effect in such a way that it is mitigated and thus provides a possible threshold for audit quality. On the other hand, if audit firm rotation is found to have a positive effect on audit quality, investor protection could strengthen this effect or make sure that this level of audit quality is maintained. Therefore, third hypothesis of this study is as follows:

Hypothesis 3: *Audit firm rotation only influences audit quality in countries with a weak level of investor protection and does not influence audit quality in countries with strong investor protection.*

3. Research design

3.1 Sample selection

The empirical analysis from this study is based on a research sample of publicly listed firms from nine European countries in the 2014-2016 period. The selection of countries is based on the countries La Porta et al. (1998) scored in their study with regard to investor protection. The period of 2014-2016 that is investigated is chosen because 2016 is the year in which the mandatory audit firm rotation rule was implemented. The years 2014 and 2015 are likely influenced by the fact that this rotation rule was going to be implemented in 2016 and are therefore taken into account as well. This means that audit firm rotations in the 2014-2015 period have been done mainly because of the introduction of the mandatory audit firm rotation rule.

The necessary data for audit fees and audit firms, and all other necessary data for the other variables used in this study, is retrieved from the Thomson One database and annual reports that have been downloaded from company websites. Some companies in the sample recorded their accounting data in another currency than euros; therefore, these have been converted to euros based on the currency exchange rate at that moment. The data to calculate the mean investor protection score across the three legal variables is retrieved from the La Porta et al. (1998) study. Table 1 provides an overview of the amount of observations and table 2 provides an overview of the amount of observations per industry.

TABLE 1. Firm year observations per country

Country	**Year**			**Total number of observations per country**
	2014	2015	2016	
Netherlands	27	27	27	81
Germany	27	27	27	81
France	30	30	30	90
Denmark	19	19	19	57
Italy	28	28	28	84
Spain	27	27	27	81
Portugal	16	16	16	48
Greece	22	22	22	66
Total observations per year	196	196	196	588

TABLE 2. Firm year observations per industry

Industry	Year			Total number of observations per industry
	2014	2015	2016	
Mining	5	5	5	15
Construction	11	11	11	33
Manufacturing	72	72	72	216
Transport, Communication, Electricity, Gas	42	42	42	126
Wholesale	1	1	1	3
Retail	11	11	11	33
Finance, Insurance, Real Estate	38	38	38	114
Services	16	16	16	48
Total number of observations per year	**196**	**196**	**196**	**588**

Note: *mining and construction have been grouped together as well as wholesale, retail, and services in order to create industry groups with 15 or more observations per year. (All other tables including industry will show Mining & Construction and Wholesale, Retail, and Services as new industry groups)*

The total sample consists of 196 publicly listed firms from France, Greece, Italy, the Netherlands, Portugal, Spain, Germany, and Denmark, resulting in 588 firm-year observations. These countries have been chosen because they show a clear difference in the level of investor protection and thus make it possible to make a distinction between strong and weak investor protection countries. A country's investor protection is regarded as weak when the mean of the three legal variables taken from the study of La Porta et al. (1998) is lower than 8 and it is regarded as strong when the mean is equal or above 8. Based on this criterion the sample contains four countries with strong investor protection and four countries with

weak investor protection. Table 3 provides an overview of some of the main firm characteristics per country.

TABLE 3. Main characteristics per country

Country	Average size	EY	PwC	KPMG	Deloitte	non-Big4	Average audit fees	Rotations
NL	9.4	16	18	21	26	0	8.2	16
GER	11.1	9	27	42	3	0	14.7	0
FRA	10.7	32	9	10	25	14	7.3	16
DNK	9.0	11	22	8	14	2	2.2	6
ITA	10.2	38	28	8	10	0	7.8	3
SPA	10.3	20	14	12	34	1	6.7	8
POR	8.3	2	19	8	17	2	0.9	4
GRE	7.5	10	19	9	4	24	0.7	6
Total (avg.)	9.6	138	156	118	133	43	6.1	59

Note: *Size is measured as the natural logarithm of total assets. The audit firm columns contain the amount of years that specific audit firm has been observed. Audit fees are in millions of euros.*

Table 4 presents an overview of the amount of rotations per industry by year and by country, where the countries have been divided into strong investor protection countries and weaker investor protection countries. A total of 38 audit firm rotations have been done in the 2014-2016 period in the strong investor protection countries. Germany is the only country in which no audit firm rotations have taken place at all. Most rotations in the strong investor protection countries took place in the year 2015, namely 22 in contrast to 0 in 2014 and 16 in 2016. Both the Netherlands and France have a total of 16 audit firm rotations in 2015 and 2016 combined, whereas Denmark had six rotations in the 2015-2016 period. Most of the audit firm rotations throughout the 2014-2016 period in the strong investor protection countries were in the

manufacturing industry and the least audit firm rotations were in the mining & construction industry.

TABLE 4. Audit firm rotations per industry (by year and country)

Country	Industry	Number of audit firm rotation(s)						Total rotations '14 - '16
		2014		2015		2016		
		Yes	No	Yes	No	Yes	No	
Netherlands	1	0	4	0	4	2	2	**2**
	2	0	10	3	7	4	6	**7**
	3	0	3	2	1	0	3	**2**
	4	0	5	2	3	1	4	**3**
	5	0	5	0	5	2	3	**2**
	Total per year	**0**	**27**	**7**	**20**	**9**	**18**	**16**
		Yes	No	Yes	No	Yes	No	
Germany	1	0	1	0	1	0	1	**0**
	2	0	14	0	14	0	14	**0**
	3	0	5	0	5	0	5	**0**
	4	0	3	0	3	0	3	**0**
	5	0	4	0	4	0	4	**0**
	Total per year	**0**	**27**	**0**	**27**	**0**	**27**	**0**
		Yes	No	Yes	No	Yes	No	
France	1	0	2	0	2	1	1	**1**
	2	0	16	5	11	5	11	**10**
	3	0	3	2	1	0	3	**2**
	4	0	5	2	3	0	5	**2**
	5	0	4	1	3	0	4	**1**
	Total per year	**0**	**30**	**10**	**20**	**6**	**24**	**16**
		Yes	No	Yes	No	Yes	No	
Denmark	1	0	0	0	0	0	0	**0**
	2	0	10	2	8	0	10	**2**
	3	0	3	0	3	1	2	**1**
	4	0	2	1	1	0	2	**1**
	5	0	4	2	2	0	4	**2**
	Total per year	**0**	**19**	**5**	**14**	**1**	**18**	**6**
	Total strong IP countries	**0**	**103**	**22**	**81**	**16**	**87**	**38**

Notes: *Mining & Construction and Wholesale, Retail, and Services have been combined in order to create industry groups that contain at least 15 firm year observations. 1 = Mining & Construction; 2 = Manufacturing; 3 = Transportation, Communication, Electricity, and Gas; 4 = Wholesale, Retail, and Services; 5 = Finance, Insurance, and Real estate.*

TABLE 4. ***CONTINUED***

Country	Industry	Number of audit firm rotation(s)						Total rotations '14 - '16
		2014		2015		2016		
		Yes	No	Yes	No	Yes	No	
Italy	1	0	1	0	1	0	1	**0**
	2	0	9	0	9	1	8	**1**
	3	0	8	0	8	1	7	**1**
	4	0	2	0	2	1	1	**1**
	5	0	8	0	8	0	8	**0**
	Total per year	**0**	**28**	**0**	**28**	**3**	**25**	**3**
		Yes	No	Yes	No	Yes	No	
Spain	1	0	4	0	4	0	4	**0**
	2	0	3	1	2	0	3	**1**
	3	0	9	0	9	1	8	**1**
	4	0	4	0	4	2	2	**2**
	5	0	7	1	6	3	4	**4**
	Total per year	**0**	**27**	**2**	**25**	**6**	**21**	**8**
		Yes	No	Yes	No	Yes	No	
Portugal	1	0	1	0	1	0	1	**0**
	2	0	5	1	4	0	5	**1**
	3	0	5	3	2	0	5	**3**
	4	0	3	0	3	0	3	**0**
	5	0	2	0	2	0	2	**0**
	Total per year	**0**	**16**	**4**	**12**	**0**	**16**	**4**
		Yes	No	Yes	No	Yes	No	
Greece	1	0	3	0	3	0	3	**0**
	2	0	5	1	4	0	5	**1**
	3	0	6	2	4	2	4	**4**
	4	0	4	1	3	0	4	**1**
	5	0	4	0	4	0	4	**0**
	Total per year	**0**	**22**	**4**	**18**	**2**	**20**	**6**
	Total weak IP countries	**0**	**93**	**10**	**83**	**11**	**82**	**21**

Notes: Mining & Construction and Wholesale, Retail, and Services have been combined in order to create industry groups that contain at least 15 firm year observations. 1 = Mining & Construction; 2 = Manufacturing; 3 = Transportation, Communication, Electricity, and Gas; 4 = Wholesale, Retail, and Services; 5 = Finance, Insurance, and Real estate.

In the weaker investor protection countries, 21 audit firm rotations have taken place in 2014-2016. Italy has three audit firm rotations, which is the lowest amount of the weaker investor protection countries. Spain has eight audit firm rotations, which is the highest amount of the weaker investor protection countries. Most of the audit firm rotations took place in 2016, which is contrary to the stronger investor protection countries. This could mean that firms in the weaker investor protection did not anticipate the introduction of the mandatory audit firm rotation rule as much as firms in the stronger investor protection countries. Most of the audit firm rotations took place in the transportation, communication, electricity, and gas industry, which is also contrary to the strong investor protection countries. The least audit firm rotations took place in the mining & construction industry, which is consistent with the stronger investor protection countries.

As is argued in this study, the rotations in 2015 and 2016 have most likely been done because of the introduction of the mandatory audit firm rotation rule and the firms anticipating on this upcoming law. This argument is made even more likely because no audit firm rotations have taken place in 2014 throughout all firm year observations, but only the year directly surrounding the introduction of the mandatory audit firm rotation rule, 2015, and the year in which the mandatory audit firm rotation has been introduced contain audit firm rotations. Most audit firm rotations have occurred in the strong investor protection countries, namely 38 in contrast to 21 audit firm rotations in the weaker investor protection countries. Thus, the strong investor protection countries have 44.7% more audit firm rotations in 201 and 2016. An explanation for this difference could be that because of the better-developed regulatory environment of the strong investor protection countries, audit firms are more likely to rotate off from an engagement to prevent a company's stakeholders from questioning their independence and the audit quality they deliver. Another explanation could be that audit firms in the strong investor protection countries use the new mandatory audit firm rotation rule to conceal possible other problems and prevent having to raise a so-called 'red flag'. This explanation could also apply to the weaker investor protection countries, even though the regulatory environment and the possible risk of litigation is lower in these countries.

Finally, table 5 provides an overview of the investor protection scores and the individual scores on the three legal variables of the countries used in this study and whether the investor protection score is weak or strong.

TABLE 5. Overview of investor protection scores per country

Country	Efficiency of judicial system	Rule of law	Corruption	Investor Protection score	Investor Protection level
Netherlands	10	10	10	10	Strong
Germany	9	9.23	8.93	9.05	Strong
France	8	8.98	9.05	8.68	Strong
Denmark	10	10	10	10	Strong
Italy	6.75	8.33	6.13	7.07	Weak
Spain	6.25	7.8	7.38	7.14	Weak
Portugal	5.5	8.68	7.38	7.19	Weak
Greece	7	6.18	7.27	6.82	Weak

Note: the legal variable scores are based on La Porta et al. (1998).

Both the Netherlands and Denmark have an investor protection score of 10, which is the highest possible score. The lowest strong investor protection score is equal to 8.68, which belongs to France. Within the weak investor protection countries, the difference between the four investor protection scores is small. The highest investor protection score within the weak investor protection countries is equal to 7.14 and the lowest investor protection score is equal to 6.82.

3.2 Measurement of variables

3.2.1 Audit quality

Audit quality has been measured in different ways in the literature. The measurement of audit quality has mostly been based on output-based proxies because these measure the level of audit quality that is actually delivered (DeFond & Zhang, 2014). Further, it is difficult to assess audit quality before an audit has actually been done because the only observable outcome is the audit report which is made publicly available afterwards (Francis, 2004; Raak & Thürheimer, 2016).

In this study audit quality is, among other things. measured based on two accrual measurement models, namely the Modified Jones Model (Dechow et al., 1995) and the Ball and Shivakumar (2006). The Modified Jones Model has already been used in multiple previous studies, but the Ball and Shivakumar model to a lesser extent has also been used frequently in previous research such as in Bruynseels and Cardinaels (2014). These two models are used to provide a more thorough measurement of accruals and thus audit quality. Discretionary accruals are the part of accruals which are assumed to be used by management for earnings management purposes (Raak & Thürheimer, 2016). Accruals have been used frequently to identify managers' reporting decisions with regard to presenting a firm's financial position (Kwon et al., 2014) and can indicate a lack of auditor supervision. The level of absolute discretionary accruals is used in order to take into account both income increasing and income decreasing effects of earnings management. A lower level of accruals is argued to be associated with a higher level of audit quality, because this could indicate that the auditor prevented management's reporting decisions with regard to a firm's financial position.

3.2.1.1 Modified Jones Model

The Modified Jones Model provides the most powerful test of earnings management (Dechow et al., 1995). Several studies have used this model, among others Johnson, Khurana, and Reynolds (2002), Myers et al. (2003), and Chen et al. (2008). The model to calculate the absolute discretionary accruals in year t for firm i is as follows:

$$DAC_{i,t} = TAC_{i,t} - \left[\beta_0 + \beta_1 * \left(\frac{1}{TA_{i,t-1}}\right) + \beta_2 * (\Delta Sales - \Delta AR)_{i,t} + \beta_3 * PPE_{i,t}\right]$$

Where:

TAC = Total Accruals (earnings before interest and taxes – net cash flows from operations) scaled by total assets at t-1;

$\boldsymbol{\beta_i}$ = coefficients estimated by using the following regression:

$$TAC_{i,t} = \beta_0 + \beta_1 * \left(\frac{1}{TA_{i,t-1}}\right) + \beta_2 * (\Delta Sales - \Delta AR)_{i,t} + \beta_3 * PPE_{i,t} + \varepsilon$$

TA = Total Assets in year t-1;

Δ***Sales*** = the change in sales revenue scaled by total assets at t-1;

Δ***AR*** = the change in accounts receivable scaled by total assets at t-1;

PPE = Property, Plant, and Equipment scaled by total assets at t-1.

Because it is common that bigger firms have higher amounts of accruals, the variables TAC, ΔSales, ΔAR, and PPE are scaled by total assets of year t-1. The Modified Jones Model incorporates receivables to also take into account earnings management caused by credit sales, whereas the original Jones Model makes the implicit assumption that discretion is not exercised over revenue (Dechow et al., 1995). The reasoning behind the incorporation of receivables is that it is easier to manage earnings by exercising discretion over the recognition of revenue on credit sales than on cash sales (Dechow et al., 1995). The regression that is used measures the level of non-discretionary accruals and the residuals are subsequently used as a measure for the level of absolute discretionary accruals. These absolute discretionary accruals caption the manager's ability to influence earnings (Jones, 1991).

3.2.1.2 Ball and Shivakumar Model

The Ball and Shivakumar (2006) model calculates the total accruals while controlling for asymmetric timeliness of accruals and recognizing economic gain and loss (Bruynseels & Cardinaels, 2014). The model to obtain the absolute discretionary accruals for a firm in a given year is as follows:

$$TAC_{i,t}/AVTA_{i,t} = \beta_0 + \beta_1 * \left(\frac{\Delta REV_{i,t}}{AVTA_{i,t}}\right) + \beta_2 * \left(\frac{PPE_{i,t}}{AVTA_{i,t}}\right) + \beta_3 * \left(\frac{CFO_{i,t}}{AVTA_{i,t}}\right) + \beta_4 * DCFO_{i,t} + \beta_5 * \left|\left(\frac{CFO_{i,t}}{AVTA_{i,t}}\right) * DCFO_{i,t}\right| + \varepsilon$$

Where:

TAC	= Total Accruals for firm i in year t (earnings before interest and taxes – net cash flows from operations);
AVTA	= Average Total Assets for firm i in year t and year t-1;
Δ***REV***	= change in Revenues for firm i in year t;
PPE	= Property, Plant, and Equipment for firm i in year t;
DCFO	= a dummy variable which is equal to 1 if cash flow from operations is negative, otherwise 0;
CFO	= Cash flow from operations for firm i in year t.

The absolute discretionary accruals are equal to the residuals from the model. This is consistent with Cohen, Dey, and Lys (2008) and Braam, Nandy, Weitzel, and Lodh (2015) who also used the residuals to capture the absolute discretionary accruals. This model divides the variables by average total assets and thus scales the variables, because it is again common that bigger firms have higher amounts of accruals.

3.2.1.3 Audit fees

The other proxy that is used for audit quality are audit fees. The advantage of using audit fees as a proxy for audit quality is that they are continuous and therefore variations can be captured very well (DeFond & Zhang, 2014). Audit fees are argued to measure an auditor's level of effort. Other studies use audit fees to test whether audit quality has an association with the risk of litigation (DeFond and Zhang, 2014), such as the studies from Engel, Hayes, and Wang (2010) and Choi, Kim, and Zang (2010). Further, Keune and Johnstone (2012)

have reported that the likelihood of waiving material misstatements (e.g. earnings management) is lower when audit fees are higher. They argue that this is due to the current transparency for audit fees that are paid and because of the importance of reputation, an auditor has. Thus, it is argued that higher audit fees reflect differences in effort costs and client-specific risk and that a higher amount of audit fees indicates that the auditor can use more audit hours and therefore put in more effort into an audit which would indicate a higher audit quality (Bruynseels & Cardinaels, 2014). Therefore, in this study it is assumed that a higher amount of audit fees indicates a higher level of audit quality. Audit fees are measured in millions of euros as disclosed in the annual reports and are scaled by total assets for comparison reasons.

This study also checks whether a going-concern opinion is given by the auditor. A going-concern opinion is an auditor's evaluation of whether there is substantial doubt about the client's ability to continue as a going concern. Therefore, the auditor is required to evaluate the ability of a company to continue as a going concern for the next 12-month period (Public Company Accounting Oversight Board, 2013). By checking for a going-concern opinion, it is made sure that the companies included in this study's sample have the ability to continue as a going concern[1].

3.2.2 Independent variables

Audit firm rotation is measured based on financial statements. If a financial statement is audited by a different audit firm than the previous year (year t-1), then the dummy variable used is equal to 1. If on the other hand a financial statement is audited by the same audit firm as last year (year t-1), then the dummy variable is equal to 0.

Investor protection is measured based on the La Porta et al. (1998) study, in which five measures were used to examine the strength of the legal environment: efficiency of the judicial system, the rule of law, corruption, risk of expropriation, and contract repudiation by the government. However, this study follows Leuz et al. (2003), DeFond, Hung, and Trezevant (2007), Ding, Hope, Jeanjean, and Stolowy (2007), and Hope, Kang, Thomas, and Yoo (2008). These studies have measured investor protection by using the legal enforcement variable from La Porta et al. (1998). Subsequently, investor protection is measured as the mean across three legal variables; (1) the efficiency of the judicial system, which takes into

[1] None of the companies in the sample received a going-concern opinion, therefore going-concern opinion is not taken into account in the econometric model used in this study

account the efficiency and integrity of the legal environment, (2) the rule of law, which addresses the law and order tradition in a country, and (3) the corruption index, which is assessed by the International Country Risk (ICR) guide and shows whether there is a high or low level of corruption in a country. A dummy is used to indicate whether a country has a strong or a weak investor protection environment, where a high level of investor protection is equal to a score of 1 and a low level of investor protection is equal to a score of 0. The level of investor protection is high and thus strong when the mean of the three legal variables is the same or higher as eight. If, however, the mean is below eight, this means the level of investor protection is low and thus weak.

3.2.3 Control variables

This study takes into account several important control variables. These control variables might affect audit quality because these are input based proxies for audit quality. Thus, it is important to control for other audit-firm characteristics and client characteristics (Johnson et al., 2002). In addition, there have to be controls in place to control for factors affecting absolute discretionary accruals. The following control variables serve these control purposes.

Firm size, which is the natural log of total assets, is included in the model because it is argued to influence discretionary accruals (Kim et al., 2015). Furthermore, large firms tend to record larger and more stable accruals (Chu et al., 2016; Myers et al., 2003) and have better developed financial reporting systems (Johnson et al., 2002).

Leverage, which is measured as the ratio of total liabilities to total equity, is found to be positively associated with discretionary accruals (Corbella et al., 2015; Kim et al., 2015). It is argued that firms are incentivized to engage in earnings management when they have high debt.

Cash flow, which is measured as the ratio of cash flow from operations at year t divided by total assets at year t (Davis et al., 2009; Harris & Whisenant, 2012), is included in the model because the firms that have higher cash flow from operations are more likely to be better performers (Myers et al., 2003). Therefore, cash flow is expected to be negatively associated with discretionary accruals (Chu et al., 2016; Corbella et al., 2015; Kim et al., 2015).

Return on assets (ROA) is included in the model to control for the nondiscretionary component of abnormal accruals (Corbella et al., 2015) and to control for differences in firms'

performance (Kim et al., 2015). It is measured as the ratio of the firm's earnings divided by total assets, consistent with Johnson et al. (2002).

An indicator variable for Big 4 auditor is added to control for possible differences in audit quality between Big 4 and non-Big 4 audit firms (Kim et al., 2015). This variable is equal to 1 if the audit firm belongs to the Big 4 audit firms; otherwise, it is equal to 0 indicating the audit firm is a non-Big 4 audit firm.

Because financial distress could negatively affect audit quality, financial distress is included in the model. It is possible that firms that are financially distressed are more likely to use more aggressive financial reporting in order to not have to disclose too much bad news. The level of financial distress is measured by using the Z-score model from Altman (1968). The formula for calculating the Z-score is as follows:

$$Z - score = 1.2 * \frac{WC}{TA} + 1.4 * \frac{RE}{TA} + 3.3 * \frac{EBIT}{TA} + 0.6 * \frac{Equity}{TL} + 0.999 * \frac{Sales}{TA}$$

Where:

TA = Total Assets

TL = Total Liabilities

WC = Working Capital (current assets - current liabilities)

RE = Retained Earnings

EBIT = Earnings Before Interest and Taxes

Equity = Market value of equity at year t

Sales = Sales value at year t

3.3 Regression model

The analysis done in this study is a multilevel panel data analysis. The following general (logistic) regression model is used to test the hypotheses:

$$AUDIT\ QUALITY = \beta_0 + \beta_1 ROTATION + \beta_2 IP + \beta_3 ROTATION * IP + \beta_4 SIZE + \beta_5 LEV + \beta_6 CFO + \beta_7 ROA + \beta_8 BIG4 + \beta_9 ZSCORE + \varepsilon$$

The definitions of the different variables from the regression model are provided in table 6 below. For the analysis, a multilevel regression model is estimated because this type of regression fits the data in this study best. Industry and year effects are controlled for by adding dummy variables for industry and year. In order to ensure robustness, the regression model is also estimated using only strong and weak investor protection countries respectively

in order to check whether the original regression results hold or differ. Industries are grouped into five groups, because this results in industry groups with a minimum of 15 observations. The absolute discretionary accruals have been standardized in order to make comparison possible between the outcomes of the Modified Jones Model and the Ball and Shivakumar model. Finally, the absolute discretionary accruals variables and the audit fee variable have been winsorized to decrease the amount of extremely high values and reduce the effects such outliers.

The primary variables of interests are *ROTATION*, *IP*, and *ROTATION*IP*, as their beta coefficients test the hypotheses of this study. Hypothesis 1 is tested by the beta coefficient of *ROTATION*. This coefficient shows the change in the level of absolute discretionary accruals, measured with two different models, when a firm has rotated to another audit firm. If the coefficient for *ROTATION* were negative, this would indicate that audit firm rotation leads to a lower level of absolute discretionary accruals and lower audit fees, which thus shows a positive effect on audit quality with regard to absolute discretionary accruals and a negative effect on audit quality with regard to audit fees. On the other hand, if the coefficient for rotation is positive, this would indicate that audit firm rotation leads to a higher level of absolute discretionary accruals and higher audit fees and thus to a lower level of audit quality with regard to absolute discretionary accruals and a higher level of audit quality with regard to audit fees.

The beta coefficient on *IP* provides a test for hypotheses 2 and 3. Here, a positive coefficient sign indicates a (higher) country's level of investor protection positively influences audit quality with regard to audit fees and negatively influences audit quality with regard to absolute discretionary accruals. A negative coefficient sign indicates that a (higher) country's level of investor protection negatively influences audit quality with regard to audit fees and positively influences audit quality with regard to audit fees.

Finally, the beta coefficient for the interaction variable *ROTATION*IP* provides a test for hypothesis 4. This beta coefficient shows the simultaneous effect of audit firm rotation and a country's level of investor protection on audit quality. If this effect were positive, this would indicate that the additional (incremental) effect of an audit firm rotation in a country with a certain level of investor protection on audit quality is positive with regard to audit fees and a negative with regard to absolute discretionary accruals. On the other hand, a negative effect indicates that the additional (incremental) effect of an audit firm rotation in a country with a

certain level of investor protection on audit quality is negative with regard to audit fees and positive with regard to absolute discretionary accruals.

Table 7 presents the Pearson correlation coefficients for all variables from the regression model used in this study. All correlations are lower than 0.8, which means there is no multicollinearity and that all correlations are not harmful (Gujarati, 1988). Both accrual models are highly significantly correlated. This is logic, because both models measure absolute discretionary accruals and proxy for audit quality.

TABLE 6. Definition of variables

Variable	Definition
AUDIT QUALITY	Absolute discretionary accruals calculated with the Modified Jones Model; Absolute discretionary accruals calculated with the Ball and Shivakumar model; Fees paid to the audit firm by firm i at year t scaled by total assets *(measured in millions €)*
ROTATION	A dummy variable which equals 1 if a company rotated to another audit firm and 0 otherwise
IP	Investor protection, based on the mean across the three legal variables from La Porta et al. (1998); (1) efficiency of the judicial system, (2) rule of law, and (3) corruption index, where <8 = weak and ≥8 = strong;
ROTATION*IP	The interaction effect between the variables *ROTATION* and *IP*. It measures the effect of audit firm rotation on audit quality while also considering the effect of investor protection
SIZE	The natural logarithm of total assets at year t *(measured in millions €)*
LEV	The ratio of total liabilities to total assets at year t *(measured in millions €)*
CFO	Cash flow from operations at year t divided by total assets at year t *(measured in millions €)*
ROA	Return on assets for firm i at year t; *(measured in millions €)*
BIG 4	A dummy variable which equals 1 if the audit firm is EY, PwC, KPMG, or Deloitte, and 0 otherwise
Z-SCORE	The Z-score for firm i at year t calculated with the model from Altman (1968)

TABLE 7. Pearson correlations

	MJ accruals	B&S accruals	Audit fees	ROTATION	IP	SIZE	LEV	CFO	ROA	BIG 4	ZSCORE
MJ accruals	1.0000										
B&S accruals	0.7322***	1.0000									
Audit fees	-0.0627	0.0518	1.0000								
ROTATION	-0.0011	-0.0047	0.0521	1.0000							
IP	0.0238	0.0178	0.0018	0.0872**	1.0000						
SIZE	0.0042	-0.1809***	-0.5996***	-0.0253	0.2005***	1.0000					
LEV	-0.0697*	-0.1567***	-0.2518***	0.0043	-0.0279	0.4043***	1.0000				
CFO	-.02678***	0.0234	0.0568	0.0612	0.1379***	-0.2029***	-0.2375***	1.0000			
ROA	0.2945***	0.5071***	0.0057	-0.0547	0.1728***	-0.1646***	-0.1771***	0.5188***	1.0000		
BIG 4	-0.0674	-0.0721*	-0.1247***	-0.1019**	0.1530***	0.2530***	0.1013**	0.0278	0.0421	1.0000	
ZSCORE	0.1230***	0.3713***	0.3287*	0.0215	0.1307*	-0.4995*	-0.3972*	0.4328*	0.5145*	-0.0810**	1.0000

Note: the definitions of the variables are provided in Table 6. Correlations indicated with ***, **, and * are significant at the 1%, 5%, and 10% level respectively

4. Results

4.1 Descriptive statistics

Table 7 presents an overview of the descriptive statistics from all variables. The average absolute discretionary accruals based on the Modified Jones Model are equal to 1.65% of total assets and equal 0.52% of total average assets based on the Ball and Shivakumar model. The overall values of both absolute discretionary accruals models are consistent with prior studies that have used the same models (Bruynseels & Cardinaels, 2014; Chen et al., 2008; Myers et al., 2003). The average amount of audit fees is equal to 0,03% of total assets, with a maximum amount of audit fees equal to 1.78% of total assets[2]. A little over 10% of all firm year observations contain an audit firm rotation, which is equal to a total of 59 audit firm rotations (see also Table 3). The average score for investor protection is 8.3, which shows that the average score is a strong score on investor protection. The lowest score is equal to 6.81, which can be seen as a weaker score for investor protection. Nearly 93% of all audit firms belong to the Big 4 audit firms, which means that nearly 93% of all firm years where audited by an auditor belonging to the Big 4.

TABLE 8. Descriptive statistics

Variable	Mean	Std. Dev.	Minimum	Maximum
DISCR ACCR MJ	0.0165	0.8390	-2.7857	2.8979
DISCR ACCR BS	0.0052	0.8870	-2.6098	3.0705
AUDIT FEES	0.0003	0.0003	0.0000027	0.00178
ROTATION	0.1003	0.3007	0	1
IP	8.2679	1.2363	6.8167	10
ROTATION * IP	0.0323	0.4123	-1.4513	1.7320
SIZE	9.7956	1.9679	5.4412	14.5468
LEV	5.0339	8.8483	-61.3782	80.0361
CFO	0.0769	0.0908	-0.2793	1.4224
ROA	3.6315	7.2890	-90.85	42.44
BIG 4	0.9269	0.2606	0	1
Z-SCORE	1.4647	1.1251	-0.7683	1 8.2929

Note: the definitions of the variables are provided in Table 6. Audit fees and cash flow from operations are scaled by total assets.

[2] Because the data used in this study are recorded in millions € the presented scaled values for audit fees may seem rather low, however if multiplied by 100 they come down to proper percentages.

Table 9 presents the mean absolute discretionary accruals for both the Modified Jones Model and the Ball and Shivakumar and the mean for audit fees scaled by total assets. This makes it possible to indicate the effects of an audit firm rotation on the audit quality measures used in this study. Table 9 also presents the audit quality measures per country in order to see whether the means of the strong and weak investor protection countries differ significantly.

On average, all three audit quality measures show an overall decrease in audit quality after an audit firm rotation, which shows that these measures consistently measure the same effect. Both absolute discretionary accrual models show an overall increase after an audit firm rotation has taken place. An explanation for this increase could be the fact that client specific knowledge is lost. Audit fees decrease on average after an audit firm rotation. A possible explanation for this could be that newly appointed audit firms use lowballing in order to acquire a company as client. However, no differences based on whether an audit firm rotation has taken place are statistically significant.

Further, the absolute discretionary accruals are higher for strong investor protection countries than for weak investor protection countries. In addition, audit fees are lower in strong investor protection countries. Again, the audit quality measures measure the overall effect consistently all, which is a negative effect. Overall, strong investor protection countries have a lower audit quality. An explanation for the lower audit fees in strong investor protection countries could be that in those countries there is more supervision and that there are tighter deadlines for audit opinions (e.g. more pressure from regulators or stakeholders to get audited financial statements) which subsequently leads to less time available for an audit (e.g. possibly less effort) and thus lower audit fees. An explanation for the higher absolute discretionary accruals could be that managers of companies in strong investor protection countries receive more pressure from investors to meet or beat analyst forecasts and receive more analyst following. Combined with the lower audit fees this would mean that auditors in strong investor protection countries are more likely to waive material misstatements and thus allow more earnings management. This explanation is consistent with what Keune and Johnstone (2012) find in their study. They also report that there is more earnings management when audit fees are low and analyst following is high. However, the differences between strong and weak investor protection countries are statistically insignificant as well.

TABLE 9. Mean audit quality values rotation vs. no rotation and strong vs. weak IP

Country	ADA Modified Jones		ADA Ball and Shivakumar		Audit fees scaled by total assets	
	Mean (Median) [obs.]		Mean (Median) [obs.]		Mean (Median) [obs.]	
	Rotation		Rotation		Rotation	
	Yes	No	Yes	No	Yes	No
Netherlands	-0.1636 (-0.0238) [16]	-0.1394 (-0.0429) [65]	-0.2760 (-0.0265) [16]	-0.1991 (-0.1416) [65]	0.00042 (0.00030) [16]	0.00031 (0.00027) [65]
Germany		0.1563 (0.2402) [81]		0.0079 (0.0864) [81]		0.00018 (0.00019) [81]
France	0.0893 (0.1448) [16]	0.0660 (0.0945) [74]	0.1524 (0.0858) [16]	-0.0440 (-0.0584) [74]	0.00024 (0.00011) [16]	0.00020 (0.00012) [74]
Denmark	0.0068 (0.0794) [6]	0.1811 (0.2773) [51]	-0.1248 (-0.0245) [6]	0.4832 (0.2084) [51]	0.00027 (0.00031) [6]	0.00036 (0.00037) [51]
Italy	-0.2720 (-0.2818) [3]	-0.1317 (0.1499) [81]	-0.3195 (-0.3787) [3]	-0.1584 (-0.1252) [81]	0.00043 (0.00039) [3]	0.00025 (0.00018) [81]
Spain	0.1157 (-0.0533) [8]	0.0632 (0.1996) [73]	0.1143 (-0.1206) [8]	-0.0031 (0.0748) [73]	0.00013 (0.00007) [8]	0.00015 (0.00012) [73]
Portugal	-0.1515 (-0.3435) [4]	-0.1542 (-0.0294) [44]	0.0181 (-0.2267) [4]	-0.0969 (-0.1104) [44]	0.000548 (0.000548) [4]	0.00025 (0.00015) [44]
Greece	0.4106 (0.3033) [6]	0.0669 (0.0049) [60]	0.3783 (0.4567) [6]	0.1952 (0.0368) [60]	0.00035 (0.00038) [6]	0.00051 (0.00041) [60]
Difference Rotation vs. no Rotation and t-value	0.0029 (0.0257)		0.0138 (0.1136)		-0.00005 (-1.2618)	
Difference Strong vs. Weak and t-value	0.0782 (1.1291)		0.0324 (0.4426)		-0.00002 (-0.8304)	

Note: the models used for both accruals measurements are described in paragraph 3.2.1. The firm year observations for Germany did not include audit firm rotations; therefore, these rows do not have values.

Table 10 presents the mean differences between weak and strong investor protection countries in the case of both an audit firm rotation and no audit firm rotation. Further, it also presents the mean differences between strong and weak investor protection countries per year as well as the mean differences between an audit firm rotation and no audit firm rotation per year. Thus, table 10 provides a more precise overview of the mean differences and the t-values of these differences.

The difference between the Modified Jones Model accruals of strong countries in combination with no audit firm rotation and weak countries in combination with no audit firm rotation is statistically significant at the 10% level. Moreover, the difference in Modified Jones Model accruals between strong investor protection countries and weak investor protection countries is statistically significant at the 10% level for the year 2016. This second finding of significance shows that the significance of strong investor protection countries with no audit firm rotation versus weak investor protection countries with no audit firm rotation is mostly related to the difference between strong and weak investor protection and less to the fact that no rotation has taken place. Further, this significant difference only applies to the year 2016, which is the year in which the mandatory audit firm rotation rule was introduced. An explanation for this significant difference could be that analyst coverage is higher and pressure from investors to meet or beat analyst forecasts is higher in stronger investor protection countries, which could lead to higher auditor propensity to waive material misstatements. This would be consistent with Keune and Johnstone (2012). This explanation has already been given above based on table 9, however there the explanation was given for a statistically insignificant effect whereas this effect is statistically significant. Nevertheless, this statistically significant effect is only found for one out of the three audit quality measures.

When looking at the difference in means between stronger investor protection countries and weak investor protection countries in combination with an audit firm rotation the audit quality increases across all audit quality measures. This shows that the combination of rotation and a stronger level of investor protection increases audit quality, which is in contrast to the individual effects of the level of investor protection and audit firm rotation as shown in the last two rows of table 9. However, the t-values for the combination of the level of investor protection and audit firm rotation are all statistically insignificant, which is also the case for the individual effects t-values as presented in table 9.

Overall, the other mean differences for the audit quality measures consistently show the same effect and show that there are no statistically significant differences in means in the different

years, which is consistent with the statistically insignificant mean difference values presented in table 9.

TABLE 10. Mean audit quality value differences by rotation, IP, and year

Sort of difference	ADA Modified Jones	ADA Ball and Shivakumar	Audit fees scaled by total assets
Difference strong rotation vs. weak rotation	-0.1239 (-0.6801)	-0.1812 (-0.9609)	0.00000766 (0.0750)
Difference strong no rotation vs. weak no rotation	0.0996 (1.3378) *	0.0553 (0.7004)	-0.0000268 (-1.0387)
Difference strong vs. weak 2014	0.0631 (0.5362)	0.0671 (0.5705)	-0.000011 (-0.2495)
Difference strong vs. weak 2015	-0.0198 (-0.1677)	-0.0425 (-0.3318)	-0.0000233 (-0.5417)
Difference strong vs. weak 2016	0.1914 (1.5370) *	0.0727 (0.5359)	-0.0000285 (-0.6425)
Difference rotation vs. no rotation 2015	-0.0749 (-0.4694)	-0.1417 (-0.8205)	-0.0000852 (-1.0768)
Difference rotation vs. no rotation 2016	0.0470 (0.2590)	0.1559 (0.7943)	-0.0000232 (-0.3602)

Note: the models used for both accruals measurements are described in paragraph 3.2.1. * means the value is significant at the 10% level.

4.2 Test of hypotheses

The results of the multilevel panel data regression for all three audit quality measures are presented in table 11. The regression model has also been run with a dummy for investor protection (unreported) where the dummy was equal to 1 in the case of a strong investor protection country and 0 otherwise. This yielded the same results as the regression model with the investor protection score variable and therefore this additional analysis shows that the results are robust.

Table 11 shows that the model is significant (0.0000), which indicates that the coefficients in the model are different than zero. A significant positive effect at the 10% level is found for rotation for both absolute discretionary accrual models, which indicates that an audit firm rotation increases the level of absolute discretionary accruals and thus decreases audit quality. This finding shows that audit quality is significantly influenced by an audit firm rotation. However, no (significant) negative effect on audit quality is found with regard to audit fees. Nevertheless, these findings on the effect of audit firm rotation could serve as confirmation of the argument of mandatory audit firm rotation opponents that the newly appointed audit firm lacks client-specific knowledge, which impairs the quality of the audit. Further, Myers et al. (2003) argue that the newly appointed auditor may find that there are necessary impairments that have to be done, which subsequently lead to higher accrual levels. Together, these findings on the effect of audit firm rotation confirm hypothesis 1, but this only applies to accruals and not to audit fees.

The coefficients for investor protection show negative values with regard to absolute discretionary accruals and positive values with regard to audit fees. However, only the coefficient for audit fees is significant at the 5% level. This effect indicates a higher level of investor protection leads to higher audit fees and therefore, as is argued in this study, leads to more auditor effort and thus higher audit quality. This finding is consistent with the argument from Bruynseels and Cardinaels (2014). Based on this finding, hypothesis 2 can only be accepted with regard to audit fees and not with regard to absolute discretionary accruals.

The interaction effect between audit firm rotation and investor protection shows negative values for the absolute discretionary accruals models and a positive value for audit fees, which means audit quality increases for all three measures. This would mean that an audit firm rotation in countries with higher levels of investor protection increases audit quality However, despite the fact that all three audit quality coefficients indicate a positive effect on

audit quality and would confirm hypothesis 3, these effects are statistically insignificant and therefore hypothesis 3 cannot be confirmed.

All control variables show mostly significant effects (1% level) on the three audit quality measures. This means the control variables account for most of the variation in audit quality. The coefficient for size indicates larger companies have higher absolute discretionary accruals based on the Modified Jones Model and pay a lower amount of audit fees. This shows that audit quality, based on two of the three audit quality measures, is lower for bigger companies. This finding is inconsistent with Myers et al. (2003), but consistent with Davis et al. (2009). A possible explanation for the lower audit quality for bigger companies is that those companies use discretionary accruals to meet or beat analyst forecasts and because of the lower audit fees that are also found, the auditor is more likely to waive material misstatements (Keune & Johnstone, 2012). The coefficients for leverage are all negative, but only significant for the absolute discretionary accrual models. This shows that accrual levels decrease with higher levels of leverage. This finding is consistent with Kwon et al. (2014). The negative and significant coefficient for cash flow from operations on the absolute discretionary accrual models is consistent with Myers et al. (2003), Jackson, Moldrich, and Roebuck (2008), and Kwon et al. (2014). This negative effect indicates that companies with higher cash flows from operations are better performers and do indeed have lower levels of accruals. The coefficient for ROA is significant at the 1% level for all three audit quality measures and indicates a decrease in audit quality with higher return on assets. An explanation for this finding could be that firms that perform better with regard to return on assets did so by making use of more earnings management and paying a lower amount of audit fees leading to a lower effort of the auditor that allowed these companies to use more earnings management. The Z-score coefficient is positive and significant at the 1% level for both accruals models, which is consistent with Kim et al. (2015). The coefficient is positive for all three audit quality measures, which indicates a higher Z-score and thus a lower probability of bankruptcy leads to higher accruals and audit fees. An explanation for this finding could be that firms in financial distress are audited more thoroughly, leading to more audit fees and subsequently also to lower levels of accruals. The coefficient for Big 4 is only significant for the Modified Jones Model accruals. The other coefficients for Big 4 are not significant, but they do show the same positive effect on audit quality, which is consistent with Kim et al. (2015). This finding serves as a small indication that having a Big 4 audit firm as auditor increase audit quality in comparison with a non-Big 4 audit firm.

TABLE 11. Multilevel panel data regression

Variable	ADA Modified Jones		ADA Ball and Shivakumar		Audit fees scaled by total assets	
	Excl. interaction	Incl. interaction	Excl. interaction	Incl. interaction	Excl. interaction	Incl. interaction
ROTATION	**0.1857** **(1.94) ***	**0.1857** **(1.89) ***	**0.1613** **(1.68) ***	**0.1862** **(1.89) ***	0.0000247 (0.73)	0.0000138 (0.40)
IP	-0.0040 (-0.16)	-0.0040 (-0.16)	-0.0056 (-0.20)	0.0016 (0.06)	**0.000037** **(2.45) ****	**0.0000332** **(2.20) ****
ROTATION*IP		-0.0020 (-0.03)		-0.0841 (-1.15)		0.0000386 (1.50)
SIZE	**0.0530** **(2.79) *****	**0.0529** **(2.79) *****	-0.0272 (-1.37)	-0.0247 (-1.27)	**-0.000103** **(-13.66) *****	**-0.0001037** **(-13.74) *****
LEV	**-0.0070** **(-1.77) ***	**-0.0067** **(-1.76) ***	**-0.0108** **(-2.82) *****	**-0.0109** **(-2.85) *****	-0.000009 (-0.06)	-0.000006 (-0.01)
CFO	**-5.9322** **(-15.70) *****	**-5.9322** **(-15.62) *****	**-3.7543** **(-9.89) *****	**-3.7072** **(-9.74) *****	-0.0001194 (-0.89)	-0.0001379 (-1.03)
ROA	**0.0680** **(13.90) *****	**0.0680** **(13.90) *****	**0.0755** **(15.37) *****	**0.0756** **(15.42) *****	**-0.000006** **(-3.50) *****	**-0.000006** **(-3.52) *****
ZSCORE	**0.1001** **(2.78) *****	**0.1001** **(2.77) *****	**0.2315** **(6.38) *****	**0.2279** **(6.29) *****	0.0000165 (1.28)	0.0000174 (1.36)
BIG 4	**-0.2064** **(-1.87) ***	**-0.2064** **(-1.86) ***	-0.1647 (-1.46)	-0.1489 (-1.33)	0.0000499 (1.22)	0.0000448 (1.10)
INDUSTRY = 2	-0.1633 (-1.49)	-0.1633 (-1.49)	**-0.4096** **(-3.72) *****	**-0.4146** **(-3.77) *****	-0.000004 (-0.10)	-0.000008 (-0.02)
INDUSTRY = 3	0.1084 (0.95)	0.1084 (0.95)	0.0269 (0.24)	0.0165 (0.14)	-0.0000314 (-0.78)	-0.0000268 (-0.67)
INDUSTRY = 4	-0.1604 (-1.31)	-0.1604 (-1.30)	**-0.4293** **(-3.49) *****	**-0.4321** **(-3.51) *****	0.0000473 (1.09)	0.0000497 (1.15)
INDUSTRY = 5	**-0.2544** **(-1.99) ****	**-0.2543** **(-1.98) ****	0.1597 (1.23)	0.1481 (1.15)	0.0000255 (0.55)	0.0000281 (0.61)
YEAR = 2015	-0.0234 (-0.34)	-0.0234 (-0.34)	-0.0288 (-0.42)	-0.0273 (-0.40)	-0.000005 (-0.22)	-0.000006 (-0.25)
YEAR = 2016	-0.0319 (-0.46)	-0.0319 (-0.46)	-0.0181 (-0.26)	-0.0194 (-0.28)	0.000006 (0.24)	0.000006 (0.27)
Number of observations	588		588		588	
Overall Chi^2	0.0000		0.0000		0.0000	

Note: the definitions of the variables are provided in Table 6. The reference category for industry is Mining & Construction; reference category for year is 2014. Coefficients indicated with ***, **, and * are significant at the 1%, 5%, and 10% level respectively. The value between parentheses are the Z-values for the respective coefficient.

As a robustness check, table 12 and 13 present the results from the multilevel regression of the regression model used in this study for only strong and weak investor protection countries respectively in order to check whether the regression output differs from the regression output from table 11. Both models are significant (0.0000) indicating that the coefficients in both models are different from zero.

The results presented in table 12 and 13 show that the coefficients for the control variables do not differ in their effect (positive or negative) and there are only slight differences in the significance of the coefficients. What stands out is the fact that the control variable coefficients with regard to audit fees, except for leverage, all become significant when running the regression model only for weak investor protection countries. The coefficient for return on assets on audit fees becomes insignificant when the model is performed for strong investor protection countries. With regard to the control variables, the regression model can be deemed robust.

TABLE 12. Multilevel panel data regression for strong IP countries

Variable	ADA Modified Jones		ADA Ball and Shivakumar		Audit fees scaled by total assets	
	Excl. interaction	Incl. interaction	Excl. interaction	Incl. interaction	Excl. interaction	Incl. interaction
ROTATION	0.1382 (1.37)	0.1447 (0.72)	0.1225 (1.17)	0.1033 (0.49)	0.0000535 (1.40)	0.000011 (0.14)
IP	-0.0706 (-1.08)	-0.1150 (-1.62)	-0.1170 (-1.72)	-0.1201 (-1.62)	0.0000286 (1.15)	0.0000185 (0.69)
ROTATION*IP		0.2462 (1.62)		0.0168 (0.11)		0.0000561 (0.98)
SIZE	**0.0643** **(2.26) ****	**0.05887** **(2.07) ****	-0.0121 (-0.41)	-0.0124 (-0.42)	**-0.0000935** **(-8.71) *****	**-0.000948** **(-8.78) *****
LEV	**-0.0111** **(-2.40) ****	**-0.0109** **(-2.38) ****	**-0.0145** **(-3.02) *****	**-0.0144** **(-3.02) *****	0.0000016 (0.91)	0.0000016 (0.93)
CFO	**-4.9846** **(-13.12) *****	**-5.0564** **(-13.27) *****	**-4.1147** **(-10.42) *****	**-4.1196** **(-10.37) *****	-0.0001049 (-0.73)	-0.0001213 (-0.84)
ROA	**0.0834** **(12.59) *****	**0.0846** **(12.75) *****	**0.1053** **(15.31) *****	**0.1054** **(15.22) *****	-0.0000028 (-1.11)	-0.0000025 (-1.00)
ZSCORE	**0.1187** **(2.50) ****	**0.1174** **(2.48) ****	**0.1558** **(3.15) *****	**0.1557** **(3.15) *****	-0.0000099 (-0.55)	-0.0000102 (-0.57)
BIG 4	-0.0275 (-0.18)	-0.0105 (-0.07)	-0.1065 (-0.66)	-0.1053 (-0.66)	-0.0000369 (-0.63)	-0.000033 (-0.57)
INDUSTRY = 2	-0.1069 (-0.79)	-0.1089 (-0.81)	-0.5102 (-3.63) ***	-0.5103 (-3.63) ***	-0.0000345 (-0.67)	-0.0000349 (-0.68)
INDUSTRY = 3	0.0943 (0.63)	0.0937 (0.63)	-0.2083 (-1.35)	-0.2084 (-1.35)	0.0000481 (0.85)	0.0000479 (0.85)
INDUSTRY = 4	0.0508 (0.33)	0.0382 (0.25)	**-0.4127** **(-2.62) *****	**-0.4135** **(-2.62) *****	-0.0000262 (-0.46)	-0.0000291 (-0.51)
INDUSTRY = 5	0.1067 (0.62)	0.1093 (0.64)	**0.3099** **(1.73) ***	**0.3102** **(1.73) ***	-0.0000956 (-1.47)	-0.000095 (-1.46)
YEAR = 2015	-0.0525 (-0.66)	-0.0501 (-0.63)	-0.0596 (-0.72)	-0.0594 (-0.71)	-0.0000151 (-0.50)	-0.0000145 (-0.48)
YEAR = 2016	0.0311 (0.39)	0.0297 (0.38)	0.0008 (0.01)	0.0007 (0.01)	-0.0000023 (-0.08)	-0.0000027 (-0.09)
Number of observations	309		309		309	
Overall Chi^2	0.0000		0.0000		0.0000	

Note: the definitions of the variables are provided in Table 6. The reference category for industry is Mining & Construction; reference category for year is 2014. Coefficients indicated with ***, **, and * are significant at the 1%, 5%, and 10% level respectively. The value between parentheses are the Z-values for the respective coefficient.

TABLE 13. Multilevel panel data regression for weak IP countries

Variable	ADA Modified Jones		ADA Ball and Shivakumar		Audit fees scaled by total assets	
	Excl. interaction	Incl. interaction	Excl. interaction	Incl. interaction	Excl. interaction	Incl. interaction
ROTATION	0.1558 (0.97)	0.3463 (1.23)	0.1988 (1.20)	0.2080 (1.35)	-0.0000019 (-0.33)	0.0005972 (1.30)
IP	**0.9647** **(2.53) ****	**0.8380** **(2.17) ****	**1.2172** **(3.09) *****	**1.0494** **(2.64) *****	-0.000273 (-1.18)	-0.0003078 (-1.32)
ROTATION*IP		**1.7957** **(1.72) ***		**2.3784** **(2.22) ****		0.000505 (1.35)
SIZE	**0.0533** **(1.88) ***	**0.0549** **(1.95) ***	**-0.0601** **(-2.05) ***	**-0.0579** **(-1.99)**	**-0.0001073** **(-9.65) *****	**-0.0001069** **(-9.63) *****
LEV	-0.0060 (-1.10)	-0.0062 (-1.15)	**-0.0103** **(-1.82) ***	**-0.0106** **(-1.89) ***	-0.0000014 (-0.70)	-0.0000014 (-0.72)
CFO	**-10.7864** **(-13.41) *****	**-10.9098** **(-13.58) *****	**-4.2525** **(-5.11) *****	**-4.4158** **(-5.34) *****	**-0.0004785** **(-1.64) ***	**-0.0005162** **(-1.77)**
ROA	**0.0634** **(9.78) *****	**0.0656** **(9.98) *****	**0.0585** **(8.73) *****	**0.0614** **(9.07) *****	**-0.0000078** **(-3.37) *****	**-0.0000072** **(-3.04) *****
ZSCORE	**0.1432** **(2.84) *****	**0.1442** **(2.88) *****	**0.3172** **(6.10) *****	**0.3185** **(6.17) *****	**0.0000331** **(1.83) ***	**0.0000334** **(1.86) ***
BIG 4	**-0.2807** **(-1.71) ***	**-0.3057** **(-1.87) ***	-0.1726 (-1.02)	-0.2057 (-1.22)	**0.0001473** **(2.50) ****	**0.00014** **(2.37) ****
INDUSTRY = 2	-0.2243 (-1.42)	-0.2211 (-1.41)	**-0.4677** **(-2.87) *****	**-0.4634** **(-2.87) *****	-0.00000056 (-0.01)	-0.00000037 (-0.01)
INDUSTRY = 3	0.1661 (1.10)	0.1838 (1.22)	0.1076 (0.69)	0.1311 (0.84)	-0.0000669 (-1.23)	-0.0000622 (-1.15)
INDUSTRY = 4	-0.1706 (-0.98)	-0.1686 (-0.98)	**-0.5214** **(-2.91) *****	**-0.5187** **(-2.92) *****	**0.0001493** **(2.41) ***	**0.0001496** **(2.42) ***
INDUSTRY = 5	**-0.6481** **(-3.68) *****	**-0.6542** **(-3.74) *****	0.0076 (0.04)	-0.0005 (-0.00)	0.00005 (0.78)	0.0000477 (0.75)
YEAR = 2015	0.0318 (0.32)	0.0365 (0.37)	0.0220 (0.21)	0.0282 (0.28)	0.000006 (0.18)	0.000007 (0.22)
YEAR = 2016	-0.0782 (-0.78)	-0.0819 (-0.82)	-0.0344 (-0.33)	-0.0394 (-0.38)	0.000021 (0.59)	0.000020 (0.56)
Number of observations	279		279		279	
Overall Chi^2	0.0000		0.0000		0.0000	

Note: the definitions of the variables are provided in Table 6. The reference category for industry is Mining & Construction; reference category for year is 2014. Coefficients indicated with ***, **, and * are significant at the 1%, 5%, and 10% level respectively. The value between parentheses are the Z-values for the respective coefficient.

Table 12 and 13 also show differences in the significance and effects of the independent variable coefficients. For rotation, the coefficients obtained from running the regression model only for weak investor protection countries shows that audit fees now has a negative coefficient instead of a positive one. Further, the results obtained from running the regression model only for strong investor protection countries yields only positive coefficients, which is the same as the coefficients in table 11. However, the coefficients for rotation in table 12 and 13 are all statistically insignificant, which is in contrast to the significant coefficients found in table 11. This shows that an audit firm rotation in strong- or weak investor protection countries increases does not significantly increase or decrease audit quality. Still, the negative effects on audit quality could serve as support for the opponents of mandatory audit firm rotation even though the effect are insignificant. Taken together, this result does not provide evidence that audit firm rotation has an effect on audit quality on the short term and therefore hypothesis 1 is rejected.

The investor protection coefficient for strong investor protection countries shows the same insignificant coefficients for all audit quality measures in comparison to table 11. These coefficients all indicate that a stronger level of investor protection increases audit quality, but the effects are insignificant. For weak investor protection countries, the investor protection coefficients for both accruals models are significant and both show a positive sign. This shows that audit quality, based on absolute discretionary accruals, decreases when the level of investor protection increases for countries with a weak investor protection. An explanation for this could be that when a country is already seen as a weak investor protection country, an increase in the investor protection level does not benefit audit quality and this effect will therefore only disappear when a country obtains a strong level of investor protection. Taken together, the different results on the investor protection coefficient for weak investor protection countries indicate that audit quality decreases when weak investor protection countries increase their investor protection, but this effect reverses and becomes insignificant when a country becomes a strong investor protection country. These findings provide support for hypothesis 2, but only for weak investor protection countries and only with regard to absolute discretionary accruals.

The coefficients for the interaction variable between rotation and investor protection are all insignificant for strong investor protection countries, which is consistent with the results from the regression model in which both strong- and weak investor protection countries were taken into account. On the other hand, the coefficients for both accrual models are significant in the

weak investor protection countries indicating an increase in accruals and thus a lower audit quality in the case of an audit firm rotation in combination with an increase in the investor protection score. These findings provide evidence that does not support hypothesis 3 and therefore this hypothesis is rejected, because this finding shows that a combination of an audit firm rotation and an increase in the level of investor protection negatively influences audit quality with regard to accruals. Also, here, an explanation could be that a low investor protection country will only be able to reverse this negative effect when it becomes a strong investor protection country. As long as it remains weak, the negative effect will stay because the country will be seen as a weak investor protection country.

5. Conclusion and discussion

This study examines the relationship between audit firm rotation, a country's level of investor protection, and audit quality. Prior research on the effect of audit firm rotation on audit quality has not provided consistent results and therefore has been unable to provide a conclusive answer to the question whether audit firm rotation positively or negatively influences audit quality. One factor that might explain these inconsistent results is investor protection, which has not been taken into account yet. Therefore, this study contributes to the currently available literature by examining the relationship between audit firm rotation and audit quality, while at the same time taking into account the possible effect of investor protection.

Three proxies for audit quality are used, namely audit fees and two models for absolute discretionary accruals, i.e. the absolute discretionary accruals have been measured by the Modified Jones Model (1995) and the Ball and Shivakumar (2006) model. Based on these three audit quality proxies, the results show that audit firm rotation does not influence audit quality. Moreover, when the sample is divided into strong- and weak investor protection countries, audit quality is also not found to be influenced by an audit firm rotation. This finding provides some support for opponents of mandatory audit firm rotation, but only with regard to a short-term period.

Second, this study finds that investor protection has an effect on audit quality. An increasing level of investor protection increases audit fees and thus positively influences audit quality. This could be the case because companies in strong investor protection countries require more audit effort because of the higher amount of regulation already in place in contrast to weak investor protection countries. This subsequently results in relatively higher audit fees paid in strong investor protection countries. When strong- and weak investor protection countries are taken into account separately, a negative effect on audit quality with regard to accruals is found. However, this negative effect only applies to countries with weak investor protection. An explanation for this could be that when a country is already seen as a weak investor protection country, an increase in the investor protection level does not benefit audit quality and this effect only disappears when a country obtains a strong level of investor protection. This finding also confirms that investor protection has a significant effect on audit quality, but only with regard to accruals in weak investor protection countries. This effect on audit quality disappears when a country becomes a strong investor protection country, which implies that countries with weak investor protection should attempt to increase their level of investor

protection to become a strong investor protection country, at least based on the three legal variables.

Third, this study finds that the combined effect of an audit firm rotation and an increasing level of investor protection increases accruals (for both accrual models), but only for weak investor protection countries. This, again, implies that especially weak investor protection countries should not implement mandatory audit firm rotation when looking at the negative effect on audit quality in the short term. However, weak investor protection countries should still attempt to increase their level of investor protection in order to obtain a strong level of investor protection.

Taken together, the findings provide support for the opponents of mandatory audit firm rotation, as an audit firm rotation is not found to influence audit quality. This finding applies to both strong- and weak investor protection countries. Instead, adapting SOX regulation could be a better solution, as this increases the amount of regulation, which could lead to an increase in investor protection as well. Further, this study provides evidence that investor protection has an effect on audit quality, but only with regard to accruals in weak investor protection countries. Finally, the combined effect of an audit firm rotation and an increasing level of investor protection decreases audit quality. However, this finding, again, only applies to weak investor protection countries. Once the country obtains a strong level of investor protection, this effect disappears. The latter two findings suggest that regulations and laws protecting outside investors currently in place in strong investor protection countries, but not in weak ones, guarantee a sufficient level of audit quality. Also here, the adaptation of SOX, mainly in countries with a weak investor protection, could lead to more and better regulations and laws in place to protect outside investors and thus could lead to a higher level of investor protection.

This study is, however, subject to several limitations. First, the investor protection score from La Porta et al. (1998) dates from 1998. This score could be different if it was measured again using contemporary data. Thus, future research should measure the investor protection scores again based on contemporary data to check whether the results of this study still hold. Second, this study only takes into account a 3-year period (2014-2016) because the mandatory audit firm rotation rule has come into life in 2016. Future research should be able to collect mandatory audit firm rotation data over a longer period to examine if audit quality is influenced by audit firm rotation on the long term. Third, the usage of absolute discretionary accruals and audit fees could provide significantly different results in contrast to other

possible proxies for audit quality. Therefore, future research should examine whether other audit quality proxies yield the same or different results. Further, future studies could take into account multiple other proxies that are significantly different from one another in order to attenuate their individual weaknesses and make use of their individual strengths (DeFond & Zhang, 2014). By using other different proxies, an even more complete and thorough measure of audit quality would be taken into account. It could also be possible that future research makes use of new audit quality measures that have been constructed through a collaboration between the auditing practice, regulators, and scholars, which Francis (2011) highly recommends in order to move research on audit quality forward. Fourth, although the audit firm rotations in the 2014-2016 period that are regarded in this study to be mandatory or influenced by the mandatory audit firm rotation rule, it is not possible to be completely certain that the rotation is indeed mandatory. It could also be that some of the rotations in the sample were voluntary (e.g., mandatory audit firm rotation did not influence the decision to rotate). Future studies could attempt to measure audit firm rotation in such a way that it is made possible to assure that an audit firm rotation decision is indeed mandatory or voluntary.

This study contributes to current literature by examining the relationship between audit firm rotation, investor protection, and audit quality. A country's level of investor protection should not be ignored in future studies, because they differ with regard to audit quality. The mixed results in the literature are therefore, among other things, due to the difference in the type of countries that were taken into account. The insights gained from this study could be of interest for policy makers and regulators, as it is shown that audit firm rotation does not significantly increase nor decrease audit quality for both strong- and weak investor protection countries. Thus, this study suggests reconsidering the introduction of mandatory audit firm rotation and suggests looking at a possible adaptation of other options such as SOX regulation. Future research could examine whether audit firm rotations in Europe and SOX countries differ in their effect on audit quality in the short term while also taking into account the difference between strong- and weak investor protection.

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