



INTERNATIONAL
HELLENIC
UNIVERSITY

*The Relationship of the Internal Audit with
the Internal Control System and the Effect
of its Components on US Banking Sector*

Malisiovas Theodoros

**SCHOOL OF ECONOMICS, BUSINESS ADMINISTRATION & LEGAL
STUDIES**

A thesis submitted for the degree of

**Master of Science (MSc) in International Accounting, Auditing and Financial
Management**

May 2019

Thessaloniki-Greece

Student Name: **Malisiovas Theodoros**
SID: **1107170013**
Supervisor: **Dr. Andreas Koutoupis**

I hereby declare that the work submitted is mine and that where I have made use of another people's work, I have attributed the source(s) according to the Regulations set in the Student's Handbook.

ACKNOWLEDGMENTS

Writing this master thesis to obtain my master's degree in International Accounting, Auditing and Financial Management was not just a process of a few months. It was an effort of many months which took place in different places of Europe due to my work obligations and it was an effort where without the support of many people, it would be very difficult to achieve this target.

Firstly, I would like to express my sincere gratitude to my academic Supervisor Dr. Andrea Koutoupi for his assistance and his guidance throughout this period until the very end of this dissertation. Moreover, I am grateful to my family for the encouragement and for the fact that they gave me the opportunity to gain this experience. Additionally, I would like to thank all the people who contributed with their way in the accomplishment of this study. Finally, I would like to thank the staff of the International Hellenic University for their help during the whole period of this Master.

ABSTRACT

This dissertation was written as part of the MSc in International Accounting, Auditing and Financial Management at the International Hellenic University.

The purpose of this study is twofold. Firstly, through a theoretical research to provide the role of the internal audit and the relationship with the internal control system and then by a strongly quantitative research to investigate whether the components of the internal control system affect the profitability, the riskiness and the compliance of US banking sector. Specifically, the second objective of this study is unconventional since most of the studies in this field up to now investigate these topics by theoretical approaches and qualitative researches. To this direction, based on COSO Framework, on Basel Committee Frameworks and on the literature, the components of the internal control system were quantified via 8 independent variables. Moreover, 3 more bank's characteristics were included. These 11 independent variables were analyzed in three different regression models, with the credit risk, the profitability and the compliance being the dependent variable in each model. After cleaning the data from outliers, several tests were performed, while a panel set of data was used comprising by the 210 biggest Bank Holding companies. The Fixed-effects regression was applied in the three models, while the years under examination were the 5 fiscal years 2013-2017. The results indicated that all five components of internal controls have a significant effect on the credit risk of the banks. As for the other two models, the research showed that the components of the internal control system significantly affect the profitability and the compliance of US banks, except from the Risk Assessment component in the first case, and the Control Environment component in the second case respectively. Finally, the size, the age and the external audit of the banks were taken into consideration for a more comprehensive study.

Key words: Internal Audit, Internal Control System, US Banks, COSO Framework, Credit Risk, Profitability, Compliance

Table of Contents

ACKNOWLEDGMENTS	2
ABSTRACT.....	3
LIST OF TABLES	5
LIST OF FIGURES.....	6
CHAPTER 1- INTRODUCTION	7
CHAPTER 2- LITERATURE REVIEW	13
CHAPTER 3- VARIABLES AND RESEARCH HYPOTHESIS.....	17
3.1- <i>DEPENDENT VARIABLES</i>	17
3.2- <i>INDEPENDENT VARIABLES</i>	20
CHAPTER 4- RESEARCH DESIGN-METHODOLOGY	28
4.1- <i>SAMPLE AND DATA COLLECTING PROCESS</i>	28
4.2 <i>EMPIRICAL MODELS</i>	29
4.3 - <i>DESCRIPTIVE STATISTICS</i>	33
4.4- <i>CORRELATION MATRIX</i>	36
4.5- <i>ESTIMATION MODEL-TESTS</i>	37
CHAPTER 5 – EMPIRICAL RESULTS	40
5.1 – <i>DEPENDENT VARIABLE-CREDIT RISK</i>	40
5.2 – <i>DEPENDENT VARIABLE-PROFITABILITY</i>	43
5.3 – <i>DEPENDENT VARIABLE-COMPLIANCE</i>	46
CHAPTER 6- CONCLUDING REMARKS	49
6.1 – <i>RESEARCH CONCLUSIONS</i>	49
6.2 – <i>RESEARCH LIMITATIONS</i>	52
6.3 – <i>RESEARCH SUGGESTIONS</i>	52
REFERENCES	53
APPENDIX	66

LIST OF TABLES

<i>Table 1- Description of Variables</i>	32
<i>Table 2- Descriptive Statistics</i>	33
<i>Table 3- Descriptive Statistics (After cleaning the data)</i>	34
<i>Table 4- Correlation Matrix (After cleaning the data)</i>	37
<i>Table 5- Regression analysis- Model 1: Credit Risk</i>	42
<i>Table 6- Regression analysis- Model 2: Profitability</i>	45
<i>Table 7- Regression analysis- Model 3: Compliance</i>	48
<i>Table 8- Breusch-Pagan Lagrange multiplier (LM) random effects- Credit Risk</i> . 66	
<i>Table 9- Breusch-Pagan Lagrange multiplier (LM) random effects- Profitability</i> 66	
<i>Table 10- Breusch-Pagan Lagrange multiplier (LM)random effects-Compliance</i> 67	
<i>Table 11- F-test – Credit Risk</i>	67
<i>Table 12- F-test – Profitability</i>	67
<i>Table 13 – F-test – Compliance</i>	68
<i>Table 14- Hausman test- Credit Risk</i>	68
<i>Table 15- Hausman test- Profitability</i>	69
<i>Table 16- Hausman test- Compliance</i>	69
<i>Table 17- Modified Wald Test- Credit Risk</i>	70
<i>Table 18- Modified Wald Test- Profitability</i>	70
<i>Table 19- Modified Wald Test- Compliance</i>	70
<i>Table 20- Wooldridge test- Credit Risk</i>	71
<i>Table 21- Wooldridge test- Profitability</i>	71
<i>Table 22- Wooldridge test- Compliance</i>	71
<i>Table 23- VIF</i>	72
<i>Table 24- Pesaran’s test- Credit Risk</i>	72
<i>Table 25- Pesaran’s test- Profitability</i>	72
<i>Table 26- Pesaran’s test- Compliance</i>	72

LIST OF FIGURES

<i>Figure 1- COSO Cube</i>	12
<i>Figure 2- Box Plot</i>	34

CHAPTER 1- INTRODUCTION

Based on the history, the financial crisis which started almost ten years ago is not the only crisis that the world has faced, and probably will not be the last one. Consequently, banks have been affected to a large extent and many weaknesses have been revealed in the banking sector. The recent financial crisis started from the US housing market and through the securitization process, this crisis has spread worldwide and not just in the US and in the banks, but also in the insurance companies (Batrancea et al., 2013). The US banking industry has faced several bank collapses. The Federal Deposit Insurance Corporation (FDIC) disclosed 528 failed banks the last ten years (2008-2017), 465 of which being from 2008-2012.

Many researches stated that the current financial turbulence was caused by banks' problems regarding risk management and mainly credit risk and liquidity risk. Basel Committee on Banking Supervision decried banks for their risk management tools due to their dependence on historical statistical relationships that are widely known and constant (EIBannan, 2017). In the same line Koutoupis and Tsamis (2009) concluded that Greek Banking Credit Institutions ignore most regulations and, although internal audit approach takes into consideration the various risks, it does not estimate and manage them. The objective of Basel Committee on Banking Supervision (BSBS) is to improve the quality of banking supervision and to enhance the understanding of key supervisory issues. Nevertheless, it is claimed that Basel I and Basel II were not eligible to prevent the subsequent banking crisis, but contrariwise they contributed to it (Hartman, 2010). Therefore, in response to the financial crisis, a set of measures named "Basel III" was developed by BSBS. The main improvements of BASEL III referred to three areas: Bank capital, leverage and liquidity.

The widespread economic crisis and the huge need for a stable banking system render the role of Internal Audit of paramount importance. The Institute of Internal Auditors

CIIA (September 2013, pp. 4) define Internal Auditing as “an independent, objective assurance and consulting activity designed to add value and improve an organization’s operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes”. Internal auditing constitutes a powerful tool for banks in order to find the optimal point between risk, value and cost.

Banking supervision is strongly related with the internal audit department. It is crucial that banks supervisors assess the work of the bank’s internal audit department and they recognize areas of potential risk based on this work. The work of the internal audit department can be used as a proof for the quality of bank’s internal controls (BCBS, July 2000). Specific guidelines for internal audit are provided on the “Corporate Governance Principles for Banks” (BCBS, July 2015). The three lines of defense in an organization are the well-defined organization responsibilities for risk management. The internal audit function consists the third line and is independent from the first and second lines of defense. The role of the internal audit function is to provide independent assurance regarding the effectiveness and the quality of the bank’s internal control system, the first and the second line of defense and the risk governance framework. There should be enough standing, skills, resources and authority within the bank to enable the auditors to carry out their assignments effectively and objectively. However, the board and the senior management should also contribute to the effectiveness of the internal audit and promote the independence of its function.

As it was mentioned before, banks deal with high level of risk and in many cases with fraudulent actions. The proper operation of internal audit must be top listed in the business plan of the modern banking institutions. Internal audit plays a major role in order to tackle the different types of banks’ fraud (Vousinas, 2015). Internal audit is indispensable and has become one of the most influential and value-added function within banks (Kristo, 2013). Additionally, the research which took place in Turkish banking sector (Kepekci, 1989) revealed that the importance of banks’ audits is increased

in the last decades, and the size of the banks affects the number of the internal auditors. Finally, Zinca (2016, pp.1023) mentioned that “the value added of internal audit is also based on its contribution to reducing the risk of losses and to improving the risk profile of credit institutions”.

The relationship between the internal audit and internal controls in the banking sector is fully described by the “Framework For Internal Control Systems In Banking Organizations” (BCBS, September 1998). The internal audit function constitutes a part of the monitoring of the system of internal controls. Internal auditors should conduct reviews and other forms of monitoring in order to inform the board or the management for internal control weaknesses. The effectiveness of the Internal Control System (ICS) must be audited by independent, appropriately trained and competent staff. The internal audit function provides an independent assessment of the compliance with, and the adequacy of, the established procedures and policies and for this reason it constitutes a pillar of the continuous monitoring of the system of internal controls. Finally, in the same framework of BCBS (September 1998, pp.21) it is highlighted that “The frequency and extent of internal audit review and testing of the internal controls within a bank should be consistent with the nature, complexity, and risk of the organization’s activities”.

The role of the internal auditor when reviewing the effectiveness of the internal control system is to ascertain whether it is functioning as intended (Fadzil et al., 2005). Additionally, in the same research (2005, pp. 848) it is written that “the internal auditor should review the accuracy and reliability of financial and operating information and provide appraisals with recommendations regarding administration management established objectives and goals for operations and programs”. Finally, an internal audit function is strongly correlated with the success of the organization and the proper function of the internal control system.

In the last two paragraphs it is made mention of the relationship of internal audit with the internal control system, mainly through the fifth component, the monitoring. The role of internal controls cannot be undermined in the banking sector since banks, which are pillars for the economic development of a nation, are now being characterized by economic instability, slow growth and fraudulent actions (Enofe et al., 2013). But let's clarify the definition of internal controls, which are going to be examined in this research. In the Integrated Framework about Internal Control, COSO (May 2013, pp. 3) it is defined that "Internal control 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 relating to operations, reporting, and compliance." The Framework also provides the three categories of objectives which represent different aspects of internal control:

A) OPERATIONS OBJECTIVES: These concern the efficiency and the effectiveness of the entity's operations, including operational and financial performance goals and safeguarding assets from loss.

B) REPORTING OBJECTIVES: These concern internal and external financial and non-financial reporting and may contain timeliness, transparency, reliability or other issues as were established by entity's policies, regulations, or recognized standard setters.

C) COMPLIANCE OBJECTIVES: These are about the laws and regulations to which the entity should comply with.

Additionally, COSO Framework refers to the five integrated components of internal control, on which the following research will be based (May 2013, pp.4-5). These are:

1) CONTROL ENVIRONMENT: It comprises a set of standards, processes and structures that provide the basis for carrying out internal controls across the organization. It includes:

- Ethical values and integrity
- Commitment to Competence
- Board of Directors and their responsibilities
- Organizational structure
- HR policies and procedures

2) RISK ASSESSMENT: It comprises a dynamic process in order to identify and assess risks to the achievement of objectives. It includes:

- Company's objectives and risks related to them
- Risks identification and analysis
- Impact of possible changes

3) CONTROL ACTIVITIES: It comprises the actions established through policies and procedures for the mitigation of risk and the achievement of objectives. It includes:

- All the levels of the entity
- Preventive or detective nature
- Manual and automated activities
- Segregation of duties

4) INFORMATION AND COMMUNICATION: Information is important for carrying out responsibilities in order to enhance objectives' achievement while communication constitutes the continual iterative process of providing, sharing and obtaining necessary information. It includes:

- Internal and External communication
- Quality of Information
- Effectiveness of communication

5) MONITORING ACTIVITIES: Ongoing, separate or some combination of these two evaluations are used to ensure each of the five components is present and functioning. This component includes:

- Provision of timely information from ongoing evaluations
- Variation on scope and frequency of separate evaluations
- Evaluation of findings based on criteria
- Communication of deficiencies

Finally, the relationship between these components, the three objectives and the organizational structure of the entity is depicted below in the 3D cube.

Figure 1- COSO Cube



CHAPTER 2- LITERATURE REVIEW

As already mentioned, an effective internal control system constitutes a pillar for enhancing bank's efficiency, profitability and risk reduction. Consequently, there have been many researches and interesting approaches focusing on internal control system. For the purpose of our research we will try to focus on the most relevant researches to this dissertation, starting with a briefly review about internal audit and internal controls and proceeding with the literature focused on the relationship between internal controls and organizations' risk and efficiency. Finally, it is important to mention that there are no researches for the impact of internal controls on the bank's compliance, something which firstly is going to be investigated in this research.

Karagiorgos et al. (2010) used questionnaires to examine the effectiveness of internal control system in Greek banking sector. The results indicate that the success of internal auditing is strongly related with the five elements of internal control system. However, except from the fifth component, the Monitoring, on the other four components further improvement can be achieved.

In the same line, one year later, (Karagiorgos et al.,2011) again via the use of questionnaires tried to examine the interaction of internal control system and internal auditing in Greek hotel business. Through the connection of internal audit and internal control system, they arrived at the conclusion that all the components of internal control system are highly rated, and they are crucial for the success of the industry.

Enofe et al. (2013) investigated the relationship between internal control system and audit work in banking sector in Nigeria. Via interviews and questionnaires, it was revealed that an effective internal control system has a great influence on bank's operation and on the quality of audit work, and consequently stated that it is of paramount importance to be employed by the management of every organization.

Fadzil et al. (2005) in order to examine the effects of the internal audit practices on the quality of the internal control system, they used two set of questionnaires. The results indicate that management of the internal audit department and the performance of the internal auditing practices positively influences the Monitoring aspect, the Control environment aspect and the Control Activities aspect of the quality of the internal control system. On the other hand, the scope of work of the internal auditing practices and the management of the internal audit department negatively influences the Information and Communication aspect and the Risk Assessment aspect respectively, of the quality of the internal control system.

More recently, Al-Thuneibat et al. (2015) examined the impact of internal control system on the profitability of Saudi shareholding companies. By using questionnaires and data from the financial statements, they concluded that the internal control system and it's component significantly and positively affect ROA and ROE, while the effect on EPS and PM is positive but statistically insignificant. Similarly, Bett and Memba (2017) stated that Control Environment, Risk Assessment and Information have a significant influence on the company's financial performance.

Ayagre et al. (2014) through an extensive research in all banks of Ghana, they used questionnaires to examine the effectiveness only of the two components of internal control system (Control Environment and Monitoring) and they concluded that strong controls exist in these two components of ICS of Ghana's Banks. Moreover, in a research which took place also in Ghana, Ibrahim et al. (2017) examined the impact of ICS on financial performance of health institutions. The answers of the correspondents indicate the strong relationship between internal controls and financial performance, especially of the three of five components. (Control Activities, Internal Audit and Monitoring.)

Four years ago, Onumah et al. (2015) via the annual reports of listed firms on the Ghana Stock Exchange, categorized 23 items under the five components of internal control system in order to measure the level of internal control effectiveness. The result indicates

that Control Environment had the highest level of effectiveness among the five components and Control Activities and Monitoring the worst performance. Thus, there was room for improvement in these two components of internal controls.

Likewise, Sultana and Haque (2011) evaluated the internal control structure of Bangladesh's banks. The results stemmed from questionnaires and interviews indicated that all components of control objectives were achieved in a greater extent with a minimum deviation regarding the achievement of these.

Niyonsenga and Abuya (2017) examined the effect of internal control system on financial institutions in Rwanda. By using questionnaires, they concluded that internal control system is strongly related with financial performance. They also mentioned that ICS contributes to risk management process and its contribution increased in gross loan/equity, increased bank asset, increased profitability and capital.

Bayyoud and Sayyad (2015) conducted a study in order to analyze the impact of internal control and risk management on banks in Palestine. By distributing a structured survey questionnaire in managers and administrative level personnel of banks, they stated that ICS helped banks to limit their risk limits and assess these periodically. Additionally, positive quantitative and qualitative impacts in banks' profits were achieved as well as overall performance.

Akwaa-Sekyi and Moreno Gent (2016) examined the relationship between credit risk and internal controls of Spanish banks. Through a quantitative approach they used a number of variables strongly related with the five components of COSO framework and they concluded that internal controls are in place in Spanish banking sector, but their effectiveness cannot be guaranteed. Moreover, they stated that four out of five

components significantly influence credit risk and the non-disclosure of material internal control weaknesses significantly influences the effectiveness of ICS.

In the same line, one year later Akwaa-Sekyi and Moreno (2017) performed a similar research in order to examine the relationship between internal controls and credit risk in European banks. They stated that the European banking sector has effective internal control systems due to the achievement of objectives like operational performance and compliance, and that internal controls significantly affect credit risk.

Finally, Vu (2016) in an attempt to investigate the factors which affect the effectiveness of internal control systems in commercial Banks, he performed interviews and came to the conclusion that except from the five components of COSO there are also two additional factors which have an impact on internal controls, political institutions and interest groups.

CHAPTER 3- VARIABLES AND RESEARCH HYPOTHESIS

For the purpose of our research, in order to gain a more holistic view about the interaction of internal controls and banking sector, we will investigate the effect of the components of internal control system on the profit, the risk and the compliance of US banking sector. Thus, we are going to use a quantitative approach and use three regression models, where the independent variables will be derived from the five components of COSO framework and the dependent variables of the three models will be credit risk, Net Interest Margin (NIM) and Total Capital Ratio (CAR) respectively. Finally, three more bank's characteristics is going to be included in the models.

3.1- DEPENDENT VARIABLES

Credit Risk

There are four main risks every bank faces these days. These are credit, market operational and liquidity risk. The majority of banking problems are strongly related to loose credit standards for counter parties and borrowers, poor risk management practices and lack of attention to changes in economic circumstances that could have an impact on the credit standing of a bank's borrowers (BCBS, September 2000). Additionally, the same framework of Basel Committee (September 2000, pp.1) defines credit risk as "the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms". Financial crisis of 2008 affected to a large extent the activity of banking- loaning making the debtors unable to repay their obligations. Thus, banks faced a huge danger and the expansion of loss provisions knocked on the banks' door (Cibulskiene and Rumbauskaitė, 2012). In the same year, Kolapo et al. (2012) recommended that banks in Nigeria should pay more attention to credit analysis and loan administration while the regulatory authority should focus on banks' compliance to relevant provisions. They also stated that an increase in non-performing loan by 100 percent, reduces profitability by about 6,2 percent. Moreover, the credit and the operational risk are of high importance for small and medium-sized institutions in the US (BIS, October 1999).

Credit risk is strongly related with non-performing loans. This term referred to the amount of money upon which the debtor did not make the payments in a period. In the framework of the Financial Stability Institute BIS (October 2017, pp.2) is stated that “in most countries, the majority of bank credit risk comprises actual lending, the paper refers to the bad quality assets as NPLs, which is the convention in the relevant literature’’. Thus, we will quantify the credit risk of each bank by the Non-performing loans ratio. To summarize, all the above discussion proves that credit risk is of great importance for bank’s stability and is one indicator of business riskiness. Thus, this will be the dependent variable in the first regression in order to examine the interaction between banks’ risk and internal control system.

Profitability

The major part of banks’ profitability is based on the interests which come from the assets and the fees which come from their services. Return on Equity (ROE), Return on Assets (ROA) and Net Interest Margin (NIM) constitute three of the most important indicators which express institutions’ profitability. Petria et al. (2015) in an attempt to find the determinants of banks’ profitability, they used ROAE and ROAA as performance indicators. In the same direction, Capraru and Ihnatov (2015) to investigate banks’ profitability in Central and Eastern Europe they also used ROE, ROA and NIM as the most appropriate indicators. Naceur (2003) used ROA and NIM in order to measure banks’ profitability in Tunisia and the same ratios were used by Ozili (2015) to quantify banks’ profitability in Nigeria. Moreover, Fidanoski et al. (2018) by trying to determine the factors which affect banks’ profitability in Croatia, they preferred ROA, and they excluded ROE because of its vulnerability to accounting and managerial actions and its sensitivity to strategic actions, like M&As and restructuring. Thus, due to the frequent use of ROE and ROA as profitability ratios, we will approach this part from a different perspective and not so commonly used, of Net Interest Margin. This will be the dependent variable in the second regression in order to investigate the relationship between banks’ profitability and internal controls.

Compliance

After the financial crisis of 2008, the Basel committee on Banking Supervision (BCBS) made the decision to impose more strictly regulations regarding the common equity and the liquidity of the banks. Thus, through the Basel III and the application of the different requirements, regulators intend both to avoid cases of insolvency and to strengthen the financial position of banks. As it was already mentioned, one of the three objectives of internal control system is the compliance. This has to do with regulations to which each bank is subject. From the regulators' and analysts' perspective, capital adequacy ratio constitutes the core measure of bank's financial strength and compliance. This ratio is a cornerstone for the regulators and the public since it indicates whether the bank is stable and financially viable (Mendoza and Rivera,2017). Moreover, the key element of capital directly affects the profitability and the competitiveness of banks (BIS, November 2005). Thus, we easily understand that each bank which is characterized as strong in terms of finance and capital area should comply with standards regarding the equity, the reserves and the quality of its assets. So, we are going to investigate how the internal controls affect the banks in their efforts both to enhance their strength and to conform to the regulations. Thus, the third dependent variable will be quantified through the Capital Adequacy Ratio (CAR).

3.2-INDEPENDENT VARIABLES

Control Environment-Board of Directors

As it was already mentioned, the board of directors constitutes the most essential subcomponent of the Control Environment. The board is responsible for the development and the compliance with an appropriate internal control system. It also has the major responsibility for the adequacy and the effectiveness of the internal control system (BSBS, September 1998). The board should ensure that internal controls are in place and more specific risk management systems, financial and operational control and compliance with the law and standards (IFC,2019). The literature is mainly focused on the independence and the number of board members. The proportion of outside directors has a negatively significant impact on bank risk taking (Abobakr and Elgirizy,2017). In the same research it was proved that the bigger the board size, the higher the credit risk. Moreover, De Vita and Luo (2018) stated that larger board size and other characteristics enhance risk-taking by banks and this cannot be mitigated by the discipline, which is exerted by external private monitoring, with the only exception being the capital requirements. As for the performance, Nodeh et al. (2015) proved that the board independence and board size positively affect the financial performance of the Malaysian banking sector. In the same line, Isik and Ince (2016) proved that the bigger the board size, the more profitable are the Turkish banks. Finally, Agoraki et al. (2010, pp.19) and Pathan (2010, pp.18) confront these assumptions by stating that “smaller boards are more efficient” and “There is a negative association between board independence and performance in U.S bank holding companies” respectively.

Thus, we are going to quantify Control Environment component through board size and board independence, and

we hypothesize that:

H1: The independence of BoD has a significant effect on the credit risk, the profitability and the compliance.

H2: The number of BoD has a significant effect on the credit risk, the profitability and the compliance.

Risk Assessment- Management

The contribution of the management in the proper function of the bank is of paramount importance. Based on the Framework about the internal controls, we can easily draw the conclusion that management's decision affects the assessment of the risk. Management is responsible for the identification of the risks regarding the different objectives, for the suitability of these objectives and for the impact of possible changes (COSO, May 2013), Most of the literature focuses on the characteristics of the chief executive officer since he is the responsible person for the implementation of strategic plans and for reinforcing the internal controls. The experience is measured by the number of years that the manager has stayed in the same position in the firm (Papadakis and Barwise, 2002). Matemilola et al. (2017) proved that the experience of the CEO influences the decision of firms' capital structure. As for CEO's tenure and bank performance, Kyereboah-Coleman and Biekpe (2006) and Sarkar and Sarkar (2018) proved that a longer CEO tenure positively affects banks' net interest margin and outcome in Ghanaian's and India's banking sectors respectively. In the same line, Aburime (2013) based on a research about Nigerian banking sector stated that the longer the CEO's tenure, the better the bank's performance will be, and that the longer the tenure of the CEO, the better the banks' loan portfolio quality. Moreover, the literature is also based on CEO's age as another indicator of experience. CEOs which are around 40s have negative correlation with earnings, while CEOs over 50s and 60s have positive (D'Ewart,2015). Finally, the literature is contradictory regarding the age of the CEO and the risk. Serfling (2014) found that older CEOs are more risk-averse affecting by this way the risk of the company, while three years later Meijer (2017, pp.26) mentioned that "CEO age has a positive correlation with bank risk". From all the above we are going to quantify the Risk Assessment component by using the management's experience measured by the number of years that CEO has stayed in the same position and the age as a measure of experience.

We hypothesize that:

H3: The experience (measured by tenure) of the management has a significant effect on the credit risk, the profitability and the compliance.

H4: The experience (measured by age) of the management has a significant effect on the credit risk, the profitability and the compliance.

Control Activities- Compliance with Exposure Limits

Control activities are strongly related with every part of the bank. These activities are implemented in order to confront the risks that the banks face and have been identified in the risk assessment process. As it was stated before, the provision of loans to the clients and the problems with the non-performing loans are the most common situations in the banking sector nowadays. Thus, based on the framework of Basel Committee (BCBS, September 1998), I draw the conclusion that the establishment of prudent limits constitutes one of the most important control activities for each bank. The loans-to-asset ratio positively affects both interest margins and the profitability of banks. (Abreu and Mendes, 2001). On the other hand, in the study regarding the EU banking sector from Staikouras and Wood (2004) and in the study regarding the US banks from Wang and Wang (2015) found that the higher the loans-to-asset ratio, the lower the profitability of banks. In the same line, El-Kassem (2017) found that the higher this ratio is, the lower the profitability of banks in Qatar. Moreover, as for the credit risk, contrary to the expected results that the higher this ratio is the higher the credit risk of the bank will be, Akwaa-Sekyi and Moreno (2016) revealed a negative relationship between these two. From all the above, we are going to quantify control activities by using the loans-to-asset ratio due to the fact that this ratio indicates whether the bank complies with the prudent limits and more generally whether the control activities operate in a proper way.

We hypothesize that:

H5: The establishment of prudent limits has a significant effect on the credit risk, the profitability and the compliance

Information and Communication- Timeliness of Reports

An effective internal control system is strongly related with adequate internal data and external information. In the framework regarding the internal controls BCBS (September 1998, pp.17) is highlighted that “The information should be timely, reliable and provided in a consistent format, while the effective communication is essential for the proper function of the system of internal controls.” This element of the internal controls constitutes a significant factor both for internal parties and for external stakeholders. Timeliness works as a pillar of relevance of financial reporting information (Ohaka and Akani,2017). Timeliness of financial reporting is a way to verify the extent of transparency and quality of the report (Adebayo and Adebisi,2016). Thus, we can easily understand that this fact could easily affect the reputation of the bank with whatever this means for the profitability, the risk and the trust of the supervisors in this bank. The lead time of the timeliness is calculated by the number of days between the year-end and the publication of the financial statements (Güleç,2017; Leventis and Weetman, 2004). Most of the researches in this field up to now have examined the factors that affect the timeliness. On the contrary I am going to investigate whether this part of internal controls affects the bank itself regarding the profit, the risk and the compliance.

We hypothesize that:

H6: The timeliness of the financial reports has a significant effect on the credit risk, the profitability and the compliance.

Monitoring- Audit Committee

Internal audit function constitutes an important factor for the monitoring of the effectiveness of the internal control system. In the framework of Basel Committee BCBS (September 1998, pp.4) it is defined that “there should be an effective and comprehensive internal audit of the internal control system carried out by operationally independent, appropriately trained and competent staff”. However, based on the same framework and on the literature, it is also mentioned the crucial role of the audit committee for the proper function of the internal control system. This committee is the responsible part for overseeing the financial reporting process and the internal control system (BSBS, September 1998; Ojo, 2009). Al-Baidhani (2016, pp.4) emphasized on this by stating that “evaluation of the internal control structure and process is considered one of the most, if not the most, important oversight responsibility faced by the audit committee”. In reality, audit committee is working as the intermediate between the internal and external audit. Moreover, the composition of the audit committee is remarkably important. Based on the literature, the audit committee’s expertise, the independence, and the frequency of meetings are the three main attributes for the effectiveness of internal controls. The internal control weakness is more possible to occur when the audit committees have less accounting-financial expertise (Zhang et al., 2007). There should be more focus on the diversity of the experience of audit committee’s members and on the independence of its composition (Rabab’ah et al., 2017). Moreover, Al-Baidhani (2016, pp.1) mentioned that “the United States requires that the public companies should have audit committees composed of independent members from outside the companies’ managements, and that there should be at least one financial/accounting expert”. The presence of financial experts on the audit committee of the bank is a factor of reducing insolvency risk (García-Sánchez et al., 2017). Moreover, the frequency of the meetings attracts the attention of the literature since it is regarded as the third most important element of audit committee’s efficient (Al-Matari et al., 2014). The frequency of the meetings is crucial for the examination of the internal control system. Majiyabo Onyabe et al. (2018, pp.62) noted that “audit committee without any meeting or with small number of meetings is less likely to be a good monitor.” Zájbojníková (2016) proved that the frequency of the

meetings and the financial expertise of the members positively affect the financial performance of UK firms. The number of audit committee's meetings positively affects the profitability of Indonesian's Banks (Chou and Buchdadi, 2017). There are no researches regarding audit committee meetings, credit risk, and compliance, so we are going to investigate whether there is any relationship.

Thus, we hypothesize that:

H7: The audit committee's expertise has a significant effect on the credit risk, the profitability and the compliance.

H8: The audit committee's meetings have a significant effect on the credit risk, the profitability and the compliance.

Except from the variables regarding the internal control system that we should take into consideration, there are many other factors which may affect internal controls and therefore the banks' profit, risk and compliance. Therefore, we are going to integrate some more variables in our model in order to enhance our results and draw more accurate conclusions.

Bank's Size

Although the internal control system of each bank consists of the five components which were already mentioned, the way that they are implemented is strongly related with the size of the bank. In the handbook issued by the Office of the Comptroller of the Currency OCC (January 2001, pp.5) is stated that "the formality of any control system will depend largely on the bank's size." Usually larger firms have strongest internal control systems due to economic of scales in the phases of developing and implementing these controls. Chen et al. (2017) mentioned that larger firms have higher inherent risk and more internal control weaknesses due to their complexity and due to the number of operations. Moreover, Xu and Gao (2015) by trying to define the factors that affect the effectiveness of internal controls proved that firms' asset size negatively affects the ROE and

positively affects the reliability goal. Similarly, Aladwan (2015) proved that while asset increases, the profitability decreases in Jordanian banking sector. On the other hand, Wang and Wang (2015) proved that the bigger the US bank holding company the higher the ROA. Furthermore, Akwaa-Sekyi and Moreno Gen (2016) found that the size of the bank does not affect the credit risk. Additionally, in the research of Deutsche Bank from Schildbach (2017, pp. 3) it was mentioned that the significance of the bank is measured by the size and that “in US, ‘significant’ bank holding companies are subject to tighter supervisory requirements.” Moreover, it is stated that bank’s size is of paramount importance both for regulators and supervisors. Finally, El-Ansary and Hafez (2015) found that bank’s size is negatively correlated with the capital requirements in the Egyptian banking sector.

Based on all the above, we are going to investigate the influence of bank’s size on internal controls and thus on the profitability, the riskiness and the compliance.

We hypothesize that:

H9: Bank’s size has a significant effect on the credit risk, the profitability and the compliance.

Bank’s Age

The years that the bank operates is expected to determine the procedures of the internal control system. Ge and McVay (2005, pp. 149) stated that younger firms is probable to “have less established procedures and thus, less experienced firms seem more likely to report material weakness”. Doyle et al. (2006, pp. 200) highlighted that “the older the firm, the more likely they are to have ‘ironed out the kinks’ in the internal control procedures.” The main reasons for this were the lack of experience in developing high-quality accounting systems and the improper segregation of duties. Moreover, Li (2015) for the research that took place in China, he mentioned that the internal control quality is strongly related with the firm’s age and that the internal control deficiencies are always disclosed from younger firms. Thus, based on the above it is therefore likely that the

older the bank, the better the structure of the internal control system, something which will increase the profits and the compliance and decrease the risks. We hypothesize that:

H10: Bank's age has a significant effect on the credit risk, the profitability and the compliance.

External Auditors

Although external auditors are not part of the internal control system, their role in the proper function of this is of vital importance due to their provisions of important feedbacks regarding its operation (BSBS, September 1998). Additionally, in the manual about Supervisory Policy and Issues BHC (2000) it is mentioned that both internal and external auditors should verify that internal controls are maintained and implemented in a proper manner addressing the risks. Thus, we can easily understand that the existence of a well-known audit firm and the cooperation with the bank matters for the efficiency of the internal controls. Khlif and Samaha (2016) revealed that the contribution of Big-4 audit firms in the improvement of the internal control quality is very important in Egyptian setting while the collaboration of the audit committee with the internal control quality system is more noticeable when the audit takes place from a Big-4 audit firm. Furthermore, Hodgdon and Porter (2017) through their research of the largest 100 U.S Banking Holding Companies draw the conclusion that when these banks are audited by the Big-4, they are forced in stricter audits regarding the valuing of their loan portfolios. Finally, there are no researches regarding the compliance, but we suppose that the impact of the external auditors in the internal control system could maintain the compliance of the bank holding company.

We hypothesize that:

H11: The audit quality has a significant effect on the credit risk, the profitability and the compliance.

CHAPTER 4- RESEARCH DESIGN-METHODOLOGY

The second purpose of the study is to investigate whether the internal control systems affect the U.S banking sector in three different aspects. In the sub-chapters below, there will be analyzed the methodology about the target group, the way that the sample was taken, the models with the dependent and independent variables that were used, and the estimation model along with the tests that were applied.

4.1- SAMPLE AND DATA COLLECTING PROCESS

The initial dataset was downloaded from Bankscope database since the population is only comprised by banking institutions. The population for the study is the U.S banking sector. In order to determine the target population, it was applied some criteria. The first one was the region of US. The second was to include only listed banks for the purpose of the availability of the data. The third criterion focused on the specialization of the sector. The choice of bank and financial holding companies instead of a mix of all kinds of banks was preferred, in order to provide a more accurate and comparable research without fluctuations based on the different services of these banks. Finally, the last criterion was to be active. After all these criteria were applied, a sum of 683 bank and financial holding companies was taken.

The next step was to distinguish the bank holding companies from the general financial holding companies for the purpose of focusing only in banking institutions and not to the general financial institutions. Finally, from a target population of 478 bank holding companies, it was taken a sample of 210 banks representing almost the 44% of the total population and based on the sample techniques it represents a confidence interval of 95% and a Margin of Error of $\pm 5\%$. (Krejcie and Morgan,1970).

The 210 biggest bank holding companies were taken based on the total assets and on the availability of the data. Some of the data were taken from Bankscope database and the majority were taken from the proxy statements (DEF 14A) and from the annual reports (10-k statements), due to their qualitative nature. The years under examination are the five fiscal years 2013-2017.

4.2 EMPIRICAL MODELS

As it was mentioned above, the second purpose of the study is to identify the effect of internal controls and other variables in three different aspects of risk, profitability and compliance. Thus, the panel data regression model was used with three different regressions models, each of these having a different dependent variable and the same independent variables regarding the internal controls and the banks' characteristics. The general regression function, which calculates the relationship of these elements taking into consideration the observations and the error term, is the following:

$$Y_{it}=a+bx_{i,t}+e_{it}, \text{ where } i=1,2,3,\dots,210 \text{ and } t=2013..2017 \quad (1)$$

In this research the relationship between the variables is described as:

$$CrRisk_{it}=f(ICS) + f(BankCharact) \quad (2)$$

$$Profit_{it}=f(ICS) + f(BankCharact) \quad (3)$$

$$Compl_{it}=f(ICS) + f(BankCharact) \quad (4)$$

Where:

CrRisk_{it}: The credit risk for the bank i and the period t

Profit_{it}: The profitability for the bank I and the period t

Compli_{it}: The compliance for the bank i and the period t

ICS: The internal control system which is depicted through:

$$ICS = f(BodNumb, BodInd, CEOYears, CEOAge, LoantoAss, \\ NumbofDays, AudComExp, AudComMeet) \quad (5)$$

BankCharact: The other characteristics which affect the ICS and thus the banks

$$BankCharact = f(BankAge, BankSize, ExterAudit,) \quad (6)$$

If we include all the independent variables and the bank's characteristics in the final regressions, we will have the 3 regression models:

$$CrRisk_{it} = a + b_1BodNumb_{it} + b_2BodInd_{it} + b_3CEOYears_{it} + b_4CEOAge_{it} + b_5LoantoAss_{it} + b_6NumbofDays_{it} + b_7AudComExp_{it} + b_8AudComMeet_{it} + b_9BankSize_{it} + b_{10}BankAge_{it} + b_{11}ExterAudit_{it} + e_{it} \quad (7)$$

$$\begin{aligned}
 \text{Profit} = & a + b_1 \text{BodNumb}_{it} + b_2 \text{BodInd}_{it} + b_3 \text{CEOYears}_{it} + b_4 \text{CEOAge}_{it} + b_5 \text{LoantoAs} \\
 & \text{sit} + b_6 \text{NumbofDays}_{it} + b_7 \text{AudComExp}_{it} + b_8 \text{AudComMeet}_{it} + b_9 \text{BankSize}_{it} + b_{10} \text{Ba} \\
 & \text{nkAge}_{it} + b_{11} \text{ExterAudit}_{it} + e_{it}
 \end{aligned}
 \tag{8}$$

$$\begin{aligned}
 \text{Complit} = & a + b_1 \text{BodNumb}_{it} + b_2 \text{BodInd}_{it} + b_3 \text{CEOYears}_{it} + b_4 \text{CEOAge}_{it} + b_5 \text{Loanto} \\
 & \text{Ass}_{it} + b_6 \text{NumbofDays}_{it} + b_7 \text{AudComExp}_{it} + b_8 \text{AudComMeet}_{it} + b_9 \text{BankSize}_{it} + b_{10} \\
 & \text{BankAge}_{it} + b_{11} \text{ExterAudit}_{it} + e_{it}
 \end{aligned}
 \tag{9}$$

Where i depicts the bank holding companies (1, 2, ..., 210), t depicts the fiscal years under examination (2013, ..., 2017), (b_1, \dots, b_{11}) are correlations that should be calculated and e is the error.

It is important to mention that in all three models we have a strongly balanced panel data with 1050 observations per variable.

In the table below there are provided the different type of variables, the quantification of them along with the measurement and finally the expected correlation.

Table 1- Description of Variables

Type of Variable	Variable	Quantification	Measurement	Expected Signal
Dependent	<i>Credit Risk (CrRisk)</i>		Non-Performing Loans/Total Loans	
Dependent	<i>Profitability(Prof)</i>		Net Interest Margin	
Dependent	<i>Compliance (Compl)</i>		Capital Adequacy Ratio	
1-Independent	<u>Control Enviroment</u>	Board of Directors	Number of BoD (BodNumb)	(+), (+)/(-), (+)/(-)
2-Independent	<u>Control Enviroment</u>	Board of Directors	Number of independent members to total number of BoD (BodInd)	(-), (+)/(-), (+)/(-)
3-Independent	<u>Risk Assesment</u>	Chief Executive Officer	Number of years in the same position (CEOYears)	(-), (+), (+)/(-)
4-Independent	<u>Risk Assesment</u>	Chief Executive Officer	Age (CEOAge)	(+)(-), (+), (+)/(-)
5-Independent	<u>Control Activities</u>	Compliance with Exposure Limits	Loans to Assets ratio (LoantoAss)	(-), (+)/(-), (+)/(-)
6-Independent	Information and Communication	Timeliness of Reports	Number of days between the fiscal year end and the disclosure of financial report (NumbofDays)	(+), (-), (+)/(-)
7-Independent	<u>Monitoring</u>	Audit Committee	Members with financial-auditing background as a ratio of total members (AudComExp)	(-), (+), (+)/(-)
8-Independent	<u>Monitoring</u>	Audit Committee	Number of audit committee's meetings in the year (AudComMeet)	(+)(-), (+), (+)/(-)
9-Independent	<u>Bank's Size</u>		Log of Total Assets (BankSize)	(+), (+)/(-), (+)/(-)
10-Independent	<u>Bank's Age</u>		Number of years since the incorporation (BankAge)	(-), (+), (+)/(-)
11-Independent	<u>External Auditor</u>		"1" If bank is audited by Big4 and "0" if not (ExterAud)	(-), (+), (+)/(-)

4.3 -DESCRIPTIVE STATISTICS

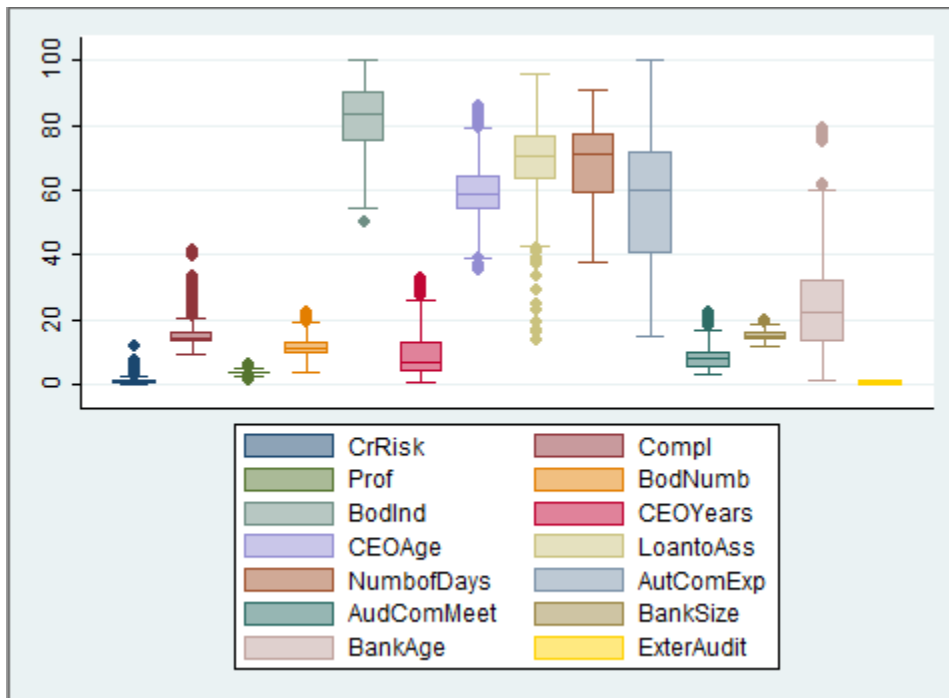
The table below depicts the descriptive statistics for all the three dependent variables and the independent variables. Thus, the main data that were used in this research can easily be analyzed. However, before the analysis of the data we should remove the outliers from the dataset. Outliers are the data that do not fit with the pattern of the remainder of the data and constitute a serious factor of non-normality (Brooks, 2008). In the table 2 below it is depicted the initial dataset with all the observations.

Table 2- Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
CrRisk	1050	.9853854	.9412265	.01	12
Compl	1050	14.85004	3.223841	9.4	41.25
Prof	1050	3.563314	.554745	.95	5.969
BodNumb	1050	11.06952	2.815239	4	22
BodInd	1050	81.74048	9.059913	50	99.9
CEOYears	1050	9.664762	7.542823	.5	33
CEOAge	1050	59.0781	7.190689	35	86
LoantoAss	1050	69.06081	11.21738	13.715	95.464
NumbofDays	1050	69.70381	11.59496	38	91
AutComExp	1050	56.67772	20.348	15	100
AudComMeet	1050	8.013333	3.648238	3	22
BankSize	1050	14.9562	1.417588	11.47071	19.95116
BankAge	1050	22.83905	13.07075	1	79
ExterAudit	1050	.3380952	.4732866	0	1

Moreover, the box plot below (Figure 2) clearly depicts that there is an issue with the data, and they must be cleaned as there are many outliers especially in the cases of “LoantoAss”, “BankAge”, “Compl” and “CEOAge”. This fact raises suspicion for records in the data set that have incorrect or omitted (blank) values and might be possible outliers and extreme values.

Figure 2- Box Plot



In order to tackle this problem and remove these outliers the Cook and Welsch distance theories were applied. After cleaning the data from all the missing or omitted values the following table depicts the summary statistics of each variable.

Table 3- Descriptive Statistics (After cleaning the data)

Variable	Obs	Mean	Std. Dev.	Min	Max
CrRisk	1007	.8659409	.617755	.01	3.601013
Compl	1007	14.79324	3.143835	10.09	41.25
Prof	1007	3.565487	.5325224	.999	5.969
BodNumb	1007	11.10228	2.82288	4	22
BodInd	1007	81.68658	9.076315	50	99.9
CEOYears	1007	9.728401	7.513207	.5	33
CEOAge	1007	59.03774	7.18919	35	86
LoantoAss	1007	69.39003	10.70901	16.063	95.464
NumbofDays	1007	69.48361	11.51218	38	91
AutComExp	1007	56.84386	20.39526	15	100
AudComMeet	1007	7.96425	3.635575	3	22
BankSize	1007	14.96402	1.38362	11.47071	19.95116
BankAge	1007	22.98411	13.11373	1	79
ExterAudit	1007	.3396226	.4738165	0	1

The data cleaning from the outliers is obvious in the comparison of the two statistics tables. Firstly, the observations were reduced from 1050 to 1007. Moreover, the reduction of the standard deviations is obvious especially in the variables of “CrRisk”, “Compl” and “LoantoAss”. Finally, the cleaning of the outliers and the extreme variables is also visible from the differences regarding the minimum and the maximum value. It is remarkable the big change in the minimum value of the variable “LoantoAss” and in the maximum value of the variable “CrRisk”. After this cleaning it is rational to commend on the new table.

Starting with the credit risk, we can observe that in general all the bank holdings do not face high Non-performing loan ratios, with the highest being 3,60% and the lowest almost zero. As for the compliance, we can observe a difference in the capitalization of the banks with the lowest being 10,09% and the highest being 41,25%. However, the mean of 14,75% indicates the good capitalization and a ratio which is above the 8% which is the minimum requirement. As for the independent variables it is important to mention that from the control environment perspective the average number of board of directors is almost 11 members, while the board of directors is characterized of high independence with a mean value of 81,6%. As for the CEO which depicts the Risk Assessment component, we can observe differences in the tenure in this position which varies from half a year to more than 30 years and also in the ages of the chief executive officers with an average of almost 60 years. The loans as a percentage of total assets have an average value of almost 69% while from the perspective of Information and Communication, we can observe that the banks need more than two months (69,48 days) as an average, in order to disclose their 10-k statements. Finally, regarding the Monitoring component, it is important to mention that there are differences in the audit committees’ expertise since the minimum is 15% and the maximum is 100%. This is a rational fact since the regulation requires that it should be at least one financial/accounting expert in the audit committee. Additionally, there are also differences in the number of meetings of the audit committees with an average of almost 8 meetings per fiscal year.

Regarding the banks' characteristics it is important to mention that the size is expressed in thousands of total assets and is calculated based on the logarithm of total assets, while the biggest fluctuations are observed in the age of incorporation of the holdings. There are holdings that were incorporated in the 2013 fiscal year and holdings that have been incorporated more than 70 years ago. The average year of their incorporation is in 1993.

Finally, it is worth to mention that there is not high standard deviation in the variables. The exceptions are observed in the case of the expertise of the audit committee (AudComExp), the age of the banks (BankAge), the Control Activities' variable (LoantoAss), and the Information and Communications' variable (NumbofDays) with 20,39%, 13,11%, 10,70% and 11,51% respectively. The variability of these variables, which is expressed from the standard deviations, indicates differences in the data throughout the years. In the first and the third case of "AudComExp" and "LoanstoAss" respectively, this variability is due to the differences in the business model of the banks, while in the other two cases is due to the different years of incorporation and the regulations regarding the acceptable period of publication.

4.4- CORRELATION MATRIX

The correlation matrix that is provided below is after the cleaning of data and it constitutes a good indicator of possible multicollinearity. In the correlation matrix below, there are provided both the dependent and independent variables. In general, we can observe that most of the correlations among the variables are quite low indicating that the problem of multicollinearity is not faced. The highest correlations are observed between "CEOyears" and "CEOage" (56,67%), "BankSize" and "ExterAudit" (63,80%), "NumbofDays" and "ExterAudit" (53,15%) and "NumbofDays" and "BankSize"(76%). Except these four pairs, all the other pairs have correlation below 50% and this indicates that any problem of multicollinearity is faced in the model. However, since there are concerns of possible multicollinearity, even in one pair, the multicollinearity is going to

be checked through the test of Variance Inflation Factor (VIF) which is presented in the next chapter.

Table 4- Correlation Matrix (After cleaning the data)

	CrRisk	Compl	Prof	BodNumb	BodInd	CEOYears	CEOAge	LoantoAss	NumbofDays	AutComExp	AudComMeet	BankSize	BankAge	ExterAudit
CrRisk	1.0000													
Compl	0.1522	1.0000												
Prof	0.1021	-0.0372	1.0000											
BodNumb	-0.0811	-0.2637	-0.0129	1.0000										
BodInd	0.0035	0.0166	-0.0352	0.1146	1.0000									
CEOYears	-0.0590	0.0874	-0.0181	-0.0963	-0.1434	1.0000								
CEOAge	-0.0285	0.0667	-0.0919	-0.0498	-0.1311	0.5667	1.0000							
LoantoAss	-0.1775	-0.3326	0.1437	-0.0208	-0.0818	-0.0547	0.0059	1.0000						
NumbofDays	0.1475	0.0569	0.0836	-0.3465	-0.1069	-0.0743	-0.0453	0.1499	1.0000					
AutComExp	-0.0413	0.0416	-0.0802	-0.0700	-0.0049	0.0090	0.0390	-0.0453	-0.0954	1.0000				
AudComMeet	-0.0117	0.0553	0.0073	0.0643	0.1238	-0.1065	0.0940	-0.0567	-0.1794	0.0853	1.0000			
BankSize	-0.1483	-0.1425	-0.1138	0.3975	0.1244	0.1359	0.1437	-0.1552	-0.7608	0.0771	0.2552	1.0000		
BankAge	0.0585	-0.0876	-0.1683	0.2730	0.1289	0.1310	0.0293	-0.3082	-0.3427	0.0074	0.0748	0.3799	1.0000	
ExterAudit	-0.0803	-0.0423	-0.1398	0.2111	0.1212	0.0973	0.0835	-0.1211	-0.5315	0.1778	0.1883	0.6380	0.2269	1.0000

4.5- ESTIMATION MODEL-TESTS

Since we have both time series (years) and cross section elements (Bank Holding Companies) we have a panel dataset. The simplest technique is through the estimation of a pooled regression where we would estimate a single equation on all the data together and then this equation would be estimated by using OLS (Brooks, 2008). However, there are some limitations on this method like the assumption of constancy over time and across all the units of the variables and the relationship between them. Moreover, the vast majority of similar studies is focused on the fixed and random effect models. All of these estimations have their benefits and their drawbacks. Thus, the proper estimation method

for our models is based on the nature of our data. So, several tests were conducted in order to settle on the appropriate model that should be followed.

Firstly, the Breusch-Pagan Lagrange multiplier (LM) was conducted for random effects in order to decide between the random effect regression and the OLS regression. In all of the three models the null hypothesis that there are zero variances across the entities (no significant difference across units) was rejected since the $\text{Prob} > \chi^2 = 0.0000$ (Table 8, Table 9, Table 10). This indicates that random effect regression is more appropriate in comparison with the OLS due to the differences across the units. (Torres-Reyna,2007). Moreover, by the F-test, which under the null hypothesis assumes that the fixed effects are zero, we test for fixed effects and choose between OLS and fixed effect model. In all the three models we can see that we reject the null hypothesis since the $\text{Prob} > F = 0,000$ (Table 11, Table 12, Table 13). This means that there is a significant fixed effect and the OLS should be rejected. Thus, the final decision between fixed and random effects was taken through the Hausman Test. (Brooks,2008). There should be a comparison between the random effects and the fixed effects to verify if there are certain differences (Hausman, 1978). In all three models the null hypothesis that the individual effects are uncorrelated with the explanatory variables is rejected. Thus, we reject the random effects model, and the fixed effects model is more appropriate in our case. (Table 14, Table 15, Table 16).

Moreover, a few diagnostics tests were applied. The first test was the test for heteroscedasticity, and since we applied the fixed effect model, the Modified Wald test was conducted (Baum,2001). The test was conducted in all three models. All the p-values were significant ($\text{Prob} > \chi^2 = 0.0000$) and thus we reject the null hypothesis of homoscedasticity. (Table 17, Table 18, Table 19). Additionally, by applying the Wooldridge test for the existence of serial correlation, under the null hypothesis it is regarded that there is no serial correlation. (Drukker, 2003). In all three models it is observed that the null hypothesis is strongly rejected since the $\text{Prob} > F = 0,00$. Thus, the existence of autocorrelation is a fact. (Table 20, Table 21, Table 22).

Moreover, as it was mentioned in the previous chapter the existence of multicollinearity is not observed, but since there is suspicion even in one pair of variables, we are going to investigate this thoroughly through the variance inflation factor (VIF). The VIF measures how much the multicollinearity in the model causes the variance of a regression coefficient to be inflated. The literature proposes a threshold of 5 or 10 for the VIF value. Hair et al. (2014, pp. 200) defined that “A common cutoff threshold is a VIF value of 10”. However even in lower levels there should be problem. In our case (Table 23) all the VIF values are even below 4 proving that the problem of multicollinearity is not faced.

Finally, the last test was about the existence of cross-sectional dependence (Pesaran,2004). The tests were applied in all three models in order to check whether the residuals are correlated across entities. (Reyna,2007). Thus, by strongly rejecting the null hypothesis ($Pr=0,00$) that the residuals are not correlated, we conclude the existence of cross-sectional dependence in all models. (Table 24, Table 25, Table 26).

In order to tackle all the above problems (Cross-sectional dependence, Heteroscedasticity, autocorrelation) the fixed effect regression with Driscoll and Kraay standard errors was followed. These standard errors are heteroscedasticity consistent and robust to general forms of cross-sectional dependence. Finally, Hoechle (2007, pp. 2) highlighted that “Fortunately, Driscoll and Kraay(1998) propose a nonparametric covariance matrix which produces heteroscedasticity consistent standard errors that are robust to very general forms of spatial and temporal dependence”

The statistical analysis was performed through Stata13.

CHAPTER 5 – EMPIRICAL RESULTS

5.1 – DEPENDENT VARIABLE-CREDIT RISK

Starting with the analysis of the results in the table below, it is evident that the number of observations in the model was increased to 1032. The explanation of this is that the Driscoll-Kraay standard errors are much better calibrated (Hoechle, 2007). Thus, the observations fit better the regression and fewer observations are dropped out of the model after applying the Cook and Welsch distance theories that were described in the previous chapter. The R-square indicates that the model explains the 21,6% of the variance in the Credit Risk. Additionally, the Prob>F=0.00 indicates that our regression is statistically significant.

At a first glimpse it is clear that the majority of the variables representing the internal control system significantly affect the credit risk. Specifically, six out of eight variables of the internal controls are statistically significant at 95% confidence interval while all the three variables representing the banks' characteristics are significant as well.

Starting from the Control Environment component which is represented from the number of the board (BodNumb) and the independence (BodInd), we can say that this component considerably affects the credit risk from the perspective of the board's number. The coefficient is negative indicating that an increase in the board's number leads to a decrease in the credit risk of the bank. This is contrary to our expectations based on the research of Abobakr and Elgirizy (2017) and De Vita and Luo (2018) which found the opposite. Regarding the second variable of the Control Environment (BodInd) the results prove that an increase in the board independence increases the credit risk, but this is not significant in 95% confidence interval.

Additionally, both the variables that represent the Risk Assessment component have a significant effect on the credit risk each one with different way. The experience, which is also connected with the tenure of the CEO in the same position (CEOYears), is negative correlated with the credit risk. This finding is in accordance with the research of Aburime (2013) which stated that the experience of the management is crucial for minimizing the credit risk and for maintaining a healthy loan portfolio. On the other hand, older CEOs increase the credit risk of banks contrary to the findings of Serfling (2014) that the age acts as a restraining factor for risk-taking, but in accordance with the study of Meijer (2017) who found positive correlation between these two.

Continuing to the third component of the internal control system, the Control Activities, it has a significant impact on the credit risk. The change of the limits regarding the exposure, which is depicted by one unit increases in the Loan to Asset ratio (LoantoASS), significantly decreases the risk of the bank. This is in accordance with the findings of Akwaa-Sekyi and Moreno (2016).

Furthermore, the Information and Communication component has a significant effect in the risk of the banks. It is obvious from the results that the more days the banks need to publish their financial statements, the bigger the credit risk. This finding is consistent with our expectations since the effective communication makes the system of internal controls to work properly (BCBS, September 1998).

The last component of the internal controls is the Monitoring. From the two variables (AudComExp, AudComMeet) which are used in order to quantify this component, only the auditing-financial expertise of the audit committee produces a significant effect on the credit risk. Specifically, the more expertised members are engaged in the audit committee, the less the risk, something which was expected based on the literature Zhang et al. (2007) and García-Sánchez et al. (2017).

Finally, as it was mentioned in the previous chapter three more characteristics of the banks were examined regarding their influence in the internal control system and thus in the credit risk. All three variables (BankSize, BankAge, ExterAudit) strongly and significantly affect the credit risk. The first two (size of the bank and age) negatively affect the credit risk while the last (External Auditors) has a positive effect on the dependent variable. This means that the bigger the bank, the less the risk, something which is opposite to the findings of Chen et al. (2017) who found that bigger firms have more complex structures, increasing the internal control weaknesses. However, this is a rational result, if we take into consideration that the formality of the internal controls strongly depends from the banks' size (OCC, January 2001). Furthermore, the older is the bank, the less problems faces with the non-performing loans, confirming the previous studies by Ge and McVay, (2005), Doyle et al. (2006) and Li (2015) who mentioned that problems are usually faced by younger firms. Finally, the finding that, when the banks are audited by Big4 companies have bigger non-performing loans, is contrary to our expectations and to the literature.

Table 5- Regression analysis- Model 1: Credit Risk

```

Regression with Driscoll-Kraay standard errors   Number of obs   =   1032
Method: Fixed-effects regression                Number of groups =   210
Group variable (i): BankHolding                F( 11, 209)     =   43.70
maximum lag: 2                                 Prob > F         =   0.0000
                                                within R-squared =   0.2161

```

CrRisk	Drisc/Kraay			P> t	[95% Conf. Interval]	
	Coef.	Std. Err.	t			
BodNumb	-.0156246	.0049703	-3.14	0.002	-.025423	-.0058262
BodInd	.001272	.0018197	0.70	0.485	-.0023153	.0048594
CEOYears	-.0225365	.0037719	-5.97	0.000	-.0299723	-.0151007
CEOAge	.0207466	.0022787	9.10	0.000	.0162544	.0252388
LoantoAss	-.0133696	.0011582	-11.54	0.000	-.0156528	-.0110863
NumbofDays	.0070933	.0019927	3.56	0.000	.0031649	.0110218
AutComExp	-.0023503	.000633	-3.71	0.000	-.0035981	-.0011024
AudComMeet	.0104412	.0099954	1.04	0.297	-.0092635	.0301458
BankSize	-.3780481	.0907233	-4.17	0.000	-.5568981	-.1991981
BankAge	-.0620861	.0096851	-6.41	0.000	-.0811791	-.042993
ExterAudit	.1803137	.0520464	3.46	0.001	.0777105	.282917
_cons	7.471621	1.073452	6.96	0.000	5.355441	9.587802

5.2 – DEPENDENT VARIABLE-PROFITABILITY

The second regression concerns the profitability as the dependent variable under examination. Starting with the R-squared of the regression in the table below we can observe that the independent variables explain almost 10% of the variance in the profitability. However, this is not a problem and the regression is acceptable due to the fact that the explanatory variables have an impact on profitability since the probability value of F-statistic is zero.

The first component of the internal control system is the Control Environment. From the table below it seems that this component has a significant effect on the profitability of the banks only from the perspective of the board's size. Both the variables (BodNumb,BodInd) that are used to quantify the Control Environment are positively correlated with the profitability of the banks, something which confirms the findings of Nodeh et al. (2015) and Isik and Ince (2016), but confronts the findings of Agoraki et al. (2010) and Panthan (2010). This means that an increase in the board's number could lead to an increase in Net Interest Margin (NIM).

The two variables (CEOYears, CEOAge) which represent the Risk Assessment component are both negatively correlated with the profitability of the banks. These findings are opposite to the positive correlations which were proved from the studies of Kyereboah-Coleman and Biekpe (2006), Aburime (2013), D'Ewart, (2015) and Sarkar and Sarkar (2018). However, their p-value indicates that the risk assessment component does not affect the profitability of the banks neither in 95% nor in 90% confidence interval.

As for the establishment of prudent limits which represents the Control Activities component through the Loans to Assets ratio (LoantoAss), it seems that a 1% increase of loans as a percentage of total assets could lead to an increase of the banks' profitability. This is logical and is in accordance with the research of Abreu and Mendes (2001) and indicates that banks which depend on assets are more profitable

than banks that have non-loan bearing assets. In the same line, there is a significant and positive correlation between the fourth component of internal controls (Information and Communication) and the profitability. However, the finding that the more days the banks need to publish their 10-K statements, the bigger the Net Interest Margin is contrary to our expectations.

Finally, regarding the last component of the internal controls, the monitoring component, it is negatively correlated with the banks' profitability, but it is statistically significant in 95% confidence interval only from the perspective of the expertise of the audit committee (AudComExp). Especially, the fact that the more expertise has the audit committee, the lower is the Net Interest Margin is contrary to our expectations and the research of Zábajniková (2016). However, it is rational since many audit committees have only a couple of financial-accounting expertise members, something which was proved in the descriptive statistical analysis in the previous chapter, where the mean value of the audit committees' expertise was 56,8%. This means that many audit committees are comprised of several members who come from other fields (management, advisory, law) and who are engaged many years in the banks being very experienced for audit matters.

The last part of the analysis concerns the three bank's characteristics (BankSize, BankAge, ExterAudit) which affect the internal controls, therefore the profitability. Based on the results, it is of no consequence if the bank is audited by a big4 company or not, as it does not affect the profitability. Moreover, the bigger and the older is the bank, the less is the profitability. The first finding about the size was expected, based on the researches of Xu and Gao (2015) and Aladwan (2015) and based on the theory that bigger firms are possible to have more internal control weaknesses due to their complex structure (Chen et al., 2017). The second finding about the age surprisingly shows a negative correlation, confronting the literature which supports that older banks have better internal control systems. (Ge and McVay, 2005; Doyle et al., 2006; Li, 2015).

Table 6- Regression analysis- Model 2: Profitability

Regression with Driscoll-Kraay standard errors	Number of obs	=	1032
Method: Fixed-effects regression	Number of groups	=	210
Group variable (i): BankHolding	F(11, 209)	=	94.32
maximum lag: 2	Prob > F	=	0.0000
	within R-squared	=	0.0998

Prof	Drisc/Kraay				
	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
BodNumb	.0118093	.0039166	3.02	0.003	.0040883 .0195303
BodInd	.0011898	.0014377	0.83	0.409	-.0016445 .0040241
CEOYears	-.0000299	.001466	-0.02	0.984	-.0029198 .0028601
CEOAge	-.001476	.000965	-1.53	0.128	-.0033784 .0004264
LoantoAss	.0085723	.0007894	10.86	0.000	.0070161 .0101286
NumbofDays	.0026653	.0010616	2.51	0.013	.0005726 .0047581
AutComExp	-.0014376	.0004176	-3.44	0.001	-.0022608 -.0006145
AudComMeet	-.001848	.0030719	-0.60	0.548	-.0079038 .0042078
BankSize	-.1363059	.0152917	-8.91	0.000	-.1664516 -.1061602
BankAge	-.0169817	.0025118	-6.76	0.000	-.0219333 -.01203
ExterAudit	-.0157702	.0193285	-0.82	0.415	-.0538739 .0223335
_cons	5.171805	.3206808	16.13	0.000	4.539622 5.803989

5.3 – DEPENDENT VARIABLE-COMPLIANCE

The last table below illustrates the regression results for the last model, in which the compliance is the dependent variable under examination. There are no researches regarding the internal control system and the compliance, thus their relation in the most variables are expected to be either positive or negative. The probability value of the F-statistic, which is zero, depicts our statistically significant regression, while the explanatory power of the model is the highest, with an R-squared of 26,5%, comparing to the two previous models.

The first component of internal controls, the Control Environment, seems to have no significant relation with the compliance of the banks based on both variables that are used to quantify this component. Even though it is not of high importance, it should be mentioned that an increase in the number of the board leads to a decrease in the compliance, while the more independent is the BoD the higher is the capital adequacy ratio.

The Risk Assessment component has a significant effect on banks' compliance. Both variables (CEOYears, CEOAge) are significant in 95% confidence interval but with different correlation coefficients. The correlation coefficient of the first relationship surprisingly indicates that the longer the CEO stays in the same position, the less is the Capital Adequacy Ratio. The second correlation shows that older CEOs increase the compliance of the banks. This is a rational fact since older CEOs are more experienced and are more risk-averse (Serfling,2014), following by this way a more conservative approach.

Moreover, the Control Activities component and the Information and Communication component have a strong and negative effect on the compliance of the banks. Specifically, a change in the prudent limits, which is measured through the increase of the loans as percentage of Assets (LoantoAss), could lead to a decrease of the Capital Adequacy Ratio (CAR). Additionally, the timelier the banks publish their statements, that

is, the fewer days they need (NumbofDays), the more these banks comply with the regulations. This was the expected result since the effective communication makes the internal control system works properly (BCBS, September 1998).

Finally, the Monitoring component of internal controls significantly affects the banks' compliance. From the two variables that are used for the quantification of this component, the meetings of the audit committee (AudComMeet) is the most important since it is statistically significant in a 95% confidence interval while the expertise of the members (AudComExp) is significant for the level of $\alpha=10\%$. According to the table below, the more meetings the audit committee holds, the more the banks comply with the regulations, something which strongly meets our expectations since the frequency of these meetings enhances the examination of the internal controls and the monitoring as process (Zábojníková, 2016; Majiyabo Onyabe et al., 2018). On the other hand, although the negative relation between the financial-auditing expertise of the audit committee and the compliance seems strange, it is very logical as it was explained in the previous regression (profitability), since many members of the audit committees come from other fields, but their long-term relationship with the banks and their experience make them suitable for audit matters.

As for the bank's characteristics that may influence the internal controls and the compliance, the table below indicates negative correlations for the first two as in the previous model. Thus, the bigger and the older the bank is, the less it complies with the regulations. The "BankSize" is statistically significant in a 90% confidence interval and the negative correlation with the compliance meets our expectations based on the research of Ansary and Hafez (2015) and on the theory of Chen et al. (2017) that the size makes the firms more complex enhancing the internal control weaknesses. Finally, as it was expected, if the external auditor of the bank is a big4 company, the bank is more probable to comply with the regulations.

Table 7- Regression analysis- Model 3: Compliance

Regression with Driscoll-Kraay standard errors	Number of obs	=	1032
Method: Fixed-effects regression	Number of groups	=	210
Group variable (i): BankHolding	F(11, 209)	=	18.64
maximum lag: 2	Prob > F	=	0.0000
	within R-squared	=	0.2651

Compl	Drisc/Kraay				[95% Conf. Interval]	
	Coef.	Std. Err.	t	P> t		
BodNumb	-.0216736	.0185024	-1.17	0.243	-.0581489	.0148017
BodInd	.0119988	.0105101	1.14	0.255	-.0087206	.0327182
CEOYears	-.0327289	.0129798	-2.52	0.012	-.0583169	-.0071409
CEOAge	.0334843	.0111719	3.00	0.003	.0114603	.0555083
LoantoAss	-.1777874	.0081056	-21.93	0.000	-.1937667	-.1618082
NumbofDays	-.0196715	.0069558	-2.83	0.005	-.0333842	-.0059589
AutComExp	-.0074347	.0043711	-1.70	0.090	-.0160517	.0011824
AudComMeet	.0532647	.0120223	4.43	0.000	.0295643	.0769652
BankSize	-.4239241	.2418268	-1.75	0.081	-.9006565	.0528084
BankAge	-.0939007	.0363816	-2.58	0.011	-.1656226	-.0221788
ExterAudit	.7050715	.2408889	2.93	0.004	.230188	1.179955
_cons	34.32547	3.07715	11.15	0.000	28.25924	40.3917

CHAPTER 6- CONCLUDING REMARKS

The last chapter of this thesis is comprised of three parts. The conclusions that were drawn based on the whole research, the limitations that were faced during the investigation, and the potential areas for further research in the fields of the internal audit, the internal control systems and the banking sector.

6.1 – RESEARCH CONCLUSIONS

The widespread economic crisis, the widely publicized fraud and the need for a stable banking system make the banks to place more emphasis in the function of the internal audit and the internal control systems. The aim of this study was twofold.

The first objective was through a theoretical research to investigate the role of the internal audit in the banking sector and to define the relationship of internal audit with the internal control system (ICS). Through an extended research of the literature, the conclusion which was deduced is that internal audit constitutes a powerful tool for defining the optimal point between risk, profit and compliance, but this depends on how it is going to be exerted. One of the main objectives of the internal audit is to provide assurance regarding the effectiveness and the quality of the internal controls. This is accomplished mainly through the monitoring aspect and it depends on the risk, the complexity and the nature of each bank's activities. Thus, the internal audit function strongly determines whether the bank is going to meet the objectives regarding the operations, the reporting and the compliance, which are the main objectives of the process, which is called internal control system.

Based on the COSO Framework (COSO, May 2013) the internal controls are comprised of five integrated components which are the following: Control Environment, Risk Assessment, Control Activities, Information and Communication and Monitoring. The vast majority of the researches regarding this topic investigate

the matters regarding the internal controls only through a theoretical perspective and through qualitative research. Thus, since there is no such study for the Us Banking sector, the second objective of this study was to find whether the components of the internal control system affect the risk, the profit and the compliance of US banks through a strongly quantitative research.

Based on the Frameworks of Internal Controls in Banking Organizations (BCBS, September 1998), on Internal Controls (COSO, May 2013) and on the literature, the quantification of the internal controls took place. The five components were expressed via a sum of 8 independent variables, while 3 more bank's characteristics were used as well. These 11 variables were analyzed in 3 different regression models with different dependent variable in each model (Credit Risk, Profitability, Compliance). A sample of the 210 biggest Bank Holding Companies was chosen, concluding to a dataset of 1050 observations per variable. After cleaning the data from outliers, a couple of diagnostics tests were performed while the years under examination were the 5 fiscal years 2013-2017.

The results indicated that Risk Assessment, Control Activities and Information and Communication components strongly affect the credit risk. Specifically, the older the CEOs and the more days needed for banks to publish their 10-K statements, the higher the credit risk. On the other hand, the longer the tenure of the CEO in this position and the bigger the percentage of loans to total assets, the lower the danger of non-performing loans. The first (Control Enviroment) and the last (Monitoring) components have a significant effect on credit risk, but only from the perspective of the board's number and the expertise of the audit committee respectively. Bigger boards and highly expertised audit committees contribute to the improvement on the loan's portfolio quality.

All the components of the internal control system significantly affect the profitability of the bank, except from the Risk Assessment. Especially, the Control Activities component and the Information and Communication component have a

significant and positive relation with the Net Interest Margin. Additionally, significant and positive is the relation between the Control Environment and the profitability only from the perspective of board's number, proving that the bigger the board, the better the performance of the bank. Finally, significantly but negatively is affected the profitability from the Monitoring component from the perspective of audit committee's expertise, something which is rational as it was mentioned before.

Last but not least, for the first time the effect of internal controls on the compliance of the banks was examined. Other than Control Environment, all the other components significantly affect the compliance of the banks. The Control Activities component and the Information and Communication component have a significant and negative effect on the Capital Adequacy Ratio. Furthermore, older CEOs and bigger frequency of audit committees' meetings enhance banks' efforts to adapt to the regulations. This proves that Risk Assessment and Monitoring components have strong and positive effect on the compliance when they are quantified through these variables.

Concluding with the analysis of the regressions, three more bank's characteristics were examined whether they affect internal controls and thus the dependent variables. The bigger and the older is the bank, the lower is the danger of non-performing loans but also the less the bank complies with the regulations and the lower the profits are. Finally, the audit of a bank by a big4 company makes the bank not only more reliable to the regulators, but also riskier.

6.2 – RESEARCH LIMITATIONS

The unconventional nature of this study, although contributes to enriching the existing literature via a different perspective, it also makes this study to have two main limitations. The first concerns the quantification of the data. Although an extended review of the frameworks and the literature took place in order to quantify as better as possible the internal controls, there are some concerns regarding the complete representation of the theory from the variables. This concern mainly comes from the goodness-of-fit especially in the second model, and it could be tackled via the increase of the number of the variables. The second limitation comes from the empirical model that was used. We are a little bit cautious when using Driscoll and Kraay standard errors in panels with large cross-section but short time dimension due to the base of the estimator on an asymptotic theory. (Hoechle, 2007). However, since there is no common solution that solves all the problems, in our case due to the existence of all the three problems of heteroscedasticity, cross-sectional dependence and autocorrelation (and not only one or two of them), Driscoll and Kraay standard errors seemed to confront better with our issues.

6.3 – RESEARCH SUGGESTIONS

To overcome these limitations, the first suggestion is the model to be expanded through the increase of the variables as it was mentioned above. Thus, the internal control system could be expressed via more and different variables. Moreover, more variables regarding the bank's characteristics could be incorporated in the models in order to draw more generalized conclusions. Finally, there is space for further researches, not only about the effect on the profitability, the riskiness and the compliance of the banks, but also on other vital parts for the well-functioning and the existence of a financial institution.

REFERENCES

- Abreu, M. and Mendes, V. (2001) Commercial bank interest margins and profitability: Evidence for E.U countries. [Online]. Available: https://www.researchgate.net/publication/237460076_COMMERCIAL_BANK_INTEREST_MARGINS_AND_PROFITABILITY_EVIDENCE_FOR_SOME_E_U_COUNTRIES [2 March 2019]
- Aburime T. (2013) CEO tenure and other determinants of bank performance in Nigeria, [Online]. Available: <http://dro.deakin.edu.au/view/DU:30067282> [20 January 2019]
- Adebayo, P.A. and Adebisi W.K (2016) Effect of firm characteristics on the timeliness of corporate financial reporting: evidence from Nigerian deposit money banks. *International Journal of Economics, Commerce and Management* IV(3), pp.369-381.
- Agoraki, M., Delis, M. and Staikouras, P. (2010) The effect of board size and composition on bank efficiency. *International Journal of Banking, Accounting and Finance* 2(4), pp. 357-386
- Akwaa-Sekyi, E.K. and Moreno Gené, J. (2016) Effect of internal controls on credit risk among listed Spanish banks. *Intangible Capital* 12(1), pp.357-389.
- Akwaa-Sekyi, E.K. and Moreno Gené, J. (2017) Internal controls and credit risk relationship among banks in Europe. *Intangible Capital* 13(1), pp.25-50.
- Aladwan, M.S. (2015) The impact of bank size on profitability “An empirical study on listed Jordanian commercial banks”. *European Scientific Journal* 11(34), pp.217-236.

- Al-Baidhani, AM (2016) The Nature of a Dynamic Relationship between Audit Committee and Auditors, both Internal and External. *Business and Economics Journal* 7(4), pp.1-5.
- Al-Matari, E.M., Al-Swidi, A.K. and Bt Fadzil, F.H.(2014) Audit Committee Characteristics and Executive Committee Characteristics and Firm Performance in Oman: Empirical Study. *Asian Social Science* 10(12), pp.98-113.
- Al-Thuneibat, A.A., Al-Rehaily, A.S. and Basodan, Y.A. (2015) The impact of internal control requirements on profitability of Saudi shareholding companies. *International Journal of Commerce and Management* 25(2), pp.196-217.
- Ayagre, P., Appiah-Gyamerah, I. and Nartey, J. (2014) The effectiveness of Internal Control Systems of banks: The case of Ghanaian banks. *International Journal of Accounting and Financial Reporting* 4(2), pp. 377-389.
- Batrancea, M., Moscviciov, A., Popa, A., and Csegedi, S., (2013) Financial Crisis in Banks. *Annals of Faculty of Economics* 1(2), pp. 411-420.
- Baum, C. (2001) Residual diagnostics for cross-section time series regression models. *The Stata Journal* 1(1), pp. 101–104.
- Bayyoud, M. and Sayyad, A.N. (2015) The Impact of Internal Control and Risk Management on Banks in Palestine. *International Journal of Economics, Finance and Management Sciences* 3(3), pp.156-161.
- BCBS (July 2000) *Internal audit in banking organizations and the relationship of the supervisory authorities with internal and external auditors* Basel Committee on Banking Supervision, Basel, Available: <https://www.bis.org/publ/bcbs72.pdf>

- BCBS (September 2000) *Principles for the Management of Credit Risk* Basel Committee on Banking Supervision, Basel, Available: <https://www.bis.org/publ/bcbs75.pdf>
- BCBS (September 1998) *Framework For Internal Control Systems In Banking Organizations* Basel Committee on Banking Supervision, Basel, Available: <https://www.bis.org/publ/bcbs40.pdf>
- Bett, J.C. and Memba F.S. (2017) Effects of Internal Control on the Financial Performance of Processing Firms in Kenya: A Case of Menengai Company. *International Journal of Recent Research in Commerce Economics and Management (IJRRCEM)* 4 (1), pp. 105-115.
- BHC (2000) *2000 Supervisory Policy and Issues* Bank Holding Company Supervision, US Available: <https://www.federalreserve.gov/publications/files/bhc-2000-201709.pdf>
- BIS (July 2015) *Guidelines Corporate governance principles for banks*, Basel Committee on Banking Supervision: Bank for International Settlements. Available: <https://www.bis.org/bcbs/publ/d328.pdf>
- BIS (November 2005) *International Convergence of Capital Measurement and Capital Standards A Revised Framework* Basel Committee on Banking Supervision, Basel, Available: <https://www.bis.org/publ/bcbs118.pdf>
- BIS (October 1999) *Strengthening The Banking System In China: Issues and Experience : A joint BIS/PBC conference held in Beijing, China* BIS POLICY PAPERS: Bank for International Settlements Available: <https://www.bis.org/publ/plcy07.pdf>

- BIS (October 2017) *FSI Insights on policy implementation No 3 Resolution of non-performing loans policy options* Financial Stability Institute: Bank for International Settlements Available: <https://www.bis.org/fsi/publ/insights3.pdf>
- Brooks, C. (2008) *Introductory Econometrics for Finance*, Cambridge: Cambridge University Press
- Căpraru, B. and Ilnatov, I. (2014) Banks' Profitability in Selected Central and Eastern European Countries. *Procedia Economics and Finance* 16, pp.587-591.
- Chen, J.V., Lu, I., Yen, D. and Widjaja, A. (2017) Factors affecting the performance of internal control task team in high-tech firms. *Information Systems Frontiers* 19, pp.787–802.
- Chou, T.K. and Buchdadi, A.D. (2017) Independent Board, Audit Committee, Risk Committee, the Meeting Attendance level and Its Impact on the Performance: A Study of Listed Banks in Indonesia. *International Journal of Business Administration* 8(3), pp. 24-36.
- Cibulskiene, D. and Rumbaускаite, R. (2012) Credit Risk Management Models of Commercial Banks: their Importance for Banking Activities. *Social Research* 2 (27), pp. 71–77
- CIIA (September 2013) *Effective Internal Audit in the Financial Services Sector Recommendations from the Committee on Internal Audit Guidance for Financial Services: How They Relate to the Global Institute of Internal Auditors' (The IIA) International Standards for the Professional Practice of Internal Auditing (Standards)*, Chartered Institute of Internal Auditors, London, Available: <https://na.theiia.org/standards-guidance/Public%20Documents/Effective%20Internal%20Audit%20Financial%20GLOBAL.pdf>

- COSO (May 2013) *Internal Control — Integrated Framework: Executive Summary*, Durham: Committee of Sponsoring Organizations of the Treadway Commission Available: https://na.theiia.org/standards-guidance/topics/documents/executive_summary.pdf
- D'Ewart, B.(2015) The Effect of CEO Gender, Age, and Salary On Firm Value,[online]. Available: https://scholarship.claremont.edu/cmc_theses/1059/ [10 March 2019]
- De Vita, G. and Luo, Y. (2018) When do regulations matter for bank risk-taking? An analysis of the interaction between external regulation and board characteristics. *Corporate Governance: The international journal of business and society* 18(3), pp.440-461.
- Doyle, J., Ge, W. and McVay, S. (2007) Determinants of weaknesses in internal control over financial reporting. *Journal of Accounting and Economics* 44, pp.193–223.
- Drukker, D. (2003) Testing for serial correlation in linear panel-data models. *The Stata Journal* 3(2), pp. 168–177.
- El-Ansary, O. and Hafez, H.(2015) Determinants of capital adequacy ratio: An empirical study on Egyptian banks. *Corporate Ownership & Control* 13(1), pp.806-816.
- ElBannan, M. (2017) The Financial Crisis, Basel Accords and Bank Regulations: An Overview. *International Journal of Accounting and Financial Reporting* 7(2), pp.225-275.
- El-Kassem, R.C. (2017) Determinants of Banks' Profitability:Panel Data from Qatar. *Open Journal of Accounting* 6, pp. 103-111.

- Enofe, A.O., Mgbame, C., Akhor, S.O. and Okungbowa, F.A. (2013) Internal Control System and Quality Audit Work. *Research Journal of Finance and Accounting* 4(13), pp.100-105.
- Fidanoski, F., Choudhry, M., Davidović, M. and Sergi, B. (2018) What does affect profitability of banks in Croatia? *Competitiveness Review: An International Business Journal* 28(4), pp.338-367.
- Galal Abobakr, M. and Elgiziry, K. (2017) The Relationship Between Board of Directors' Characteristics and Bank Risk-Taking: Evidence from Egyptian Banking Sector. *Journal of Finance and Accounting* 5(1), pp.24-33.
- García-Sánchez, I-M., García-Meca, E. and Cuadrado-Ballesteros, B. (2017) Do financial experts on audit committees matter for bank insolvency risk-taking? The monitoring role of bank regulation and ethical policy. *Journal of Business Research* 76, pp. 52–66.
- Ge, W. and McVay, S. (2005) The Disclosure of Material Weaknesses in Internal Control after the Sarbanes-Oxley Act. *Accounting Horizons* 19(3), pp. 137-158.
- Güleç, Ö.F. (2017) Timeliness of corporate reporting in developing economies: Evidence from Turkey. *Accounting and Management Information Systems* 16(3), pp. 219-239.
- Hair, J. F., Black, W.C., Babin, B.J and Anderson, R.E (2014) *Multivariate Data Analysis*, London: Pearson Education Limited
- Hanim Fadzil, F., Haron, H. and Jantan, M. (2005) Internal auditing practices and internal control system. *Managerial Auditing Journal* 20(8), pp.844-866.

- Hartman, S.W. (2010) The Basel Committee and the International Financial Crisis [Online]. Available: <http://iris.nyit.edu/~shartman/mgmt630/articles/BASEL.pdf> [5 March 2019].
- Hausman, J.A. (1978) Specification Tests in Econometrics. *Econometrica* 46(6), pp. 1251-1271.
- Hodgdon, C. and Porter, R. (2017) Auditor Choice and the Consistency of Bank Accounting: are Some Auditors Stricter than Others When Assessing the Value of a Bank's Loan Portfolio?. *Journal of Accounting and Finance* 17(3), pp.40-54.
- Hoechle, D. (2007) Robust standard errors for panel regressions with cross-sectional dependence. *Stata Journal* 7(3), pp. 281-312.
- Ibrahim, S., Diibuzie, G. and Abubakari, M. (2017) The Impact of Internal Control Systems on Financial Performance: The Case of Health Institutions in Upper West Region of Ghana. *International Journal of Academic Research in Business and Social Sciences* 7(4), pp.684-696.
- IFC (2019). *The Board's Role and Responsibilities Over the Control Environment* WORLD BANK GROUP Available: <https://www.ifc.org/wps/wcm/connect/c8cf6100468133e58da7bd9916182e35/Session+4+-+Control+Environment.pdf?MOD=AJPERES>
- Isik, O. and Ince, A. R. (2016) Board size, board composition and performance: An investigation on Turkish banks. *International Business Research* 9(2), 74-84.
- Karagiorgos T., Drogalas G. and Giovanis N. (2011) Evaluation of the effectiveness of internal audit in Greek hotel business. *International Journal of Economic Sciences and Applied Research* 4(1), pp.19-34.

- Karagiorgos, T., Drogalas, G. and Dimou, A. (2010) Effectiveness of internal control system in the Greek bank sector. *The South European Review of Business Finance and Accounting* 6(2), pp.1-11.
- Kepekci, C. (1989) Internal Auditing in the Turkish Banking Sector. *Managerial Auditing Journal* 4(2), pp.7-12.
- Khlif, H. and Samaha, K. (2016) Audit committee activity and internal control quality in Egypt: Does external auditor's size matter?. *Managerial Auditing Journal* 31(3), pp.269-289.
- Kolapo, T.F., Ayeni, R.K. and Oke, M.O. (2012) Credit risk and commercial banks' performance in Nigeria: A panel model approach. *Australian Journal of Business and Management Research* 2 (2), pp. 31-38
- Koutoupis, A. and Tsamis, A. (2009) Risk based internal auditing within Greek banks: a case study approach. *Journal of Management and Governance* 13, pp.101–130.
- Krejcie, R. and Morgan, D. (1970) Determining sample size for research activities. *Educational and Psychological Measurement* 30, pp. 607-610.
- Kristo, E. (2013) Survey on Bank Internal Audit Function. *European Scientific Journal* 9(13), pp.70-77.
- Kyereboah-Coleman, A. and Biekpe, N. (2006) Do boards and CEOs matter for bank performance? A comparative analysis of banks in Ghana. *Corporate Ownership and Control* 4(1), pp. 119-126.

- Leventis, S. and Weetman, P. (2004) Timeliness of financial reporting: applicability of disclosure theories in an emerging capital market. *Accounting and Business Research* 34(1), pp. 43 –56.
- Li, H. (2015) Managerial Ability and Internal Control Quality: Evidence from China. *International Journal of Financial Research* 6(2), pp.54-66.
- Majiyabo Onyabe, J., Okpanachi, J., Nyor, T., AdabenegeYahaya, O. and Mohammed, A. (2018) Audit Committee Meeting, Expertise and Financial Reporting Quality of Listed Deposit Money Banks in Nigeria. *IOSR Journal of Economics and Finance (IOSR-JEF)* 9(1), pp.60-67.
- Matemilola, B., Bany-Ariffin, A., Azman-Saini, W.and Nassir, A.M. (2017) Does top managers' experience affect firms' capital structure? *Research in International Business and Finance* 45, pp. 488–498.
- Meijer, M. (2017) CEO compensation and risk-taking: Evidence from the US banking industry.[online]. Available: <https://arno.uvt.nl/show.cgi?fid=145043> [25 February 2019]
- Mendoza, R. and Rivera, J. (2017) The Effect of Credit Risk and Capital Adequacy on the Profitability of Rural Banks in the Philippines. *Scientific Annals of Economics and Business* 64(1), pp.83-96.
- Naceur, S. B., (2003) The Determinants of the Tunisian Banking Industry Profitability: Panel Evidence, [Online]. Available:https://www.researchgate.net/publication/228606633_The_determinants_of_the_Tunisian_banking_industry_profitability_Panel_evidence [20 January 2019]

- Niyonsenga, E. and Abuya, J. O. (2017) Internal control system and financial performance in financial institutions in Rwanda: a case of I & M Bank Ltd Rwanda. *African Journal of Business and Industry* 2(3), pp. 46-58.
- Nodeh, F., Anuar, M., Ramakrishnan, S. and Raftnia, A. (2015) The Effect of Board Structure on Banks Financial Performance by Moderating Firm Size. *Mediterranean Journal of Social Sciences* 7(1), pp.258-263.
- OCC (January 2001) *Internal Control Comptroller's Handbook*, Washington:U.S Department of Treasury
- Ohaka, J. and Akani, F. (2017) Timeliness and Relevance of Financial Reporting in Nigerian Quoted Firms. *Management and Organizational Studies* 4(2), pp.55-62.
- Ojo, M. (2009) The role of external auditors in corporate governance: agency problems and the management of risk, Oxford Brookes University,[Online] .Available: <https://mpra.ub.uni-muenchen.de/28149/> [30 January 2019].
- Onumah, J.M., Kuipo, R. and Obeng, V.A. (2015) Effectiveness of Internal Control Systems of Listed Firms in Ghana. *Accounting in Africa* 12A, pp. 31-49.
- Ozili, P.K. (2015) Determinants of Bank Profitability and Basel Capital Regulation: Empirical Evidence from Nigeria. *Research Journal of Finance and Accounting* 6(2), pp. 124-131.
- Papadakis, V. and Barwise, P. (2002) How Much do CEOs and Top Managers Matter in Strategic Decision-Making? *British Journal of Management* 13(1), pp.83-95.

- Pathan, S.(2010) Does board structure in banks really affect their performance? *Journal of Banking & Finance*.
- Pesaran, M. H. (2004) General Diagnostic Tests for Cross Section Dependence in Panels. *Cambridge Working paper in Economics 0435*
- Petria, N., Capraru, B. and Ilnatov, I. (2015) Determinants of Banks' Profitability: Evidence from EU 27 Banking Systems. *Procedia Economics and Finance 20*, pp.518-524.
- Rabab'ah, M., Al-Sir.,O. and Alzoubi, A. (2017) The Impact of the Audit Committees' Properties on the Quality of the Information in the Banking Financial Reports: A Survey on Saudi Arabia. *International Business Research 10(1)*, pp. 175-192.
- Sarkar, J. and Sarkar, S. (2018) Bank Ownership, Board Characteristics and Performance: Evidence from Commercial Banks in India. *International Journal of Financial Studies 6(17)*, pp.1-30.
- Schildbach, J. (2017) Large or small? How to measure bank size, *Deutsche Bank Research*, [Online].Available https://www.dbresearch.com/PROD/RPS_EN-PROD/PROD0000000000443314/Large_or_small%3F_How_to_measure_bank_size.pdf [05 March 2019]
- Serfling, M. A. (2014) CEO age and the riskiness of corporate policies. *Journal of Corporate Finance 25*, pp. 251– 273.
- Staikouras, C. and Wood, G.(2004) The determinants of European bank profitability. *International Business and Economics Research Journal 3 (6)*, pp. 57-68

- Sultana, R. and Haque, M. E. (2011) Evaluation of Internal Control Structure: Evidence from Six Listed Banks in Bangladesh. *ASA University Review (5)1*, pp. 70-81
- Torres-Reyna, O. (2007) Panel Data Analysis: Fixed and Random Effects using STATA, [Online]. Available: <https://www.princeton.edu/~otorres/Panel101.pdf> [10 March 2019]
- Vousinas, G. (2015) The Critical Role of Internal Audit in Addressing Bank Fraud: A Conceptual Framework and Critical Review of the Literature with Future Extensions. [Online]. Available: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2632911 [05 March 2019].
- Vu, H. (2016) The Research of Factors Affecting the Effectiveness of Internal Control Systems in Commercial Banks-empirical Evidence in Viet Nam. *International Business Research 9(7)*, pp.144-153.
- Wang, R. and Wang, X. (2015) What Determines the Profitability Of Banks? Evidence from The US, [online]. Available: <http://summit.sfu.ca/item/15820> [2 February 2019]
- Xu, X. and Gao, L. (2015) An Empirical Study On The Factors Affecting The Effectiveness Of Internal Control Of Listed Corporation -Based On The Perspective Of Corporate Governance. *The Fourteen Wuhan International Conference on E-Business*, pp. 442-448
- Zábajniková, G. (2016) The Audit Committee Characteristics and Firm Performance: Evidence from the UK,[Online]. Available: <https://repositorio-aberto.up.pt/bitstream/10216/84439/2/138239.pdf> [5 April 2019]

- Zhang, Y., Zhou, J. and Zhou, N. (2007) Audit committee quality, auditor independence, and internal control weaknesses. *Journal of Accounting and Public Policy* 26, pp. 300–327.
- Zinca (Voiculescu), C.I. (2016) Measuring the value of internal audit in the banking industry. *Audit Financiar XIV (9)*, pp. 1009-1024.

APPENDIX

Table 8- Breusch-Pagan Lagrange multiplier (LM) random effects- Credit Risk

Breusch and Pagan Lagrangian multiplier test for random effects

$$\text{CrRisk}[\text{BankHolding}, t] = Xb + u[\text{BankHolding}] + e[\text{BankHolding}, t]$$

Estimated results:

	Var	sd = sqrt(Var)
CrRisk	.3816212	.617755
e	.1639793	.4049436
u	.1865493	.4319136

Test: $\text{Var}(u) = 0$

chibar2(01) = 320.30
 Prob > chibar2 = 0.0000

Table 9- Breusch-Pagan Lagrange multiplier (LM) random effects- Profitability

Breusch and Pagan Lagrangian multiplier test for random effects

$$\text{Prof}[\text{BankHolding}, t] = Xb + u[\text{BankHolding}] + e[\text{BankHolding}, t]$$

Estimated results:

	Var	sd = sqrt(Var)
Prof	.2835801	.5325224
e	.037939	.1947793
u	.2532612	.5032507

Test: $\text{Var}(u) = 0$

chibar2(01) = 1299.63
 Prob > chibar2 = 0.0000

Table 15- Hausman test- Profitability

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fe	(B) re		
BodNumb	.0100521	.0093676	.0006845	.0022814
BodInd	.0014968	.0009925	.0005043	.0005941
CEOYears	-.0022856	.0017232	-.0040088	.0019666
CEOAge	-.0003056	-.0045621	.0042566	.0016029
LoantoAss	.0094491	.0063282	.0031209	.0010164
NumbofDays	.0019857	.0016478	.000338	.0004236
AutComExp	-.0016411	-.0020772	.0004361	.0002681
AudComMeet	-.003218	-.001832	-.001386	.0018139
BankSize	-.1572867	-.086509	-.0707777	.0259403
BankAge	-.0161574	-.007939	-.0082184	.0034533
ExterAudit	.002182	.0369257	-.0347437	.0209259

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(11) = (b-B)'[(V_b-V_B)^(-1)](b-B)
 = 41.34
 Prob>chi2 = 0.0000

Table 16- Hausman test- Compliance

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fe	(B) re		
BodNumb	-.0384957	-.0846919	.0461963	.0235209
BodInd	.0114756	.0093392	.0021364	.0062084
CEOYears	-.0141935	.0041558	-.0183493	.0186754
CEOAge	.0212559	.0157499	.005506	.0153339
LoantoAss	-.1847149	-.1579349	-.02678	.0090513
NumbofDays	-.0190395	-.018806	-.0002335	.0045984
AutComExp	-.0089904	-.0069104	-.00208	.0027227
AudComMeet	.0604343	.0530973	.007337	.0185114
BankSize	-.2544827	-.5789406	.3244579	.2161652
BankAge	-.1004781	-.0543982	-.0460798	.0280423
ExterAudit	.6643389	.6087506	.0555883	.1982466

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(11) = (b-B)'[(V_b-V_B)^(-1)](b-B)
 = 39.13
 Prob>chi2 = 0.0001

Table 17- Modified Wald Test- Credit Risk

Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: $\sigma(i)^2 = \sigma^2$ for all i

chi2 (210) = 2.2e+31
Prob>chi2 = 0.0000

Table 18- Modified Wald Test- Profitability

Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: $\sigma(i)^2 = \sigma^2$ for all i

chi2 (210) = 2.1e+31
Prob>chi2 = 0.0000

Table 19- Modified Wald Test- Compliance

Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: $\sigma(i)^2 = \sigma^2$ for all i

chi2 (210) = 6.1e+31
Prob>chi2 = 0.0000

Table 20- Wooldridge test- Credit Risk

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

F(1, 207) = 148.791
Prob > F = 0.0000

Table 21- Wooldridge test- Profitability

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

F(1, 208) = 17.582
Prob > F = 0.0000

Table 22- Wooldridge test- Compliance

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

F(1, 208) = 27.645
Prob > F = 0.0000

Table 23- VIF

Variable	VIF	1/VIF
BankSize	3.25	0.308130
NumbofDays	2.45	0.408681
ExterAudit	1.71	0.583785
CEOYears	1.62	0.618950
CEOAge	1.57	0.637128
BodNumb	1.30	0.769711
BankAge	1.28	0.779016
AudComMeet	1.14	0.875739
LoantoAss	1.11	0.901885
BodInd	1.08	0.927972
AutComExp	1.06	0.947151
Mean VIF	1.60	

Table 24- Pesaran's test- Credit Risk

Pesaran's test of cross sectional independence = 10.081, Pr = 0.0000

.

Table 25- Pesaran's test- Profitability

Pesaran's test of cross sectional independence = 7.839, Pr = 0.0000

.

Table 26- Pesaran's test- Compliance

Pesaran's test of cross sectional independence = 9.314, Pr = 0.0000

.