Erasmus School of Economics
Accounting, Auditing and Control

The effect of Mandatory Audit Firm Rotation on Audit Quality. An empirical analysis of EU Member States.

Master Thesis

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Date submitted:

Academic Year: 2018-2019

Abstract

Mandatory Audit Firm Rotation is a measure introduced by the EU Member States to improve auditor independence and audit quality. However, existing empirical evidence does not provide a justification for the positive effect of mandatory rotation on audit quality. Using a sample of EU companies between 2014-2018 years this study found that firms that mandatorily rotated their auditors do not experience an improvement in audit quality during the first year of rotation for both low- and high-regulated EU Member States, and these results are robust to the measure of audit quality. Moreover, it was found that for low-regulated EU Member States mandatory rotation is associated with a decrease in audit quality. This paper calls for further research related to the effects of mandatory rotations on audit quality over the longer horizons and further exploration of different dimensions of audit quality affected by MAFR.

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1. Introduction

Over the last 20 years, accounting scandals like Waste Management (1998), Enron (2001) and Worldcom (2002) caused significant losses in client returns for Arthur Andersen, one of the Big Five accounting firms at that time, due to the erosion of the public confidence in the financial markets and the audit practice in general (Nelson et al., 2008).

As a consequence, those companies went bankrupt, and the Sarbanes-Oxley Act 2002 (SOX) was enacted in the US to strengthen the supervision over public interest entities and their auditors. Moreover, from a global point of view, additional considerations related to the regulatory environment were discussed at the global level. For example, during the past decades regulatory bodies around the world have discussed the necessity of introducing stricter laws and regulations, aimed to protect the interests of the financial statement users, increase the confidence of the public in general (Jones, 2012) and enhance both the audit quality and the auditor independence.

Some of the primary measures discussed include the mandatory audit partner rotation (MAPR), mandatory audit firm rotation (MAFR), the restrictions on non-audit services (NAS) offered to audit clients, the increase in the responsibilities of the audit committee, the extension of auditor reporting requirements and the creation of numerous oversight bodies.

The aim of this thesis is to analyze the impact of the relatively new MAFR regulation (537/2014) applied to the EU Member States since June 17, 2016, to shed some light with regards to the effects of this mandatory rule on the audit quality.

Adoption of the MAFR rule in the US was intensely debated after the accounting scandals mentioned earlier. According to Edwards (2014), some members of the audit profession, audit clients, and users of the financial statements feared that the MAFR could impose significant costs on business without a compensating benefit, devastating audit quality as the result. Back in the time when SOX was issued, in the year 2002, the Congress dismissed MAFR in favor of MAPR and instructed the Government Accountability Office (GAO, 2003) to investigate the potential effects of MAFR. The resulting report eventually stated that the MAFR might not be the most effective solution to improve the auditor independence and audit quality, motivating PCAOB not to continue with the MAFR project.

However, in the EU, the adoption of the MAFR measure after the accounting scandals mentioned earlier and before the enactment of the 537/2014 Regulation was different. For example, countries like Germany and France debated on the MAFR rule but decided not to apply it. Italy adopted it in 1975. Spain adopted it in 1988 but abolished in 1995. Finally, Poland and Portugal adopted it before, but only

under certain conditions, including insurance industry specification (Poland) and the basis of "comply or explain" (Portugal).

Despite this mixed context, the 537/2014 regulation was enacted in 2014 following an intensive consultation process. The objectives of this rule include enhancement of the independence and professional skepticism of the auditor, reduction of the concentration at the top end of the audit market, clarification of the role of the auditor and improvement in the auditor's supervision (EC, 2011).

From a technical point of view, the regulation 537/2014 specifies that this rule is applicable for Public Interest Entities (PIE)[1]. According to this regulation, the maximum period of audit tenure should not exceed ten years with the possibility to extend this tenure for the next ten years if a tender procedure selects this auditor (first rotation) or for the next fourteen years in the case of joint audits. Moreover, this regulation granted to the Member States the option to adopt a shorter term of rotation (KPMG FAQ, 2018).

Overall, all these regulations adopted in the US (SOX) and the EU (Regulation 537/2014, and other country-specific regulations applied before) initiated a continuous debate between regulators, auditors, and users of the financial statements with regards to the usefulness of MAFR. On the one hand, proponents suggest that MAFR could increase the auditor skepticism and independence by eliminating the monetary and nonmonetary incentives to retain the client, improving transparency and confidence in the audit market (Ryan et al. 2001). On the other hand, opponents to this measure state that long-lasting audit engagement periods positively affect audit quality in comparison to shorter audit periods since it allows auditors to maintain client-specific knowledge or company know-how (Choi et al. 2017).

Based on the information above, the research question of this thesis is: "How does the mandatory audit firm rotation rule affect audit quality of PIE's from the EU Member States?".

This thesis aims to contribute to the existing academic literature by filling the gaps in the previous studies. First, results of some of these studies are not robust regarding to the effect of MAFR on audit quality. For example, Stakebrand (2016) analyzes the effect of the audit firm rotation on audit quality of European countries, but he states that the results largely vary depending on the choice of audit quality variable. Meanwhile, Bronson (2016), in his study on Italy, Brazil, and South Korea, concludes that the adoption of mandatory firm rotation improves audit quality. Finally, Choi et al. (2017), in their study over the South Korean Market, find that audit quality after the adoption of mandatory audit rotation rules is generally lower or at the same level in comparison to previous periods. Second, most studies were conducted from a theoretical standpoint without considering an empirical approach due to the lack

[1] PIE is defined as follows by the new statutory audit directive (2014/56/EU): "a) entities governed by the law of a Member States whose transferable securities are admitted to trading on a regulated market of any Member … ; b) credit institutions … ; c) insurance undertakings … ; d) entities designated by Member States as public-interest entities … "

of data (Maier at al. 2015; Fournès Dattin 2016). Third, this proposal responds to current demand for a broader perspective in terms of the number of countries included (García-Sanchez et al. 2014; Maier et al. 2015). Forth, this is the first paper controlling for the strength of the legal enforcement in the countries under investigation in the context of the application of the Regulation 537/2014. Finally, the study covers a different period than earlier studies on this topic (period 2014 to 2018) including the years after as well as the years before the rule enactment. Overall, this thesis aims to be useful for the audit professionals and regulators by shedding some light on this topic.

Although this study could not investigate the long-term effect of the MAFR regulation, descriptive statistics of DA show that, on the average, during the first year of audit firm change the audit quality decrease while the effect is mostly positive for the second year of change. Moreover, the empirical results show that the auditor rotation (mandatory or voluntary) does not have a statistically significant association with the audit quality. Results for highly regulated EU Member States also do not show any statistically significant association between both types of rotation and audit quality. However, results for low-regulated countries show a negative effect on audit quality related to the mandatory rotation events. The robustness check confirms the results obtained except for ones for low-regulated environments where an insignificant association between audit quality and mandatory rotation is found. This study contributes to the existing literature by showing that the MAFR regulation (537/2014) applied to EU State Members does not have a statistically significant association with audit quality at least in the short term. However, this study also shows that a positive effect on audit quality exist in the second year after rotation in comparison to the first year of change, meaning that it is possible that such effects exist in the long run between auditor rotation and audit quality.

The paper is structured as follows. In Section 2, existing literature is reviewed. In Section 3, the hypotheses of the paper are developed. In section 4, the research design is explained. In Section 5, the sample selection is presented. In Section 6, the results of the empirical analysis are presented. In section 7, the conclusion, limitations and potential for the future research are presented.

2. Literature Review

When it comes to interconnection between auditor independence, auditor firm and partner rotation, and audit quality, numerous studies were conducted. The following section defines the key elements involved in this thesis, describes the interconnection between variables, mentioned above, and presents the key arguments used by the proponents and opponents of the MAFR.

2.1 Audit Quality

2.1.1 Audit Quality Definition

The financial market is characterized by the high level of information asymmetry between shareholders and managers as management usually has more information about the company than investors. On the one hand, shareholders invest their funds to increase the value of their capital. On the other hand, the managers tend to be selfish in their interests to achieve their personal goals, and for that reason, they have incentives to use their position to distort the financial statements. Consequently, to avoid the distortion of the financial statements used by investors, the role of the auditor is to provide an opinion on their quality (Palepu et al., 2016).

Before moving forward with the review of the literature, it is important to formally define the concept of audit quality, which plays a significant role in providing an opinion on the quality of the financial statements.

One of the most recognized definitions comes from DeAngelo (1981). She defines it as "*the market-assessed joint probability that a given auditor will both (a) discover a breach in the client's accounting system, and (b) report the breach*". According to her study, both probabilities of discovering a breach in the accounting system of the client and reporting that breach depend upon the auditor technological capabilities (for example, the procedures employed by the auditor and the sample used by the auditor for tests) and the auditor independence, respectively. This definition also points out what high audit quality means that all identified accounting system breaches are reported.

Moreover, GAO (2003) also defines high audit quality for the US environment as performed "*in accordance with generally accepted audit standards to provide reasonable assurance that the audited financial statements and related disclosures are presented in accordance with generally accepted accounting principles and are not materially misstated whether due to errors or fraud*" (GAO, 2003)

Finally, the IAASB (2011) report states that the key to defining and measuring audit quality is understanding and capturing the various aspects influencing the concept of audit quality to identify the factors that increase it. In this report, the IAASB describe different elements that influence audit quality: inputs (the personal attributes and processes of the auditors), outputs (reports) and contextual factors (corporate governance mechanisms, laws and regulations, and the society itself).

Considering the definition of audit quality stated by DeAngelo (1981) and the different aspects involved included in the IAASB (2011) report, the European Parliament enacted the Regulation 537/2014 as a measure to enhance all the elements (independence, objectivity, professional skepticism, and technical competence) that generally comprise audit quality definition (EC, 2011).

2.1.2 Elements of Audit Quality

In the following section, the elements that comprise the Audit Quality definition are defined.

Independence:

The EU has regulations containing the requirements for auditors' independence. One of them, the article 24 in the Directive 84/253/EEC of the European Commission Council states the requirement that auditors should not perform statutory audits if they do not comply with the independence requirement detailed in the law of the Member States.

Additional guidelines similar to "*Statutory Auditors Independence in the EU: A set of fundamental principles*" are enacted by the EU Committee to provide a common understanding of the independence requirement. This framework is based on the IESBA Code of Ethics for Professional Accountants (Section 290) and involves two views that the auditor must maintain, the independence of mind and appearance.

The independence of mind is defined by the Code of Ethics for Professional Accountants (CEPA) as "*the state of mind that permits the expression of a conclusion without being affected by influences that compromise professional judgment, thereby allowing an individual to act with integrity, and exercise objectivity and professional skepticism*".

The independence in appearance is defined by CEPA as "*the avoidance of facts and circumstances that are so significant that a reasonable and informed third party would be likely to conclude, weighing all the specific facts and circumstances, that a Firm's ..., integrity, objectivity or professional skepticism has been compromised*".

Being independent in mind and appearance are the most basic requirements, designed to keep the confidence of the public in the financial statements. Both types of independence are required from auditors to gain the trust of the users of the financial statements. This means that is not enough that the Financial Statements are accurate; they should be perceived as accurate.

The intrinsic value of independence relies on the fact that the quality of the earnings reported is also affected by the auditor independence. At the same time, the quality of the earnings reported is affected by earnings management. Earnings management is defined by Healy et al. (1999) as the situation when the judgment of the management is used to alter the Financial Statement to mislead the shareholders about the performance of the company or influence contractual outcomes. Therefore, when more auditor independence exists between the auditor and the auditee (as a consequence of mandatory audit firm rotation, for example), the auditor is more likely to stop any management intend to manipulate earnings, which will be reflected in a more conservative accounting booking, increasing the quality of the reported earnings (Kramer, et al. 2011).

Objectivity:

Objectivity is defined by the IESBA as a state of mind preventing any sort of bias, conflict of interest, or improper influence of others to cancel professional or business judgments.

Professional skepticism:

Professional skepticism means to have a questioning mind and to be alert to possible misstatements through all the engagement process. This state of mind is necessary to assess the audit evidence critically.

Technical competence:

Technical competence or professional competence means to maintain professional knowledge and skills at a required level to make sure that the client receives a competent professional service and to act diligently in accordance to professional standards (Hayes, 2014).

All the elements stated above are necessary qualities of a high-quality audit. However, in practice, several threats to independence identified by Hayes (2014) including the provision of non-audit services, having a financial interest with audit clients, the dependence on the audit fees, the presence of related parties, inside the audit team and fears of litigation threats, affect the ability of the auditor to produce high quality audits.

2.1.3 Audit Quality Measures

Although various audit proxies are used, they provide only a limited view of such a complex concept as audit quality. The choice of the proxies used ultimately depends on the perspective used by the researcher (Ewelt-Knauer et al., 2013). In the following subsection, some of the most commonly used proxies are defined.

Gonzalez-Diaz et al. (2015), Geiger et al. (2002) and Jackson et al. (2008) use the tendency to issue a going concern opinion as an indicator of audit quality. They justify their choice using the fact that when an audit report is issued with observations, the auditor is independent and objective with the client.

Cameran et al. (2016) and Man (2016) use the abnormal amount of working capital accruals as a measure of audit quality since a high level of audit quality reduces the extreme accounting decisions, leading to decreased abnormal working capital accruals.

Johnson et al. (2002), Myers et al. (2003) and Bronson (2002) use the Modified Jones Model (Dechow et al. 1995). This accrual-based model uses the abnormal value of discretionary accruals as a proxy for audit quality, which is based on the tendency of the management to influence earnings for achieving specific goals.

Discretionary accruals differentiate from non-discretionary accruals since they are not explained by economic factors, hence they are more likely to be controlled by management. Discretionary accruals

often contain two elements: the information component that includes insider company information and noise, which could be a consequence of opportunistic reporting initiatives by management (Healy, 1993). On the one hand, higher levels or abrupt changes in the amount of discretionary accruals could be the signal for earnings manipulation (Bartov et al. (2000); Palepu et al. (2016)) that can potentially lead to audit failures and qualified opinions (Geiger et al., 2002). On the other side, lower or consistent level of discretionary accruals is associated with a high level of audit conservatism, which, in its turn, is positively related to audit quality (Becker et al.,1998).

Other studies like Bruynseels et al. (2014) and Stakebrand (2016) use an improved Modified Jones model to estimate the discretionary accruals included in the reported income. This improvement consist in the control of the asymmetric timeliness of accruals when recognizing losses and gains.

Overall, all the measures used as proxies for audit quality in addition to different environments (countries and years analyzed) and sample sizes generate inconsistencies among their results.

2.2 Mandatory Audit Partner Rotation

The mandatory partner firm rotation rule (MAPR) requires the rotation of the audit partners working with PIE. This rule was initially established in the US (AICPA, 1978) and then in the EU (Directive 2006/43/EC). In the US, the SOX (Section 203) states that the lead partners have to rotate every five years with a non-participation period of five years in the same engagement. In most of the Member States of EU, the lead partners have to rotate every seven years with two years of non-participation in the same engagement.

This measure was defined as the cheapest way to promote independence and objectivity (Man, 2016) since the change of the audit firm requires both the new team and the new client procedure. This way, the client and industry knowledge remain in the audit firm, so that the firm will not need to invest more than the usual engagement hours to maintain the audit quality (Man, 2016).

Although this measure is the most generally accepted by legislators and professional organizations, the consensus regarding its effects on audit quality is still not reached.

On the one hand, Monroe et al. (2013) discover that there is a significant positive association between audit partner tenure (when tenure is five years or more) and the likelihood of issuing a going-concern opinion (GCO) for financially distressed companies. This means that after the implementation of the MAPR rule, auditors are expected to be more inclined to issue a qualified GCO for financially distressed companies after a fixed amount of years, which might be a proof that audit quality improves by the MAPR. Lennox et al. (2014) show other benefits of the MAPR rule implementation, including a positive peer review and a fresh perspective. In particular, they find a high frequency of audit adjustments during

the last year of the previous partner (before the mandatory rotation) in comparison to the following year and suggest that MAPR results in higher quality of audits during the years, surrounding the rotation. Chi et al. (2005) find in the context of the Taiwanese market adoption of the MAPR law that there is a differential effect of the length of audit tenure on the quality of the earnings. They identify a cutoff point of five years and prove that the effects of familiarity are beneficial for the earnings quality when the period of five years is not exceeded, while the excessive familiarity has negative effect when that period is exceeded. Finally, Firth et al. (2012) find in their study on the Chinese environment that the mandatory audit partner rotation is associated with a significantly higher likelihood of issuing a modified audit opinion. However, implications of the study are restricted to less developed markets as well as legal institutions in the specific regions.

On the other hand, the opponents of this measure point out the loss of the know-how of the client and the industry business, leading to the decrease in the audit efficiency as the major drawback, (Sayyar et al., 2014). The EC (2011) memo considers the MAPR rule as an insufficient measure since the client-audit relationship maintains, causing pressure for the new partner to retain the client and making unlikely that the new auditor will criticize the previous partner. For that reason, the EC (2011) memo states that both measures (MAFR and MAPR) need to work together to ensure the high independence and quality by rotating the firm (external rotation) and the key audit partner (internal rotation). This combination of measures could ensure that the quality of the audit maintains in case the key partner changes (Corbella et al., 2015).

Not much research was done on the interconnection between mandatory partner rotation and mandatory audit firm rotation (Firth et al. 2012). On the one hand, both have the potential to reduce the threats to auditor independence separately. However, audit firm rotation has a greater potential to increase independence (EC, 2011). On the other hand, both rotations imply an additional cost, however the cost is higher for mandatory audit firm rotation since not only the partner but the whole engagement team and all the working papers are lost as a consequence of the audit firm change (Chen et al., 2008).

Summing up, mandatory audit partner rotation has its benefits and costs, which could vary when these measures are applied jointly with the mandatory audit firm rotation in the same country. It could happen that both measures would complement each other increasing the level of audit quality even more (EC, 2011) but it is also possible that both would substitute each other causing no effect on audit quality or decreasing audit quality as a consequence of the substantial costs.

2.3 Audit Firm Tenure

In this subsection, the effect of audit firm tenure on audit quality will be discussed. In general, most of the studies reviewed reveal a positive association between audit tenure and audit quality.

For example, Myers et al. (2003) examine the relationship between audit tenure and earnings quality. In their study on the US companies under a voluntary rotation system, they discover that with the increase of the auditor tenure, the auditor tends to place more controls on the income increasing and decreasing accruals. Similarly, Johnson et al. (2002)conclude that short audit tenures (2 to 3 years) are associated with unexpected and less persistent accruals during the following periods and a significant decline in the quality of the financial statements. At the same time, the authors could not find any significant difference in the quality of reports, produced by firms with medium (4 to 8 years) and long (9 or more years) audit tenures.

Geiger et al. (2002) study the relationship between audit tenure and audit reporting failures for financially distressed companies receiving a wrong GCO and report a positive association between audit tenures and the occurrence of modified GCO. Therefore, it can be inferred that longer audit tenures are associated with lower probability of giving wrong opinions by auditors.

However, not all the studies analyzed found a positive relationship between audit tenure and quality. In his study on the Taiwanese market, Chen et al. (2008) finds no evidence that after controlling for the partner tenure, the discretionary accruals significantly decrease with the increase in audit firm tenure. Therefore, MAFR cannot be justified since audit firm tenure does not hurt earnings quality(although during the period analyzed the audit firm rotation and partner rotation were not mandatory in Taiwan). Arel et al. (2005) conclude that long audit relationships with clients could increase the reliance of the auditor on working papers from previous periods, hence decreasing the chances to detect erroneous or fraudulent transactions by lowering auditor skepticism. Casterella et al. (2013) reveal that long-term audit relationships might decrease independence to reduce audit failure, thus lowering audit quality. It is essential to mention that Casterella et al. (2013) study simulates the MAFR to conduct an experimental research, while rotation was not mandatory in the country of study.

Summing up, the relationship between audit quality and the length of the audit tenure is positive for most of the studies reviewed, which do not justify MAFR adoption.

2.4 Voluntary Audit Firm Rotation

It is crucial to distinguish between voluntary audit firm rotation (VAFR) and mandatory audit firm rotation (MAFR) since effects on audit quality and independence differ relative to the type of audit rotation.

For example, Williams (1988) states some of the reasons for voluntary change including changes in the contracting environment of the client, when the auditor effectiveness decreases and when the client perceives that the auditor reputation damages their reputation. Since the reasons for changing are diverse for each company analyzed, the effects on audit quality under voluntary rotation regime are different compared to the mandatory rotation.

Similarly, after analysis of several studies Casterella et al. (2013) suggest that the conclusions based on voluntary rotation regimes are less adequate or supportive for drawing inferences on the effectiveness of MAFR compared to the studies that use mandatory rotation regimes.

Several studies also analyze whether the association between audit quality and voluntary rotation is positive or negative. Firth et al. (2012) study the Chinese environment and analyze different forms of audit rotation (mandatory and voluntary rotation) at different levels (the audit firm and partner rotation) on audit quality. They find that voluntary audit firm rotation regime has no significant association with the likelihood of audit opinion modification.

This might be explained by R.L.A. (2016), suggesting that the auditor independence is not increased since the reason for the rotation is not the over-familiarity with the client.

2.5 Mandatory Audit Firm Rotation

The MAFR is introduced by the Regulation 537/2014 as a requirement for PIE to rotate the statutory auditors after ten years or less when is stated by the EU Member State legislation. This regulation also allows the Member States to alter the application of this rule under certain conditions (first tenders or joint audit engagements).

The following subsection analyses the arguments of the MAFR's proponents and opponents. This topic was intensely debated after the occurrence of some of the largest accounting scandals.

2.5.1 Proponents of the MAFR rule

The arguments that are most commonly provided by supporters of MAFR include the increase in auditor independence in fact and appearance, fresh look at the company, new cross border opportunities, increased "watchdog" role of the auditor and the inefficiency of MAPR. Ryan et al. (2001) show that even in the absence of additional services, auditors have career incentives to maintain long relations with audit clients. In its turn, this could negatively affect auditor independence and as well as his/her professional skepticism (EC, 2011).

Similarly, Tepalagul et al. (2015), Ewelt-Knauer et al. (2013) and Casterella et al. (2013) state that having long audit tenures with clients could lead to reduced auditor independence, audit quality and an

increase in routine processes. Moreover, Dopuch et al. (2001) in their experimental study, prove that under MAFR rules, auditor independence increases as a consequence of a decrease in the willingness to issue a biased report to beneficiate corporate management. Similarly, Francis et al. (2006) and Jackson et al. (2008) find that independence in appearance increases as a consequence of the auditor's rotation. A reasonable justification for that increase is that stakeholders, investors, and shareholders perceive the auditor change as the chance to have a fresh look at the company (Tan, 1995; Corbella et al., 2015) that could potentially lead to an increase in audit quality, transparency, and confidence in the financial information. That eventually might attract more investments and close the gap between what auditors do and what is expected from them. Other studies based on interviews and surveys like the one from Ebimobowei et al., (2011) analyze the effects of mandatory rotation on the auditors' independence and audit quality in Nigeria. By employing the knowledge of 172 auditors, they find a positive association between those variables, showing that auditor's independence increases with mandatory rotation.

Furthermore, it is also expected that next-tier audit firms (non-Big Four) will benefit from the new cross-border opportunities and the high auditor rotation to increase the competition and decrease the systemic risk of a big four collapse (EC, 2011). In the same line of thought, the enactment of MAFR is an opportunity for small audit firms to improve the competitiveness of the market with their participation (Jackson et al. 2008). The Member States, supervisors (national oversight bodies) and auditors are also expected to benefit from harmonized regulations. (EC, 2011). This point of view is defined as the helping hand theory of regulation, arguing that the mandatory rotation enacted by the government is beneficial to investors and is mighty to boost the growth of markets (Firth et al. 2012).

With regards to the watchdog role of the auditor, the user of the financial statements demands from auditors to exercise a high level of professional skepticism during the course of an audit. With the application of MAFR, the more independence gained, the more skepticism applied by the auditor. (Hayes, 2014)

Finally, the EC (2011) explains that only when MAPR rules are applicable, the audit firm and the client continue their relationship, increasing the pressure on the following auditor to retain the client.

2.5.2 Opponents of the MAFR rule

From the opponent side, the common arguments used by them include the loss of client-specific knowledge after the adoption of the rotation, the increased risk of audit failure, the start-up costs of acquiring a new client, and the limited impact on independence.

With regards to the loss of client-specific knowledge, GAO (2003) explains that through the years of client-auditor relationship, the auditor obtains an in-depth understanding of the client industry, understanding of the company and the risks involved. All this information, in the long run, might increase audit quality since the auditor relies less on the management information. However, with the increased rotation most of the cumulative knowledge of the company business, risks, people, processes, and controls are lost, which could affect audit quality negatively, leaving the clients more vulnerable to failures (Casterella et al., 2013). EC (2016) point out that this risk could be mitigated when the former audit firm delivers a handover file to the next audit firm including the detailed overview of the risks and procedures carried out during the past audits, or when two auditors were involved in the initial audits.

Ottaway (2014) shows the increased risk of audit failure by stating that the lack of knowledge and familiarity with the new clients could increase this risk during the initial years since the auditor rotation. This might result from the complexity of business due to its industry, structure or operations.

The European Commission estimated that depending on the size, the annual start-up cost of MAFR is approximately between 90K to 150K per firm. This additional cost is expected to appear in the first two years due to the lack of experience and the extra time needed (EC, 2011). Due to the above-mentioned additional cost, the mandatory auditor rotation rule pressures the audit firms to reduce the audit fees, thus increasing the competition in the audit markets. Research conducted by Choi et al. (2017), arrives at the same conclusion after analyzing the effects of MAFR rule for the Korean Market. In particular, this study provides evidence that quality of audits undertaken under MAFR is lower in comparison to the audit quality under VAFR and MAPR regimes. Jackson et al. (2008), in their Australian Market study, reach to the same conclusion as Choi et al. (2017) by providing evidence that giving the substantial costs of changing the auditor, MAFR might only bring minimal benefits to the market. Both authors also say that there are better ways to increase and protect auditor independence, including quality control standards and oversight bodies.

With regards to the limited impact on independence, Firth et al. (2012) contribute to this argument of the limited effect on independence by showing that MAFR has no significant effects on modified audit opinions as a proxy for audit quality.

Ruiz-Barbadillo et al. (2009) empirically support the arguments against MAFR by analyzing the audit quality before and after the abolishment of the MAFR rule, using the sample of distressed Spanish Companies. Authors show that MAFR is not associated with an improvement in auditor independence. Moreover, their results show that the auditor incentives to retain clients do not affect the likelihood of issuing GCO controlling for the existence of mandatory rotation regime. However, the auditors' incentive to protect their reputation has a positive effect on the likelihood of issuing GCO.

In the same line of thought, Cameran et al. (2015; 2016) do not support the implementation of MAFR rule under the Italian environment. They conclude that the auditor applies a higher level of accounting conservatism in the last years of the engagement since they want to be reappointed during the following years. They also prove that the earnings quality is lower in the first years after the rotation compared to the later years. Therefore, audit quality is higher under long audit tenures in contrast to the early years of the engagement.

2.5.3 Summary of the MAFR rule

Overall, several papers analyzed effects of MAFR and its consequences on audit quality and auditor independence in different countries. However, conclusions regarding the role of MAFR in enhancing audit quality are not consistent across academic studies. It is expected that including other control variables in the analysis could shed more light on the effects of mandatory audit firm rotation on audit quality for the EU Member States.

2.6 Level of Legal environment and Market development

Some authors in the field of accounting including Burgstahler et al. (2006) and Ahmed et al. (2013) investigate the link between accounting quality and the enforcement quality of a specific country as well as the link between a firm legal system and the earnings management. These authors point out that a strong level of enforcement is associated with higher accounting quality.

However, how do the institutional factors of a country affect audit quality?. Some researchers including Firth et al. (2012) and Francis et al. (2008) show that particular factors, including economic conditions, regulatory frameworks, and the legal environment, are able to explain the differences in accounting and audit quality across different regions and countries.

Firth et al. (2012), in their study of different rotation regimes on audit quality, show that firms adopting MAPR have a significantly higher likelihood of receiving a modified audit opinion (MAO), which might be a signal that MAPR application increases audit quality. However, their study suggests that these conclusions apply only to clients located in regions of China, where the legal institutions are weak.

Francis et al. (2003) conclude that when the audits are carried out by Big Four auditors in countries with stronger investor protection, the earnings quality increases, implying a positive association between audit quality and the legal environment level when the audits are carried out by auditors from Big Four.

Choi et al. (2007) state that Big Five auditors perform a stronger governance function (mitigating agency problems, reducing information asymmetry and increasing audit quality) in weaker legal environments.

Similarly, Fan et al. (2005), indicate that Big Five auditors have a corporate governance role in emerging markets.

To measure the level of the legal environment and market development, authors used various indices. Firth et al. (2012) use an index, controlling for specific differences in institutional, economic, legal, and political factors as a proxy for the level of the legal environment. This index captures market intermediaries (lawyers and CPA's in the province's population) as well as legal environment (lawsuit enforcement efficiency, consumer rights, and intellectual property rights protection).

Choi et al. (2007) use a combination of legal indices implemented by La Porta et al. (1998). They use the investor protection index (including the quality of rules and regulations to protect investors and the degree of their application) and the law enforcement index (estimating the quality of a country's legal enforcement based on an investors' survey)

3. Hypothesis Development

3.1 Hypothesis 1

The first hypothesis of this thesis aims to test the effect of MAFR adoption on audit quality. On the one hand, existing literature shows that the mandatory rotation is considered as a safeguard measure aimed to decrease the familiarity and self-interest threats that could affect the outcome of long-term audit relations (EC, 2011). Furthermore, MAFR could potentially increase the auditor's professional skepticism (Arel et al. 2005), and for that reason, it is expected that after the enactment of the MAFR rule, the new auditor could be more skeptical, increasing the level of earnings management detection and, hence audit quality.

On the other hand, prior literature describes several costs that associated with the MAFR rule, such as the loss of client knowledge (Casterella et al., 2013), higher risks of audit failure (Ottaway, 2014), and limited impact on auditor independence (Firth et al., 2012). Also, under the studies of Cameran et al. (2015; 2016) and Ruiz-Bardillo et al. (2009), those costs are proven to be significant enough to reduce the positive effects stated before (EC, 2011).

Therefore, based on the literature review, I state this first hypothesis as null.

H1: "MAFR adoption has no effect on audit quality for PIEs from the EU Member States"

This hypothesis is based on the inconclusive evidence related to the MAFR rule and audit quality, and the lack of studies carried out on mandatory environments described in the literature.

3.2 Hypothesis 2

As it was mentioned in the subsection 2.6, Firth et al. (2012) in their study of the different rotation regimes on audit quality covering different regions of China, state that the effectiveness of MAFR largely vary across regions. This statement is based on the differences in regulatory and cultural environments. As it is stated by Casterella et al. (2013) and Catanach et al. (1999) those criteria also differ across countries (cross-country regulatory and cultural differences) and are essential for understanding of the effects of MAFR on audit quality.

Based on the previous studies mentioned, it is reasonable to expect that the effects of MAFR might be different depending on the development level of the Member States of the European Union.

For the less-developed Member States, Choi et al. (2007) state that the auditors located there feel lower pressure from market forces to carry out quality audits and, as a consequence, do not have enough discipline to hold the audit quality level. Therefore, it is expected that the enactment of the MAFR rule in a less-developed legal system might potentially increase the level of audit quality since new auditors could be competing to gain new engagements by offering a higher level of audits.

On the other side, when it comes to the well-developed Member States, auditors are more motivated in comparison to less-developed Member States to maintain the level of audit quality due to the higher market pressure. Therefore, it might be expected that the enactment of MAFR rule in highly regulated legal systems will not increase audit quality, but rather decrease it due to the additional operating effort needed for that companies and audit firms to adapt to the new legislation in exchange for a small benefit. Therefore, the correspondent hypotheses are:

H2 a: "MAFR adoption does not have a statistically significant effect on audit quality for PIEs from highly-regulated EU Member States"

H2 b: "MAFR adoption increases audit quality for PIEs from EU Members, which are low-regulated"

Existing theoretical papers written for Germany (Maier et al., 2015) and France (Fournès Dattin, 2016) support this argument theoretically. Maier et al. (2015) study on the German environment is significant due to the similarity of the dynamic local market with the European trend. This dynamic environment refers to the dominance of Big Four in the local audit market and the moderate presence of mid-tier audit firms. Fournès Dattin (2016) study on the French environment is also significant to this study due to her analysis on the strongly regulated French environment.

Both authors argue that the application of this new homogeneous law (Reg. 537/2014) for the EU Member States does not challenge their local legislation; hence, they will be not sufficient to increase

audit quality. Moreover, they say that this rule does not fulfill the objectives for which it was enacted since the company does not break with the audit firm, while it also allows the company to apply for preferred treatment. Maier et al. (2015) and Fournès Dattin (2016) provide examples of rules enacted in Germany and France, that were aimed to increase the auditor independence and applied before MAFR rule. Examples include a priori and a posteriori incompatibilities, ban on non-audit services, and the use of joint audits or internal rotation rules (MAPR).

4. Research Design

Appendix 1 provides more details on the correspondent Predictive Validity Framework for each hypothesis stated in the section above and the operationalization of all the variables involved.

4.1 Regression Model

A fixed effects model is utilized to study the effects of MAFR on audit quality for the PIE's located in the EU Member States that apply the mandatory rotation rule without deferment as of the next fiscal year starting after June 17 2016. The following model is applied at the firm level basis and is used to analyze the hypotheses 1 and 2 previously stated.

$$AQ_{i,t} = \beta 0 + \beta 1\, Mandatory_{i,t} + \beta 2\, Rotation_{i,t} + ControlVar_{i,t} + \varepsilon_{i,t.} \quad (1)$$

4.2 Operationalization of Variables

4.2.1 Independent Variable

ROTATION is a dummy variable, that equals to 1 when the current auditor firm is different from the auditor firm during the previous fiscal year (FY) for a single firm and to 0 if there was no auditor rotation during the current FY. Based on the identification of the rotation events, the tenure of the engagements is calculated as the last year of audit engagement minus the first year of audit engagement. The calculated estimates of tenure were used for identification of mandatory and voluntary rotations. Voluntary rotations were identified between 2014 to 2018, while MAFR rotations were only identified for the FY2016, FY2017, and FY2018 (See table 5).

Moreover, this study only includes observations for firms with the first year of relationship with auditors starting from 2004 year and onwards. In order to identify tenures properly, mandatory and voluntary rotations are identified according to regulation 537/2014.

MAFR is a dummy variable that equals 1 when the tenure of the relation between the company and the rotated auditor firm is equal to or higher than the maximum period allowed by each State Member law, and 0 when the tenure period is lower. MAFR is a subgroup of Rotation and it is analyzed for the FY2016 (only for companies that started their years from July to December 2016, assuming these companies rotated to follow the 537/2014 Regulation), FY2017 and FY2018 based on the data available on Compustat Global.

For example, if a company is located in Bulgaria, it rotates after seven years of audit engagement without any different in the rule application. So, if the audit relation started at the FY2011, the company has to change the auditor firm before the FY2018 since seven years of engagement are reached at the FY2018 (see Appendix 2 for maximum periods allowed for each country), if the firm rotates, it is identified as mandatory.

4.2.2 Dependent Variable

The dependent variable in all the models is Audit Quality (AQ), measured as the amount of discretionary accruals. This study uses the Modified Jones Model by Bruynseels et al. (2014) based on the literature described in the subsection 2.1.3. This model differs from the Dechow et al. (1995) model since it includes the control for the asymmetric timeliness of accruals when recognizing losses and gains, since losses tend to be recognized in a more timely fashion than gains (Basu, 1997). Having said that, this model is adopted to challenge the linear relationship that is generally used in the standard accruals models by including a substantial specification improvement. Previous studies also support this methodology (Ball et al., 2006) by proving that the linear models that do not control for the asymmetric timeliness of accruals when recognizing losses and gains, explain substantially less variation in accruals in comparison to models including these controls.

The discretionary accruals are estimated using the approach by Bruynseels et al. (2014) as the actual amount of accruals minus the predicted amount of accruals. Lower values of discretionary accruals after MAFR enactment might eventually mean a higher quality of accruals, signaling higher audit quality.

$$\frac{TACC_{i,t}}{AVTA_{i,t}} = \beta_0 + \beta_1 \left[\frac{\Delta REV_{i,t}}{AVTA_{i,t}}\right] + \beta_2 \left[\frac{PPE_{i,t}}{AVTA_{i,t}}\right] + \beta_3 \left[\frac{CFO_{i,t}}{AVTA_{i,t}}\right] + \beta_4 DCFO_{i,t} + \beta_5 \left[\left(\frac{CFO_{i,t}}{AVTA_{i,t}}\right) * DCFO_{i,t}\right] + \varepsilon \quad (2)$$

TACC= Total accruals per firm and year. Net income before extraordinary items minus cashflows from operations.

AVTA= Average of total assets for the periods 2014 to 2018.

ΔREV= Change in total revenues for the periods 2014 to 2018.

PPE= Gross property, plant and equipment.

CFO= Cash Flow from Operations.

DCFO= This dummy variable is 1 if CFO is negative and 0 if it is positive.

ε = Error term.

4.2.3 Control Variables

SIZE: This variable is calculated as the natural logarithm of the total assets. As it is stated by Johnson et al. (2002) and González-Díaz et al. (2015), larger firms are more stable, have more sophisticated financial-reporting systems, and fewer chances to go bankrupt. They add this variable as a control in their study.

ROA: This variable is defined as a control for the firm performance, and it is calculated as Net Income Before Extraordinary Items divided by the Total Assets.

BIG4: This variable shows whether the firm was audited by the BIG4 firm or not, it is a dummy variable that equals 1 when the audit firm is classified as a Big 4 and 0 otherwise. Previous studies also used this variable.

DEBT: This variable represents the level of debt, and it is measured as the total liabilities divided by the total assets. This variable is used as a control since debt can incentivize firms to manage their earnings to not violate debt covenants, for example. (Carey et al. 2006)

SALESGROWTH: This variable is defined as the growth level of sales, and it is calculated as the percentage change in sales from year T-1 to year T. This variable is used by Choi et al. (2017), and it controls for the boost of sales originated by earnings management due to contracting reasons.

Also, YEAR, STATE and INDUSTRY variables are included as time, country, and industry controls. Identification of sector was made using two-digit SIC codes.

5. Sample Composition

5.1 Sample Selection

The research sample was constructed using Compustat Global (balance sheet data and auditor data) and foreign exchange, obtained from the European Central Bank. The sample selection procedure is illustrated in table 1.

The initial sample consisted of 102,727 observations representing 10,517 companies[2] from the total sample of companies from the EU Member States, where extension of mandatory rotation was not allowed (see Appendix 2). This means that the companies included in the sample selection need to rotate according to the maximum audit tenure established by their respective Member States (see Appendix 2) as of the first fiscal year started after June 17, 2016, without any deferment. In addition, companies located in Italy (which has been applying this rule since 1975), were also excluded from the sample since no change is expected from them. As audit standards in the financial industry remain comparably stricter, the companies from the financial sector were excluded from the sample.

In order to accurately measure audit tenure, the observations of firms being audited by the same company as of 2003 were also eliminated since the regulation established that the audit relations started before July 1st , 2003 will apply this rule for the fiscal year 2020 or 2023, according to the length of the relationship.

For each control variable, the 1st and 99th percentile were subtracted to not bias estimates with outliers. The final sample consisted of 14,070 observations representing 1,569 firms. From this sample, the observations for 2014-2018 years were only kept, leaving 5,519 observations for 1,347 firms. The following table summarizes the selection process described above.

Table 1: Sample Selection Process

	Number of Companies	**Number of Observations**
All firms in EU Member States	10,517	102,727
Less: Firms in Countries Where Mandatory Rotation Extension is Allowed	(8,184)	(77,010)
Less: Firms in Financial Industry	(500)	(5,312)
Less: Firms with the First Audit Year 2003	(257)	(5,915)
Less: Outliers	(7)	(420)
Total	1,569	14,070
Total: 2014-2018	**1,347**	**5,519**

(1) The table 1 summarizes the sample selection process of the research. All the data comes from the Compustat Global Database.

The composition of the sample by industry and country is presented in table 2. Polish companies constitute almost half of the sample while companies from Hungary, Lithuania, Ireland, and Portugal remain less represented. Manufacturing and services firms represent 66% of the sample, while

[2] For practical reasons, all these companies are governed by the law of a Member States whose transferable securities trade on a regulated market. Credit institutions, insurance undertakings and entities specially designated by Member States are omitted from the sample.

agricultural and public administration firms have the lowest share in total. One of the potential reasons for such inequality is that the agricultural industry is mostly composed of small farms, and only a few entities gain a status of PIE. Knowing that the objective of our research is to identify mandatory rotation effect for PIE, the geographic and industrial composition of the sample is related to the geographical and industrial distribution of PIE in the EU.

Table 2: Geographical and Industry Composition of Firms in the Sample

Country	ISO Country Code	Number of Firms	Number of Observations
Bulgaria	BGR	49	214
Spain	ESP	124	568
Greece	GRC	161	670
Hungary	HUN	20	83
Ireland	IRL	40	116
Lithuania	LTU	29	124
Netherlands	NLD	122	483
Poland	POL	630	2,763
Portugal	PRT	41	179
Romania	ROU	81	319
Total		**1,297**	**5,519**
Industry	**SIC Code**	**Number of Firms**	**Number of Observations**
Agriculture, Forestry, Fishing	01-09	2	10
Mining and Construction	10-19	125	471
Manufacturing	20-39	554	2,328
Transportation and Utilities	40-49	163	704
Retail and Wholesale Trade	50-59	148	665
Services	70-89	298	1,314
Public Administration	90-99	7	27
Total		**1,297**	**5,519**

(1) The table 2 details the composition of the sample firms and observations for the period 2014 to 2018 by Country/Member State and Industry. All the information comes from Compustat Global Database.

5.2 Measurement of Legal environment and Market development

Based on the studies of Choi et al. (2007) and Firth et al. (2012), the sample of this study is divided into two sub-samples representing the high and the low level of the legal environment and market

development. By doing this, it will be possible to investigate the effects on audit quality in both scenarios of high and low regulation.

In order to distinguish between high and low legal environments, the Kaufmann (2007) approach is used to create a combined index of investor protection and law enforcement (Choi et al. 2007) for each Member State included in the sample and compare it with the EU average of the combined index for each year analyzed.

The indices included are "the rule of law" and “regulatory quality”. Those indices are computed by the World Bank for the period analyzed. The first one measures “the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence”, while the second one measures “the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development” (Kaufmann, 2007)

6. Results and Interpretation

6.1 Estimating Discretionary Accruals

First of all, the estimates of discretionary accruals were obtained using the Modified Jones Model of Bruynseels et al. (2014). The separate regressions of TACC/AVTA on covariates of Modified Jones Model were estimated for each country under investigation with the year and 1-digit SIC as time and industry controls. To ensure the accuracy of estimates, regressions were done using the full sample of companies in the selected EU Member States between 2003 and 2018 years. For each covariate of the model, the first and the ninety-ninth percentile were excluded from estimation to not bias the regression results. The summary statistics of the main variables used for DA estimation as well as the resulting distribution of estimated discretionary accruals is presented in table 3. From the table provided, it can be inferred that on the average firms in the sample were rather conservative in their accounting policies, as the mean for discretionary accruals is equal to -0.006.

Table 3: Summary statistics of variables used for estimating Discretionary Accruals.

	Obs	Mean	Std. Dev.	Min	Max
Discretionary Accruals	13,345	-0.006	0.806	-36.816	57.255
AVTA	13,345	891.514	4,529.350	0.001	110,524.200
TACC(3)	13,345	-0.038	1.340	-33.523	104.668
ΔREV(3)	13,345	0.029	2.025	-161.643	24.483
PPE(3)	13,345	0.512	0.482	0.000	6.874
CFO(3)	13,345	0.027	0.937	-104.671	2.270
DCFO*CFO(3)	13,345	-0.045	0.928	-104.671	0.000

(1)This table summarize the statistics of the variables used for estimating DA. (2) Discretionary Accruals estimates are estimated as residuals of the Bruynseels et al. (2014) Modified Jones Model. TACC is the Total accruals per firm and year and is calculated as the total income before extraordinary items minus cash flow from operations. AVTA is the average of total assets for the periods 2014 to 2018. ΔREV is the change in total revenues for the periods 2014 to 2018. PPE is the gross property, plant and equipment. CFO is the Cash Flow from Operations. DCFO is a dummy variable that equals 1 if CFO is negative and 0 if it is positive. (3) All marked variables were normalized by the average value of total assets (AVTA).

6.2 Discretionary accruals by Country and Industry

The table 4 aggregate discretionary accruals by country and industry. It can be inferred that historically, there was no tendency for companies from the sample to choose strictly aggressive or conservative accounting policies. Throughout the years of investigation, the average level of discretionary accruals was negative for Bulgaria, Greece, Hungary, Poland, and the Netherlands, implying domination of conservativism in accounting policies. For other countries including Spain, Ireland, Lithuania, Portugal, and Romania, the level of discretionary accruals was rather positive, which might be a signal for higher usage of aggressive accounting policies. Accounting policies in Communications, Transportation, Utilities, and Service industries were rather conservative while other industries exhibited relative aggressiveness in accounting policies. It can be observed that implementation of MAFR policy in the countries under investigation was undertaken during the years marked by the relative drop in discretionary accruals. However, the level of change is not substantial, and the analysis that has been done so far does not allow this study to claim that this was the result of tightening of accounting regulations.

Table 4: Distribution of discretionary accruals by countries and industries

Country	**2014**	**2015**	**2016**	**2017**	**2018**
BGR	-0.0009	0.0011	-0.0053	-0.0037	-0.0007
ESP	-0.0011	0.0035	-0.0025	0.0012	0.0003
GRC	-0.0052	-0.0048	-0.0013	-0.005	-0.0013
HUN	-0.0071	-0.0014	-0.0105	-0.0091	-0.0018
IRL	-0.0536	0.0127	0.0018	0.0015	0.0059
LTU	0.0032	-0.0009	0.0017	0.0026	-0.0011
NLD	-0.0228	-0.0047	-0.002	0.0054	-0.0042
POL	-0.002	0.0019	0.0024	-0.0021	-0.0012
PRT	0.0062	-0.0032	0.0053	-0.0101	0.0014
ROU	-0.0093	0.0209	-0.0113	0.0057	0.0002
Total	**-0.0055**	**0.0018**	**-0.0001**	**-0.0011**	**-0.001**
1-digit SIC	**2014**	**2015**	**2016**	**2017**	**2018**
Agriculture, Forestry, Fishing	0.3960	0.5823	-0.2483	-0.1934	-0.7924
Mining and Construction	-0.0075	0.0145	0.0012	-0.0962	0.0228
Manufacturing	0.0360	-0.0279	0.0101	-0.0222	0.0443

Transportation and Utilities	0.2676	0.2336	-2.1990	8.0522	-4.7246
Retail and Wholesale Trade	0.0054	-0.0229	0.0060	-0.0275	0.0439
Services	-0.0206	-0.0058	0.0572	-0.0315	0.0216
Public Administration	-0.0286	-0.0014	-0.0065	-0.0161	0.0373
Total	**-0.0055**	**0.0018**	**-0.0001**	**-0.0011**	**-0.001**

(1) The table 4 summarizes the distribution of DA by Country/ Member State and Industry per year. The industry classification was prepared based on the first digit of the SIC number for each Company included in the sample.

6.3 Effects of Mandatory and Voluntary Rotation

Since the start of the imposition of MAFR requirement for PIE in 2016, less than 25% of firms changed their auditors. Moreover, table 5 shows that only for 109 firms in the sample, the rotation process exhibited features of mandatory rotation (the maximum allowed auditor tenure was reached a year before the rotation). However, it is possible that the number presented above does not represent the exact number of mandatory rotations. One of the reasons is that the tenure for firms not changing the auditor since the 2003 year was not calculated. That means that if the firm A started the relationship with auditor B in 2003 but was forced to rotate the auditor in 2016 or 2017, it was not possible to consider this rotation mandatory due to difficulties with tenure identification. Surprisingly, some firms in the sample continued relationship with the same auditor even after reaching the maximum tenure in 2016 and 2017 (this fact might be explained by the deficiencies in the tender process, issues related to mergers and acquisitions of companies).

Table 5: Sample Composition by the form of Auditor Rotation

year	MAFR	VAFR	Number of Rotations	Number of Companies
2014	-	149	149	1,150
2015	-	160	160	1,152
2016	34	113	147	1,147
2017	53	110	163	1,110
2018	56	114	170	960
Total	**143**	**646**	**789**	**5,519**

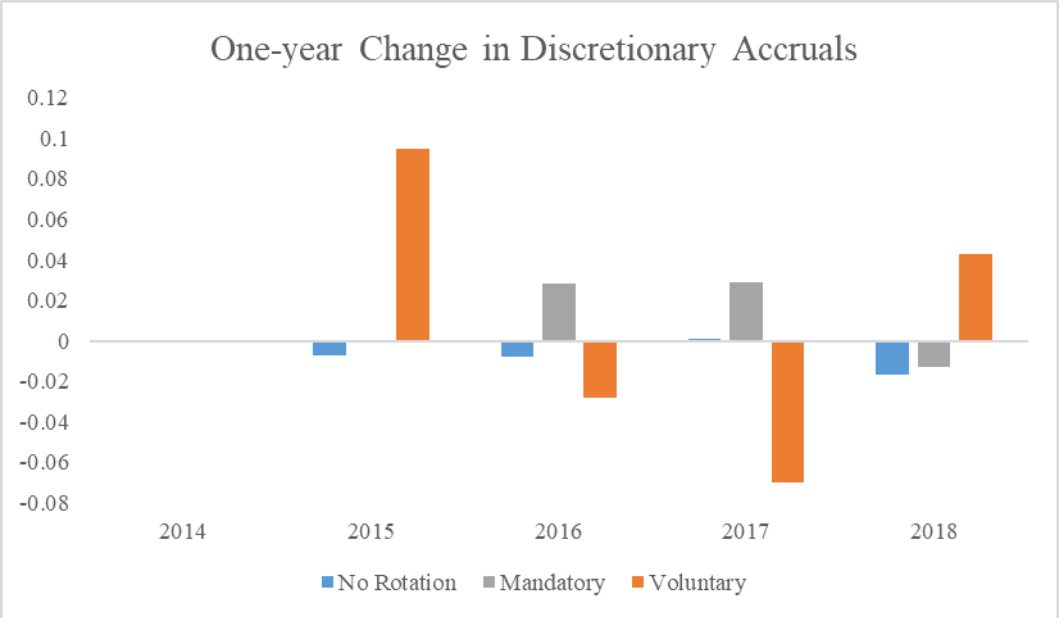
(1) The table 5 includes the sample composition of the rotations divided by form of Auditor Rotation. The first two columns correspond to Mandatory (MAFR) and Voluntary (VAFR) firm rotations that sum the total number of rotations for the period 2014-2018. Since the Regulation 537/2014 is applicable as of the FY started before June 17, 2016, the MAFR are only present on the FY2016, FY2017 and FY2018.

To understand the dynamics of discretionary accruals around the rotation events, the 1- and 2-year changes in discretionary accruals were estimated for each firm and compared changes in audit quality for firms, which did not experience auditor rotations, and for firms, experiencing voluntary and

mandatory rotations. Although it is difficult to identify a clear pattern, it can be observed in the figure 1 that Discretionary Accruals are more volatile during the periods corresponding to auditor rotations compared to periods without such change. While next year with the same auditor (no rotation) is associated with a slight decrease in discretionary accruals, mandatory rotation of auditor is associated with a small positive change in discretionary accruals, meaning that there is a slight decrease in auditor quality (although this difference is not statistically different from zero).

This negative change might be explained by a significant lack of company-specific information ("know-how") faced by the newly-hired auditor. However, if the auditor was rotated voluntarily, it was not possible to identify a clear tendency as there was a decrease in average discretionary accruals in 2015 and 2018 years, and an increase in 2016-2017 years. Country-specific results in table 6 show that for five countries in the sample, one-year improvement in audit quality was observed for companies, which mandatorily rotated their auditor while for six countries one-year improvement was investigated for firms having no rotation or voluntary rotation. Sector-specific results have shown that the direction of change in discretionary accruals largely depends on the sector, with a positive change in audit quality for firms, mandatorily-rotated, and negative for voluntary-rotated in Mining and Construction, Manufacturing, and Public Administration, and the reverse tendency for other sectors.

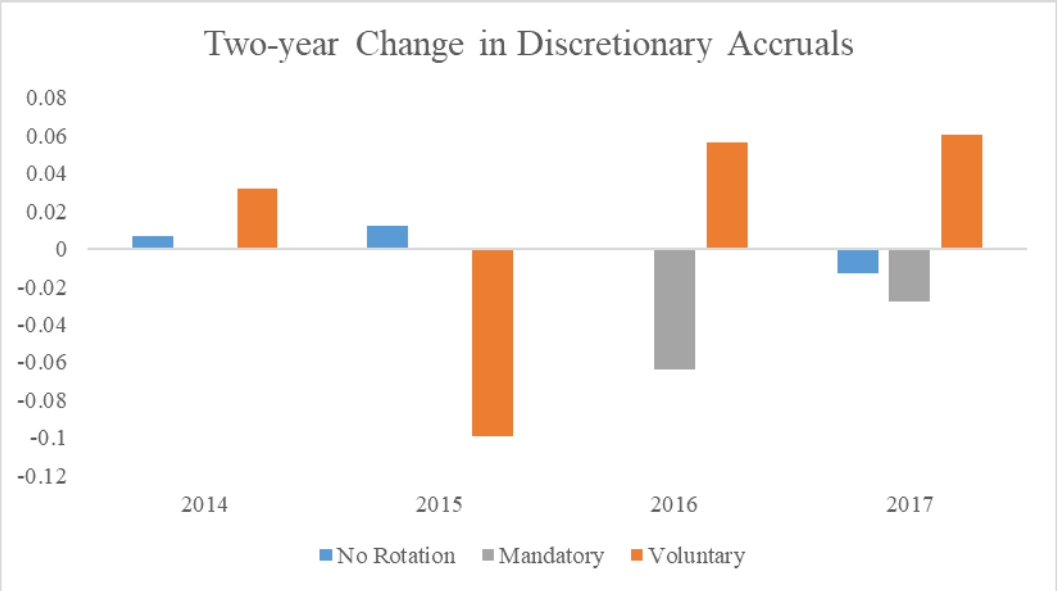
Figure 1 – One-year change in discretionary accruals



(1)This chart shows the average value of DA Difference for firms rotated in the period FY 2014 and FY 2018. Firms under each year will be different, which means that if in FY2017 "A" amount of firms rotated, and in FY2018 "B" firms rotated, the value for 2017 will describe the average value for "A" firms, while the value for 2018 year will describe the average value for "B" firms. As this is a one-year change, the DA difference is calculated as follows: If the auditor rotate in FY 2018, the DA difference would be between FY2018 and FY2017. No rotation = companies that rotate during the period of analysis but not in that year. Mandatory = companies that rotate according the Member State law. Voluntary = companies that rotate independently of the maximum period allowed by the Member State.

To investigate whether this quality drop ceases after auditors get more familiar with the company, the two-year modifications in discretionary accruals (figure 2) were also checked. When looking at the two-year DA changes, it can be observed that although voluntary rotations are associated with a decrease in audit quality, mandatory ones are associated with an increase in audit quality relative to firms, not experiencing auditor rotation. Although the change is not substantial, it is possible that as soon as mandatorily assigned auditors become more familiar with the company, they start providing an audit of higher quality, while their judgment is more independent compared to auditing firms, appointed during the voluntary rotation. Although presented descriptive statistics are insufficient to infer that the impact of MAFR is rather long-term than short-term, analyzing long-term effects of MAFR on audit quality might be a possible direction for future research. Country-specific results in table 6 show that only for Bulgaria, Spain, and Ireland there was no two-year improvement in audit quality for firms, which mandatorily rotated their auditors. At the same time, only half of the countries under investigation experienced two-year quality improvement for firms which voluntarily rotated auditors. Sector-specific results show that two-year improvement in audit quality for firms, which mandatorily rotated their auditors, was investigated only for firms in manufacturing and retail and wholesale trade. For the firms, which voluntarily rotated auditors, positive two-year change was observed only for transportation and utilities as well as public administration sectors.

Figure 2 – Two-year change in discretionary accruals



(1)This chart shows the average value of DA Difference for firms rotated in the period FY2014 to FY2018. So for example, firms on FY2016 bar will not be the same as on FY2017 bar. As this is a two-year change, the DA difference is calculated as follows: if the auditor rotate in FY2016, the DA difference would be between FY2017 and FY2015. No rotation = companies that rotate during

the period of analysis but not in that year. Mandatory = companies that rotate according the Member State law. Voluntary = companies that rotate independently of the maximum period allowed by the Member State.

Table 6: Discretionary Accruals Dynamics around the Rotation events

	1YR Change			2YR Change		
Member States	**No Rotation**	**MAFR**	**VAFR**	**No Rotation**	**MAFR**	**VAFR**
Bulgaria	+	+	-	-	+	-
Spain	-	+	+	-	+	+
Greece	-	-	+	-	-	-
Hungary	+	+	+	+	-	+
Ireland	+	-	-	+	+	+
Lithuania	+	+	-	-	-	+
Netherlands	-	-	+	+	-	-
Poland	-	+	-	-	-	-
Portugal	-	-	-	-	-	+
Romania	-	-	-	-	-	-
Sectors						
Agriculture, Forestry, Fishing	-	N/A	N/A	-	N/A	N/A
Mining and Construction	+	-	+	-	+	+
Manufacturing	+	-	+	-	-	+
Transportation and Utilities	+	+	-	+	+	-
Retail and Wholesale Trade	+	+	-	+	-	+
Services	+	+	-	+	+	+
Public Administration	-	-	+	+	N/A	-

(1) This table summarize the sign of change of discretionary accruals around the rotation events. Basically, if the mean of DA change for all years after the mandatory rotation of a specific Member State or Industry is positive, it is reflected as a "+" to the specific row of the table. If it is negative, it is reflected as "-". Those signs are obtained from taking the sign of the average value of each row (No Rotation, Mandatory and Voluntary Rotation) of the Appendixes 4 and 5 which contain the exact estimates in the difference in discretionary accruals. This analysis was made for one-year and two-year periods as well as for Member State and Industry Sectors. The N/A values apply when no auditor rotations (mandatory or voluntary exist for a specific year and industry.

6.4 Summary of Descriptive Statistics

Although descriptive statistics show that mandatory rotation slightly reduces audit quality in the short term, while improving it in the long term, they are insufficient to test our hypotheses related to the effects of mandatory rotation. That is why to expand the analysis by controlling for additional factors affecting audit quality, a regression analysis was conducted. Table 7 presents the summary statistics of dependent and independent variables used. Estimated discretionary accruals were regressed on the set of control variables and dummies for mandatory rotations and rotations for the sample of high-regulated (those with the average level of Rule of Law and Regulatory Quality lower than the EU average) and low-regulated countries separately and jointly and compared the results in tables 8-9.

Table 7: Summary Statistics of variables used for regression analysis

Variable	Obs.	Mean	Std. Dev.	Min	Max
Discretionary Accruals	5,519	0.008	0.188	-2.436	1.123
LN(AWCA+1270[3])	5,372[4]	7.146	0.235	1.267	11.273
Rotation	5,519	0.026	0.159	0.000	1.000
MAFR	5,519	0.117	0.322	0.000	1.000
SIZE	5,519	4.011	2.611	-5.891	11.726
ROA	5,519	-0.021	0.341	-13.468	0.993
BIG4	5,519	0.374	0.484	0.000	1.000
DEBT	5,519	0.605	0.665	0.007	31.583
SALES GROWTH	5,519	1.057	5.478	-391.067	70.192

(1) The table 7 includes the summary statistics of the variables used in the regression analysis. (2) Discretionary Accruals estimates are residuals of the Working Capital Accruals Model of DeFond et al. (2001). LN(AWCA+1270) is the natural logarithm of the AWCA distribution and follows the following formula: log(AWCA + |1st percentile|). This variable is implemented in the robustness test. Rotation is a dummy variable that equals 1 when the current auditor firm of an observation is different from the auditor firm of the fiscal year (FY) before, and 0 when the auditor firm from the current FY and the FY before are the same (no rotation event). MAFR is a dummy variable that equals 1 when the tenure of the relation between the company and the auditor firm is equal or higher to the maximum period allowed by each State Member law, and 0 when the tenure period is lower (voluntary). Size is the natural logarithm of the total assets. ROA is the Net Income before extraordinary items divided by the total assets. BIG4 is a dummy variable that equals 1 when the audit firm is classified as a Big 4 and 0 otherwise. Debt is the total liabilities divided by the total assets. Sales Growth is the change in sales from year T-1 to year T.

6.5 Hypothesis Testing

Table 8 shows that for the sample of all countries, mandatory rotation of auditor has an insignificant association with the level of discretionary accruals, implying no effect on audit quality. This leads this study to fail to reject the hypothesis H1 about the absence of a statistically significant relationship between audit quality and mandatory rotation of auditor for 95% confidence level. Rotation itself does not have a statistically significant association with discretionary accruals, making firms indifferent between continuing with the previous auditor and launching a tender process for a new one from the quality perspective. The same results are obtained when the dependent variable has an absolute value, implying that earning manipulations is not significantly affected by rotation events.

Table 8: Test of hypotheses - DA analysis

	All Countries	All Countries
	DA	|DA|

[3] The value (-1270) correspond to the first percentile of the AWCA distribution. The transformation of the AWCA dependent variable is necessary [log(AWCA + abs(1st percentile))] in order solve two problems: the existence of negative values and a skewed data distribution.

[4] The number of observation is different for this variable since measures with different availability were used for computation and also because some of the outlier observations were excluded for the purpose of normalization of the dependent variable for robustness test.

MAFR	0.016	-0.011
	(1.07)	(-0.97)
ROTATION	0.001	-0.004
	(0.12)	(-0.68)
SIZE	0.038*	-0.014
	(2.5)	(-1.11)
ROA	0.236*	-0.144
	(2.04)	(-1.70)
BIG4	-0.007	0.001
	(-0.59)	(0.08)
DEBT	0.02	-.006
	(0.45)	(-0.17)
SALES GROWTH	-0.001***	-.002***
	(-4.55)	(-12.46)
Year fixed effects	yes	yes
Country fixed effects	yes	yes
Industry fixed effects	yes	yes
_cons	-0.143*	0.157**
	(-2.38)	(2.89)
N	5519	5519

(1) *, **, *** represent significance at a level of 10, 5 and 1 percent, respectively. The t values are stated in parenthesis. The table with the variable definitions is in the appendix 3. (2) Rotation is a dummy variable that equals 1 when the current auditor firm of an observation is different from the auditor firm of the fiscal year (FY) before, and 0 when the auditor firm from the current FY and the FY before are the same (no rotation event). MAFR is a dummy variable that equals 1 when the tenure of the relation between the company and the auditor firm is equal or higher to the maximum period allowed by each State Member law, and 0 when the tenure period is lower (voluntary). Size is the natural logarithm of the total assets. ROA is the Net Income before extraordinary items divided by the total assets. BIG4 is a dummy variable that equals 1 when the audit firm is classified as a Big Four and 0 otherwise. Debt is the total liabilities divided by the total assets. Sales Growth is the change in sales from year T-1 to year T.

Another question to analyze is whether there is a difference in the estimated effects between high- and low-regulated EU member States. Table 9 shows that when it comes to highly regulated countries, neither mandatory nor voluntary rotation does have a statistically significant association with the level of discretionary accruals. The results above make this study fail to reject the hypothesis H2a about the absence of a significant effect of mandatory auditor rotation on audit quality for the highly regulated EU member States for the 95% confidence level. Nonetheless, the same regression equation estimated for the sample of low-regulated countries shows that mandatory rotation has a positive and marginally significant association with the level of discretionary accruals, implying a negative association with audit quality. This causes the rejection of the hypothesis H2b about the improvement of audit quality as a result of mandatory rotation for the low-regulated EU Member States. Noticeably, rotation itself has a statistically insignificant association with audit quality. However, when the dependent variable has absolute values, it was found that although neither in highly regulated, nor in low-regulated EU

Member States exists a statistically significant association between mandatory rotation and audit quality, rotation itself has negative and statistically significant effect on audit quality for low-regulated EU Member States.

Table 9: Test of hypotheses - DA analysis

	Highly Regulated	Lowly Regulated	Highly Regulated	Lowly Regulated
	DA	**DA**	**|DA|**	**|DA|**
MAFR	0.049	0.016	-0.131	-0.011
	(0.38)	(1.7)	(-1.25)	(-1.24)
ROTATION	0.004	-0.004	-0.017	0.011*
	(0.19)	(-0.74)	(-0.77)	(2.11)
SIZE	0.102*	0.025	-0.019	-0.018
	(2.31)	(1.61)	(-0.36)	(-1.47)
ROA	0.359***	0.23	-0.212	-0.133
	(7.36)	(1.94)	(-4.30)	(-1.58)
BIG4	-0.069	-0.003	0.024	0.004
	(-1.46)	(-0.42)	(0.39)	(0.60)
DEBT	-0.022	0.018	0.173	-0.005
	(-0.26)	(0.4)	(2.49)	(-0.13)
SALES GROWTH	0.013	-0.001***	0.003	-0.002
	(0.43)	(-5.07)	(0.11)	(-11.70)
Year fixed effects	yes	yes	yes	yes
Country fixed effects	yes	yes	yes	yes
Industry fixed effects	yes	yes	yes	yes
_cons	-0.499	-0.091	0.182	0.15
	(-1.73)	(-1.61)	(0.52)	(2.98)
N	599	4920	599	4920

(1) *, **, *** represent significance at a level of 10, 5 and 1 percent, respectively. The t-values are in parenthesis. (2) Rotation is a dummy variable that equals 1 when the current auditor firm of an observation is different from the auditor firm of the fiscal year (FY) before, and 0 when the auditor firm from the current FY and the FY before are the same (no rotation event). MAFR is a dummy variable that equals 1 when the tenure of the relation between the company and the auditor firm is equal or higher to the maximum period allowed by each State Member law, and 0 when the tenure period is lower (voluntary). Size is the natural logarithm of the total assets. ROA is the Net Income before extraordinary items divided by the total assets. BIG4 is a dummy variable that equals 1 when the audit firm is classified as a Big Four and 0 otherwise. Debt is the total liabilities divided by the total assets. Sales Growth is the change in sales from year T-1 to year T.

6.6 Robustness Test

Although the empirical evidence discussed above cannot empirically justify MAFR adoption, usage of a single audit quality measure might not be enough for ensuring the validity of findings. For the purpose of a robustness check, the re-estimation of the models was carried out using the level of abnormal

working capital accruals of DeFond et al. (2001) as another measure for audit quality. This model was estimated based on the following regression:

$$AWCA_t = WC_t - [(WC_{t-1})/(S_{t-1})*S_t] \quad (2)$$

AWCA = The abnormal working capital of the current year

WC_t = The non-cash working capital accruals of the year

WC_{t-1}= The non-cash working capital accruals of the prior year

S_t = Current year sales

S_{t-1} = Prior year sales

To normalize the dependent variable, the absolute value of the first percentile was added to each observation and took the natural logarithm of the resulting estimates. The results for the same audit quality regressions estimated for the samples of high-, low-regulated countries and the entire sample are presented in table 10. Table 10 shows that for the sample of all countries, neither mandatory nor voluntary rotation have statistically significant effects on audit quality, making this study fail to reject the hypothesis H1 regarding the absence of statistically significant association between mandatory auditor rotation and the level of audit quality. Distinctions between high- and the low-regulated EU Member States provide similar results: audit quality is not significantly influenced by mandatory audit rotations (although there is a marginally significant and positive association with rotation itself for the sample of high-regulated EU Member States). These results confirm that rejection of hypothesis H2b and failure to reject the hypothesis H2a for 95% confidence level are robust to dependent variable specifications.

Table 10: Robustness check for the sample of high-, low-regulated countries and for the entire sample

	Highly Regulated	**Lowly Regulated**	**All Countries**
	ln(AWCA+1270[5])	**ln(AWCA+1270)**	**ln(AWCA+1270)**
MAFR	0.037	-0.009	-0.004
	(1.00)	(-0.27)	(-0.13)
ROTATION	-0.074	-0.009	-0.014
	(-1.83)	(-0.91)	(-1.48)
SIZE	-0.018	0.003	0.004
	(-0.51)	(0.50)	(0.65)

[5] The value (-1270) correspond to the first percentile of the AWCA distribution. The transformation of the AWCA dependent variable is necessary [log(AWCA + abs(1st percentile))] in order solve two problems: the existence of negative values and a skewed data distribution.

ROA	-0.025	0.003	0.003
	(-1.04)	(1.16)	(1.23)
BIG4	-0.18	0.001	-0.012
	(-1.02)	(0.07)	(-0.76)
DEBT	-0.005	-0.0001	0.0002
	(-0.65)	(-0.09)	(0.16)
SALES GROWTH	0.068	0.001*	0.001
	(1.15)	(2)	(1.95)
Year fixed effects	yes	yes	yes
Country fixed effects	yes	yes	yes
Industry fixed effects	yes	yes	yes
_cons	7.352***	7.136***	7.139***
	(22.13)	(313.67)	(283.01)
N	534	4796	5330

(1) *, **, *** represent significance at a level of 10, 5 and 1 percent, respectively. The t-values are in parenthesis. (2) LN(AWCA+1270) is the natural logarithm of the AWCA distribution and follows the following formula: log(AWCA + abs(1st percentile)). Rotation is a dummy variable that equals 1 when the current auditor firm of an observation is different from the auditor firm of the fiscal year (FY) before, and 0 when the auditor firm from the current FY and the FY before are the same (no rotation event). MAFR is a dummy variable that equals 1 when the tenure of the relation between the company and the auditor firm is equal or higher to the maximum period allowed by each State Member law, and 0 when the tenure period is lower (voluntary). Size is the natural logarithm of the total assets. ROA is the Net Income before extraordinary items divided by the total assets. BIG4 is a dummy variable that equals 1 when the audit firm is classified as a Big Four and 0 otherwise. Debt is the total liabilities divided by the total assets. Sales Growth is the change in sales from year T-1 to year T.

Therefore, failure to reject the hypothesis H1 for 95% confidence level is robust to the measure of audit quality the same way as the rejection of hypotheses H2b and failure to reject the H2a hypothesis.

7. Limitations

Although this might serve as an empirical justification for the redundancy of MAFR for audit quality improvement, the research method of this study is prone to some limitations:

1) As MAFR adoption is a relatively recent event, it was not possible to assess the long-term effects of this policy. It is possible that it takes more than one year for the MAFR to take effect on audit quality and lower earnings management but, unfortunately, the existing data did not allow this study to do that;

2) Although the starting year of the dataset was 2003, the tenure was not calculated for firm-auditor pairs starting their relationship in 2003. The main reason was due to the impossibility of the audit tenure calculation. There might be no need for this if the precise data on the length of audit tenure for each client-auditor pair was available.

3) According to EU regulation (537/2014), in exceptional circumstances (for example, in case of mergers or in case of issues with the tender process), the firm might ask regulators to extend the tenure of the auditor. It was not possible to control for such cases with the dataset available;
4) Although daughter companies can be PIE the same way as parent companies, any relationship was controlled between the firms studied. Also, the relation of group audits subject to ISA 600 with group members in the different Member States of the EU was not controlled. The main reason is that there is still no clear consensus regarding these cases in the European Regulation, most of such rotation decisions are made on a case-by-case basis. Therefore, it might be possible that some of the mandatory rotations were misclassified due to lack of data on subsidiaries as well as MAFR options applied in these countries.

8. Conclusions and future research

This thesis was aimed to analyze the impact of MAFR regulation on the quality of audit provision for Public Interest Entities in the EU Member States In particular, the way how the audit provided after mandatory rotation from MAFR differed from audit provided after voluntary rotation in terms of quality. As MAFR is a relatively recent measure, only a few authors analyzed its impact, and the research in this area was restricted to theoretical debate and the analysis of interconnection between audit tenure and its quality (mostly measured by Discretionary Accruals or the level of Abnormal Working Capital Accruals). Making use of the most recent version of COMPUSTAT dataset, the short-term effects of MAFR was empirically investigated by taking advantage of the recent data. Also, it was examined the difference in estimated effects between countries with high levels of regulation and countries with the low level of regulation, using the composed index of Regulatory Quality and Rule of Law as a benchmark for dividing countries into low-regulated and high-regulated.
Although the links between audit tenure and the quality of its provision were intensely studied before, the results of existing papers are often ambiguous. On the other hand, Cameran et al. (2015), Ottaway (2014), Casterella et al. (2013), and Choi et al. (2017) show that audit quality increases with years of tenure due to better knowledge of client and the need to apply more conservative policies to have higher chances to be re-applied. On the other hand, Firth et al. (2012) show that mandatory rotations lower probability of auditor giving modified audit opinion, which signals about the enhancement in audit quality. Jackson et al. (2008) and Choi et al. (2017) suggest that even though audit quality might increase from such measures, substantial costs, associated with rotating the auditor, offset potential benefits for PIEs. Also, authors like Firth et al. (2012) and Casterella et al. (2013) point out that the understanding

of the effects of MAFR is limited without understanding the cultural and legal differences in countries, where it is applied, which is a further justification for the empirical strategy, applied in this thesis.

In order to analyze the effects of mandatory rotation the three hypotheses were tested. The first one claims the absence of a statistically significant relationship between mandatory rotation after MAFR adoption and the audit quality measured by the level of discretionary accruals. The second one refers to the absence of a statistically significant relationship between the mandatory rotation and audit quality for the highly-regulated EU Member States, while the third one is related to the improvement of audit quality for PIEs from the low-regulated EU Member States. To test these hypotheses, I used data only for countries which adopted MAFR without extension possibilities, namely, Bulgaria, Greece, Romania, Poland, Hungary, Netherlands, Spain, Ireland, Lithuania, and Portugal. Also, firms from the financial sector were not included and it was also removed the data below the 1st and above the 99th percentile for each country, sector, and year for main explanatory and control variables. The period of analysis was chosen as 2014-2018 to include both years before and after MAFR adoption. Once discretionary accruals were measured, one- and two-year differences in discretionary accruals were compared for firms, which did not rotate the auditor, firms, which voluntarily rotated, and ones, which mandatorily rotated their auditors. Although the results were somewhat mixed, the apparent tendency of increased volatility in discretionary accruals during rotations was investigated. Also, although for firms, experiencing mandatory rotations, the audit quality rather deteriorated during the first year after rotation, the two-year effect was mostly positive. Although it cannot be used as an empirical justification of rather long-term improvements in audit quality, this can be a possible direction for future research.

Testing our null hypotheses required estimating the fixed-effects regression models using the estimated level of discretionary accruals as dependent variable and dummies for rotations and mandatory rotations as independent variables for the total sample as well as on samples for low-regulated and high-regulated countries. The empirical results show that rotation of auditor (either mandatory or voluntary) does not have a statistically significant association with audit quality measured by discretionary accruals; therefore, this study fail to reject the hypothesis H1. Results for high-regulated countries also do not show any statistically significant association between audit quality and mandatory rotation events. However, results for low-regulated countries show that there is a marginally significant and positive association between the level of discretionary accruals and mandatory rotation events, implying rather a negative effect on audit quality (while the rotation effect is mostly insignificant). This empirical evidence fails to reject the hypothesis H2a but rejects the hypothesis H2b regarding the positive impact of MAFR on audit quality for the low-regulated EU Member states. The results above were checked for robustness using the level of abnormal working capital accruals as another measure for audit quality.

Robustness check suggests an insignificant association between audit quality and mandatory rotations for low-regulated EU Member States, which causes the further rejection of the hypothesis H2b. Also, failure to reject hypotheses H1 and H2a is found to be robust to the dependent variable specification.

The obtained results do not serve as an empirical justification for MAFR, which is aimed at lowering earnings management though not meaning that it is redundant. Moreover, the study does not consider the impact on variables, different from audit quality, although their effect might be even more economically significant than the impact on audit quality. Also, the study does not evaluate potential long-term effects of the above-mentioned measure on audit quality, although looking into them might motivate further arguments to justify MAFR adoption. Overall, if auditing firm cares about its reputation and perception of its independence, it is unlikely that longer audit tenure will motivate it to reduce audit quality even in the absence of the mandatory rotation requirement (although, such measure might mitigate some risks, related to auditor's incentives to continue relationship with important client). This study also provides the following directions for future research:

1. Wait for more recent data to evaluate both short-term and long-term effects of MAFR on audit quality;
2. Investigate the effects of MAFR for the other EU Member States;
3. Re-examine the relationship using the data on the relationship between parent and daughter companies and the decisions applied in each case, related to group audits. Also, instead of identifying mandatory rotations manually, it might be worthwhile to re-estimate regressions using better data with rotations already classified.

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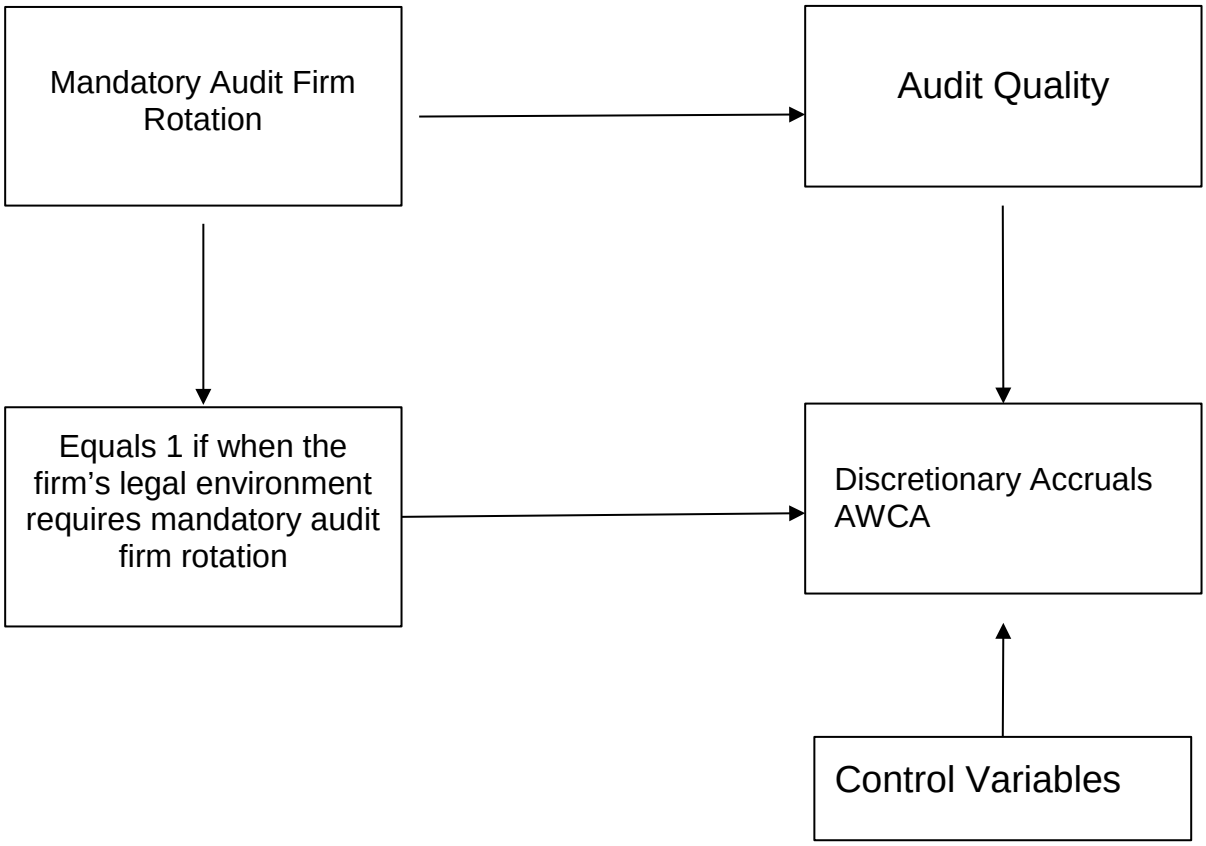
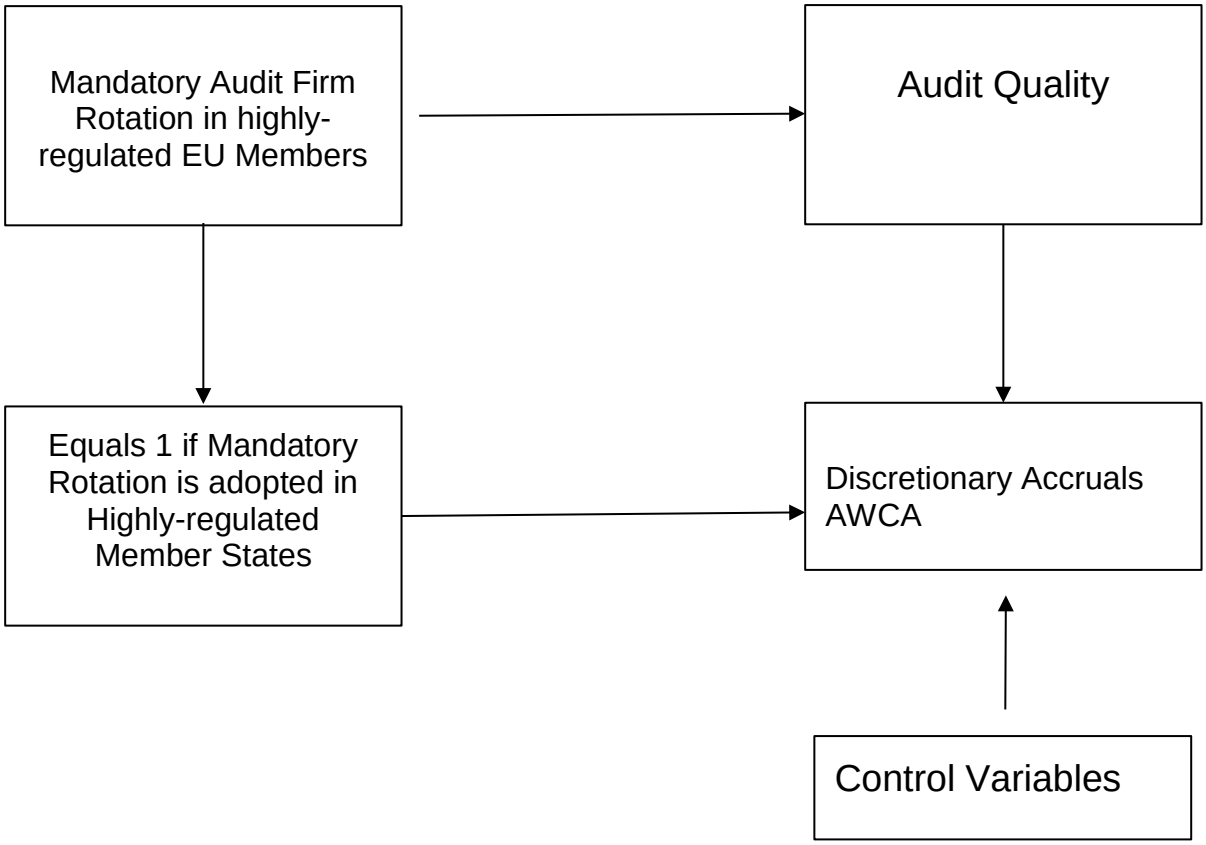
10. Appendix 1

Predictive Validity Frameworks

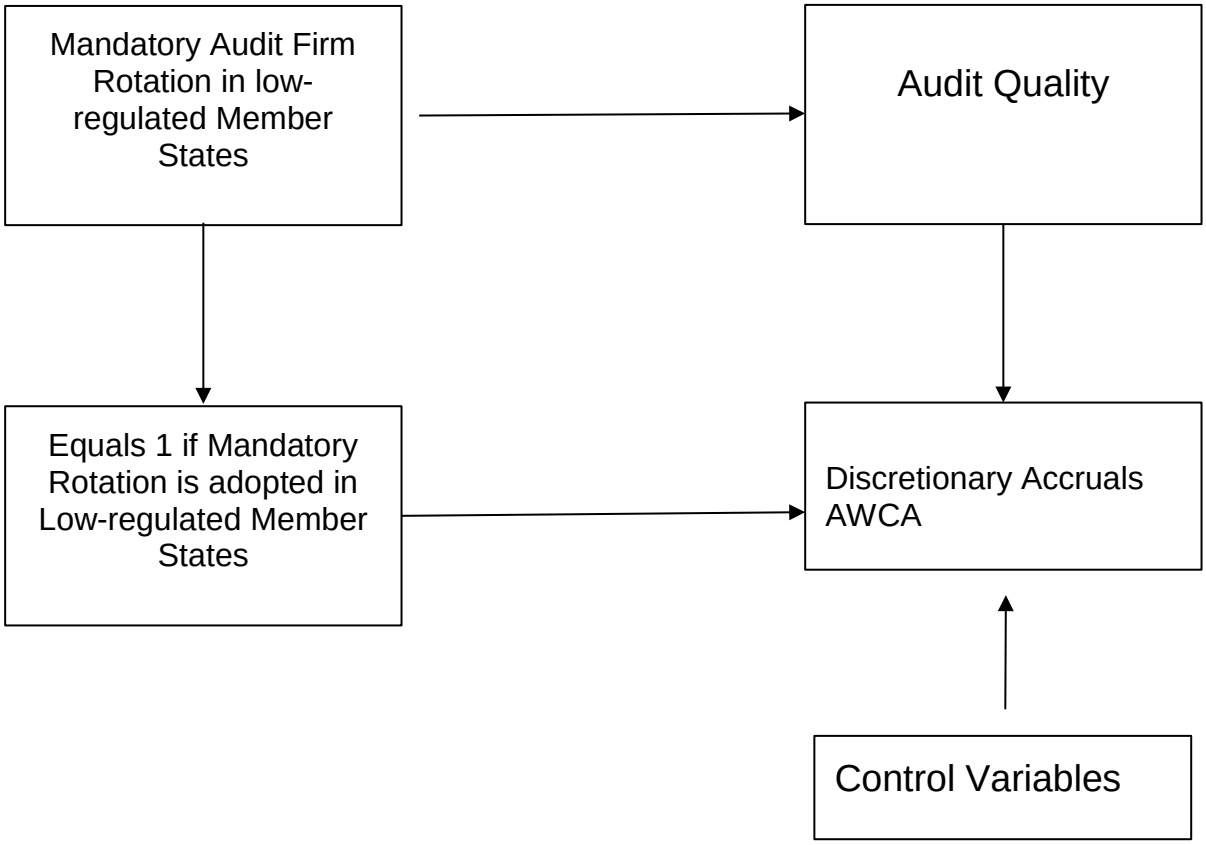
H1: "*MAFR adoption has no effect on audit quality for EU PIE*"



H2 a: *"MAFR adoption does not have a statistically significant effect on audit quality for highly-regulated EU Members"*



H2 b*: "MAFR adoption increases audit quality for EU Members, which are low-regulated*"



11. Appendix 2

Country	MAFR every (…) years	Application of Transition rules	Applicable since	Additional comments
Austria	10	yes	6/17/16	[H]
Belgium	9	yes	6/17/16	
Bulgaria	**7**	**no**	**6/17/16**	
Cyprus	10	yes	6/17/16	
Czech Republic	10	yes	6/17/16	
Denmark	10	yes	6/17/16	
Estonia	10	yes	6/17/16	
Finland	10	yes	6/17/16	
France	10	yes	6/17/16	[G]
Germany	10	yes	6/17/16	
Greece	**10**	**no**	**6/17/16**	
Hungary	**10**	**no**	**6/17/16**	
Ireland	**10**	**no**	**6/17/16**	
Italy	9	no	6/17/16	[D]
Malta	10	yes	6/17/16	
Latvia	10	yes	6/17/16	
Lithuania	**10**	**no**	**6/17/16**	
Luxembourg	10	yes	6/17/16	
Netherlands	**10**	**no**	**6/17/16**	**[C]**
Poland	**5**	**no**	**6/17/16**	**[F]**
Portugal	**8 or 9**	**no**	**6/17/16**	**[B]**
Romania	**10**	**Partial (No Joint Audit extension)**	**6/17/16**	
Slovakia	10	yes	6/17/16	[I]
Spain	**10**	**Partial (No First Tender extension)**	**6/17/16**	**[E]**
Sweden	10	yes	6/17/16	
United Kingdom	10	yes	6/17/16	[J]
Croatia	-	-	-	[K]
Slovenia	-	-	-	[K]
Iceland	-	-	-	[A]
Liechtenstein	-	-	-	[A]
Norway	-	-	-	[A]

(1) This appendix details the status and characteristics of the MAFR for each Member States of EU. The data was taken from the EY homepage. https://www.ey.com/Publication/vwLUAssets/ey-the-audit-mandatory-rotation-rule-the-state-of-the-art/$FILE/ey-the-audit-mandatory-rotation-rule-the-state-of-the-art.pdf.

All the bold countries apply the MAFR rule since 2016 without extensions or with partial extensions. Moreover, they did not apply it for listed companies during the period 2014 to 2015. [A] Members of EEA - These members are included in this law. However, agreements still pending. [B] Portugal applied it before only for listed companies only under the base of comply or explain. MAFR applicable for 8 o 9 years. [C] Netherlands apply MAFR rule since January 2016. [D] Italy apply MAFR rotation rule since 1975. [E] Spain applied MAFR before, for the period 1988 to 1995. [F] Poland applied the rotation rule before but only for insurance companies. [G] France applied MAFR before for join audits (6 years audit tenure, it can be renewed). [H] Austria applied MAFR before (5 years of tenure for governmental owned companies). [I] Slovakia applied a 5 years rotation rule before the enactment of the EC rule. [J] U.K. applied a MAFR rule since January 2015 of 10 years tenure. [K] Croatia and Slovenia have not applied the 537/2014 Regulation yet.

12. Appendix 3

Variable Definition		
Dependent Variable	**Definition**	**Source**
Audit Quality (AQ) or (DA)	Absolute value of discretionary accruals calculated with the Bruynseels et al. (2014) model or the abnormal amount of working capital accruals scaled by the average total assets of DeFond et al. (2001)	Compustat Global
Independent Variable	**Definition**	**Source**
ROTATION	This is a dummy variable that equals 1 when the current auditor firm of an observation is different from the auditor firm of the fiscal year (FY) before, and 0 when the auditor firm from the current FY and the FY before are the same (no rotation event).	Compustat Global
MAFR	MAFR is a dummy variable that equals 1 when the tenure of the relation between the company and the auditor firm is equal or higher to the maximum period allowed by each State Member law, and 0 when the tenure period is lower (voluntary).	Compustat Global
Control Variable	**Definition**	**Source**
SIZE	This is the natural logarithm of the total assets	Compustat Global
ROA	This is the Net Income before extraordinary items divided by the total assets	Compustat Global
BIG4	This is a dummy variable that equals 1 when the audit firm is classified as a Big 4 and 0 otherwise	Compustat Global
DEBT	This is the total liabilities divided by the total assets	Compustat Global
SALES GROWTH	This is the change in sales from year T-1 to year T	Compustat Global
YEAR	Year dummies	
COUNTRY	Member State dummies	
INDUSTRY	Industry dummies	

13. Appendix 4

One-year Differences in Discretionary Accruals by Country

Country		2014	2015	2016	2017	2018
BGR	No Rotation	0.015	0.004	-0.011	0.001	0.006
	Mandatory Rotation			0.011	0.013	
	Voluntary Rotation	-0.040	-0.023	0.001	-0.006	0.001
ESP	No Rotation	-0.037	-0.009	-0.012	0.013	0.005
	Mandatory Rotation			0.299	-0.025	0.052
	Voluntary Rotation	0.309	0.014	0.012	-0.020	-0.065
GRC	No Rotation	-0.002	-0.003	-0.002	-0.016	0.004
	Mandatory Rotation				-0.012	-0.002
	Voluntary Rotation	-0.023	0.004	0.020	0.025	-0.022
HUN	No Rotation	0.060	0.000	-0.024	-0.021	0.015
	Mandatory Rotation				0.154	
	Voluntary Rotation		0.116	-0.011	0.002	
IRL	No Rotation	-0.003	0.094	0.042	0.005	-0.002
	Mandatory Rotation			0.010	0.124	-0.149
	Voluntary Rotation	-1.505	-0.161	0.019	-0.055	-0.837
LTU	No Rotation	-0.009	0.006	0.002	0.022	0.007
	Mandatory Rotation			0.118	0.016	
	Voluntary Rotation	0.029	-0.012	0.010	-0.080	-0.053
NLD	No Rotation	0.059	0.003	-0.120	0.075	-0.199
	Mandatory Rotation				-0.839	0.742
	Voluntary Rotation	-0.095	0.529	0.023	-0.776	0.860
POL	No Rotation	0.000	-0.015	0.002	-0.012	0.008
	Mandatory Rotation			0.013	0.068	-0.045
	Voluntary Rotation	-0.016	-0.017	0.002	-0.026	-0.084
PRT	No Rotation	0.002	-0.021	0.021	-0.049	0.031
	Mandatory Rotation			0.016	0.004	-0.078
	Voluntary Rotation	-0.041	0.077	-0.172	0.104	-0.085
ROU	No Rotation	-0.047	-0.016	0.006	0.021	-0.058
	Mandatory Rotation			-0.073		
	Voluntary Rotation	0.017	0.213	-0.286	0.011	0.042

(1)This table contain the exact estimates in the difference in discretionary accruals for one year period per country included in the sample. Each value compares DA for the rotation year with DA a year before the rotation. The same thing is done for no rotation, voluntary, and mandatory rotation.

Two-year Differences in Discretionary Accruals by Country

Country		2014	2015	2016	2017
BGR	No Rotation	0.005	-0.001	-0.011	0.004
	Mandatory Rotation			0.046	0.111

	Voluntary Rotation	-0.002	-0.031	0.009	-0.039
ESP	No Rotation	-0.046	-0.010	-0.031	-0.011
	Mandatory Rotation			3.086	0.018
	Voluntary Rotation	0.208	0.009	0.007	0.074
GRC	No Rotation	-0.011	-0.010	-0.010	-0.015
	Mandatory Rotation				-0.019
	Voluntary Rotation	0.011	-0.004	-0.011	-0.023
HUN	No Rotation	0.048	0.001	-0.032	0.021
	Mandatory Rotation				-0.033
	Voluntary Rotation		0.043	0.058	-0.032
IRL	No Rotation	0.018	0.075	0.093	0.044
	Mandatory Rotation			0.076	
	Voluntary Rotation	0.253	-0.223	0.053	0.055
LTU	No Rotation	-0.010	-0.020	0.002	0.005
	Mandatory Rotation				-0.050
	Voluntary Rotation	0.001	0.030	0.031	0.024
NLD	No Rotation	0.292	0.220	0.103	0.002
	Mandatory Rotation			-0.540	0.199
	Voluntary Rotation	-0.130	-0.520	-0.285	0.444
POL	No Rotation	-0.008	0.002	-0.015	-0.025
	Mandatory Rotation			-0.011	-0.058
	Voluntary Rotation	-0.025	-0.063	0.014	0.027
PRT	No Rotation	0.008	-0.004	-0.018	0.000
	Mandatory Rotation			0.033	-0.060
	Voluntary Rotation	0.038	0.038	-0.022	0.033
ROU	No Rotation	-0.058	-0.015	0.038	0.006
	Mandatory Rotation			-0.051	
	Voluntary Rotation	0.180	0.042	-0.267	0.028

(1)This table contain the exact estimates in the difference in discretionary accruals for two year period per country included in the sample. Each value compares DA for the following year after the rotation with DA a year before the rotation. The same thing is done for no rotation, voluntary, and mandatory rotation.

14. Appendix 5

One-year Differences in Discretionary Accruals by Sector

Sector		2014	2015	2016	2017	2018
Agriculture, Forestry, Fishing	No Rotation	0.481	0.186	-0.831	0.055	-0.599
	Mandatory Rotation					
	Voluntary Rotation					
Mining and Construction	No Rotation	0.037	-0.079	0.013	-0.017	0.072
	Mandatory Rotation			-0.027	-0.122	-0.085
	Voluntary Rotation	-0.034	-0.029	0.159	-0.200	0.174
Manufacturing	No Rotation	-0.024	0.011	-0.007	-0.119	0.144
	Mandatory Rotation			-0.020	0.032	-0.055

	Voluntary Rotation	-0.005	0.009	-0.030	-0.008	0.070
Transportation and Utilities	No Rotation	-0.013	0.008	-0.009	-0.019	0.080
	Mandatory Rotation			0.039	0.054	-0.064
	Voluntary Rotation	-0.120	0.011	0.036	-0.021	-0.054
Retail and Wholesale Trade	No Rotation	0.024	-0.034	0.019	-0.054	0.066
	Mandatory Rotation			-0.017	0.082	0.083
	Voluntary Rotation	-0.136	-0.012	0.018	-0.028	0.138
Services	No Rotation	0.036	-0.008	0.079	-0.088	0.049
	Mandatory Rotation			0.131	0.077	0.105
	Voluntary Rotation	0.185	0.309	-0.427	-0.267	-0.052
Public Administration	No Rotation	-1.323	-0.046	-4.454	10.251	-23.149
	Mandatory Rotation					-0.086
	Voluntary Rotation	0.032	3.578	0.178		-0.011

(1)This table contain the exact estimates in the difference in discretionary accruals for one year period per industry included in the sample. Each value compares DA for the rotation year with DA a year before the rotation. The same thing is done for no rotation, voluntary, and mandatory rotation.

Two-year Differences in Discretionary Accruals by Sector

Sector		**2014**	**2015**	**2016**	**2017**
Agriculture, Forestry, Fishing	No Rotation	0.667	-0.644	-0.776	-0.544
	Mandatory Rotation				
	Voluntary Rotation				
Mining and Construction	No Rotation	-0.020	-0.046	0.017	0.039
	Mandatory Rotation			0.231	-0.115
	Voluntary Rotation	-0.029	-0.017	-0.032	0.189
Manufacturing	No Rotation	-0.020	0.003	-0.108	0.026
	Mandatory Rotation			0.030	-0.045
	Voluntary Rotation	0.054	0.022	-0.084	0.033
Transportation and Utilities	No Rotation	-0.004	0.000	-0.015	0.021
	Mandatory Rotation			0.058	-0.031
	Voluntary Rotation	-0.045	-0.002	-0.018	0.053
Retail and Wholesale Trade	No Rotation	-0.008	-0.015	-0.004	0.028
	Mandatory Rotation			-0.034	-0.006
	Voluntary Rotation	0.053	-0.003	-0.095	0.064
Services	No Rotation	0.065	0.074	-0.038	-0.080
	Mandatory Rotation			0.144	0.089
	Voluntary Rotation	0.079	0.314	0.001	0.088
Public Administration	No Rotation	0.448	-0.068	9.327	-1.792
	Mandatory Rotation				
	Voluntary Rotation	-0.026	-9.745	-0.161	

(1)This table contain the exact estimates in the difference in discretionary accruals for two year period per industry included in the sample. Each value compares DA for the following year after the rotation with DA a year before the rotation. The same thing is done for no rotation, voluntary, and mandatory rotation.