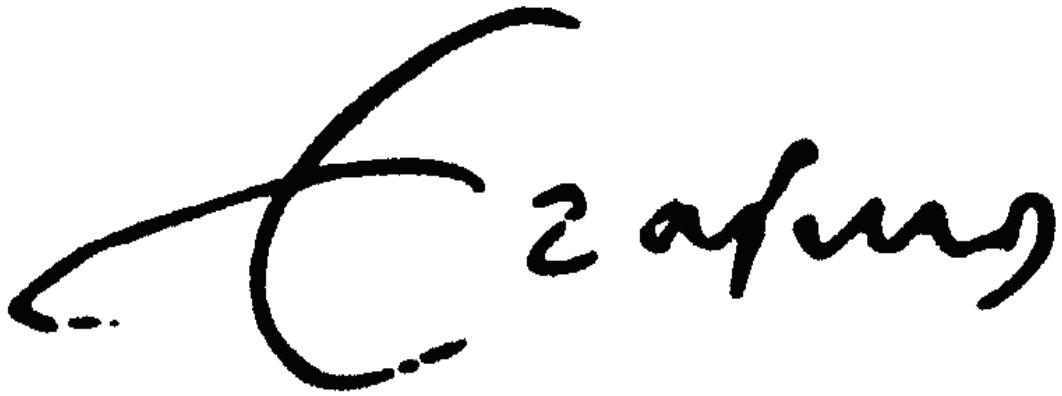
The effects of mandatory audit firm rotation on audit quality

Evidence from the United States of America



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Abstract

By examining a sample of 4565 companies that operate in the United States of America, this study provides evidence concerning the association between mandatory audit firm rotation and the audit quality provided. Although this relationship has been investigated many times during the last two decades, this research contributes to the findings of previous literature due to the unique proxy that is used for the measurement of audit quality. Whereas previous studies have examined audit quality using both direct proxies (audit firm size, audit fees, going concern opinion) and indirect ones (abnormal discretionary accruals, going concern model of logistic regression), this study uses a unique direct measure, the detection and reporting of control deficiencies by auditors under section 404 of the Sarbanes-Oxley Act. After testing the model for problems of multicollinearity and autocorrelation, the results of the study reveal a negative effect of audit firm rotation on audit quality provided. Moreover, the separation of the sample in three different industries does not change the results. This study is unique concerning its measurement for audit quality and compliments previous studies with significant findings.

Key words: Mandatory audit firm rotation, audit quality, internal control deficiencies

CHAPTER 1- Introduction

This study will provide evidence on the relationship of mandatory audit firm rotation and the audit quality provided. Previous studies have shown mixed results between these two concepts. From the one hand there are researchers like *Knechel and Vanstraelen (2007), Arrunada and Paz-Ares (1997), Johnson et al. (2002)* who have found a negative association between audit firm rotation and audit quality. On the other hand, other researchers such as *Shafie et al. (2009), Cameran et al. (2012)* and *Fitzgerald et al. (2012)* have found that a mandatory audit firm rotation rule would have a positive effect on audit quality provided. As a result this study will try to shed some light to the implications of a mandatory audit firm rotation rule in quality of audits provided in the United States of America.

On December 18 2013, the European Union Council issued a paper named *"Agreement on the reform of the audit market"*. In this paper, a new rule for European companies was presented. More specifically, all the public-interest entities (PIEs) which are based in Europe, including banks, insurance and listed companies, are required from the second quarter of 2014, to change their auditors after 10 years. This measure came into practice in order the transparency and confidence on the audit market to be increased together with higher audit quality provided by audit firms.

However, this was not the first time that audit firm rotation came into discussion through the recent years, as an improvement of audit quality and credibility of the audit profession itself. Discussion whether mandatory audit firm rotation is beneficial or not has led to a huge debate amongst researchers and other interested parties such as audit firms and companies for many years, with strong opponents and proponents. This discussion includes the United States of America also. On the 16th of August 2011, the Public Company Oversight Board (PCAOB), a non-for profit organization in the USA, which is established to inspect the audits of public listed companies (www.pcaobus.org), issued a paper in which mandatory audit firm rotation in the United States of America was proposed as a way that integrity and

independence of auditors to be strengthened. After many months and several opinions stated by various interested parties (e.g. audit firms, companies affected), on July 2013 the American Congress finally voted against the proposed law indicating that this is neither the best way for the audit quality to be enhanced nor the audit profession to be protected (www.economia.icaew.com).

This was not the first time that a significant change was proposed in the U.S.A. After many scandals that were developed during the last two decades (e.g. Enron 2002, WorldCom 2003, Adelphia Brothers 2002) a huge change for companies and auditors was decided. This was the implementation of the Sarbanes-Oxley Act in 2002, and especially the establishment of sections 302 and 404. Since then, great significance and importance has been attributed to the internal controls of companies in the United States and the report that both the management of the company (section 302) and the auditors (section 404) have to issue concerning their effectiveness *(Rice and Weber, 2011).* Moreover, mandatory audit firm rotation, as stated above, has been a subject of great importance among regulators companies and auditors for many years. Whereas in some countries like Italy, South Korea, and Spain mandatory audit firm rotation exists *(Cameran et al. 2011, Kwon et al. 2010, Arrunada and Pas Arez 1997)*, there are other countries like the United States of America that this measure, while proposed recently, has been rejected as it is not believed that it would provide higher audit quality.

Moreover, great significance has been attributed to the profession of auditors due to the agency theory. Auditors are perceived to be the agents of the principals (owners of shares), in order to provide reasonable assurance that the Financial Statements of the company do not contain material misstatements *(Arens, 2013)*. Auditors in their assessment of the effectiveness of the internal controls of a company use the audit risk model. A component of it is the control risk that refers to the probability that a material misstatement will not be prevented or detected by the internal controls of the company in time *(Houston, et al. 1999*). Taking all that into consideration I believe that it would be of great importance the relation between mandatory audit

firm rotation and the audit quality provided based, as measured by the detection of internal control weaknesses of companies, to be investigated on public listed companies in the United States of America. Such a rule can have severe implications on the way the audit market behaves as it affects both the costs of audit firms, in respect of time and effort invested, but also the companies being audited *(Ernst and Young, 2013).*

Based on the study of *Fitzgerald et al. (2012),* I extend it in order to investigate the effects of a mandatory audit firm rotation on the quality of audits provided in the U.S.A environment. *Fitzgerald et al. (2012)* have tried to investigate the consequences of an audit firm and partner rotation when they report on the internal controls of large U.S not-for-profit organizations. My study will be based on a sample of profit organizations, in the same environment and with the same proxy used for audit quality. *Fitzgerald et al.* have found that the first year of the audit tenure the internal control weaknesses reported by auditors appear to be increased. I extend their study to U.S.A public listed companies based on similar models to investigate if the impact of mandatory audit firm rotation would be beneficial or not to companies regarding their quality of financial reporting in the first year of the audit firm rotation.

- ***The main research question of this paper is:***

"Does mandatory audit firm rotation has an association with the quality of audits provided?"

In order to answer the main research question, I will answer 5 sub questions which complement the main research question. By defining these sub questions, the reader of this paper will be prepared to understand all the important aspects of my paper.

- ***Sub question 1:***

What are the internal controls of a company, what is the role of COSO and how the Sarbanes-Oxley Act has affected them?

Sub question 2:

What is the audit risk model and which is the role of auditors?

- ***Sub question 3:***

What do we define as audit quality and how can it be measured?

- ***Sub question 4:***

What are the agency theory and the Limberg theory, and which is the relation of the agency theory with audit quality?

- ***Sub question 5:***

What is mandatory audit firm rotation and which are the findings of previous articles concerning its association with audit quality?

After these questions are answered, the hypotheses and the research of this study are illustrated. I believe that with this research I can contribute to the previous existing literature which has been inconclusive so far. More specifically, there have been various empirical researches about the implications of a mandatory audit firm and partner rotation on public listed companies in the U.S.A and other countries too, in relation with the effects of such a rule on audit quality, audit costs, audit fees and earnings quality. Despite the various previous researches, mixed results have appeared. While some authors like *Arrunada and Paz-Ares (1997), Knechel and Vanstraelen (2007)* have found negative correlation between the two variables, there are others like *Shafie et al. (2009), Cameran et al. (2012), Harris and Whisenant (2012), and. Jackson et al.(2008)* who have found positive relation. As far as I know none of them have based their research on the audit quality provided by the report of internal control material misstatements. By using this proxy I believe that I can contribute to the previous researches in a way that no one before has achieved. This proxy for audit quality has been chosen due to the importance of the

internal controls of the company in U.S.A. Taken into consideration the definition of internal controls I believe that their importance is critical to the preparation of Financial Statements: *"an internal control system consists of all the procedures, methods and measures (control measures) instituted by the Board of Directors and executive management to ensure that operational activities progress in a proper fashion" (PriceWaterHouseCoopers, 2008).*

Also, the U.S.A. environment has been chosen due to the Sarbanes-Oxley Act. In the U.S.A. both auditors and managers are required to issue a report on the effectiveness of the internal controls of a company (section 302 and 404 of Sox). As a result, audit quality can be measured based on their reports the first year after a change of the audit firm.

Also, this paper can be important both for regulators and auditors due the insufficiency of previous studies in the United States of America. This is because data for audit partner tenure and rotation is not generally available for public companies in the U.S.A. environment. My research focuses on a rotation of audit firms because I believe that such a change can have more implications in the audit profession when compared to a partner rotation. This is because, in my opinion, a firm rotation can give a fresher look on the audited company, more than the one provided by a partner rotation, and also can improve the independence of the auditor in appearance. At last, my research paper will answer the question whether the mandatory audit firm rotation, which was proposed in 2011 by PCAOB and rejected in 2013, was the right decision or not, depending on the audit quality provided.

For this reason two hypotheses are examined. The first one relates to the implementation of such a rule in the whole business environment of U.S.A. and it investigates the relationship of mandatory audit firm rotation in relation with the audit quality provided. The hypothesis is that a negative association will be detected. The second hypothesis on the other hand investigates the industrial characteristics of companies in the U.S.A. and is developed in a null form, stating that no different results will be detected in different industries.

After examining the two hypotheses, the results of the paper reveal a negative association between audit firm rotation and the audit quality provided after controlling for complexity of company's operations, company's size and profitability. After the first results, a further examination of industry's characteristics is provided. The sample is divided in 3 kinds of industries: agricultural, finance and administration. As illustrated by the regression model analysis, the results for the agricultural and administration sector indicate negative association between audit firm rotation and audit quality, whereas the relationship concerning the finance sector illustrate a positive association between the two variables, although not statistically significant in a $p<0.05$ level.

As a result, the findings of this study compliment the decision of the American Congress not to allow the passage of a mandatory audit firm rotation rule in the U.S.A as a way that integrity and independence of auditors to be strengthened. These findings also illustrate that this rule would not be beneficial for different industries in the U.S.A environment.

Structure of the paper

The structure of this paper will be as follows:

The second chapter includes the background information concerning the main parts of the research. First, the importance of the internal controls of a company is explained and also the changes that the Sarbanes-Oxley Act has brought to the U.S.A business environment. After, the audit risk model which is used by auditors when conducting an audit is defined, along with the role of auditors and their responsibilities. The last part of chapter two refers to the audit quality itself. A definition of audit quality is stated and the IASSB Framework for it is provided. Also, proxies for its measurement are illustrated. The third chapter is about the related theories that have an effect on audit firm rotation like the agency theory and the Limperg and their relation with audit quality. The forth chapter deals with the findings of previous literature concerning mandatory audit firm rotation, while the fifth chapter deals with the hypotheses development and the research design of the paper. The sixth chapter deals with the findings of this research while chapter number seven is the conclusion of this research. At last, an Appendix of the findings of this research is provided.

CHAPTER – 2 Background information

2.1 Introduction

In this part I will indicate parts of previous literature that relate to the subject of the internal controls of a company. I believe that this part is basic for the reader in order to obtain an understanding of the important controls that are implemented in a company, the Sarbanes-Oxley Act which brought significant changes in the U.S.A and the important reports of both auditors and managers concerning the efficiency of the internal controls of companies. This part, will answer sub-question 1.

2.2 Internal Controls of a company

2.2.1 What are the internal controls of a company

As defined by COSO, the internal controls of a company is *"a process, effected by an entity's board of directors, management and other personnel, designed to provide reasonable assurance regarding the achievement of objectives in the following categories: effectiveness and efficiency of operations, reliability of financial reporting, and compliance with applicable laws and regulations."*

2.2.2 The role of COSO

In 1992 the Committee of Sponsoring Organizations of the Treadway Commission (COSO) issued the *Internal Control-Integrated Framework* which was the response to many financial frauds detected at that time. Its purpose was to implement a mechanism in order to demand higher quality of Financial Statements of a company as a result of better internal controls. As referred in the Framework, it was issued in order *"to help businesses and other entities assess and enhance their internal control*

systems". This was the first attempt to assess and estimate the internal controls of a *company (Altamuro and Beatty, 2009)*.

The Framework indicates the most important elements of companies' internal controls. These are:

- Audit committee
- Establishing and Communicating Written Policies
- Organizational Relationships
- Personnel
- Code of Conduct
- Program of Internal Auditing

Moreover there are five interrelated components of Internal Controls. These are: control environment, risk assessment, control activities, information and communication and monitoring *(COSO, Internal Control-Integrated Framework 1992).*

All the above, affect both the management of a company but also the auditors of public listed companies that are obliged under the section 302 and 404 of the SOX to report on the effectiveness of internal controls of a company.

2.3 The Sarbanes- Oxley Act

After many accounting scandals developing in the last decade, such as Enron and WorldCom, the Sarbanes-Oxley Act were established in 2002 in order the capital markets to restore their confidence to the public and protect other accounting scandals to appear in the future that could damage the public trust. The most important section of the Sarbanes-Oxley Act was the Section 404 which demands both the management of the company and the auditor who performs the audit of the internal controls of the company to formalize an opinion on their effectiveness and material weaknesses *(Rice and Weber, 2011).*

To begin with, SOX is a set of accounting regulations that has been entered into force by the Congress on the 25th of July 2002. It consists of laws by Sen. Sarbanes and Reg. Oxley who tried to gain again the trustworthiness of the investors which had been decreasing over the years. Investors felt that the financial information provided was unreliable due to several accounting scandals that had happened in the previous years. The breakdown of Enron in 2001 was the main reason that forced the American Congress to establish stricter rules in order to avoid similar situations *(Hemmer 2006, Ettredge et al. 2006)*. The Sarbanes Oxley Act includes a variety of different rules. As an example, since that regulation auditors are forbidden to provide both audit and non-audit services to the same client. Regulations were also established that aimed to make corporate governance more effective and to force penalties to companies committing fraud activities *(Hemmer, 2006)*. The regulators also changed the rules concerning financial reporting in order to improve the quality of information provided to the public by a company. Part of these rules was about the disclosure of the effectiveness of the internal controls of the companies by the Chief Financial Executive (CFO) and the Chief Financial Officer (CEO) of companies in the United Stated of America. According to Nicolaisen, that was a fundamental step so as to make investors trust again the markets. In his speech in 2004, as a Chief Accountant of the Securities and Exchange Commission (SEC), he stated that the act of providing information to the public about the efficiency of internal controls, would lead investors to feel more confident about their decisions and this as a result would help them in order to recapture their reliability to the market.

2.4 SOX about Internal Controls

As referred before, the numerous bookkeeping scandals and the collapse of huge companies led regulators to focus on two important factors that have caused unreliability to investors: financial reporting quality and financial reporting timeliness. Thus, Sarbanes Oxley Act obliged companies to immediately report any information related to a change of their financial situation *(Ettredge, 2006).* Specifically, regulators decided that internal controls are an essential part of a

company and companies should focus on the effectiveness of disclosures in order to improve financial reporting quality. Specifically, CEOs and CFOs should estimate every 3 months and every year the efficiency of the internal control of their company *(Krishnan, 2004).* Moreover, auditors should express their opinion about manager's assumptions of internal control quality *(Hemmer 2006).* Two parts of the SOX are related to the success of company's internal control: Section 302 and Section 404 *(Hammersley et al., 2007).*

2.5 Section 302 of SOX

According to Section 302, "*A firm's CEO and CFO certify in periodic SEC filings that the signing officers have evaluated and have presented in the report their conclusions about the effectiveness of their internal controls based on their evaluation"* (SOX Section 302). However, section 302 of the Sarbanes Oxley Act does not provide information about how controls would be assessed and also does not oblige auditors to express their opinion about internal control. On the other hand, auditor should know the internal control environment and internal control weaknesses of the company that they audit in order to express their opinion about the Financial Statements *(Skaife et al., 2008).*

2.6 Section 404 of SOX

Section 404 is one of the most essential parts of the whole Sarbanes Oxley Act. It states that managers should evaluate and report on the quality of the internal control systems of a company. The difference from Section 302 is that not only managers, but also auditors should evaluate the vulnerability of internal controls *(Ettredge, 2006)*. Manager's estimation about internal control efficiency should be also assessed by an independent auditor. Therefore, the auditor should also disclose his opinion on whether there are internal control weaknesses by performing an audit in company's internal control systems *(Skaife et al., 2008)*. Hammersley also stated that this double evaluation of internal controls has a purpose to warn investors or

other stakeholders about possible omissions of financial statements that have been caused by inefficient internal controls. According to the same researcher, investors, as a consequence, express their opinion not only about the reliability of financial reports but also about the internal controls of the company due to the extra audit that is being performed *(Hammersley et al., 2007)*.

However, there are some doubts about the effectiveness of Section 404. Of course, it is clear that by this regulation investors have access to a variety of information about the company that they may want to invest in, but this is too costly for the companies themselves. Specifically, it is too expensive for firms to disclosure information about their internal control and there is also the risk that competitors can also have access to this information. Moreover, Section 404 does not ensure improvement of internal controls. It only obliges companies to disclosure the situation of their internal control systems and provides also an audit opinion about managers' evaluation. That does not mean that internal controls become more accurate *(Franco et al., 2005).*

2.7 Internal Control Deficiencies

As indicated by ISA 450 *(International Standard on Auditing 450, IFAC 2011)* misstatements arise either from fraud or error and are defined as the difference between a reported amount in the Financial Statements of a company and the actual number that should have been reported under the applicable Financial Reporting Framework. As a result, the Financial Statements are not fairly reported.

By material misstatement we mean a mistake in the Financial Statements of a company either due to error or fraud that will be significant to the users of them.

PCAOB defines material weaknesses of internal controls as: *''a significant deficiency or combination of significant deficiencies that result in more than a remote likelihood that a material misstatement of the annual or interim financial statements will not be prevented or detected'' (PCAOB, 2004).*

Moreover, Auditing Standard 2 indicates that there are three levels of internal control deficiencies:

- ✓ Control deficiency: Flaw in the design or operation of a control, which disallows managers or workers to detect the misstatement in time *(AS No. 2, paragraph 8).*
- ✓ Significant deficiency: control deficiency or a combination of them, which weakens the ability of the company to report external financial data and as a result allows material misstatements to be presented in the Financial Statements without being detected *(AS No.2, paragraph 9).*
- ✓ Material weakness: Significant deficiency or a combination of them, which has high probability to material misstatements, be presented in the Financial Statements without being detected *(AS No.2, paragraph 10).*

2.8 Summary

In this part of the research sub-question 1 was answered. I have indicated all the important aspects of the internals control of a company trying to give the reader a first insight into this important subject of my paper. At first, I defined the internal controls of a company and the role that COSO has played in their implementation and development. Afterwards, I indicated the role of the Sarbanes-Oxley Act and the changes that has brought in the United States of America. Moreover, I illustrated specific details about the two main sections of it, section 302 and 404. At last, I have provided a definition of the term internal control deficiencies and their relation with the material misstatements reported by a company.

2.9 Audit risk model

2.9.1 Introduction

In this part of the paper I answer sub-question 2 by defining the audit risk model, its importance to the role of the auditors, and also its relation to the internal controls of a company. This part will answer sub-question 2 and is important to the reader in order to gain an understanding of what the profession of an auditor is, what "tools" he uses in order to conduct the audit and how these relate to the internal controls of each company.

2.9.2 Audit risk model and the role of auditors

According to PCAOB (Public Company Accounting Oversight Board), the objective of the auditor is to conduct the audit of financial statements in a manner that reduces audit risk to an appropriately low level. To form an appropriate basis in order to state an opinion on the financial statements, the auditor must plan the audit in a way that enables him to obtain reasonable assurance that the financial statements are free of material misstatement due to error or fraud. Moreover, SAS No.47 *(American Institute of Certified Public Accountants, 1983)* requires auditors to use the Audit Risk Model as a significant part of the whole overall audit-planning test *(Houston et. al., 1999).*

The IAASB also states that with the use of the Audit Risk Model, the risk assessments will eventually be better, providing a more detailed understanding of the audit procedures. Audit risk model can be presented by the following formula:

Audit risk = Inherent Risk x Control Risk x Planned Detection Risk

Audit risk refers to the probability that an unqualified opinion will be published about the financial statements of a company that eventually contains material misstatements. There are three components of audit risk: inherent risk, control risk, and planned detection risk. Inherent risk refers to the probability that an account balance or a transaction will contain material misstatements before the internal

control of the company is taken into consideration. Control risk refers to the probability that a material misstatement will not be prevented or detected, by the internal controls of the company, in time. Inherent and control risks are closely related and the combination of them is called risk of material misstatements. The last component of audit risk, planned detection risk, refers to the permissible level of risk that the audit evidence, which is gathered for an audit objective, will not be sufficient enough to detect material misstatements *(Houston et. al., 1999).*

Considering the Audit Risk Model, a major concern is the term materiality. Materiality is stated as the magnitude of omission or misstatement of accounting information that, in the light of surrounding circumstances, makes it probable that the judgment of a reasonable person relying on this information would have been changed or influenced by the omission or misstatement. As stated before, auditors are responsible for providing reasonable assurance that the financial statements of a company are free from material misstatements. Misstatements can arise either from intentional or unintentional mistakes *(Arens et al., 2013).*

2.9.3 Audit risk model and the strength of internal controls

As already explained before, one of the components of the audit risk model is control risk, which is the risk that a misstatement is not prevented or detected on a timely basis by the company's internal control. This type of risks is highly dependent on the effectiveness of the company's internal control in fulfilling its objectives related to the company's financial statement preparation.

Auditing standards require auditors to understand the client's internal control systems and take it into account when assessing the audit risks involved in the engagement with the client. For example, Statement on Auditing Standards (SAS) No. 47 states that auditors' considerations of audit risk and materiality are affected by the auditor's experience with and knowledge of the entity and its environment, including its internal controls. Furthermore, SAS No. 55 states that auditors are also required to obtain an understanding of the client's internal control before planning an audit. The auditor's understanding of the client's internal control is an instrument

used to decide the extent to which the auditor can rely on the client's internal control. If the auditor is determined that the client's internal controls can be trusted, the auditor can rely on the internal control and the extent of substantive tests of the accounts can be reduced. However, if the auditor believes that the client's control cannot be trusted, the auditor may reduce his or her reliance on the controls *(Bedard and Jackson, 2002).*

2.9.4 Summary

In this part of the paper, I introduced the meaning of the audit risk model in the work of auditors answering the second sub-question of this study. I explained the equation about audit risk and also provided definitions about its components. Also, its importance in the audit profession was stated. Moreover, I connected the subject of control risk with the internal controls of the company. By that, I hope that I have provided the reader with useful information regarding the audit profession and its dependence on the reliability of the internal controls of a company.

2.10 Audit quality

2.10.1 Introduction

In this part of the study the third sub-questions is answered. By providing a definition from *DeAngelo (1981)* and indicating parts of the Framework for Audit Quality by IASSB, I hope that the reader will have a first approach on the subject of audit quality and its importance. Moreover, I illustrate the various measures for audit quality that have been used until today and at last I explain that until today none of them has been acknowledged as the best one.

2.10.2 Definition of audit quality

According to *DeAngelo (1981)* the quality of audit services in defined 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 that breach."* This probability is thought to be influenced by many characteristics such as the personal capabilities of the auditor himself, the audit procedures that have been chosen in order the audit to be conducted, and how extensive the sampling tests are. Furthermore, *Francis* in his study described audit quality as *"a theoretical continuum ranging from very low to very high audit quality" (Francis 2004).*

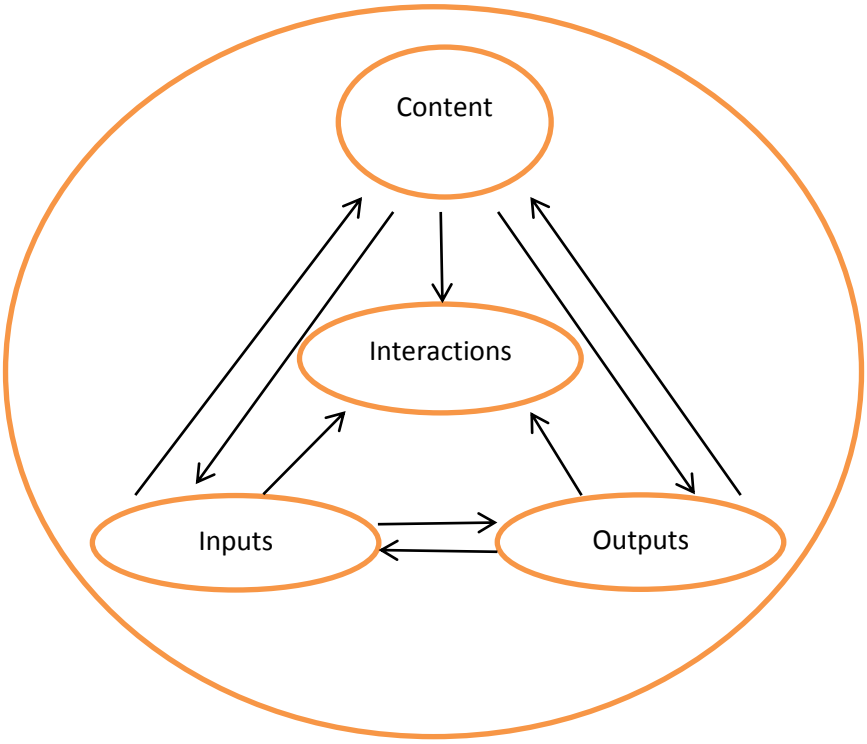
As stated before, a material misstatement is the difference between a reported amount in the Financial Statements of a company and the actual number that should have been reported under the applicable Financial Reporting Framework which its omission can influence the perception of the stakeholders of a company about its financial performance. Moreover, as has been indicated before, the role of the auditors is to obtain reasonable assurance that the financial statements are free from material misstatement due to error or fraud. As it is clear for someone to conclude, the quality of audit provided by an audit firm relies heavily on the right

detection of material misstatements in a company's Financial Statements and their report.

2.10.3 IAASB Framework on audit quality

Moreover, in May 2013 the International Auditing Standards and Assurance Board (IAASB) issued a paper named *Framework for Audit Quality.* In that paper, various elements for auditors to enhance audit quality are being reported. To begin with, the Audit Quality Framework can be perceived as the following image.

Picture 1



✓ ***Input factors***

As stated in the paper, input factors are related to the auditors' quality themselves. Specifically, in order to enhance high audit quality, auditors need to have a high level of ethical behavior and values, comparative level of experience and knowledge of the profession, must place appropriate time allocation, sufficient audit processes and quality controls. Moreover, despite the underlying training that has been

attributed to the auditor himself, it is of high importance auditor's inherent qualities. Also, due to the fact that most of the large entities have internal control functions inside the company it is critical to be an effective interaction between external and internal auditors. Other important elements of high audit quality that relate to input factors are the strict planning to meet reporting deadlines and the engagement with the management of the company in time. At last, appropriate audit documentation is needed in order experienced auditors, not familiar with the company being audited, to be enabled to understand the procedures and results of previous audits in case a partner or audit firm rotation exists.

✓ *Output Factors*

Output factors relate to the stakeholders of the company and the legislation requirements. As an example, investors in listed companies can be influenced by the auditor's report in order to make decisions on whether to invest in a company or not. When we speak about these kinds of factors IAASB states that, stakeholders of listed companies most of the times care only about the audit report itself on the Financial Statements of the company. As a result, other aspects of audit quality such as improvements in the financial reporting practices of audits and develops of the internal controls of the company are not taken into consideration. As an example it is stated the improvement in the clarification of note disclosures.

✓ *Key interactions*

Important interactions in relation to audit quality as indicated by IAASB rely on the interaction of external auditors with all the related parties both inside and outside of a company in a way that high audit quality is safeguarded. These are the management of the company, the external auditors, the users of the Financial Statements, regulators and those who are charged with governance.

2.10.4 Proxies for audit quality

Through the years, numerous proxies for audit quality have been reported by various researches. Until today though, none of them has been acknowledged as the best one. As *Jackson et al. (2008)* stated: *"true audit quality is when the audit does not result in a Type I or II error – a failing company being given an unqualified report or a non-failing company being given a qualified report".*

To begin with, *DeAngelo (1981)* has indicated that audit quality depends on the audit firm size. In particular, she proved that the larger the audit firm size the greater the audit quality provided. To continue with, *Becker et al. (1998)* investigated the relationship between earnings managements and audit quality. The assumption that they have used was that Big six auditors provide more qualitative audits than non-Big six auditors. Their study indicated that when there is lower quality of audits provided, *"accounting flexibility"* increases. Moreover, *O'Sullivan (2000)* has used audit fees as a proxy for audit quality, indicating that non-executive directors of companies affect the audit quality provided. An important classification of audit quality measures was held by *Francis (2004).* He indicated that audit quality can be affected by many characteristics such as the firm size, the specialization of each industry that the audit is performed in, the characteristics of the office, the legal systems of each country, the legal exposure of the audit firm and the restatement of earnings. Also, another important indicator of low audit quality is audit failures either due to fail in using the General Acceptable Accounting Principles (GAAP) right, or by providing a company with unqualified opinion when this is not appropriate. The results of the study indicate that other services provided by audit firms such as non-audit services can impose restrictions to auditor's objectivity. On the other hand, *Chambers and Payne (2008)* have used three different measures for audit quality. These are the audit firm industry specialization, auditor-firm independence and the litigation/reputation risk of audit firms. To continue with, *Okolie et al. (2013)* used four other proxies in order to measure audit quality. These were audit firm size, audit fees, auditor tenure and client importance. In their study on Nigerian

companies, they have also proved that, audit quality was negatively associated with the amount of discretionary accruals reported. *Fitzgerald et al. (2012)* have introduced a different way to measure the quality of audits provided. More specifically, audit quality was measured by the identification of internal control weaknesses in section 404 of the Sarbanes-Oxley At. At last, other studies by various researchers such as *Arrunada and Paz-Ares (1997), Knechel et al. (2007), Myers et al. (2003),* have investigated the effects of audit rotation in audit quality. Their proxies for audit quality along with the results of their studies are provided in a following chapter.

As it is obvious, during the years there have been many researchers trying to indicate the best measure for audit quality. However, until today none of these proxies can be demonstrated as the best one and as a result each one of them has weaknesses and strengths.

2.10.5 Summary

In this part of the paper I have defined the term audit quality answering sub-question 4. By providing scientific definitions by *DeAngelo (1981)*, *Francis (2004)* and also the view of audit quality given by the IASSB Framework I believe that the reader can now identify the characteristics of this important subject for this paper. At last, I have indicated how previous researches have measures the term and explained why there is no best proxy for it.

2.11 Summary of chapter 2

In this chapter, the first three sub-questions were answered. At first, the role of the internal controls of companies in the U.S.A. was illustrated with important definitions and views provided about the Sarbanes-Oxley Act. Moreover, audit risk model was illustrated in order the reader to have a first approach with the profession of auditors and their responsibilities. At the last part of the chapter, a definition of audit quality was provided along with the various proxies that have been used until today in order to be measured.

CHAPTER 3 – Related Theories

3.1 Introduction

In this part of the paper the important concepts of the agency theory and the Limberg theory are analyzed in order sub-question 4 to be answered. Agency theory concerns the relationship between two parties of owners of economic resources, the principal and the agent, and has great significance for this paper as explained below. On the other hand, Limberg theory connects the trust of the public with the role of auditors. At first, the agency and Limberg theories are explained and after, the connection between agency theory and audit quality is provided.

3.2 Related theories

3.2.1 What is the agency theory?

Previous financial economic theory has been very analytical to define auditing theory, as it is part of other positivist theories *(Walker, 1988).* Agency theory states that there is a nexus of contracts between the two parties of owners of economic resources. The first part is those named principals, who are considered to be the ones that own the economic resources of the company, while the second part is the agents who are the ones that use the resources provided by the principals in order to generate profits for the company. Agency theory also states that agents are considered to have more information than the principals and that as a result there is information asymmetry between these two parties *(Jensen and Mecklin, 1976).*

Two problems can be addresed by the agency theory. The first one is named agency problem, and indicates that the principal has inability to identify whether the agent has acted accordingly to his desire, due to the fact that there are conflicting goals between the two parties and the costs of spesifiying if the agents behaves appropriatelly are very high. The second one is the *"problem of risk sharing"*. It is developed when there are different aspects between the two parties concerning the risk attitude that has to be considered. To be more spesific, the agents have different

views about how the risks are mitigated than the agents because of the different actions that these two parties prefer towards them (*Eisenhardt ,1989).* As a result, due to the conflicting goals of the two parties and the different risk attitude they have, agency theory is a way to resolve them.

Two major types concerning information asymmetry have been reported; *"moral hazard"* and *"adverse selection"*. The first type arises because of the individual motives of the agents which are not always consistent with those of the principals. As an example, managers' bonuses can be demonstrated, which arise from the achievement of specific goals. Self-motivated managers can try to deceive principals in order to reach them, and as a result *"moral hazard"* problem arises. The latter refers to the inability of the owners of the company (principals) to have the same level of information as managers (agents). As a result, they are unable to determine if the agents behave to the best interest of the company or not *(Scapens, 1985).*

3.2.2 What is the Limperg theory?

Theodore Limperg, professor at the University of Amsterdam, developed in 1920 his theory which is known as the *"theory of inspired confidence"*. The theory states that the role of auditors is to meet the needs of the users of the Financial Statements. It also considers the fact that the business is a faction that is always in motion and thus it evolutes. As a result, auditing technics should evolute accordingly. Moreover, the needs of the users of financial information and their trust to the audit profession itself are important to the role of auditors. Limperg's theory is characterized as dynamic and connects the expectations of the public to the reliability of information provided by the audit profession. Auditor's social responsibility is maintained by the independence of the person performing the audit and the understatning of his role as an agent, not only representing the needs of the shareholders of the company but also the needs of society. Only in that way, the profession of auditors maintains its high level of competence and remains reliable to the eyes of the public (*Comments on Limperg's theory (Carmichael, 2004: 133).*

3.2.3 Agency theory and audit quality

In December 2005 the Institute of Chartered Accountants of England and Wales (ICAEW) issued a paper focusing on audit quality in relation to the agency theory. Many important aspects of the relationship between the principal and the agent were pointed out and ways of enhancing transparency were developed. To begin with, the Institute pointed out that auditors themselves are also considered agents of the principals because they are hired by the audit committee of the company. As a result, trust needs to be placed between these two parties and this can be achieved if auditors maintain their objectivity and independence. Moreover, the Institute underlines the importance of regulations and mechanisms to enforce the fulfillment of expectations of all the stakeholders of the company related to the audit profession. As stated in the paper: *"An audit provides an independent check on the work of agents and of the information provided by an agent, which helps to maintain confidence and trust"*. It is obvious that auditors are hired as agents by the directors of the company in order to monitor the work of managers who are also considered as agents. In its simplest model, the agency theory states that no agent is trustworthy. Therefore, external auditors in order to maintain their trustworthiness and objectivity need to be independent of the company and its executives. As indicated in the paper "Auditors provide credibility for the financial information presented which impacts on information value and the value of the entity concerned". As it is easy to conclude, due to the special relationship between the principal and the agent great importance has been attribute to the role of the auditors in today's economic environment.

3.3 Summary

In this part, the concepts of agency theory and Limperg theory were introduced so that the forth subquestion to be aswered. At first, agency theory was defined along with the two parties of owners of economic resources, the principals and the agents. After the Limperg threory was developeda and at last, the study of ICAEW was presented that gave a connection between the agency theory with audit quality.

CHAPTER 4 - Previous literature about mandatory audit firm rotation

4.1 Introduction

In this part, I will illustrate the findings of previous studies that have been published through the years trying to answer the last sub-question. The researchers have used different proxies for audit quality, different samples and have retrieved data from various countries finding mixed results. In the end of this part, I illustrate a table with the year of the conduction of each one of the researches, the country in which the research was developed, the proxy for audit quality used and the findings of each research.

4.2 What is mandatory audit firm rotation

First of all, when we want to introduce the term mandatory audit firm rotation we need to assess what we mean by the term rotation. In many countries around the world and also in the United States of America (Section 203 of the Sarbanes-Oxley Act) there have been regulations prohibiting audit partners to perform audits for the same company for more than five consecutive years. As a result a mandatory audit partner rotation exists *(Firth et al. 2011)*.

On the other hand though, when we introduce the term of mandatory audit firm rotation we mean the imposition of a limit on the period of years during which an accounting firm may be the auditor of a company as defined in the Sarbanes-Oxley (SOX) Act 1 (*Harris et al. 2012*). Both the Sarbanes Oxley-Act in the USA and the European Commission in Europe have proposed the consideration of a mandatory audit firm rotation as a measure to ensure the objectivity and dynamism of the audit market *(Firth et al. 2011).*

There is not that extensive previous literature concerning the concept of mandatory audit firm rotation in the United States of America and many other countries. The findings of such studies report somehow contradicting results and have not until

recently managed to find an answer whether the advantages of mandatory audit rotation and its costs would exceed its disadvantages.

4.3 Different views about mandatory audit firm rotation

To begin with, there are two separate views about mandatory audit firm rotation. On the one hand, by changing the audit firm periodically, auditor's independence can become stronger because of the mitigation of the close relationship being developed between the auditors of the firm and the management of the company *(Lennox et al. 2013).* Moreover, periodic rotation of the audit firms can allow a fresher look in the Financial Statements along with increased competition in the audit markets. The Committee on Global Accreditation Activities (CGAA) in his study mentioned: *"The argument for firm rotation is that in a long term audit relationship, the auditors will tend to identify too closely with management, their proper professional skepticism will be diluted and they will be more likely to smooth over areas of difficulty in order to preserve the relationship and In particular the long term income which flows with it" (FEE Study Mandatory Rotation of Audit Firms, 2004).* On the other hand, those who are opposed to this rule state that the auditors may lose their specific knowledge of the client and hence be less capable of constrain managers' opportunistic behaviors *(Harris et al. 2012).* This opinion comes along with a lot of the studies being conducted through the years, which have found that the shorter the audit tenure the lower the audit quality being provided *(Lennox et al. 2013).*

4.4 Previous empirical studies on mandatory audit firm rotation

Arrunada and Arez issued a paper in 1997, in which they concluded that a mandatory audit firm rotation would eventually result in an increase of both the audit costs, meaning those incurred by the audit firms, and the costs which are directly attributable to the companies being audited. The paper explains that this is because of the competition being developed between audit firms and the increase of production costs. Moreover, it is argued that a mandatory audit firm rotation causes problems to the audit quality both in terms of technical competence and auditor's

independence. Another study that comes along with the opinion that audit tenure does not have positive relationship with audit quality is that of *Knechel and Vanstraelen in 2007.* By using a sample of stressed companies in Belgium, they found that the independence of auditors does not decrease over time and that the audit quality seems to be unaffected. To continue with the papers which have reached a negative result about the usefulness of the rule, *Myers et.al (2003)* by investigating a sample of 42.302 firms reached to the conclusion that the longer the audit tenure the higher the earnings quality. They also concluded that when the audit tenure is longer, auditors impose greater constrains to managers who want to take aggressive decision on how they report on the financial performance of the company. Another study by *Johnson et al. (2002)* indicated that the shorter the tenure of an audit firm the lowest the audit quality it is provided and also that there is no indication of lower audit quality for those audit firms that conduct audits for many years in a company.

Furthermore, in a study conducted in a country where mandatory audit firm rotation exists, South Korea, *Kwon et al.2010* found that both the audit hours and the audit fees increase because of mandatory audit firm rotation, but that audit quality was not affected significantly. To continue with countries where the rule is established, *Shafie et al.* conducted a research in 2009 in Malaysia, finding a positive relationship between audit firm tenure and reporting quality when the going concern model of logistic regression as a proxy for audit quality is used. Another study conducted in Italy, where the audit rotation is mandatory, a different aspect of audit rotation was detected. More specifically, *Cameran et al.* searched in 2012 in a field where mandatory audit firm rotation exists, that of Italy, and found that if the mandatory audit rotation was held for three years with the option to be renewed for another six years, the level of reporting conservatism will be higher for the auditors in the last year of their initial tenure. They have also indicated that the audit quality that firm provide improves in the last periods of audits but they admit that further research on that subject needs to be conducted.

To continue with, *Harris and Whisenant (2012)* in their study investigated the effects of mandatory audit rotation by splitting the period investigated in pre-adoption and after adoption. Their results indicated that in the period after the adoption of the rule, there was detected less earnings management and more accurate recognition of losses as concerned by the time being reported. However, their study showed less audit quality in both periods when the proxy for audit quality is the level of earnings management. Some researchers like *Jackson et al. (2008)* have tried to introduce new concepts of mandatory audit firm rotation. More specifically they tested the implications of the rule on audit quality and the costs to the audit market in the Australian environment taking into consideration client's financial characteristics. They concluded that when the propensity of a going concern opinion is used as a proxy, the quality of audits improves, whereas when discretionary accruals are used, it remains unaffected. At last, *Fitzgerald et al*. *(2012)* examined the effects of the rule in not-for-profit organizations in the U.S.A finding that audit quality is improved when audit firm tenure exists. Table 1 below provides the reader with a summary of the findings of previous articles concerning the examined relationship.

Table 1: Findings of previous studies about audit firm rotation and audit quality

Name of Author	**Year**	**Country of research**	**Proxy for audit quality**	**Relationship of audit quality and MAR**
Arrunada and Paz-Ares	1997	European companies	Professional competence/ auditor independence **(both direct)**	Negative relationship
Knechel and Vanstraelen	2007	Belgium	Going concern opinion **(direct)**	Negative relationship
Myers et al.	2003	U.S.A	Modified Jones model about accruals **(indirect)**	Positive relationship

Johnson et al.	2002	U.S.A	Absolute value unexpected accruals/ Current Accruals **(indirect / direct)**	Negative relationship
Kwon et al.	2010	South Korea	Abnormal discretionary accruals **(indirect)**	No relationship
Shafie et al.	2009	Malaysia	Going concern model of logistic regression **(indirect)**	Positive relationship
Cameran et al.	2012	Italy	Abnormal Working Capital Accruals **(direct)**	Positive relationship
Harris and Whisenant	2012	U.S.A	Discretion in earnings **(indirect)**	Positive relationship
Jackson et al.	2008	Australia	Going concern opinion / Discretionary accruals **(direct / indirect)**	Positive relationship/ No relationship
Fitzgerald et al.	2012	U.S.A	Internal control weaknesses **(direct)**	Positive relationship

4.5 Opinions by audit firms and other experts

The *Fédération des Experts Comptables Européens in Brussels*, an international non-profit organization, in its study about mandatory audit firm rotation, gathered the different views of numerous surveys of different organizations like ICAEW, GAO, CGAA and various studies concerning the implications of mandatory audit firm rotation and reached to the conclusion that a change in the way audit rotation is being performed in most of the countries in Europe would not be beneficial neither to auditor's independence nor to the public interest.

Moreover, the *Research Committee of the Institute of Chartered Accountants of Scotland (ICAS)* in its paper named "What do we know about mandatory audit firm rotation", published in 2012, states that the evidences concerning mandatory audit rotation in the European Union are, at this point of time, far from being characterized as conclusive and although the mandatory rotation might improve the view of the public towards the audit profession, there is no evidence that this could also improve the quality of audits. To continue with, Deloitte LLP in its comment letter towards PCAOB states that its response to the concept release of PCAOB in 2011 concerning the mandatory audit rotation in the United States of America is that although the majority of the firm's response to this proposal is negative, there are plenty other solutions to improve the independence of auditors and to improve their professional skepticism. Close to this opinion is the one that was issued by PriceWaterHouseCoopers in May 2012 about the proposed rule in the USA. The audit firm stated that the are significant costs in a possible change to a rule of audit firm rotation such as the loss of auditor's cumulative knowledge of the audited company but also the lack of audit committee's ability to find the best audit firm in order to perform the audit of the company *(PWC point of view in Mandatory Audit Firm Rotation, May 2012).*

4.6 Summary

In this part of the paper the concept of mandatory audit firm rotation was introduced in order sub-question 5 to be answered. At first, the term of audit firm rotation was defined along with the two views, by previous researchers and committees, both positive and negative concerning audit rotation. After, previous studies were contemplated with their results and a table for them was illustrated in order to help the reader gather the main findings. At last, the opinion of other experts was provided in order the subject of audit firm rotation to be presented at the most delicate way.

CHAPTER 5 – Hypotheses development and research design

5.1 Introduction

In this part, I will indicate the hypotheses and research design of my paper. First, by illustrating parts of previous literature, I provide to the reader the logic steps that lead to the first hypothesis and the used model in order to examine it. After, I continue with the second hypothesis by also stating the reasons that have led to it and I illustrate the second research model. Furthermore, the Libby boxes of the research are provided for a better comprehension about the examined relationship along with a setting on the matter of the validity of the study. Moreover, the measures for the variables are illustrated and at the last part of this chapter information about the sample selection is provided.

5.2 Hypotheses development

5.2.1 Hypothesis No1

My first hypothesis examines the association of audit quality with audit firm rotation trying to answer the main research question. Whereas, as I have indicated before, there are many proxies in order to measure audit quality (abnormal discretionary accruals, the going concern model of logistic regression, abnormal working capital accruals, discretion in earnings, audit fees and many others), in my research audit quality is going to be measured by the detection or not of material control weaknesses in companies' internal controls by auditors under section 404 of the Sarbanes-Oxley Act. As it has been stated before, until today none of these proxies has been acknowledged as the best one or the most indicative one.

This measure has been chosen for various reasons. First of all, the research is about audit firm rotation for companies that operate in the U.S.A. Companies that operate under this business environment, due to the implementation of the Sarbanes-Oxley Act in 2002, have a specific characteristic as has been indicated before. Due to the section 404 of the Act, auditors are responsible to issue their opinion concerning the effectiveness of internal controls. As a result, I believe that internal control

deficiencies, due to the importance of the internal controls of companies that was highlighted previously, is the best proxy in order to measure the audit quality provided.

Audit firm change is going to be simply measured as the change of audit firm that performs the audit after some years of continuous audit. In this paper I will not make a distinction between Big 4 and all the other audit firms. Whereas, there are some authors *(DeAngelo 1981, Geiger and Dasaratha 2006)* that have found that auditor size (Big 4, non-Big 4) affects audit quality, I believe that the change of the auditor firm itself is of greater importance. This is because, as *Krishnan and Visvanathan (2007)* have indicated, after the implementation of the Sarbanes Oxley Act in the U.S.A environment, auditor changes have increased. This is due to the fact that the change of the auditor can be attributed to a possible detection of control weaknesses in a company. As a result, whether the proceeding auditor was a Big 4 auditor or not does not affect my research. Although, there have been many previous studies concerning the subject of audit firm rotation, there are not many of them which have investigated the effects of an audit firm change on audit quality the very first year of the rotation.

Despite the obvious disadvantage of audit firm rotation, which is the loss of the previous knowledge of the company and its internal controls by the new auditors, there are studies by *Caramanis and Lennox (2008) and Deis and Giroux (1992)* which indicate that, when a change of the relationship between the audit firm and the client exists, the hours that are invested by the auditors seem to be much higher than before. Based on these papers, if the new audit firm invests much more audit effort, in all the parts of the audit, then there is higher probability that the internal controls of a company are going to be tested more thoroughly. As a result, there is higher probability that there will be internal control weaknesses identified and reported in the first year of the audit. Moreover, due to the fresher look that the new auditor provides in the audit in the first year of the change, due to the mitigation of the close relationship being developed between the auditors of the

firm and the management of the company *(Lennox et al., 2013),* there is higher possibility that control deficiencies will be detected and reported. As stated before, a change of the auditor can be attributed to the possible detection of a control weakness *(Krishnan and Visvanathan, 2007).* At last *Fitzegerald et al. (2012)* indicated that in a sample of non for profit organizations taken from U.S.A more internal control deficiencies were indicated the first year of an audit firm tenure. Consequently, taking into consideration all the above information I formulate the following hypothesis.

H1: Audit firms report more internal control deficiencies in the first year of the audit firm tenure.

- ✓ ***The used model for the first hypothesis is provided below:***

$$MW = \beta 0 + \beta 1\ CHANGEFIRM + \beta 2\ FOREIGN\_EXCHANGE\ INCOME + \beta 3\ BOOK\_VALUE + \beta 4 MARKET\ CAP + \beta 5\ ROA + \beta 6\ CFO/A + \varepsilon$$

5.2.2 Hypothesis No 2

The second hypothesis relates the industry characteristics of the companies in the sample, with the possibility of detecting material weaknesses after an audit firm change. Auditing standards require auditors to take into account the type of industry the company being audited performs in, when they plan the audit process. To be more specific, United Statement's auditing standards *(SAS) No .47 (www.aicpa.org)* , which refers to the audit risk and materiality when auditors conduct the audit, require auditors to consider the industry that the company, which is being audited, operates in, in order to define possible material errors in the Financial Statements. Moreover, *SAS No. 53 (www.aicpa.org)* states that auditors have to consider the industry characteristics of the client when they try to detect material errors and irregularities. In addition, experienced auditors like *Solomon, Mars and Thomas of KPMG (1997)* admit that industry knowledge is essential for auditors in order to understand the business characteristics of the company, the organization structure

and its internal environment. Furthermore, *Peters (1990)* states that auditors when considering the audit plan take into account the industry conditions and evaluate the control risks when they make their risk hypotheses. Also *Maletta and Wright (1996),* made a distinction between regulated and unregulated industries, and concluded that the formers have lower error incidents than the latters.

As indicated before, the United States of America have rejected mandatory audit firm rotation, whereas in some other countries this law has been implemented recently (second quarter of 2014) for specific industries like banks, insurance companies and public listed companies. This difference calls into question what is the differentiation between these kinds of companies in the two continents and has resulted in such a huge change in Europe, whereas in the United States of America the law has remained unchanged. Despite the fact that there has been an extensive previous literature developed about financial crisis and the role of banks, there have not been many studies about the implications of SOX 404 on the banking sector in the United States and the detection of material control deficiencies in other industries.

Whereas *Zhao and Ziebart (2011)* have indicated that SOX has a positive impact on the monitoring mechanisms of banks, there are other studies like the one of *Siegel et al. (2010)*, which states that although a positive change in decision making and increased internal control efficiency was presented, the costs of SOX for banks are more than the benefits. Furthermore, *Alexander et al. 2010* state that the benefits of section 404 of SOX are reduced for banks, due to the extensive regulations imposed to the business environment of the United States of America.

Due to the fact that, as far as I know, there have not been any previous studies concerning the internal control deficiencies on the banking sector and any other kind of industries in the United States after SOX following an audit firm change, my second hypothesis is presented at a null form:

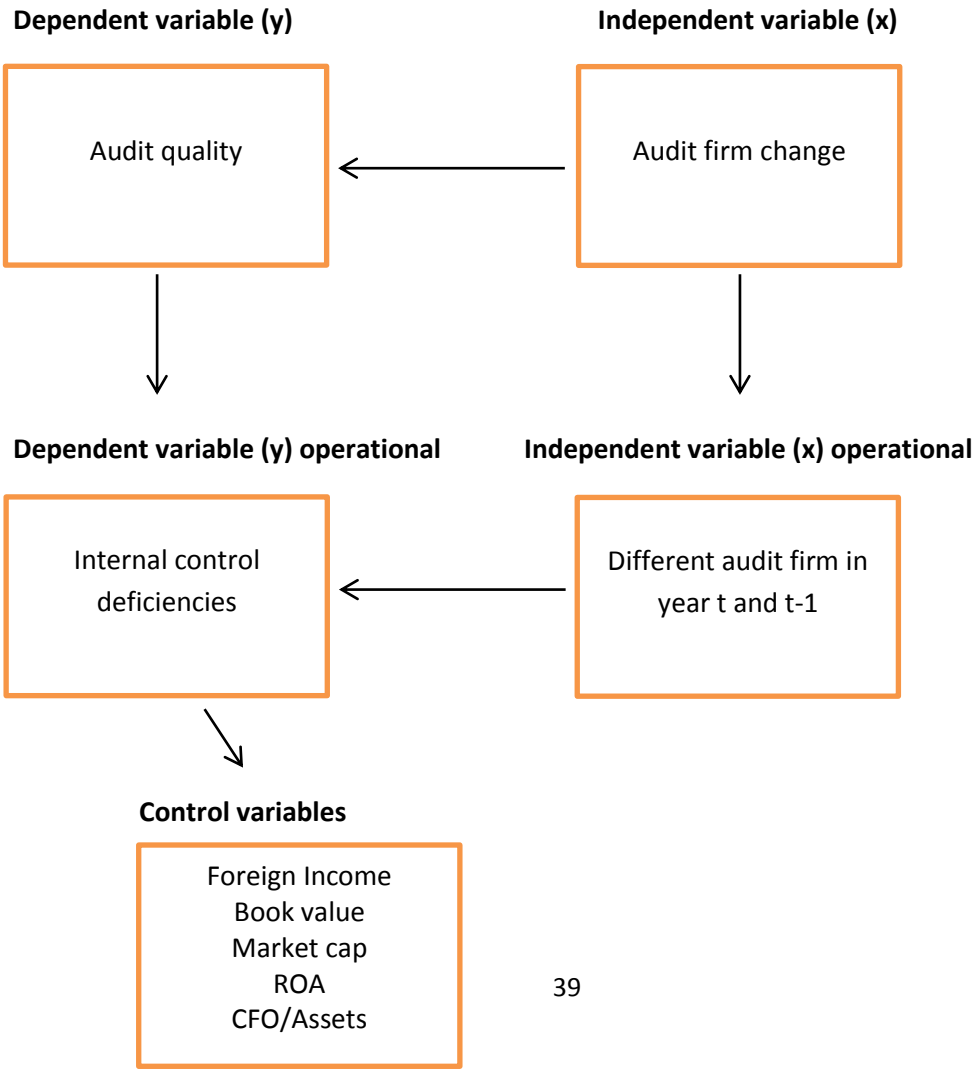
H2: Companies in different industries are no more likely to report internal control deficiencies in the first year of the audit firm tenure.

✓ *The used model for the second hypothesis is provided below:*

$$MW = \beta 0 + \beta 1\ CHANGEFIRM + \beta 2\ FOREIGN\_EXCHANGE\ INCOME + \beta 3\ BOOK\_VALUE + \beta 4 MARKET\ CAP + \beta 5\ ROA + \beta 6\ CFO/A + \varepsilon$$

✓ *Libby boxes*

In order to help the reader of this paper to understand thoroughly the concept of the first and second hypothesis, I also provide Libby boxes in order the proxies for independent variable with the dependent variable and the control variables to be clear.



5.2.3 Validity of the paper

✓ External Validity

This paper suffers from low external validity. Due to the small population that has been examined concerning the association between audit firm rotation and audit quality provided, but also the fact that the study has examined organizations operating in the U.S.A. environment, the results of this study may are not able to be generalized to the broader population.

✓ Internal Validity

In my opinion, this study provides high internal validity. This is due to the fact that, the research captures well the causal effect of the independent variable (x) on the dependent variable (y) after eliminating alternative hypotheses. As an example, the audit quality provided by audit firms is attributed to the change of the audit firm itself and not to other factors such as the size of the audit firm, the legal environment of the country examined or the experience of auditors and managers.

✓ Construct Validity

Concerning construct validity, I believe that this study has a high one. This is because of the proxies that have been chosen to analyze the variables. For the dependent variable i.e. audit quality, the internal control deficiencies of companies performing under sections 302 and 404 of SOX have been used as explained before. This way of measuring audit quality is accurate because of the importance of internal controls in the way businesses are operating and auditors work in the U.S.A. environment. Moreover, the change of audit firms was measured as the change of audit firm from year t-1 to year t which is the most appropriate one. At last, the control variables that have been used for the model (complexity, size and profitability) capture the effects of other possible explanations concerning the change of audit quality provided after an audit firm rotation in the best way possible. As a result, the most

accurate methods were used as the variables to be analyzed, thus the high construct validity of the study.

5.3 Research design for the two hypotheses

The two hypotheses are examined using the same model. The first model is examined for the whole sample. The difference between them lies to the separation of the sample of the second hypothesis into three different industries: agricultural, finance and administration. After this distinction, the same regression model is used for three times in order possible differences between industries to be detected.

5.3.1 Measuring audit firm changes

I identify audit firm changes by using a specific choice which is provided in the database WRDS. Following *Fitzgerald et al. (2012*) I classify a company as changing firm if the audit firm in year t is different from the auditor in year t-1 (CHANGEFIRM). This is provided as a number (number of auditor change) and was checked by identifying that the audit firm in year t is different from the auditor in year t-1.

5.3.2 Measuring audit quality

In order to measure audit quality it is important that I identify measures that have been used in previous studies. Previous studies have used different proxies to measure audit quality. Most of them along with the findings of the researchers have been indicated in previous parts of the paper, so I simply make a small summary of them.

To begin with, *DeAngelo (1981*) has indicated that audit quality depends on the audit firm size; *O'Sullivan (2000*) has used audit fees as a proxy, while *Chambers (2008)* has used three different measures for audit quality. These were the audit firm industry specialization, auditor-firm independence and the litigation/reputation risk of audit firms. Moreover, *Arrunada and Paz-Ares (1997)* have used professional competence

and auditor independence, while *Knechel and Vanstraelen (2007)* have used the going concern opinion of auditors. *Myers et al. (2003)* used an indirect model, that of modified Jones, when *Johnson et al. (2002)* used one direct (absolute value of unexpected accruals) and one indirect (current accruals). *Cameran et al. (2012)* have used the abnormal working capital accruals model. At last *Fitzgerald et al. (2012)* have used internal control deficiencies as a proxy. As indicated before the measure used in this research is the internal control deficiencies of companies' internal controls reported by auditors under section 404 of the Sarbanes-Oxley Act.

5.3.3 Control Variables

To begin with, I use five control variables to identify if other factors, different from the change of the audit firm itself, play a significant role affecting the initial relation between internal control deficiencies and the change of audit firm. Following *Skaife et al. (2007)*, the first control variable that I use is about the complexity and scope of operations of the firms and the structure of the organization in general. I believe that organizations that have greater complexities and various operating activities will probably have more internal control problems than companies with less activities and not so complex structures. If the company operates in more activities, the transactions that are developed as a consequence will be increased. This is also the case when companies operate in more diverse industries or oversees. If the transactions of the company are complex, then it will be more difficult for internal control systems to be structured adequately. Therefore, I use the FOREIGN_EXCHANGE INCOME control variable in order to measure how complex the operations of the organization are and their scope.

To continue with, another aspect of company characteristics is examined that of the size of the company. Once again, following *Skaife et al. (2007)* I state that the size of the company plays a significant role in the internal control systems that are implemented. This is due to the fact that, information and control systems are very costly to be implemented and maintained in a good condition. As a result, the size of the company can play a decisive role in the choice of a company to invest in the best

information and control systems or not. Based on this assumption it is obvious that the smaller the firm, the less appropriate the control system used will be *(DeFond and Jiambalvo, 1991*). Due to the importance of the company size in the information and control systems possessing, I have chosen two control variables to capture its effect on the association investigated. The first one is BOOK_VALUE which is the company's book value of asset and is computed as the rate of Common/Ordinary Equity. The second one is MARKET CAP which is the firm's market capitalization equal to the price of the company multiplied by the common shares outstanding *(Doyle et al. 2007).*

At last, following *Krishnan and Gnanakumar (2007)* the last two control variables are about the profitability of the firm. As mentioned in their study, except from the size of the organization that can affect the quality of internal control systems, the level of profitability of companies is also important. This is because, if a company is more profitable that its competitors it is more likely that will establish and maintain the control and information systems needed, in a better way. As a result, those companies that possess more resources are more likely to implement the highest technology level of internal control systems if they have understood the importance of them. Due to the high importance of the profitability of firms in the choice of information and control systems, I have taken two control variables. The first one is ROA which measures the return on assets, a company's profitability ratio. It is measured as the rate of Income before extraordinary items to the total assets of the company. The second one is CFO/A, and is represented as the ratio cash flows from operating activities scaled by assets. Below a table of all the control variables is presented.

5.3.4 Multivariate Model

I use the following model to identify the joint probability that an auditor will both identify a material mistake in the internal control of a company and report it, so that the auditor reports a material deficiency.

The empirical model for testing the first hypothesis of this paper is similar to the empirical model that *Fitzgerald et al. (2012)* have used for their research. However, the control variables are different as has been indicated previously. For the second hypothesis the same model is used, but there is a division of the companies depending on the industry that they belong to.

The used model is:

$$MW = \beta 0 + \beta 1\ CHANGEFIRM + \beta 2\ FOREIGN\_EXCHANGE\ INCOME + \beta 3\ BOOK\_VALUE + \beta 4 MARKET\ CAP + \beta 5\ ROA + \beta 6\ CFO/A + \varepsilon$$

- Where:

✓ *Dependent Variable:*

MW= is a dummy variable coded 1 for companies that report a material weakness and 0 otherwise.

✓ *Independent Variable*

CHANGEFIRM = is a dummy variable which equals 1 if the client has changed auditors between year t-1 and year t, and equals 0 otherwise

✓ *Control Variables*

The following table provides a brief explanation of the control variables together with their assumed relation with the dependent variable.

Table 2: Analysis of the control variables of the regression model

VARIABLE NAME	DEFINITION VARIABLE	PREDICTED SIGN
FOREIGN_EXHANGE INCOME	Income that is gained by foreign transactions	+
BOOK_VALUE	Firm's book value of assets	-
MARKET_CAP	Firm's market capitalization. Equals the price of the company multiplied by the common shares outstanding	-
ROA	Return on assets. Equal to the Income before extraordinary items to the total assets of the company	-
CFO/A	Cash from operations scaled by assets	-

5.4 Sample Selection

The sample of this research consists of companies that operate in the U.S.A. The choice of this country as the one from which companies will be examined, is the appropriate one. This is because of the Sarbanes-Oxley Act that has been imposed in the U.S.A since 2002 and has changed the importance and the role of both the internal controls of companies and auditors. Since the proxy for audit quality is internal control deficiencies, the U.S.A is the best country for this research. The

second reason that this country has been chosen is that the data which can be retrieved are numerous and they can also be chosen from different sectors so that the classification of the companies between industries to be performed.

In order to construct the sample, I have used the Audit Analytics database which is part of Wharton Research Data Services (WRDS). The database consists of firms that operate in the U.S and can provide the researcher with much information such as audit firm changes, reports of sections 302 and 404 of SOX, audit opinions and many others. My initial search for the sample was of companies that have experienced a change of auditor from 2002-2014. This time period has been chosen due to the fact that in the U.S.A companies do not change their auditors that often, and because SOX was established in 2002. As a result I want my data to be extending in a large time period. The sample in first place was consisted of 5263 companies in the United States of America that have changed their audit firm through those years. After excluding those that the tickers could not be found, the sample consisted of 4585 companies for which data with all the specifications could be retrieved. The data for the control variables were retrieved from COMPUSTAT which is also a database included in WRDS. After excluding those companies for which data for control variables could not be found, the final sample consists of 4565 companies. The following table gives a better picture for the final sample of the first model.

Table 3: Information about the first sample

Information about the sample selection	Big 4 audit firms	Non Big 4 audit firms
Number of companies	1788	2777
Issue internal control weakness	179	261
Not issue internal control weakness	1609	2497

After the selection of the sample for the first hypothesis, information about the sample for the second hypothesis is provided. In Hypothesis number two, the sample is divided accordingly to the industry that each company that operates in belongs. In order to make this distinction COMPUSTAT database has been chosen. After imputing the data for the second time in the database I divided them accordingly, using the SIC code of each company. At last the sample was divided in three different industries:

a) Agriculture, forest, fishing and hunting
b) Finance and insurance
c) Public Administration

Table 4 below provides an analysis for the sample selected for the second hypothesis.

Table 4: Information about the second sample

Industry	Issue internal control weakness	Not issue internal control weakness	Number of companies
Agriculture, Forestry, Fishing and Hunting	197	1814	2011
Finance and Insurance	149	1149	1298
Public Administration	98	1040	1138

5.5 Summary

In this chapter of the paper various subjects of the research were analyzed. At first, the two main hypotheses were introduced with information derived from previous studies and also the logic steps that have led to them were analyzed. Hypothesis number 1 is about audit firm rotation and its association with audit quality provided in the first year of the tenure, while hypothesis number 2 is about the industry characteristics of companies and is formulated in a null form. After, the research design of the paper was analyzed. The measures concerning the dependent, independent and the control variables were given along with the regression model of this research. Validity issues were introduced and at last, the sample of this research was analyzed with two tables, providing more details about the final data.

CHAPTER 6 – Research findings and Empirical analysis

6.1 Introduction

In this chapter, the results of the research will be revealed. First, the descriptive statistics will be presented with all the necessary information about the findings of the regression model. After, the tests for the regression models will be presented along with their results. At last, the two hypotheses will be examined and analyzed in order to conclude if they will be accepted or rejected.

6.2. Descriptive statistics

In this part of the chapter the descriptive statistic of the research are analyzed.

✓ *Summarized Descriptive statistics for model 1*

To begin with, the number of observations was 4565. The dependent variable with the control variables consisted of 4565 observations in the end while the independent variable of auditor change was consisted of 459 observations. In the regression analysis no omitted variables were detected. Table 5 below presents the descriptive statistics for the different variables of the first model. The observations extend from 2002-2014. Also the mean and the standard deviation of each variable are illustrated.

Table 5: Summarized descriptive statistics for the first model

Variables	Mean	Standard Dev.	Observations	Skewness	Kurtosis
CHANGEFIRM	10.5207	5.693126	459	0.4320035	2.027134
FOREIGN_EXCHANGE INCOME	7.877547	2.093904	4565	-1.56698	4.784978
BOOK_VALUE	11.39956	5.44831	4565	0.039593	2.034234
MARKET CAP	12.3345	6.327919	4565	-0.863463	1.843598

ROA	10.9126	6.214331	4565	-0.2404309	1.560512
CFO/A	14.11457	5.885131	4565	-0.7096569	2.522913

✓ *Summarized descriptive statistics for model 2, illustrated per industry*

Table 6 below presents the descriptive statistics for the different variables of the second model depending on the industry that each company operates in.

Table 6: Summarized descriptive statistics for the second model

Variables	Mean Agriculture/ Finance/ Administration	Standard dev. Agriculture/ Finance/ Administration	Observations Agriculture/ Finance/ Administration	Skewness Agriculture/ Finance/ Administration	Kurtosis Agriculture/ Finance/ Administration
CHANGEFIRM	0.09801/ 0.1141095/ 0.0853122	0.2974021/ 0.3180668/ 0.2794687	2010/1297/ 1137	2.704017/ -0.1203277/-0.273286	8.311705/ 1.714879/ 1.635347
FOREIGN_EXCHANGE INCOM	6.70995/ 5.324595/ 5.991205	6.70995/ 1.529127/ 1.985403	2010/1297/ 1137	-1.281216/ -1.433996/ -1.289573	3.663674/ 4.206262/ 3.528357
BOOK_VALUE	9.402985/ 8.688512/ 1.7810682	4.968171/ 4.48094/ 1.485907	2010/1297/ 1137	0.1319023/ 0.2334957/ 1.459387	1.740414/ 1.893263/ 3.13407
MARKET CAP	9.587562/ 9.290671/ 1.970509	5.346207/ 4.597656/ 3.883409	2010/1297/ 1137	0.2219224/ 1.805701/ 1.688461	1.939206/ 4.664056/ 4.237811

ROA	9.20597/ 8.062452/ 8.024626	5.266739/ 4.723198/ 4.837619	2010/1297/ 1137	-0.217677/ -0.1640545/ -0.1997938	1.541923/ 1.664589/ 1.608069
CFO/A	11.7796/ 8.947571/ 9.008795	5.31372/ 4.172629/ 4.142904	2010/1297/ 1137	-0.5377874/ -0.2256002/ -0.433235	2.265257/ 2.306493/ 2.155393

6.3. Testing assumptions

✓ *Model 1*

First of all, the model was tested for possible problems of multicollinearity. By the term multicollinearity, we mean the statistical problem when the independent variables of the regression model are closely correlated with the control variables. Multicollinearity can cause problems to the regression model in case there is an indication that the dependent variable (in this study control deficiencies) is not explained by the independent variables due to the close correlation of the independent with the control variables. The first regression model, after computing the statistical results in STATA has a VIF value of 2.37. This value means that there is no indication of multicollinearity in the first regression model.

To continue with, the model was also tested for problems of autocorrelation. This statistical problem indicates the possible degree of similarity between a time series and a lagged version of them during the interval of previous time series. For this possible statistical problem the Durbin Watson statistics, was used and the results were derived from STATA. As was detected the value of the test was 1.888121 which means that there is no autocorrelation in the model.

Also, each component of the model was tested for normality. The descriptive statistics that were chosen for testing normality were skewness and kurtosis. Skewness indicates the symmetry of the distribution. A skewed distribution which

is positive indicates scores that are clustered to the left, and the tail of the distribution extending to the right while a negatively skewed distribution demonstrates scores that are clustered to the right and the tale of the distribution extends to the left. Kurtosis on the other hand, defines the peakedness of the distribution. Positive kurtosis is indicated by a peak. Negative kurtosis is indicated by a flat distribution. All the variables in the tables provided by STATA seem to indicate that the model seems to be close to the normal distribution with an exception of the control variables FOREIGN_EXCHANGE INCOME and CFO/A for which the results seem to be far from 0.

✓ *Model 2*

The same tests were conducted for each of the industries of the second model. The VIF multicollinearity results for the agricultural industry is 2.37 which indicate that there is no indication of multicollinearity between the variables, in the sample of agricultural companies. On the other hand, the results for the finance industry seem to indicate that multicollinearity exists between the variables of this industry. As can be observed the VIF result for this industry is 7. This seems also to be the case for the administration industry where the VIF for the administration industry is above 7 (8.81).

Autocorrelation tests for these three industries were also conducted. The results indicate that for the agricultural company the Durbin Watson statistics is 1.8800894 and there is no indication of autocorrelation in this sample. This can also be indicated for the finance industry (Durbin-Watson d-statistic = 1.88618) and also for the administrative industry (Durbin-Watson d-statistic = 1.780177).

At last, concerning the normality tests skewness and kurtosis of the models were analyzed. As can be seen in table 6 the skewness and kurtosis for most of the variables indicate that the model seems to be close to the normal distribution. The only problems detected concern the kurtosis of the variable CHANGEFIRM for the agricultural industry, the kurtosis of FOREIGN_EXCHANGE INCOME in the finance

industry and at last the kurtosis of the variable MARKETCAP in both finance and insurance industry and the public administration industry.

6.4 Kernel density estimate

In Appendix A, a Kernel density estimate is represented for both models, which illustrates the most important variables individually. This kind of representation has been chosen because of the problems that histograms face when they graphically distribute data. As it is known, graphical displays represent visual judgment about confidence intervals, central density and others. These visual representations are offered as a cross-check of statistical results. However, if the data are a random selection, the histogram is an estimate of the population density distribution. However, *"the visual impression gained from a histogram can depend to an unwelcome extent on the intervals selected from the classes" (Thompson, 2006).* As a result, the Kernel estimate when calculated appropriately gives a better estimation of the population density without making any assumptions and provides a better graphical representation of the variables.

6.5 Analysis of the model results

✓ Model 1

After implementing the regression model in STATA as first discussed in section 5, the association between mandatory audit firm rotation and audit quality is analyzed in this part. Tables 7 and 8 below provide the results of the regression model and the findings are analyzed thoroughly below.

Table 7: Information about the results of the first model

Number of observations = 4565
F (6, 4558) = 21.84
Prob. > F = 0.000
R-squared = 0.0280
Adj. R – squared = 0.0267

Table 8: Results concerning the association between the variables of the first model

Variables/Results	Coefficient	P>[t]	[95% Conf. Interval]	
CHANGE FIRM	-0.0080236	0.000	-0.102963	-0.0057509
FOREIGN_EXCHANGE INCOME	0.0055185	0.057	-0.0001703	0.112072
BOOK_VALUE	0.068342	0.000	0.0040688	0.0095997
MARKET CAP	-0.034693	0.000	-0.052235	-0.0017151
ROA	0.0080988	0.000	0.0059648	0.0102329
CFO/A	-0.0105699	0.000	-0.0128634	-0.0082763

On the table above, the coefficients of the first regression model are distributed, which indicate whether there exists a positive or negative association between the dependent variable, the independent variable and the control variables.

To begin with, the R square (0.0280) and the adjusted R square (0.0267) are close to each other. However, they are low for this model and this is a possible limitation of the study. Possible explanation of this phenomenon lies at the sample that has been

selected for the study and the control variables that have been chosen. There are various control variables that could have been chosen, so the choice of these five may has affected the research. Moreover the sample of the first regression model is low (4565 companies) which could lower the external validity of the findings.

On the other hand, all the variables of the model have been found statistically significant except the control variable FOREIGN_EXCHANGE INCOME which is not significant in a statistical level of 5%. This can be attributed to the few observations that were found for this variable in the sample.

As it can be observed from the table, the most important variable for this research is the coefficient for audit firm rotation (CHANGE FIRM). The coefficient of the variable indicates a negative relation (-0.0080236), at a $p<0.05$ level, with audit firm quality. This means that a rule of audit firm rotation in the current sample does not result in a higher audit quality. This result is in line with the findings of some previous literature researches which have indicated that audit firm rotation does not have a positive association with audit quality. As a consequence, the first hypothesis of the paper is **rejected**. Audit firm rotation affects audit quality in a negative way.

Furthermore, the control variable FOREIGN_EXCHANGE INCOME has a **positive** association with audit quality (0.0055185). This means that the more complex the operations of an organization are, the higher the possibility for an auditor to report internal control weaknesses. This variable although, is not statistical significant at a $p<0.05$ level and this is why it cannot be taken into consideration for this model.

To continue with, the control variable MARKET CAP which represents firm's market capitalization as computed by multiplying the price of the company with the common shares outstanding, has a **negative** association with audit quality provided (-0.034693) at a level of $p<0.05$.This result indicates that the size of the company, when measured as the company's book value of assets, can play a decisive role in in the information and control systems that are implemented. In this model, the results indicate that the bigger the firm, in relation to its asset size, the less the internal control deficiencies that will be detected and reported. However, the control

variable BOOK_VALUE has a **positive** association with audit quality provided (0.068342) at a p<0.05 level. This result is not in line with the expected outcome of table 2 and can call into question the significance of the company's size in the choice of internal control and information systems.

Moreover, CFO/A has **negative** association (-0.0105699) with internal control deficiencies which are reported in a company in a statistical level of p<0.05, as was expected. This result indicates that the more profitable a firm is the better information systems it uses and the better maintenance of them performs. At last, the other control variable for audit quality, ROA, has a **positive** association with audit quality (0.0080988) at a p<0.05 level. This result also calls into question the possibilities of a profitable company to implement the highest technology control and information systems. This result can be an indication of a possible underestimation of the importance of the internal controls by companies.

✓ *Model 2*

For the second model, as has been previously indicated, the sample has been divided into three different industries. Tables 9 and 10 below, provide the results of the second regression model per industry. Further analysis and comparison between them is performed later in this section.

Table 9: Information about the second model

Agricultural	Finance	Administration
Number of obs. = 2010	Number of obs. = 1297	Number of obs. = 1137
F (6,2003) = 6.08	F (6, 1290) = 13.19	F (6,1130) = 8.06
Prob. > F = 0.000	Prob. > F = 0.000	Prob. > F = 0.000
R-squared = 0.0179	R-squared = 0.0578	R-squared = 0.0410
Adj. R-squared = 0.0150	Adj. R-squared = 0.0534	Adj. R-squared = 0.0359

To begin with, the R square for the agricultural (0.0179), finance (0.0578) and administrator industry (0.0410) are illustrated. Also the adjusted R square for agricultural (0.0150), finance (0.0534) and administration industry (0.0359) are distributed to indicate the explanatory power of the independent variable. The results for the agricultural industry are low, whereas the results for the other two industries indicate a higher explanatory power of the independent variable. Once again the results of R squared and the adjusted R squared are close to each other. Table 10 below illustrates the results of the second model, as divided per industry.

Table 10: Results concerning the association between the variables of the second model

Variables /Results		Coefficient			P>[t]	
	Agricultural	Finance	Administration	Agricultural	Finance	Administration
CHANGE FIRM	-0.049087	0.0068114	-0.067768	0.007	0.297	0.000
FOREIGN_ EXCHANG E INCOME	0.022487	-0.300709	0.004942	0.608	0.002	0.935
BOOK_VA LUE	0.0065924	-0.010495	-7.480309	0.003	0.153	0.004
MARKET CAP	-0.0010492	-1.592311	2.912511	0.506	0.004	0.004
ROA	0.0099398	0.0120361	0.055712	0.000	0.000	0.008
CFO/A	-0.109111	-0.144627	-0.109708	0.000	0.000	0.0001

On the table above, the coefficients of the regression model are distributed, divided by industry. Each one of them provides indication whether a positive or negative association exists between the dependent variable, the independent variable and the control variables. In this part, the results of the table provide excellent comparison between the industries of the sample. All the results above seem to be statistically significant expect from those that are highlighted with a red color.

To begin with, the most important variable is again CHANGEFIRM. It indicates whether the change of an audit firm provides better audit quality, as measured by the report or not of internal control weaknesses by auditors under section 404 of SOX. For the agricultural industry, the change of an audit firm seems to have a **negative** relation with audit quality provided (-0.049087) at a $p<0.05$ level. This is also the case **(negative relation)** for the administration sector (-0.067768) at the same statistical level. The association of audit firm rotation with audit quality for the finance sector indicates a **positive** relationship (0.0068114) between the two variables, although this is not statistically significant in a $p<0.05$ level. These results indicate that there exists a statistically important **negative** association between audit firm rotation and audit quality provided concerning the agricultural and the administration industry, whereas the finance sector indicates positive association which is not statistically significant. As a result, the second hypothesis that indicated that it is no more likely for audit firm rotation to improve audit quality in different industries is **accepted**.

To continue with, the complexity of companies' operations as indicated by the variable FOREIGN_EXCHANGE INCOME is statistically significant at a $p<0.05$ level and **negative** for the finance sector whereas for the other two industries the variable is not statistically significant at the same level. This result indicates that the complexity of organizations does not indicate that more control deficiencies will be detected.

Furthermore, the results for the association of the size of a company, as measured by the variable BOOK_VALUE with internal control deficiencies reported, show a **positive** statistically important relation in at a $p<0.05$ level for the agricultural

(0.0065924) industry whereas for the administrative industry the association is **negative** (-7.480309). Moreover, the other control variable for the company's size, MARKET CAP, indicated a **negative** (-1.592311) statistically important association between the two variables at a level of $p<0.05$ for the finance sector. However the same variable showed a **positive** (2.912511) statistically important association between these two variables for the administration industry.

At last, as concerns the last control variables, ROA and CFO/A, which illustrate the association of company's profitability with audit quality provided, the results indicate statistically significant ($p<0.05$) **negative** association for the variable ROA as concerns all the three industries, whereas the same association for the three industries is **positive** for the variable CFO/A. These results indicate that it cannot be extracted a clear answer whether the profitability of a firm relates to the detection of internal control deficiencies by auditors for the three different industries of the sample.

6.6 Analysis of the hypotheses of the paper

✓ *Hypothesis No 1*

As has been indicated before, the first hypothesis of this paper was rejected. The first year of the audit firm change the detection of internal control weaknesses is lowered. As a result, the audit quality provided in the first year is lower than before the rotation according to the findings of the paper. The rejection of the hypothesis can be attributed to several reasons. To begin with, the previous study of *Fitzgerald et al. (2012),* that this paper was based on, has examined the effects of the rule on non-for profit organizations. As a consequence, this different characteristic between the two samples i.e. the search for profit, can play a significant role both in the way the internal control systems of companies are implemented and maintained but also, the way the organizations operate. Moreover, some of the previous studies that have been illustrated before like the ones of *Johnson et al. (2002), Knechel and Vanstraelen (2007) and Arrunada and Paz-Ares* have indicated a negative association

concerning the relationship that is examined so the results should not be regarded as non-expected. At last, another possible explanation that can be attributed to the negative result that has been indicated for the first hypothesis lies on the control variables that have been chosen for this model. There are numerous other factors that can play their one decisive role on the examined relationships such as the experience of both auditors and managers, the age of the company, the independence in mind of the auditors that perform the audit and many others that cannot be captured appropriately. As a result, all the above may have contributed to the rejection of the first hypothesis.

✓ *Hypothesis No 2*

On the other hand, the second hypothesis which was developed in a null form and stated that companies in different industries were no more likely to report internal control deficiencies in the first year of the tenure was accepted. This result indicates that even if we divide the selected companies that have experienced an audit firm change in different groups depending on the industry that operate in the result will be the same as the first hypotheses. Industry classification does not play a role in the audit quality provided. This relation has not been examined before, as far as I am familiar with, and as a result this finding should be examined in depth.

6.7 Summary

In this chapter, the results of the empirical analysis were illustrated. First, the summarized descriptive statistics were indicated with the mean, standard deviation, min and max of the observations presented. After, the tests for the two models were conducted in order the regression models to be tested for problems of autocorrelation and multicollinearity. Following, the Kernel density estimate was introduced and its results for the most important variables are illustrated in Appendix A. Moreover, the analysis for the model results is presented with the statistical importance of the association between the variables. At last, an analysis for the two hypotheses was presented so as an explanation of the results of the study to be provided.

CHAPTER 7 – Conclusion of the paper

7.1 Discussion

During December 2013, the European Union Council decided to change the rules concerning audit firm rotation. From the second quarter of 2014 the European-listed companies, banks and financial institutions are obliged to appoint new auditors after 10 years of continuous audit. This rule, while proposed in the United States of America by PCAOB in 2011, was at last rejected in 2013 (www.economia.icaew.com). The reasons for this choice can be attributed to the different characteristics that companies and audit firms that operate in the U.S.A environment have compared to those of companies and audit firms in Europe. It is obvious, that great significance to this choice has to be attributed to the Sarbanes-Oxley Act that has been imposed in the United States of America since 2002.

Through the years, various studies concerning audit firm rotation and audit quality provided have been illustrated (*Arrunada and Paz-Ares, Knechel and Vanstraelen Knechel et al., Myers et al.*), but none of them has achieved to identify whether an audit firm rotation rule would be beneficial for companies, audit firms and the audit profession itself. This can be attributed to many possible reasons. To begin with, each study has its own unique environment that it is held under and its unique sample, possibly derived from different countries. Moreover, each country has its own legal, ethical, cultural and political environment which can affect the outcome of the results. As a result, previous studies have reached to different outcomes.

In this paper, the main research question tried to shed some light on the relationship between an audit firm change and the audit quality provided and is presented below:

"Does mandatory audit firm rotation has an association with the quality of audits provided?"

In order to answer this main research question five sub-questions were formalized. The answers of them have tried to help the reader obtain a basic understanding of the main concepts that were developed in the study. So, the internal controls of a company were explained, and great emphasis was attributed to the Sarbanes-Oxley Act that was implemented in the U.S.A. in 2002. Moreover, the audit risk model and the role of auditors along with the quality of the audits that they provide were indicated so as the reader to have an understanding of how auditors work and which is their role. Then, the agency theory and the Limperg theory was analyzed as they are an important part of the audit quality provided and at last, findings of previous literature on the subject were illustrated in order all the possible aspects of this relationships to be covered.

Moreover, based on findings of previous literature, two hypotheses were developed. The first one, based on the previous study of *Fitzgerald et al. (2012)* indicated that the first year of an audit firm rotation audit quality would be improved. After extracting the results from the model, it was rejected. The second one, formulated in a null form, due to its uniqueness, stated that the distinction of companies in the sample into separate industries would not provide better audit quality after a change of audit firm was at last accepted.

This study contributes to the findings of previous researches in a unique way. This is because a new proxy for audit quality has been introduced. While previous researchers had use various measures to capture audit quality such as audit fees, audit firm size, audit failures, and many others, this study captures the effects of audit firm rotation using as a proxy the internal control deficiencies that auditors report under the section 404 of the Sarbanes-Oxley Act. This way of measuring audit quality as first used by *Fitzgerald et al. (2012)* provides new insights and extends previous literature studies in a way never examined before providing useful findings.

Internal control weaknesses are the best measure for audit quality in the U.S.A as both the managers of the companies and the auditors that conduct the audit are obliged to report on the internal controls' effectiveness of the company under

sections 302 and 404 of the Sarbanes-Oxley Act *(Hammersley, 2007).* As a result, the capability of an auditor to both detect and report an internal control deficiency in company's control systems can be considered as an indication of high audit quality.

In the current research, a sample of 4565 companies that operate in the U.S.A has been analyzed to answer the question whether a mandatory audit firm rotation rule should be imposed in the U.S.A, as has been done recently in Europe, or not. After implementing the appropriate research model and testing it for multicollinearity and autocorrelation problems, the results indicate a negative association of audit firm rotation and audit quality provided in the examined sample. As a result, in 2013 the American Congress seems to have taken the right choice as to not allow the rule to be implemented. Audit quality would not be improved by the rule. This result is in line with the suggestions of Deloitte and PriceWaterHouseCoopers in the U.S.A that were opposed to mandatory audit firm rotation.

Even after splitting the sample of companies into three different industries, the results seem to be the same. For agricultural and administration companies the change of the rule would not be beneficial and for the finance industry the result, although indicating a positive association, is not statistically significant. As a consequence, the outcome of this research indicates that mandatory audit firm rotation has a negative association with audit quality provided and this result is indifferent whether the discussion concerns different industries.

7.2 Limitations of the study

At last, this research as all those that concern empirical studies has limitations. To begin with, the sample of companies examined is small and the outcome may not be possible to be generalized to the general population of companies. As a result, the research suffers from problems of external validity. Also, the control variables that have been chosen for this study may are not enough. Other factors such as ethical characteristics of the country examined and the political and legal environment can play its own role for the success of the rule or not. Moreover, other company characteristics other than size and profitability can play their decisive role in the

implementation of proper information and control systems by companies. As an example, mergers and acquisitions can have an effect on the proper implementation of internal control systems and the right interpretation of their functions in complex organizations. Acquiring companies seem to have such problems more often *(Skaife et al. 2006).* Also the statistical problems that have been detected through the analysis of the models seem to impose problems to the validity of some results. The R squared and the adjusted R squared numbers seem to be quite small and what is more, multicollinearity problems have been detected when the sample was split into different industries.

7.3 Suggestions for further research

Further research could examine the effects of mandatory audit firm rotation on audit quality, using the same model, but also illustrating other important factors that can affect the outcome of the research. Examples of those can be the individual characteristics of the auditors, their high level of competence and ethical behavior and of course the unique characteristics of each county such as the legal environment, the ethical issues and the litigation risks for audit firms. Moreover, due to the fact that this research is the first one that examines the effects of an industry distinction of the sample, further research could be based on these results to explain better the different characteristics between the various industries, but also indicate whether this rule should be imposed in the U.S.A. for different industries that those examined.

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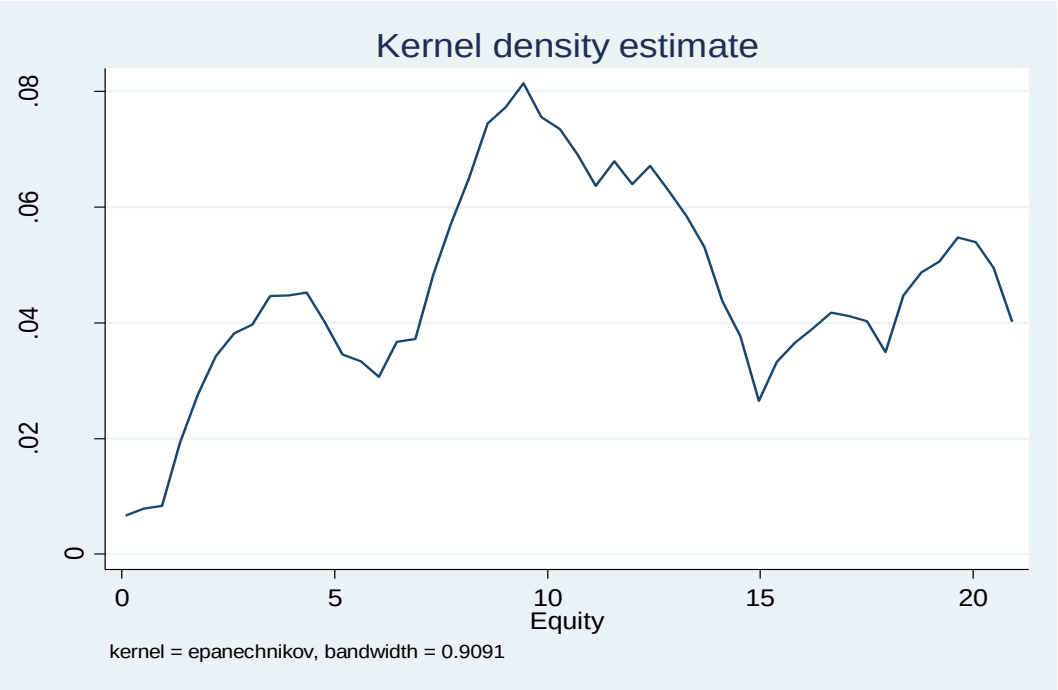
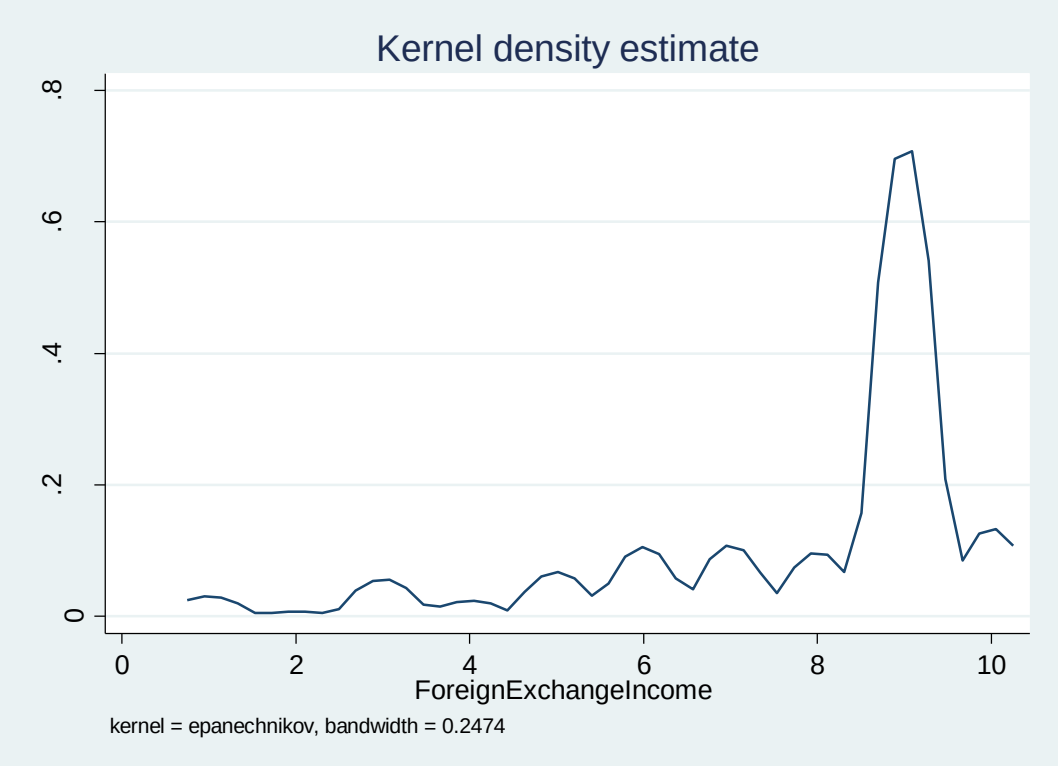
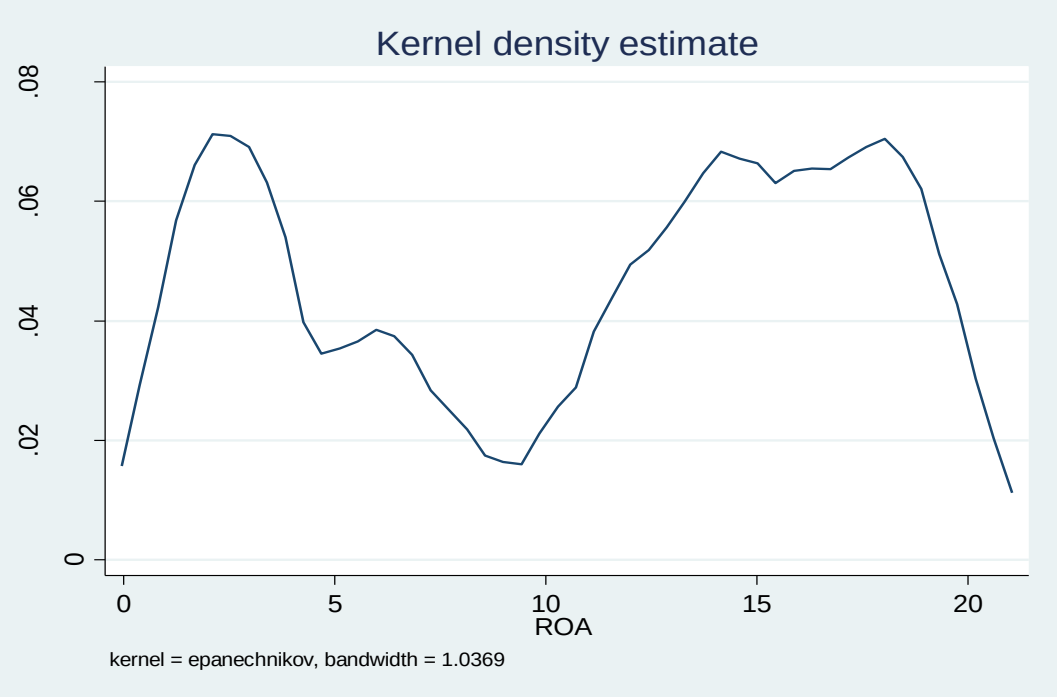
APPENDIX A

- **Kernel Density Estimates for model No1**



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.06
.08
0
5
10
15
20
ROA
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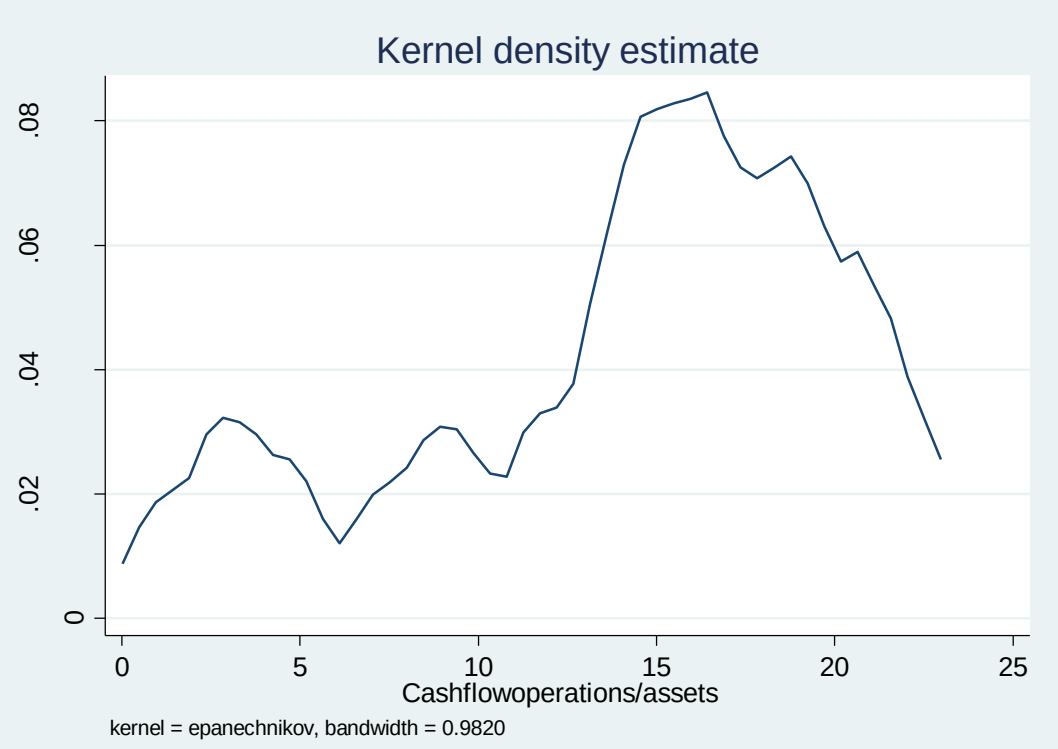
Kernel density estimate
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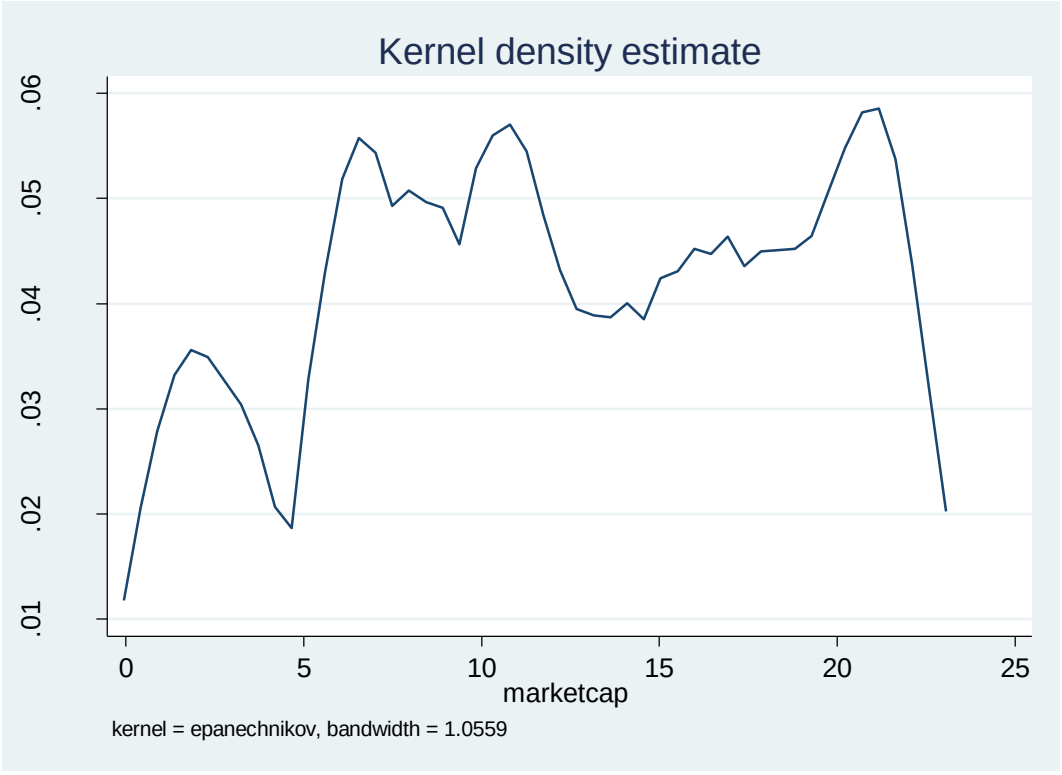
.04
.06
.08
0
5
10
15
20
25
Cashflowoperations/assets
kernel = epanechnikov, bandwidth = 0.9820


Kernel density estimate
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.02
.03
.04
.05
.06
0
5
10
15
20
25
marketcap
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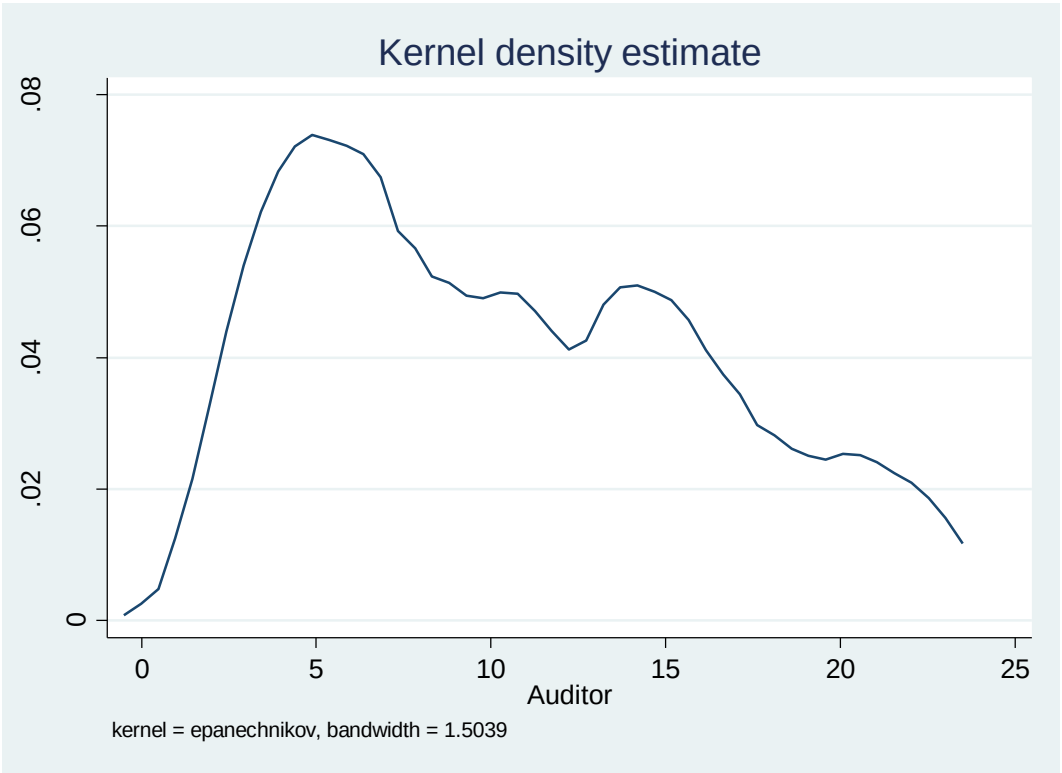
Kernel density estimate
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.02
.04
.06
.08
0
5
10
15
20
25
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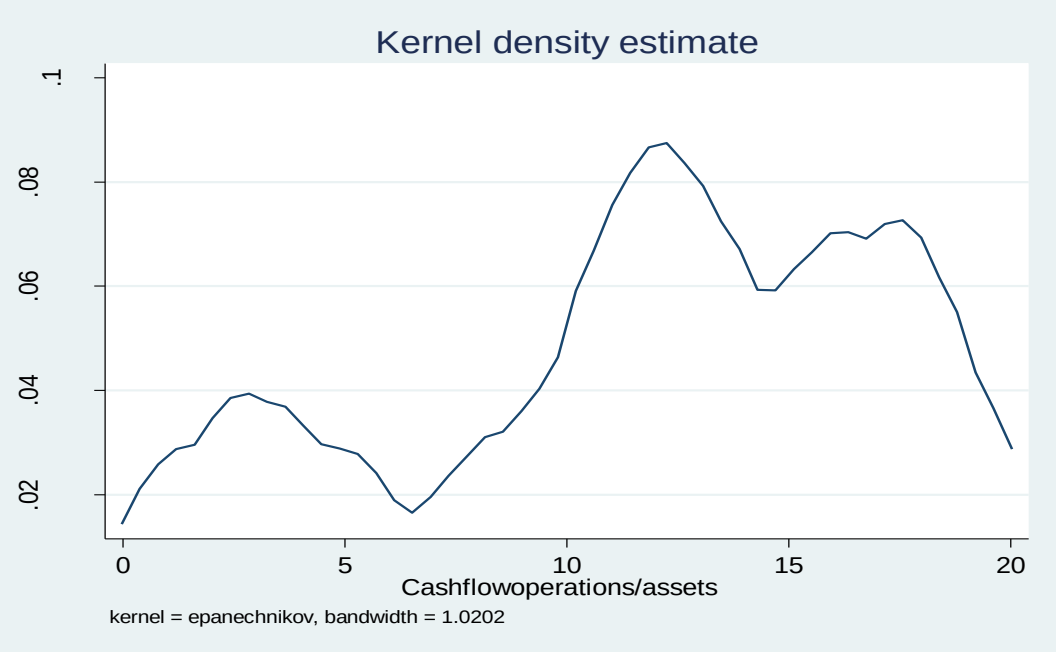
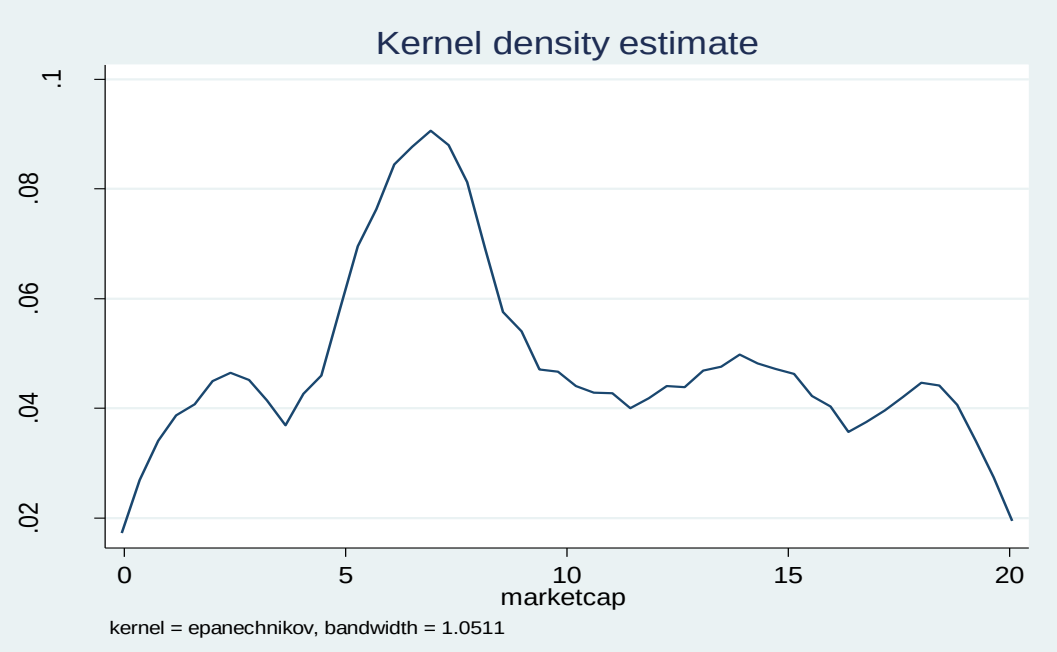
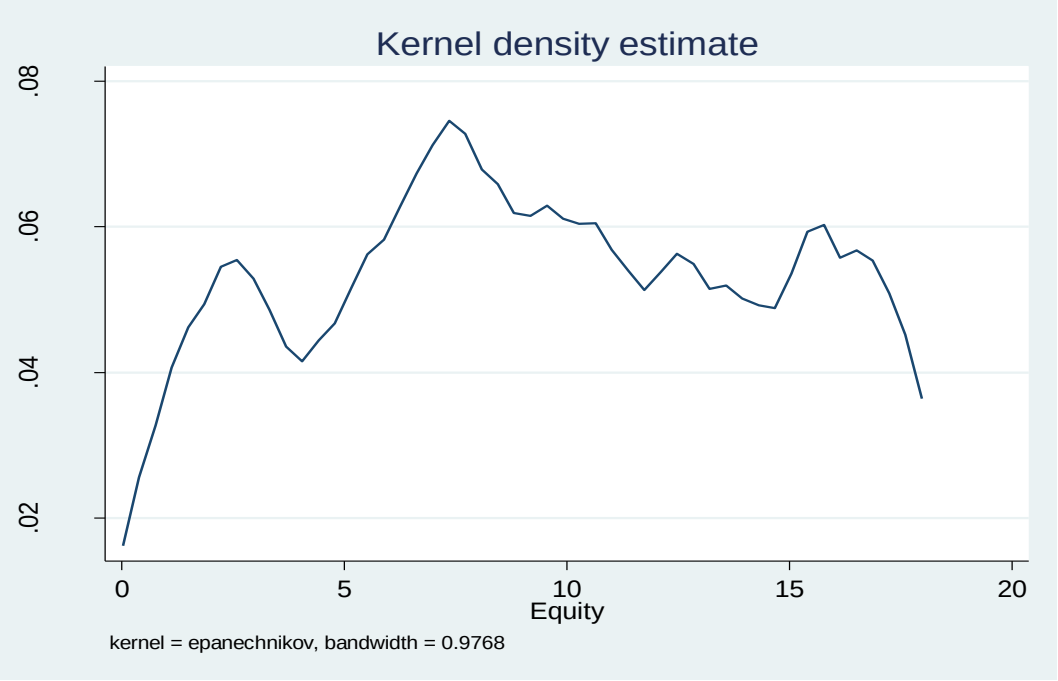
- **Kernel Density estimates for model No 2**

✓ **Agricultural industry**



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.04
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5
10
15
20
Equity
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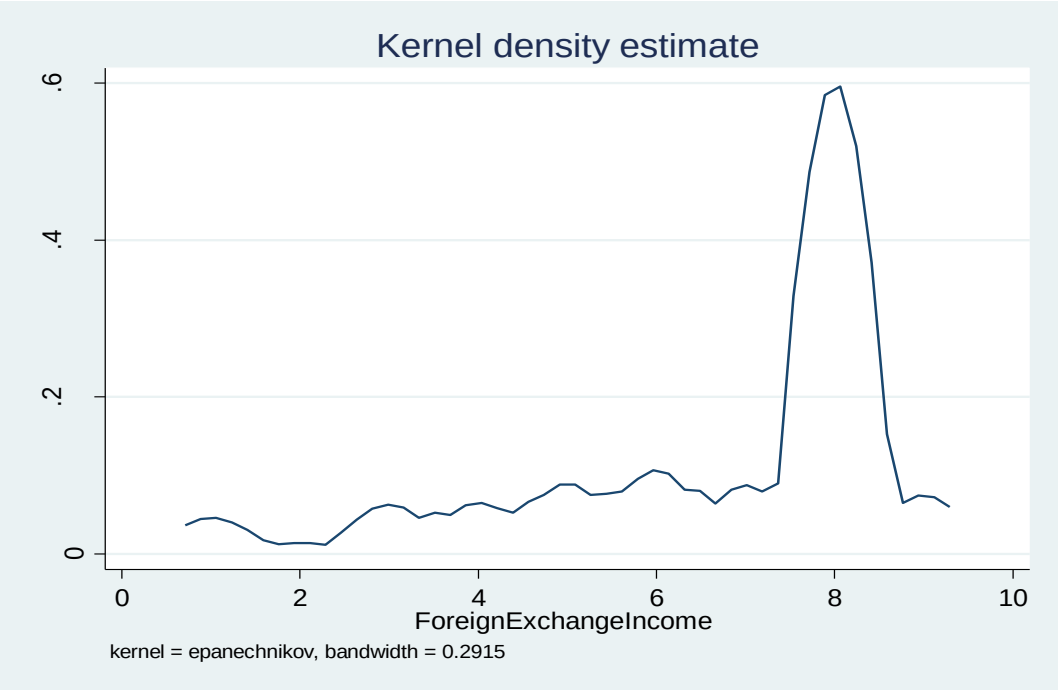
Kernel density estimate
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.2
.4
.6
0
2
4
6
8
10
ForeignExchangeIncome
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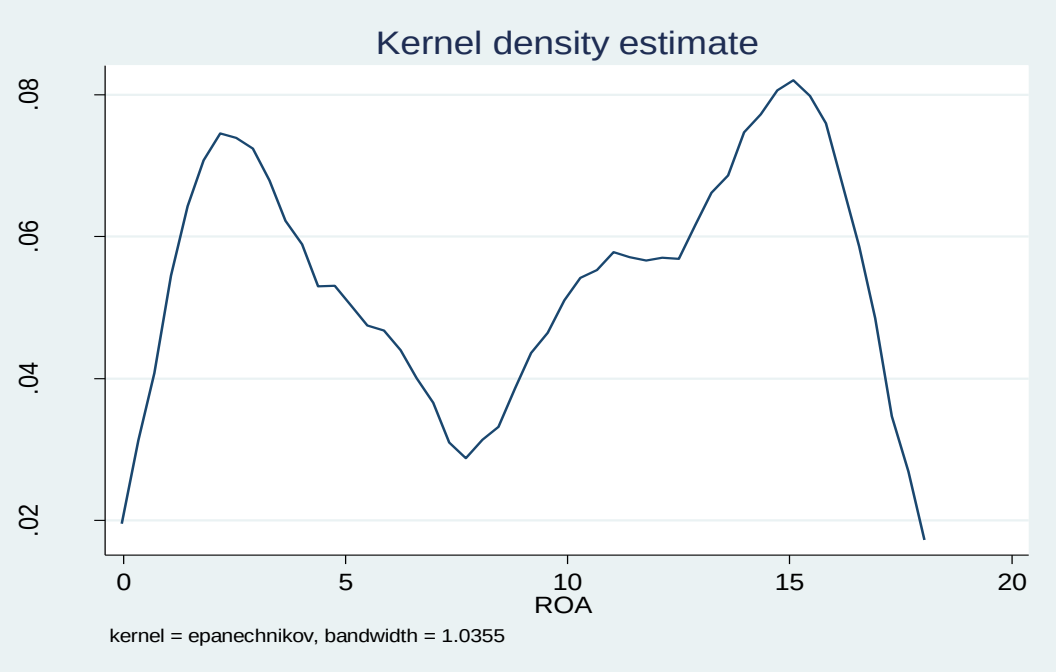
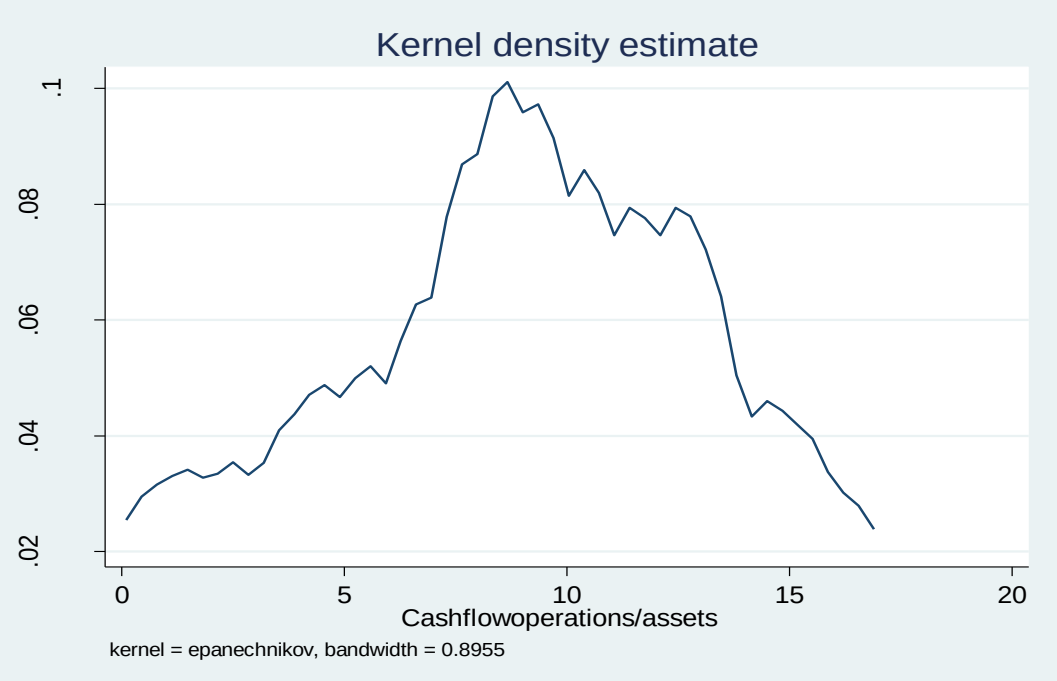
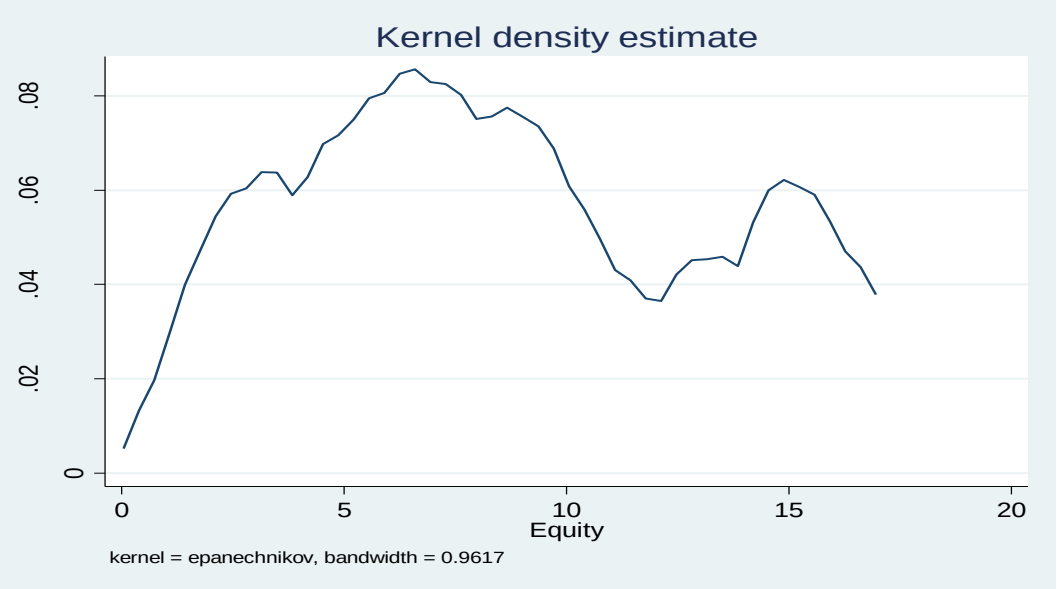


✓ **Finance industry**




Kernel density estimate
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.02
.04
.06
.08
0
5
10
15
20
Equity
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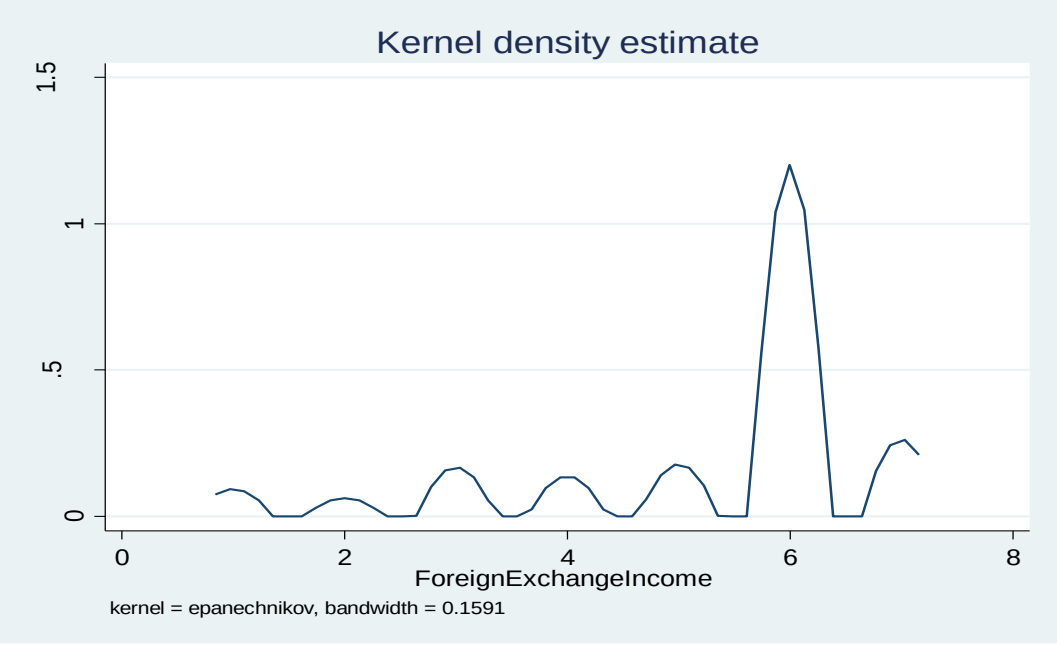
Kernel density estimate
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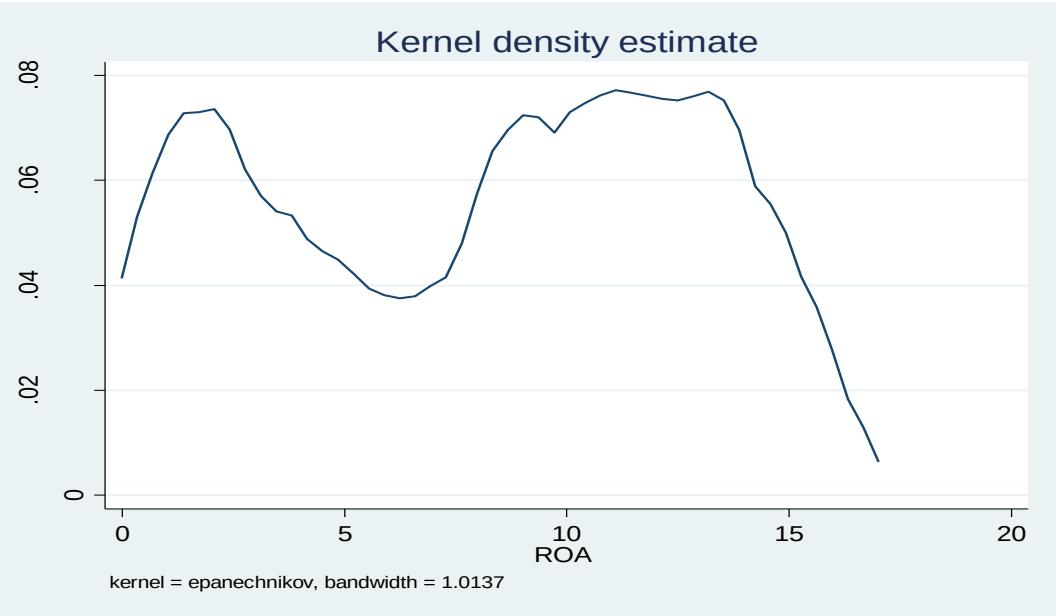
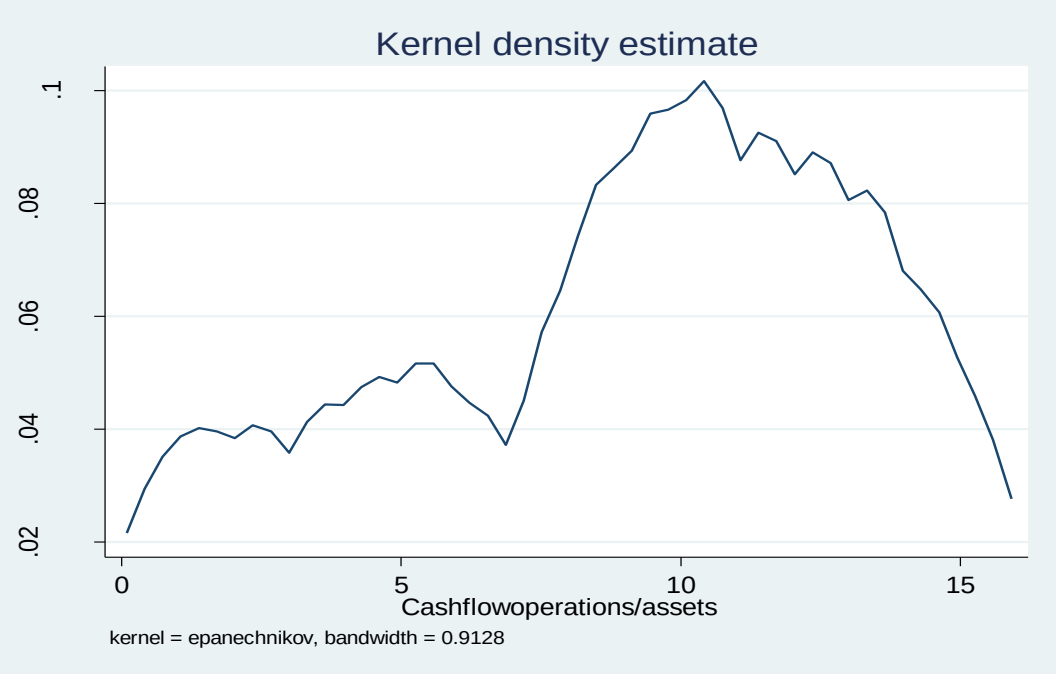
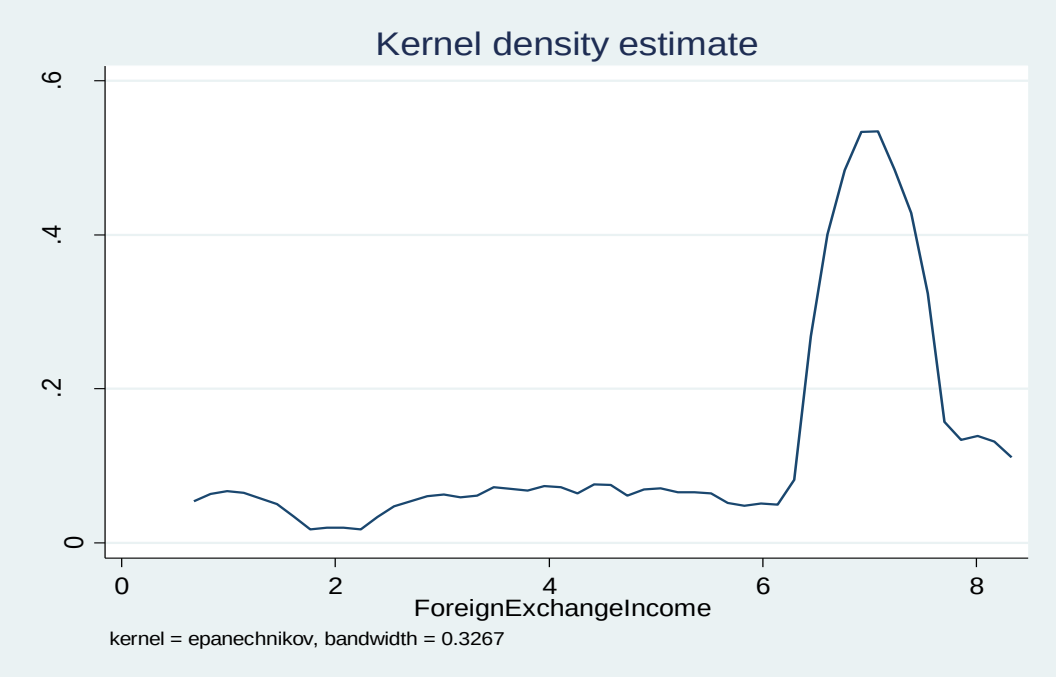
.5
1
1.5
0
2
4
6
8
ForeignExchangeIncome
kernel = epanechnikov, bandwidth = 0.1591



✓ Administration industry




Kernel density estimate
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.4
.6
0
2
4
6
8
ForeignExchangeIncome
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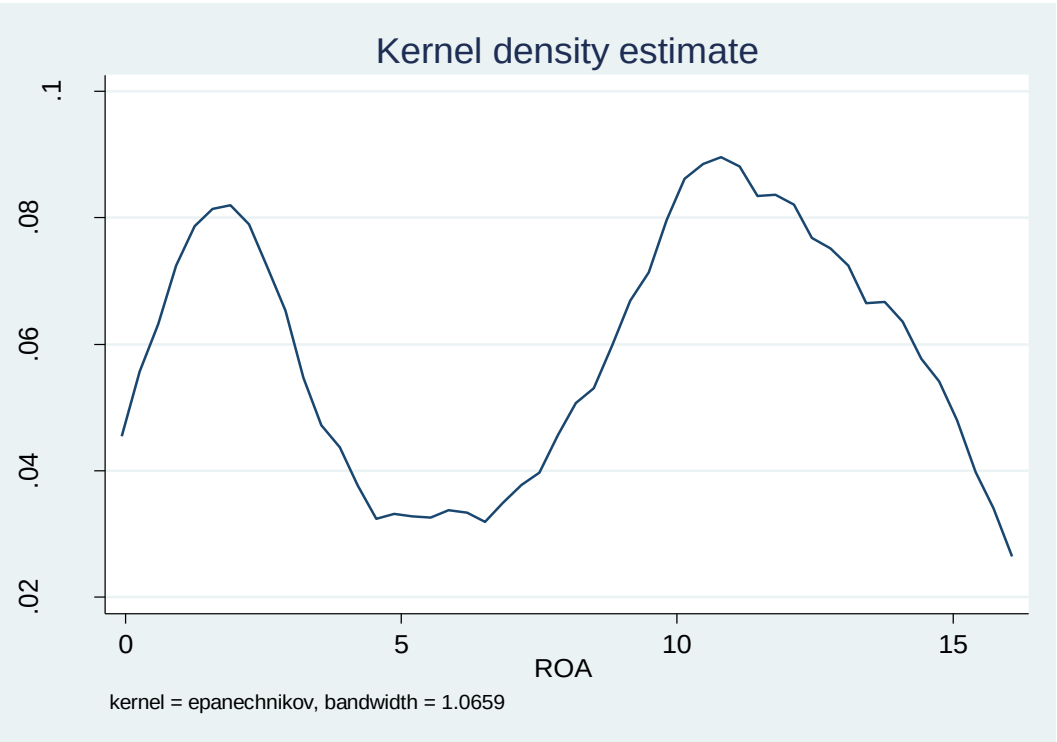
Kernel density estimate
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.04
.06
.08
.1
0
5
10
15
ROA
kernel = epanechnikov, bandwidth = 1.0659

Appendix B

- ## Results of first regression

Source	SS	df	MS		
Model	11.5396833	6	1.92328054	Number of obs =	4565
Residual	401.308948	4558	.088044964	F(6, 4558) =	21.84
				Prob > F =	0.0000
Total	412.848631	4564	.090457632	R-squared =	0.0280
				Adj R-squared =	0.0267
				Root MSE =	.29672

Issueinternalcontrolsre~e	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Auditorfirmchange	-.0080236	.0011593	-6.92	0.000	-.0102963	-.0057509
Equity2	.0068342	.0014106	4.84	0.000	.0040688	.0095997
ForeignExchangeIncome2	.0055185	.0029017	1.90	0.057	-.0001703	.0112072
ROA2	.0080988	.0010885	7.44	0.000	.0059648	.0102329
Cashflowoperationsassets2	-.0105699	.0011699	-9.04	0.000	-.0128634	-.0082763
marketcap2	-.0034693	.0008948	-3.88	0.000	-.0052235	-.0017151
_cons	.1795942	.0202232	8.88	0.000	.1399469	.2192416

- ## VIF Multicollinearity of the first regression

```
. vif
```

Variable	VIF	1/VIF
Equity2	3.06	0.326611
Auditorfir~e	2.73	0.366928
Cashflowop~2	2.46	0.406972
ROA2	2.37	0.421602
ForeignExc~2	1.91	0.522562
marketcap2	1.66	0.601730
Mean VIF	2.37	

- ## Autocorrelation of the first regression

Durbin-Watson d-statistic (7, 4565) = 1.888121

- **Results of the second regression**

✓ Agricultural industry

Source	SS	df	MS
Model	3.17935094	6	.529891824
Residual	174.512689	2003	.087125656
Total	177.69204	2009	.088448004

Number of obs = 2010
F(6, 2003) = 6.08
Prob > F = 0.0000
R-squared = 0.0179
Adj R-squared = 0.0150
Root MSE = .29517

Issueinternalcontrolsre~e	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Auditorfirmchange	-.0049087	.0018146	-2.71	0.007	-.0084675	-.00135
Cashflowoperationsassets2	-.0109111	.0021027	-5.19	0.000	-.0150348	-.0067874
marketcap2	-.0010492	.0015761	-0.67	0.506	-.0041402	.0020417
Equity2	.0065924	.0022181	2.97	0.003	.0022424	.0109424
ForeignExchangeIncome2	.0022487	.0043889	0.51	0.608	-.0063586	.010856
ROA2	.0099398	.0019506	5.10	0.000	.0061143	.0137653
_cons	.1162586	.0270557	4.30	0.000	.0631983	.1693188

✓ VIF Multicollinearity

Variable	VIF	1/VIF
Cashflowop~2	2.88	0.347388
Equity2	2.80	0.357121
Auditorfir~e	2.60	0.385261
ROA2	2.43	0.410890
ForeignExc~2	1.89	0.528898
marketcap2	1.64	0.610818
Mean VIF	2.37	

✓ Autocorrelation

Durbin-Watson d-statistic (7, 2010) = 1.800894

✓ Finance industry

Source	SS	df	MS
Model	7.58093355	6	1.26348892
Residual	123.530863	1290	.095760359
Total	131.111796	1296	.10116651

Number of obs = 1297
F(6, 1290) = 13.19
Prob > F = 0.0000
R-squared = 0.0578
Adj R-squared = 0.0534
Root MSE = .30945

Issueinternalcontrolsre~e	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Auditorfirmchange	.0068114	.0065309	1.04	0.297	-.0060009	.0196237
Cashflowoperationsassets2	-.0144627	.0033895	-4.27	0.000	-.0211122	-.0078132
marketcap	-1.59e-11	5.56e-12	-2.86	0.004	-2.68e-11	-4.98e-12
equity2	-.010495	.0073387	-1.43	0.153	-.0248921	.0039021
ForeignExchangeIncome2	-.0300709	.0096412	-3.12	0.002	-.0489851	-.0111568
ROA2	.0120361	.0034383	3.50	0.000	.0052907	.0187814
_cons	.364002	.0628758	5.79	0.000	.2406521	.487352

✓ VIF Multicollinearity

Variable	VIF	1/VIF
equity2	14.64	0.068329
Auditorfir~e	12.20	0.081953
marketcap	5.96	0.167856
ROA2	3.57	0.280165
ForeignExc~2	2.94	0.339963
Cashflowop~2	2.71	0.369396
Mean VIF	7.00	

✓ Autocorrelation

Durbin-Watson d-statistic (7, 1297) = 1.88618

✓ Administrative industry

Source	SS	df	MS
Model	3.6413518	6	.606891967
Residual	85.0833624	1130	.075295011
Total	88.7247142	1136	.078102741

Number of obs = 1137
F(6, 1130) = 8.06
Prob > F = 0.0000
R-squared = 0.0410
Adj R-squared = 0.0359
Root MSE = .2744

Issueinternalcontrolsre~e	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Auditorfirmchange	-.0067768	.0018615	-3.64	0.000	-.0104293	-.0031244
ROA2	.0055712	.0020826	2.68	0.008	.001485	.0096574
Equity	-7.48e-09	2.59e-09	-2.88	0.004	-1.26e-08	-2.39e-09
ForeignExchangeIncome2	.0004942	.0060937	0.08	0.935	-.0114621	.0124505
marketcap	2.91e-11	1.01e-11	2.89	0.004	9.36e-12	4.89e-11
Cashflowoperationsassets2	-.0109708	.003221	-3.41	0.001	-.0172906	-.004651
_cons	.2001073	.0333128	6.01	0.000	.1347455	.2654691

✓ VIF Multicollinearity

Variable	VIF	1/VIF
marketcap	23.14	0.043214
Equity	22.21	0.045032
cashflowop~2	2.69	0.372219
ForeignExc~2	2.21	0.452819
ROA2	1.53	0.652998
Auditorfir~e	1.07	0.938801
Mean VIF	8.81	

✓ Autocorrelation

Durbin-Watson d-statistic (7, 1137) = 1.780177