Auditor Rotation and Audit Quality in Europe

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Abstract

Mandatory auditor rotation has been proposed as a mechanism to enhance auditors' independence and ultimately improve the quality of audits. Proponents claim that as the auditor-client relationship increases the auditors' independence will decrease, affecting the quality of their work. Opponents, however, state that the benefits do not outweigh the costs, namely destroyed industry and client-specific expertise. New auditors need time to understand the client's business, operations and risks. This study examines the effects of auditor rotation on audit quality, by focusing on European companies for the period 1995-2014. Similar studies focusing on European companies are rare. Based on prior studies it is hypothesized that audit quality will decrease on the short term after rotation, but will increase on the long term. Also a differential effect between voluntary and mandatory rotation is hypothesized. Three different measures of audit quality are used; discretionary accruals, abnormal working capital accruals, and the ratio of loss avoidance. The results are mixed as dependent on the measure of audit quality there is supporting or contradicting evidence. The first two hypotheses are not supported nor rejected by the data, as the evidence is only indicative. The second hypothesis is rejected, however the results are not robust.

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1. Introduction

The auditor's profession has been heavily impacted by corporate scandals in the last two decades. It started with the collapse of Arthur Andersen due to the massive scandal at Enron in 2002. Soon others like WorldCom, Parmalat, and Satyam followed, but also each of the Big-Four audit firms were subject to legal investigations. The result was a societal debate on the role and functioning of auditors worldwide. Financial reports, audit quality, and auditors' independence were questioned by different stakeholders. One proposed solution was mandatory rotation of auditors. Proponents of mandatory rotation claimed that auditor tenure was negatively associated with audit quality (Myers, et al, 2003). By limiting the client-auditor relationship and periodically mandating a new auditor, the auditor's independence and audit quality should be improved (Nashwa, 2004). This should be a mechanism to restore the quality of audits and with that also the reputation of auditors worldwide. Several propositions for new legislation were made, and one of them was the introduction of the Sarbanes-Oxley Act (SOX) in the US in 2002. Before SOX the accounting profession was mostly self-regulatory as the American Institute for Certified Public Accountants (AICPA) set their own standards, however SOX replaced this with direct regulation by the Public Company Accounting Oversight Board (PCAOB) (Francis, 2004). Even though SOX did not impose mandatory audit firm rotation on auditors, it required a study on the effects of mandatory rotation to be conducted by the PCAOB. The study showed that the benefits of mandatory rotation would not outweigh its costs. The expected benefits are said to be a fresh look at the company where the audit is conducted critically in order to enhance independence and indirectly increase audit quality. Costs of mandatory rotation are the loss of experience with the audit client, leading to lower audit quality and increased first-year costs of auditing a new client (Nashwa, 2004; Firth, et al., 2012; Myers, et al., 2013; Bowlin, et al., 2015). As a result the PCAOB abandoned the idea of mandatory auditor rotation in 2014.

While in the US the idea was abandoned, in 2014 the European Parliament approved new audit legislation, mandating audit firm rotation for EU Public Interest Entities (PIEs) (KPMG, 2014). This new legislation requires companies to rotate their audit firm every 10 years. Under certain circumstances the period can be extended for up to 14 years, maximizing tenure at 24 years. EU member states' legislation can however require a maximum tenure that is shorter than 10 years (e.g. Italy and the Netherlands have a mandatory firm rotation after respectively 9 and 8 years of tenure) (KPMG, 2015). Aimed at increasing the audit quality, additional measures were taken, such as more restrictions on non-audit services, more

responsibilities for the audit committee, and expanded reporting requirements for auditors. Auditors are required to provide, in the audit report, a description of the most important risks of material misstatement that were assessed during the audit and their response to those risks. Also an additional report has to be provided to the audit committee where the results of the audit are explained in more detail (KPMG, 2015). These measures were aimed to enhance the investors' understanding of the audit process.

An extensive amount of literature has been written on the (expected) effects of mandatory auditor rotation (Arrunada & Paz-Ares, 1998; Jackson, et al., 2008; Chi, et al., 2009; Cameran, et al., 2015; Bowlin, et al., 2015), however, for voluntary rotation this is not the case. Hoyle (1978) discussed that mandatory rotation might not be the best solution, and already proposed the alternative of more responsibilities for audit committees. Arrunada and Paz-Ares (1998) have argued that rotation makes audits more costly to both the auditor and the client since client-specific knowledge is destroyed when the auditor is rotated and, instead of increasing quality, might decrease it by damaging the technical competence, e.g. the ability to detect misstatements. Nashwa (2004, p. 23) supports this decreasing quality claim by showing that the number of audit failures is highest in the first three years of tenure, and is halved in the subsequent three years. The main argument in support of mandatory rotation is that it improves audit quality, because of a new and fresh look from a new auditor which should lead to higher independence. The proponents also claim that earnings management, which is associated with audit quality, would be decreased due to the new auditor and thereby increasing audit quality. Therefore a great deal of the literature focuses on the effect of auditor rotation on audit quality. Chiefly, prior studies report a decrease in audit quality after mandatory rotation, which supports the arguments of the opponents of mandatory rotation. However, there are also studies that report opposite results, providing evidence that auditor rotation does increase audit quality. These ambiguous results make it harder to draw clear conclusions. A possible explanation for the mixed results is that the prior studies often used different proxies for audit quality and they use different samples. Because of the mixed results in prior studies and the new European legislation, this study aims to provide unambiguous evidence on the effects of auditor rotation on audit quality by studying the relation in years prior to the legislation. To guide the research the following research question is used:

To what extent does auditor rotation influence the audit quality in European companies?

This study is first scientifically relevant as it contributes to the literature on auditor rotation, both voluntary and mandatory. A great deal of literature has been written to discuss the (expected) effects of mandatory rotation to support their arguments. However little research is backed up with empirical results. Firth, et al. (2012) look at different forms of auditor rotation, voluntary vs. mandatory and audit firm vs. audit partner rotation, and audit quality, but they focus on Chinese firms. They show that audit partner and audit firm rotation leads to lower audit quality, however the effect for rotating the audit firm is weaker. As the legal environment in China is quite constrained, the results are hard to generalize. Some conducted research on the effects of mandatory auditor rotation, but only look at the audit firm tenure (Johnson, et al., 2002; Jackson, et al., 2008) or audit partner tenure (Carey & Simnett, 2006; Chen, et al., 2008) as the determinant of audit quality. In contrast, the amount of literature on voluntary rotation has been very limited. Nashwa (2004) states that voluntary switchers are not representative as they systematically differ from each other. Voluntary switchers could have very diverse reasons for changing their auditor, which makes it difficult to draw clear conclusions from the results. In line with Firth, et al. (2012), this study also takes into consideration voluntary rotation in comparison with companies that mandatorily rotate their auditor. Next to the contribution to auditor rotation literature, it does also contribute to the literature on determinants of audit quality, and specifically auditor rotation as a determinant of audit quality. A lot of different studies have looked into the determinants of audit quality (Wooten, 2003; Francis, 2011; IAASB, 2011). Hoitash, et al. (2007) looked at the effects of audit fees on audit quality and showed that audit fees had a negative association with their proxies for audit quality. The effect of auditor industry expertise has been researched by Balsam, et al. (2003) and DeAngelo (1981) and Francis and Yu (2009) used auditor size. This study expands the literature on auditor rotation as a determinant for audit quality by using historical data from European companies. It aims to clarify prior ambiguous results by not only looking at audit quality in the year immediately after rotation, but also during three years after rotation. This study is also scientifically relevant as it takes into account both voluntary and mandatory rotation, while prior studies often only looked at mandatory rotation. Comparing both could provide useful insights for the debate on mandatory rotation. This study also uses multiple measures of audit quality, in contrast to prior research where only one measures, often accruals-based or the propensity of going-concern opinions, is used. Using multiple measures is important as similar results with different measures would support more reliable conclusions. Additionally, it also shows that audit quality can be measured in different ways to match each

stakeholder's perspective of audit quality and therefore the conclusions are relevant for multiple stakeholders.

Evidence on differences between the effects of voluntary and mandatory rotation on audit quality could also have practical implications for policymakers and is therefore practically relevant as well. Higher audit quality for mandatory rotating companies could be a reason for policymakers in other countries to also mandate auditor rotation. This is especially the case since this research focuses on European companies. Prior similar research was mostly country-specific and the focus was on Asian and Middle-Eastern countries. Evidence has been documented for Indonesia (Siregar, et al., 2012), Malaysia (Salleh & Jasmani, 2014), Taiwan (Chi, et al., 2009), China (Firth, et al., 2012), Korea (Kwon, et al., 2014; Kim, et al., 2015), and Jordan (Al-Khoury, et al., 2015). While the evidence for European countries has been very limited, as research has only been conducted in Italy (Cameran, et al., 2015; Cameran, et al., 2016) and Spain (Ruiz-Barbadillo, et al., 2009; García-Sánchez, et al., 2014). Country specific results are not always easy to generalize worldwide. Therefore, this study is relevant for practice as the EU issued new audit legislation. The results of this study aim to provide more insights in the consequences of auditor rotation based on effects of rotation in the past.

The remainder of this paper is organized as follows. Section two covers the theoretical background of this paper by discussing the underlying economic theories. It also discusses the theories behind the concepts of audit quality and auditor rotation and ends with the development of hypotheses. In section three the data collection, research sample and research method, including econometric models are covered. Section four starts by providing descriptive statistics of the research sample, followed by results on the tests of hypotheses and a robustness test. This paper is concluded with the conclusion of this paper, where an answer to the research question is formulated, and a discussion of the limitations of this study.

2. Literature Overview and Hypotheses Development

2.1 Theoretical Background

Underlying this study is the agency theory by Jensen and Meckling (1976). They pose in their paper that an organization is a nexus of contracts between two or more parties; the principal and the agent working on behalf of the principal. The principal and agent have their own incompatible interests and are expected to act self-interested. This conflict of interest is also called the agency problem. However, information asymmetry exists, causing problems for the principal to monitor the agent. The agent has more information than the principal and can therefore act in his own interests. The principal can on the one hand restrict the agent's behavior by using contracts and on the other hand align his behavior with the principal's interests by incentivizing the agent. Common incentives are profit sharing, performance related payment, and option bonuses. These alignment mechanisms also bring along costs, e.g. contracts have to be written or bonuses have to be paid, and these costs are the agency costs.

The users of financial statements, in this case the shareholders, creditors, banks, and other stakeholders, are considered the principals while the firm's management is the agent. In their paper Jensen and Meckling (1976) claim that an audit of financial statements by an independent auditor is one way to reduce information asymmetry. The auditor gives assurance about the reliability of the financial statements and thereby provides the users of financial statements with information about the firm's performance (Louwers, et al., 2015). However, to some extent the position of the auditor increases the agency problem, as the auditor is an economic agent itself. Even though indirectly financed by the shareholders, the firm or the firm's audit committee decides on which auditor to hire and pays the audit fee. This gives the auditor incentives to act in the interests of the firm's management instead of the interests of the shareholders. Auditors will want to keep the company's management satisfied as it could provide a solid stream of income for several years, and this clearly blurs the auditor's independence. This is also what caused a lot of the scandals in recent years. As DeAngelo (1981) and Watts and Zimmerman (1983) state, the success of the audit depends on the probability that the auditor will discover and report a misstatement, which in turn is influenced by the auditor's level of independence and expertise. Proponents of auditor rotation claim that mandatory rotation enhances their independence and thereby increases the quality of financial reports. In the following sections the theories underlying audit quality and auditor rotation will be discussed in more detail.

2.2 Audit Quality

One of the first to try to define audit quality was DeAngelo (1981). She stated that audit quality is *"the market-assessed join probability that a given auditor will both (a) discover a breach in the client's accounting system, and (b) report the breach"* (1981, p. 186). This definition captures two important dimensions of audit quality: (a) the probability that misstatements are detected and (b) that the auditor acts properly on the discovery (Knechel, et al., 2013). The first part indicates the auditor's capabilities and competence and the second part is related to its independence, professionalism, and objectivity. DeAngelo's (1981) definition appeared to be very influential and has been the basis for a lot of studies on audit quality that followed (e.g. Arrunada, 2000; Wooten, 2003; Chi, et al., 2009; Firth, et al., 2010; Knechel, et al., 2013).

Other definitions only cover a single influencing factor when trying to define audit quality. In an early study done by the Government Accountability Office (GAO) the potential effects of mandatory audit firm rotation were studied in the light of SOX. The GAO (2002) report defines audit quality mainly as the extent to which the audit is conducted in accordance with the generally accepted auditing standards (GAAS), that it is presented in accordance with the generally accepted accounting principles (GAAP), and that there are no material misstatements. This approach uses the audit process as determinant for audit quality. Others define it in terms of audit work on a specific audit (Carcello, et al., 2002) or audit failures (Francis, 2011). Since DeAngelo's (1981) definition covers the two main dimensions of audit quality and has been used in a large number of subsequent studies, it will also be used in this study.

2.2.1 Audit Quality Frameworks

Due to the scandals, the quality of audits has become a very practically important topic. And this has attracted the attention of researchers. A large number of studies has tried to conceptualize, define and measure audit quality, with mixed results. This has resulted in audit quality being a much debated concept. In their literature review Knechel et al. (2013) start by noting that it is very important to keep in mind when researching audit quality, that the perceptions of audit quality heavily depend on the subject. User perceptions are affected by the direct level of involvement with audits and the assessment of audit quality (Smith, 2012; IAASB, 2011). Audit quality is particularly important to stakeholders of the financial reports, and they all have different views on and interests in these reports. For the auditor audit quality

could mean to be compliant with all the rules that apply in order to defend the audit process in case of an inspection or legal case. In contrast, a survey by Epstein and Geiger (1994) among the users of financial statements showed that 70% of the investors indicated no material misstatements and no fraud as high audit quality. This illustrates that the quality of audits is different for each stakeholder when studying it, it should be approached holistically (Smith, 2012). The consequence is that it is very hard, if not impossible, to capture the different aspects of audit quality in one comprehensive definition. This also has implications for individual stakeholders, as their actions regarding audit quality might have consequences for others' audit quality perspectives. Understanding the different aspects of audit quality and factors influencing it is therefore critical in increasing quality (IAASB, 2011).

In their report the International Auditing and Assurance Standards Board (IAASB) (2011) elaborated on audit quality and factors influencing it. Despite not giving an overarching definition the report tries to clarify the concept. Audit quality can, in essence, be viewed in terms of three characteristics: inputs, outputs, and context factors. The conceptual model of audit quality is depicted in Figure 1. As one could imagine there are a lot of inputs to audit quality possible, the IAASB considered the auditors' personal attributes and audit process most important. As already mentioned, the outputs have different influences since the outputs are used by stakeholders in different ways to assess audit quality. The last category consists of the contextual factors influencing audit quality. Contextual factors can be interpreted as corporate governance mechanisms, laws and regulations, and society at large. As Figure 1 shows these three factors do not only influence audit quality, but also influence each other, making the process of defining and assessing audit quality even harder (IAASB, 2011). This conceptual model forms the basis for assessing audit quality in this study.

Figure 1 - Influences on Audit Quality (IAASB, 2011)

Concluding, audit quality is influenced by inputs, outputs, and contextual factors, resulting in a lot of different definitions. Defining and measuring audit quality might therefore be very problematic. The next section discusses the determinants of audit quality which have been used in prior research.

2.2.2 Determinants and Empirical Evidence of Audit Quality

When applying the conceptual model of the IAASB (2011) on DeAngelo's definition of audit quality, the two dimensions of detecting and reporting misstatements can be considered inputs. These two dimensions however, are influenced by a lot of other factors. Some researchers have tried to model the concept of audit quality. Here, the IAASB's (2011) conceptual model of audit quality is the most generic model, however it serves its purpose by showing in general which sorts of factors influence audit quality. Francis (2011) attempted to develop a framework for understanding and researching audit quality. He identified the following six units of analysis to consider in audit research: audit inputs, audit process, accounting firms, audit industry and audit markets, institutions, and economic consequences of audit outcomes. Also this framework can be applied to the conceptual model of audit quality, where the inputs, process and accounting firms are the inputs and the industry, markets, and institutions are the contextual factors. However, Francis (2011) does not consider the output of the audit process (i.e. auditor's report and audited financial statements) to influence audit quality. Moreover, the outputs can have a substantial effect on the measured audit quality, this for instance is shown by Becker, et al. (1998) and Lin and Hwang (2010) in their studies on the effect of audit quality on earnings management, which is considered an accurate proxy for earnings quality and therefore for audit quality. Also the UK's Financial Reporting Council (FRC) developed their own audit quality framework (depicted in Knechel, et al., 2013). The FRC identified five drivers of audit quality which are as follows: 1. audit firm culture; 2. audit process effectiveness; 3. reliability and usefulness of audit reporting; 4. skills and qualities of partners and staff; and 5. factors outside the auditors' control. For each driver the FRC came up with possible indicators. However, the FRC framework also does not take into account the outcomes as substantial influences, as the focus is primarily on inputs and auditors' internal influences, such as culture, skills and qualities.

In addition to the 2011 report, the second IAASB (2013) report presents a framework for audit quality. The framework elaborates on different categories per element (i.e. inputs, outputs, context, and interactions) and differentiates on three levels within audit firms to assess the quality, being engagement level, firm level, and national level. This extended framework and the attributes per category provide a very complete framework when researching audit quality. However, considering the whole framework and all the attributes is not possible because of the scope of this study. An alternative model is that presented in Wooten's (2003) literature review, orderly presenting the relations and factors affecting audit quality and its determinants. The basis of the model is the two-dimensional definition of DeAngelo (1981).

The model starts with detection and reporting of misstatements as the core and their related factors.

Wooten (2003) states that detection of misstatements is influenced by the performance of the audit team, which is in turn firstly influenced by audit firm factors. Audit firm factors are for instance audit firm size (DeAngelo, 1981), human resources, control processes, and industry experience. Secondly, audit team performance is affected by audit team characteristics, such as client and industry experience, professionalism, planning and conduct of the audit process, and partner attention (Wooten, 2003).

Regarding the factors related to reporting, the ability to report a misstatement is largely affected by the auditor's independence. Auditors' independence has received great attention in the literature as it has been identified as one of the main causes for corporate scandals. Wooten (2003) states that audit pricing, audit tenure, and the provision of other services indirectly affect both the detection and reporting of misstatements. All of these factors are in some way related to audit quality, which is shown in the model depicted in Appendix A. The model does extensively describe the different input determinants of audit quality, but only briefly mentions the outputs and their effects. Contextual factors, such as institutional and legal influences, are not taken into account at all.

As defining audit quality is very hard, so is measuring it. A lot of different measures have been developed to measure different aspects of audit quality. A common problem in measuring audit quality in prior research has also been the fact that the measures heavily depend on from which perspective audit quality is researched. According to Francis *"audit quality can be conceptualized as a theoretical continuum ranging from very low to very high audit quality"* (2004, p. 346). In his study Francis (2004) primarily uses audit failures as measures for audit quality, since outright audit failures would be on the very low end of the continuum. The approach of interpreting audit quality as a continuum can in practice be problematic, since it is hard to operationalize. The measures of audit quality used in this study will be elaborated on later.

A lot of empirical research has been conducted on audit quality and its determinants. Empirical evidence is a valuable addition to the theoretical and conceptual models and frameworks described above. The empirical studies often focused on different factors' effects on audit quality and the results support the practical application of audit quality frameworks. Probably the most researched determinant is auditor tenure as it has also extensively been debated (Knechel, et al., 2013). The main arguments are that on the one hand short tenure means less client experience and therefore lower audit quality (Carey & Simnett, 2006), while

on the other hand long tenure may impair the auditor's objectivity (Jackson, et al., 2008; Chen, et al., 2008; Siregar, et al., 2012). The evidence of prior studies does not bring clearness to the debate as the results are quite mixed. These mixed results are due to differences in audit quality proxies, research designs and samples used. Audit firm and audit partner tenure are often used as independent variables in research on the effect of auditor rotation on audit quality.

The importance of the auditor size as a determinant has already been acknowledged by DeAngelo (1981). Francis and Yu (2009) hypothesize and show that Big-Four auditors have a positive influence on audit quality. They also differentiate between measures of office sizes and find that the results are robust. The argument is that larger offices have more capacity and in-house experience to use in the audit than small offices. In other research auditor size is not used as the independent variable, but more often as the control variable on other variables' effects on audit quality. Auditor size is measured in different ways, such as a Big-*N*/non Big-*N* dummy, office size, or the logarithm of the total asset values. Also industry specialization has received some empirical attention after being theoretically hypothesized as influential. Auditors specialized in a certain industry are expected to yield higher quality audits for companies in that industry. Balsam, et al. (2003) studied the relation between industry specialization and earnings quality, which is often seen as a proxy for audit quality (Dechow, et al., 2010; Francis, 2011). Simplified, they find that "*clients of industry specialists have higher earnings quality than clients of nonspecialists*" (2003, p.71).

Finally, audit fees are considered a very important determinant for audit quality. It is argued by some that higher audit fees impair the independence and thus the willingness to report misstatements. Hoitash, et al. (2007) conducted research on the relation between total fees and different audit quality proxies and found a positive result among all, supporting the argument that higher fees would indicate more hours spent and thus higher quality audits.

2.3 Auditor Rotation

As discussed, auditors can be identified as economic agents with their own interests within the agency problem between the shareholders and the management of a company. This places the auditors within the debate and causes them to be subject of extra regulation to increase audit quality as well. Auditors are, according to Figure 1, a very important input to audit quality and as discussed in the previous section, their functioning is influenced by a lot of determinants like their independence and expertise. The solution often proposed to decrease auditors' incentives and to align their interests with the shareholders', investors', and, at large,

societies' interests is by mandating auditor rotation. When considering the relation between auditor rotation and the conceptual model of audit quality depicted in Figure 1, auditor rotation can be seen as an influencing factor of the inputs. By rotating the auditor input factors are influenced, such as independence, tenure, and client experience (Wooten, 2003). The increase in attention for mandatory auditor rotation in the past 15 years was not rare. Already in 1939 during SEC hearings mandatory rotation was discussed (Hoyle, 1978). And ever since, there periodically were peaks in the debate where mandatory rotation was posed as a solution to independence problems. The most recent peak came after the corporate scandals in the beginning of the twenty-first century such as Enron, Worldcom, Parmalat, and Satyam. Corporate scandals are partly attributed to poor quality audits and subsequently to a lack of auditor independence (Catanach & Walker, 1999).

Auditor rotation can take several forms. First of all, firms can rotate their auditor voluntarily. The motives to voluntarily change auditors are not always clear, as firms are not required to disclose this information. In his paper, Nashwa (2004) shows that voluntary change is often associated with audit failures like financial distress and fraud. Reasons for rotation are then that firms want to delay disclosures about their financial conditions, but the current auditor does not agree. Other reasons to change auditor are identified by Williams (1988). He discusses three concepts from the client's perspective to help explain why auditors are changed. The first concept is that of changes in the client contracting environment, where the shareholders demand a new auditor. The second concept is that of auditor effectiveness, when an auditor is ineffective, a company may want to change it and hire a more effective auditor. The effectiveness is influenced by the level of industry specialization. The third concept is the client's reputation. The auditor will be changed when the client perceives the relationship as damaging to its own reputation.

The second form is mandatory rotation, which can mean either mandatory audit firm rotation or mandatory audit partner rotation. The latter is less severe as it would only require a rotation of audit partners within the same firm. However, it could be questioned to what extent the intended effects are then achieved. Mandatory firm rotation would require the company to end the tenure with the current auditor after a certain number of years and find a new auditor. Mandatory rotation has been heavily debated and it has both positive and negative effects on audit quality and auditor independence.

Every time the debate rises again, more or less the same arguments are used. In their literature review Cameran, et al. (2005) summarized the existing papers on auditor rotation and the effects on independence, quality, and agency costs. They show that worldwide the majority

of papers written by researchers and regulators is against mandatory rotation. The proponents and opponents all adduce arguments why mandatory rotation should not be implemented. The next sections summarize the most important arguments for and against mandatory rotation.

2.3.1 Arguments for Mandatory Rotation

Hoyle (1978) states that there are two main arguments in favor of mandatory rotation. The first is that over time the quality and competence of auditor's work decreases significantly. And the second argument is that long-term relationships between the client and auditor can damage the auditor's independence. Both quality and independence are essential for the auditor to be credible and deliver high-quality work. New auditors are argued to have a fresh look. Increased competition between audit firms would put quality first, and rotation allows for peer review of previous years by auditors. Mautz and Sharaf (1961) suggested that longer tenure would impair the objectivity of the auditor and therewith the auditor independence. Myers, et al (2003) pose that decreased auditor independence would lead to more support for aggressive accounting choices, because the auditors are more aligned with the management. This increases the chance of not detecting or preventing fraud. Mandating rotation of the auditor is said to mitigate these risks.

2.3.2 Arguments Against Mandatory Rotation

Strongly against mandatory rotating auditors are the auditors themselves. Since the first discussion in 1939 they consequently adduce arguments against mandatory rotation. According to Catanach and Walker (1999) the opponents acknowledge the potential benefits, but these do not outweigh the costs. The first argument is that mandatory rotation would lead to higher audit costs. Auditors have a learning curve with new clients, which increases as tenure increases. The acquired knowledge over the years will be destroyed when they are rotated (Lennox, et al., 2014). New auditors often do not have that industry and client-specific expertise, which causes more hours to be spent with a higher likelihood of audit failures. The understanding of the client's business, operations and risks takes a few years (FEE, 2004). The second argument is that auditors believe that mandatory rotation is unnecessary as there are a lot of other mechanisms in place to guard independence (Catanach and Walker, 1999). They are subject to regulations, quality control standards, and increased scrutiny by oversight bodies (e.g. the PCAOB and the SEC). The third argument claims that auditors might lose interest as the end of their term approaches, with all unacceptable effects included. In the last two years the effects of rotation might be neutralized due to the auditor's lost interest (FEE, 2004). Their last

argument is that auditor resignations are very strong and useful signals to the market, by mandating rotation the market misses these signals when clients are in conflict with their auditors (Jackson, et al., 2008). The opponents believe that if necessary the auditors will be rotated on a voluntary basis and that new legislation mandating rotation is redundant.

2.4 The Effects of Auditor Rotation on Audit Quality and Hypotheses Development

A large number of papers on the effects of auditor rotation on audit quality have preceded this study. The majority of these studies focused only on the effects of mandatory rotation and left out voluntary rotation. Also most of the studies used empirical data from Asian and Middle-Eastern countries and the US. The results of prior studies are often mixed and inconsistent, which is most likely to be attributed to differences in research design. Prior studies use different proxies for audit quality. Lennox, et al. (2014) use the number of audit adjustments to proxy for audit quality, Firth, et al. (2012) utilize the propensity to issue a modified audit opinion to measure audit quality, and Jackson, et al (2008) proxy audit quality with the propensity to issue a going-concern opinion, while more often accruals-based measures are used. However, there are also differences in which accruals to use. One possibility is using discretionary accruals, based on the model of Jones (1991) (e.g. Myers, et al., 2003; Chi, et al., 2009; Kwon, et al., 2014; Bruynseels & Cardinaels, 2014). The other possibility is using the abnormal amount of working capital accruals. This model was developed by DeFond and Park (2001) and used by Carey and Simnett (2006) and Cameran, et al. (2016). The inconsistencies in results are also enforced by different samples and research designs.

However, while the results of prior research are mixed and inconsistent, hypotheses based on these studies could be formulated. As documented by Myers, et al. (2003), Siregar, et al. (2012), and Cameran, et al. (2015) after rotation the audit quality decreases. Supporting the opponents of mandatory rotation, rotating auditors destroys client-specific knowledge and these costs do not outweigh the benefits of a fresh look. The first hypothesis of this study is therefore as follows:

H1a: Auditor rotation has after rotation a negative effect on audit quality on the short term.

But as prior literature also states, as tenure increases the auditor gains new client-specific experience which is positive for audit quality (Myers, et al., 2003; Jackson, et al., 2008; Cameran, et al., 2015; Cameran, et al., 2016). So while it is expected that audit quality

decreases in the first year, as tenure increases audit quality will increase as well, resulting in the following hypothesis:

H1b: Auditor rotation has after rotation a positive effect on audit quality on the long term.

Some prior studies also took into account the differences between voluntary and mandatory rotation and their effects on audit quality. However, as mandatory rotation was very uncommon before 2016, such studies were rare. These studies were mainly conducted with Asian data. Chi, et al. (2009) found that in Taiwan after mandatory rotation audit quality was higher than after voluntary rotation. These findings were supported by evidence from China provided by Firth, et al. (2012) and Korea by Kim, et al. (2015). Due to a lack of European studies no clear effect could be expected and therefore the third hypothesis is as follows:

H2: Voluntary and mandatory auditor rotation have differential effects on the audit quality.

3. Research Method

3.1 Research Sample

The sample consists of companies from Austria, Belgium, Germany, Italy, Luxembourg, and the Netherlands. Financial and auditor data is gathered for the fiscal years 1995-2014. Firms from the financial industry (SIC-codes 6000-6999) are excluded from the sample, because their financial statements and asset base are not comparable to the other companies in the sample. After removing firms which miss the essential data for the analyses (e.g. total assets and auditor data) a research sample consisting of 1,699 companies remains, resulting in a total of 19,973 firm-year observations which will be used for the analyses. Financial data is collected from the Compustat Global database, which contains data for a large number of companies worldwide. Auditor data is gathered and matched manually from the ThomsonOne database. Per company for each year the auditor's name and a code is matched with the financial data. The auditor-specific code allows easier analysis of auditor rotation and the number of audits they conduct. The Big-*N* auditors are engaged in more than half of all firm-year observations in the sample. Arthur Andersen went bankrupt in 2002 and this decreased the Big-Five auditors to the Big-Four. Additionally, industry data is gathered for analyses purposes. The industries are grouped per two-digit SIC codes, resulting in nine different industry groups, with the largest industry being the manufacturing industry. Table 1.1 provides a comprehensive overview of the sample descriptive statistics. More detailed descriptive sample statistics are presented in Table 1.2 which shows the number of firm-year observations per country and industry for each year.

3.2 Measurement of Variables

3.2.1 Dependent Variable

As discussed in the audit quality literature it is hard to measure audit quality. Audit quality means different things to different stakeholders and therefore the measure depends on the stakeholder's perspective. The aim of this study is to investigate the effects of auditor rotation on audit quality by using different measures. This study will utilize three different measures. Audit quality is considered to be related with earnings management. Often earnings management proxies are used to measure audit quality, since higher quality audits decrease earnings management by a company's management (e.g. Myers, et al., 2003; Carey & Simnett, 2006; Jackson, et al., 2008; Chi, et al., 2009; Cameran, et al., 2016). Fortunately, there is an extensive amount of literature written on different earnings management measures. One of the

Table 1.1 - Sample Descriptive Statistics

Panel A: Countries		
Country	No. of Companies	No. of Firm-years
Austria	97	1,251
Belgium	136	1,693
Germany	903	10,755
Italy	305	3,227
Luxembourg	54	520
Netherlands	204	2,527
Total	1,699	19,973
Panel B: Industries		
Industry[1]	SIC Codes	No. of Observations
Agriculture, Forestry, Fishing	01-09	167
Mining	10-14	262
Construction	15-17	507
Manufacturing	20-39	10,601
Transportation & Public Utilities	40-49	2,292
Wholesale Trade	50-51	784
Retail Trade	52-59	816
Services	70-89	4,225
Public Administration	91-99	319
Total		19,973
Panel C: Auditors		
Auditor[2]	No. of Observations	
Arthur Andersen	523	
Deloitte	2,155	
KPMG	3,260	
PWC	3,324	
EY	3,193	
Other	6,021	
Missing	1,497	
Total	19,973	

[1]Industry categories are based on two-digit SIC codes. On www.siccode.com subcategories are specified.
[2]Auditors are grouped based on the final acquiring firm. E.g. Coopers & Lybrand are placed under the PWC label.

first and most famous model is that by Jones (1991), which is used to measure the abnormal amount of discretionary accruals. Managers have discretion over these accruals, and therefore they can be used to manage earnings. In recent years this model has been modified and improved several times (e.g. Dechow, Sloan, & Sweeney, 1995). However, the discretionary accruals analysis will be conducted by using the method of Bruynseels and Cardinaels (2014).

Table 1.2 - Sample Descriptive Statistics

Panel A: Firm-Year Observations per Country

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Austria	34	49	55	59	65	69	71	73	63	70	68	69	67	65	66	63	64	61	60	60	1,251
Belgium	35	45	53	61	82	86	89	89	93	103	106	108	102	100	97	93	92	92	84	83	1,693
Germany	184	281	332	452	558	621	597	616	580	643	647	644	645	622	596	580	579	557	528	493	10,755
Italy	38	77	83	98	124	143	153	164	172	185	206	215	215	201	197	195	195	194	191	181	3,227
Luxembourg	3	11	11	11	16	18	19	21	21	26	25	29	32	34	37	41	43	43	42	37	520
Netherlands	64	100	115	130	143	150	148	144	145	146	140	134	138	127	117	119	121	120	113	113	2,527
Total	358	563	649	811	988	1,087	1,077	1,107	1,074	1,173	1,192	1,199	1,199	1,149	1,110	1,091	1,094	1,067	1,018	967	19,973

Panel B: Firm-Year Observations per Industry

SIC	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
01-09	4	5	5	5	6	7	7	8	6	8	9	10	10	10	11	12	11	11	12	10	167
10-14	6	8	8	9	10	9	9	10	11	14	16	14	17	16	17	18	18	19	17	16	262
15-17	16	25	26	28	29	30	28	25	25	26	28	25	27	26	24	24	24	24	24	23	507
20-39	221	355	384	447	517	551	557	565	545	605	619	624	625	601	585	581	580	571	550	518	10,601
40-49	39	58	72	86	101	116	118	122	120	133	134	145	145	137	136	130	133	131	117	119	2,292
50-51	19	27	36	39	45	42	46	49	47	47	48	46	45	43	39	35	36	34	31	30	784
52-59	20	26	27	31	43	49	47	49	46	48	47	48	46	45	42	42	43	40	40	37	816
70-89	25	49	81	154	223	267	249	261	257	272	268	266	264	253	239	231	233	222	211	200	4,225
91-99	8	10	10	12	14	16	16	18	17	20	23	21	20	18	17	18	16	15	16	14	319
Total	358	563	649	811	988	1,087	1,077	1,107	1,074	1,173	1,192	1,199	1,199	1,149	1,110	1,091	1,094	1,067	1,018	967	19,973

One advantage of the model that is used, over the conventional modified-Jones model is that it controls for asymmetric timeliness of accruals in recognizing losses and gains. The following model is used to measure discretionary accruals per company per year:

$$\frac{\mathrm{TACC}_{i,t}}{\mathrm{AVTA}_{i,t}} = \beta_0 + \beta_1\left[\frac{\Delta\mathrm{REV}_{i,t}}{\mathrm{AVTA}_{i,t}}\right] + \beta_2\left[\frac{\mathrm{PPE}_{i,t}}{\mathrm{AVTA}_{i,t}}\right] + \beta_3\left[\frac{\mathrm{CFO}_{i,t}}{\mathrm{AVTA}_{i,t}}\right] + \beta_4\mathrm{DCFO}_{i,t} + \beta_5\left[\left(\frac{\mathrm{CFO}_{i,t}}{\mathrm{AVTA}_{i,t}}\right) * \mathrm{DCFO}_{i,t}\right] + \varepsilon \quad (1)$$

where $\mathrm{TACC}_{i,t}$ equals the total accruals for firm *i* in fiscal year *t*, calculated as income before extraordinary items minus the cash flow from operations; $\mathrm{AVTA}_{i,t}$ equals the average of total assets for firm *i* in year *t* and *t*-1; $\Delta\mathrm{REV}_{i,t}$ is the change in revenues for firm *i* in year *t*; $\mathrm{PPE}_{i,t}$ presents the amount of gross property, plant, and equipment for firm *i* in year *t*; $\mathrm{CFO}_{i,t}$ equals the cash flow from operations for firm *i* in year *t*; $\mathrm{DCFO}_{i,t}$ is a dummy variable equal to 1 if $\mathrm{CFO}_{i,t}$ is negative, and 0 otherwise; and ε is the error term. For each firm Equation (1) is estimated. Then discretionary accruals (DA) will be calculated as the difference between the estimated values from Equation (1) and the actual amount of total accruals. High values of DA are an indication for more earnings management and thus lower audit quality.

The second model, which also uses accruals, does not take into account discretionary accruals, but looks at the level of abnormal working capital accruals (AWCA), developed by DeFond and Park (2001). In order to calculate the amount of abnormal working capital accruals the following model is used:

$$\mathrm{AWCA}_t = \mathrm{WC}_t - \left[\left(\frac{\mathrm{WC}_{t-1}}{\mathrm{S}_{t-1}}\right) * \mathrm{S}_t\right] \quad (2)$$

where, WC_t equals non-cash working capital, calculated as [(current assets – cash and short-term investments) – (current liabilities – short-term debt)] for year *t*, and S_t equals the amount of sales in year *t*. In accordance with prior literature all variables are scaled by the average of total assets (Myers, et al, 2003; Carey & Simnett, 2006). AWCA is the difference between the actual amount of working capital and the expected amount needed to support the current level of sales (Carey & Simnett, 2006; Cameran, et al., 2016). The expected amount of working capital is determined by the historical relationship between sales and working capital. High amounts of abnormal working capital accruals are an indication of more earnings management, and thus lower audit quality.

Finally, the third model is not based on accruals, but rather on accounting conservatism and the firm's response to reporting incentives (Burgstahler, et al., 2006). It is assumed that higher audit quality is associated with more accounting conservatism (Cameran, et al., 2016). Burgstahler and Dichev (1997) showed with their study that companies in the US use accounting to prevent reporting small losses. Earnings are managed to decrease the loss, or increase the earnings, resulting in unusually low frequencies of small losses and unusually high frequencies of small profits. Such a loss or profit is considered small if net income, be it a loss or profit, is smaller than one percent of last year's total assets. To measure the extent of loss avoidance the ratio of the number of small profits divided by the number of small losses is calculated per country for each two-digit industry group:

$$ALR = \frac{Number\ of\ small\ profits}{Number\ of\ small\ losses} \tag{3}$$

Since companies do not want small losses and therefore boost their earnings to result in a small profit, higher values of ALR are an indication of less accounting conservatism and thus lower audit quality.

The three measures of Equations (1), (2), and (3) are each used as a proxy for audit quality. The discretionary accruals model and the abnormal working capital accruals model both measure the amount of earnings management and the avoid loss ratio measures the extent of accounting conservatism. In order to investigate the development of audit quality before and after auditor rotation, and subsequently test the hypotheses, the difference between the values from Equations (1), (2), and (3) during different periods is used. The first period of change is the difference between the last year of the old auditor *t*-1 and the first year of the new auditor *t*, where *t* indicates the auditor switch. This first period of change, hereafter called C1, is calculated as values in year *t* minus *t*-1. C1 is necessary as it shows the increase or decrease of audit quality in the year of the auditor switch, which allows to compare audit quality under the old auditor and the first year of the new auditor. The second period of change, hereafter C2, uses the difference between the first year *t* and second year *t*+1 after the auditor switch to examine whether audit quality increases or decreases during tenure. C2 is calculated as the value in year *t*+1 minus *t*. To further examine the increase or decrease of audit quality during tenure the third period of change, hereafter C3, is used. C3 uses the difference between the third year *t*+2 and the first year *t* after the switch and is calculated as the values of *t*+2 minus *t*. To this extent also the difference between the fourth year *t*+3 and first year *t* after the switch is used, hereafter C4. C4 is calculated as the values at years *t*+3 minus *t*. These four periods of

change are used to test hypothesis 1a. The fifth and last period of change, hereafter C5, used to test the hypotheses is the difference between the last year of the old auditor *t*-1 and the fourth year of the new auditor *t*+3. Hypothesis 1b can be tested by examining the effects of auditor rotation on C5 as it measures the effect of auditor rotation on the long term. For each of the measures of audit quality the prior five periods of change are calculated.

3.2.2 Independent Variable

In this study the effects of auditor rotation on audit quality is investigated. In order to measure auditor rotation a dummy variable is created which equals 1 if there was a switch of auditor in that year, and 0 otherwise.

3.2.3 Control Variables

In line with prior studies certain control variables are included in the regression equations to control for influences of other variables. The first control variable is *SIZE*, calculated as the natural logarithm of total assets. It is used to control for different effects firm size has, such as more negotiation power and less chance of bankruptcy for larger firms (Carey & Simnett, 2006) or differences in accounting conservatism (Myers, et al., 2003). The second control variable is the firm's leverage *LEV*, calculated as the ratio of total liabilities divided by total assets. Leverage has to be controlled for as it could incentivize firms to manage their earnings, e.g. in case of violations of debt covenants (Carey & Simnett, 2006). The third control variable *ROA* controls for firm performance. Return on assets is calculated as the firm's net income divided by total assets. Fourth, companies can manage their earnings by boosting sales and according to Johnson, et al. (2002) accruals are associated with growth opportunities. Therefore, *SALESGROWTH*, calculated as the percentage increase from year *t*-1 to year *t*, is used to control for these effects (Cameran, et al., 2016). In order to control for effects of mandatory and voluntary auditor rotation the fifth control variable *MANDATORY* is included in the analysis. It is incorporated as a dummy variable that equals 1 if a firm's legal environment requires the firm to rotate its auditor, 0 otherwise. This is the case for Italian and Austrian firms, since in those two countries auditor rotation is mandatory. This dummy variable is also used to test hypothesis 2. A significant effect of *MANDATORY* on changes in audit quality indicates that the impact of voluntary and mandatory rotation on audit quality is differential. Some prior literature assumes that Big-*N* auditors provide higher quality audits, to control for these effects the dummy variable *BIGN* is included that equals 1 if a firm's auditor is one of the Big-*N*

auditors, 0 otherwise. Finally *YEAR*, *COUNTRY*, and *INDUSTRY* are incorporated as control dummies.

Table 2 - Explanation of Variables

Variables	Proxy	Measurement
Panel A: Dependent Variables		
C1AQ	Immediate effect of auditor rotation on audit quality.	*AQ* is substituted for each of the measures of audit quality. Calculated as the values of year *t* minus *t*-1, where *t* is the year of auditor rotation.
C2AQ	Effect on audit quality during the first two years after rotation.	*AQ* is substituted for each of the measures of audit quality. Calculated as the values of year *t+1* minus *t*, where *t* is the year of auditor rotation.
C3AQ	Effect on audit quality during the first three years after rotation.	*AQ* is substituted for each of the measures of audit quality. Calculated as the values of year *t+2* minus *t*, where *t* is the year of auditor rotation.
C4AQ	Effect on audit quality during the first four years after rotation.	*AQ* is substituted for each of the measures of audit quality. Calculated as the values of year *t+3* minus *t*, where *t* is the year of auditor rotation.
C5AQ	Effect on audit quality after four years, compared to the old auditor,	*AQ* is substituted for each of the measures of audit quality. Calculated as the values of year *t+3* minus *t*-1, where *t* is the year of auditor rotation.
Panel B: Independent Variable		
SWITCH	Auditor Rotation	Dummy variable that equals 1 if the firm's auditor was rotated in that year, 0 otherwise
Panel C: Control Variables		
SIZE	Firm Size	Natural logarithm of total assets.
LEV	Level of Debt	Total liabilities divided by total assets.
ROA	Firm Performance	Net income divided by total assets.
SALESGROWTH	Growth Opportunities	Percentage change in sales from year *t*-1 to year *t*.
MANDATORY	Mandated Rotation of the Auditor	Dummy variable that equals 1 if the firm's legal environment mandates the auditor to be rotated, 0 otherwise.
BIGN	Big-*N* Auditor	Dummy variable that equals 1 if the firm's auditor is one of the Big-*N* auditors, 0 otherwise.
YEAR		Year dummies
COUNTRY		Country dummies
INDUSTRY		Industry dummies

3.3 Econometric Model

In order to determine the effects of auditor rotation on audit quality, different measures of audit quality are used. To test the hypotheses the difference in audit quality between certain periods are calculated for each measure and used as dependent variables in regression analyses. This results in the following generic regression equation:

$$\begin{aligned} CnAQ = {} & \beta_0 + \beta_1 SWITCH + \beta_2 SIZE + \beta_3 LEV + \beta_4 ROA + \beta_5 SALESGROWTH \\ & + \beta_6 MANDATORY + \beta_7 BIGN + \beta_8 YEAR + \beta_9 COUNTRY \\ & + \beta_{10} INDUSTRY + \varepsilon \end{aligned} \tag{4}$$

where *n* is substituted for the specific period of change and *AQ* is substituted for the measure of audit quality. Five periods of change for each of the three different measures of audit quality result in a total of fifteen different regression analyses.

4. Results

4.1 Descriptive Statistics

The definitions of the variables were already presented in Table 2. Table 3.1 reports on the descriptive statistics of the variables. The amounts of changes in discretionary accruals decreased over the years as the mean value per change is negative, indicating that audit quality improves steadily over time. Changes in abnormal working capital accruals show a different pattern as first the abnormal amounts of working capital accruals increase, but after three years they slightly decrease. This is an indication for a decrease in audit quality on the short term, but an increase on the longer term, after three years. Finally, the changes in the avoid losses ratio show an increase over time. An increase in the avoid losses ratio means that the number

Table 3.1 – Descriptive Statistics of Variables

Descriptive statistics of dependent, independent, and control variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Panel A: Dependent Variables					
C1DA	15,945	-0.002	0.7087	-53.45	52.60
C2DA	15,945	-0.002	0.7087	-53.45	52.60
C3DA	14,129	-0.004	0.8614	-53.06	51.87
C4DA	12,643	-0.001	0.8617	-47.04	51.91
C5DA	11,058	-0.002	0.9843	-48.77	51.94
C1AWCA	15,627	0.358	48.5837	-2,539.14	2,916.83
C2AWCA	15,627	0.358	48.5837	-2,539.14	2,916.83
C3AWCA	13,836	0.172	35.7050	-1,503.78	1,387.21
C4AWCA	12,375	-0.064	48.1270	-3,309.12	1,630.86
C5AWCA	10,823	-0.063	50.6387	-3,309.17	1,448.21
C1ALR	2,764	0.084	0.3784	-6.00	1.00
C2ALR	2,764	0.084	0.3784	-6.00	1.00
C3ALR	2,370	0.155	0.5381	-6.00	2.00
C4ALR	2,015	0.231	0.6665	-8.00	3.00
C5ALR	1,665	0.311	0.7614	-7.00	4.00
Panel B: Independent Variable					
SWITCH	16,466	0.093	0.2904	0	1
Panel C: Control Variables					
SIZE	19,973	5.729	2.6311	-5.52	18.82
LEV	19,973	0.776	9.5323	0.00	791.75
ROA	19,973	-0.025	1.2261	-71.78	94.80
SALESGROWTH	17,622	0.422	17.4831	-431.67	1,974.50
MANDATORY	19,973	0.197	0.3979	0	1
BIGN	19,973	0.624	0.4845	0	1
YEAR	19,973			1995	2014
COUNTRY	19,973			1	6
INDUSTRY	19,973			1	99

Definition of variables in Table 2.

of small profits is relatively higher than the number of small losses, indicating less accounting conservatism and more earnings management. The descriptive statistics show that 9.3% of all firm-year observations were years where the auditor was rotated. The statistics also show that 19.7% of all firm-years were subject to mandatory rotation, as they were Italian companies or Austrian companies after 2005. Regarding the auditors, 62.4% of all firm-years were audited by Big-*N* auditors. The other control variables show sufficient variation within the sample. Table 3.2 below presents more specific descriptive statistics of the variables per country.

Table 3.2 - Descriptive Statistics of Variables per Country

Panel A: SIZE per Country					
Country	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Austria	1,251	6.087	2.0778	-4.07	11.66
Belgium	1,693	6.100	2.2408	-0.60	13.19
Germany	10,755	5.042	2.2474	-3.69	12.77
Italy	3,227	7.324	3.4354	-4.96	18.82
Luxembourg	520	6.422	2.2010	-5.52	11.80
Netherlands	2,527	6.047	2.4594	-5.52	18.65
Panel B: BIGN per Country					
Country	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Austria	1,251	0.632	0.4824	0	1
Belgium	1,693	0.620	0.4856	0	1
Germany	10,755	0.512	0.4999	0	1
Italy	3,227	0.826	0.3788	0	1
Luxembourg	520	0.637	0.4815	0	1
Netherlands	2,527	0.835	0.3713	0	1

Definition of variables in Table 2.

4.2 Tests of Hypotheses

The hypotheses are tested by conducting regression analyses per audit quality proxy. Before testing the hypotheses, an analysis has to be conducted to control for multicollinearity. Multicollinearity issues arise when two or more predictor variables correlate. This correlation of multiple variables within the model could influence the results as the predictors' effects are not pure. One way to detect multicollinearity is by analyzing the correlations between the variables. Multicollinearity is indicated by correlations among the variables higher than 0.7. The correlation matrix is presented in Table 4. The correlation matrix shows that no correlation is higher than 0.7, so no multicollinearity issues have arisen. As there are no multicollinearity issues, the assumptions are not violated and regression analyses to test the hypotheses are allowed. For each period the three different measures of audit quality are tested, resulting in a total of fifteen regression analyses. The results for the discretionary accruals measure, the abnormal working capital accruals measure, and the avoid loss ratio are presented in Table 5.1,

Table 4 - Correlations

Correlations among the independent and control variables

	SWITCH	SIZE	LEV	ROA	SALESGROWTH	MANDATORY	BIGN	YEAR	COUNTRY	INDUSTRY
SWITCH	1.000									
SIZE	-0.0746*	1.000								
LEV	-0.0059	-0.0731*	1.000							
ROA	-0.0117	0.0880*	-0.4996*	1.000						
SALESGROWTH	0.0039	-0.0074	-0.0095	0.0003	1.000					
MANDATORY	0.0179*	0.2440*	-0.0079	0.0078	0.0138	1.000				
BIGN	-0.0539*	0.3092*	-0.0234*	0.0234*	-0.0202*	0.1844*	1.000			
YEAR	-0.0100	-0.1967*	-0.0010	-0.0033	-0.0061	0.1133*	0.0847*	1.000		
COUNTRY	-0.0242*	0.1019*	0.0362*	-0.0127	-0.020*	0.0290*	0.1847*	-0.0026	1.000	
INDUSTRY	0.0235*	-0.1929*	0.0416*	-0.0335*	0.0158*	-0.1002*	-0.0549*	0.0248*	0.0431*	1.000

*Correlations are significant at a 5% level. No correlation is higher than 0.7 and significant, thus no variables will be omitted from the analysis.

Table 5.2, and Table 5.3, respectively. The next section discusses the results per hypothesis and to what extent the hypotheses are supported or rejected based on these results.

Hypothesis 1a: Auditor rotation has after rotation a negative effect on audit quality on the short term.

In line with the prior literature hypothesis 1a expects a decrease in audit quality after rotation of the auditor. The new auditor does not have as much client knowledge as the previous auditor and no experience with the client, which results in lower audit quality. The first four periods of change are used to determine what effect auditor rotation has on audit quality on the short term. The regression models with the first measure of audit quality, discretionary accruals, prove to be significant. As Table 5.1 shows, all the models are overall significant at a one percent level and thus suitable to predict discretionary accruals. The results of the discretionary accruals analyses indicate that auditor rotation, measured by the variable *SWITCH*, has a positive effect on the change in discretionary accruals, indicating that in the year immediately after the rotation and three subsequent years the amount of discretionary accruals increases. Increasing amounts of discretionary accruals are an indication of lower audit quality. However, in none of the discretionary accruals models the effect of auditor rotation is significant. This means that hypothesis 1a is not supported based on the results. Although, the results do provide some indicative evidence for the hypothesis.

The results of the second measure of audit quality, the amount of abnormal working capital accruals, are less meaningful. The regression models are only significant at a one percent level for C2AWCA and C3AWCA, while for the others they are not close to significance. Non-significant regression models mean that the independent variables are not usable to predict abnormal working capital accruals. For C2AWCA and C3AWCA the effects of auditor rotation are mixed. During the second year after rotation, the amount of AWCA decreases, indicating an increase in audit quality. However, when looking at the first three years, overall AWCA increase, indicating a decrease in audit quality. The latter is in line with the hypothesized effect. But also with the AWCA models, the effect of auditor rotation on AWCA is not significant, which means that the evidence is only indicative and does not provide clear support for the hypothesis.

The last measure of audit quality is the avoid loss ratio. Despite the insignificance of C1ALR and C2ALR, C3ALR and C4ALR are significant at a 10% level. For the significant models *SWITCH* has a negative effect on the avoid loss ratio. A decrease in the ratio means relatively less small profits, indicating higher audit quality. The results are not in line with

Table 5.1 - DA Analyses

Mixed-effect multilevel regression analyses using DA as dependent variable

	C1DA	C2DA	C3DA	C4DA	C5DA
SWITCH	0.0056	0.0074	0.0045	0.0114	0.0023
	(0.38)	(0.97)	(0.28)	(0.66)	(0.12)
SIZE	-0.0170***	0.0144***	0.0152***	0.0089***	0.0003
	(-7.56)	(11.81)	(6.27)	(3.17)	(0.08)
LEV	-0.0991***	-0.02570***	-0.3318***	-0.4359***	-0.3315***
	(-15.45)	(-66.27)	(-36.37)	(-27.80)	(-19.12)
ROA	0.6287***	-0.5362***	-0.5491***	-0.1836***	0.1487***
	(89.97)	(-144.52)	(-71.59)	(-7.67)	(5.57)
SALESGROWTH	0.0008	-0.0001	-0.0001	-0.0001	-0.0000
	(1.17)	(-1.20)	(-0.33)	(-0.36)	(-0.02)
MANDATORY	0.0158	-0.0076	-0.0151	-0.0109	-0.0046
	(1.40)	(-1.20)	(-1.19)	(-0.73)	(-0.28)
BIGN	0.0007	0.0076	-0.0032	-0.0068	-0.0104
	(0.07)	(1.37)	(-0.29)	(-0.54)	(-0.73)
No. of Countries	6	6	6	6	6
No. of Companies	1,599	1,584	1,490	1,402	1,340
Observations	14,941	14,486	12,813	11,425	10,399
Wald Chi2-statistic	8,139.69***	31,266.90***	8,784.95***	1,070.06***	1,112.51***
Prob > Chi2	0.0000	0.0000	0.0000	0.0000	0.0000

*, **, *** represent significance at a level of 10 percent, 5 percent, and 1 percent, respectively. Corresponding z-values are in parentheses.
Definition of variables in Table 2.

Table 5.2 - AWCA Analyses

Mixed-effect multilevel regression analyses using AWCA as dependent variable

	C1AWCA	C2AWCA	C3AWCA	C4AWCA	C5AWCA
SWITCH	-1.8833	-0.0674	0.7939	1.038	-0.5878
	(-1.48)	(-0.05)	(0.75)	(0.65)	(-0.34)
SIZE	-0.1677	-0.1386	-0.0373	-0.1717	-0.1946
	(-0.84)	(-0.72)	(-0.23)	(-0.69)	(-0.70)
LEV	-3.6582***	-0.7202	-3.4207***	-1.6691	-1.4224
	(-4.94)	(-0.88)	(-3.45)	(-0.86)	(-0.67)
ROA	-3.7395***	-6.3625***	-3.4445***	1.1769	2.4307
	(-2.60)	(-8.23)	(-4.53)	(0.51)	(0.96)
SALESGROWTH	0.0616	-0.0522***	-0.0562***	-0.0520**	-0.0073
	(1.00)	(-2.67)	(-3.65)	(-2.19)	(-0.09)
MANDATORY	0.8499	0.5800	0.0040	0.7042	0.7600
	(0.86)	(0.58)	(0.00)	(0.55)	(0.54)
BIGN	0.3768	0.4136	0.0464	-0.7115	-0.8400
	(0.43)	(0.47)	(0.06)	(-0.64)	(-0.69)
No. of Countries	6	6	6	6	6
No. of Companies	1,581	1,577	1,477	1,389	1,323
Observations	14,844	14,397	12,707	11,318	10,284
Wald Chi2-statistic	68.11	138.90***	164.46***	46.10	38.15
Prob > Chi2	0.8810	0.0001	0.0000	0.9989	1.0000

*, **, *** represent significance at a level of 10 percent, 5 percent, and 1 percent, respectively. Corresponding z-values are in parentheses.
Definition of variables in Table 2.

Table 5.3 -ALR Analyses

Mixed-effect multilevel regression analyses using ALR as dependent variable

	C1ALR	C2ALR	C3ALR	C4ALR	C5ALR
SWITCH	-0.0191	0.0028	-0.0053	-0.0073	-0.0354
	(-0.77)	(0.11)	(-0.15)	(-0.15)	(-0.63)
SIZE	0.0024	0.0053	0.01175	0.0193	0.0300*
	(0.50)	(1.12)	(1.40)	(1.60)	(1.83)
LEV	0.0366	0.0202	0.0250	0.0238	0.0119
	(1.04)	(0.53)	(0.38)	(0.25)	(0.10)
ROA	0.0759*	0.0507	0.0236	-0.0051	0.0411
	(1.67)	(0.94)	(0.28)	(-0.05)	(0.34)
SALESGROWTH	0.0037	0.0077	0.0200	0.0142	0.0158
	(0.49)	(1.03)	(1.30)	(0.75)	(0.72)
MANDATORY	0.0005	0.0080	0.0318	0.0679	0.0572
	(0.03)	(0.44)	(0.56)	(1.37)	(0.85)
BIGN	-0.0150	-0.0188	-0.0330	-0.0234	-0.0047
	(-0.82)	(-1.02)	(-1.06)	(-0.54)	(-0.09)
No. of Countries	6	6	6	6	6
No. of Companies	398	398	354	313	270
Observations	2,634	2,577	2,206	1,876	1,597
Wald Chi2-statistic	73.57	72.86	90.81*	86.32*	81.48*
Prob > Chi2	0.4263	0.4496	0.0566	0.0562	0.0813

*, **, *** represent significance at a level of 10 percent, 5 percent, and 1 percent, respectively. Corresponding z-values are in parentheses. Definition of variables in Table 2.

hypothesis 1a. However, again *SWITCH* is not significant which means that the hypothesis is not rejected, even though there is indicative evidence.

The control variables also provide some divergent results. Under the DA regression the variables *SIZE*, *LEV* and *ROA* are significant at one percent. This means that company size, the degree of leverage and firm performance have a significant influence on the amount of discretionary accruals. In contrast, *SALESGROWTH* and *BIGN* are not significant, indicating that the growth of sales and whether it is audited by a Big-*N* auditor do not affect the amount of discretionary accruals and thus affect audit quality. The regression analyses with the AWCA measure yield similar results. Leverage and the return on assets are again significant, and so is the percentage growth of sales. Also with these models, a Big-*N* auditor does not significantly influence the audit quality and neither does firm size. The latter insignificant effect of size is not expected as in prior literature it often proves to be of significance in predicting AWCA. One possible explanation could be that there is no significant influence since the calculation of AWCA already controls for firm size by scaling to average total assets. The results of the ALR analyses do not provide useful insights since for the relevant periods only the return on assets is significant at a 10 percent level in the first change period. So according to these results the control variables all do not influence the ratio of loss avoidance.

Overall the results on hypothesis 1a are mixed. It depends on which measure of audit quality is used whether the hypothesis is supported or rejected. If measured by discretionary accruals, audit quality decreases in the first three years after rotation, if measured by abnormal working capital accruals audit quality decreases in the second year, but increases overall in the first three years. And eventually when measured by the ratio of loss avoidance, audit quality is said to increase overall in the first three years. However, it should be noted that none of the analyses show a significant effect of auditor rotation on the audit quality measures, meaning that the results are only indicative. Concluding, the results do not provide clear evidence to support or reject the hypothesis. The indicative results are mixed and depending on the measure support or reject hypothesis 1a. There is no clear explanation why the results of the accruals-based measure are contrasting, however an explanation could be given for the dissimilar results of the avoid loss ratio-measure. In essence, the ALR model measures accounting conservatism, while the accruals-based models measure management's discretion over accruals. Accounting conservatism and management's discretion over accruals are both important in determining audit quality, however they are two different aspects of it. Another issue is the insignificance of the AWCA and ALR models, meaning that the variables included in the regression are not useful for predicting the dependent variable. This could indicate that there are other variables

also having an influence on audit quality, but which are not included. Examples are audit fees or audit firm and team characteristics.

Hypothesis 1b: Auditor rotation has after rotation a positive effect on audit quality on the long term.

The second hypothesis expects, on the long term, an increase in audit quality after rotation. Prior literature found positive relations between auditor tenure and audit quality, suggesting that as the auditor gains more client experience and knowledge it improves audit quality. In this study this hypothesis is tested by using the difference between the last year of the old auditor and the fourth year of the new auditor. Therefore, the results of the fifth change period are relevant for this hypothesis. In the DA analysis the regression equation of C5DA is significant at a one percent level. The effect of auditor rotation however is still positive, indicating that discretionary accruals still increase in the first four years of the new auditor compared to the old auditor and thus decrease audit quality. This is not in line with the hypothesis, which expects an increase in audit quality after three years. However, as the effect of rotation is not significant, it should be considered only indicative.

Regarding the second measure of AWCA it should be noted that the C5AWCA model in itself is not significant. This has consequences for further reasoning as it indicates that the variables used in the regression do not effectively predict the change in AWCA. However, for the sake of an indication, the results show an insignificant negative effect of auditor rotation on the change in abnormal working capital accruals. This means that in the four years after rotation audit quality overall improves in comparison with audit quality under the prior auditor.

The last regression analysis with the avoid loss ratio as dependent variable C5ALR is overall significant at ten percent, indicating that the variables could be used to predict ALR. The effect of auditor rotation again is not significant. But despite the insignificance the coefficient indicates that the ratio of loss avoidance decreases during the first four years of the new auditor compared to the ratio in the year prior to rotation. This means that on the long term audit quality could improve if measured accounting conservatism.

Overall the evidence is mixed again. The DA and ALR models are both significant, but if measured by the change in discretionary accruals audit quality decreases and if measured by the ratio of loss avoidance it increases. Also for both models the individual effect of rotation is not significant, but it provides indicative results. When using the AWCA measure, the model itself and the individual effect of auditor rotation are not significant. The conclusion is that the results do not provide conclusive evidence to support the hypothesis, but based on the

indications, it depends on which measure of audit quality is used. A reason for this is again that the two models that give useful results, the DA and ALR models, proxy for another perception of audit quality. The explanation given under the previous hypothesis for insignificant models also applies on hypothesis 2b. However, an important explanation for the insignificance of rotation effects is that after four years the audit quality might be at the same level as during the year before the switch. This implies that the difference between values of audit quality are not significantly different.

Hypothesis 2: Voluntary and mandatory auditor rotation have differential effects on the audit quality.

In each of the regression analyses the variable *MANDATORY* is included to control for the form of rotation, mandatory or voluntary. It is used as a dummy variable that equals 1 if the legal environment of the firm requires mandatory rotation, which is the case for Italy during the whole sample period and for Austria from 2005 on. The effects of this variable on the different audit quality measure allows for testing hypothesis 2. As the reasons for voluntary rotation could be very different from mandatory rotation it is hypothesized that the effect of mandatory and voluntary rotation is differential.

None of the effects of *MANDATORY* on the different measures of audit quality are significant, as shown in Tables 5.1, 5.2, and 5.3. This means that in none of the models the effect of rotation is significantly different between voluntary and mandatory rotation. As all the DA models, two of the AWCA models, and the last three of the ALR models are significant, it could be concluded that the results do not support the hypothesis 2 and that it can therefore be rejected. Possible reasons for rejecting the hypothesis could be first that the difference between reasons to rotate cannot be expressed in terms of audit quality, and second it could be the case that there simply is no differential effect between mandatory and voluntary rotation in terms of audit quality. Although, it should be noted that there might be limitations in the analyses due to the research method. Only 9.3 percent of the firm-years in the sample were year where auditors are rotated, while during 19.7 percent of all firm-years in the sample the companies were subject to mandatory rotation. This leads to a total of only 1.8% of all firm-years where companies have rotated their auditor mandatory. As this percentage is very low, a possible explanation for the rejection is that the difference in effect of mandatory and voluntary rotation is diluted due to a high number of other observations.

4.3 Robustness test

The previous section presented the results of the different regression analyses. Hypothesis 2 was rejected among all models in contrast to the hypothesized effect. There could be several reasons why the results reject hypothesis 2. One of them is the composition of the sample. Therefore to test the robustness of the prior results additional analyses are conducted with only two countries, one with mandatory rotation and one without. By comparing these countries the difference between the effects of mandatory and voluntary rotation could still be uncovered. The only country in the sample that had mandatory rotation throughout the whole sample period is Italy. The best comparable country is considered the Netherlands, based on the number of observations and companies per country and average firm size per country, presented in Table 1.2 and Table 3.2 respectively. Companies in the Netherlands were during the total sample period not subject to mandatory rotation. For the robustness test Equation (4) is used again to determine the effect of rotation on audit quality and the subsequent influence of mandatory or voluntary rotation. However, with these regression analyses Austria, Belgium, Germany, and Luxembourg are omitted from the analyses. The results of the regression analyses per audit quality measure are presented in Table 6.

Including only Italy and the Netherlands overall yields similar result as for the analyses with discretionary accruals as measure for audit quality all the models are significant at a one percent level. For the AWCA measure none of the models are significant and in the ALR measure analyses only the C4ALR and C5ALR models are significant at a 5 percent level. In order to test the robustness of hypothesis 2, the effects of the dummy variable *MANDATORY* are relevant. Under the first set of analyses, with discretionary accruals as measure, *MANDATORY* is significant, and as the models themselves are significant as well, these results are not just indicative. The significance means that there is a significantly differential effect between mandatory and voluntary rotation of auditors. This is the case for the periods C4 and C5, which represent the difference between the fourth year after rotation and respectively the first year of the new auditor and last year of the previous auditor. For the prior periods however, there is no significant effect, which means that the difference between form of rotation becomes visible only after four years.

Regarding the second set of analyses, with AWCA as measure for audit quality, the results in the previous section are quite robust. None of the models are significant and neither is the effect of *MANDATORY* in each of the regression analyses. These results indicate that when measuring audit quality through abnormal working capital accruals there is no difference

Table 6 - Robustness Test

Panel A: Discretionary Accruals Analyses

	C1DA	C2DA	C3DA	C4DA	C5DA
SWITCH	-0.0135**	0.0061	0.0166*	0.0140	-0.0108
	(-2.00)	(0.80)	(1.90)	(1.23)	(-0.91)
SIZE	-0.0009	0.0026***	0.0027**	0.0045**	0.0037*
	(-0.94)	(2.66)	(2.43)	(2.38)	(1.86)
LEV	0.0061*	-0.0333***	0.0054	-0.7077***	-0.6046***
	(1.77)	(-8.55)	(1.23)	(-69.06)	(-57.58)
ROA	0.0409***	-0.008*	-0.0079*	-0.2487***	0.0082
	(11.16)	(-2.04)	(-1.76)	(-13.89)	(0.44)
SALESGROWTH	-0.0016	0.0025	0.0015	0.0019	0.0011
	(-1.03)	(1.56)	(0.84)	(0.438)	(0.38)
MANDATORY	0.0008	0.0003	-0.0045	0.0308**	0.0357**
	(0.18)	(0.06)	(-0.78)	(2.00)	(2.54)
BIGN	-0.0035	0.0068	0.0315***	0.0324*	0.0249
	(-0.53)	(0.89)	(3.47)	(1.90)	(1.44)
No. of Countries	2	2	2	2	2
No. of Companies	476	473	446	412	388
Observations	4,303	4,183	3,685	3,261	2,952
Wald Chi2-statistic	237.14***	180.44***	165.40***	14,025.53***	14,980.22***
Prob > Chi2	0.0000	0.0000	0.0000	0.0000	0.0000

Panel B: Abnormal Working Capital Accruals Analyses

	C1AWCA	C2AWCA	C3AWCA	C4AWCA	C5AWCA
SWITCH	-2.0912	-2.0677	-0.9380	-7.9792**	-8.9971**
	(-0.64)	(-0.62)	(-0.36)	(-2.43)	(-2.59)
SIZE	-0.2548	-0.1903	-0.1114	-0.1748	-0.1834
	(-0.58)	(-0.44)	(-0.33)	(-0.42)	(-0.40)
LEV	-2.0845	-2.0567	-2.3907	-6.1014	-6.8009
	(-0.56)	(-0.49)	(-0.61)	(-1.24)	(-1.28)
ROA	-5.3369	2.8645	-3.7317	1.4793	1.5404
	(-1.08)	(0.55)	(-0.94)	(0.30)	(0.30)
SALESGROWTH	3.4897***	-1.8545***	-2.0693***	-2.4248***	2.7925***
	(4.77)	(-2.64)	(-3.88)	(-3.61)	(3.43)
MANDATORY	0.9809	0.8915	-0.6372	0.0338	0.3510
	(0.47)	(0.41)	(-0.37)	(0.02)	(0.16)
BIGN	-1.1774	-1.9887	-3.4294	-4.7762	-5.7061
	(-0.37)	(-0.59)	(-1.26)	(-1.38)	(-1.53)
No. of Countries	2	2	2	2	2
No. of Companies	476	472	444	410	385
Observations	4,282	4,161	3,657	3,233	2,922
Wald Chi2-statistic	57.35	40.15	54.49	54.42	57.58
Prob > Chi2	0.9238	0.9995	0.9269	0.9150	0.8351

Panel C: Avoid Loss Ratio Analyses

	C1ALR	C2ALR	C3ALR	C4ALR	C5ALR
SWITCH	-0.0127	0.0315	0.0454	0.0277	-0.0508
	(-0.24)	(0.61)	(0.60)	(0.25)	(-0.37)
SIZE	0.0164	0.0106	0.229	0.0428*	0.0695**
	(1.46)	(0.98)	(1.34)	(1.82)	(2.12)
LEV	-0.0824	-0.1377	-0.2410	-0.3141	-0.4405
	(-1.06)	(-1.51)	(-1.54)	(-1.40)	(-1.50)
ROA	0.0272	0.0701	0.1160	-0.1166	-0.0400
	(0.29)	(0.52)	(0.53)	(-0.39)	(-0.12)
SALESGROWTH	-0.0023	0.0301*	0.0347	0.0235	0.01574
	(-0.14)	(1.85)	(1.48)	(0.78)	(0.45)
MANDATORY	0.0906*	0.0900*	0.1989**	0.2380**	0.2811*
	(1.78)	(1.76)	(2.43)	(2.05)	(1.72)
BIGN	-0.0483	-0.0325	-0.0340	-0.0528	0.0166
	(-0.89)	(-0.57)	(-0.37)	(-0.40)	(0.10)
No. of Countries	2	2	2	2	2
No. of Companies	127	125	115	96	79
Observations	820	803	682	578	486
Wald Chi2-statistic	44.56	48.97	66.00	73.26**	89.16***
Prob > Chi2	0.9319	0.8211	0.1695	0.0340	0.0006

*, **, *** represent significance at a level of 10 percent, 5 percent, and 1 percent, respectively. Corresponding z-values are in parentheses. Definition of variables in Table 2.

between mandatory and voluntary rotation. However, for the third set of analyses, using the avoid loss ratio as audit quality measure, the results from the robustness test provide some contradicting evidence. While in the prior section, *MANDATORY* was not significant, it is now under each model. This means that when measuring audit quality as the ratio of loss avoidance there is a differential effect between rotating the auditor mandatory and voluntary.

The results of Table 6 support the robustness of the results in the previous section only to some extent. While hypothesis 2 was completely rejected in the previous section, it is now only rejected under the AWCA analyses. When audit quality is measured by discretionary accruals and ratio of loss avoidance the results show that there is a significant differential effect between mandatory and voluntary rotation. Thus using two comparable countries yields different results than when using the whole research sample. As Table 3.2 shows, in not even 20 percent of all firm-year observations in the sample, companies in Italy and Austria were subject to mandatory rotation. Reflecting this on the 9.3 percent of switches during the sample period, the actual number of mandatory rotations is very small. Therefore using a smaller sample with only two countries with equal characteristics proves useful in revealing the difference in effect of mandatory and voluntary rotation.

5. Conclusion and Discussion

5.1 Conclusion

The focus of this study was on the effects of auditor rotation on audit quality. In the past decades the auditors have been heavily criticized after a number of corporate scandals. Mandatory auditor rotation has been proposed as a mechanism to enhance auditor independence in order to improve audit quality. Firms are always allowed to decide themselves on switching their current auditor for another next year, which is called voluntary auditor rotation. After the introduction of SOX in the US in 2002 the PCAOB conducted a study on the effects of auditor rotation. They concluded that the costs would not outweigh the benefits and abandoned the idea of audit firm rotation. However, in Europe the call for auditor rotation resulted in new legislation, requiring mandatory rotation after ten years of tenure. Proponents of mandatory rotation claim that long-term relationships will negatively affect the auditor's independence and therefore decrease audit quality. Rotation would ensure that new auditors have a fresh look. On the other hand, the opponents of mandatory rotation, mostly the auditors themselves, claim that it is very costly to the auditor, the firm, and indirectly to the shareholders. By rotating the auditor client-specific knowledge and experience is destroyed. The new auditor has to spend more hours to get acquainted with the client. On the short term rotation would even decrease audit quality. Auditors have a learning curve, so after a few years they would have gained the client specific knowledge, but then they are rotated again. Auditors believe that mandatory rotation is not necessary as there are already enough mechanisms in place to guard their independence and audit quality.

Prior research did not yield consistent results. The literature shows that a great variety of measures for audit quality is used, e.g. accruals-based measures, the propensity to issue going-concern opinions, the propensity to issue modified opinions, etc. Also the countries, firms, and firm-years included in the research samples were diverse. The inconsistencies in results of prior research are partly explained by their divergent research methods. Therefore the aim of this study was, due the new EU legislation to come up with consistent results on the effects of auditor rotation on audit quality. The latter is hard to operationalize as it can mean different things, depending on the stakeholder's perspective.

Based on prior literature it is hypothesized in this study that on the short term auditor rotation will decrease audit quality. However, as time passes and auditors gain more client knowledge and experience audit quality will increase on the long term. It is also hypothesized that there is a differential effect of the form of rotation. It is expected that companies that

voluntarily rotate the auditor have different reasons for rotation than when it is mandated. Data is gathered for six European countries; Austria, Belgium, Germany, Italy, Luxembourg, and the Netherlands, for the period of 1995 to 2014. The total example consists of 19,973 firm-year observations. Since there is no univocal definition of audit quality, different measures are used to reflect the different perceptions of audit quality. The first two measures use accrual-based earnings management measures to proxy for audit quality. The degree of earnings management is related to audit quality in the sense that lower earnings management reflects lower management's discretion over accounting. These accrual-based measures include the amounts of discretionary accruals and of abnormal working capital accruals. The third measure of audit quality reflects the degree of accounting conservatism. It utilizes the ratio of the number of small profits divided by the number of small losses to proxy for audit quality. This ratio of loss avoidance is an indication of accounting conservatism as it measures the extent to which small losses are managed into small profits. Companies often manage small losses upwards to avoid bad news, which could influence their business and reputation. For each of these measures of audit quality five periods of change are calculated to determine the effect of rotation on the audit quality in subsequent years. The periods of change, called C*nAQ*, where *n* is substituted for the period and *AQ* is substituted for the measure of audit quality, are used as the dependent variables in the regression analyses to test the hypotheses. Using differences in audit quality over certain periods allows to see the changes in audit quality over time and to compare certain years. For each period and measure of audit quality a regression analysis is ran, resulting in a total of fifteen analyses.

The results of the regression analyses are very divergent. Only when using discretionary accruals as measure for audit quality all the models themselves are significant. For the other two models with AWCA and ALR, the models are only significant for certain periods. This means that, as the variables are not usable to predict the dependent variable, the results do not provide clear evidence to support or reject the hypotheses. Moreover, for none of the analyses *SWITCH* has a significant influence on audit quality. This means that the resulting coefficients only provide indicative evidence. Also when interpreting the indicative evidence, the results are mixed. Under the discretionary accruals model audit quality is decreasing both on the short and long term, as the amounts of discretionary accruals increase during all periods. The opposite is the case for the analyses using AWCA as measure. In the first two years, audit quality increases, during the third and fourth year, it decreases, but during the whole period of four years compared to the year before rotation audit quality has improved. Finally, under the third measure of audit quality it slightly decreases during the second year after rotation, but

increases in the years thereafter and overall. During the analyses is controlled for external influences. The results prove that firm size, the degree of leverage, and the return on assets are significant predictors for discretionary and abnormal working capital accruals. The analyses also controlled for the effect of sales growth and whether the firm is audited by a Big-*N* auditor or not. However these two variables do not seem to have significant effects. As these results are the outcome of insignificant models and the effect of rotation is not significant either no clear conclusions should be drawn. The evidence is only indicative. And therefore based on these results, hypotheses 1a and 1b could not be accepted. Though there is some indicative evidence in support of the hypotheses, that depends on which measure of audit quality is used.

Regarding hypothesis 2 the results are very clear. The dummy variable *MANDATORY*, measuring whether companies were subject to mandatory rotation or not, is not significant for each of the models. This insignificance implies that there is no difference in effect of whether an auditor is rotated mandatory or voluntary. Based on the first set of analyses hypothesis 2 should be rejected. However, these results do not prove to be very robust. When conducting an additional robustness test where only firms from the Netherlands and Italy are compared, the results show that under some of the analyses *MANDATORY* has a significant effect. Again all the models are significant when discretionary accruals are used as the dependent variable and after four years the difference between mandatory and voluntary rotation on audit quality is significant. For the ratio of loss avoidance the difference has been significant from the year of rotation on, however only the last two models are significant. The analyses with AWCA do again not yield significant results, but neither are the models. Concluding, hypothesis 2 should be rejected when using the whole sample. However, these results are not very robust, because when testing the robustness by comparing Italian companies and Dutch companies the hypothesis could be accepted.

Concluding, the results do not completely support or reject the hypotheses. First it depends on which measure of audit quality is used. The results on hypotheses 1a and 1b are indications for both rejecting and accepting the hypotheses. Second, it depends on which sample data is used in the analyses. The hypothesis 2 was rejected when the full sample was used, however when only comparing Italian and Dutch firms it can be accepted from the fourth year on that there is a differential effect between mandatory and voluntary rotation. So to answer the research question: with the data and analyses that were used it cannot be clearly stated that rotation of auditors has a significant effect on the audit quality, and by distinguishing between the forms of rotation there is no differential effect on audit quality. But, as already described in the prior section, there could be explanations for the fact that the hypotheses are

not supported by the data. The data, research method, and analyses have certain limitations which have consequences for the results. These limitations will be described in the next section.

5.2 Discussion and Limitations

Just like every study conducted in the past, this study also has its limitations. These limitations have their effect on the results of the analyses and therefore also on the conclusion. There are several possible reasons for why the hypotheses were not accepted or rejected, or why the results are only indicative. First of all, the data has its limitations. The collection of data is dependent on the availability of the data. For European companies financial data is easily available, however data on auditor, audit fees, and auditor tenure are not always easily accessible. Based on prior literature it could be argued that audit fees and auditor are also important aspects of audit quality. However, for the companies that have been used in this sample, data on fees and tenure was not available. Another limitation is only the small number of auditor switches. As shown in the descriptive statistics of the sample, only 9.3% of the firm-years were years where the auditor was rotated. This could be problematic, as the effects of rotation might be diluted by the large number of non-rotation years.

The absence of this data is also one of the causes of the second limitation, namely the limitations of the research method. The models to proxy for audit quality have been adapted from prior studies. However, these models are not perfect, they are simplifications. Accrual-based models do not purely capture earnings management, since that is also affected by other variables. For some external variables is controlled in the analyses, but important variables like audit fees, auditor tenure, the number of restatements, or auditor characteristics are not available and thus not included. This causes the models themselves to be a limitation first. Second, the models are assumed to measure audit quality. As discussed in the literature section, it is very hard to measure audit quality, since it depends on the perceptions of different stakeholders. By using multiple measures to cover different perceptions this study aimed to overcome this flaw, however it should be considered whether earnings management and accounting conservatism measures are good proxies for audit quality. Audit quality has a lot more aspects than just the company's financials, as is shown in the framework of Wooten (2003) presented in Appendix A. Other aspects are the audit process, audit firm characteristics, industry experience, and auditor independence. It is actually acknowledged that it is very hard to catch all the influences of audit quality to effectively measure it with one model.

Next to the limitations due to using audit quality as dependent variable, there are some statistical limitations when operationalizing auditor rotation. In the methodology used in this research auditor rotation is operationalized as a dummy variable with only two possible values. These one and zero values do not allow for in-depth explanation of variation in the audit quality values. Moreover based on the literature, data on auditor tenure could also be more useful in combination with a rotation dummy variable to explain some effects on audit quality.

The third limitation of the research method, which is specifically relevant for hypothesis 2, is that companies are not required to reveal their reasons for rotation, if done voluntarily. This makes it harder to look at the differences between mandatory and voluntary rotations. Mandatory rotation has in this study been operationalized as the fact that companies were subject to rotation by their legal system in general. It did not consider individual rotations and the reasons for these rotations. Also, in Europe there are only few countries that mandated auditor rotation in the past, making it hard to find enough data. And in combination with the small number of switches, the final number of switches that were actually subject to mandatory rotation is not even two percent of all firm-year observations. This has implications for the conclusion of the analyses. The robustness test already showed that when using less countries where rotation is not mandated, the difference between voluntary and mandatory rotation can be proven.

5.3 Possibilities for Future Research

This study has, despite the mixed results, also given some very insightful results which have opened possibilities for future research. First of all, this study was the first to use multiple European countries to determine the effect of auditor rotation on audit quality. Prior studies that were conducted in Europe often only focused on Italy. The research sample could be expanded by including more countries or by broadening the sample period. Comparing European countries will give new insights and could prove very useful for policymakers concerned with accounting regulation and expanding the sample period could allow for identification of patterns and comparison of audit quality after several auditor switches. A second possibility is to, instead of expand the sample, go more in-depth in the concept of audit quality and capture more aspects in the model. As audit quality is influenced by more variables than just financials, incorporating these other variables could increase the predicting value of the model and thus strengthen the results and conclusion. New developments in measures of audit quality would be very valuable, as there has been more emphasis on audit quality in the

last decade. In the present literature there are numerous models to measure audit quality, however they only measure one single aspect. A fourth possibility for future research is to compare and maybe synthesize some of these models to bring more clarity and order to the researches on audit quality. The final possibility is to not only distinguish between mandatory and voluntary, but also look at the effects of audit partner rotation. This data is not easily accessible as the audit partner of European companies is not recorded in a database. But also audit partner rotation could overcome some of the independence-impeding effects of long tenure and should therefore be researched.

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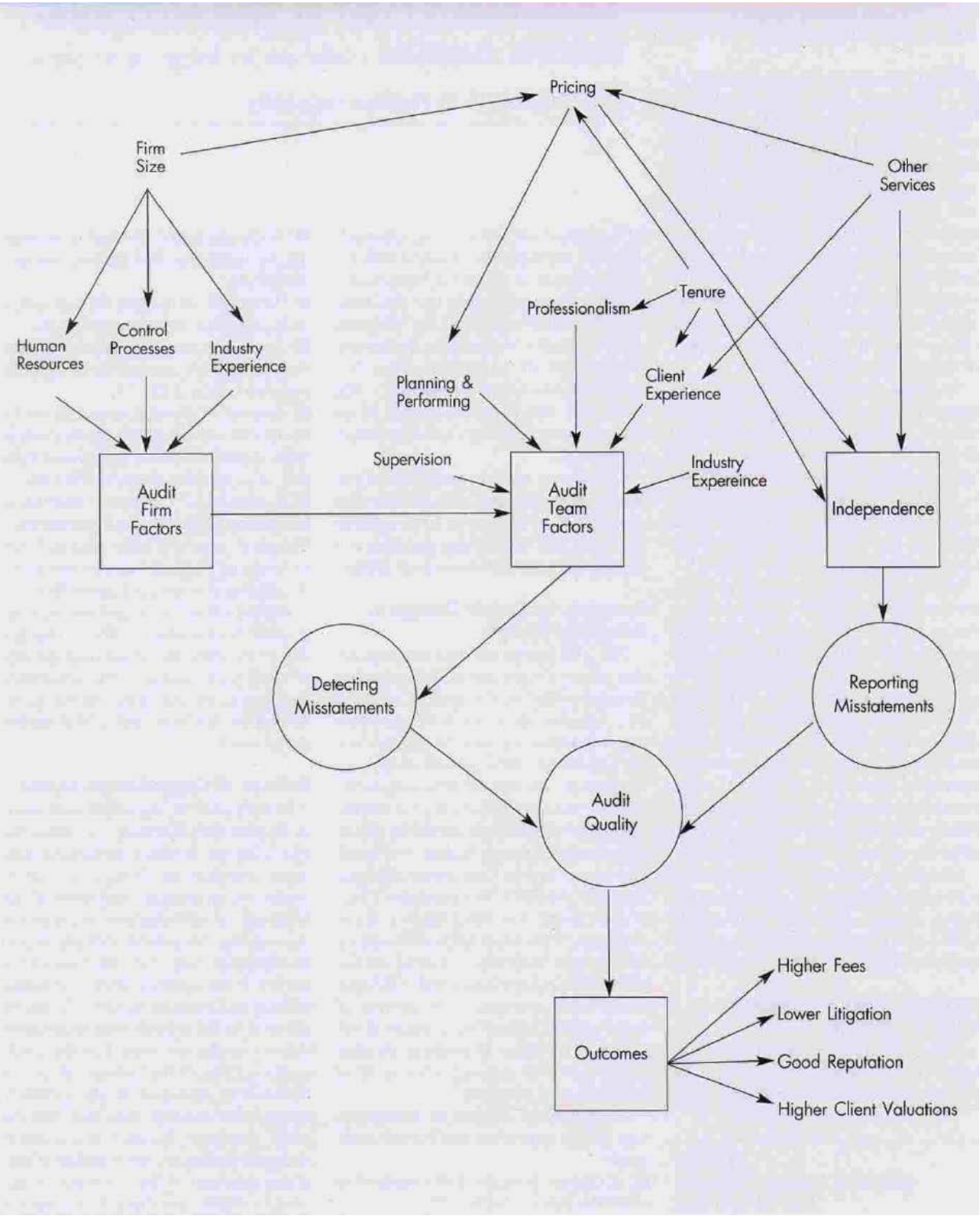
Appendix A



A Model of Audit Quality (Wooten, 2003, p. 51)