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NELLE AZIENDE"
AREA: ACCOUNTING AND AUDITING

THE EFFECTIVENESS OF INTERNAL CONTROLS
OVER FINANCIAL REPORTING

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INTRODUCTION

This thesis addresses the topic of Internal Controls over Financial Reporting. This topic has been widely addressed by the researches in the United States of America (US) after the Sarbanes-Oxley Act due to the increase of responsibilities on these controls. Italy has followed the US regulation with the law number 262 of 2005 and Internal Controls over Financial Reporting have become of the interest of the regulators and of the companies that have to implement their evaluation.

The thesis aims to analyze the effectiveness of Internal Controls over Financial Reporting. The effectiveness can be analyzed looking at the output of the Internal Controls over Financial Reporting evaluation or looking at the procedures used in this evaluation.

The outputs of the evaluation are the Internal Control Deficiencies found and disclosed to the market by the responsible for Internal Controls over Financial Reporting, that usually is the Chief Financial Officer (CFO). Literature based on Sarbanes-Oxley Act usually uses this approach because in US is possible to have public data on Internal Control Deficiencies disclosed to the market. In Italy this kind of disclosure is limited, thus one part of the thesis analyzes the Internal Control Deficiencies found by the companies but not disclosed to the market because under the materiality level. The thesis looks at the Internal Auditor Detection Process to understand where are the problems that bring to more severe and persistent Internal Control Deficiencies and look for the type of Internal Control Deficiencies more severe and persistent. The idea under this research is to find the more problematic issues where the companies have to focus to increase the effectiveness of their Internal Controls over Financial Reporting.

Because of this difficulty in data availability for Internal Control Deficiencies, the effectiveness have been analyzed looking at the procedures used to evaluate the Internal Controls over Financial Reporting. The procedures have been analyzed looking at the quality of each phase of the audit cycle. The Internal Controls over Financial Reporting have been divided in its components of Entity Level Controls, Account-specific Controls and Information Technology Controls. Information Technology Controls Quality has been then related to audit risk and audit fees to see the relation between internal controls and external controls performed by external auditors. The idea under this research is that if the internal controls are effective and assure a higher reliability of financial reporting, the external auditors can reduce their work.

Finally Information Technology Controls have been deeply investigates in their relevant component of outsourced controls. Based on specific frameworks, one part of the thesis address the Audit Quality of Outsourced Information Technology Controls, that is of significant interest nowadays. The idea under this research is that the evaluation of these controls without going directly in the outsourcers' location is not enough to assure the effectiveness and the reliability of financial reporting that use the information technology controlled. Even if the standards let to use indirect evaluation or service auditors' attestations, the thesis proposes to use the direct evaluation for a better effectiveness.

Thus, the thesis is structured in three studies:

1. Audit Quality of Outsourced Information Technology Controls.

2. Information Technology Controls Quality and Audit Fees: Evidence from Italy.

3. Internal Auditor Detection Process and Internal Control Deficiencies Types.

The order of the presentation follows the advancement of the paper for the publication.

OVERVIEW

Audit Quality of
Outsourced InformationTechnology Controls

Abstract

Purpose – This paper aims to test the positive relationship between audit quality (AQ) of outsourced information technology controls (ITC) and information technology audit quality (ITAQ).

Design/methodology/approach – Factor analysis, ordinary least squares (OLS) regressions and simulations.

Findings – Scoping and planning phases of the audit cycle account for about 69 per cent of ITAQ. The AQ of outsourced ITC is strongly and directly related to ITAQ. Improvement of AQ of outsourced ITC may be achieved through evaluation of control design and operating effectiveness by service auditor as well as direct evaluation by the client in service provider location.

Research limitations/implications – Sample size and input items in factor analysis.

Practical implications – Companies and auditors could improve ITAQ through a better organization of the scoping and planning activities; they could also improve the AQ of outsourced ITC using direct evaluation in the service provider location supplemented with service auditor reports. Regulators could refine or change laws and frameworks to take into account the factors of ITAQ and the methodology of evaluation of outsourced ITC.

Originality/value – Private data collected by questionnaire. The measures of ITAQ and the OLS model could be tested in future research, in countries with different frameworks and regulations related to AQ, different weight of outsourced information technology and other characteristics related to clients, service providers and service auditors.

Keywords: Information technology, Outsourcing, Internal controls, Audit quality, Financial reporting

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Information Technology Controls Quality and
Audit Fees: Evidence from Italy

Abstract

Purpose – This study analyzes the impact of Information Technology (IT) Controls quality on control risk and audit fees. It tests the reduction of control risk when IT Controls quality increases. The relation is expected when the regulation increases sensitiveness to audit risk assessment. The research focuses on IT Controls as part of Internal Control over Financial Reporting, particularly on scoping quality, segregation of duties and Controls framework compliance.

Design/methodology/approach – The research was conducted with a questionnaire on the population of Italian listed companies. Ordinary least square regressions are performed to test the expected relation between audit fees and IT Controls.

Findings – Audit fees decrease according to IT scoping quality, IT Controls segregation of duties and IT Controls framework compliance. The overall conclusion is that IT Controls quality decreases control risk, audit fees, audit effort and support the audit risk model.

Originality/value – Results, mainly based on private data, fill the gap of the literature related to the reduction of audit fees when the improvement of IT Controls reduces control risk.

Practical Implications – Given that improved IT Controls quality reduces audit fees, regulators and auditors have strong grounds for promoting: 1) the application of the COmmittee of Sponsoring Organization framework in the manufacturing and services industry; 2) IT map and IT segregation of duties in the financial industry.

Keywords: Audit Fees, Audit Risk, Internal Audit, Internal Control, Information Technology auditing

1. INTRODUCTION

This study tests the reduction of audit fees resulting from higher quality of Information Technology (IT) Controls which may result from a reduction of control risk and audit effort. When control risk decreases thanks to higher control quality, auditors can place more trust in internal controls and thus make less effort in the audit [1] and charge lower audit fees. IT plays an essential role in accounting information systems and IT Controls are a key element of Internal Control over Financial Reporting (ICFR). We therefore investigate the role of IT Controls quality in reducing audit fees.

Prior literature analyzed the relationship between audit effort and audit risk and found that before the Sarbanes-Oxley Act of 2002, (SOX), the audit plan was often not fully risk-adjusted in defining of the amount of audit hours and audit fees. Some specific results show that audit effort are responsive when the audit risk increases but not when audit risk decreases. Furthermore, prior studies find a relation between audit effort and inherent risk but not between audit effort and control risk. This study contributes to filling gaps in the literature covering the relationship between audit effort and control risk, by analyzing the case where control risk decreases and ICFR become more stringent.

Control risk can decrease as a results of regulation on ICFR evaluation, such as SOX and other national legislation. The work of Hogan and Wilkins (2008) and Hoitash et al. (2008) found that SOX strengthened the negative relation between ICFR and audit effort. Following this work, we investigate whether Italian legislation, known as "Light SOX" brings the same benefits.

We examine IT Controls, focusing on IT Controls scoping quality, IT Controls segregation of duties and IT Controls framework compliance. IT Controls scoping quality is evaluated using three instruments: 1) IT map of financial application and infrastructure services; 2) IT risk assessment; 3) IT link with business. The segregation of duties in IT Controls typically involves separating out the three duties of responsibility, test execution and remediation. But the segregation of duties is different in IT Controls compared to other internal controls because a high level of skills is needed in both IT and auditing. IT Controls framework

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[1] "Obtaining sufficient evidence to support control risk assessments of low for purposes of the financial statement audit ordinarily allows the auditor to reduce the amount of audit work that otherwise would have been necessary to opine on the financial statements", PCAOB – Auditing Standard 5 – Paragraph 8, p. 22.

compliance, in this research, means the voluntary adoption of United States of America (USA) IT Controls frameworks. We evaluate IT Controls framework compliance by comparing the companies' number of processes and objectives to IT framework requirements.

We collected private data on IT Controls through interviews and questionnaires, with the cooperation of listed companies and audit firms. We collected data on audit fees and on control variables directly from consolidated financial reporting and Stock Exchange databases.

Results indicate that audit fees decrease when there is an increase in IT scoping quality, IT Controls segregation of duties and IT Controls framework compliance. IT map and IT segregation of duties (as key components of IT scoping quality) reduce audit fees in financial industry: this industry has invested great resources in mapping financial applications and IT infrastructure services and in implementing an efficient IT segregation of duties between the Internal Audit department, the IT department or other departments.

Our results support the application of the Commission Of Sponsoring Organization (COSO) framework in manufacturing and services industry. This industry, mainly characterized by small and medium companies and less complex processes, may improve IT Controls quality following the requirements of COSO framework.

The overall interpretation is that higher IT Controls quality decreases control risk and audit fees, which supports the validity of the audit risk model. Our findings support that the legislation in Italy makes audit effort more sensitive to control risk, when control risk decreases and internal control quality increases.

Based on prior results, regulators and auditors can stress the application of the Committee of Sponsoring Organization framework in manufacturing and services industry, and the IT map and the IT segregation of duties in financial industry.

The remainder of this paper is organized as follows. Section Two reviews the literature and develops the research question. Section Three explains the method (model, interviews, questionnaire and database, sample). Sections Four, Five and Six show respectively descriptive statistics and correlation matrix, regression results and sensitivity analysis. Finally, Section Seven highlights the conclusions.

2. LITERATURE REVIEW AND RESEARCH QUESTION DEVELOPMENT

The audit risk model presented in Statement on Auditing Standards No. 47 (American Institute of Certified Public Accountants [AICPA] 1983) says that for a given client the acceptable audit risk is a function of inherent risk, control risk and detection risk.

The model implies the relations showed in Figure 1. Relation (a) shows the relation between IT Controls quality and control risk: an increase in ICFR quality, in its component of IT Controls, has an impact on audit risk decreasing control risk.

Relation (b) underlines the impact of control risk on detection risk, given relation (a). When control risk decreases thanks to an increase in IT Controls quality, auditors can place more trust in internal controls, including IT controls, and can thus set up the planned detection risk based on control risk, establishing less substantive tests.

Relation (c) links detection risk and audit fees, given relations (a) and (b). Establishing less substantive tests because the IT Controls quality is high, the auditors can plan less effort in the audit. Planning less effort means that auditors can reduce audit fees.

Figure 1 – Relation among Internal Control over Financial Reporting, Audit Risk and Audit Effort
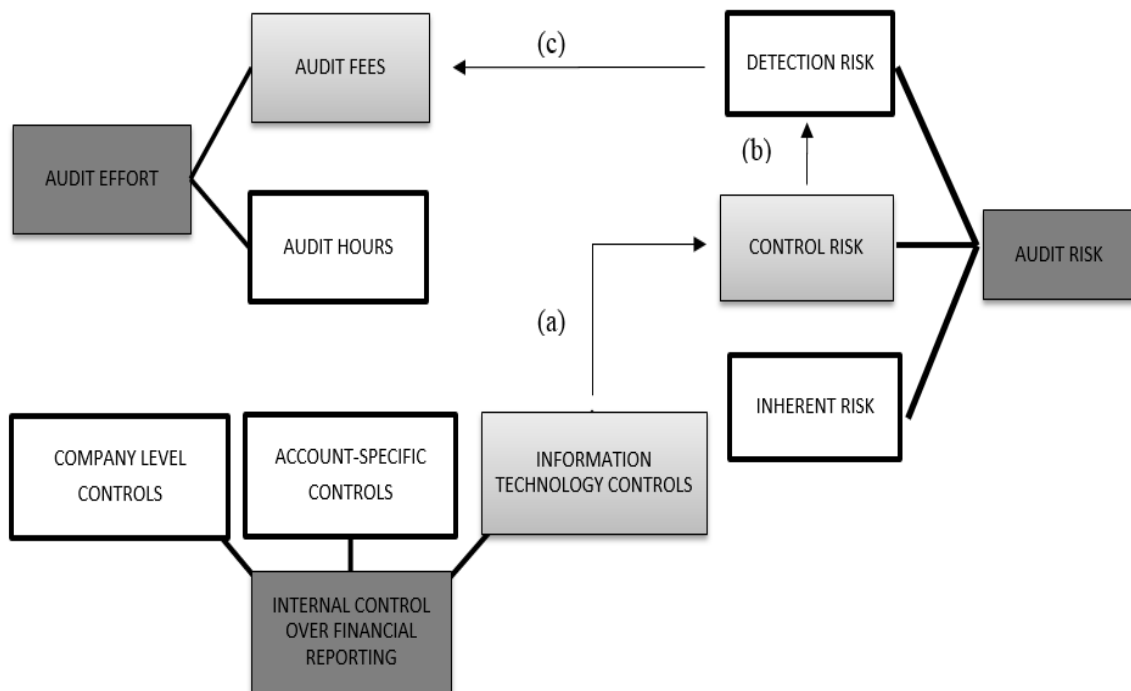
- Light grey: operative variables used by the study
- Dark grey: conceptual variables used by the study
- White: other variables in the relation

To develop our research question, we focus on the literature that examines the relation between audit effort and audit risk:

- Early studies in the late 1980s found that the change in risk has an effect on audit effort in only one direction: when the change is positive and the risk increases. Biggs et al. (1988) in an experimental study found that audit effort increased when risks were considered to have gone up, but did not decrease for lower risks. Bedard (1989), in an archival study, found that audit effort was lower when internal control evaluation was favorable (low control risk) but was not higher in the opposite case. We thus identify a gap in the literature regarding the association between control risk and audit effort. There appears to be no research demonstrating that audit effort decreases when this relevant component of audit risk model decreases.

- Other studies present separate findings for inherent risk and control risk. O'Keefe et al. (1994), and Hackenbrack and Knechel (1997) find that audit effort is responsive to inherent risk but not to control risk. This is a further gap in the literature: there appears to be no detailed research on the impact of control risk on audit effort.

More recent studies use audit fees as a proxy for audit effort. Following these studies, we too use audit fees as a proxy for audit effort, as has been found to be the case in studies with data available for both auditor labor hours and audit fees (Bell et al., 2001). These studies support prior results. Felix et al. (2001) find that audit effort is responsive to inherent risk but not to control risk.

So the relation between audit effort and audit risk appears to be largely unexplored in cases where control risk decreases. The present study aims to fill these gaps by testing how increased IT Controls quality reduces control risk and audit effort.

The literature concludes that audit effort was not strongly risk-adjusted prior to the Sarbanes-Oxley Act of 2002, which is inconsistent with the audit risk model. The results of Mock and Wright (1993), Bedard and Wright (1994), DiPietro et al. (1994), Quadackers et al. (1996), Mock e Wright (1999) do not reveal a significant relationship between audit effort and changes in risks.

Hogan and Wilkins (2008) and Hoitash et al. (2008), however, show that SOX increased auditors' sensitivity to control risk. These authors support the finding by Raghunandan e Rama (2006) that audit fees for companies with internal control problems are significantly higher and the fee effect is economically significant. Similar results were found by Krishnan et al. (2008) for audit fees associated with SOX 404, and by Bedard et al. (2008) for non-accelerated filers.

We opt to test for a reduction of audit fees when control risk decreases given that Law 262/2005 in Italy was intended to perform the same functions as the Sarbanes-Oxley Act of 2002 in the USA. Unlike Hogan and Wilkins (2008), Hoitash et al. (2008), Raghunandan e Rama (2006), Krishnan et al. (2008), Bedard et al. (2008), who all use public data on internal control deficiencies, we use private data on the audit risk process. Private data can yields better insight into the 'black-box' of audit activity.

Previous studies on ICFR deficiencies classified internal controls by nature into entity level, IT and account-specific controls, as first suggested by Doyle et al. (2007). Azzali and Mazza (2011) suggest the same classification for IT Controls. Our contribution is to investigate IT Controls quality as a key aspect of ICFR quality. IT plays an essential role in accounting information systems and IT Controls are a key element of ICFR. We focus on control risk related to IT because of its importance in audit pricing, as shown by Hoitash et al. (2008). They find that audit fees vary according to the nature of controls for companies with internal control deficiencies.

Our contribution is related to the insights into the functioning of internal control systems of IT Controls in specific companies and how this interact or stand out in comparison with the previous fee findings (Hay et al., 2006). Among the several elements that can affect IT Controls quality, we select 3 variables: IT Controls scoping; IT Controls segregation of duties; IT Controls framework compliance. All these variables are related to the planning stage.

We expect that IT Controls quality will increase when IT Controls scoping identifies riskier IT linked to a company. Scoping is the process of selecting elements for inclusion in the audit cycle and consists of: identifying all elements to be included in the audit cycle (IT MAP); selecting riskier elements which may lead to a material misstatement in the financial reporting from this map (IT RISK); selecting the IT elements with strongest links to the business from the map (IT LINK). Previous research describes additional IT RISKS linked to electronic data

processing and its specific areas (Enterprise Resource Planning analyzed by Hahn, 1999; O'Leary, 2000;Jones and Hunton, 2000; Brady et al., 2001;Wright and Wright, 2002;Hunton et al., 2004;Brazel, 2005; Brown and Nasuti, 2005; Brody and Kearns, 2009; Kuhn and Sutton, 2010; Electronic Data Interchange analyzed by Hansen and Hill, 1989; Morris and Pushkin, 1995; Schneider, 1995). IT LINK is based on the principle that IT scoping cannot be separated from business scoping. Henderson and Venkatraman (1992) suggest a model for strategic alignment. Chan et al. (1998) indicate that information system alignment has a positive impact on business performance, which is supported by other studies (Kearns and Lederer, 2000; Tallon et al., 2000; Cragg et al., 2002; Tallon, 2003; Avison et al., 2004; Chan et al., 2006). Sabherwal and Chan (2001) indicate that alignment affects perceived business performance, but only in some organizations.

Next, we expect that IT Controls quality will increase when IT Controls assignment of duties is efficient. Because of the high number of groups potentially involved in assessing and managing the field, assigning duties and responsibility to different departments (IT Controls segregation of duties) is one cause of the complexity of IT that requires investigation in order to have a measure of IT Controls quality. The groups potentially involved include managers, evaluators (internal and external auditors) and system designers (IT departments, in-house experts or outside consultants) (International Federation of Accountants- IFAC, 1995; Hermanson et al., 2000; Norman et al., 2009). Difficult communications, cooperation and integration between managers/evaluators and system designers are some of the main problems in IT audit cycles. IT requires specific skills often possessed only by system designers. But compliance with both the Sarbanes-Oxley Act and with Law 262/2005 requires business and audit skills possessed only by managers and evaluators (Cannon and Crowe, 2004; McCausland, 2004). Nichols (1987) and Ashton et al. (1991) indicate that the segregation of duties is essential to ensure internal control system reliability. Ashton (1974) reports that the segregation of duties accounted for 76.7 per cent of the variance in auditors' internal control system evaluation decisions, a finding which was supported by Hamilton and Wright (1982). Further studies analyze the segregation of duties in audit functions (Malguzzi, 2007; Bencini et al., 2008; Servato, 2008; Bencini and Filippini, 2009). In line with the above studies on the different skills possessed by groups, IT Controls RESPONSIBILITY should normally be assigned to IT departments (Ziegenfuss, 2008). And in line with the above studies on the importance of the segregation of duties, TEST EXECUTION should not be assigned to IT departments because this could undermine the reliability of financial reporting and bring the

risk of mistakes or fraud. It should rather be assigned to other evaluators, such as the Internal Audit function (Control Objectives for Information and related Technology - COBIT for Sarbanes-Oxley Act, 2006; PCAOB, 2007). However in small-medium companies which are very widespread in Italy, Internal Audit may not perform robust evaluation because of its low level of IT specific skills. The activity of REMEDIATION is linked to IT CONTROLS RESPONSIBILITY.

Finally, we expect that IT Controls quality will increase when the number of processes and objectives to perform the test is efficiently defined in relation to the framework. In Italy there is no separate authority setting guidelines. Italian listed firms usually refer to USA frameworks. The two frameworks, Commission Of Sponsoring Organization - COSO Report, and the Control OBjectives for Information Technology – COBIT, most widely used on a voluntary basis in Italy (Azzali and Mazza, 2013) were selected for our study to investigate IT CONTROLS FRAMEWORKS COMPLIANCE. Many studies examine COSO and COBIT reports, (Lainhart, 2000; Panko, 2006; Kuhn, 2007; Tuttle and Vandervelde, 2007; Garelli, 2009; Bernroider and Ivanov, 2011;Cereola and Cereola,2011; Mishra and Weistroffer, 2007; Merhout and Havelka, 2008). COSO is a model for internal controls and corporate governance (Harris 2006). Although it was not designed for IT Controls, it can be applied to IT Controls (Linkhous, 2008; Wallace et al., 2011). The 2006 version of COSO covers IT Controls in Principle No. 14, where it is classified into four processes: systems development, change management, security and logical access and computer operations. The same taxonomy is used in Auditing Standard 5 (PCAOB, 2009). COBIT for Sarbanes-Oxley Act is a model for IT Controls, especially for IT Controls related to financial reporting (COBIT for Sarbanes-Oxley Act, 2006). It describes approximately 12 processes divided into nearly 80 control objectives.

To summarize, we expect that a high level of IT Controls quality decreases audit fees because internal auditors map correctly, select IT elements that are risky and linked to the business, and combine IT and audit skills in assigning duties and defining the number of processes and objectives. All this allows external auditors to build on the work of the internal auditors and thus to reduce their effort in planning. Our research question is the following:

Does IT Controls quality decrease audit fees?

Testing the research question that IT Controls quality decreases audit fees, the study aims to show that an improvement of this component of ICFR is likely that produces a reduction of control risk and audit efforts.

3. METHOD

3.1. Model

We summarize the research question in the following model:

AUDIT FEES= α + β_1IT MAP + β_2IT RISK + β_3 IT LINK + β_4 IT CONTROLS SEGREGATION OF DUTIES + β_3IT CONTROLS FRAMEWORK COMPLIANCE + $\sum_{n=4}^{6} \beta_n$ CONTROL VARIABLES + YEAR FIX EFFECT

The study uses a cross-sectional ordinary least square (OLS) audit fees regression model, with the dependent variable measured with the natural log of audit fees. As regards the independent variables we measure IT Controls scoping with three specific variables based on frameworks definitions. Firstly, we measure IT MAP as the presence of a matrix that includes the list and the description of financial applications and IT infrastructure services (COBIT for Sarbanes-Oxley Act 2006, p. 27/28). Secondly, we measure the IT RISK assessment as the presence of an activity that evaluates the likelihood and the impact of the misstatement that one IT element could have on the financial reporting (COBIT for Sarbanes-Oxley Act 2006, p. 31/32). Finally, we measure the IT LINK with business as the presence of an activity that determines whether the IT elements support the business (COBIT for Sarbanes-Oxley Act 2006, p. 12/13). We predict that IT MAP, IT RISK and the IT LINK reduce audit fees because improved IT Controls scoping reduces the need for additional work in scoping by external auditors.

In this study, IT Controls segregation of duties is the number of duties actually assigned to a different department divided by the number of duties that could be assigned to a different department (3 = IT Controls responsibility, test execution and remediation). We predict that the segregation of duties, as a principle of auditing, reduces audit fees. However, considering the requirement for IT skills this may not necessarily be the case.

IT Controls framework compliance is measured with the inverse of the cross-sectional Euclidean distance between the number of processes or objectives and this number as defined by frameworks. A firm is compliant if it uses a number of IT Controls processes and objectives similar to the number suggested by frameworks. These frameworks, after a general description of principles, focus in the classification of the typology of IT processes that firms need to control, independently of other factors, and break each process down into objectives. They thus lay down a fixed number of processes/objectives, which take account of company complexity in different ways. COSO defines a fixed number of processes (four), and supplies different levels of description for complex or less complex environments. COBIT for Sarbanes-Oxley Act takes into account the complexity and characteristics of different companies by making a selection from the entire range of COBIT (Appendix C in COBIT for Sarbanes-Oxley Act). The IT Controls framework compliance is the COBIT compliance in Model 1 and the COSO for Sarbanes-Oxley Act compliance in Model 2 (Tables 5 − 6). We proxy the more complex IT environment with the financial industry and the less complex with the manufacturing and service industries, and we predict that: compliance with COSO report decreases audit fees in the manufacturing and service industries where less complex companies tend to need an aggregate level of classification (few general processes); and compliance with COBIT for Sarbanes-Oxley Act decreases audit fees in the financial industry where more complex firms tend to use a disaggregate level of classification (higher stratification of the processes).

As regards control variables, audit fees regression models use test variables of interest concerning internal control plus an additional set of variables to control for general cross-sectional differences in factors that affect fees (Simunic, 1980; Francis, 1984; Palmrose, 1986; Francis and Simon, 1987; Chan et al., 1993; Craswell et al., 1995; Simunic and Stein, 1996; Collier and Gregory, 1996; Hay et al., 2006; Francis et al. 2005; Choi et al., 2010; DeFond et al., 2000; Whisenant et al., 2003; Basioudis and Francis 2007; Jiang and Wu, 2009). We include the following control variables: SIZE, LOSS, ROI, DE, CATA, QUICK, FOREIGN, SEGMENTS, MARKET CAPITALIZATION, BIG4, FIRM ROTATION, PARTNER ROTATION, AUDIT OPINION, NON-AUDIT FEES (Table 1). The natural logs of total assets and market capitalization are proxies for client SIZE (Simunic, 1980; Francis, 1984), LOSS, DE and CATA are proxies for client-specific litigation risks borne by auditors (Francis, 1984; Hay et al., 2006). We include the number of business SEGMENTS rather than the number of subsidiaries, as additional proxy together with FOREIGN, because operationally diversified firms may require more complex audits (Simunic, 1980; Francis et al. 2005; Choi et al., 2010).

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We include BIG4 and AUDIT OPINION variables to capture the fee premium associated with being audited by a Big4 audit firm or with the bigger investigative efforts required in where there is a going concern issue (DeFond et al., 2000; Choi et al., 2010). Audit opinion in Italy is different from that in USA. We select opinions where the auditor is unable to formulate an opinion due to going concern issue or where the auditor simply notes an issue on going concern (not considered material) in a separate section of the report. Given the findings of prior research, higher fees are also associated with higher NON-AUDIT FEES (Whisenant et al., 2003; Basioudis and Francis 2007). We expect the coefficients for all the above control variables, except ROI, QUICK and FIRM ROTATION, to be positive, since the literature shows that audit fees are positively related to client size, client-specific risk factors and client complexity. Clients with higher ROI have lower fees because of risk sharing, and clients with higher QUICK have lower fees because there is more liquidity. Lower fees are expected due to lowballing effects when the auditor changes. Because data is available for Italy, we are also able to include PARTNER ROTATION. We perform the regressions separately for the manufacturing and service and the financial INDUSTRIES to control for differences across them (Francis et al., 2005; Basioudis and Francis 2007).

Table 1 – Definition of Variables

Dependent variable	
AUDIT FEES	Natural log of Audit Fees
Independent Internal Control Variables	
IT MAP	Indicator variable, 1 = if companies have a matrix that includes the list and the description of financial applications and IT infrastructure services, 0 = otherwise
IT RISK	Indicator variable, 1 = if companies evaluate the likelihood and the impact of the misstatement that one IT element could have on the financial reporting, 0 = otherwise
IT LINK	Indicator variable, 1 = if companies have an activity that understands if the IT elements support the business, 0 = otherwise
IT CONTROLS SEGREGATION OF DUTIES	The number of duties actually assigned to a different department divided by the number of duties that could be assigned to a different department (3 = IT CONTROLS RESPONSIBILITY, TEST EXECUTION, REMEDIATION) $$\frac{\#\text{duties assigned to different department by questionnaire}}{3}$$ (we thank the anonymous referee for the suggestion of the operalization of this variable)
COSO COMPLIANCE	the inverse of the cross-sectional Euclidean distance between the number of processes from the questionnaire and this number as defined by COSO defined in the principle n°14 (4). We standardize the indicator putting +1 at the denominator. $$\frac{1}{1 + \sqrt{(\#\text{processes by questionnaire} - 4)^2}}$$
COBIT COMPLIANCE	the inverse of the cross-sectional Euclidean distance between the number of processes (12) and objectives (80) from the questionnaire and this number as defined by COBIT for SARBANES-OXLEY ACT in the APPENDIX C. We standardize the indicator putting +1 at the denominator. $$\frac{1}{1 + \sqrt{(\#\text{processes by questionnaire} - 12)^2} + \sqrt{(\#\text{objectives by questionnaire} - 80)^2}}$$
Independent Control Variables	
SIZE	Natural log of total assets
LOSS	Indicator variable, 1 = negative earning, 0 = otherwise
ROI	Ratio of earnings before interest and tax to total assets
DE	Ratio of long term debt to total assets
CATA	Ratio of current assets to total assets
QUICK	Ratio of current assets (less inventory) to current liabilities
FOREIGN	Indicator variable, 1=Presence of foreign currency translation in the other comprehensive income, 0=otherwise
SEGMENTS	Number of operating segments
CAPITALIZATION	1 = Index FTSE Italy Micro Cap 2 = Index FTSE Italy Small Cap 3 = Index FTSE Italy Mid Cap 4 = Index FTSE Italy Mib
BIG4	Indicator variable, 1= if the auditor is D&T, KPMG, E&Y or PWC, 0=otherwise
FIRM ROTATION	Indicator variable, 1=voluntary auditor rotation, 0=otherwise
PARTNER ROTATION	Indicator variable, 1=partner rotation, 0=otherwise
AUDIT OPINION	Indicator variable, 1=going concern problem where the auditor is unable to formulate an opinion or where the auditor simply notes the problem (not considered material) in a separate section of the report (clean opinion with emphasis on matter paragraph)., 0=otherwise
NON-AUDIT FEES	Natural log of non-audit fees paid to the auditor

All the continuous variables are in thousands of Euro and are winsorized at 1%

3.2. *Interviews, questionnaire and database*

We collected private data on IT Controls through interviews and questionnaires.

We performed 6 interviews on 2 companies from each industry (the banking, the insurance and the manufacturing and service industries), because different industries have different IT systems and different internal control systems. Moreover, size (total assets) can influence the evaluation process because larger firms have more resources and more controls. We thus selected one firm from the top and one firm from the bottom quartile of the total assets for each industry. Interviews were carried out during the period May – August 2010. We conducted exploratory interviews with a general open question: "How do you evaluate the IT Controls?" Face-to-face interviews of chief financial officer or financial staff were carried out by two professors and a Ph.D. student. Each interview lasted about 3 hours because after answering the first general question, firms often showed us their IT control system and the details of controls and the procedures of the audit cycle. The information collected was mainly used to draw up a questionnaire and interpret responses to it. We prepared the questionnaire together with external auditors from one of the Big4. We discussed and selected instruments for each construct based on frameworks. External auditors made a key contribution in ensuring language would be comprehensible for the target companies. We used yes/no questions, multiple choice about the procedures implemented for the evaluation process and open questions asking the number of processes and objectives of controls, with none of the questions requiring discretionary judgment. Appendix A shows the questions used in this research and their relation with the variables defined for the regression models.

The questionnaire was next tested on three firms from the target population: a bank, an insurance firm and a manufacturing firm. On the basis of their responses and comments, the questionnaire, the study design and the measurement of some constructs were slightly adapted.

The questionnaire focused on evaluating the year 2010 and was distributed by email in 2011. The distribution procedure involved sending a survey package containing the questionnaire and a covering email underlining the importance of the research and encouraging firms to reply. In order to increase the response rate, companies which had not yet responded were contacted by phone after three weeks.

We opted to make the questionnaire confidential, i.e. although the names of respondent companies are known to us they are not disclosed here and results are shown only in aggregate form. We were thus able to link the data collected by questionnaires with other sources. Finally,

we hand-collected data from the consolidated annual reports for firms using IFRS, from company web sites and the website of the *Borsa Italiana*, the Italian Stock Exchange.

3.3.   Sample

For this research, the population is the 255 Italian companies listed on the Milan Stock Exchange which are explicitly targeted at monitoring and assuring compliance with Law 262/2005.

We sent the questionnaire to 122 companies which agreed to take part. We received 109 answers (response rate: 89%; 43% of the population). Among respondents, 50 firms operate an IT Controls evaluation process. This sample thus represents nearly 20% of the population (50 of 255). We performed the analyses for the two samples, the full sample (109) and the sample of companies that implement IT Controls evaluation (50).

For the full sample we obtained 84 observations for the manufacturing and service industries and 25 observations for the financial industry. For the sample implementing IT Controls evaluation, we obtained 31 observations for the manufacturing and service industries and 19 observations for the financial industry (Table 2).

Table 2 – Sample Selection

	Total	Manufacturing and service industry	Finance industry
Panel A – Full sample			
Total number of companies listed on the Milan Stock Exchange in 2010	255	219	36
Less companies not willing to supply information requested	-133	-127	-6
Total companies to whom questionnaire sent	122	92	30
Less companies not answering questionnaire (Response rate: 89%; 43% of the population)	-13	-8	-5
Total number of companies answering questionnaire	109	84	25
Panel B – Sample with an IT Controls evaluation			
Number of companies from Panel A	109	84	25
Less number of companies without an IT Controls evaluation process	-59	-53	-6
Total number of companies with an IT Controls evaluation process (about 20% of the population)	50	31	19

4.   DESCRIPTIVE STATISTICS AND CORRELATION MATRIX

Table 3 shows the descriptive statistics of the internal control variables and the control variables for the full sample and for the sample of companies implementing an IT Controls evaluation process.

In the full sample, few companies implement IT Controls scoping (22.6-36% map, 19-24% risk and 26.2-36% link), few carry out IT Controls segregation of duties (17.5-25.4%) and few show IT Controls framework compliance (1.2-1.4% COBIT, 23.4-35.1% COSO). Overall, these statistics point to a weakness in IT Controls among firms in Italy.

In the sample of firms implementing IT Controls evaluation processes, the most critical points are risk assessment (51.6-31.6%) and IT Controls segregation of duties (47.4-33.4%). Although audit guidelines underline the importance of risk assessment and the segregation of duties, about 50-70% of companies in our sample do not respect these requirements. Compliance with COSO is higher than compliance with COBIT, showing that companies prefer to set up lower numbers of processes. However, companies making IT Controls evaluation seem to have understood the importance of the link between IT and business (71-47.4%).

Comparing different industries, in the full sample, IT Controls scoping and IT Controls segregation of duties are more developed in the financial industry than in the manufacturing and service industries, but the manufacturing and service companies that have implemented IT Controls evaluation have built up better IT Controls scoping and IT Controls segregation of duties. COSO compliance is more widely observed in the financial industry.

Financial statement variables show that the sample carrying out IT Controls evaluation presents smaller losses (10.5/35.5% versus 37.8/37.9%) and higher ROI (3.1/0.9% versus 0.7/-3.1%). This sample also presents fewer audit opinions with going concern issues (9.7/0% versus 19/8%). The DE, CATA and QUICK indices in our sample are consistent with those found in USA research, which are approximately 26.3/16.1%; 43.6/43.5% and 1.179/1.731 respectively (Francis et al., 2005; Reichelt and Wang, 2010).

All our financial firms use one of the Big4, and for financial firms using IT Controls evaluation there were no audit opinions with going concern issues. These variables were thus dropped in the regressions. Their size and capitalization show that banks and insurance companies are larger than manufacturing and service companies (17.286/14.926 versus 14.072/12.596; 3.211/3.160 versus 2.516/2.488 respectively). On the other hand however, manufacturing and service companies have higher levels of internationalization than banks and

insurance firms (foreign: 61.3/52.4% versus 31.6/28%). The level of diversification (number of segments) is similar across industries and samples (mean: 3-4).

In the year 2010 , the sample making IT Controls evaluation shows higher rotation of audit firms than the full sample (16.1/10.5% versus 13.1/12%) while for the financial industry this rotation is lower than for the manufacturing and service industries. Partner rotation shows similar results; it is higher for the full sample (22.6/10.5% versus 26.2/16%) and for the manufacturing and service industries.

We performed a t-test for the mean difference between the two samples and the population (untabulated). Our samples are not significantly different from the population in terms of liquidity, loss for manufacturing and service companies. The financial industry is not different from the population in terms of profitability.

Table 3 – Descriptive statistics

	Full sample from questionnaire								Sample with an ITC evaluation							
	Manufacturing and service n=84				Finance n=25				Manufacturing and service n=31				Finance n=19			
	Mean	Std.	Min	Max	Mean	Std.	Min	Max	Mean	Std.	Min	Max	Mean	Std.	Min	Max
Internal Control Variables																
IT MAP	0.226	0.421	0.000	1.000	0.360	0.490	0.000	1.000	0.613	0.495	0.000	1.000	0.474	0.513	0.000	1.000
IT RISK	0.190	0.395	0.000	1.000	0.240	0.436	0.000	1.000	0.516	0.508	0.000	1.000	0.316	0.478	0.000	1.000
IT LINK	0.262	0.442	0.000	1.000	0.360	0.490	0.000	1.000	0.710	0.461	0.000	1.000	0.474	0.513	0.000	1.000
IT CONTROLS SEGREGATION OF DUTIES COBIT	0.175	0.296	0.000	1.000	0.254	0.294	0.000	0.670	0.474	0.309	0.000	1.000	0.334	0.295	0.000	0.670
COMPLIANCE COSO	0.012	0.004	0.011	0.045	0.014	0.006	0.001	0.036	0.014	0.007	0.011	0.045	0.015	0.007	0.001	0.036
COMPLIANCE	0.234	0.158	0.077	1.000	0.351	0.343	0.032	1.000	0.293	0.251	0.077	1.000	0.399	0.383	0.032	1.000
Control Variables																
SIZE	12.596	1.990	6.661	18.180	14.926	3.152	8.481	18.722	14.072	2.044	10.595	18.112	17.286	1.317	14.261	18.722
LOSS	0.379	0.486	0.000	1.000	0.378	0.492	0.000	1.000	0.355	0.486	0.000	1.000	0.105	0.315	0.000	1.000
ROI	0.007	0.105	-0.558	0.259	-0.031	0.127	-0.558	0.071	0.031	0.082	-0.201	0.211	0.009	0.029	-0.066	0.071
DE	0.161	0.161	0.000	0.630	.	.	.	.	0.263	0.160	0.000	0.630	.	.	.	.
CATA	0.435	0.242	0.019	0.935	.	.	.	.	0.436	0.218	0.059	0.825	.	.	.	.
QUICK	1.731	3.207	0.127	31.432	.	.	.	.	1.179	0.633	0.214	3.315	.	.	.	.
FOREIGN	0.524	0.502	0.000	1.000	0.280	0.458	0.000	1.000	0.613	0.495	0.000	1.000	0.316	0.478	0.000	1.000
SEGMENTS	3.095	1.986	0.000	10.000	3.800	1.528	1.000	7.000	2.903	2.103	0.000	8.000	4.105	1.487	1.000	7.000
CAPITALIZAZION	2.488	0.885	1.000	4.000	3.160	0.987	1.000	4.000	2.516	0.962	1.000	4.000	3.211	1.032	1.000	4.000
BIG 4	0.940	0.238	0.000	1.000	1.000	0.000	1.000	1.000	0.968	0.180	0.000	1.000	1.000	0.000	1.000	1.000
FIRM ROTATION	0.131	0.339	0.000	1.000	0.120	0.332	0.000	1.000	0.161	0.374	0.000	1.000	0.105	0.315	0.000	1.000
PARTNER ROTATION	0.262	0.442	0.000	1.000	0.160	0.374	0.000	1.000	0.226	0.425	0.000	1.000	0.105	0.315	0.000	1.000
AUDIT OPINION	0.190	0.395	0.000	1.000	0.080	0.277	0.000	1.000	0.097	0.301	0.000	1.000	0.000	0.000	0.000	0.000
NON AUDIT FEE	3.596	2.192	0.000	8.081	4.625	2.898	0.000	8.348	3.512	2.530	0.000	8.081	5.608	2.370	0.000	8.348
AUDIT FEE	5.860	1.154	3.555	9.807	6.329	1.700	2.996	9.782	6.107	1.452	3.555	9.807	6.833	1.325	4.220	9.782

t-test is the test for the mean difference between each group and the population. ***indicates significance at the 0.01 level or better, **indicates significance at the 0.05 level or better, *indicates significance at the 0.10 level or better.

The correlation matrix (Table 4) shows that audit fees are significantly correlated with the variables of interest. We thus investigated in regressions the relations between the internal control variables of interest and the audit fees controlling for factors that can influence audit fees (control variables).

Table 4 shows a positive correlation between Big4 and audit fees, and a negative correlation between audit opinions and audit fees. This is validity confirmation of the audit fees proxy because it is consistent with USA research. The correlation matrix shows a significantly high Pearson correlation (over 50%) coefficient between audit fees and non-audit fees, supporting the positive correlation identified in the literature. There is also, as in the literature, a high correlation (over 50%) between audit fees and market capitalization and client size.

The three components of IT Controls scoping quality are positively and significantly correlated, as validity confirmation that they measure a similar concept. However their individual Variance Inflation Factors (VIF) in the regressions are about 2 and do not show problems of multicollinearity as they are below the conventionary acceptable level.

Other high significant correlations occur between ROI, the presence of loss and the presence of going-concern opinions; size, capitalization and non-audit fees. Because of these correlations, as shown in the sensitivity analysis, one variable was dropped for each of these correlations. The dropped variable was selected on the basis of the highest individual VIF (over 10).

Spearman correlations give rise to similar considerations (untabulated).

Table 4 – Correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	AUDIT FEES	**1.000**																				
2	IT MAP	**0.379**	**1.000**																			
3	IT RISK	**0.307**	**0.594**	**1.000**																		
4	IT LINK	0.182	**0.700**	**0.646**	**1.000**																	
5	IT CONTROLS SEGREGATION OF DUTIES	**0.277**	**0.520**	**0.501**	**0.578**	**1.000**																
6	COBIT COMPLIANCE	**0.401**	**0.454**	**0.418**	**0.334**	**0.325**	**1.000**															
7	COSO COMPLIANCE	0.036	0.119	-0.020	0.117	**0.319**	0.149	**1.000**														
8	SIZE	**0.687**	**0.418**	**0.338**	**0.360**	**0.363**	**0.350**	0.148	**1.000**													
9	LOSS	**-0.334**	-0.166	-0.128	-0.163	0.001	-0.147	-0.013	**-0.345**	**1.000**												
10	ROI	0.174	0.029	0.009	0.018	-0.096	0.048	-0.060	**0.224**	**-0.518**	**1.000**											
11	DE	0.096	0.201	0.093	0.148	0.100	0.005	0.082	**0.387**	0.014	0.014	**1.000**										
12	CATA	0.046	-0.185	-0.169	-0.265	-0.199	-0.071	-0.062	**-0.264**	-0.059	0.078	**-0.320**	**1.000**									
13	QUICK	-0.040	0.014	0.038	-0.023	-0.069	-0.009	-0.027	-0.025	0.075	-0.085	-0.094	0.055	**1.000**								
14	FOREIGN	**0.283**	0.164	0.124	0.061	0.074	0.152	-0.140	0.084	0.009	0.023	0.058	0.192	-0.021	**1.000**							
15	SEGMENTS	**0.371**	0.064	0.064	-0.032	0.027	0.082	-0.056	**0.447**	-0.271	0.120	0.162	-0.166	-0.045	0.018	**1.000**						
16	CAPITALIZATION	**0.604**	**0.268**	0.167	0.110	0.161	**0.250**	-0.027	**0.596**	-0.335	0.055	0.063	-0.060	0.040	0.102	**0.292**	**1.000**					
17	BIG 4	0.145	0.129	0.001	0.041	0.044	0.070	0.062	0.172	-0.116	0.123	0.001	-0.080	0.094	0.030	0.168	0.149	**1.000**				
18	FIRM ROTATION	-0.014	0.088	-0.125	0.062	0.028	0.133	0.018	-0.063	0.122	-0.001	0.113	-0.162	-0.146	-0.085	0.165	-0.058	-0.047	**1.000**			
19	PARTNER ROTATION	-0.010	0.016	-0.174	-0.019	-0.049	0.042	-0.032	-0.079	0.178	-0.069	0.082	-0.067	0.099	-0.093	0.185	-0.084	-0.083	**0.686**	**1.000**		
20	NON-AUDIT FEE	**0.576**	0.221	0.157	0.075	0.117	0.127	0.175	**0.526**	-0.229	0.133	0.056	-0.073	0.128	0.169	0.228	**0.326**	**0.310**	-0.079	-0.147	**1.000**	
21	AUDIT OPINION	-0.147	-0.205	-0.224	**-0.280**	-0.151	-0.139	-0.034	**-0.345**	**0.556**	**-0.330**	0.130	-0.025	-0.173	0.128	-0.099	**-0.303**	-0.139	0.051	-0.017	-0.115	**1.000**

Note: The lower left-hand portion of the table presents Pearson correlation. Bold text indicates significance at the 0.01 level or better. See Table 1 for definition of variables.

5.   REGRESSION RESULTS

The model verifies the relationship between audit fees and IT Controls quality, measured with variables related to IT scoping (IT map, IT risk, IT link) IT Controls segregation of duties, IT Controls framework compliance. The results are presented for the full sample and for the sample of firms implementing IT Controls evaluation. They are shown separately for manufacturing and service industries and the financial industry (Table 5). The results are shown for the two samples.

Previous research based on the production function view of audit fees has provided a great deal of insight into the determinants of audit fees. However, Hay et al. (2006) highlight some anomalies in audit fee models, possibly due to low-power tests or assumptions that underlie the production view of audits. We show however that our model has a high power in testing (Adjusted R^2) due to the inclusion of internal control variables related to IT Controls quality, which reduces the problem of the omitted variables, as suggested by Hay et al. (2006). We test this in two ways: with the overall exclusion of our explorative variables and with the omitted variable test. In the first test we assess whether the Adjusted R^2 increases from the regressions with only control variables to regressions with both control variables and explorative variables. For example in the finance industry, we find that the Adjusted R^2 increases from 81.2% to 89.6% in the full sample, from 81.2% to 86.9% in the sample with IT Controls evaluation (untabulated). Adjusted R^2 increase because including IT Controls quality variables reduces the problem of the omitted variables, as suggested by Hay et al. (2006). In the second test, we run the omitted variable test twice, for regressions with only control variables and for regressions with both control variables and explorative variables. We find that the omitted variable tests for the regressions with only control variables are significant under the 1% level. This result means that we reject the hypothesis that the model has no omitted variables. The inclusion of explorative variables should reduce this problem; in fact when they are included, the omitted variable test is no longer significant for the full sample or for the sample with IT Controls evaluation in finance industry. In comparison with the previous findings on fee determinants (Hay et al., 2006), we thus make the new finding that the functioning of internal control systems related to IT Controls in specific companies is an important determinant of audit fees.

The results provide useful indications on the reduction of audit fees linked to IT Controls scoping quality. They show that the IT MAP reduces the audit fees in the financial industry and that the IT LINK reduces the audit fees in the manufacturing and service industries. A possible explanation is that banks and insurance firms benefit more from the activity of creating a matrix with a list and a description of all the elements because they are more complex and mapping requires a major effort. In manufacturing and service companies, on the other hand, the link between IT and the business reduces the audit fees, a finding which is consistent with prior research (Chan et al. 1998; Kearns and Lederer, 2000; Tallon et al., 2000; Cragg et al., 2002; Tallon, 2003; Avison et al., 2004; Chan et al., 2006; Sabherwal and Chan 2001) which finds that the business-IT alignment increases business performance in these industries. The activity of IT MAP is inefficient for manufacturing and service industries because it increases audit fees. These results show how an efficient IT Control scoping lowers audit fees by releasing auditors from the need to perform additional tests.

The results indicate that IT Controls segregation of duties reduces audit fees in the financial industry. Consistent with the literature (Ashton, 1974; Hamilton and Wright, 1982; Nichols, 1987; Ashton et al., 1991; Malguzzi, 2007; Bencini et al., 2008; Servato, 2008; Bencini and Filippini, 2009) we find that the segregation of duties is a good principle leading to high quality ICFR, and our study emphasizes that it also has a positive influence on IT Controls quality. Because of the requirement for highly trained skills in the field of IT, the segregation of duties in many cases means the concentration of two duties (responsibility and remediation) and the separation of testing (IFAC, 1995; Hermanson et al., 2000; Cannon and Crowe, 2004; McCausland, 2004; Norman et al., 2009). Consistently with this, excessive segregation of duties in the manufacturing and service industries is not efficient and in fact increases audit fees. Audit fees decrease when IT Controls quality increases, but only when IT Controls assignment of duties is efficient. The issue here is that the efficient assignment of duties and responsibilities to Internal Audit, IT or other departments, is different between industries.

The results show that in the manufacturing and service industries, IT Controls framework compliance with COSO framework (efficient definition of the number of processes and objectives) decreases audit fees. Consistent with Linkhous (2008) and Wallace et al. (2011), companies were found to use the COSO framework for IT Controls. This framework, developed in the USA, could potentially be used as a high quality benchmark in Italy too. In the manufacturing and services industries because the smaller size of companies, their lower complexity and their greater difficulties in obtaining human and financial resources lead to the concentration of processes and the simplification of the IT system. In these industries, IT Controls quality is best obtained with a non specialized IT framework, such as COSO, which is simpler than COBIT for Sarbanes-Oxley Act and more suitable for less complex activities (Azzali and Mazza, 2013). COBIT is less effective, maybe because of the high presence of outsourcing in IT Controls (Mazza et al. 2014). Contrary to our expectation, COBIT is not yet a framework that improves IT Controls quality in financial industry. This could be due to the inefficient implementation of COBIT in the early years of its voluntary use by Italian companies.

The control variables significant at least at 5% in our models are: SIZE, LOSS, CATA, QUICK, MARKET CAPITALIZATION, PARTNER ROTATION, AUDIT OPINION, NON-AUDIT FEES. The variables from the financial statement and company prices show that client size, proxied by the log of total assets and market capitalization, is positively related to audit fees because more effort and resources are required to audit bigger companies . This result is consistent with the literature (Simunic, 1980; Francis, 1984). The results show a positive relation between audit fees and CATA and a negative relation with QUICK in manufacturing and service companies. Because of the higher risk of litigation related to CATA (Francis, 1984; Hay et al., 2006), this variable shows a direct relation to audit fees. Companies with higher QUICK have lower audit fees because they have greater liquidity. The control variables on external audit show, consistent with prior research, that higher audit fees are

associated with higher non-audit fees (Whisenant et al., 2003; Basioudis and Francis 2007). Our results on specifically Italian partner rotation show a positive relation with audit fees: the new partner has to spend more time and effort in getting to know the client. There is no partner rotation for the 19 banks or insurance firms in 2010, so this has been dropped from this regression. We identify a positive relationship with audit opinions and audit fees. This result is consistent with the literature, which has previously identified a fee premium associated with the greater effort involved in giving an opinion with an issue in going concern (DeFond et al., 2000; Choi et al., 2010).

These results can be interpreted in the light of the ICFR regulation in Italy. Italian legislation, with Article 154bis (Law 262/2005)[2] was passed in 2005 and came into force in the second half of 2007. It aims to protect shareholders and stakeholders from fraudulent corporate practices and accounting errors. It requires the evaluation of ICFR and their certification only by insiders (without the certification by the external auditors), and the responsibility for ICFR is often given to the chief financial officer by the Italian listed firms. This evaluation increases sensitiveness to ICFR, including IT Controls, and it brings benefits, such as the reduction of audit fees.

Nevertheless Italian legislation is less stringent than SOX and it is known as "Light SOX", it leads to the reduction of audit fees partly thanks to the voluntary adoption of USA frameworks. It would be interesting to compare findings for Italy with results from other countries in order to identify their relevance and applicability in legal systems outside Italy.

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[2] This article was an amendment of "Testo Unico della Finanza" - the code which regulates the financial market (CONSOB, 2010 –CONSOB is the Commissione Nazionale per le Società e la Borsa similar to the USA Security Exchange Commission - SEC).

Table 5 - Regression Results

	Exp. Sign	Full sample from questionnaire				Sample with an IT Controls evaluation			
		Manufacturing and service Industries		Finance Industry		Manufacturing and service Industries		Finance Industry	
		Model1	Model2	Model1	Model2	Model1	Model2	Model1	Model2
IT MAP	-	0.700	0.810	-1.471	-1.097	0.927	0.800	-1.773	-1.245
		(0.602)	(0.569)	(0.446)***	(0.471)**	(1.272)	(1.057)	(0.366)***	(0.709)
IT RISK	-	0.521	0.659	0.0813	0.774	0.391	0.539	0.0995	0.693
		(0.459)	(0.429)	(0.355)	(0.535)	(0.922)	(0.787)	(0.468)	(0.577)
IT LINK	-	-0.949	-1.161	0.160	0.415	-0.895	-0.911	0.417	0.544
		(0.645)	(0.623)*	(0.433)	(0.535)	(1.630)	(1.419)	(0.338)	(0.633)
IT CONTROLS SEGREGATION OF DUTIES	-	0.401	0.880	-1.310	-1.489	1.028	1.762	-2.034	-1.807
		(0.442)	(0.417)**	(0.556)**	(0.497)**	(0.823)	(0.736)**	(0.616)**	(0.996)
COBIT COMPLIANCE	-	35.20		81.42		15.34		77.58	
		(26.41)		(24.28)***		(44.78)		(23.74)**	
COSO COMPLIANCE	-		-1.467		1.057		-2.070		0.624
			(0.545)***		(0.524)*		(0.777)**		(0.747)
SIZE	+	0.203	0.219	0.322	0.293	0.211	0.312	0.991	0.782
		(0.165)	(0.146)	(0.138)**	(0.108)**	(0.423)	(0.317)	(0.321)**	(0.602)
LOSS	+	-0.146	-0.253	0.736	0.795	-0.140	-0.545	3.772	3.219
		(0.305)	(0.301)	(0.669)	(0.539)	(0.817)	(0.714)	(1.249)**	(2.566)
ROI	-	0.663	0.600	0.444	0.772	0.151	-0.483	39.69	31.21
		(1.657)	(1.619)	(0.841)	(0.947)	(5.139)	(4.836)	(15.98)*	(29.73)
DE	+	0.443	0.733			1.252	2.472		
		(0.757)	(0.743)			(1.554)	(1.238)*		
CATA	+	1.364	1.633			3.602	4.331		
		(0.459)***	(0.433)***			(2.018)	(1.676)**		
QUICK	-	-0.141	-0.151			-0.401	-0.206		
		(0.0653)**	(0.0616)**			(0.367)	(0.293)		
FOREIGN	+	0.130	0.0571	-0.723	-0.109	0.159	-0.0895	-0.604	-0.104
		(0.189)	(0.184)	(0.472)	(0.563)	(0.459)	(0.431)	(0.407)	(0.650)
SEGMENTS	+	0.0276	0.00522	0.146	0.209	0.0618	-0.0495	0.141	0.167
		(0.0474)	(0.0439)	(0.146)	(0.124)	(0.202)	(0.149)	(0.187)	(0.221)
CAPITALIZ.	+	0.387	0.372	1.000	1.016	0.542	0.368	0.621	0.649
		(0.183)**	(0.171)**	(0.244)***	(0.278)***	(0.617)	(0.424)	(0.283)*	(0.486)
BIG 4	+	-0.0469	0.0608	.	.	0.613	1.146	.	.
		(0.319)	(0.313)	.	.	(1.040)	(1.017)	.	.
FIRM ROTATION	-	-0.257	-0.185	0.450	0.195	0.984	1.597	-0.761	-0.835
		(0.289)	(0.263)	(0.683)	(0.536)	(1.447)	(0.937)	(0.317)*	(0.508)
PARTNER ROTATION		0.599	0.646	-0.824	-0.697	-0.790	-0.959	.	.
		(0.268)**	(0.268)**	(0.453)	(0.425)	(1.118)	(0.740)	.	.
AUDIT OPINION	+	0.401	0.502	1.718	1.851	-0.697	-0.0363	.	.
		(0.253)	(0.245)**	(0.429)***	(0.401)***	(1.434)	(1.357)	.	.
NON AUDIT FEE	+	0.126	0.131	0.451	0.364	0.113	0.127	0.411	0.336
		(0.0631)*	(0.0561)**	(0.108)***	(0.102)***	(0.158)	(0.145)	(0.105)**	(0.147)*
CONSTANT		0.384	0.693	-5.041	-4.246	-1.624	-3.038	-15.52	-11.38
		(1.626)	(1.539)	(2.268)*	(1.987)*	(4.602)	(3.223)	(4.707)**	(8.964)
MEAN VIF		2.67	2.65	4.22	4.17	4.26	4.03	6.23	7.78
Adjusted R^2		0.620	0.644	0.896	0.856	0.301	0.517	0.869	0.645
Observations		84	84	25	25	31	31	19	19

Note: this table presents the robust standard error in parentheses for the OLS regression ***indicates significance at the 0.01 level or better, **indicates significance at the 0.05 level or better, *indicates significance at the 0.10 level or better.
The IT Controls FRAMEWORK COMPLIANCE is the COBIT COMPLIANCE in Model 1 and the COSO for Sarbanes-Oxley Act COMPLIANCE in Model 2.

6.   SENSITIVITY ANALYSIS

We perform two sensitivity tests.

The mean VIF in Table 5 shows that there may be problems of multi-collinearity (mean VIF about 4.03 to 7.78); in the first sensitivity test (untabulated) we thus drop the variable with the highest VIF from the regression. For the full sample in finance industry, we drop the size variable, and re-running the regression, the mean VIF becomes 2.85 for Model 1 and 2.81 for Model 2. For the sample with an IT Controls evaluation in manufacturing and service industries, we drop partner rotation, and the mean VIF becomes 3.55 for Model 1 and 3.18 for Model 2. In the finance industry we drop ROI, and the mean VIF becomes 3.06 for Model 1 and 2.97 for Model 2. However all the variables dropped are control variables, and in the re-run   regressions the explanatory variables of interest have the same sign. This supports previous results.

In the second sensitivity test (Table 6), we assume that the evaluation procedures of IT Controls do not change in the short term, given that they require high investment and a long training process to be implemented. We choose as short term a 3 year period and we collect financial data for one year before and one year after 2010. Then, we average the continuous variables for the three years (2009/2010/2011) and we match them with the questionnaire data. The results for the internal control variables are consistent (Table 6). The three years period is homogeneous with respect to the financial context of crisis. The Adjusted R^2 is higher and the mean VIF does not show multi-collinearity.

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Table 6– Sensitivity analysis – Mean 2009-2010-2011

	Exp. Sign	Full sample from questionnaire				Sample with an IT Controls evaluation			
		Manufacturing and service Industries		Finance Industry		Manufacturing and service Industries		Finance Industry	
		Model1	Model2	Model1	Model2	Model1	Model2	Model1	Model2
IT MAP	-	0.604	0.751	-1.271	-0.892	0.890	0.934	-1.253	-0.910
		(0.303)**	(0.300)**	(0.178)***	(0.216)***	(0.405)**	(0.382)**	(0.222)***	(0.260)***
IT RISK	-	0.176	0.229	0.358	1.018	0.223	0.223	0.406	1.190
		(0.210)	(0.206)	(0.164)**	(0.197)***	(0.240)	(0.225)	(0.169)**	(0.213)***
IT LINK	-	-0.766	-0.927	-0.253	-0.102	-1.137	-1.067	-0.224	0.00206
		(0.303)**	(0.308)***	(0.168)	(0.191)	(0.491)**	(0.450)**	(0.197)	(0.224)
IT CONTROLS SEGREGATION OF DUTIES	-	0.251	0.670	-0.687	-0.964	0.312	0.969	-0.533	-0.921
		(0.229)	(0.228)***	(0.237)***	(0.236)***	(0.376)	(0.346)***	(0.327)	(0.355)**
COBIT COMPLIANCE	-	32.39		69.59		34.01		71.30	
		(10.82)***		(11.34)***		(11.22)***		(10.24)***	
COSO COMPLIANCE	-		-1.256		1.012		-1.505		1.245
			(0.233)***		(0.198)***		(0.285)***		(0.231)***
SIZE	+	0.298	0.310	0.273	0.281	0.366	0.362	0.286	0.236
		(0.0680)***	(0.0614)***	(0.0486)***	(0.0494)***	(0.129)***	(0.116)***	(0.103)***	(0.102)**
LOSS	+	0.179	0.141	-0.121	0.0427	0.123	-0.00235	-0.144	-0.00673
		(0.126)	(0.124)	(0.166)	(0.168)	(0.284)	(0.267)	(0.229)	(0.199)
ROI	-	-0.374	-0.435	-0.153	0.0501	-7.341	-6.871	-2.138	-7.699
		(0.806)	(0.845)	(0.659)	(0.744)	(2.930)**	(2.734)**	(4.450)	(3.948)*
DE	+	-0.210	-0.130			0.382	0.443		
		(0.539)	(0.513)			(0.710)	(0.706)		
CATA	+	1.133	1.370			2.296	3.299		
		(0.253)***	(0.247)***			(0.532)***	(0.546)***		
QUICK	-	-0.00913	-0.0108			-0.000287	-0.00711		
		(0.0029)***	(0.0029)***			(0.00553)	(0.00509)		
FOREIGN	+	0.158	0.0885	-0.251	0.194	0.0605	-0.0554	-0.324	0.0766
		(0.0960)	(0.0931)	(0.177)	(0.178)	(0.209)	(0.196)	(0.178)*	(0.190)
SEGMENTS	+	0.0508	0.0406	-0.0198	0.0215	0.0409	0.000267	-0.0434	0.0108
		(0.0218)**	(0.0201)**	(0.0544)	(0.0595)	(0.0513)	(0.0459)	(0.0691)	(0.0689)
CAPITALIZ.	+	0.292	0.280	0.767	0.766	0.253	0.296	0.758	0.853
		(0.0863)***	(0.0822)***	(0.0748)***	(0.0798)***	(0.216)	(0.185)	(0.0956)***	(0.111)***
BIG 4	+	-0.0328	0.0115	.	.	-0.220	0.524	.	.
		(0.159)	(0.159)	.	.	(0.501)	(0.462)	.	.
FIRM ROTATION	-	-0.253	-0.243	-0.288	-0.661	-0.299	-0.138	-0.398	-0.806
		(0.154)	(0.152)	(0.299)	(0.280)**	(0.280)	(0.270)	(0.341)	(0.246)***
PARTNER ROTATION		0.0764	0.105	0.183	0.357	0.0727	0.0506	0.216	0.400
		(0.0984)	(0.0926)	(0.129)	(0.154)**	(0.192)	(0.178)	(0.175)	(0.210)*
AUDIT OPINION	+	0.0171	0.0886	1.301	1.401	-1.212	-0.914	.	.
		(0.125)	(0.130)	(0.258)***	(0.293)***	(0.467)**	(0.481)*	.	.
NON AUDIT FEE	+	0.122	.	0.349	.	0.0951	.	0.355	.
		(0.0358)***	.	(0.0437)***	.	(0.0717)	.	(0.0617)***	.
CONSTANT		-0.389	-0.0754	-2.203	-1.878	-1.250	-1.970	-2.432	-1.419
		(0.638)	(0.596)	(0.605)***	(0.565)***	(1.388)	(1.253)	(1.649)	(1.788)
MEAN VIF		2.23	2.24	2.75	2.76	2.58	2.53	2.75	2.73
Adjusted R²		0.694	0.707	0.911	0.896	0.694	0.741	0.861	0.855
Observations		84	84	25	25	31	31	19	19

Note: this table presents the robust standard error in parentheses for the OLS regression ***indicates significance at the 0.01 level or better, **indicates significance at the 0.05 level or better, *indicates significance at the 0.10 level or better.
The IT Controls FRAMEWORK COMPLIANCE is the COBIT COMPLIANCE in Model 1 and the COSO for Sarbanes-Oxley Act COMPLIANCE in Model 2.

7.   CONCLUSION

The main contribution of the paper is the finding that high quality of IT Controls decreases audit fees. IT Controls quality is explored using IT scoping quality, IT Controls segregation of duties and IT Controls framework compliance and these components of ICFR are shown to be highly relevant to a reduction in audit fees.

The results support the hypothesis that audit effort is sensitive to control risk, as a specific component of audit risk, and not only to inherent risk as has been found by previous literature. The findings were made after the implementation of Law 262/2005 in Italy, which indicates that the increased sensitiveness of the audit effort to risk is a benefit of this type of regulation. The Italian law thus appears to have an effect similar to the Sarbanes-Oxley Act in the USA. Our results show that when control risk decreases, because the IT Controls quality increases, auditors charge lower audit fees.

As regards IT scoping quality, IT RISK assessment does not currently significantly reduce audit fees, and this may be because it is not fully implemented by listed firms. We find that investments in IT scoping quality, specifically, investment in IT MAP for banks and insurance firms and investment in IT LINK for manufacturing and service companies, lead to a reduction of audit fees. IT Controls segregation of duties decreases audit fees for banks and insurance firms but increases them for the manufacturing and service industries. This could be because the requirement for high level IT skills is harder for manufacturing and services industries to meet. Finally, we suggest the COSO framework be adopted by manufacturing and services firms in Italy because compliance with the framework tends to lower audit fees.

Summarizing, the most effective factors of IT Controls are IT map and IT segregation of duties in the financial industry, and the efficient implementation of the COSO framework in the manufacturing and services industry.

When control risk decreases thanks to an increase in IT Controls quality, auditors can place more trust in internal controls, including information technology controls, and can thus set up the planned detection risk based on control risk, establishing less substantive tests. The

decrease in substantive tests manifests itself in reduced audit effort, which in turn should reduce audit fees.

Our study has however some limitations. The first limitation is the way IT Controls quality is measured: we used 3 variables but there may be other important elements, such as outsourcing (Mazza et al., 2014). The second limitation is the composition of the sample; it is composed of companies which responded to the questionnaire, which showed a higher size and a lower presence of losses than the population as a whole. The third limitation is related to the problem of omitted variables, because the omitted variable test is still significant in the manufacturing and service industries even after the inclusion of our explorative variables. Finally, we investigate IT Controls quality, but within ICFR, account-specific and entity level controls quality are important components which require further research.

In spite of these limitations, however, this study provides useful indications for future research in auditing, particularly for closing the gap in the literature on the reduction of audit fees when the improvement of IT Controls reduces control risk. Given that improved IT Controls quality is shown to lead to reduced audit fees, regulators and auditors have strong grounds for promoting: 1) the application of the COSO framework in the manufacturing and services industry; 2) IT map and IT segregation of duties in the financial industry.

Appendix A –Questionnaire

Questions	Answer		Variables in the model
1. IT Controls evaluation			
-Do you perform an IT Controls evaluation to comply with the law 262?	☐ YES	☐ NO	IDENTIFICATION OF THE SAMPLE
2. IT Controls Scoping			
-Do you have a matrix that includes the list and the description of financial applications and IT infrastructure services in the scoping for the law 262?	☐ YES	☐ NO	IT MAP
-Do you evaluate the likelihood and the impact of the misstatement that one IT element could have on the financial reporting in the scoping for the law 262?	☐ YES	☐ NO	IT RISK
-Do you have an activity that understands if the IT elements support the business in the scoping for the law 262?	☐ YES	☐ NO	IT LINK
3. IT Segregation of Duties			
Which department:			IT CONTROLS SEGREGATION OF DUTIES
-has the direct responsibility for IT Controls for the law 262?	☐ IT department ☐ Internal Audit ☐ Other: _____		
-has the duty of test execution for IT Controls for the law 262?	☐ IT department ☐ Internal Audit ☐ Other: _____		
-has the responsibility for IT Controls deficiencies remediation for the law 262?	☐ IT department ☐ Internal Audit ☐ Other: _____		
4.IT Controls Processes and Objectives	Number		
-How many IT processes (develop, change, access, security and operations) have you identified for IT Controls?	_ _ _ _		COSO AND COBIT COMPLIANCE
-How many objectives have you defined for IT Controls?	_ _ _ _		COBIT COMPLIANCE

REFERENCES

Ashton, R. H. (1974), 'An Experimental Study of Internal Control Judgments', *Journal of Accounting Research,* Spring, pp. 143-157.

Ashton, R., Arens, A. A. & Loebbecke, J. K. (1991), *Auditing: An Integrated Approach,* 5th edition, New York: Prentice Hall.

Avison, D., Jones, J., Powell, P. & Wilson, D. (2004), 'Using and Validating the Strategic Alignment Model', *Strategic Information Systems*, Vol. 13, No. 3, pp. 223–246.

Azzali, S. & Mazza, T. (2011), 'La valutazione degli Information Technology Controls nell'ambito dei sistemi di controllo interno: i risultati di una ricerca empirica (Information Technology and Internal Controls over Financial Reporting: the audit cycle)', *Management control, FrancoAngeli, AIDEA*, Vol. 3, pp. 91-118, http://www.francoangeli.it/riviste/Scheda_Rivista.aspx?IDArticolo=44886

Azzali, S. & Mazza, T. (2013), 'Internal Control over Financial Reporting Quality and Information Technology Control Frameworks', in the book '*Accounting Information Systems for Decision Making, Series Lecture Notes in Information Systems and Organization'*, Germany: Springer-Verlag Berlin Heidelberg http://link.springer.com/chapter/10.1007%2F978-3-642-35761-9_3

Basioudis, I. G. & Francis, J. R. (2007), 'Big 4 Audit Fee Premiums for National and Office-Level Industry Leadership in the United Kingdom', *Auditing: A Journal of Practice & Theory,* Vol. 26, No. 2, pp. 143-166.

Bedard, J. (1989), 'An archival investigation of audit program planning', *Auditing: A Journal of Practice & Theory,* Vol. 9, No. 1, pp- 57-71.

Bedard, J. C., Hoitash, U. & Hoitash, R. (2008), 'Audit Pricing And Internal Control Disclosures Among Non-Accelerated Filers', *Research in Accounting Regulation*, Vol. 20, pp. 103–126.

Bedard, J., & Wright, A. (1994), 'The functionality of decision heuristics: Reliance on prior audit adjustments in evidential planning', *Behavioral Research In Accounting* (Supplement), pp. 62-89.

Bell, T. B., Landsman, W., & Shackelford, D. A. (2001), 'Auditors' perceived business risk and audit fees: Analysis and evidence'. *Journal of Accounting Research,* Vol. 39, No. 1, pp. 35–43.

Bencini, F., Filippini, L. & Canofani, P. (2008), 'Controlli interni ed esterni: il loro coordinamento', *Contabilità finanza e controllo*, Vol. 31, No. 5, pp. 444-448.

Bencini, F., Filippini, L. (2009), 'Controlli contabili e legami con l'attività di programmazione aziendale : la legge 262/2005', *Contabilità finanza e controllo*, Vol. 32, No. 7, pp. 608-613.

Bernroider, E.W.N. & Ivanov, M. (2011), 'IT project management control and the Control Objectives for IT and related Technology (COBIT) framework', *International Journal of Project Management*, Vol. 29, No. 3, pp. 325-336.

Biggs, S., Mock, T. & Watkins, P. (1988), 'Auditor's use of analytical review in audit program design', *The Accounting Review* (January), pp. 148-161.

Brady, J., Monk, E. & Wagner, B. (2001), *Concepts in Enterprise Resource Planning*, Boston, MA: Thomson Learning.

Brazel, J. F. (2005), 'A Measure of Perceived Auditor ERP System Expertise', *Managerial Auditing Journal*, Vol. 20, No. 6, pp. 619-631.

Brody, R. & Kearns, G. (2009), 'IT Audit Approaches for Enterprise Resource Planning Systems', *ICFAI Journal of Audit Practice,* Vol. 6, pp. 7-26.

Brown, W. & Nasuti, F. (2005), 'What ERP Systems Can Tell Us About Sarbanes-Oxley', *Information Management & Computer Security*, Vol. 13, No. 4, pp. 311-327.

Cannon, D. M. & Crowe, G. A. (2004), 'SOA Compliance: Will IT Sabotage Your Efforts?', *The Journal of Corporate Accounting and Finance*, Vol. 15, No. 5, pp. 31 – 37.

Cereola, S. J. & Cereola, R. J. (2011), 'Breach of Data at TJX: An InstructionalCaseUsed to StudyCOSO and COBIT, with a Focus on Computer Controls, Data Security, and Privacy Legislation', *Issues in Accounting Education,* Vol. 26, No. 3, pp. 521-545.

Chan, P.; Ezzamel, M. & Gwilliam, D. (1993), 'Determinants Of audit fees For Quoted UK Companies', *Journal of Business Finance & Accounting*, Vol. 20, No. 6, pp. 765-786.

Chan, Y.E., Huff, S.L., & Copeland, D.G. (1998), 'Assessing realized information systems strategy', *Journal of Strategic Information Systems,* Vol. 6, No. 4, pp. 273–298.

Chan, Y.E., Sabherwal, R. & Thatcher, J.B. (2006), 'Antecedents and Outcomes of Strategic IS Alignment: An empirical investigation', *IEEE Transactions on Engineering Management*; Vol. 51, No. 3, pp. 27–47.

Choi J.; Kim, C.; Kim, J. & Zang, Y. (2010), 'Audit Office Size, Audit Quality, and Audit Pricing', *Auditing: A Journal of Practice &Theory*, Vol. 29, No. 1, pp. 73-97.

COBIT for SARBANES-OXLEY ACT (2006), *IT Control Objectives for Sarbanes-Oxley: The Role of IT in the Design and Implementation of ICFR,* 2nd Edition, USA: IT Governance Institute ITGI.

Collier, P. & Gregory, A. (1996), 'Audit committee effectiveness and the audit fee', *European Accounting Review,* Vol. 5, No. 2, pp. 177-198.

CONSOB – Commissione Nazionale per le Società e la Borsa, a cura della Divisione Relazioni Esterne Ufficio Relazioni con il Pubblico (2010), *Testo Unico della Finanza Decreto legislativo 24 febbraio 1998, n. 58 Updated with d.lgs. n. 104 del 2.7.2010,* Roma: CONSOB, http://www.camera.it/parlam/leggi/05262l.htm

COSO - Committee of Sponsoring Organizations of the Treadway Commission (2006), *Guidance for Smaller Public Companies Reporting on Internal Controls over Financial Reporting,* New York: AICPA.

Cragg, P., King, M. & Hussin, H. (2002), 'IT Alignment and Firm Performance in Small Manufacturing Firms', *Strategic Information Systems*, Vol. 11, No. 2, pp. 109–132.

Craswell, A. T., Francis, J. R. & Taylor, S. L. (1995), 'Auditor brand name reputations and industry specializations', *Journal of Accounting & Economics*, Vol. 20, No. 3, pp. 297-322.

DeAngelo, L. E. (1981), 'Auditor size and audit quality', *Journal of Accounting and Economics,* Vol. 3, No. 3, pp. 183-199.

DeFond, M., Francis, J., & Wong, T. (2000), 'Auditor industry specialization and market segmentation: Evidence from Hong Kong', *Auditing: A Journal of Practice & Theory,* Vol. 19, pp. 49-66.

Di Pietro, J., Mock, T., & Wright, A. (1994), 'An investigation of adaptability in evidential planning', *Proceedings of Symposium on Auditing Problems XII*, Lawrence, KS: University of Kansas

Doyle, J., Ge, W. & McVay, S. (2007), 'Determinants of weaknesses in internal control over financial reporting', *Journal of Accounting and Economics*, Vol. 44, No. 1–2, pp. 193–223.

Felix, W.L., Gramling, A.A. &. Maletta, M.J. (2001), 'The contribution of internal audit as a determinant of external audit fees and factors influencing this contribution', *Journal of Accounting Research,* Vol. 39, No. 3, pp. 513-34.

Francis, J. R. & Simon, D. T. (1987), 'A Test of Audit Pricing in the Small-Client Segment of the U.S. Audit Market', *The Accounting Review*, Vol. 62, No. 1, pp. 145-157.

Francis, J. R. (1984), 'The Effect Of Audit Firm Size On Audit Prices', *Journal of Accounting & Economics,* Vol. 6, No. 2, pp. 133-151.

Francis, J. R. (2004), 'What do we know about audit quality?', *British Accounting Review*, Vol. 36, No. 4, pp. 345-368.

Francis, J. R., Reichelt, K. & Wang, D. (2005), 'The Pricing of National and City-Specific Reputations for Industry Expertise in the U.S. Audit Market', *The Accounting Review,* Vol. 80, No. 1, pp. 113-136.

Francis, J.R. (2011), 'A Framework for Understanding and Researching Audit Quality', *Auditing: A Journal of Practice & Theory*, Vol. 30, No. 2, pp- 125-152.

Garelli, R. (2009), 'Controlli interni e requisiti del Sarbanes-OxleyAct', *Impresa progetto – Rivista on line del DITEA,* Vol. 2, pp. 1-26.

Hackenbrack, K.E. & Knechel, W.R. (1997), 'Resource allocation decisions in audit engagements', *Contemporary Accounting Research*, Vol. 14, No. 3, pp. 481-500.

Hahn, J. (1999), '*ERP Systems: Audit and Control Risks',* Vol. 26, Retrieved from http://www.auditnet.org/docs/erprisks.pdf

Hamilton, R.E. &. Wright, W. F. (1982), 'Internal Control Judgments and Effects of Experience: Replications and Extensions', *Journal of Accounting Research,* pp. 756-765.

Hansen, J.V. & Hill, N.C. (1989), 'Control and Audit of Electronic Data Interchange'. *MIS Quarterly,* pp. 402-414.

Harris, S. (2006), 'Alphabet soup: Understanding standards for risk management and compliance', *Information Security Magazine*, 2.

Hay, D., Knechel, W.R. & Ling H. (2008), 'Evidence on the Impact of Internal Control and Corporate Governance on Audit Fees', *International Journal of Auditing*, Vol. 12, No. 1, pp. 9-24.

Hay, D.C., Knechel, W.R. & Wong, N. (2006), 'Audit Fees: A Meta-analysis of the Effect of Supply and Demand Attributes', *Contemporary Accounting Research*, Vol. 23, No. 1, pp. 141-191.

Henderson, J.C. & Venkatraman, N. (1992), 'Strategic Alignment: A model for organizational transformation through information technology', in Trasforming Organization, Kochan T.A. & Useem M., pp. 97-112.

Hermanson, D.R., Hill, M.C. & Ivancevich, D.M. (2000), 'Information Technology-Related Activities of Internal Auditors', *Journal of Information Systems,* Vol. 14 (supplement), pp. 39-53.

Hogan, C., & Wilkins, M. (2008), 'Evidence on the audit risk model: Do auditors increase audit fees in the presence of internal control deficiencies?', *Contemporary Accounting Research* Vol. 25, No. 1, pp. 219–42.

Hoitash, R., Hoitash, U. & Bedard, J. (2008), 'Internal Control Quality and Audit Pricing under the Sarbanes-Oxley Act', *Auditing: A Journal Of Practice & Theory*, Vol. 27, No. 1, pp. 105–126.

Hunton, J., Wright, A. & Wright, S. (2004), 'Are financial auditors overconfident in their ability to assess risks associated with enterprise resource planning Systems?', *Journal of Accounting Information Systems,* Vol. 18, No. 2, pp. 7-28.

IFAC - International Federation of Accountants, (1995), *Information Technology in the Accounting Curriculum, Education Guideline No. 11*, New York, NY: IFAC.

Jiang, W. & Wu, J. (2009), 'The impact of PCAOB Auditing Standard 5 on audit fees', *Accounting and Auditing,* April, pp. 34-39.

Jones, T. & Hunton, J. E. (2000), *Assessing Risks and Controls in an ERP Environment*, New York, NY: AICPA.

Kearns, G.S. & Lederer, A.L. (2000), 'The Effect of Strategic Alignment on the use of IS-Based Resources for Competitive Advantage', *Journal of Strategic Information Systems*, Vol. 9, No. 4, pp. 265–293.

Krishnan, J., Rama D. & Zhang Y. (2008), 'Costs to comply with SOX Section 404'. *Auditing: A Journal of Practice & Theory*, Vol. 27, No. 1, pp. 169–186.

Kuhn, J.R. & Sutton, S.G. (2010), 'Continuous auditing in ERP system environments: The current state and future directions', *Journal of Information Systems,* Vol. 24, pp. 91-112.

Kuhn, J.R. (2007), 'Electronic Records Management and Sarbanes-Oxley Compliance: A Case Study of the COBIT Approach'. *Journal of Audit Practice*, Vol. 4, No. 4, pp. 25-39.

Lainhart IV, J.W. (2000), 'COBIT: A Methodology for Managing and Controlling Information and Information Technology Risks and Vulnerabilities', *Journal of Information Systems*, Vol. 14, No. 1, pp. 21-26.

Linkhous J. (2008), 'Puzzle pieces: The relationship between SARBANES-OXLEY ACT, COSO and COBIT', *Information Systems Control Journal,* p. 5.

Malguzzi, A. (2007), 'Il sistema dei controlli e il flusso delle informazioni nelle società quotate. Conclusioni. Il ruolo cruciale dell'Internal Audit', *Rivista dei dottori commercialisti,* Vol. 58, No. 1, pp. 111-119.

Masli, A., Peters, G.F., Richardson, V.J. & Sanchez, J.M. (2010), 'Examining the Potential Benefits of Internal Control Monitoring Technology', *The Accounting Review,* Vol. 85, No. 3, pp. 1001-1034.

Mazza, T., Azzali, S. & Fornaciari, L. (2014), 'Audit quality of outsourced information technology controls', *Managerial Auditing Journal*, Vol. 29 Iss: 9, pp.837 – 862.

McCausland, R. (2004), 'Sarbanes-Oxley Act and the IT Risk Factor', *Accounting Technology*, pp. 44-48.

Merhout, J.W. & Havelka, D. (2008), 'Information Technology Auditing: A Value-Added IT Governance Partnership between IT Management and Audit', *Communications of the Association for Information Systems CAIS*, Vol. 26, pp. 463-482.

Mishra, S.; Weistroffer, H. R. (2007), 'A Framework for Integrating Sarbanes-Oxley Compliance into the Systems Development Process', *Communications of AIS*, Vol. 20, pp. 712-727.

Mock, T. J. &. Wright A.M. (1999), 'Are audit programs risk-adjusted?', *Auditing: A Journal of Practice & Theory,* Vol. 18, No. 1, pp. 55-74.

Mock, T.J. & Wright, A.M. (1993), 'An exploratory study of auditor evidential planning', *Auditing: A Journal of Practice & Theory*, Vol. 12, No. 2, pp. 39-61.

Morris, B. (1995), 'Pushkin A. Determinants of Information systems audit involvement in EDI systems development', *Journal of Information Systems*, pp. 111-128.

Nichols, D. R. (1987), 'A Model of Auditor's Preliminary Evaluations of Internal Control from Audit Data', *The Accounting Review,* Vol. 62, No. 1, pp. 183-190.

Norman, C.S., Payne, M.D. & Vendrzyk, V.P. (2009), 'Assessing Information Technology General Control Ris: An Instructional Case', *Issue in Accounting Education*, Vol. 24, No. 1, pp. 63-76.

O'Keefe, T.B., Simunic D.A. & Stein M.T. (1994), 'The production of audit services: Evidence from a major public accounting firm', *Journal of Accounting Research*, Vol. 32, No. 2, pp. 241-61.

O'Leary, D. (2000), *Enterprise Resource Planning Systems,* Cambridge, U.K.: Cambridge University Press.

Palmorese, Z. (1986), 'Audit Fees and Auditor Size: Further Evidence', *Journal of Accounting Research*, Vol. 24, No. 1, pp. 97-110.

Panko, R.R.. (2006), 'Spreadsheets And Sarbanes-Oxley: Regulations, Risks, and Control Frameworks', *Communications of AIS,* Vol. 17, pp. 2-50.

PCAOB - Public Company Accounting Oversight Board (2007), *An audit of ICFR That Is Integrated with An Audit of Financial Statements*, *Auditing Standard n.5*, Washington, D.C.: PCAOB.

PCAOB - Public Company Accounting Oversight Board (2009), *An audit of ICFR That Is Integrated with An Audit of Financial Statements. Guidance for auditors of smaller public companies, Auditing Standard n.5*, Washington, D.C.: PCAOB.

Quadackers, L., Mock, T., & Maijoor, S. (1996), 'Audit risk and audit programs: Archival evidence from four Dutch audit firms', *The European Accounting Review*, pp. 217-237.

Raghunandan, K., & Rama D.V. (2006), 'SOX Section 404 material weakness disclosures and audit fees', *Auditing: A Journal of Practice & Theory,* Vol. 25, pp. 99–114.

Sabherwal, R., & Chan, Y.E. (2001), 'Alignment between business and IS strategies: A configurational approach', *Information Systems Research,* Vol. 12, No. 1, pp. 11–33.

Schneider, G.P. (1995), 'Discussion of determinants of information systems audit involvement in EDI systems development'. *Journal of Information Systems*, Vol. 9, No. 2, pp. 129-132.

Servato, F., (2008), 'L'impatto della legge n. 262/2005 sulla corporate governance e sul sistema di controllo interno ai fini della corretta informativa contabile e finanziaria delle società quotate', *Il controllo nelle società e negli enti*, Vol. 12, No. 4/5, pp. 381-401.

Simunic, D. (1980), 'The pricing of audit services: Theory and evidence', *Joumal of Accounting Research*, Vol. 18, pp. 161-190.

Simunic, D.A. & Stein, M.T. (1996), 'The Impact of Litigation Risk on Audit Pricing: A Review of the Economics and the Evidence'. , *Auditing: A Journal of Practice & Theory*. Vol. 15, No. 2, pp. 119-134.

Tallon, P.P. (2003), 'The Alignment Paradox', *CIO Insight*, Vol. 1, No. 47 www.cioinsight.com/article2/0,1397,137546,00.asp.

Tallon, P.P., Kraemer, K.L. & Gurbaxani, V. (2000), 'Executives' Perceptions of the Business Value of Information Technology: A process-oriented approach', *Journal of Management Information Systems*, Vol. 16, No. 4, pp. 145–173.

Tuttle, B. & Vandervelde, S.D. (2007), 'An empirical examination of CobiT as an internal control framework for information technology', *International Journal of Accounting Information Systems*, Vol. 8, No. 4, pp. 240-263.

Wallace, L., Lin, H. & Cefaratti, M.A. (2011), 'Information Security and Sarbanes-Oxley Compliance: An Exploratory Study', *Journal of Information Systems*, Vol. 25, No. 1, pp. 185-211.

Whisenant, S., Sankaraguruswamy, S. & Raghunandan, K. (2003), 'Evidence on the joint determination of audit and non-audit fees', *Journal of Accounting Research*, Vol. 41, pp. 721-744.

Wright, S. & Wright, A.M. (2002), 'Information System Assurance for Enterprise Resource Planning Systems: Unique Risk Considerations', *Journal of Information Systems,* pp. 99-115.

Ziegenfuss, D. (2008), 'IT Controls: Good for Operations', *Internal Auditor,* (December), pp. 80-81.

Internal Auditor Detection Process and Internal Control Deficiencies Types

Abstract

This study investigates Internal Controls Deficiencies (ICD) in Italy, where the responsibility on Internal Control over Financial Reporting is assigned to Internal Auditor. We investigate Internal Audit Detection Process, analyzing the process of planning, scoping, testing, monitoring and ICD accounts-specific classified by severity as Deficiencies, Significant Deficiencies and Material Weaknesses. We use proprietary data from questionnaires. We find that several qualitative indicators and the top-down approach should be used in scoping and planning; the optimum frequency of testing would be every semester; re-performing or observation should be used instead of simple inspection of documentation; operation effectiveness of information technology and entity level controls should be tested; segregation of duties, education and experience of internal auditors are key elements. We also find that revenues are the most severe ICD types and that human resource and period end are the most persistent ICD types.

Keywords: Internal Control, Internal Audit, Audit planning, Audit Methodology

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1. INTRODUCTION

This study addresses the topic of Internal Controls Deficiencies and focuses on Italy, where a law with the same objectives and origins as the United States of America (USA) Sarbanes-Oxley Act (SOX) has been implemented. The Italian setting presents however a different capital market and auditor legislation. Italy is interesting because it allows us to analyze the usefulness of the regulations implemented as a result of financial scandals in a civil law country where the market is driven by banks and financial institutions, with weak legal enforcement, weak investor protection and a low litigation risk, and the Italian "light SOX" makes fewer requirements overall for external auditors.

The study tests two research questions related to ICD severity and persistence. We investigate two causes of the severity classification and persistence: 1) internal auditors detection process following Public Company Accounting Oversight Board (PCAOB) Auditing Standard 5 and 2) types of ICD types classified by literature. ICD types are accounts-specific. The internal auditors detection process is the process of planning and scoping or testing and monitoring influenced by the internal auditors characteristics. For internal auditors we refer to Internal Control over Financial Reporting (ICFR) auditors, identified as responsible by the Italian law. We predict systematic differences in severity classifications and persistence across types of ICD and a lower probability of more severe and persistent ICD in companies with higher overall quality of internal control.

Prior research uses publicly available annual report data to distinguish characteristics of companies disclosing MW under Section 404 or under Section 302 (Ashbaugh-Skaife et al. 2007; Doyle et al. 2007; Hoitash et al. 2009). However, it does not address the full extent of detected control flaws, how those problems are detected, or how auditors determine which problems are disclosed. Because studies using publicly available data cannot directly examine the method of detection, research with access to this type of data is important.

We use proprietary data on detected ICD, classified by severity as Deficiencies, Significant Deficiencies (SD) and Material Weaknesses (MW). Managers of a sample of

Italian listed companies provided the data answering at questionnaires. The data is private and thus more precise and comprehensive than public data, which allows us to give a contribution developing findings from previous literature.

Furthermore, the private data gives indication on how ICD are detected by internal auditor detection process. The absence of data has not previously allowed research to address this topic. Our data provides information about the following: quantitative and qualitative indicators of firms, financial statement values and accounts in scoping, the type of qualitative indicators, the consideration of groups and the use of a top-down approach to analyze scoping quality. It gives information about the frequency of tests for account-specific, entity and information technology controls in terms of period and reports addressed, the type of tests (design or operation effectiveness/ based on decentralized documentation, observations or re-performing) and the consolidation of the results. We also use data on segregation of duties, education and experience of ICFR auditors, which is innovative.

The internal auditor detection process shows the situation about planning and scoping, testing and monitoring and ICFR auditors. The weakest part of scoping is the procedure to identify the financial statement values. Scoping quality can be improved with the use of a higher number of qualitative indicators, a control hierarchy based on financial reporting, and a perspective of the firm as a part of a group. Managers have improved the internal auditor detection process from the start-up period (2007-2009) to the operating period (2010-2012). Internal auditors perform the complete set of control tests (at account-specific, entity and information technology level) on average every year. The greatest difference between periods is the reports addressed by the tests and the type of tests for account-specific controls. In the start-up period, tests focus more on the annual financial report and are mainly decentralized inspections of documentation. In the operating period they focus on intermediate relationships and consist mainly of observations. Few companies perform tests on the operation effectiveness of entity level and information technology controls and few companies consolidate the results of all the tests. The level of segregation of duties among department shows that responsibility, test execution and remediation are usually assigned to two different

departments out of three, and in most of the sample, the ICFR auditors hold a post graduate qualification in Accounting and Business Administration. The ICFR auditors have on average between four and six years of experience mainly in the administrative area.

We investigate this issue in a sample of 4284 ICD. Among account-specific controls, the very widespread ICD are those in accounting period-end/accounting policies, purchases, inventory, revenues, human resources, fixed assets and intangibles. The most severe ICD are purchase and revenue, while the ICD that increase more over time are on human resources, fixed assets and intangibles, period end and reconciliations.

For the research question 1, results confirm a lower probability of more severe ICD in companies with higher overall quality of internal control. These results have several implications: several qualitative indicators and the top-down approach should be used in scoping and planning; the optimum frequency of testing would be to test all account-specific, entity and information technology controls every semester; re-performing or observation should be used instead of simple inspection of documentation; operation effectiveness of information technology and entity level controls should be tested; segregation of duties, education and experience of internal auditors are key elements to have an high ICFR quality. These results give a contribution at world-wide level because it addresses the quality of Internal Auditor Detection Process having private data on its internal structure and procedures. This analysis is often difficult due to the absence of data, even in the US market.

For the research question 2, we found that revenues are the most severe ICD types and that human resource and period end are the most persistent ICD types. These results can be useful to other European country with similar contexts to Italy, i.e. civil law countries, bank-driven, with low litigation risk (France, Germany, Netherlands, Norway, and Switzerland) to understand the behavior of ICD in ICFR in listed companies, outside from the context of Sarbanes-Oxley Act where the major part of the academic research focus on.

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2. BACKGROUND

The empirical setting of the study is the Italian stock market. This market is less developed than the USA market. The Italian market is more driven by banks and financial institutions than by investors and listed companies are only about 250. Italy is a civil law country and is characterized as having weak legal enforcement and weak investor protection (Choi and Wong, 2007). Italy also has low litigation risk based on the index in Wingate (1997). The litigation risk score is 6.22 for Italy, while Anglo-Saxon countries report scores above 10, with a maximum score of 15 for the USA. Italy's score is similar to other non-Anglo-Saxon European countries like France, Germany, Netherlands, Norway, and Switzerland (Cameran et al., 2013).

Statutory Audit was adopted in Italy for all listed companies in 1975 by Presidential Decree D.P.R. 136/1975, and was later extended to unlisted companies in some regulated industries such as banks and insurance. The Italian market is considered to be thin, with auditors competing for a relatively small number of statutory audits (Gietzmann and Sen, 2002). Audit is subject to mandatory audit firm and partner rotation.

Internal Audit is a relatively new discipline in Italy, and there is no legal requirement for Italian companies to establish Internal Audit units. Financial service providers are the only exception to this (Arena and Azzone 2009; Cortesi et al. 2009; Mariani et al. 2010), but in 2005 Law Number 262 introduced compulsory assessment of ICFR in 2005 (Law 262/2005).

As SOX was enacted in the USA as a response to financial scandals like Enron and Worldcom, Law 262/2005 was enacted in Italy after financial scandals like Parmalat and Cirio. Law 262/2005 requires CFO to attest ICFR effectiveness. The Italian law has a clear objective, but the implementation procedure is not defined. Due to the absence of compulsory framework, Italian listed companies mainly test ICFR following Committee of Sponsoring Organizations of the Treadway Commission report (COSO 2006), Control Objectives for

Information and related Technology (COBIT, 2007; COBIT for SOX, 2006) (Azzali and Mazza, 2012).

The USA and Italian laws have the same objectives of seeking to protect shareholders from financial scandals and fraudulent practices. There are , however, many differences in aspects such as effective date, phase-in period, authority, field of application, object of control, the main sections related to ICFR, responsibilities, frameworks for ICFR and external auditing principles used for listed companies and severity of ICD (Table 1). Law 262 was passed in 2005 but came into force only in the second half of 2007, nearly five years after the USA law. Second, in the USA the PCAOB was set up, whereas in Italy there is no separate authority setting guidelines or supervising auditors, and there was no facilitation or phase-in period either. Furthermore, in the USA, supervision is extended to the overall internal control system while in Italy only ICFR is supervised. As Security Exchange Commission in USA, the "COmmisione Nazionale per le SOcietà e la Borsa" (CONSOB) in Italy oversees the financial markets. For example, CONSOB provide indications about the reporting to comply with Law 262/2005, proposing a report type (CONSOB report). The main section of Law 262/2005 covering ICFR is Art. 154 – bis. The disclosure and the assessment provided for by Sections 404 and 302 of the SOX are wider and the compliance is more costly than Art. 154 – bis; Italian Law 262 is in fact known as "Light SOX". But the biggest difference between the two laws lies in the responsibilities and role of external auditors. In Italy, external auditors are not required to certify the reliability of the Internal Control System of the company; they have no direct responsibility for the design and effectiveness of ICFR. Another important difference concerns the frameworks for ICFR. Companies are required to state which frameworks they use. In Italy on the other hand, no frameworks exist and companies have the choice to state or not which international or own-developed frameworks they use. Italy follows National Auditing Standards laid down by the "Consiglio Nazionale Dottori commercialisti ed Esperti Contabili" based on International Standard of Auditing (ISA). Disclosure of ICD is higher in USA. In Italy, CONSOB reports include a section that could show ICD, but in early applications of Law 262, no ICD have been disclosed to the market because CONSOB doesn't

mandatory require them. For the purposes of this study, we request internal data on ICD, classified as Deficiencies, Significant Deficiencies and Material Weaknesses, output of the ICFR testing. Auditing Standard No. 5 issued by PCAOB (paragraph 63), shows that ICD severity classification depends on "whether there is a reasonable possibility that the company's control will fail to prevent or detect a misstatement of an account balance or disclosure; and the magnitude of the potential misstatement resulting from the deficiency". Prior research implies that the component tasks of classifying the severity of ICD through judging the likelihood and the materiality of misstatement are unstructured, complex, and difficult (Messier et al. 2005; Allen et al. 2006). Sources of difficulty can be, for example, inconsistency in definitions and interpretation of the materiality (Bedard and Graham 2011). Because Italy has no frameworks for severity classification, we based our research on the PCAOB definition as a benchmark.

Table 1 - Main differences between Sarbanes-Oxley Act and Law 262 related to Internal Controls over Financial Reporting

	Law 262 – 2005 - Italy	**Sarbanes-Oxley Act – 2002 - USA**	**Differences/Similarities**
Objective	Protection shareholder from fraudulent practices	Protection shareholder from fraudulent practices	Same
Origin	Financial scandals and fraudulent practices	Financial scandals and fraudulent practices	Same
Effective Date	2007	2002 (302), 2004 (404)	5 years later in Italy
Phase-in period	No phase-in period	For non accelerated and foreign private issuers, the act is effective from 2006	No phase-in period in Italy
Authority	COmmisione Nazionale per le SOcietà e la Borsa - CONSOB (corresponding to USA SEC)	Security Exchange Commission - SEC Public Company Accounting Oversight Board - PCAOB	No separate/specific authority that states guidelines and control the auditors in Italy
Field of application	All listed companies and public companies owned by the State	Facilitations for non-accelerated public companies and foreign private issuers	No facilitations in Italy
Object of control	Internal Controls over Financial Reporting (ICFR)	Internal Controls System	Focus on ICFR in Italy and wider control object in USA
Main Section related to ICFR	Art. 154 –bis (comma 1 to 6)	Section 404 and 302	The disclosure and the assessment provided for by Section 404 and 302 are wider and more costly than Art. 154 – bis. Law 262 in Italy is called "Light Sox".

Responsibility	Board of Directors, Audit Committee, Chief Financial Officer	Board of Directors, Audit Committee, Chief Financial Officer, External Auditor	No direct responsibility of External Auditor by the Italian law (262/2005).
Framework for ICFR	Not defined in the law but companies may explicit the ICFR and ITC frameworks employed	Not defined in the law but companies must show the ICFR and ITC frameworks employed	In USA is compulsory for companies to explicit the ICFR framework employed; in Italy is not compulsory. In Italy a national framework for ICFR does not exist
External Auditing Principles to be employed for listed companies	National Auditing Standard stated by Consiglio Nazionale Dottori commercialisti ed Esperti Contabili. They are similar to ISA of IFAC	National Auditing Standard stated by Auditing Standard Board of American Institute of Certified Public Accountants	Both Italy and USA employ National Auditing Standards.
Disclosure of ICD	ICD are not disclosed to the market. The CONSOB report employed by CFO, includes a paragraph that should show ICD. In the first implementation of the law, however, reports do not show any ICD.	Reports employed by CFO and auditors show SD and MW. Facilitations for non-accelerated public companies and foreign private issuers	Absence of effective disclosure in Italy.

Much previous research has investigated the ICD after SOX on US market, but even if the European Commission does not issue European Directive on ICFR, the legislator of individual European countries issued similar laws with the same objective of SOX and it is important to investigate the ICD after these laws also in the European market. This study investigate Law 262/2005, that is a national law issued by the Italian government in autonomy. The identification of ICD output of the ICFR evaluation due to the application of Law 262/2005 can only be investigated in Italy thanks to the private data collected by the Italian companies. This research can be useful to other European country with similar contexts, i.e. civil law countries, bank-driven, with low litigation risk (France, Germany, Netherlands, Norway, and Switzerland) to understand the behavior of ICD in ICFR in listed companies. This understanding is useful for the company itself, but also for external auditors in the assessing of internal control system reliability, even if the country has not a regulation for ICFR attestation.

This research can give a contribution also at world-wide level because it addresses the quality of Internal Auditor Detection Process having private data on its internal structure and procedures. This analysis is often difficult due to the absence of data, even in the US market.

3. LITERATURE AND RESEARCH QUESTIONS

3.1. Internal Auditor Detection Process

Prior literature address Internal Audit quality (Regoliosi and D'Eri, 2004; Allegrini et al. 2006; Lenz et al. 2014; Sarens and Lamboglia 2014; Sarens et al. 2011; Sarens and Abdolmohammadi 2011; Christopher et al. 2009; Prawitt et al. 2009), we specifically give a contribution in the Internal Auditor detection process of ICD to attest ICFR. Because one big difference between Law 262/2005 and SOX is that in Italy the detection process of ICD to attest ICFR is performed only by Internal Auditors, our fist contribution is to investigate its procedures through the audit cycle phases established by PCAOB Auditing Standard No. 5 (Planning-Scoping, Testing-Monitoring) and its structure through the IA characteristics. Italy is the best context where to investigate this issue because Law 262/2005 does not introduce the external auditors responsibility in ICFR attestation. Therefore Italy is the only country in the world where this analysis can be performed.

We based the following IA detection process on PCAOB Auditing Standard No. 5, because, as explained in the background, there are not Italian guidelines to implement Law

262/2005, and from interviews we conclude that all the companies in our sample use US frameworks (Azzali and Mazza, 2012).

3.1.1. Planning and Scoping

Planning and scoping is evaluated following PCAOB Auditing Standard No. 5, paragraph 21-41. It is of high quality if it uses both quantitative and qualitative indicators for firms, financial statement values and accounts selection. We also investigate the kinds of qualitative indicators for firms and accounts selections, the view of a firm as a part of a group, the control hierarchy based on top-down approach. We expect that a high quality of planning and scoping decreases the presence of more severe and persistent ICD.

3.1.2. Testing and Monitoring

For testing and monitoring, we follow PCAOB Auditing Standard No. 5, paragraph 42-61. We expect that the speed of the testing process (FREQUENCY) is negatively associated with the detection probability of SD and MW or persistent ICD. We define the account-specific control test frequency as annual or semi-annual. We define the entity-information technology level control test frequency as multi annual given that the entire control system at these levels is similar in the near years, and a company can also opt to test it in a cycle longer than the fiscal year. Regarding frequency, account-specific controls are addressed to all the documents with financial data. We thus develop an ordinary measure of quality assigning a higher level of quality when they are addressed to more documents.

Research on external audit investigate substantive tests. We investigate control tests on design and operation effectiveness of account-specific, entity and information technology controls.

We investigate the most common tests on operation effectiveness for account-specific control. The tests can be: self-assessment, decentralized inspection of documentation, observation and re-performing. For entity level and information technology controls, most

companies evaluate only the design of controls, and we define as internal control quality the presence of tests also on operation effectiveness. Results consolidation is a further indicator of higher quality of procedures. We predict that the high quality of testing and monitoring decreases the presence of more severe and persistent ICD.

3.1.3. ICFR Auditors

We measure expertise and independence using the idea that managers with higher qualifications, more years of experience and prior jobs in control have more knowledge of internal controls and that managers carrying out higher segregation of duties are more independent. We expect that *the probability of more severe and persistent ICD* decreases with education, expertise and segregation of duties of the parties performing the work (internal auditor detection process quality).

RQ1a= Are there cross section variation within ICD severity due to the internal audit detection process?

RQ1b= Are there cross section variation within ICD persistence due to the internal audit detection process?

3.2.ICD types

Differences in effective date and in object of control (focus only on ICFR) between Law 262/2005 and SOX, have bring Italian company to more develop the account-specific controls overall in the start-up period (2007-2009). We thus investigate the variation due to the type of account-specific ICD to understand which are the more problematic issue in countries civil law, bank-driven, with low litigation risk that have to been addressed by the company itself to guarantee a reliable ICFR, indirectly useful also to external auditors.

Literature and professional standards on Section 404, such as PCAOB Auditing Standard No. 5 paragraph 28-33, require specific consideration of accounts and assertions. While past studies find little difference in control risk assessments across accounts/assertions (Elder and Allen, 2003), current standards suggest that there may be systematic differences in severity classifications across types of ICD, such as account-specific ICD (Bedard and Graham, 2011). PCAOB notes that the auditor should consider the nature of the affected financial statement accounts in assessing the likelihood of misstatements that may result from an inoperative control.

We consider whether severity classifications and persistence vary according to the nature of the account-specific ICD where ICD are classified for financial statement accounts/cycle based on literature (Ashbaugh-Skaife et al. 2007; Doyle et al. 2007; Ge and McVay, 2005; Bedard and Graham, 2011).

Ge and McVay (2005) found that MW tend to be related to deficient revenues-recognition policies, lack of segregation of duties, deficiencies in the period-end reporting process and accounting policies, and inappropriate account reconciliation. The most common account-specific MW occurs in current accrual accounts, such as the accounts receivable and inventory accounts. Other frequent MW occur in complex accounts, such as derivative and income tax accounts. The contribution of Doyle et al. (2007) is to find that the determinants vary based on the type of control problems (serious entity-wide or account-specific), and on the specific reason for the material weakness, consistent with each firm facing their own unique set

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of internal control challenges. Ashbaugh-Skaife et al. (2007) underline the difference in the existence of a MW and in detecting (finding and reporting) it. Bedard and Graham, (2011) find that account-specific ICD related to revenues are more severe in US.

RQ2a= Are there cross section variation within ICD severity due to type of ICD?

RQ2b= Are there cross section variation within ICD persistence due to type of ICD?

4. METHOD

4.1.Questionnaire and Sample

We collected private data through interviews and questionnaires. We conducted exploratory interviews to understand the implementation of Law 262/2005. Face-to-face interviews of CFO or financial staff were carried out by two professors and a PhD student. Each interview lasted about 3 hours because after answering the first general question, firms often showed us their procedures. The information collected was mainly used to draw up questionnaires and interpret responses to it. We prepared questionnaires together with external auditors from one of the Big4. We discussed and selected instruments for each construct based on frameworks. External auditors made a key contribution in ensuring language would be comprehensible for the target companies. Questionnaires were next tested and on the basis of their responses and comments, the questionnaire, the study design and the measurement of some constructs were slightly adapted. Questionnaires focused on evaluating the period 2007-2012 and was distributed by email. The distribution procedure involved sending a survey package containing questionnaires and a covering email underlining the importance of the research and encouraging firms to reply. In order to increase the response rate, companies which had not yet responded were contacted by phone. We opted to make the questionnaire confidential, i.e.

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although the names of respondent companies are known to us they are not disclosed here and results are shown only in aggregate form. We were thus able to link the data collected by questionnaires with other sources. Finally, we hand-collected data from the consolidated annual reports for firms using IFRS, from company web sites and the website of the Borsa Italiana, the Italian Stock Exchange. In addition, it was emphasized that the research was under the auspices of a well-known university, widely recognized as trustworthy, so that firms could be confident that sensitive information would not be disclosed.

The 255 Italian companies listed on the Milan Stock Exchange are the population explicitly targeted at monitoring and assuring compliance with Law 262/2005. We exclude from the analysis the financial industry because of the different types of accounts in their financial report.

We received 14 answers over 211 companies in non-financial industry. To perform regression analysis we consider the number of ICD as observations, as Bedard and Graham (2011). Our sample comprises 4284 specific ICD detected by ICFR auditors for 14 companies in 6 years (84 firm-year observations, "n" in Table 2). In comparison with the study by Bedard and Graham (2011), we use a lower numbers of companies (14 versus 44), a longer period of time (6 versus 2 years) resulting in a higher number of ICD (4284 versus 3990 ICD).

Table 2 - Sample Selection

Description	N.
Mean number of ICD for each firm-year	50
Mean number of observations (ICD) for the period 2007-2012 for each firm	300
Total number of observations (ICD) for the period 2007-2012 for 14 companies listed on the Milan Stock Exchange that answered at the questionnaire (6.6% of the population)	4284

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The number of ICD detected could be related to the composition of the sample. Our sample mainly includes big Italian listed companies that have invested a lot of human and finance resources in compliance with Law 262/2005, although it does not make as many requirements as the USA SOX. At the beginning, in 2007, the companies modified their internal organization, some requesting help from consulting firms at high non-audit fees. They attempted to reorganize internal control systems, especially internal control over financial reporting, and to implement advanced evaluation procedures. Finally, we matched the questionnaire data with the financial data for each fiscal year and we break the period in two sub-periods: the start-up period (2007-2009) and the operating period (2010-2012). From 2007 to 2009, big changes took place in the internal structure of many companies in for example assignment of responsibilities and the organization chart.

To check the validity of the database, we select specific questions for the internal auditors detection process for which is easier to receive answers and we ask at the companies that do not have answered at the full questionnaires if they can answer at only these questions. We compare the mean of the answer in our sample (14 companies) with the mean of the answer of this control group (35 companies). Two-groups mean comparison test do not show significant differences, supporting the validity of the data for Italian companies that comply with Law 262/2005 (Table 3).

Table 3 - Mean Comparison

Variable	Our sample Mean	Control group	Two-groups mean comparison (two-tailed p-value)
SCOPING QUALITY	3.23	3.06	-0.41 (0.68)
ACC_TESTS FOR FINANCIAL REPORTING	1.85	2.11	1.54 (0.12)
ACC_TEST TYPE	1.54	1.37	-1.29 (0.20)
n	14	35	

4.2.Model

First, we perform univariate tests for differences between two periods: the start-up period that includes years 2007-2008-2009; and the operating period that includes years 2010-2011-2012. We use group mean comparison t-tests for the ordered variables and Pearson X^2 tests (with d.f. =1) for the dummy variables. For the t-test, we first perform the sd-test (standard deviation test) and then use the t-test with unequal variance if the group mean comparison sd-test is significant. Secondly, we perform the following multivariate logistic regression with severity, a dummy variable as the dependent variable.

$$SEVERITY \text{ or } PERSISTENCE = \beta_0 + \sum_{n=1}^{16} \beta_n \text{ ICD TYPES} + \sum_{n=17}^{21} \beta_n \text{ INTERNAL}$$
$$AUDITOR \text{ } DETECTION \text{ } PROCESS + \sum_{n=22}^{38} \beta_n \text{ CONTROL VARIABLES} + year \text{ } dummy$$
$$variable \text{ } included$$

We use a logistic regression model to test RQ regarding factors associated with severity classification or persistence of ICD.

The dependent variable for severity is *SD/MW*: 1 MW or SD, 0 Deficiency. It investigates factors associated with ICD meeting the criterion for a "more than remote" likelihood of failing to detect or prevent a misstatement i.e., at least SD classification, implying that the ICD must be reported at least to management and the audit committee.

The other dependent variable is PERSISTENCE: 1 if the number of a specific type-severity level ICD for a company of the following year is equal or bigger than that number in the prior year; 0 otherwise.

ICD TYPES definitions are presented in Table 4. ICD TYPES are all dummy variables for which their sum is equal to 1. To perform the regression we drop one type to be included in the constant (β_0) and to interpret the results in comparison with this type. To choose which ICD type use as benchmark, we based on the results of prior research finding that revenues is one of

the most important ICD type (Ge and McVay, 2005; Bedard and Graham, 2011). Thus all the coefficients of the regression have to be interpreted in comparison with ICD on ACC_REVENUE.

INTERNAL AUDITOR DETECTION PROCESS definitions are presented in Table 4. These are dummies and ordinal variables built to have a measure of IA detection process quality. An higher code means an higher quality.

We derive our predictions for company-level control variables from prior research (Ashbaugh-Skaife et al. 2007; Doyle et al. 2007; Ge and McVay, 2005).

We expect a negative sign on SIZE, given that prior research shows that smaller companies have more serious internal control problems. We expect that bad performance will be associated with more severe ICD, generating a positive sign on LOSS. We also expect that company complexity and riskiness will be positively associated with ICD severity, including B/M, M&A, SEGMENTS, FOREIGN, and RESTRUCTURING and LITIGATION for complexity and riskiness. We expect that companies with longer tradition and experience have lower serious internal control problems, generating a negative sign on FIRM AGE.

Characteristics of the Italian context are the widespread perception of a lack of independence by outside directors and weak legal protection for small investors (Volpin 2002; Di Pietra et al. 2008). In this context, agency conflicts between large insider and minority outsider shareholders are mitigated by internal control mechanisms, such as the board of directors and its internal committees (Allegrini and Greco 2013).The characteristics of corporate governance that can influence the disclosure of MW, SD or CD are audit committee and board of director size, number of meetings of audit committee and board of directors, accounting and supervisory experience of members, independence of members (Krishnan and Visvanathan (2007), Hoitash et al. (2009), Hermanson et al. (2009), Shu et al. (2011), Goh (2009). Therefore we include a GOVERNANCE SCORE covering these variables to control

for its association with the severity of the ICD and we expect a negative sign following Doyle et al. (2007).

Because the work of the external auditor is closely related to internal control quality, we also control for external audit characteristics. One strand of literature found higher audit fees in the presence of internal control problems (Raghunandan and Dasaratha 2006; Hoitash et al. 2008; Hogan and Wilkins 2008). Krishnan et al. (2008) examine both total costs and auditor attestation costs associated with SOX 404: all the costs are higher for ICFR MW firms. Furthermore, Hoitash et al. (2008) find that audit pricing for companies with internal control problems varies by problem severity or by nature of the problem. Therefore, we expect a positive association between severity of ICD and AUDIT FEES. Ashbaugh-Skaife et al. 2007; Ge and McVay, 2005) find a positive association with the disclosure of MW and BIG4. We expect a positive relation between the ICD severity and BIG4.

In our sample there are not companies cross-listed in USA that have to comply with SOX; therefore we do not have to add this control variable in our model. Analysis of audit opinion reveals that all the companies in our sample appear to be clean.

A dummy to control for the year effect is added.

5. DESCRIPTIVE STATISTICS

5.1. Internal Auditor Detection Process

Table 4 describes Company-Level Client Control and Detection Process Variables.

Table 4 - Company-Level Control and Detection Process Variables: Mean (Std. Dev.) or Percent = 1

Variable		All Firms-year (n=84)	Start-up period 2007-2009 (n=42)	Operating period 2010-2012 (n=42)
NUM_MW	number of material weaknesses.	1	1	1
		(3)	(4)	(2)
NUM_SD	number of significant deficiencies.	10	12	9
		(21)	(25)	(15)
NUM_Deficiencies	number of control deficiencies.	82	84	78
		(106)	(104)	(108)
PLANNING AND SCOPING				
FIRMS	1 = if to include a firm in the scope both quantitative AND qualitative indicators are used	73%	67%	79%*
	0 = if to include a firm in the scope quantitative OR qualitative OR neither indicators are used			
FINANCIAL STATEMENT VALUES	1 = if to include a financial statement value in the scope both quantitative AND qualitative indicators are used	71%	63%	79%**
	0 = if to include a financial statement value in the scope quantitative OR qualitative OR neither indicators are used			
ACCOUNTS	1 = if to include an account associated with financial statement value in the scope both quantitative AND qualitative indicators are used	75%	67%	83%**
	0 = if to include an account associated with financial statement value in the scope quantitative OR qualitative OR neither indicators are used			
SCOPING	FIRMS+ FINANCIAL STATEMENT VALUES+ ACCOUNTS (3=highly effective to 0 = highly ineffective)	2.19 (1.09)	1.96 (0.71)	2.42*** (0.82)***
FIRMS' QUALITATIVE INDICATORS	2 = if the qualitative indicators are the operative risk AND the type of contract (warranties, risks)	1.02 (0.66)	0.92 (0.71)	1.13 (0.60)
	1 = if the qualitative indicators are only operative risk			
	0 = otherwise			
ACCOUNTS' QUALITATIVE INDICATORS	2 = if the qualitative indicators are: the extraordinary events, the volatility of the financial count, the specific risks linked to the financial count	1.15 (0.71)	1.08 (0.76)	1.21* (0.65)
	1 = if the qualitative indicators are the specific risks linked to the financial count			
	0 = otherwise			

GROUP/SINGLE ENTITY	1 = if to include a firm in the scope, it is considered as a part of the group 0 = if to include a firm in the scope, it is considered only as a single entity	40%	38%	42%
CONTROLS HIERARCHY	1 = if a control hierarchy based on top-down approach is performed 0 = otherwise	67%	63%	71%
SCOPING QUALITY	FIRMS' QUALITATIVE INDICATORS+ ACCOUNTS' QUALITATIVE INDICATORS+ GROUP/SINGLE ENTITY+ CONTROLS HIERARCHY (6=highly effective to 0= highly ineffective)	3.23 (1.60)	3.00 (1.79)	3.46* (1.36)**

TESTING AND MONITORING

ACC_TEST FREQUENCY	2 = every six months 1 = every year 0 = not applicable	1.27 (0.57)	1.21 (0.65)	1.33 (0.47)***
ENTITY AND IT_TEST FREQUENCY	3 = every six months 2 = every year 1 = multi-year 0 = not applicable	2.29 (0.79)	2.29 (0.85)	2.29 (0.74)
ACC_TESTS FOR FINANCIAL REPORTING	1 = more than 50% for the annual financial report 2 = more than 50% for the intermediate relations 3 = more than 50% for the two quarterly relations 0 = not applicable	1.85 (0.84)	1.67 (0.95)	2.04*** (0.68)***
FREQUENCY	ACC_TEST FREQUENCY + ENTITY_TEST FREQUENCY + ACC_TESTS FOR FINANCIAL REPORTING (8=highly effective to 0 = highly ineffective)	5.41 (1.61)	5.17 (1.90)	5.67* (1.22)***
ACC_TEST TYPE	1 = inspections of documentation decentralized 2 = observations 3 = reperforming 0 = not applicable	1.54 (0.92)	1.38 (0.96)	1.71** (0.85)

ENTITY AND IT_OPERATION EFFECTIVENESS TEST	1 = if operation effectiveness test have been performed on entity and information technology level controls 0 = otherwise	31%	29%	33%
RESULTS CONSOLIDATION	1 = if the results of the monitoring are consolidated 0 = otherwise	56%	50%	63%
TESTING QUALITY	ACC_TEST TYPE + ENTITY_OPERATION EFFECTIVENESS TEST + RESULTS CONSOLIDATION (5=highly effective to 0 = highly ineffective)	2.41 (1.26)	2.17 (1.35)	2.76** (1.11)*

ICFR AUDITORS

SEGREGATION OF DUTIES	The number of duties actually assigned to a different department divided by the number of duties that could be assigned to a different department (3 = RESPONSIBILITY, TEST EXECUTION, REMEDIATION)	0.65 (0.20)	0.63 (0.20)	0.67 (0.19)

$$\frac{\#duties\ assigned\ to\ different\ department\ by\ questionnaire}{3}$$

(1=high segragation to 0.33= low segregation)

EDUCATION	1 = if all the ICFR auditors have a master degree in Accounting and Business administration 0 = if at least one the ICFR auditors have education different	69%	71%	67%
YEARS OF EXPERIENCE	1 = if most of ICFR auditors have between 0 and 1 years of experience 2 = if most of ICFR auditors have between 2 and 3 years of experience 3 = if most of ICFR auditors have between 4 and 6 years of experience 4 = if most of ICFR auditors have more than 6 years	2.94 (1.18)	2.58 (1.39)	3.29*** (0.80)***

PREVIOUS EXPERIENCE	1 = no previous experience	2.94	2.83	3.04
	2 = previous experience in other company	(0.97)	(1.03)	(0.90)
	3 = previous experience in the administrative staff of the same company			
	4 = previous experience in internal audit staff of the same company			
ICFR AUDITORS QUALITY	SEGREGATION OF DUTIES + EDUCATION+ YEARS OF EXPERIENCE+ PREVIOUS EXPERIENCE(10=highly effective to 1.67 = highly ineffective)	7.21 (1.73)	6.75 (1.97)	7.67*** (1.31)***

*, **, *** Indicate ≤0.10, ≤0.05, and ≤0.01, respectively, with one-tailed probability levels for t-tests.

This table presents descriptive statistics on company-level variables, with differences between periods initial/subsequent using group mean comparison t-tests with unequal variance if the group mean comparison sd-test is significant or Pearson _2 tests _with d.f. =1) for the dummy variables.

5.1.1. Planning and Scoping

Both quantitative and qualitative indicators are used in the scoping process by 71-73-75 percent of the full sample companies, resulting in a scoping score (as sum of three variables in Table 2) of 2 over 3. The weakest part of scoping is the procedure to identify financial statement values (71%; 63% in the first period and 79% in the next period).

Scoping quality (as sum of four variables in Table 2) is just over the half of the code (3.23 on the scale of 0= low quality to 6= high quality): about 50 percent of the sample use a bigger number of qualitative indicators than the single qualitative indicator based on operative risk and specific risks linked to the financial statement (such as type of contract, warranties, risks, extraordinary events, volatility); 67 percent of the sample perform a control hierarchy based on financial reporting while only 40 percent of the sample view the firms in the scoping as a part of the group rather than a single entity.

Companies in the start-up period of implementation have a lower mean in SCOPING and SCOPING QUALITY than those in the following period (1.96 versus 2.42, p = 0.01; and 3 versus 3.46, p = 0. 10).

5.1.2. Testing And Monitoring

Frequency is effective (5.41 on the scale of 0= highly ineffective to 8= highly effective). Client internal auditors perform the entire set of control tests (at account specific, entity and information technology level) on average every year, and more than 50% of the tests are for the intermediate relations (reported every six month). The greatest difference between periods is the type of the report the tests are run for: in the start-up period tests focus on the annual financial report, while in the next period they focus on the intermediate relations (1.67 versus 2.04, p = 0.007).

Testing quality is middle effective (2.41 on the scale of 0= highly ineffective to 5= highly effective).

We investigate the most common tests on operation effectiveness for account specific level control and the presence of these tests for entity and information technology level control. The greatest difference between periods is in the type of tests for account specific level controls: in the start-up period the tests are mainly decentralized inspections of documentation, while in the following period they are mainly observations (1.38 versus 1.71, p = 0.028). In our sample companies do not make use of self-assessment or centralized inspection of documentation tests because they have low reliability; they should be used only as additional tests. Regarding entity

level and information technology controls, only about 30 percent of the sample perform the tests on the operation effectiveness. Finally the results of these tests should ideally be consolidated, but this is done by only 56 percent of the sample (50% in the first period, 63% in the following period).

5.1.3. ICFR Auditors

ICFR auditor quality is effective (7.21 on the scale of 1.67= highly ineffective to 10= highly effective). ITC responsibility, test execution and remediation are usually assigned to two different departments out of three (about 67%) and in about 70% of the sample, all ICFR auditors have a postgraduate qualification in Accounting and Business Administration. The ICFR auditors have an average of between four and six years of experience (the number varies with the passage of time) and a good level of previous experience.

5.2. ICD types

Table 5 shows the percentage composition of detected ICD by severity category.

Table 5 – Percentage Composition of Detected ICD by Severity Category

		All			**Deficiencies**			**Significant Deficiencies**			**Material Weaknesses**		
		All (4284= 100%)	**All Start-up (2526= 100%)**	**Oper (1758= 100%)**	**All (3258= 100%)**	**Start-up (1902= 100%)**	**Oper (1356= 100%)**	**All (978= 100%)**	**Start-up (576= 100%)**	**Oper (402= 100%)**	**All (48= 100%)**	**Start-up (33= 100%)**	**Oper (15= 100%)**
ACC_ REVENUES	1 = if the problems are in the account-specific controls in the revenue to cash cycle, in the design and review of revenue-recognition policies, in the contracting practices, in the detection of side letters and the process of investigating customer assertions regarding terms not specified in the agreements. 0 = otherwise	10%	9%	10%	6%	5%	6%	22%	22%	23%	25%	27%	20%
ACC_ PURCHASES	1 = if the problems are in the account-specific controls in the purchase to payment cycle. 0 = otherwise	16%	17%	14% **	13%	12%	14%	22%	27%	16% ***	62.5%	61%	67%
ACC_ INVENTORY	1 = if the problems are in the account-specific controls in inventory. 0 = otherwise	12%	13%	10% ***	15%	17%	12% ***	2.5%	1%	4% **	0%	0%	0%
ACC_ HUMAN RESOURCES	1 = if the problems are in the account-specific controls in the compensation, payroll and benefits, competences and segregation of duties of the human resources 0 = otherwise	10%	8%	13% ***	11%	9%	14% ***	8%	6%	10% **	0%	0%	0%
ACC_ FIXEDASSET AND INTANGIBLE	1 = if the problems are in the account-specific controls in the fixed assets (e.g., existence, amortization) and intangibles (e.g., existence and capitalization, impairment test) 0 = otherwise	10%	9%	12% ***	10%	9%	11% **	11%	9%	14% ***	6.25%	6%	6.5%
ACC_ TAXES	1 = if the problems are in the account-specific controls in taxes 0 = otherwise	3%	3%	3%	3%	3%	4%	3.5%	5%	1% ***	0%	0%	0%
ACC_ TREASURY	1 = if the problems are in the account-specific controls in treasury and investments. 0 = otherwise	7%	11%	2% ***	7%	10%	3% ***	9%	15%	1% ***	6.25%	6%	6.5%
ACC_ PERIOD-END/ ACCOUNT. POLICIES	1 = if the problems are in the period-end reporting process (closing process), in the application of new accounting principles or existing accounting principles to new transactions, in the absence or ineffectiveness of a rule compliance, in the record keeping and compliance assistance for reports required, in the authorization, recognition, capture, and review of transactions, facts, circumstances, and	19%	18%	21% *	20%	21%	19%	17%	11%	25% ***	0%	0%	0%

ACC_ ACCOUNT RECONCIL.	events that could have a material impact on the company's financial reporting process, in the design of policies and execution of processes related to accounting for transactions, in the establishment of standards for review of journal entries and related file documentation, in the accounting and financial reporting infrastructure for collecting, analyzing, and consolidating information to prepare the consolidated financial statements, in the procedures for appropriately assessing and applying disclosures and requirements, in the application of accounting policies 0 = otherwise 1 = if the problems are in certain accounting reconciliations and review procedures or in lack of compliance with established procedures for monitoring and adjusting balances relating to certain accruals and provisions, including restructuring charges. 0 = otherwise	5%	5%	6% **	6%	5%	7% **	2.5%	2%	3%	0%	0%	0%
ACC_ SUBSIDIARY SPECIFIC	1 = if the problems are in the timely completion of statutory filings in foreign countries, in the application of company policies among business units and segments, in the timely and complete revelation of material contracts entered into by subsidiaries of the company, in control that could have permitted employees at certain company improper transactions, unauthorized trading or cash payments, in the procedure of consolidation (e.g., consolidation area, intergroup transaction, minority interests recognition, business combination). 0 = otherwise	8%	7%	9%	9%	9%	10%	2.5%	2%	3%	0%	0%	0%
		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Among account-specific controls, the most widespread ICD are ACC_PERIOD-END/ACCOUNTING POLICIES ICD: period-end reporting process (closing process), the application of new accounting principles or existing accounting principles to new transactions, the absence or ineffectiveness of rule compliance, record keeping and compliance assistance for reports, the authorization, recognition, capture, and review of transactions, facts, circumstances, and events that could have a material impact on the company's financial reporting process, the design of policies and execution of processes related to accounting for transactions, the establishment of standards for review of journal entries and related file documentation, the accounting and financial reporting infrastructure for collecting, analyzing, and consolidating information to prepare the consolidated financial statements, the procedures for appropriately assessing and applying disclosures and requirements and the application of accounting policies.

After that, the most frequent ICD are ACC_PURCHASES (16%), ACC_INVENTORY (12%) and ACC_REVENUESS, ACC_HUMAN RESOURCES, ACC_FIXEDASSETS AND INTANGIBLES (10%). Critical areas are related to: the hierarchy of greater presence of ICD in account-specific controls in the revenues to cash cycle, the design and review of revenues-recognition policies, contracting practices, the detection of side letters and the process of investigating customer assertions regarding terms not specified in the agreements, compensation, payroll and benefits, human resource duties, fixed assets (existence, amortization) and intangibles (existence and capitalization, impairment test) where ICD are more widespread than ICD in account-specific controls in taxes, commitments and contingencies and in treasury and investments. The most severe ICD are ACC_PURCHASES (62.5% of MW and 22% of SD) and ACC_REVENUES (25% of MW and 22% of SD). We note that although ACC_TREASURY is less frequent; when it is present, it shows severe ICD (6.25% of MW and 9% of SD).

Looking at the difference in the frequency between the start up period and the operating period, ICD on purchases, inventory, treasury and taxes (for SD) decrease over time, while ICD on human resources, fixed assets and intangibles, period end and reconciliations increase over time (p-value statistically significant). Inventory decrease in the number of less severe ICD and increase in the number of significant deficiencies.

5.3. Control Variables

Table 6 reports names, definitions and descriptive statistics for company-level control variables.

Table 6 - Sample Composition and Descriptive Statistics on Company-Level Control Variables: Mean (Std. Dev.) or Percent = 1

Variable		Firms-year (n=84)
SIZE	Natural log of total assets	13.85 (1.86)
LOSS	An indicator variable equal to 1 if earnings before extraordinary items from the income statements in years t is less than zero, and zero otherwise	21%
FOREIGN	An indicator variable equal to 1 if is present an Other Comprehensive Income related to foreign transactions	38%
SEGMENTS	The number of operating segments reported in the financial statement notes	3.46 (2.369)
B/M	book value / (share price * number of shares outstanding)	3.41 (11.35)
FIRM AGE	Number of years from establishment (companies history in their web site)	50 years (37)
M&A	An indicator variable equal to one if a firm is involved in a merger or acquisition in year t, and zero otherwise	62%
RESTRUCT.	An indicator variable equal to one if a firm is involved in a restructuring in year t, and zero otherwise	22%
GOVERNANCE SCORE	A composite measure of factors encompassing 7 corporate governance categories: board of directors size, board of directors meeting, directors education, directors experience, directors independence, audit committee size, audit committee meeting.	-0.73 (0.29)
LITIGATION	The gicsgroup codes considered as litigation industry based on Ashbaugh et al. (2003) are 2520-Consumer Durables and Apparel, 2550-Retailing, 2010-Capital Goods, 3010-Food & Staples Retailing, 4530-Semiconductors & Semiconductor Equipment, 3520-Pharmaceuticals, Biotechnology & Life Sciences, 4510-Software & Services, 4520-Technology Hardware & Equipment	27%
BIG4	Indicator variable, 1= if the auditor is D&T, KPMG, E&Y or PWC, 0=otherwise	89.74%
AUDIT FEES	Natural log of audit fees paid to the auditor	6.38 (1.55)

All the continuos variables are in thousands of Euro and are winsorized at 1%

The mean log of total assets is 13.85 (the mean in euro is €7121 million and the median in euro is €627 million). The frequency of loss is 21%. Complexity can be seen by the level of diversification, measured through the number of operating segments reported in the financial statement notes, and the level of internationalization, measured through a dummy variable equal to 1 if an Other Comprehensive Income related to foreign transactions is present. On average, sample companies have 3.46 segments. 38% of the sample has an other comprehensive income related to foreign transactions.

The companies are on average 50 years old and a book value of 3.46 times the market value. There is a significant presence of merger or acquisition (62%) and a moderate presence of restructuring (22%) following the definition of variables by Ashbaugh-Skaife et al. (2007). 27% of the sample is considered to be in a high litigation industry. This is defined using the "gicsgroup" Global Industry Classification codes following the definition of Ashbaugh et al. (2003) who use the SIC – Standard Industrial Classification codes. The gicgroup codes labeling litigation industries are 2520-Consumer Durables and Apparel, 2550-Retailing, 2010-Capital Goods, 3010-Food & Staples Retailing, 4530-Semiconductors & Semiconductor Equipment, 3520-Pharmaceuticals, Biotechnology & Life Sciences, 4510-Software & Services, 4520-Technology Hardware & Equipment. The governance score is a composite measure of factors encompassing seven corporate governance categories: size of board of directors, board of directors meetings, director qualifications, director experience, director independence, audit committee size, audit committee meetings. The mean is the average of the factor score from a factor analysis. 89.74% of our Italian sample is audited by one of the Big4, consistent with their market share of the population of the Italian listed companies. The mean log of audit fees is 6.38.

6. RESULTS

The results in Table 7 and 8 show that the variables of interest increase the Pseudo R2 from Model 1 to Model 2: from 20.7% to 32% for severity and from 48.5% to 67.6% for persistence. Most of the variables regarding INTERNAL AUDITOR DETECTION PROCESS are significant and have a negative sign as expected with both severity (RQ1a) and persistence

(RQ1b). Results confirm the lower probability of discovering a more sever ICD in companies with higher overall quality of internal control.

The use of quantitative and qualitative indicators for firms, financial statement values and accounts selection in SCOPING decreases persistence and increases severity. This result suggests that using only quantitative indicators is less discretionary and for this reason may be a preferred approach to reduce ICD severity; but the use of both qualitative and quantitative indicators however help in the long term perspective reducing ICD persistence.

A high level of SCOPING QUALITY decreases the presence of more severe ICD. Results suggest that companies would be well-advised to use several qualitative indicators, to consider the relationship with the holding company and to use a top-down approach. However these specifications are not important in decreasing persistence (opposite sign found).

We find that the speed of the testing process (FREQUENCY) is negatively associated with the detection probability of SD and MW and the ICD persistence. Our results show that the best test frequency would be to cover all account-specific controls, entity and information technology control every semester.

The high level of TESTING QUALITY decreases the presence of more severe ICD. Our results show that the presence of re-performing or observation rather than only document inspections, the operation effectiveness tests on IT and entity level controls, the consolidation of results are all negatively associated with the detection probability of SD and MW.

The ICFR AUDITORS QUALITY decreases the presence of more persistent ICD. Segregation of duties, higher education and experience have an impact on the ICFR quality reducing the persistence of their ICD.

Comparing with revenues all the other account specific ICD TYPES are less severe (negative and significant coefficients) supporting the results of prior literature for RQ2a.

For RQ2b, Inventory, fixed assed and intangibles, taxes, treasury and subsidiary specific are less persistent than revenues (negative and significant coefficients) while human resources and period end are more persistent (positive and significant coefficients).

Implications of these results are that internal controls have to give importance in the evaluation of account-specific control on revenues, human resources and period end.

Consistent with Ashbaugh-Skaife et al., 2007; Doyle et al., 2007; Ge and McVay, 2005; Raghunandan and Dasaratha, 2006; Hoitash et al., 2008; Hogan and Wilkins, 2008; Krishnan et al., (2008), the control variables for which the coefficient has the expected sign significant are SIZE, LOSS, B/M, RESTRUCTURING, LITIGATION for severity and SIZE, LOSS, FIRM AGE, GOVERNANCE SCORE and AUDIT FEES. Our results confirm that bigger companies, companies with good performance, less complex and risky companies all present less severe and persistent ICD. Less persistent ICD are also present for companies with an high corporate governance quality and with a less costly external audit based on a better internal control system. Indicator of risky companies (foreign, B/M, restructuring, merge and acquisition, litigation), even if they cause more severe ICD, they do not cause more persistent ICD, reversing their effect over time.

Table 7 - Severity

	Exp. Sign	Model 1		Model 2	
		SEVERITY			
INTERNAL AUDITOR DETECTION PROCESS					
SCOPING	-			2.722	(3.52)***
SCOPING QUALITY	-			-1.98	(-3.93)***
FREQUENCY	-			-1.989	(-5.76)***
TESTING QUALITY	-			-2.91	(-3.42)***
ICFR AUDITORS QUALITY	-			0.409	(0.90)
ICD TYPES					
ACC_PURCHASE	-			-1.103	(-6.88)***
ACC_INVENTORY	-			-3.496	(-13.93)***
ACC_HUMAN RESOURCES	-			-1.717	(-8.94)***
ACC_FIXEDASS.INTANGIBLES	-			-1.522	(-8.23)***
ACC_TAXES	-			-1.291	(-4.38)***
ACC_TREASURY	-			-1.665	(-8.56)***
ACC_PERIOD-END	-			-1.642	(-9.93)***
ACC_ RECONCILIATION	-			-1.43	(-5.56)***
ACC_SUBSIDIARY SPECIFIC	-			-1.761	(-6.91)***
CONTROL VARIABLES					
SIZE	-	-0.557	(-4.49)***	-0.585	(-1.93)*
LOSS	+	0.227	(1.10)	0.767	(2.79)***
SEGMENTS	+	0.18	(4.13)***	-0.11	(-1.10)
FOREIGN	+	-0.453	(-2.23)**	0.218	(0.89)
B/M	+	0.774	(10.55)***	1.686	(5.25)***
FIRM AGE	-	0.00182	(0.43)	0.000364	(0.04)
RESTRUCTURING	+	-0.201	(-0.46)	3.636	(3.28)***
M&A	+	1.146	(5.35)***	-0.349	(-1.07)
GOVERNANCE SCORE	-	4.157	(4.95)***	3.673	(1.49)
LITIGATION	+	1.163	(3.55)***	4.963	(2.72)***
BIG4	+	1.289	(4.01)***	2.38	(1.92)
AUDIT FEES	+	-0.577	(-4.50)***	0.101	(0.41)
CONSTANT		7.194	(3.45)***	19.22	(2.63)***
Year indicator variables		Included		Included	
Pseudo R^2		0.207***		0.32***	
Observations		4284		4284	

Table 8 - Persistence

	Exp. Sign	PERSISTENCE			
		Model 1		Model 2	
INTERNAL AUDITOR DETECTION PROCESS					
SCOPING	-			-1.303	(-9.53)***
SCOPING QUALITY	-			0.531	(4.46)***
FREQUENCY	-			-1.321	(-9.94)***
TESTING QUALITY	-			0.0821	(0.45)
ICFR AUDITORS QUALITY	-			-0.52	(-3.18)***
ICD TYPES					
ACC_PURCHASE	-			0.0835	(0.33)
ACC_INVENTORY	-			-0.691	(-2.37)**
ACC_HUMAN RESOURCES	-			1.334	(4.94)***
ACC_FIXEDASS.INTANGIBLES	-			-1.076	(-3.50)***
ACC_TAXES	-			-1.438	(-3.13)***
ACC_TREASURY	-			-6.449	(-11.72)***
ACC_PERIOD-END	-			2.79	(10.80)***
ACC_ RECONCILIATION	-			0.0845	(0.21)
ACC_SUBSIDIARY SPECIFIC	-			-2.377	(-6.51)***
CONTROL VARIABLES					
SIZE	-	-0.428	(-5.64)***	-0.306	(-2.93)***
LOSS	+	-0.486	(-2.95)***	-1.584	(-5.94)***
SEGMENTS	+	-0.0147	(-0.48)	0.00843	(0.18)
FOREIGN	+	0.079	(0.40)	-0.67	(-2.33)**
B/M	+	-0.0381	(-7.60)***	-0.0608	(-6.70)***
FIRM AGE	-	-0.0195	(-7.40)***	-0.0369	(-7.90)***
RESTRUCTURING	+	-1.195	(-6.69)***	-0.487	(-1.99)**
M&A	+	-0.264	(-1.83)*	-0.612	(-2.76)***
GOVERNANCE SCORE	-	-2.223	(-5.18)***	-2.741	(-4.99)***
LITIGATION	+	-3.14	(-13.21)***	-7.139	(-12.16)***
BIG4	+	-4.938	(-17.27)***	-12.74	(-19.59)***
AUDIT FEES	+	0.245	(3.62)***	0.209	(2.14)**
CONSTANT		9.535	(8.05)***	30.38	(11.27)***
Year indicator variables		Included		Included	
Pseudo R^2		0.485***		0.676***	
Observations		4284		4284	

7. CONCLUSION

The paper contributes to literature on ICFR by examining the relationship between the severity and persistence of ICD and their type and detection process in a country where a "light SOX" does not assure that information about ICD is publicly available and where external auditors are not involved in ICFR assessment and reporting. Bedard & Graham (2011) conclude that in the USA, SOX does not lead to effective disclosure. The problem is more severe in Italy, where the implementation of the CONSOB report has not led to disclosure at all.

The research measures internal auditor detection process with multiple variables classified as planning and scoping, testing and monitoring, ICFR auditor and control variables. Variables were measured for a start-up period (2007 – 2009) and an operating period (2010 - 2012). All the indicators improved over the period. The biggest improvement is related to "Account tests for financial reporting", followed by "Account test type".

The descriptive show that the following ICD types have the highest percentages: accounting period-end/accounting policies, purchases, inventory, revenues, human resources, fixed assets and intangibles. The most severe ICD are purchase and revenue, while the ICD that increase more over time are on human resources, fixed assets and intangibles, period end and reconciliations.

When the quality of internal auditing activity is high, the results show a reduction in ICD severity and persistence. In line with previous research, results confirm that revenues are one of the most critical areas for ICFR because more severe ICD are likely to be identified here and that human resources and period end ICD are also critical because they are higher related to probability of persistence.

The findings may be limited in their generalization by several features of its design. First, it is difficult to directly compare the proportions of MW identified in our sample with public disclosures, as individual control flaws may be aggregated in these reports. Second, we cannot rule out the possibility that non-random selection might have influenced our results.

REFERENCES

Allegrini, M. & Greco, G. (2013), Corporate boards, audit committees and voluntary disclosure: evidence from Italian Listed Companies. *Journal Management Governance*, Vol. 17, pp. 187-216.

Allegrini, M., D'Onza, G., Paape, L., Melville, R. & Sarens G. (2006) The European literature review on internal auditing. Managerial Auditing Journal. Vol. 21, No. 8, pp. 845-853.

Allen, R., Hermanson, D. Kozloski, T. & Ramsay, R. (2006), Auditor risk assessment: Insights from the academic literature. *Accounting Horizons* 20 (2): 157–177.

Arena, M. & Azzone, G. (2009), Identifying Organizational Drivers of Internal Audit Effectiveness, *International Journal of Auditing* Vol. 13, pp. 43–60.

Ashbaugh-Skaife, H., Collins, D. & Kinney, W. (2007), The discovery and reporting of internal control deficiencies prior to Sarbanes-Oxley Act-mandated audits. *Journal of Accounting and Economics*, Vol. 44, No. 1–2, pp. 166–92.

Azzali, S. & Mazza, T., (2012), Internal Control over Financial Reporting Quality and Information Technology Control Frameworks, in the book "Accounting Information Systems for Decision Making", Series "Lecture Notes in Information Systems and Organization". Editor: Daniela Mancini, Eddy Vaassen, Renata Paola Dameri. Publisher: Springer-Verlag GmbH, Tiergartenstr. 17, 69121 Heidelberg, Germany

Bedard, J. C. & Graham, L. (2011). Detection and Severity Classifications of Sarbanes-Oxley Section 404 Internal Control Deficiencies, *The Accounting Review* Vol. 86, No. 3, pp. 825-855.

Cameran, M., Francis, J., Marra A., &, Pettinicchio, A. (2013), Are there adverse consequences of mandatory auditor rotation? Evidence from the Italian experience. *Auditing: A Journal of Practice & Theory.* Available on-line as pre-prints.

Choi, J. and Wong, T.. (2007). Auditors' Governance Functions and Legal Environments: An International Investigation. *Contemporary Accounting Research* Vol. 24, No. 1, pp. 13-46.

Christopher, J., Sarens, G., & Leung, P. (2009) A critical analysis of the independence of the internal audit function: evidence from Australia. Accounting, Auditing & Accountability Journal. Vol. 22, No. 2, pp. 200-220.

COBIT - IT Governance Institute (2007). Control Objectives for Information and related Technology 4.1 (COBIT 4.1, USA: IT Governance Institute (ITGI)

COBIT for SOX (2006). IT Control Objectives for Sarbanes-Oxley: The Role of IT in the Design and Implementation of Internal Control Over Financial Reporting, 2nd Edition, USA: IT Governance Institute (ITGI)

Cortesi A., Tettamanzi P. & Corno F. (2009). Empirical evidence on internal control systems and corporate governance in Italy, *Journal Management Governance* Vol. 13, pp. 75-100.

COSO. (2006). Guidance for Smaller Public Companies Reporting on Internal Controls over Financial Reporting, New York: Committee of Sponsoring Organizations of the Treadway Commission.

Di Pietra, R., Grambovas, C., Raonic, I., & Riccaboni, A. (2008). The effects of board size and ''busy'' directors on the market value of Italian firms. *Journal of Management and Governance* Vol. 12, pp. 73–91.

Doyle, J., Ge, W. & McVay, S. (2007). Determinants of weaknesses in internal control over financial reporting. *Journal of Accounting and Economics* Vol.44, No. 1–2, pp. 193–223.

Earley, C., Hoffman, V. & Joe J. (2008). Reducing management's influence on auditors' judgments: An experimental investigation of SOX 404 assessments. *The Accounting Review* Vol. 83, No. 6, pp. 1461–1485.

Elder, R. A., & Allen, R. D. (2003). A longitudinal field investigation of auditor risk assessments and sample size decisions. *The Accounting Review* Vol. 78, No. 4, pp. 983–1002.

Ge, W. & McVay, S. (2005). The disclosure of material weaknesses in internal control after the Sarbanes-Oxley Act. *Accounting Horizons* Vol. 19 (September), pp. 137–158.

Gietzmann, M., & Sen, P. (2002). Improving mandatory rotation through selective mandatory rotation. *International Journal of Auditing* Vol. 6, No. 2, pp.183-210.

Hogan, C., & Wilkins, M. (2008). Evidence on the audit risk model: Do auditors increase audit fees in the presence of internal control deficiencies? *Contemporary Accounting Research* Vol. 25, No. 1, pp. 219–42.

Hoitash, R., Hoitash, U. & Bedard, J. (2008) Audit fees and internal control problems disclosed under theSarbanes-Oxley Act. *Auditing: A Journal of Practice & Theory* Vol. 27, No. 1, pp. 105–126.

Hoitash, R., Hoitash, U. & Bedard, J. (2009) Corporate governance and internal control quality: A comparison of regulatory regimes. *The Accounting Review* Vol. 84, No.3, pp. 839–867.

Krishnan, J., Rama, D. & Zhang, Y. (2008) Costs to comply with SOX Section 404. *Auditing: A Journal of Practice & Theory* Vol. 27, No. 1, pp. 169–186.

Lenz, R., Sarens, G.; D'Silva, K. (2014) Probing the Discriminatory Power of Characteristics of Internal Audit Functions: Sorting the Wheat from the Chaff. International Journal of Auditing.Vol. 18, No. 2, pp. 126-138

Mariani L., Tettamanzi P. & Corno F. (2010) External Auditing vs Statutory Committee Auditing: The Italian Evidence, *International Journal of Auditing* Vol. 14, pp. 25-40.

Messier, W., Martinov-Bennie, N. & Eilifsen, A. (2005). A review and integration of empirical research on materiality: Two decades later. *Auditing: A Journal of Practice & Theory* Vol. 24, No. 2, pp. 153–187.

PCAOB. (2007). Auditing Standard n.5, Un audit of Internal Control Over Financial Reporting That Is Integrated with An Audit of Financial Statements. USA: Public Company Accounting Oversight Board.

Prawitt, d. F.; Smith, J. L.; Wood, D. A. (2009) Internal Audit Quality and Earnings Management. Accounting Review. Vol. 84, No. 4, pp. 1255-1280.

Raghunandan, K., & Rama, D. V. (2006). SOX Section 404 material weakness disclosures and audit fees. *Auditing: A Journal of Practice & Theory* Vol. 25 (May), pp. 99–114.

Regoliosi, C. & D'Eri, A. (2014). 'Good' corporate governance and the quality of internal auditing departments in Italian listed firms. An exploratory investigation in Italian listed firms. Journal of Management & Governance. Vol. 18, No. 3, pp. 891-920.

Sarens, G. & Abdolmohammadi, M. J. (2011) Monitoring Effects of the Internal Audit Function: Agency Theory versus other Explanatory Variables. International Journal of Auditing. Vol. 15, No.1, pp. 1-20.

Sarens, G., Allegrini, M., D'Onza, G. & Melville R. (2011) Are internal auditing practices related to the age of the internal audit function?: Exploratory evidence and directions for future research. . Managerial Auditing Journal. Vol. 26, No. 1, pp. 51-64

Sarens, G.; Lamboglia, R. (2014). The (mis)fit between the profile of internal auditors and internal audit activities.Accounting & Business Research (Taylor & Francis). Vol. 44, No. 1, pp. 41-62

Volpin, P. F. (2002). Governance with poor investor protection: Evidence from top executive turnover in Italy. *Journal of Financial Economics*, Vol. 64, pp. 61–90.

Wingate, M. (1997). An Examination of Cultural Influence on Audit Environments. *Research in Accounting Regulation* Vol. Supplement 1, pp. 129-148.

Wolfe, C., Mauldin, E. & Diaz, M. (2009). Concede or deny: Do management persuasion tactics affect auditor evaluation of internal control deviations? *The Accounting Review* Vol. 84 , No. 6, pp. 2013–2037.