The effect of audit firm size and audit fees on tax reconciliation informativeness in private Belgian firms

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Abstract

Using multiple regression model, this study investigates the relationship between audit firms' characteristics and audit quality in Belgium, using quantitative data provided by Bel-first from Bureau Van Dijk that encompasses 8982 private companies between 2009 and 2014. The data analysis is performed using SPSS (Statistical Package for the Social Sciences) program. The findings suggest with strong evidence that the audit firm's characteristic, firm size (BIG4 or not) is positively and significantly related to audit quality (tax reconciliation informativeness) indicating that a private company that is audited by a BIG4 audit firm tend to be more transparent and disclose all the information regarding differences between book and tax results. In contrast we didn't find any significant evidence supporting the existence of any relation between audit quality and audit fees. After performing several sensitivity analysis tests this results remain robust across different models, only the robustness test where we investigated the impact of the presence versus the absence of non audit services fees reveals that BIG4 remain positively related to audit quality as it has a negative effect on our dependent variable ADIFF in the absence of non audit fees , what we didn't expect is that in the presence of non audit fees the impact of the audit company's size is not known or inconclusive on the basis of its type as it has an insignificant relation with tax reconciliation informativeness quality. It is important to note that in this research paper audit quality and tax reconciliation informativeness are used as synonyms. The study is closed off with the presentation of its limitation and future research opportunities that we suggested based on our findings.

Keywords: Tax reconciliation, Private firms, audit fees, audit company's' size, investors, stakeholders.

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List of abbreviation:

OECD	The organization for Economic Co-operation and Development.
IAS	The International Accounting Standards.
ISA	International Standard on Auditing
IAASB	The International Auditing and Assurance Standards Board
GAAP	Generally Accepted Accounting Principles
IFAC	The international Federation of Accountants
IESBA	The International Ethics Standards Board for Accountants
ESMA	The European Securities and Markets Authority
IAESB	The International Accounting Education Standards Board
ICAEW	Chartered Accountants in England and Wales
ISQM	International Standard on Quality Management
EFRAG	The European Financial Reporting Advisory Group
EC	European commission
IFRS	International Financial Reporting Standards
IRE	L'institut des réviseurs d'entreprises
EU	European-Union
UK	United Kingdom
ICAS	The Institute of Chartered Accountants of Scotland
PCAOB	Public Company Accounting Oversight Board
CEAOB	Committee of European Auditing Oversight Bodies
CSA	Code des sociétés et des associations
NACE	Nomenclature des activités économiques
SPSS	Statistical Package for the Social Sciences

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I.   Introduction

This study's objective is to investigate the type of relation between auditor characteristics and tax reconciliation informativeness, as a start the definition of theoretical concepts is important to have an overview about our objectives, (OECD, 2024) define **the tax** as a "compulsory unrequited payment to the government, they are unrequited in the sense that benefits provided by government to taxpayers are not normally in proportion to their payments ". In his article published on Investopedia (Gorton, 2023) **defines tax** as "mandatory contributions levied on individuals or corporations by a government entity whether local, regional, or national". From the previous definitions we can say that tax is a levy made by the state on the individuals, legal persons or entities income and revenues that are located on its territory or who are using it in their activities to get profits, these taxes are used to finance the projects that are of public interest. For **tax reconciliation** it is a disclosure that is required by the **International Accounting Standards 12** (IAS 12) that was issued in 1996 and adopted by the International Accounting Standards Board in 2001 this standard introduced a number of disclosures (make the information known) about income taxes, including a disclosure about **tax reconciliation that forces companies to provide an explanation of the elements that account for the differences between tax expense or income and the accounting profit** (theoretical tax that is calculated by multiplying the statutory tax rate by the accounting profit or loss), it is also mandatory to recognize a deferred tax liability or a deferred tax asset for all temporary differences. **Temporary differences** are defined in **IAS 12** as "differences between the tax base (amount attributed to that asset or liability for tax purposes) of an asset or liability and its carrying amount in the statement of financial position". In practice the difference between accounting profit and taxable income is that we must make some adjustments to the accounting profit by adding non-deductible expenses and deduct the non-taxable profits in order to find the taxable base, the difference can arise also because of deferred tax assets or liabilities. To understand this difference between current tax and deferred tax IAS 12 gives more explanations in **paragraph 5** and it considers that **Current tax** is "the amount of tax payable (recoverable) in respect of the taxable profit (tax loss) for the period", the deferred tax can be an asset or a liability and it is an accounting concept that is calculated based on the temporary differences between the accounting numbers and the tax base, the difference can be also explained by the fact that accounting and taxation have different objectives and rules, the objective of financial accounting (GAAP) is to inform the decision makers as shareholders, investors and market in general, but the tax rules have a much more political objectives and destined to the tax authorities more than other parties as suggested by (Hanlon & Heitzman, 2010). Our study focuses only on **private firms** that are defined in Cambridge dictionary as companies who are not trading their shares or parts of capital on a stock market. In other words, a private firm is a company that is owned by individuals or entities who don't trade their shares on a public stock exchange.

To study the type of relation between the auditor characteristics and tax reconciliation informativeness, we have to know what is an auditor and what are his characteristics, first **the Auditor** is a person or a firm that audits financial accounting information, the auditor's role is to provide a credible signal of their commitment to higher-quality reporting, "The statutory auditor is expected to provide different stakeholders of the company assurance concerning the accuracy of the financial statements, the non existence of financial statement fraud, and the going concern status" (Van Tendeloo & Vanstraelen, 2008). The International Standard on Auditing (ISA 220) considers in paragraph 5 that the auditor must give a "reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error". Depending on International Standards on Auditing (ISA) when we are conducting an audit the word auditor refers to the individuals or persons who are part of the engagement team that is nominated by the audit company (like big 4 companies: Deloitte, EY, KPMG, PwC) but this word can also refer to the audit company itself.

In this thesis we will focus on the audit company's characteristics and not the individual characteristics because we find it more practical as we will have access to data that will make the generalization easier, the other reason for this choice is that the individual characteristics are very difficult to determine and to measure compared to companies' numbers and statistics or financial statements, for the auditor company's characteristics we decided to focus on the **audit company's size** and **the audit fees**. We will try to find if there is a relation between the characteristics of auditors and tax reconciliation informativeness as it is important for investors to have all possible information about the firm's situation but they have a problem to interpret and understand tax disclosures as found by (Barth, Clinch, & Shibano, 2023) who suggest that investors will not give importance to this disclosures and will just ignore them because they don't have all the required information and expertise to analyze and to take decisions based on these disclosures. It is the auditor's role to inform all stakeholders and not just investors about the company's tax situation, and the reasons of book-tax differences, in disclosures relating to tax expense and deferred tax the information that can be provided by the auditor about tax reconciliation is important for investors and shareholders in private firms to predict the future tax burden of the company. It is evident that auditors play an important role in reducing the information asymmetry problems between shareholders, managers, and state. It is what (Hope, Langli, & Thomas, 2012) found with evidence when they discovered that there is higher agency conflicts and different interests between stakeholders who will choose to audit their financial statements by higher audit firms. In another study, (Van Tendeloo & Vanstraelen, 2008) found that private companies who choose to contract for high-quality auditing could signal financial reporting quality in order to convince the stakeholders of the credibility of their financial statements. For our study, this information is important because it confirms that the quality of information that can reduce agency conflicts is impacted by auditor characteristics, but we don't know if these characteristics impact also tax reconciliation informativeness.

The remainder of this paper is organised as follows: in section 1 we have the introduction below, the research question and the academic contribution. In section 2, we conduct a thorough examination of the pertinent literature, offering the theoretical backdrop for our research. In section 3, we formulate the research hypothesis. Section 4 describes the research design and methodology. For the results of our study, they are presented in section 5. The section 6 provides a summary of our results as a conclusion and a discussion oh the limitations with further suggestions for future research.

1. Research question.

Is there a relation between auditor characteristics (Audit firm size and audit fees) and tax reconciliation informativeness?

The objective is to know if the auditor characteristics can explain differences in quality that we can identify between tax reconciliation reports when comparing different private Belgian firms, we will try to identify several variables that characterize auditors in private firms and try to use them to explain differences between this companies in terms of the quality of tax reconciliation informativeness. The final goal is to reduce this differences and to explain their reasons in order to facilitate and help investors to take decisions regarding the selection of the best private firms for their investments, as we know from the study of (Gary C. Biddle, Oct., 2006) where they investigated the relation between accounting quality and firm level capital investments that high audit quality is positively related to investments, this is explained by the fact that investors trust more the audited financial statement and can use them to take decisions. It is also an important subject for companies because it helps to improve their reporting practices and their audit quality with respect to all the regulatory actions that are been taken to improve companies' transparency and reporting. We would like to study the effect of auditor characteristics on the audit quality, we are more interested in two of the audit firm's characteristics that are audit company's size and audit fees.

We will study the impact of **auditor's size** on the quality of tax reconciliation informativeness as a part of the audit, we would like to understand if the auditor's size will impact positively the transparency of companies regarding tax reconciliation. We will have two types of audit companies by considering Big 4 and Non-Big 4 companies as we know that the big 4 audit firms are **PwC, KPMG, Deloitte and EY,** the other audit firms are considered as **non-big 4.** We are also doing this research to detect the effect of **audit fees** on the quality of audit for example (Reynolds & Francis, 2000) and (Chung & Kallapur,

2003) found no evidence that client who pays more (larger clients) gets a favorable treatment by their auditors in financial statement or reports but other studies like the one of (Reynolds & Francis, 2000) find that audit quality and qualified reports are positively related to large audit fees.

The auditor's role is to try to identify potential tax issues that are related to differences between taxes and accounting and to give an opinion about the company's financial statements, this is why auditors need to perform many tasks and to follow a procedure that takes in consideration taxes, for example any amount that is a tax credit is subject to audit and this is important in order to give a general and overall assurance. All this element that we mentioned are guiding us and shows that this study can contribute to improve the tax reconciliation quality by discovering the audit firm's characteristics that can make the tax reconciliation information provided to investors and all stakeholders very useful.

2. Academic contribution

Our objective is to understand how auditor characteristics can influence tax reconciliation informativeness, this will help us to provide investors with the information about audit companies characteristics that can make the disclosed information more confident and transparent, this will also improve financial transparency for regulators, investors and all the users of financial statements. We want to investigate if there is any evidence that auditor firm's characteristics influence and can explain the differences in the quality of tax reconciliation information between private firms, if we can confirm this in our research using the quantitative study, then we can suggest some auditor characteristics as a model that can make reconciliation better if the auditor (audit firm) shows these characteristics.

As we tried to find other studies that are related to the relationship between the audit company's characteristics and the tax reconciliation informativeness we didn't find any articles or scientific research that treat this subject, for this reason it is sure that this study extends the existing academic literature by further examining the relation between both audit fees and auditor size and the audit quality of tax reconciliation. Therefore, this is important and useful for investors, researchers and all the parties who are interested in discovering this relationship and the impact of audit company's characteristics in private firms' transparency.

This study is also an important contribution to the existing literature about private firms, which have been ignored and have not received attention to the audit quality within this type of firms.

II. Literature review

1. Tax reconciliation:

The IAS 12 standard part 12.18 requires some important disclosures among them we find the point C that is related to tax reconciliation, this disclosure is presented as follows **" (c) explanation of the relationship between tax expense (income) and the tax that would be expected by applying the current tax rate to accounting profit or loss (this can be presented as a reconciliation of amounts of tax or a reconciliation of the rate of tax) …"** IAS 12.18 give the choice either to do:

the tax expense or income reconciliation by explaining the difference between the tax expense or income and the theoretical tax that would be determined if the accounting profit is multiplied by the tax rate or to follow a **Tax rate reconciliation** in this situation, we explain the difference between the tax rate that is applicable and the average effective tax rate (theoretical tax rate = tax expense or income /accounting profit)

The objective of the point C on IAS 12 is to:

- Make it possible for users of financial statements to understand the differences and the relationship between tax expense (income) and the accounting profit.
- To understand the factors that are affecting this relationship, this factor may be the exemption of some revenues from tax or the existence of some non-deductible expenses that are added to the tax base, the taxable base can be a profit or a loss.

(Raedy, Seidman, & Shackelford, 2011) considers that there are three items of tax reconciliation, the first is information regarding accrual quality, the second one is information about tax evasion and third one is less useful or less important information. The information about book-tax differences is very important for stakeholders because the taxable income can be used as another measure of the company's performance this is why it is also audited, as found by (Barrett, 2004) the auditor play an important role in providing assurance to investors as they evaluate the validity of accrued taxes payable and tax contingent liabilities on the balance sheet and income tax expenses on the income statement and all the notes to the financial statements, the auditor also reduces the book-tax differences by assuring that the book and taxable income are correctly reported in the financial statements this reduces indirectly tax avoidance by the firms (Hanlon M. , 2005) as large book tax differences increase the probability of detection by the tax authorities. (Kvaal & Nobes, 2013) examined the variations in tax disclosures between companies from five countries and found many differences in IFRS reporting between these companies, this information are relevant as they are in contradiction with the aim of IFRS, which exists in order to make the financial statement more comparable and understandable, they also consider that a complete tax disclosure provide the important information and the opportunity to estimates the amount of the company's tax return.

1.1   Example of tax reconciliation:

For stakeholders it is important to understand why there is a difference between the tax rate multiplied directly by the accounting profit and the tax rate multiplied by the tax base that can be generally different from the accounting profit because of the effect of non-deductible expenses and non-taxable profits.

As an example, let's take the company **X** that submits its financial statement for the financial year 2023 on 12/31/2023, as the fiscal year is from 1 January to 31 December.

The start for tax reconciliation is the accounting profit which needs to be adjusted to find the tax base by deducting non-taxable profits and adding non-deductible charges.

Accounting profit	2.020.000,0
Non deductible charges (+)	350 000
Non taxable profits (-)	6000
Tax base	2 364 000
Tax at standard rate of corporation tax in the Belgium 25% (1)	591 000

Table 1 : Example Determining tax amount from accounting profit.

The companies who are considered as completely transparent and provide a good quality of tax reconciliation information provide an explanation of all the elements that permits to go from accounting profit to tax base, so that stakeholders can understand without any problem the reasons of this differences. To explain the difference between applying the tax directly to the accounting profits and applying tax rate to a tax base and to detect the effect of each element we can use the following table:

Accounting profit (A)	2.020.000,0
Tax at standard rate of corporation tax in the Belgium 25% (2) (applied directly to the accounting profit)	505 000
Tax effect of non-deductible expenses (350 000*25%)	87 500
The effect of non-taxable profits (6000*25%)	(-)1500
Total income tax expense (B)	591 000
Proxied tax rate (ETR* = B/A)	29.25%
Effective Tax rate (ETR)	29.25%
ETR – ETR*	0

Table 2 : Determining the level of tax reconciliation transparency.

For this firm the difference between ETR and ETR* is equal to zero (0) this means that the firm is

disclosing all the elements that affect the tax reconciliation and it is very transparent regarding all matters that can affect the accounting and tax differences.

- The effective tax rate (ETR) is the tax rate that is really paid (tax burden), it is determined by dividing the tax paid by the accounting profit. It takes in consideration all the elements that represents the difference between the accounting profit and the tax base.
- The proxied tax rate (ETR*) is the tax rate that is calculated by dividing the reconciled taxable base that is calculated based only on the elements that are disclosed in the tax reconciliation.

1.2 Heterogeneity in disclosures and issues faced by stakeholders regarding tax reconciliation.

Our important reference for this section is the information and different documents about tax reconciliation provided by (the European Financial Reporting Advisory Group (EFRAG) and the UK standard setter, 2011) where they detected an heterogeneity in disclosures and some issues that are faced by stakeholders regarding tax reconciliation, EFRAG is an AISBL (Association International Sans But Lucratif), established in conformity with Belgian law, it is an important organization that influences the IASB with its engagement with the European constituents and its contribution in introducing many disclosures that were adopted by the IASB. EFRAG also provide advice to the European commission on all issues relating to the application of IFRS in the EU with respect to the international standards, its final objective is to improve the quality of information and to have a better transparency and enhance accountability. One of the important discussion reports by EFRAG that is related to our thesis subject is **"Improving the financial reporting of income tax"** in this report as found by EFRAG many users suggest some issues that are related to tax reconciliation and that should be solved, like the diversity in the practice of tax reconciliation by entities as many financial statements users suggest to have more transparency and clearance in the reconciliation without using complex and very technical description in order to give more useful information to users[1], in our thesis it is the auditor's job to provide a clear opinion and to explain the financial situation of the firm with simple words to users and force firms to provide all the required information that explains and that can be used to interpret the numbers in financial statements. Another important point is related to the explanation of the relationship between tax expense and accounting profit that should be significant and understandable for the users of financial statements, to explain this the reconciliation should contain all the elements that are not taxed as revenues and expenses and that can affect this relation with the use of the appropriate tax rate (page 21 (2.18). Another problem for users is identified in the part 2.23 where EFRAG explains that there is a variation across entities in details, words and terms that are used by these firms to describe their reconciliation, and this represents a problem for users of financial statement because it reduces the level of understanding and make the comparison difficult because the transactions are reported in different ways. Another report of the **EFRAG** and **ICAS** titled "**Professional investors and the decision usefulness of financial reporting, 2016"** gives an overview of the importance of respecting the accounting standards to get high audit quality for all stakeholders, the audit quality and governance quality as mentioned in the report are very important in order to detect the level of compliance with accounting standards for all stakeholders and exactly the investors who consider that managerial quality, auditing and independent assessment by external experts who are independent is important in judging the usefulness of the information provided by firms to stakeholders.

In their research about agency theory (Jensen & Meckling , 1976) found that there is a conflict of interest between the principal (shareholders) and the agent (management), this conflict is due to the fact that the agent may not always take decisions that are in the interest of the shareholders, this situation forces the shareholders to engage an independent party that guarantees that they can get all the information about how the agent is managing the company, this is the role of the auditor who is an intermediary between the two and who provide an assurance to the shareholders about the quality of the financial statements that are prepared by the agent (management). (Ittonen, 2010) suggested that the assurance provided by the auditors to the financial statements reduces the problem of information asymmetry, these are all important findings that justifies why we are conducting this study because we want to know how the

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[1] EFRAG "Improving the financial reporting of income tax", page 16 and 21 (parte 2.18 and 2.23)

auditor reduces this asymmetry of information between the shareholders and managers regarding the tax reconciliation in private Belgian firms.

2.   The audit and auditor characteristics

To preserve and improve the audit quality many international organizations are working to make and propose some improvements in order to enhance the auditors independence by avoiding the influence of any external factors or his own characteristics which can bias his opinion, one of this organizations is **the International Auditing and Assurance Standards Board (IAASB)** that is an independent international standards body that sets and issues standards on auditing (ISAs), this organization was founded in march 1978 with the nomination 'the international auditing practices committee' (IAPC), the standards proposed by this organization are used as a basis for other organizations like the European union in order to improve the audit quality**.** Another organization that provides guidance for the development of audit quality around the world is **the international Federation of Accountants (IFAC)** this organization provide advocacy and serve the public interest in the accountancy profession, we can find also **the International Accounting Education Standards Board (IAESB), The International Auditing and Assurance Standards Board (IAASB) and The International Ethics Standards Board for Accountants (IESBA)** this bodies are independent standard-setting boards that produces high quality global standards for audit and assurance professional ethics, public sector financial reporting, professional skills and competencies, this three (3) organizations are working under IFAC. Another international organization is **the organization for Economic Co-operation and Development (OECD)** that contributes to the audit field by providing and publishing some recommendations related to audit of the public sector entities and they try to increase citizens' trust in the audit reports and ensure accountability and integrity**,** in Europe we found **the European Securities and Markets Authority (ESMA)** that is playing an important role in improving the audit quality and preserving the public trust in the financial reporting in the EU, the objective is to ensure the uniformity of practices in the global auditing and assurance profession, ESMA play today the role of EU's financial markets regulator and supervisor**.** All this organizations are crucial for maintaining the auditor's independence and ethical conduct of audit work.

2.1 The Audit Profession in Belgium

The audit profession was formalized in Belgium in **1953** with the creation of the institute of registered auditors ((IEC/IRE) this was an important step towards regulating and professionalizing audit in Belgium, the objective of this institute is to offer continuing training to auditors and manage the access to this profession. In 2009 Belgium has adopted the ISAs rules and made these rules an obligation for companies from 15 December 2012 for PIEs and Non-PIEs from 15 December 2014. For the enforcement of the application of ISAs rules the Board of the IRE-IBR adopted a professional standard on 10 November 2010 wish contains an important obligation of the external quality control to verify that companies respect the ISAs rules, so in accordance with the EU directives, Belgian companies are required to have their financial statement audited by an external auditor if this companies are large, this means according to the **article 1:24 of Belgian code of companies and associations** that this companies are exceeding more than one of the following criteria :

- Turnover is over 11.250.000 EUR.
- Balance sheet total is over 6 000 000 EUR.
- Average annual number of employees is over 50.

According to this law the appointment of the external auditor must be approved by shareholders for a period of 3 years and the audit should be conducted in respect to the Audit Act of 2016.

In order to comply with the Eu law, Belgium adopted the EU directives and regulation this directives aims to guarantee the auditor independence and accountability of the audit teams? this is important to ensure good audit quality like the adoption of **the audit act of 2016** in respect to the DIRECTIVE 2014/56/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 April 2014 amending Directive 2006/43/EC on statutory audits of annual accounts and consolidated accounts, the objective of the audit act of 2016 was to determine and ensure the application of the ethical rules that should be respected by registered auditors.

Concerning the Belgian audit market, it is very similar to most of the other European countries because they all follow the European directives, so it applies the same rules regarding the accounting and audit regulations with some changes in other to be in accordance with the Belgian financial market and environment. In Belgium the appointment of the statutory auditor is done by the general meeting of shareholders on the recommendation of the board of directors in respect to the Belgian company low, (Buijink, 1996) studied the role of the auditor within the European Union and he considers that audit firms are subject to high quality regulations and standards that preserves the auditors independence.

To control and supervise whether audit firms in Belgium respects regulations and to organize the audit market, Belgium established some important institutions such as:

- **The Belgian Audit Oversight Board (BAOB)**

This institution was established by the law of 7 December 2016, BAOB perform tasks in the public interest, this independent public authority is responsible of supervising auditors and audit firms, it ensures the continuation of professional development for auditors and that they are respecting the quality assurance, furthermore it assures that the audit standards and ethical principles of this professions are respected by practitioners by subjecting auditors to a quality control at least every 6 years.

- **Belgian Institute of Registered Auditors (IBR-IRE)**

IBR-IRE is an organization that is established with respect to the accounting law of 1953 and was amended in 2015. It is under the control and supervision of the Belgian audit oversight board (BAOB), it has also some responsibilities as approving and registering statutory auditors and audit firms, provide continuing professional development for auditors and draft and prepare audit and ethical standards for approval and endorsement by the BAOB and Minister of Economy.

2.2 The audit quality

2.2.1 Definition

The most common definition of audit quality is provided by (DeAngelo, 1981) for her the audit quality is defined as the detection of any material misstatement in the financial statement and report it to authorities, the level of detection of material misstatement depends on many factors like the qualities of the audit team and the resources that are available for them. for (Palmrose Z.-v. , 1987) audit quality is an audit that permits the detection of all misstatements or material omissions, this means that the audit quality is related to failure detection and the audit quality is high when the audit failures are less occurring, for (Carcello & Nagy, 2004) audit quality is connected to the efforts of the audit team it is more about the amount of audit work, but for (DeFond & Zhang , 2014) higher audit quality is "the higher assurance reflected by the firm about its basic economy based on financial statements, financial reporting system of the firm, and intrinsic properties.". IAASB considers that audit quality contains the elements that helps to have a good environment and conditions to make the audit conducted more sufficient and efficient on a consistent basis. From previous different suggested definitions we can consider that the definition of audit quality is not something that is formalized and unique but it depends on what is important for the readers and users of the audit report in the process of decision making, for example the regulators are more interested in detecting whether firms respect the audit ethics, regulation and standards, on the other side investors want to have an assurance that the financial statement are representing a fair view of the company's financial situation, in general the audit quality definition and level of importance depends on the user.

In IAASB**, 2020a, 2020b** high audit quality is an audit that increases the quality of the financial reports and supports well-informed investment decision and financial stability and decreases information asymmetry between managers and shareholders. There are many perspectives of the audit quality, and no single element has the dominant effect on it.
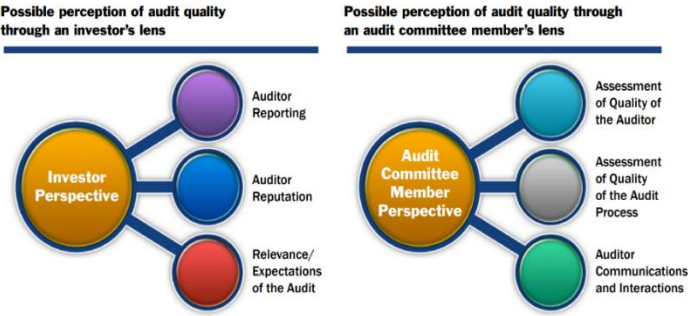
Figure 1: Different perceptions of audit quality (IAASB CAG Agenda, March 2011)

The audit quality depending on IAASB can be seen in terms of three aspects that are **inputs**, **outputs,** and **context factors**. These are the elements that can impact the audit quality :

As inputs we can detect:

- **Personnel attributes** of auditors (Skills, experience, education, values…), For (Knechel, Krishnan, Pevzner, Shefchik, & Velury, 2013) when we want to obtain a reasonable assurance for audit, we need resources that are related to the audit team availabilities and expertise and the audit methodology and technologies that are used.

- **The audit process:** the audit is done in respect to a process that contains many stages in each stage there is a judgement that is done by the auditors which influences the audit quality, it is more related to the audit methodology and audit tools.
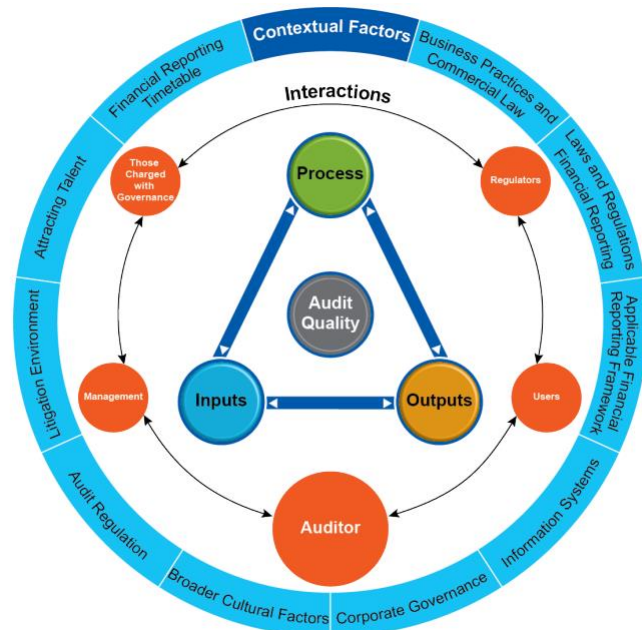
Figure 2: Framework for Audit Quality (IAASB)

As outputs we can detect:

- **The outcome of audit that we can find in audit reports:** high audit quality is more viewed as the absence of financial statement restatements and poor financial reporting quality.
- **The communication of auditors with those charged with governance:** on matters such as qualitative aspects of the entity's financial reporting practices and deficiencies in internal control can positively influence audit quality.

As contextual factors we can find:

- **Corporate governance:** it is important for audit quality if it creates a climate of transparency and ethical behavior.
- **Law and regulation**: influences audit quality if it established a framework that can produce high audit quality and if it is respected, it is also important to have a communication between auditors and regulators.
- **The quality of the applicable financial reporting framework** has an influence over the audit quality as example transparent disclosures are important for audit quality.

2.2.2 What are the motivations of the audit company to provide a good quality (reputation, fees….)

For (Epstein & Geiger, 1994) the auditor follows strictly the Generally Accepted Auditing Standards (GAAS) and try to identify all types of risk (inherent risks, control risk, detection risks) to give an appropriate opinion in order to avoid possible litigation with the users of financial statements or regulators, they want also to maximize client satisfaction and at the same time limit any possible damage to their reputation as an important asset for the auditor and the audit firm. Providing an audit quality can also be motivated by **the audit fees** as we find the example of the dependence of Arthur Anderson on Enron's payments which leads to the collapse of the two companies, Arthur Anderson was one of the five (5) big audit firms in 2001, but it fails to report and detect the truth of Enron's financial situation which was one of the biggest accounting scandals in history. Audit fees can also be used positively to motivate audit firms to provide audit quality because these fees are resources that are used to recruit experienced professionals and to provide staff with all possible knowledge and experience, these fees help also audit firms to invest in advanced software and intangible assets.

2.2.3   Importance of audit quality: Accountability and Improvement

It is an obligation for auditors to comply with audit standards and audit regulations, in the ISA auditors have many obligations as:

- Obligation of giving a reasonable assurance (not an absolute assurance) about the quality of the financial statements and whether they are free in general from material misstatements.
- In ISA 200 Para. A28–A37 the engagement partner is responsible for managing and achieving audit quality as creating the appropriate environment for work and being involved in the audit engagement to approve the conclusions that are reached by the audit teams and to make sure of giving the appropriate opinion.

There are other rules that are organizing the audit profession which are provided by the **International Standard on Quality Management (ISQM),** for example, ISQM 1 made it an obligation for firms to have quality objectives and to implement a system of quality managements which is an obligation also for audit firms.

2.2.4   Measurement of audit quality

For (Wooten, 2003) the results or outcomes of the audit quality are not directly observable so it is problematic to measure the audit quality, but a poor audit quality can be detected when it has an impact on the business failure, also when there is a material misstatement that is not detected by the audit quality control procedures, it is the same for (Francis J. R., 2011) who considers that the audit quality can be determined by the audit errors, it means that the errors can be used as a measure of the audit quality.

(DeFond & Zhang , 2014) consider that there is no standardize measures that directly assess the audit quality and that the lack of measurement leads the literature to analyze the audit quality from different perspectives as audit fees and audit hours, reputation, industry expertise, lawsuit risk, auditor independence, ethics, auditor size and abnormal assessments. For example, (Kilgore & Radich, 2011) investigated the importance of the audit team and the audit firm attributes that can influence the perception of audit quality by users of the audit services, they found that the important attributes to measure the audit quality are the audit firm size, partner attention to audit, the knowledgeable audit team and the industry of the audit firm experience, the data for this study is gathered from 81 users of audit services, this study results suggest that the users of audit services give more importance to the audit team attributes than audit firm attributes in perception of audit quality.

2.3 Audit and audit quality in private firms.

The Fourth EU Directive requires private EU firms that exceed certain size criteria to have their financial statements audited by an independent audit firm, in this situation audit is a legal obligation, but it can be also a voluntary choice as we found in the literature that (Jensen & Meckling , 1976) demonstrate that managers will tend to hire an independent audit firm in order to monitor their behavior as it is important to show to owners that the work done by the management is appropriate, audit in this situation is a voluntarily choice. For (Watts, 2003) the private companies will contract with an independent audit firm because they want to satisfy loan covenant that represent a type of restriction for this companies and making the audit financial statements an obligation. According to (Lennox, 2005) an independent auditor has a monitoring role within the private companies because he can reduce the asymmetry of information between all users of financial statements, whether they are insiders or outsiders of the company such as owners and managers and bankers. The auditor plays an important role in private firms because this firms disclose less non-accounting information in comparison to public firms which is something that is important in the process of decision making for the users of this financial statements. Another study done by (Dedman, Kausar, & Lennox, 2014) found that UK private firms will tend to purchase voluntary audits if the agency cost are greater within the company or the situation of the company is in risk or to raise capital as they want to give an assurance to investors and attract them because they tend to trust the information provided by an independent audit firm rather than the internal information provided by the private company itself. For (Niskanen, Karjalainen, & Niskanen, 2011) higher audit quality provided by big 4 audit firms for private clients is motivated by the intention to overcome the agency costs that are caused by the asymmetry of information between managers and

shareholders, when the shares owned by management are low the demand for an increased audit quality increase. (Esplin, Jamal, & Sunder, 2018) detected that private firms in Canada hire an external auditor even if it is not a legal obligation because internal and external stakeholders tend to be more interested in audited financial statements and this is why they request more audits.

2.4 Audit fees and audit quality.

The audit fees are the counter part for the services and the work that is done by the auditor, it is an income for the audit firm and an expense for the clients. The security and exchange commission made it an obligation for companies to disclosure audit fees in their financial statement on or after February 2001. In the literature there are many explanations to audit fees, they can be explained by the audit efforts or the number of hours that are required to complete the audit or the level of experience of the auditors as found with evidence by (Palmrose Z.-V. , 1988) that there is positive relation between audit fee and audit quality that is explained by the audit effort and the higher expertise. (Vander Bauwhede, Deumes, Schelleman, & Vanstraelen, 2012) confirmed when they studied a sample of transparency reports of 103 audit firms in several EU countries that there is a positive relation between client satisfaction, audit team and audit fees, so client's satisfaction level is related positively to higher fees. (Francis & Yu, 2009) provided evidence form their comparative study of the impact of big four (4) firms and small audit firms on the audit quality, that big firms (Big4) provide higher audit quality.

In contrast (Caramanis & Spathis, 2006) conducted an audit on a sample of 185 companies in Athen's stock exchange to investigate the impact of audit fees (financial variable) and audit size (non-financial variable) on the audit qualifications, the results showed that there is no relation between these variables and the audit opinion. For (Prabhawanti & Widhiyani, 2018) and (Ramdani, 2015) the audit fees don't have any impact on audit quality, because the fees are not an indicator of the good quality this results are the same as those found by (Sari, Diyanti, & Wijayanti, 2019) when they studied a sample of 50 manufacturing companies listed on the Indonesia stock exchange between 2015 and 2017.

2.5 Auditor size and audit quality

For (DeAngelo, 1981) the size of the audit firm has an impact on the audit quality, she argues the larger audit firms provide more audit quality when they are compared to small audit firms, this can be justified by the fact that large audit firms have more risks when giving a wrong opinion because of false or mistaking financial statement, this firms have more reputational risks and are afraid of losing client and being in trouble with regulators. (DeAngelo, 1981) considers also that the large audit firms are more independent this is why they provide more high audit quality, this can also be explained from her point of view by the fact that large audit firms have more resources as talented employees and they provide more training and education to developpe their staff experience. Another finding by (Mutchler, Hopwood, & McKeown, 1997) proposed that big six auditors can issue more going concern opinions than non-big six auditors, this can be interpreted in two ways either that the big audit firms can detect the going concern issues more than smaller audit firms, but it can be also that the large audit firms audit client with these problems. (Van Tendeloo & Vanstraelen, 2008) made a study across different European countries to examine the audit quality in private firms and found that large audit firms will provide more audit quality for private clients this are the same results of the study done by (Francis & Yu, 2009).

On the other side (Roberts & Sweeney, 1997) found no relation between auditor independence and the audit firms' size for theme the relationship is unclear, it is the same results found by (Caramanis & Spathis, 2006) as they proposed that the audit firm's size does not have any significant effect on the audit opinion. Furthermore (Vander Bauwhede H. a., 2004) found no difference between Big N and Non big N auditors influence on audit quality for a sample of private firms in Belgium.

III. Hypothesis:

The proposed research question is whether the audit firm's characteristics especially audit firm size and audit fees have an influence and can explain tax reconciliation informativeness in private firms. From the previous literature review we can formulate two hypotheses concerning the relation that can exist between tax reconciliation informativeness and audit firm's characteristics:

The null hypothesis: Even if the audit firm characteristics are different, their private clients have equivalent tax reconciliation informativeness, means that the audit firm's characteristics (size and audit fees) don't have any influence on tax reconciliation informativeness (the level of transparency of private firms is the audit quality).

The alternative hypothesis: The quality of tax reconciliation informativeness is related to the audit firm's characteristics (size and audit fees). We study two characteristics that are the audit fees and the audit firm's size, for each of these characteristics we have a hypothesis as follows:

> **H1**: In private firms **the audit fees** have a positive influence on tax reconciliation informativeness (audit quality).

The auditor gets a remuneration for his work that is the audit fees, this amount of money can impact the auditor's opinion because audit firm will try to satisfy her clients in order to preserve them and to benefit from audit fees. This hypothesis is in contrast with (Prabhawanti & Widhiyani, 2018) and (Ramdani, 2015) findings that the audit fees don't have an impact on the audit quality, because the fees are not an indicator of the good quality, their results are the same as the ones that are found by (Sari, Diyanti, & Wijayanti, 2019).

> **H2:** In private firms **the auditor's size** has a positive influence on tax reconciliation informativeness (audit quality).

We predict that large audit firms can provide high audit quality because of the fact that they have greater reputational and litigation risks, and they have more resources to conduct audits as was found by (Wang & Xin, 2011) when they investigated the relation between the auditor size and the audit quality in Hong-Kong and found that Big 4 audit firms provide more quality compared to non-big 4, this are the same results found by (Abughazaleh , O'connell , & Princen , 2015) for a sample of German, French and UK listed companies during 2008 to 2012. (Francis & Yu, 2009) provided evidence from their study of the impact of big 4 firms and small audit firms on the audit quality that the big firms provide a higher audit quality, In the contrary (Sari, Diyanti, & Wijayanti, 2019) found no relation between the two variables. The **collapse of the Arthur Andersen** one of the biggest audit firms because of its failure to detect Enron accounting irregularities, it is one of the biggest audit failures in history, is also evidence of the fact that the audit quality is not related to the size of the audit firms.

IV. Research design and methodology.

1. Methodology:

The objective of this study is to detect the type of relation between audit firm's characteristics and tax reconciliation informativeness, the objective is to explain the reasons of differences between the private firms concerning the quality of tax reconciliation informativeness and to detect how the auditor's characteristics can influence the quality of tax reconciliation information. To achieve the objective of our research we choose to follow a quantitative research approach, the reason of this choice is the fact that we want to collect and analyze statistically significant data using sampling method in order to investigate the relationship between the dependent variable that is tax reconciliation informativeness and the independent variables which are the audit firm's size and the audit fees. We want to explain the reasons of differences in tax reconciliation informativeness between private firms. The use of quantitative data analysis is important as it makes it possible to convert numerical data into information to describe and explain the information that is included in data using statistical techniques. As we cannot examine all private companies in Belgium, quantitative analysis will allow us to make a generalization of the sample results to all the population, the objective is to test our hypothesis and obtain a conclusion

using inferential analysis. Our sample consists of **8.982** private Belgian companies and has an observation period of 6 years from **2009** to **2014,** the choice of this period is related to the fact that there were many changes by EFRAG and ISA after **2014**, in 2014 the European union adopted an important reform of the statutory audit market, this reform was made through two legislative instruments; Directive amending the 2006 audit directive and the audit regulation (the Audit Reform (i.e. Directive 2014/56/EU3 and Regulation 537/2014), This two regulations are important to reinforce transparency of companies for investors and to reinforce the independence of auditors, another reason is the changes in the Belgian regulation after the company law reform in 2016, this choice is also explained by the fact that after 2014 the world faced many crisis because of climate changes and the effect of Covid 19 (December 2019) which made many European companies in difficult financial situations, all this previous elements can impact private companies decisions in term of auditor choosing and tax reconciliation or even their investment decisions.

Regulation 537/2014	Directive 2014/56/EU
Prohibition and capping of non-audit services (art.4 and art.5)	New definition (e.g. PIEs) (Art.2)
Mandatory firm rotation (art.17)	Independence and objectivity (Art.22)
Auditor reporting (art.10)	Quality assurance (Art. 29)
Overight at the EU level (Art.12)	New mechanism to adopt ISAs (Art. 26)
Establishment of the CEAOB (Art.30)	

Table 3 : Overview of main provisions included in Regulation 537/2014 and Directive

Because the audit quality of tax reconciliation information is difficult or can't even be measured directly, we chose to adopt the methodology for which we provided an explanatory example to explain how we will measure the tax reconciliation informativeness to answer the research question.

For the independent variable we opted to use the following measures to determine it:

- **Audit fees:** it is the amount that is paid by each private entity of our sample to its auditor for audit services.
- **Audit firm's size:** this variable is measured by classifying the audit companies as big 4 and non-big 4.
- **Control variables:** the size of the private firm, Industry, the Change of the Auditor, The Board of directors' independence (ownership concentration).

To avoid that our result may hold in only some environments and situations we will study the model in the following situations:

- Tax aggressive VS non-tax aggressive.
- Absence VS Existence of Non audit services

For data analysis we used statistical methods provided by the software-tool Statistical Package for the Social Sciences (SPSS).

1.   Example:

For four firms A, B, C , and D who are operating in the same industry at the end of the year they report the same profit before taxes for an amount of 2.000.000, as they are in the same sector and all the four firms are subject to the same tax at standard rate of corporation tax in the Belgium 25% (statutory tax rate) we can observe differences between this four firms in the effective tax rate, the only firm that reports an effective tax rate that is equal to the statutory tax rate of **25%** is the company **B**, for the other three **A,C** and **D** their effective tax rate deviate and is different from the statutory tax rate that is applicable in Belgium**.** For the effective tax rates of firms **A, C** and **D** it is respectively **23,18; 0.49** and **50.94.**

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To understand the calculation these elements are important to understand:

Disallowed expenses: are expenses that are not deductible in Belgian tax for example we have 31% of restaurant expenses, 50% of representation expenses and business gifts, the company's tax we also find payments to tax havens. This type of expenses should be added to the accounting profit as a step to find the tax base.

Risk capital allowance: to encourage investments in innovation and technology and under certain conditions the Belgian companies can benefit from a deduction of a certain percentage of their investments according to Articles 68 up to 77 and 201 of the Belgian Income Tax Code 1992, even if the investments are not considered normally as expenses.

Tax shelter: in Belgium tax authorities allow companies to reduce their taxes by a tax shelter under certain conditions of investing in audiovisual costs such as a documentary for cinema or web series.

	Firm A	Firm B	Firm C	Firm D
Profit before taxes (x)	2 000 000	2 000 000	2 000 000	2 000 000
Disallowed expenses (+)	**555 520**	**500 000**	**500 000**	**2 575 000**
Risk capital allowance (-)	**100 350**	**200 700**	**200 700**	**200 700**
Tax shelter (-)	**600 000**	**299 100**	**2 260 100**	**299 100**
Taxable base	1 855 170	2 000 200	39 200	4 075 200
Tax expense (25%) (y)	**463 792,5**	**500 050**	**9 800**	**1 018 800**
Effective tax rate (Y/X)	**23,18**	**25.00**	**0.49**	**50.94**

Table 4: Example determination of effective tax rate

For tax reconciliation we want to know the difference between the tax rate applied to the accounting profit (profit before taxes) and the tax applied to the taxable base.

The four firms have different level of materiality that is explained as the maximum amount that can be accepted before considering that something is very important and has a high influence on the stakeholders' decisions. For firm **B** the level of materiality is **300 000** when an item is higher than this amount it is considered as materiel. Whereas for firm **C** the level of materiality is equal to **200 000,** for firms **A** and **D** something is material if it is larger than **1.5** times the accounting profit, taking into consideration this given information the tax reconciliation of each firm can be presented as follows:

	Firm A	Firm B	Firm C	Firm D
Disallowed expenses (+)		500 000	500 000	
Risk capital allowance (-)			200 700	
Tax shelter (-)			2 260 100	

Table 5: Tax reconciliation items taking in consideration the level of materiality.

Because of the levels of materiality defined by each firm we can observe that the firms **A**, **B** and **D** don't provide a full tax reconciliation, in other words these firms don't provide all the items (accounting accounts) that explains the difference between the accounting profit and the taxable base that is determined in table 2.

Now let's determine the proxied tax expense, the proxied tax rate and the error level (ETR-ETR*) taking into consideration the level of materiality for each of the 4 firms, we want also to reconcile the effective tax rate and the expected statutory tax rate using all available information in the financial statements. **The estimation error (ERROR)** is determined as the absolute difference between the effective tax rate (ETR) and the tax rate that is calculated using all available financial information (ETR*), the difference converge to zero (0) when a stakeholder can fully approximate the effective tax rate. In contradiction the estimation error increases as the tax reconciliation becomes less informative it means that it doesn't explain clearly or it is not taking into consideration all elements that explains the reasons of differences between the proxied tax rate (ETR*) and the Effective tax rate (ETR), for our previous example, the *ERROR term* is calculated as:

	Firm A	Firm B	Firm C	Firm D
Profit before taxes	2 000 000	2 000 000	2 000 000	2 000 000
Disallowed expenses (+)		500 000	500 000	
Risk capital allowance (-)			200 700	
Tax shelter (-)			2 260 100	
Reconciled taxable base	2 000 000	2 500 000	39 200	2 000 000
Proxied tax expense (25%)	500 000	625 000	9 800	500 000
Proxy tax rate (ETR*)	**25%**	**31.25%**	**0.49%**	**25%**
Effective tax rate (ETR)	**23,18%**	**25.00%**	**0.49%**	**50.94%**
ETR - ETR*	**-1.82**	**-6.25**	**0.00**	**25.94**
ERROR (|ETR - ETR*|)	**1.82**	**6.25**	**0.00**	**25.94**

Table 6 : Example determination of ERROR (Variable ADIFF)

Overall, ERROR shows that the firm C provide all the important information to explain and reconcile the difference between accounting profit and taxable base, we can classify the level of transparency of the three other firms starting by A as the most transparent with 1.82 than B with 6.25 and at the end we find D with 25.94 as the worst company regarding the level of transparency.

2. Data collection

To extract the data we used the database Bel-first, it provides data and the all the financial information regarding firms that are registered in Belgium and Luxembourg, as our study focuses on private companies who are operating in Belgium, this database provided us with the important financial information that we need, the access was provided to us by the university of Liege library as the University of liege has a license that allow us as research students to access the database. The dataset used for this study is a secondary data that is gathered from the database Bel-first from Bureau Van Dijk (**https://belfirst.bvdinfo.com**), we collected data that include the following information:

Variable	Acronym	Variable	Acronym
Company identifier	BVD	**Leverage**	DegreDetteLT
Private company name	client	**Tax loss carryforwards**	FISCLOSS
Firm's founding date	FOUNDED	**Audit fees**	AUDITFEE
Annual statements (01/01-31/12)	YEAR	**Consulting/compliance Non audit services (NAS) 1**	AUDITCONTR1
Industry of private firm	Industry	**Tax Non audit services NAS 1**	TAXFEE1
Whether disclosure is made	INFO	**Other Non audit services (Nas) 1**	OTHERNAS1
Ownership concentration	BVDINDEP	**Consulting/compliance Non audit services (NAS) 2**	AUDITCONTR2
Audit firm name	Auditfirm	**Tax Non audit services NAS 2**	TAXFEE2
Audit firm ID	auditfirmid	**Other Non audit services (Nas) 2**	OTHERNAS2
The change of audit firm	AFIRMSWITCH	**Size of audit firm**	BIG4
Ownership structure	GROUPIND	**Effective Tax rate**	ETR
Nomenclature of Economic Activities	NACE	**Difference between expected statutory tax rate given accounting profit before taxes and the ETR**	STRGAP
Intangibles	R21	**Difference proxy tax rate and ETR**	DIFF
Property plant and equipment	R2227	**Absolute value of DIFF**	ADIFF
Total asset (size)	TOTALASSETS		

Table 7 : Variables used in data analysis.

3. Sample, and Sampling Method:

The population of this study is private Belgian companies for the period of 2009 to 2014, the information gathered concern 8.982 company, so we exclude public companies, the criteria for selecting this simple are: Incorporated private companies in Belgium before 2009; audited private companies between 2009 and 2014; private companies which publish annual reports, companies which disclose audit fees separately from non audit fees.

We classified the companies by the industry criterion using the NACE Rev. 2 statistical classification of economic activities in the European Community.

NACE section	Industry	Frequency	Percentage
A	Agriculture, Forestry and Fishing	15	0,17%
B	Mining and Quarrying	56	0,62%
C	Manufacturing	2351	26,17%
D	Electricity, Gas, Steam and Air Conditioning Supply	7	0,08%
E	Water Supply, Sewerage, Waste Management and Remediation Activities	101	1,12%
F	Construction	989	11,01%
G	Wholesale and Retail Trade	3357	37,37%
H	Transporting and Storage	914	10,18%
I	Accommodation and Food Service Activities	31	0,35%
J	Information and Communication	166	1,85%
L	Real Estate Activities	162	1,80%
M	Professional, Scientific and Technical Activities	480	5,34%
N	Administrative and Support Service Activities	310	3,45%
S	Other Service Activities	43	0,48%
Total		8982	100,0
Years of observation 2009-2014		6 years	

Table 8: Sample by industry.

We can notice that most of private firms in our sample operate in 2 main sectors: Manufacturing (26,17%), Wholesale and Retail Trade (37,37%).

For the period between 2009 to 2014 we have a sample of 8982, the distribution of this companies by year is given in the following table:

		Frequency	Percent
Valid	2009	1344	15,0%
	2010	1589	17,7%
	2011	1633	18,2%
	2012	1289	14,4%
	2013	1635	18,2%
	2014	1492	16,6%
	Total	8982	100,0%

Table 9: Sample distribution by year.

4.   Variables:

4.1 Dependent variable:

The dependent variable can be defined as a variable that depend upon some other factors named independent variables, in our analysis the dependent variable is **the quality of tax reconciliation informativeness (ADIFF) or the ERROR (ADIFF) as** we use the measure provided in the example provided in the methodology section, the measure that we will use is the ERROR that is the absolute value of difference between effective tax rate (ETR) and Proxy tax rate (ETR*), the ERROR converge toward zero when the company provide all the sufficient information to reconcile the difference between the accounting profit and the taxable base, when the ERROR takes a large value the quality of tax reconciliation informativeness is low, this ERROR term is represented in our analysis by the variable ADIFF.

4.2 Independent variables

The Independent variables are the variables which can have an impact on the tax reconciliation informativeness, we will work on 2 audit firm's characteristics as independent variables that are: **Audit firm's size** and **Audit fees.**

- **Auditor Size (BIG4 or NOT) :**

As a non-financial variable, we will study the impact of audit firm's size (Big4 or not) on the audit quality, as we predict that the differences between audit firms in terms of size can impact the audit quality. We think that the audit firm's size has an impact on the audit quality of tax reconciliation because the large audit firms have more clients and will try to preserve them by providing more audit quality, so they have more interest in providing high audit quality with an independent judgement, there is also more pressure on theme because of the reputation that they have in the market. These are good motivations for us to study if this is true for audit firms in private sector for the mater of tax reconciliation. So, we are predicting that big audit firms force private companies to provide stakeholders with all the important information about tax reconciliation in order to facilitate for them to understand the difference between taxation and accounting results, in our data set the variable audit firm's size is represented by the acronym BIG4, that is a dummy variable to quantify if the firm is audited by a Big4 for each year during the period from 2009 to 2014, this variable equals 1 if the audit firm is a Big4 and 0 otherwise.

In our data for the period between 2009 to 2014, the Big 4 firms are KPMG, EY, Deloitte, in

- **Audit fees (AUDITFEE):**

We study audit fees as a financial variable because maybe the audit company's or the auditor's opinion is affected by the audit fees (the amount of money he gets from clients), as the audit firm resources can be dependent on the clients payments and this may impact the audit quality and the quality of tax reconciliation if the audit firm want to just satisfy the client and provide the audit opinion that can make the client happy. In our sample of Belgian private firms, the audit fees are the amount of money paid by the client (Belgian private firm) to its audit firm as a counter part for its audit services (audit work).

The collapse of Arthur Anderson because of Enron's scandal is an example of the dependence of the audit firm on audit client payments, this relation impacts the audit quality when the amount of audit fees is important. We predict that there is a positive relation between audit quality and audit fees as found by (Palmrose Z.-v. , 1987) and (Vander Bauwhede, Deumes, Schelleman, & Vanstraelen, 2012). This prediction is justified by the fact that the audit firms are appointed and remunerated directly by their client, and they are using these fees to invest in different software's or to provide training their staff to provide high quality audits.

The audit fees information can be downloaded as they are specified in the financial statements of private firms as the expense paid to the audit company for the audit work performed.

4.3 Control variables:

To count for other factors that can influence the type of relationship between dependent and independent variables, which can influence the results of our study, we test for control variables to reduce confounding effects. This allows us to better understand the specific effect of the independent variables on the dependent variable and strengthen the robustness of our findings.

The selection of our control variables was not done randomly. Indeed, thanks to the numerous studies that have been carried out on the relation between the dependent variable (audit quality) and the independent variables (audit fees and the size of the audit company), we were able to select our own variables. We then conducted an inventory of the independent variables that researchers have used to answer our same hypothesis. We sorted them to determine the following important control variables that are used in the previous literature as they can impact audit quality:

- **The size of the private firm:**

As discussed in the section related to the methodology, we explained how the quality of tax reconciliation informativeness is determined, based on this explanation it is clear that we will use the accounting profit of each company for the period from 2009 to 2014 as a start in order to find the error, but the case is that the company's' size can impact the accounting profit as it is normal that the large private companies have more profits than small companies (generally in the case of a profitable situation and normal business conditions). We also control for firm size (SIZE) because larger firms have more resources and ability to pay for high quality audits more than small companies, additionally the increasing size of client (private companies) can influence audit fees because of the increase in complexity and audit effort. The firm's size is an important control variable used in the literature and known as the size effect, the measure of the size depends also on the field of study (Chongyu Dang, 2018), moreover it was found by (MANSI, 2004) that appointing a big4 is positively related to the client firm's size.

The private firm's categories in Belgium depending on the **Belgian code of companies and associations** (CSA) are as follows:

- o Small companies are companies with legal personality which, on the balance sheet date of the last closed financial year, do not exceed more than one of the following criteria (**article 1:24)**
  - Number of workers, annual average: 50
  - Annual turnover, excluding value added tax: 11 250 000 euros.
  - Balance sheet total: 6 000 000 euros.
  A company is considered large if it exceeds 2 of the 3 thresholds or if it is listed on a stock exchange.
- o Micro-companies we mean small companies with legal personality which are not a subsidiary company or a parent company and which on the balance sheet date of the last closed financial year do not exceed more than one of the following criteria: (**article 1:25)**
  - Number of workers, on annual average: 10
  - Annual turnover, excluding value added tax: 900 000 euros.
  - Balance sheet total: 450 000 euros.

For our study we will use total assets as measures of the private firm's size.

- **Industry of private firm:**

The other important control variable is the industry of the private company, the reason for this choice is related to the fact that each industry has its unique characteristics which can impact and influence our dependent variable and consequently affecting our findings, the distinctive traits of each industry have an impact on each company's financial decision as each industry is different from another because of the economic activity, regulation … that have disparate effects across different industries. This impact of the business environment of each firm might impact our independent variables audit fees and size of the audit firm we can go further and say that it changes and influence the whole audit processes.

As a measure of the private companies' industry, we use NACE[2] to determine the variable industry (see table 8 for sample classification by industry using NACE)

- **The Change of the Audit firm (AFIRMSWITCH):**

The audit firm rotation impact on audit quality has been studied by many researchers as we found numerous publications, we can identify two research opinions or perspectives: a group of research and institutions who consider that auditor rotation enhances audit quality, conversely the other group don't support the auditor rotations and consider it a cause of bad audit quality.

For EC long audit tenure is considered as an indicator of bad audit quality as the close relationship between the auditor and its clients reduces the independence of the first one, this is consistent with (Arel, Brody, & Pany, 2005) who think that the relationship between the auditor and its client will lead the auditor to take the work as redundant and his attention will reduce. Additionally, (Vanstraelen, 2000) investigated the impact of renewable long-term audit mandates on audit quality in Belgium and found that an extended tenure relationship is positively related to issuing an unqualified audit opinion. further, (Singer & Zhang, 2018) study discovered that long audit tenure is associated with less rectification or correction of misstatements. Conversely (Palmrose Z.-v. , 1987) find that the auditor face high litigation risk during the initial stages of an engagement. Another research by (Deis & Giroux, 1992) Suggests an inverse correlation between auditor tenure and audit quality. (Cory A. Cassell, 2016) consider that long tenure reduces the risk of fraud more than new appointed auditors.

For our study if we have a change of the auditor within the period of 2009 to 2014 this can influence the level of quality, it is a dummy variable that takes the value of 1 if there was a change of auditor, and the value of 0 otherwise, this change of auditor is a legal obligation for public companies and all companies who are required by law to have an auditor, it is important in order to preserve the auditors independence this is why it can increase the audit quality. At the same time, it can cause a deterioration of audit quality since the new auditor doesn't have any strong knowledge about the entity and its processes, which can increase the audit fees and efforts during the first years of audit.

Four our sample the following table present the number of audit firms' rotations that have occurred each year:

| | | AFIRMSWITCH | | Percentage | Total |
		No	Yes		
YEAR	2009	1304	40	2.09%	1344
	2010	1527	62	3.9%	1589
	2011	1583	50	3.06%	1633
	2012	1280	9	0.69%	1289
	2013	1625	10	0.61%	1635
	2014	1428	64	4.28%	1492
Total		8747	235	2.616%	8982

Table 10 : Change in auditor per year.

- **The Board of directors' independence (ownership concentration):**

As we found that in the previous literature the Board of Directors independence can impact the audit quality as this governance body is responsible for making sure that the managers are acting in the best interests of shareholders, it is known from the agency theory that there is different interests between shareholders and managers, but also the interest of majority shareholders can be in a conflict of interest with minority shareholders as found by (Fama & Jensen, 1983) who Suggest that the Bod can influence positively the audit quality in order to protect its reputation capital, as a high audit quality need more

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[2] NACE is the abbreviation of "Nomenclature Generale des Activitks Economiques dans l'Union Europ6enne" or "General Name for Economic Activities in the European Union." The NACE-code system is based on the European standard for industry classifications.

resources this can increase the audit fees. Another study done by (Hanlon & Heitzman, 2010) suggest that companies with concentrated ownership structure experience a greater opportunity for tax avoidance, as the controlling owners stand to benefit more from the tax savings. For (Alhababsah, 2019) the percentage of shares held by a single person or organization is known as ownership concentration, and it can have a significant effect on corporate governance frameworks and decision-making procedures. when we think about independence, we link it to ownership concentration as used by (Horobet, Belascu, Curea, & Pentescu, 2019), because when only one or two shareholders have the majority of the voting rights then the other shareholders are just following his decisions. In Belgium the composition of a board of directors for private companies is governed by company law, private companies are not facing the same rules as public firms regarding the board composition, the Bod in private firms has more flexibility to establish a board consisting of only one or two members. Foe our research we predict that ownership concentration can affect audit quality in several ways. For example, when choosing external auditors, ownership concentration can influence the quality of the audit by influencing the choice of reputable audit firms, such as the Big Four firms, which can increase the audit fee and audit quality. This was found by (Hay, Knechel, & Ling, 2008) who observed that companies with concentrated ownership are highly influenced by the major shareholders regarding decision making and that the major owners have a positive influence on audit quality.

To measure the ownership concentration (Bod independence) we use the Bvd independence indicator that is provided by Bureau van Dijk, this indicator measures the level of independence of the firm with regard to it is shareholders, the table 12 provide the five (5) categories of ownership concentration degrees:

Indicator and Degree of Ownership Concentration	Main Significance	Supplementary Clarifications
A Low ownership concentration	Independent companies—those with known recorded shareholders, each of them having less than 25% of direct or total ownership of the company	A+—Companies with six or more shareholders and/or companies in whose case the sum of direct ownership is above 75% A—Companies with 4 or 5 shareholders and/or companies that are the ultimate owners of another company (given that the information is included in a source), even when its shareholders are not mentioned. A−—Companies with 1 to 3 shareholders
B Medium-low ownership concentration	Companies with known recorded shareholders with ownerships below 50%, but with one or more shareholders with ownership percentages above 25%	B+, B and B−—allocated similarly to A clarifications above
C Medium-high ownership concentration	Companies with known recorded shareholders that have a total or calculated ownership above 50%	C+—Companies with a sum of direct percentage of ownership is 50.01% or higher C—Also assigned to companies in whose case an ultimate owner is mentioned in a source, although its ownership percentage is unknown
D High ownership concentration	Companies with a recorded shareholder that has a direct ownership above 50%	
U	Companies with an unknown degree of ownership concentration	

Table 11 : BvD independence indicators provided by Bureau van Dijk.

We resume the research framework of this study in the Figure 3:

Independent Variable

Control Variable

Dependent Variable
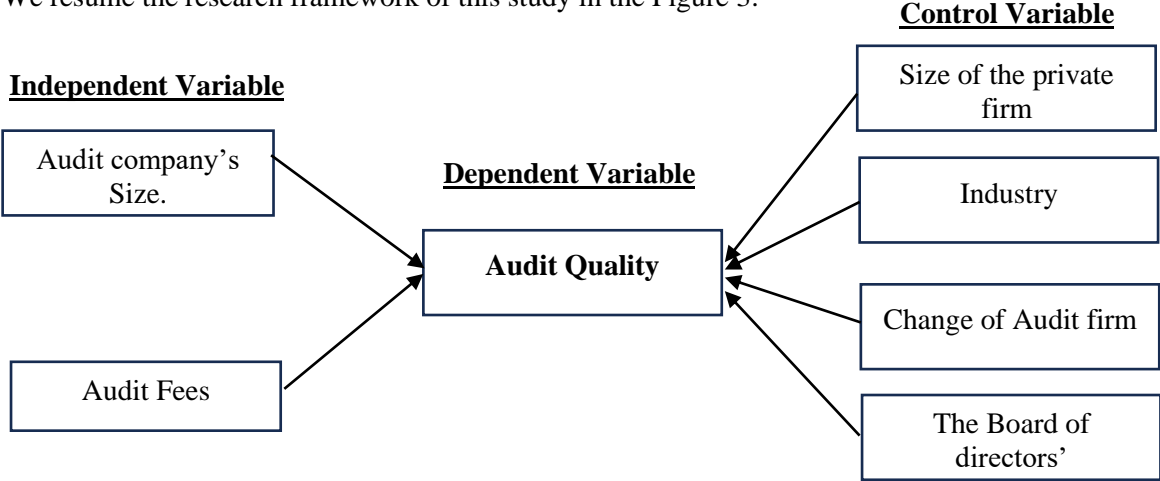
Figure 3 : Research Framework

4.4 Sensitivity Analysis variables

To assess the robustness of the results documented we will conduct additional tests in different situations, as we want to know if our results of the analysis are not obtained accidentally and if it holds in the following situations:

- **Tax aggressive vs Non-tax aggressive:**

As found by (Kanagaretnam, Lee, Lim, & Lobo, 2016) tax aggressiveness is negatively related to auditor quality, as we know that the audit work includes also auditing taxes and evaluate the reasonableness of the tax this way the audit company's characteristics could influence the tax aggressiveness level. Other evidence of the negative relation between audit quality and tax aggressiveness are found by (Kanagaretnam, Lee, Lim, & Lobo, 2016). Another study by (Donohoe & Robert Knechel, 2014) found that companies with greater tax aggressiveness can expose the audit firm to many risks as litigation with shareholders because they consider them to be there representatives and they should protect their interest by providing a high audit quality, so the owner hold auditors responsible for any type of tax misstatement, this situation represents a reputational risks for the audit firm this is way they tend to increase the audit fees for clients with this types of risks. It is important to note that the tax aggressiveness or tax avoidance is legal on the contrary tax Evasion is illegal.

To measure tax aggressiveness, we use **the affective tax rate (ETR)** this ration is calculated as the total income tax expense divided by Pretax accounting profit, as we are studying only companies in Belgium this measure is correct as the ETR is affected by the local GAAP. This measure is used in previous literature by many researchers as (Donohoe & Robert Knechel, 2014)**.**

- **Presence Vs Absence of non audit services (NAS).**

As we know that audit firms provide other non-audit services to their clients, we want to control for the fact that this other services fees can impact our results, for (Hay, Knechel, & Wong, 2006) this non audit services can include consulting and advisory services. We predict that a high amount of non-audit services can represent a threat for the auditor independence, and this could influence the audit quality negatively as found by (Carson, et al., 2013)**.** In contrast our prediction can be false as (Svanström, 2013) found based on 420 surveyed private firms in Sweden that NAS can improve the auditor's knowledge and understanding about his client's business thus the amounts of non-audit services can increase audit quality.

To Measure the NAS, we use different Nas fees disclosed in the financial statements.

5. Statistical Model

To study the relationship between audit fees, audit firm's size as independent variables and the audit quality (transparency of tax reconciliation information), we use **the descriptive statistical analysis** as it enables us to effectively summarize and make sense of large datasets. To test for any multicollinearity issues, we use **the correlation analysis** (correlation matrix).

To test the hypothesis proposed in this study we opted for **multiple linear regression** this method provides us with the type of relation between our variables. To explore the existence of any possible influence of control variables we will use **mediation analysis** to detect if there are any indirect effects between the variables of analysis. These statistical techniques are important to answer our thesis questions: Is there a relation between auditor characteristics and tax reconciliation informativeness?

In this study, we will follow a quantitative research approach, we estimate the following base multiple regression model:

$$ADDIF = \beta_0 + \beta_1 BIG4 + \beta_2 LogAUDITFEE + \beta_3 LogTOTALASSETS + \beta_4 INDUS +$$
$$\beta_5 AFIRMSWITCH + \beta_6 BVDINDEP + \beta_7 ETR + \beta_8 TAXAGR + \beta_9 NAS +$$
$$\beta_{10} DegredetteLT + \beta_{11} GROUP + \beta_{12} STRGAP + \beta_{13} logFISCLOSS +$$
$$\beta_{14} PPE_{AS} + \beta_{15} Intangibles_{AS} + \beta_{16} Year + \epsilon$$

Equation 1: Full model

Where the dependent variable, **ADIFF** represent the quality of tax reconciliation informativeness or the estimation error (ERROR) that is determined as the absolute value of difference between the effective tax rate (ETR) and the proxy tax rate (ETR*), this measure converge to zero when a stakeholder can fully approximate the effective tax rate. Consistent with our Hypothesis 1 we expect audit fees (LogAUDITFEE) to have a positive association with the quality of tax reconciliation informativeness (ADIFF), we also test hypothesis 2 by including the Size of the audit firm (BIG4) which is a dummy variable set to 1 if the entity is audited by a Big-4 firm. We added the variable Size, which corresponds to the natural logarithm value of total assets LogTOTALASSETS, another variables is the variable INDUSTRY is the industry of private firm that is determined using General Name for Economic Activities in the European Union (NACE) this is a dummy variable that captures the type of the private firm's industry. The variables AFFIRMSWITCH is a dummy variable set to 1 for each year the private firm changes its auditor between 2009 and 2014. To control for the board of directors' independence or the ownership concentration impact we included the variable BVDINDEP which is a dummy variable that takes 8 values as explained in appendix 3, for our sensitivity analysis we choose based on previous studies to control for the level of tax aggressiveness using the variable TAXAGR that is measured using the effective tax rate ETR, ETR is calculated as the income tax expense divided by earnings before tax, for our analysis we follow (Xiaojian, Dongying, Xie, & Bin, 2022) and we shorten ETR to the interval [0,1] we categorize this values based on the ETR median if the ETR of a private company is equal or lower than the median (Median ETR = 26,955) the degree of the tax aggressiveness TAX$_{AGR}$ is high and takes a value of 1, otherwise it equals 0 and it indicate a low degree of tax aggressiveness (Chen, Chen, Cheng, & Shevlin, 2010). We also control for Non audit fees (NAS) using the natural logarithm of total NAS to get our variable LogNAS to calculate these fees we use the disclosures made by this firms in the financial statements the global NAS is calculated as follows:

$$NAS = TAXFEE1 + TAXFEE2 + AUDITCONTR2 + AUDITCONTR2 + OTHERNAS1 + OTHERNAS2$$

Equation 2 : Non audit services NAS

Where :

TAXFEE1: Tax Non audit services NAS 1

TAXFEE2: Tax Non audit services NAS 2

AUDITCONTR1: Consulting/compliance Non audit services (NAS) 1

AUDITCONTR2: Consulting/compliance Non audit services (NAS) 2

OTHERNAS1: Other Non audit services (Nas) 1

OTHERNAS2: Other Non audit services (Nas) 2

For each of these variables 1 represents the company level and 2 represents the group level

We also want to control for the Ownership structure of private companies we use the variable **GROUP** as a dummy variable that equals 1 if the company belongs to a Groupe and 0 otherwise. To study if there is any influence of other financial variables on our dependent variables and to control for this variable, we added to our model the variable **DegredetteLT** that represents the leverage this variable is calculated by dividing total debt on total assets.

$$DegredetteLT = \frac{\text{long term liabilities}}{\text{Total assets}}$$

Equation 3 leverage (degredtteLT)

Furthermore, we added the variable **STRGAP** which represents the difference between expected statutory tax rate given accounting profit before taxes and the ETR. We also included the variable **logFISCLOSS** which is the logarithm of Tax loss carryforwards. We have also the variable propriety plant and equipment PPE_{AS} which is the ratio of property plant and equipment to total assets, we also add the variable $Intangibles_{AS}$ that is calculated by dividing total intangible assets on the total assets,

$$PPE_{AS} = \frac{\text{Property plant and equipment}}{\text{Total assets}} \quad ; \quad Intangibles_{AS} = \frac{\text{Intangible assets}}{\text{Total assets}}$$

Equation 4 : Ratio PPE to assets and Intangibles to assets

We also add the variable Return on total assets ROTA that is calculated as a ration of return before tax (Pretax) to total assets as it is important to control for the private company's profitability because previous studies as one of (Johnson & Lys, 1990) finds that profitability influences the likelihood of auditor changes, we include ROTA as control variable for potential effect of profitability as used also by (Niskanen , Karjalainen, & Niskanen, 2010)**.**

$$ROTA = \frac{\text{Return before tax}}{\text{Total assets}}$$

Equation 5 : Ratio return on total assets (ROTA)

Finally, to control our analysis from **Year** effect, we added the **Year** as a dummy variable, because from 2009 to 2014 there may be some increase or decrease in complexity of audit procedure or regulatory requirement. β_0 represents the intercept and other β_x represents the coefficient of each variable and takes values from 1 to 16 as we have Sixteen (16) variables in our model. ϵ is the error term capturing the unexplained variance. In our model, this margin of error is 5%. Thus, the set level of confidence is estimated to be 95% according to the confidence interval developed by statisticians.

For our variable **LogAUDITFEE**, **logFISCLOSS, LogTOTALASSETS, LogNAS** we use natural logarithm of each variable plus one (1) as we know that some variable take null value (0) and log(0) is undefined, the use of natural logarithm is important to make our data more normal as possible this improves the linearity of the relation between this variables and the dependent variable, the use of natural logarithm is also important in order to reduce the impact of outliers.

For more information about variables used in this study see Appendix 2. Explanation of variables.

In the following sections, we will delve into understanding the results deeply by conducting a thorough descriptive analysis. Then, we will move on to examining our hypotheses using statistical and regression analyses. Finally, we will conduct a sensitivity analysis to ensure the reliability of our findings.

6. Descriptive statistics

Variable	Acronyme	N Valid	N Missing	Mean	Median	Mode	Std. Deviation	Minimum	Maximum	Percentiles 25	Percentiles 50	Percentiles 75
Descriptive Statistics												
Dependent variable :												
Absolute value of DIFF	ADIFF	8982	0	10,4201893	4,320	0,000	13,28	0,00	99,12	0,740	4,320	15,640
Independent variables :												
Size of audit firm	BIG4	8982	0	0,4193943	0,000	0,000	0,49	0,00	1,00	0,000	0,000	1,000
logarithm of audit fees	LOGAUDITFEE	8982	0	3,9731331	3,929	3,699	0,36	2,79	5,94	3,720	3,929	4,199
Control variables												
Industry of private firm	INDUSTRY	8982	0	6,5209308	7,000	7,000	2,78	1,00	14,00	3,000	7,000	7,000
Natural logarithm of Total Assets. (Size)	LOGTOTALASSETS	8982	0	7,0690378	7,001	4,843^a	0,59	4,84	10,63	6,705	7,001	7,378
Independence of board of directors	BVDINDEP	8982	0	6,6520819	7,000	7,000	1,23	1,00	8,00	7,000	7,000	7,000
The change of audit firm	AFIRMSWITCH	8982	0	0,0261634	0,000	0,000	0,16	0,00	1,00	0,000	0,000	0,000
Variables for Sensitivity analysis												
Tax agressivenes	TAXAGR	8982	0	0,5000000	0,500	,000^a	0,50	0,00	1,00	0,000	0,500	1,000
Logarithm of total Non audit services	LOGNAS	8982	0	1,1303592	0,000	0,000	1,71	0,00	5,83	0,000	0,000	3,203
Other variables for control												
Annual statements (01/01 - 31/12)	YEAR	8982	0	2011,5297261	2011,000	2013,000	1,69	2009,00	2014,00	2010,000	2011,000	2013,000
Whether disclosure is made	INFO	8982	0	0,7584057	1,000	1,000	0,43	0,00	1,00	1,000	1,000	1,000
Ownership structure	GROUPIND	8982	0	0,8676241	1,000	1,000	0,34	0,00	1,00	1,000	1,000	1,000
Ratio of intangibles to total assets	INTANGAS	8982	0	0,0084224	0,000	0,000	0,04	0,00	0,77	0,000	0,000	0,003
PPE to total assets	PPEAS	8982	0	0,1872672	0,117	,000^a	0,20	0,00	0,99	0,035	0,117	0,269
Leverage	DEGREDETTELT	8982	0	17,6976063	7,700	0,000	22,13	0,00	99,78	0,698	7,700	27,635
Return before taxes to total assets	ROTA	8982	0	0,0207875	0,009	0,000	0,03	0,00	1,01	0,000	0,009	0,029
Natural logarithm of Tax loss carryforwards	LOGFISCLOSS	8982	0	0,8791020	0,000	0,000	2,15	0,00	9,38	0,000	0,000	0,000
Effective Tax rate	ETR	8982	0	22,6940715	26,955	0,000	16,94	0,00	99,12	3,598	26,955	33,740
Difference between expected statutory tax rate given accounting profit before taxes and the ETR	STRGAP	8982	0	15	9,9850000	33,990	12,921	0,00	74,14	3,14	9,985	27,813
a. Multiple modes exist. The smallest value is shown												

Table 12: Descriptive Statistics extracted from SPSS.

The table N°12 present the descriptive statistics, this statistic gives an overview of the distribution of our dependent, independent variables and control variables. The results indicates that all our variables contain valid data with 8.982 observations and 0 missing values in the dataset.

For our dependent **variable Absolute value of DIFF (ADIFF**) as DIFF is the difference between proxy tax rate and ETR see the example presented in the methodology, the mean of this variable is 10,42 this represents the average value of our variable ADIFF as we know that the estimation ERROR converge to zero (0) when a stakeholder can fully approximate the effective tax rate. In contradiction the estimation error increases as the tax reconciliation becomes less informative it means that it doesn't explain clearly and it is not taking into consideration all elements that explains the reasons of differences between the proxied tax rate (ETR*) and the Effective tax rate (ETR), this value is a sign that in average our dataset companies are

Figure 4 : Distribution of variable Audit fees (LogAUDITFEE)

less informative. The median of ADIFF is 4.320 which means that the middle value when our data is ordered is 4,32, since our median is lower than the mean this suggest a right skewed distribution of values. As our mode is 0 this indicate that the most of our observation have a value of 0. We can also observe 75% percentile with a value of 15.640 this indicates that 75% of our data point are below 15.640 which reinforces the observation that the distribution is skewed right.
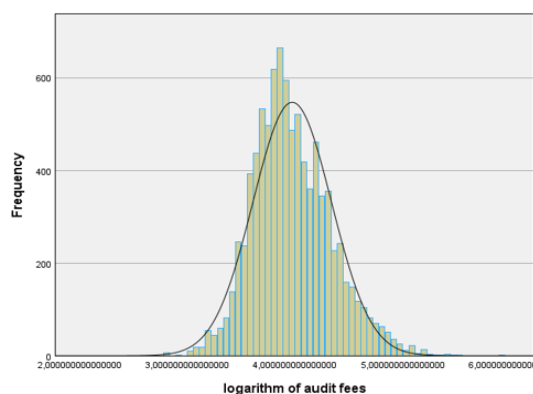
We observe also that the standard deviation (13.28) is higher than the mean 10.42 which shows that our variable contains a diverse range of values and represents the population. For our <u>independent variables</u> we can notice that the variable **Size of audit firm (BIG4)** mean is 0.4193 as it is a binary variable [1=yes; 0 = No] this mean indicates that approximately 41.94 of the audit firms employed by our dataset of private firms belong to BIG4 (KPMG, EY, Deloitte, PWC) category while the remaining 58.06% belongs to Non-big4 audit firms, for the variable **Audit fees (LogAUDITFEE)** which is the amount's paid by private companies to get their financial statements reviewed, the average value of LOGAUDITFEE is 3.973 and a median of 3.929 indicating a relatively symmetrical distribution as the mean and the median are very close the standard deviation of 0.36 indicates a moderate variability within the dataset, overall the LOGAUDITFEE statistics suggests that logarithm transformation has effectively normalized the distribution of the audit fees.

Size of audit firm (BIG4)			
		Frequency	Percent
Valid	No	5215	58,1
	Yes	3767	41,9
	Total	8982	100,0

Table 13: Size of audit firm (BIG4)

For our control variables, **the industry of a private firm INDUS** the mode is 7 which means that the dominant industry among the private firms in our sample is **G** which is Wholesale and Retail Trade with 3.357 observations. As we used the Total assets to control for the size of private companies, we can observe that **logTOTALASSETS** means is 7.069 this is the average of total assets after using the natural logarithm. For the **independence of board of directors (Bvdindependece)** presented by the level of ownership concentration the mode and median takes a value of 7 which means that the majority of our observation have a value of 7 that indicate a High ownership concentration as the level D is referring to companies with a recorded shareholder that has a direct ownership above 50%, this means that this companies have less independent Board of directors, for more understanding of the values of this variable see Appendix 3. For the **change of audit firm (AFIRSWITCH)** the mean is 0.026163 suggesting that we have only 2.61% of audit firm switches in our dataset between 2009 and 2014 which is consistent with the information provided in table 10 above.

For sensitivity analysis, we use the variable **TAXAGR** that represents **tax aggressiveness** we observe that the mean of this variable is 0.5 which means that 50% of our dataset private companies are classified as tax aggressive this is normal as we used the ETR median (26,955) to separate tax aggressive firms from non-aggressive ones [1=Yes; 0=No]. To control for **Non audit services** we use the variable **LogNAS** it is the logarithm transformation of the total amount spent on non-audit services by the private companies in our dataset, Nas is calculated as explained in equation 2, LogNAS has a mean of 1.1303, the median and mode are 0 which means that we have an important portion of companies which did not ask for non audit services.

Table 12 also reports the descriptive statistics of the other variables that are used in this study: the variable INFO represents **whether disclosure is made** its mean is 0.75 which means that 75.8% of companies disclosed the information, the mode and median are 1 as it is the most frequent value. For the variable Ownership structure **GROUPIN** the mean is 0.867 which means the 86.7% of our companies belong to a group the mode and median are 1 as it is the most frequent value. For other financial variables Ratio of intangibles to total assets **INTANGAS**

Whether Disclosure is made			
		Frequency	Percent
Valid	No	2170	24,2
	Yes	6812	75,8
	Total	8982	100,0

Table 14 : Variable INFO

mean is 0,00842 mode 0 and median 0, for PPE to total assets **PPEAS** mean is 0,1872672 the mode is 0,117 and median is 000a (a means there is multiple modes and 0 is the smallest one), variable leverage **DEGREDETTELT** mean is 17.69 this means that our private companies should liquidate in average 17.69% of their assets to reimburse their long-term obligations, which is an indication of a favorable debt position as leverage is the long-term debts divided by Total Assets. **Return before taxes to total assets ROTA** present return before taxes divided by total assets its average value is 0.0207 which means that our private companies assets generate in average 2.07% of profit before tax (pre-tax return). For Natural **logarithm of Tax loss carryforwards (LOGFISCLOSS)** the mean is 0.8791. The variable difference between expected statutory tax rate given accounting profit before taxes and the ETR **(STRGAP)** present an average value of 15 indicating that on average the difference between the

statutory tax rate and ETR is 15% the mode is 33.99 this implies that the most common difference is 33.99%.

To avoid normality issues which could impact our results we used the natural logarithm of the following variables: total assets, total non-audit services, loss carry forward, audit fees. For descriptive statistics before the use of natural logarithm see

7. Multicollinearity test

		Variables																	
		Size of audit firm	logarithm of audit fees	Industry of private firm	Logarithm of TOTALAS SETS	Independence of board of directors	The change of audit firm	Tax agressiven es	Logarithm of total Non audit services	Annual statement s (01/01 - 31/12)	Whether disclosure is made	Ownership structure	Ratio of intangibles to total assets	PPE to total assets	Leverage	Return before taxes to total assets	logarithm of FISCLOSS	Difference between expected statutory tax rate given accounting profit before taxes and the ETR	Effective Tax rate
		BIG4	LOGAUDIT FEE	INDUSTRY	LOGTOTA LASSETS	BVDINDEP	AFIRMS WITCH	TAXAGR	LOGNAS	YEAR	INFO	GROUPIND	INTANGAS	PPEAS	DEGREDETTELT	ROTA	LOGFISCLOSS	STRGAP	ETR
Collinearity Statistics	Tolerance	0,753	0,466	0,958	0,567	0,997	0,997	0,256	0,867	0,973	0,944	0,926	0,974	0,835	0,786	0,727	0,594	0,427	0,292
	VIF	1,328	2,146	1,044	1,764	1,003	1,003	3,911	1,153	1,028	1,059	1,079	1,027	1,197	1,273	1,376	1,684	2,341	3,420
a. Dependent Variable: Absolute value of DIFF																			

Table 15: Results of Multicollinearity test provided by SPSS.

The table 15 present the results of multicollinearity test among the independent variables using the Variance Inflation Factor (VIF). As tolerance value of all variables is higher than 0.1 and the VIF values are less than 4 (VIF < 4) as the largest value of VIF is **3.911** for the variable **TAXAGR**. we can conclude that there is no sign of multicollinearity between our independent variables. The variance inflation factors (VIF) reported in table 15 do not indicate any problems of multicollinearity.

8. Correlation analysis

The table 16 below presents the Pearson correlation, the table shows that all coefficients are less than 0.7 which confirms the absence of any form of multicollinearity issues.

As we have hypothesized we can notice that the size of audit firm (**BIG4**) is negatively (-0.079) correlated with **ADIFF** Absolute value of DIFF (Difference proxy tax rate and ETR) this correlation is statically significant at the 5% level which means that when BIG4=1 the ADIFF decline, in other words when the audit firm is a big 4 the client (private firm) tend to provide all the important information to explain and reconcile the difference between accounting profit and taxable base.

ADIFF is also positively correlated with **Logarithm of total assets LOGTOTALASSETS** with a significant value 0.065 at 5% level which means that large firms are less informative, **ADIFF** is highly and positively correlated with **tax aggressiveness (TAXAGR)** with a significant coefficient of 0.351 at 5% level which can mean that private firms which involves more in tax aggressiveness tend to be less informativeness, this is also the case for the variable **whether disclosure is made INFO** which is highly and negatively correlated with ADIFF with negative coefficient of -0.271 significant at 5% level, this indicates that when the firms disclose the information about its financial situation and its tax, the variable ADIFF decline and it is the normal situation as ADIFF measures the disclosure of the information concerning the difference between proxy tax rate and effective tax rate, There is also, weak negative correlation between ADIFF and ownership structure **GROUPIND** with a negative coefficient of -0.052 statistically significant at 5% level, which can mean that firms which belongs to a group tend to have lower ADIFF, There is a weak positive correlation between **ADIFF** and **the ratio of intangibles to total assets** INTANGAS (0.045) significant at 5%, it means that firms with more intangible assets tend to have slightly higher values of ADIFF, ADIFF is also weakly and positively correlated with PPE to total assets **PPEAS** with a significant coefficient of (0.073) at 5% level, there is also a weak correlation between **ADIFF** and return before taxes to total assets **ROTA** which means that more profitable companies tend to be more transparent. There is a moderate positive correlation between **ADIFF** and **tax loss carry forwards LOGFISLOSS** with a significant coefficient of (0.259) at 5% level this can mean that firms with higher tax loss carry forwards tend to have higher values of ADIFF. There is a strong positive correlation between **ADIFF** and the **difference between the expected statutory tax rate and the effective tax rate (STRGAP)** with a significant coefficient of 0.553 at 5% level which means that larger discrepancies between the statutory and effective tax rates are associated with higher

values of **ADIFF.**

We also notice that coefficient of correlation between **Logarithm of audit fees (LOGAUDITFEE)** and **ADIFF** is insignificant and equals (-0.020), but **LOGAUDITFEE** is positively corelated with the **size of audit firm BIG4** 0.143 and significant at 5% level which means that when the audit firm is a big 4 audit fees go up. For the Size of audit firms BIG4 we observe that there is weak positive correlation (0.076) significant at 5% between Industry of Private Firm (**INDUSTRY**) and BIG4 this suggests that certain industries might be more likely to use Big Four auditors as we go from industry 1 (A: Agriculture, Forestry and Fishing) to industry 14 (S: other service Activities). There is a moderate positive correlation between being audited by a **BIG4** and the size of the private firm (**LOGTOTALASSETS**) with a coefficient of 0.166 at significant level of 5% this means that larger firms are more likely to be audited by Big Four firms. Moreover, there is a very weak positive correlation between being audited by a **BIG4** and **the independence of the board of directors (BVDINDEP)** 0.030 at 5% level this means that high concentrated firms tend to have a BIG4 audit firm. There is also a weak positive correlation (0.121) significant at 5% between being audited by a **BIG4** firm and the **logarithm of total non-audit services (LOGNAS),** this implies that private firms who are audited by BIG4 firms tend to purchase more non-audit services from these firms. Furthermore we can observe a very weak positive significant correlation between being audited by a Big Four firm and whether the annual statements year (0.028) this signifies that maybe there were some changes in the environment and the regulation which affected the choice of being audited by BIG4 or non-BIG4, we can see that there is a moderate positive significant correlation between being audited by a **BIG4** firm and the likelihood of disclosure being made **INFO** 0.169 at 5% level, this indicates that private firms who are audited by BIG4 audit firms are more likely to disclose all the required information. We find also a moderate positive correlation between being audited by a **Big Four firm BIG4** and ownership structure **GROUPIND** of private firms this suggests that firms who are part of a group are more likely to be audited by Big Four firms (BIG4=1), There is a very weak positive correlation between being audited by a Big Four firm **BIG4** and the ratio of intangibles to total assets **INTANGAS** (0.055**) it is the same with and return before taxes to total assets **ROTA** (0.060**). Correlation between **BIG4** and tax loss carryforwards (**LOGFISCLOSS**) is low and positive 0.101** significant at 5%, we also observe a very weak negative correlation between being audited by a Big Four firm **BIG4** and tax aggressiveness **TAXAGR**, suggesting that firms audited by Big Four firms tend to be slightly less tax aggressive, BIG4 is also negatively and significantly correlated with PPE to Total Assets (**PPEAS**) (-0.114**) and Leverage (**DEGREDETTELT**) (-0.138**).

For the variables who are significantly correlated with our independent variable Audit fees **logAUDITFEE** we can notice that the Industry of private firm **INDUSTRY** is negatively (-0.078) correlated with audit fees which means that firms in certain industries pay lower audit fees**, the Size LOGTOTALASSETS** is highly 0,589 correlated with audit fees at 5% level this signifies that large firms tend to pay higher audit fees , **audit fees LogAUDITFEE** present a weak positive correlation with the Independence of board of directors **BVDINDEP** 0,024 significant at 1% level, moreover there is also a negative correlation with Tax aggressiveness **TAXAGR** (-0,031) at 5% level, Audit fees are highly correlated with Non audit services **LOGNAS** with a positive coefficient of (0,355) at 5%, there is also a slight correlation of audit fees with the Year of annual statements (0.055) and significant at 5%, we can notice that the variable INFO is highly and positively correlated with Audit fees (0.126) at 5% which implies that transparent firms which makes more disclosures tend to have higher audit fees, Audit fees are positively correlated with Ownership structure **GROUPIND** (0,150) at 5% level, Ratio of intangibles to total assets INTANGAS is positively correlated with Audit fees (0,100) at 5% level, PPE to total assets PPEAS is negatively correlated with Audit fees (0, 093) at 5% level, there is also Weak positive correlation with leverage (0.041) at 5% level, indicating firms with higher leverage may pay slightly higher audit fees, Tax loss carry forwards LOGFISCLOSS are also positively correlated with audit fees (0,102) at 5% level, indicating that firms with larger tax loss carry forwards tend to pay higher audit fees. **STRGAP** is positively correlated with audit fees (0,028) at 5%.

	ADIFF	BIG4	LOGA-UDITFEE	INDUSTRY	LOG-TOTALASSETS	BVD-INDEP	AFIR-MSWITCH	TAXAGR	LOGNAS	YEAR	INFO	GROUP-IND	INTANGAS	PPEAS	DEGRED ETTELT	ROTA	LOGFISC LOSS	STRGAP
Table 16 : Pearson correlations for our different variables Pearson correlations																		
ADIFF	1																	
BIG4	-0,079**	1																
LOGAUDITFEE	-0,020	0,423**	1															
INDUSTRY	0,013	0,076**	-0,078**	1														
LOGTOTALASSETS	0,065**	0,166**	0,589**	-0,042**	1													
BVDINDEP	-0,020	0,030**	0,024*	-0,007	0,015	1												
AFIRMSWITCH	-0,002	-0,002	0,018	-0,004	0,004	-0,004	1											
TAXAGR	0,351**	-0,049**	-0,031**	-0,038**	0,135**	-0,010	-0,015	1										
LOGNAS	-0,006	0,121**	0,355**	0,006	0,191**	-0,011	-0,024*	-0,008	1									
YEAR	-0,013	0,028**	0,055**	0,002	0,050**	0,003	-0,019	-0,018	0,010	1								
INFO	-0,271**	0,169**	0,126**	0,003	0,044**	0,012	0,003	-0,079**	0,051**	0,099**	1							
GROUPIND	-0,052**	0,176**	0,150**	-0,065**	0,024*	0,024*	0,002	-0,074**	0,029**	0,011	0,093**	1						
INTANGAS	0,045**	0,055**	0,100**	0,039**	0,052**	0,008	0,004	0,007	0,051**	-0,003	0,016	0,016	1					
PPEAS	0,073**	-0,114**	-0,093**	0,005	0,029**	0,000	0,009	0,120**	-0,050**	-0,018	-0,023*	-0,152**	-0,049**	1				
DEGREDETTELT	0,134**	-0,138**	0,041**	0,035**	0,223**	0,002	-0,005	0,067**	0,029**	-0,030**	-0,062**	-0,097**	-0,005	0,357**	1			
ROTA	-0,272**	0,060**	-0,001	0,050**	-0,180**	0,012	0,001	-0,435**	0,023*	-0,080**	0,048**	0,071**	0,003	-0,105**	-0,154**	1		
LOGFISCLOSS	0,259**	0,101**	0,102**	-0,040**	0,048**	0,013	0,009	0,397**	0,039**	0,037**	-0,033**	0,059**	0,061**	0,036**	0,056**	-0,251**	1	
STRGAP	0,553**	-0,007	0,028**	0,019	0,141**	-0,015	0,002	0,673**	0,009	0,018	-0,086**	-0,046**	0,078**	0,113**	0,141**	-0,458**	0,522**	1

*. Correlation is significant at the 0.01 (1%) level   **. Correlation is significant at the 0.05 (5%) level.

Where **BIG4** is Size of audit firm, **LOGAUDITFEE** is logarithm of audit fees, **INDUSTRY** is Industry of private firm, **LOGTOTALASSETS** Natural logarithm of Total Assets. (Size), **BVDINDEP** Independence of board of directors, **AFIRMSWITCH** The change of audit firm, **TAXAGR** is Tax aggressiveness, **LOGNAS** is Logarithm of total Non audit services, **YEAR** is Annual statements (01/01 - 31/12), **INFO** is Whether disclosure is made, **GROUPIND** is Ownership structure, **INTANGAS** is the Ratio of intangibles to total assets, **PPEAS** is PPE to total assets, **DEGREDETTELT** is Leverage , **ROTA** is Return before taxes to total assets, **LOGFISCLOSS** is Natural logarithm of Tax loss carry forwards, **STRGAP** represents difference between expected statutory tax rate given accounting profit before taxes and the ETR, **ETR** is the effective tax rate.

9.   Regression Analysis:

As we discovered in table 16 The existence of correlation between the variables used in our study justifies the use of regression analysis.

In this section we will present and analyse the results of the regression analysis

As a remainder our research question: Is there a relation between auditor characteristics and tax reconciliation informativeness?

And the hypothesis is:

- **H0**: The null hypothesis: Even if the audit firm characteristics are different, their private clients have equivalent tax reconciliation informativeness, means that the audit firm's characteristics (size and audit fees) don't have any influence on tax reconciliation informativeness (the level of transparency of private firms is the audit quality).
- **H1**: In private firms the audit fees have a positive influence on the tax reconciliation informativeness.
- **H2**: In private firms the auditor's size has a positive influence on the tax reconciliation informativeness.

9.1 . Regression Analysis: Full sample:

a)   Model summary.

From Table 17 (model summary) we can notice that **R square** is equal to 0.317 which means that The independent variables explain 36,1 % of the variance of our dependent variable, in other words that 36,1% is the portion of variance in ADIFF that is explained by the model, this also signifies that 63,9% of the variability in our dependent variable is due to other factors.

Table 17: Model summary provided by SPSS

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
					Change Statistics				
1	,602ª	0,363	0,361	10,61595	0,363	283,213	18	8963	0,000

Pearson R (0.563) is a sign of positive correlation between the predictors that we have in our model and the dependent variable ADIFF, **Standard error term** (**10.61595**) signifies that the predicted values of the model deviate from the actual values on average by about 10.62 units, **the R square change** is the same as the R square as this is our first model we didn't add or remove any variables yet. **The F change** is equal to 283.213 which implies that the predictors improve the model, **df1** represents the number of predictors (independent variables) 18, **df2** of 8963 is the degrees of freedom (DF2=N-K-1; where N is the total sample size 8982 and K is the number of predictors 18).

b)   Anova test

The table 18 provide the Anova test of our full model as we observe the regression Sum of squares 574.517,538 represents the total variance in the dependent variable ADIFF that is explained by the independent variables.   *Table 18 : Regression analysis on full model ; Anova Test*

ANOVAª					
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	574.517,538	18	31.917,641	283,213	,000ᵇ
	Residual	1.010.116,549	8963	112,698		
	Total	1.584.634,087	8981			
a. **Dependent Variable:** Absolute value of DIFF						
b. **Predictors:** (Constant), Effective Tax rate, Independence of board of directors, The change of audit firm, Ratio of intangibles to total assets, Annual statements (01/01 - 31/12), Ownership structure, Logarithm of total Non audit services , Industry of private firm, Leverage, Whether disclosure is made, Size of audit firm, Logarithm of TOTALASSETS, PPE to total assets , Return before taxes to total assets, logarithm of FISCLOSS, Difference between expected statutory tax rate given accounting profit before taxes and the ETR, logarithm of audit fees , Tax aggressiveness						

In contrast **Residual sum of squares** 1.010.116,546 is the amount of variance that is in dependent

variables that is not explained by the predictors. The mean Square of our Regression Model (31,917.641) represents the average amount of variance explained by each predictor, it is calculated as the Regression Sum of Squares divided by its degrees of freedom (574,517.538 / 18).

The important value in this Test is the F-statistic 283,213 this value is calculated as the ratio of mean square regression to the mean square residual (31,917.641 / 112.698) as we have a significant value at 1% we can conclude that our model is statically significant, which allows us to reject the H0, this confirms that at least one of coefficient of our independent variables is different from zero (0).

c) Regression coefficient :

Table 19 shows the regression results of our full model presented in equation , where we examined the relationship between audit quality (tax reconciliation informativeness), which is measured using the absolute value of difference proxy tax rate and effective tax rate ETR (ADIFF) and the independent variables Size of audit firm (BIG4) and audit fees (LOGAUDITFEE) and other control variables as explained in the equation 1.

Coefficients^a						
Model			Unstandardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error	Beta		
1	(Constant)		31,173	134,935		0,231	0,817
	Size of audit firm	BIG4	**-0,909***	0,262	-0,034	-3,475	**0,001**
	logarithm of audit fees	LOGAUDITFEE	**0,297**	0,451	0,008	0,659	**0,510**
	Industry of private firm	INDUSTRY	0,009	0,041	0,002	0,208	0,836
	Logarithm of TOTALASSETS	LOGTOTALASSETS	-0,195	0,251	-0,009	-0,776	0,438
	Independence of board of directors	BVDINDEP	-0,090	0,091	-0,008	-0,994	0,320
	The change of audit firm	AFIRMSWITCH	-0,185	0,703	-0,002	-0,263	0,793
	Tax agressivenes	TAXAGR	-0,231	0,443	-0,009	-0,522	0,602
	Logarithm of total Non audit services	LOGNAS	0,013	0,070	0,002	0,187	0,852
	Annual statements (01/01 - 31/12)	YEAR	-0,012	0,067	-0,002	-0,177	0,859
	Whether disclosure is made	INFO	**-6,817***	0,269	-0,220	-25,313	**0,000**
	Ownership structure	GROUPIND	0,082	0,343	0,002	0,240	0,811
	Ratio of intangibles to total assets	INTANGAS	2,469	3,141	0,007	0,786	0,432
	PPE to total assets	PPEAS	-0,427	0,605	-0,007	-0,706	0,480
	Leverage	DEGREDETTELT	**0,025***	0,006	0,041	4,357	**0,000**
	Return before taxes to total assets	ROTA	**-10,302****	3,970	-0,026	-2,595	**0,009**
	logarithm of FISCLOSS	LOGFISCLOSS	-0,109	0,068	-0,018	-1,606	**0,108**
	Difference between expected statutory tax rate given accounting profit before taxes and the ETR	STRGAP	**0,577***	0,013	0,561	43,490	**0,000**
	Effective Tax rate	ETR	**0,040***	0,012	0,051	3,286	**0,001**

a. Dependent Variable: Absolute value of DIFF

Table 19 : Regression coefficient of full model

This table can be interpreted as follows, the constant 31,173 represents the intercept value which means that when all predictors are equal to zero (0) the dependent variable ADIFF equals 31,173. We can also observe a negative coefficient of size of audit firm (B=-0.909) that is significant at 1% level this means that being audited by a big 4 decrease ADIFF by 0.909 units, which is consistent with our second (2) hypothesis that audit size (BIG4) has a positive influence on the tax reconciliation informativeness (audit quality) as they have access to more resources, greater reputational and litigation risks, this aligns with findings of (Wang and Xin 2011; Abughazaleh, O'connell, Princen 2015; Francis & Yu, 2009).

Regarding our independent variable Logarithm of audit fees, the coefficient B equals 0,297 is not significant as the Sig equals 0,510, these results implies that there is a positive relation between tax

reconciliation informativeness quality (audit quality) and the audit fees, however as the coefficient is not significant this don't enable us to verify the first (1) hypothesis which espects that In private firms the audit fees have a positive influence on the tax reconciliation informativeness (audit quality) this is consistent with findings of (Prabhawanti and Widhiyani (2018); Ramdani (2015) ; Sari, Shinta Permata ; Diyanti, Ayu Aris ; Wijayanti, Rita 2019) who suggest that the audit fees are not an indicator of audit quality.

For our control variables none of the four control variables **INDUSTRY**, **LOGTOTALASSETS**, **BVDINDEP**, **AFIRMSWITCH** , **LOGFISCLOSS** has found to have a significant relation with the independent variable as they present the following insignificant coefficient 0,009; -0,195; -0,090 and -0,185 ; -0,109 respectively.

For the other control variables we can notice that **YEAR (-0,012, p= 0,859) ; GROUPIND (0,082, p= 0,811) ; INTANGAS (2,469; p= 0,432) ; PPEAS (-0,427; p= 0,480)** present non consistent relationship and insignificant coefficients with audit quality (tax reconciliation informativeness) .

Other control variables are significant those are ; **whether disclosure is made** *INFO (* **-6,817; P= 0,000)** it the most powerful explanatory variables in our model as it is highly negatively related to ADIFF and it is significant at **1%** level, this means that when the information is disclosed the audit quality is high (low ADIFF) in other words the private company is more transparent and the error term tends to Zero (0). The variable **leverage** DEGREDETTELT **(0,025; p= 0,000**) present a positive relationship with the ADIFF this means that one unit increase in **long term debt** increase ADIFF by 0.025 unit assuming that all other variables are constant this can be explained by the fact that this companies want to hide the level of debt which makes it less transparent as high leverage can signify more financial risks to investors there is also the problem of loan covenants which imposes some limits on leverage ratio this was the strategy used by Enron when they were hiding debts , this results are surprising as we expect that firms with higher leverage will have more transparency and higher audit quality as there debtholders want to be protected from stakeholders and manager in this situation the auditor reduces the agency conflicts as found by (DeFond M. , 1992) that the change in leverage is positively associated with changes in audit quality. The variable Return before taxes to total assets *ROTA* **(-10,302 ; P= 0,009)** is negatively and highly associated with ADIFF whit a significant level of 5%**,** this signifies that more profitable firms tends to have lower ADIFF meaning more transparency, this can also be interpreted as 1 unit increase in Profitability decrease ADIFF by 10.302 units this is consistent with (Johnson & Lys, 1990) who found that profitability has an impact on auditor change and audit quality. The variable **STRGAP** (Difference between expected statutory tax rate given accounting profit before taxes and the ETR) *(***0,577; P=0,000)** is positively associated with ADIFF at 5% level which means that one (1) unit increase in the variable STRGAP increases ADIFF by 0.577 unit, for Effective Tax rate ETR it presents a coefficient of *(***0,040 ; P= 0,001)** significant at 1% which means that 1-unit increase in ETR is associated with an increase of 0.04 unit in ADIFF.

9.2 Sensitivity Analysis results

To test the robustness and reliability of our full model results we performed three (3) sensitivity analysis tests that are: BIG4 VS NON BIG 4; Tax aggressive vs non tax aggressive; Presence vs Absence of Non audit services fees.

The results of this tests are presented in this section.

a)   BIG4 Vs Non BIG4

As we found that Big4 (**-0,909***** ; 0.001)** has a negative significant relationship with audit quality (ADIFF) this means that when the audit firm is a big 4 the private companies tend to be transparent (low ADIFF), to understand more the this relationship we test the difference between two subsamples of our model the first subsample is the one where the audit firm is a big four (Big4 = 1) and in subsample two (2) the audit firm is not a big4 (big4 = 0).

We keep the same full model with the same control variables, for each subsample BIG4 is either equals 1 or 0 this means it is a constant this is why we don't find it as a variable, but we used it to separate these two samples. The results of the regression test on the two subsamples are presented in table 20.

We can notice in our results that in the two subsamples the intercept is not significant which means it

can be equal to zero when all the variables are equal to zero (0).

For the relation of ADIFF and audit fees we can notice that when a the audit firm is a big4 there is a negative relationship between audit fees (logauditfee) and ADIFF (-0.688) which is not consistent with our previous results this suggest that when the audit firm is a big4 if the audit fees increase by one (1) unit the companies tend to be more transparent (lower ADIFF) by 0.688 units (lower audit quality), in contrast when the audit firm is not a big 4 (Big4=0) there is a positive relationship between audit fees and audit quality (0.786), but in both situations the coefficient are not statistically Significant which means the absence of enough evidence on the effect of audit fees on ADIFF.

Results show that there is significantly positive relation (0.063) at 1% level and (0.029) at 5% level between Effective tax rate ETR and ADIFF when audit firm is a BIG4 and when it is not a BIG4 respectively. which means that when the effective tax rate increases by 1-unit ADIFF increases by 0.063 units in the case of big4 and increases by 0.029 when it is not big4 auditor.

For the variable whether disclosure is made (INFO) we can notice that is in the two subsamples it keeps the same negative relationship (-7.917* and -6.286*) with ADIFF this is consistent with our previous finding in the full model. It is the same situation for the leverage and STRGAP which have a positive coefficient in the two situation and significant as found before,

For all non significant control variables in the two subsamples we can interpret it as follows; when the audit firm is a BIG4 (-0.048) the industry has negative relationship with ADIFF but when the big Big4 is a not a big4 the industry (0.051) has a positive influence on ADIFF. The Size of private firm LogTOTALASSETS also changes the sign of the relationship with ADIFF between the two subsamples it is positive (0.621) when audit firm is a big4 and negative (-0.742) when it is not a big4.

Table 20 : Regression test BIG4 VS Non BIG4

Coefficients[a]					
Model		Subsample (1) Big 4 =1		Subsample (2) Big 4 =0	
		B	**Sig**	**B**	**Sig**
	(Constant)	73,476	0,741	46,911	0,779
	LogAUDITFEE	**-0,688**	**0,315**	**0,786**	**0,201**
	Industry	-0,048	0,451	0,051	0,353
	LogTOTALASSETS	0,621	0,105	-0,742	0,031
	BVDINDEP	-0,014	0,929	-0,133	0,219
	AFIRMSWITCH	1,022	0,384	-1,228	0,155
	TAXagr	-0,009	0,990	0,265	0,613
	ETR	**0,063***	**0,003**	**0,029****	**0,047**
1	LOGNas	0,048	0,656	-0,016	0,861
	YEAR	-0,034	0,758	-0,019	0,820
	INFO	**-7,917***	**0,000**	**-6,286***	**0,000**
	GROUPIND	0,542	0,495	-0,054	0,883
	INTANGas	2,886	0,495	1,183	0,810
	PPEas	-0,440	0,657	-0,378	0,621
	DegreDetteLT	**0,030****	**0,001**	**0,020***	**0,005**
	ROTA	-7,909	0,155	**-15,303**	**0,009**
	LogFISCLOSS	0,024	0,823	-0,134	0,134
	STRGAP	**0,517***	**0,000**	**0,611***	**0,000**
a. Dependent Variable: ADIFF					
*. Correlation is significant at the 0.01 (1%) level. **. Correlation is significant at the 0.05 (5%) level					

BVDINDEP keeps the same negative relationship with ADIFF. We can observe also that when the audit firm is a big4 the variable change of audit (AFIRMSWITCH) has a positive (1.022) influence on ADIFF but it is negative when it is not a big 4, we can notice the same for variables non audit services (LOGNas), belonging to a group GROUPIND and loss carry forward LogFISCLOSS, which changes the type of relationship with ADIFF when going from BIG4 to Non big 4.

b) Tax aggressive vs non tax aggressive :

The results obtained in table 19 present a negative relationship of our measure of tax aggressiveness TAXAGR with ADIFF with a coefficient that equals (-0.231) this means that tax aggressive firms tend to have a lower ADIFF meaning that they are more transparent, but these results are not significant.

To ascertain whether there is no error in the measure that we used for tax aggressiveness in the full model we used the following measure : we shorten ETR to the interval [0,1] we categorize this values based on the ETR median if the ETR of a private company is equal or Lower than the median (Median ETR = 26,955) the degree of the tax aggressiveness TAXAGR is high and takes a value of 1, otherwise it equals 0.

we will compare the results of the two groups; **Groupe 1 (ETR>26.955) vs groupe2 (ETR<26.955)** so we partition the population into two sub samples and conduct a regression analysis on each of them and we use directly ETR as a measure of tax aggressiveness rather then transforming it to binary (1;2) variable.

Based on the results presented in table 21 our independent variable BIG4 keeps a negative (Subsample (1) b= -0.635* and subsample (2) b=-1.201) relation with ADIFF in the two subsamples as found before for the full model this support again our hypothesis H2 which states that in private firms the auditor's size has a positive influence on the tax reconciliation informativeness as ADIFF become lower when audit firm is a Big4. For the independent variables Audit fees, it presents again insignificant results which means that we can not conclude about our first hypothesis (H1: In private firms the audit fees have a positive influence on the tax reconciliation informativeness)

 For the results of control variables, we can see that when private firms are more aggressive **industry** has a negative (-0.133*) relation with **ADIFF** in contrast when it is not aggressive this relation is positive (0.100) but not statistically significant. The variable whether information is disclosed **INFO** present a negative non-significant relation with ADIFF when the private firm is tax aggressive, in contrast INFO become highly correlated negative and significant with ADIFF when it is not aggressive.

For **year** (-0.130**), **INTANGas** (-9.792) and **ROTA** (-14.304) they are statically significant and present a negative relation with ADIFF when the private companies are tax aggressive, but when it not tax aggressive it is just INTANGas that is significant and positively correlated with ADIFF (9,455**)

This test proves that our variable BIG4 remains negative relation with ADIFF whether the firm is tax aggressive or not, which support our second hypothesis (H2)

Table 21 : Regression test : Tax aggressive vs non tax aggressive

		Subsample (1) ETR>26.955		Subsample (2) ETR<26.955	
Model		**B**	**Sig.**	**B**	**Sig.**
1	(Constant)	267,863	0,037	-40,801	0,857
	BIG4	**-0,635***	**0,009**	**-1,201***	**0,008**
	LogAUDITFEE	0,447	0,316	0,407	0,582
	Industry	**-0,133***	**0,001**	0,100	0,142
	LogTOTALASSETS	**-0,776***	**0,004**	0,387	0,354
	BVDINDEP	-0,065	0,452	-0,099	0,515
	AFIRMSWITCH	-0,440	0,488	0,075	0,952
	ETR	**0,078***	**0,005**	0,055	0,508
	LOGNas	-0,063	0,342	0,035	0,770
	YEAR	**-0,130****	**0,042**	0,023	0,842
	INFO	-0,379	0,152	**-12,201***	**0,000**
	GROUPIND	-0,545	0,119	0,870	0,111
	INTANGas	**-9,792***	**0,001**	**9,455****	**0,071**
	PPEas	0,797	0,209	-1,228	0,196
	DegreDetteLT	0,000	0,956	**0,043***	**0,000**
	ROTA	**-14,304***	**0,000**	24,857	0,175
	LogFISCLOSS	**1,226***	**0,000**	-0,082	0,334
	STRGAP	**0,550***	**0,000**	**0,579***	**0,000**
a. Dependent Variable: ADIFF					

Coefficients[a]

c)   Non audit services:

The results obtained in table 22 present a positive relationship between total non audit services and ADIFF but this relationship is not significant (0,013; P= 0.852), we want to do more test taking in consideration all the 3 different categories of non audit services in one test, in another test we want to compare private companies who pay non audit services with ones which don't pay them.

- **We will test our model using 3 different categories of non audit services and not the sum.**

Table 22: Regression analysis using all 3 types of Non audit services.

We can observe that we have the same results as in the previous results obtained from table 22, the new variables used in this section are representing the three categories of non audit services that are insignificant:

- **AUDITCONTR** : Consulting/compliance Non audit services (NAS)
- **TAXFEE** : Tax Non audit services NAS
- **OTHERNAS :** Other Non audit services (Nas) 1, unspecified NAS that are not consulting NAS nor auditor-provided tax services

Based on the result of the influence of each category presented in table 22, we conclude that non audit services don't have any significant relation with ADIFF as the coefficient for all three (3) categories of non audit services.

- (Log TAXFEE ; -0,018)
- (LogOTHERNAS; -0,014)
- (log AUDITCONTR   0,295)

All other dependent and control have the same values and interpretation as ones in table 19.

Coefficients^a		
Model	**B**	**Sig.**
(Constant)	30,813	0,819
BIG4	**-0,901***	**0,001**
LogAUDITFEE	0,332	0,463
Industry	0,009	0,819
LogTOTALASSETS	-0,247	0,328
BVDINDEP	-0,088	0,333
AFIRMSWITCH	-0,192	0,784
TAXagr	0,222	0,617
ETR	**0,040***	**0,001**
Log TAXFEE	**-0,018**	**0,908**
LogOTHERNAS	**-0,014**	**0,928**
log AUDITCONTR	**0,295**	**0,082**
LOGNas	**-0,044**	**0,808**
YEAR	-0,012	0,861
INFO	**-6,809**	**0,000**
GROUPIND	0,076	0,825
INTANGas	2,339	0,457
PPEas	-0,399	0,510
DegreDetteLT	**0,024**	**0,000**
ROTA	-10,463	0,008
LogFISCLOSS	**-0,112**	**0,100**
STRGAP	**0,577**	**0,000**
a. Dependent Variable: ADIFF		

(Model column value: **1**)

- **Regression analysis when Nas = 0 vs Nas different from zero**

To control for the Non audit services impact we test our model in two situation the first is when NAS= 0 and the second is when Non audit fees as different from 0.

The results of the two subsamples are presented in table 23 we can notice that the independent variable audit fees **LogAUDITFEE** is not statistically significant again which supports our previous findings, for the variable size of audit firm **BIG4** when Non audit fees   are equal to zero (0), **BIG4** is negatively (-1,109*) and significantly correlated with ADIFF this supports the second hypothesis, this means in the absence of non audit fees the audit quality provided by BIG4 is high and private clients are more transparent. But in the subsample where non audit fees are different from 0 the coefficient of big4 (-0,476) is negative but insignificant this means that in the presence of non audit fees we can not conclude about our second hypothesis (H2).

For the other control variables, we notice that **AFIRMSWITCH** in only significant in the case where there is non audit fees and present a negative coefficient of (**-2,719)** significant at 10% level, for the variable INFO It is significantly negative in the two situations.

The leverage **DegreDetteLT** is positively and significantly related to **ADIFF** in the two subsamples which supports the findings of the first full model.

ROTA coefficient is only significant in the first subsamples where are absent (Nas= 0) **(-13,551*)** at 5% level which means that it has a negative relation with ADIFF and as ROTA represents the profitability of the firm, this can be interpreted that when profitability increase by 1 unit the variable ADIFF decreases by 13.551 units which is an important finding, this is normal as profitable firms don't have any risks to face and they are not hiding a lot

of information to make their financial situation looks better. For the variable **STRGAP** it is positively and significantly related to **ADIFF** in the two subsamples results.

Table 23 : Regression analysis when Nas = 0 vs Nas different from zero

	Model	Nas =0		Nas different than 0	
		B	Sig.	B	Sig.
1	(Constant)	48,045	0,763	27,368	0,914
	BIG4	**-1,109***	**0,000**	-0,476	0,348
	LogAUDITFEE	0,522	0,319	-0,257	0,767
	Industry	0,063	0,199	-0,115	0,129
	LogTOTALASSETS	-0,425	0,161	0,294	0,517
	BVDINDEP	-0,155	0,150	0,029	0,864
	AFIRMSWITCH	0,664	0,405	**-2,719*****	**0,064**
	TAXagr	0,142	0,786	0,434	0,607
	ETR	**0,054***	**0,000**	0,018	0,436
	YEAR	-0,020	0,798	-0,010	0,936
	INFO	**-6,723***	**0,000**	**-7,031***	**0,000**
	GROUPIND	0,323	0,418	-0,528	0,434
	INTANGas	2,583	0,517	1,430	0,783
	PPEas	-0,677	0,334	0,114	0,924
	DegreDetteLT	**0,023***	**0,001**	**0,030***	**0,004**
	ROTA	**-13,551***	**0,011**	-6,281	0,301
	LogFISCLOSS	-0,096	0,238	-0,130	0,296
	STRGAP	**0,587***	**0,000**	**0,561***	**0,000**

a. Dependent Variable: ADIFF

V. Discussions

To answer our research question whether there is a relation between auditor characteristics and tax reconciliation informativeness or not, we formulated three hypothesis, the null hypothesis (H0) suggests that there is no relation between audit firm characteristics and audit quality, the first (H1) predict that In private firms the audit fees have a positive influence on tax reconciliation informativeness (audit quality) and the second one (H2) predict that in private firms the auditor's size has a positive influence on tax reconciliation informativeness (audit quality). we followed a quantitative research design to confirm or deny these hypotheses, based on the performed analysis we made the following conclusions.

First the correlation analysis suggests that there is an insignificant relation between audit fees (LogAUDITFEE) and ADIFF (-0.020), for the variables BIG4 it is negatively and significantly (-0.079; 10% level) correlated with ADIFF this is supporting our second hypothesis.

Based on the Anova test we concluded that our model is significant and can explain the variance in the dependent variable ADIFF, which allows us to reject the null hypothesis (H0) which states that there is no relation between auditor characteristics and audit quality based on these results we tried to understand which characteristics are important and significant. Our full sample regression analysis rejects the first hypothesis (H1) and showed that audit fees are not related to audit quality as we didn't find any significant evidence of this relation as the coefficient is positive and equal to 0.297 but not significant this consistent with prior literature were it was found that there is no evidence of the type of relation between audit fees and audit quality (Reynolds & Francis, 2000) and (Chung & Kallapur, 2003) who found no evidence that client who pay more get a favorable treatment by their auditors but also

(Prabhawanti & Widhiyani, 2018) and (Ramdani, 2015) and (Sari, Diyanti, & Wijayanti, 2019) who suggest in their findings that audit fees are not an indicator of audit quality.

For our second hypothesis we can notice already that 41.9% is the percentage of the presence of BIG4 audit companies in our data, which is important as it is almost the half of the sample the regression results on full model provide evidence that Big4 companies tend to increase audit quality as our coefficient is equal to (-0.909) and significant at 10% level which signifies that when the audit firm is a BIG4 our variable ADIFF tend to decrease, and as explained in example provided in the methodology ADIFF is the error term when it is low and close to Zero (0) our private companies are considered to be more transparent this is consistent with the findings of (DeAngelo, 1981) that the size of audit firms have an impact on audit quality as big audit firms are more independent this is why they provide high audit quality in comparison to small audit firms, this also supported by the findings of (Van Tendeloo & Vanstraelen, 2008) who made a study across different European countries (Belgium, Finland, France, the Netherlands, Spain and the United Kingdom.) on the audit of privately held firms and found that large audit firms (BIG4) provide more audit quality.

For our control variables **Industry** of private firm **(INDUSTRY; 0,009),** Logarithm of TOTALASSETS **(LOGTOTALASSETS; -0,195),** Independence of board of directors **(BVDINDEP ;0,090),** the change of audit firm **(AFIRMSWITCH; -0,185)**, Tax aggressiveness **(TAXAGR; -0,231)**, and non audit services fees that are measured as logarithm of total Non audit services **(LOGNAS; 0,013)** we find that all this variables are not significant and we can not conclude regarding the type of their relation to ADIFF.

But for the variable whether information ais disclosed INFO (-6.817) it has a negative significant relation with ADIFF and it is not a surprise as when more information is disclosed ADIFF should be low meaning that companies are more transparent. The surprising results are that the variables Leverage DEGREDETTELT (0,025; p= 0,000) has a positive relation with ADIFF and not as we expected, this is inconsistent with (DeFond M. , 1992) findings that higher leverage is associated with higher audit quality as audit helps to reduce agency conflicts.

For the sensitivity analysis when the audit firm is BIG4 the relation of our independent variable audit fees logAUDITFEE with ADIFF is also insignificant which support our previous results that we can not conclude regarding the type of relation between this two variables, for the control variables whether disclosure is made (INFO), leverage (DegreDetteLT) they keep the same relation with ADIFF as INFO is negative and leverage is positively correlated with ADIFF and the two variables are significant.

Additional analysis of two subsamples where private tax aggressive firms versus non tax aggressive firms give us more evidence that our independent variable audit fees once again don't present any significant relation with ADIFF, when private firms are tax aggressive (ETR>26.955) the coefficient of logAUDITFEE is (0.447) and when it is not tax aggressive (ETR<26.955) the coefficient is (0.407) in both situation it is not significant this is supporting again our results that non evidence has found of the relation between audit fees and audit quality (tax reconciliation informativeness) but the independent variable size of audit firm (BIG4) keeps a negative significant relation with ADIFF in the two subsamples as found before for the full model this is supporting again our second hypothesis (H2) for the control variables the control variables who are significant shows that there is some changes in the types of control variables relation with ADIFF this shows that tax aggressiveness level impacts don't impact audit quality directly but as its changing the type of relation between control variables and audit quality like the variable whether information is disclosed INFO that present a negative non significant (-0.379; p=0.152) relation with ADIFF when the private firm is tax aggressive, in contrast Info become highly negatively correlated and significant(-12.201; p=0.000) with ADIFF when it is not aggressive. This shoes that this type of control variables are playing a mediating role between audit quality and the level of tax aggressiveness and we can conclude that the level of tax aggressiveness has an indirect impact of audit quality and we can say that non aggressive companies tend to be more transparent as found in previous studies by (Kanagaretnam, Lee, Lim, & Lobo, 2016) that tax aggressiveness is negatively related to audit quality as audit companies tend to provide a high audit quality in order to avoid litigation risks with regulators and shareholders.

The results of the last robustness test where we study the impact of the presence versus the absence of

non audit services fees using two subsamples one with NAS fees equal Zero (0) and another with NAS fees different from zero (0), showed that audit fees (LogAUDITFEE) influence on ADIFF remain insignificant and we can not use this result to conclude whether the first Hypothesis (H1) is true or false which support our previous results. In the absence of non audit fees (NAS fees = 0) the independent variable BIG4 is negatively and significantly related to ADIFF which is consistent with our first hypothesis (H1), the surprising results are in the second subsample where non audit fees are different than zero (0), BIG4 is not significant but it remains negative this means in the presence of non audit fees the impact of the audit companies size is not known or we can not conclude its type. For the leverage DegreDetteLT it remains positively and significantly related to ADIFF in the two subsamples which supports the findings of the first full model.

VI. Conclusion and suggestions

Conclusion:

This study aimed to investigate the type of relation between auditor characteristics and tax reconciliation informativeness (audit quality), as we know that it is the auditor's role to reduce agency conflicts between different stakeholders and management. (Van Tendeloo & Vanstraelen, 2008) and (Hope, Langli, & Thomas, 2012) because audited financial statements are more credible and trustworthy.

Our objective is detect how the audit firms impacts audit quality of tax related maters as we now that taxes are also subject to audits but we are not interested in whether the company paid the required amount of taxes or not (tax aggressive or even tax avoidance) what is important for us is to discover how the audit firm impacts the disclosures of the information regarding the differences between accounting profit and tax profit, because the users of financial statements are not satisfied regarding the level of the information disclosed and explanation that is obtained regarding book and tax differences this is represented in the report provided by The European Financial Reporting Advisory Group (EFRAG). The disclosure of the relation between accounting and tax is also a requirement by ISA12 part 12.18. This why we choose to study the impact of audit firms' characteristics on the level of transparency of their private clients.

 To make it possible to have all the information that is required to conduct the analysis we chose to work on audit firms characteristics rather than the auditor individual as financial information are more easy to collect because they are provided by many databases as Bureau van Dijk - Bel-first that is used in this study, we also decided to focus on two audit firm's characteristics that are audit fees (logAUDITFEE) and the size of the audit firm (BIG4). For the environment of this study, we choose to focus on Belgian private companies using a database consisting of 8982 Belgian private companies between 2009 and 2014, this data is provided by Bel-first. For data analysis we used statistical methods provided by the software-tool Statistical Package for the Social Sciences (SPSS). Our independent variables are size of the audit firm (is it a big4 or not) and as we know that big4 companies are PwC, KPMG, Deloitte and EY, and audit fees (logAUDITFEE) that are disclosed in the financial statement of private firms as expenses paid to the audit firm for the audit services. For our dependent variable we defined the audit quality (the level of tax reconciliation information) as the variable ADIFF which represents the absolute value of difference between proxy tax rate and ETR. We also used other variable to control for their potential effect on the audit quality as the industry of private firm (INDUSTRY), the size measured by logarithm of total assets (LogTOTALASSETS), board of directors' independence (BVDINDEP) measured by the different level of ownership concentration provided by bel-first, we also control for potential changes of audit firm (AFIRMSWITCH).

We performed a regression analysis on our full model and three (3) other sensitivity analysis (BIG4 VS NON BIG4; Tax aggressive vs non-tax aggressive; Presence vs Absence of non audit fees) in order to test the robustness of our results. The results of our regression analysis suggest the we can not make any conclusion regarding our first hypothesis (H1) where I was expecting that audit fees have a positive relation with audit quality but as the coefficient of regression is not significant then se just conclude that there is non evidence on this type of relation and our different sensitivity analysis confirmed this findings this is consistent with (Caramanis & Spathis, 2006); (Prabhawanti & Widhiyani, 2018) and

(Ramdani, 2015)**.** For our second hypothesis (H2) we found an evidence that audit firm's size (LogTOTALASSETS) has a positive influence on audit quality as we obtained a negative significant coefficient for the relation between BIG4 and ADIFF which signifies that when the audit firm is a BIG4, private firms transparency increase (low ADIFF) this results are supported by our sensitivity analysis the only surprise is in the third subsamples analysis where BIG4 was not significant in relation with ADIFF in the absence of non audit services.

For our control variables the control variable whether disclosure is made (INFO) was negatively related to ADIFF with a significant coefficient of (-6.817) this means that when information is disclosed ADIFF is low and the stakeholders receive more transparent information about differences between book and tax results, it was also surprising that we found a positive significant relation between leverage (DegreDETTELT) (0.025) and ADIFF this means that leverage is high ADIFF tends to increase also, and we know that high ADIFF means low audit quality and less transparency, this is inconsistent with (DeFond M. , 1992). We find also that more profitable private companies tend to be more transparent as our variable return before taxes to total assets ROTA in negatively and significantly related to audit quality.

In summary our findings have confirmed that audit fees are not related to audit quality (tax reconciliation informativeness) but the size of audit firm (big4) is negatively related to our dependent variable ADIFF which means better audit quality. In other words, our results suggest that the only characteristic of audit firms that impacts the disclosure of information provided by private companies regarding differences between book and tax results is the size of audit company (BIG4), when the audit firm is a big4 its private firm clients are more transparent. This information is important for stakeholders as they want to know which private firms provide more transparent information and our study suggest that the ones who are audit by big4 audit firms are more transparent.

Limitations:

Our study presents some limitations first this research focuses only on 8982 private Belgian firms, this means that our study is limited to the Belgian environment and can not be generalized to other business environments or different economic conditions. Second this study is carried out in the period between 2009 to 2014 and maybe the data post 2014 might provide different results because of changes in policies and regulations after 2014, this old data may not also reflect the current realities and may not be used for decision making.

Third limitation is that other variables can also impact the audit quality (tax reconciliation informativeness) as the characteristics of auditor individual and not just the ones of the audit firm. the fourth limitation concern the measurement used for some control variables as tax aggressiveness where we used the median of the effective tax rate (ETR) other research can use other proxies of tax aggressiveness. Measurement errors may be also present in the way we define the transparency level of a private company regarding differences between accounting and tax profits as this type of firms are just following regulations and reporting what is required by low in general and they don't think about giving more information to other stakeholders to prevent their competitors from benefiting from this published information as it is not a legal obligation. it is also possible that other determinants of audit quality are not captured in our model as the independent variables explain only 36,1% of variation in dependent variable.

Suggestions:

It is important to take into consideration all the previous cited limitations when interpreting our results. Future researchers can address previous limitations and use more control variables and other variables measurement. I also recommend using the auditor individual characteristics as gender, expertise, or any other elements.

As our study is quantitative, we suggest also to investigate in a qualitative approach using survey, interviews to study the level of different stakeholders' satisfaction regarding tax reconciliation informativeness rather than relying only on quantitative analysis, even if we are aware that quantitative analysis offers valuable insights, it is essential to interpret the findings within the broader context of the

audit landscape, considering both quantitative metrics and qualitative factors. Other researcher can also extend the period of this research to control for the changes in regulation and economic situation after COVID19 pandemic.

VII. Appendices

1. Appendix 1: Explanation of words:

- **The tax:** are "compulsory unrequited payment to the government, they are unrequited in the sense that benefits provided by government to taxpayers are not normally in proportion to their payments" (OECD, 2024).
- **Tax shelter:** in Belgium tax authorities allow companies to reduce their taxes by a tax shelter under certain conditions of investing in audiovisual costs such as a documentary for cinema or web series.
- **Tax aggressiveness:** the firm is exploiting techniques approved by fiscal law and the firm is leveraging legally approved techniques to lower its taxable base and cash tax expenses.
- **Tax Evasion** refers to illegal practices to escape from paying taxes. It involves deliberate actions taken by individuals, corporations, or other entities to misrepresent their taxable income or to hide their true financial status to reduce their tax liability.
- **Tax Loss Carryforwards:** are provisions in tax law that allow a taxpayer to apply a net operating loss (NOL) to future taxable income to reduce tax liability in those future years. This means if a company or individual experiences a loss in one year, they can carry forward that loss to offset profits in subsequent years, thereby reducing the amount of taxable income and ultimately the tax owed in those years.
- **Significance rule of a regression coefficient:** For the significance of the test, we use the p-value
  - P-value < 1% : result is significant at 1%
  - P-value < 5% : result is significant at 5%
  - P-value < 10% : result is significant at 10%

2. Appendix 2: Variables definition :

VARIABLE	DEFINITION
BVD	Company identifier
CLIENT	Private company name
FOUNDED	Firm's founding date
YEAR	Annual statements (01/01 - 31/12), The period of this study is from 2009 to 2014 we control for the year as each there may be many change in the environment and the regulation.
INDUSTRY	Industry of private firm, it is a Dummy variable Using NACE classification each industry is encoded as flows: 1=A; 2=B; 3=C; 4=D; 5=E; 6=F; 7=G; 8=H; 9=I; 10=J; 11=J ; 11=L; 12=M; 13=N; 14=S

INFO	Whether disclosure is made, Dummy variables that indicates if the firm disclosed the information coded as 1 if it is a YES, and 0 otherwise.
BVDINDEP	Independence of board of directors, Each independence level is encoded as flows: 1=A-; 2=A+; 3=B-; 4=B+ ; 5=C; 6=C+; 7=D; 8=u;
AUDITFIRM	Name of the audit firm
AUDITFIRMID	Audit firm's name
AFIRMSWITCH	The change of audit firm, dummy variable coded as 1 when the audit firm switched this year, and 0 otherwise.
GROUPIND	Ownership structure, dummy variable coded as 1 when the private company belongs to a group, and 0 otherwise.
R21	Intangibles
INTANGAS	Ratio of intangibles to total assets
R2227	Property plant and equipment
PPEAS	Property plant and equipment to total assets
TOTALASSETS	Total asset we use this variable to control for the size of the private company
LOGTOTALASSE TS	Natural logarithm of Total Assets.
DEGREDETTELT	Leverage it is the Long-term debts divided by Total Assets. This ratio shows the debt position of the entity.
PRETAX	Return before taxes
ROTA	Return on total assets, it calculated as return before taxes divided by total assets, this ratio represents the profitability of the firm.
FISCLOSS	Tax loss carryforwards
LOGFISCLOSS	Natural logarithm of Tax loss carryforwards
AUDITFEE	Audit fees
LOGAUDITFEE	Natural logarithm of audit fees
AUDITCONTR1	Consulting/compliance Non audit services (NAS) 1 on private company level
AUDITCONTR2	Consulting/compliance Non audit services (NAS) 2 on group level
TAXFEE1	Tax Non audit services NAS 1 on private company level
TAXFEE2	Tax Non audit services NAS 2 on group level
OTHERNAS1	Other Non audit services (Nas) 1, unspecified NAS that are not consulting NAS nor auditor-provided tax services on company level
OTHERNAS2	Other Non audit services (Nas) 2, unspecified NAS that are not consulting NAS nor auditor-provided tax services on group level
BIG4	Size of audit firm, dummy variable coded as 1 if the auditor is a Big-4 firm and 0 otherwise,
NAS	Total of non audit services (AUDITCONTR1 + AUDITCONTR2 + TAXFEE1 + TAXFEE2 + OTHERNAS1 + OTHERNAS2)
LOGNAS	Natural logarithm of total non-audit services

ETR	Effective Tax rate
TAXAGR	Dummy variable
STRGAP	Difference between expected statutory tax rate given accounting profit before taxes and the ETR
DIFF	Difference proxy tax rate and ETR
ADIFF	Absolute value of DIFF

3. Appendix 3: The variable Independence of board of directors (BVDINDEP) :

Code SPSS	Indicatore	Main Significance	Degree of Ownership Concentration
1	A-	firms with one (1) to three (3) shareholders, each of them having less than 25% ownership (A-).	Low ownership concentration
2	A+	Firms which includes six (6) or more identified shareholders and/or companies whose percentage is known, each of them having less than 25% ownership (A+) and the sum of direct ownership is above 75%	
3	B-	Companies with one (1) to three (3) shareholders, each of them having less than 50% ownership, but with at least one shareholder having more than 25% ownership (B-)	Medium-low ownership concentration
4	B+	Compagnies with six (6) or more shareholders and/or companies each of them having less than 50% ownership, but with one or more shareholders having more than 25% ownership (B+)	
5	C	Companies with known recorded shareholders that have a total or calculated ownership above 50%, Also assigned to companies in whose case an ultimate owner is mentioned in a source, although its ownership percentage is unknown	Medium-high ownership concentration
6	C+	Companies with a sum of direct percentage of ownership is 50.01% or higher (C+).	
7	D	Companies with a recorded shareholder that has a direct ownership above 50%	High ownership concentration
8	U	**Companies with an unknown degree of ownership concentration**	

The variable Independence of board of directors (BVDINDEP) classification provided by Bel-first.

4. Appendix 4: Descriptive analysis before changes in data

Descriptive analysis before using the ratios and the natural logarithm.

Statistics												
Variable	Acronyme	N Valid	N Missing	Mean	Median	Mode	Std. Deviation	Minimum	Maximum	Percentiles 25	Percentiles 50	Percentiles 75
Whether disclosure is made	INFO	8982	0	0,76	1,00	1,00	0,43	0,00	1,00	1,00	1,00	1,00
Ownership structure	GROUPIND	8982	0	0,87	1,00	1,00	0,34	0,00	1,00	1,00	1,00	1,00
Industry of private firm	Industry	8982	0	6,52	7,00	7,00	2,78	1,00	14,00	3,00	7,00	7,00
Total asset (Size)	TOTALASSETS	8982	0	65 464 335,92	10 019 303,50	69651[a]	806 368 706,57	69 651,00	42 541 215 000,00	5 068 134,00	10 019 303,50	23 870 482,50
Independence of board of directors	BVDINDEP	8982	0	6,65	7,00	7,00	1,23	1,00	8,00	7,00	7,00	7,00
Size of audit firm	BIG4	8982	0	0,42	0,00	0,00	0,49	0,00	1,00	0,00	0,00	1,00
The change of audit firm	AFIRMSWITCH	8982	0	0,03	0,00	0,00	0,16	0,00	1,00	0,00	0,00	0,00
Audit fees	AUDITFEE	8982	0	14 150,03	8 500,00	5 000,00	20 381,13	620,00	871 580,00	5 248,75	8 500,00	15 796,25
Intangibles	R21	8982	0	1 299 548,71	0,00	0,00	47 268 747,94	0,00	3 823 988 000,00	0,00	0,00	35 855,75
Property plant and equipment	R2227	8982	0	6 188 346,17	1 166 411,50	442[a]	26 481 618,37	101,00	1 083 781 000,00	309 240,25	1 166 411,50	3 407 749,00
Leverage	DegreDetteLT	8982	0	17,70	7,70	0,00	22,13	0,00	99,78	0,70	7,70	27,64
Return before taxes	PRETAX	8982	0	394 284,35	75 001,00	0,00	1 650 606,75	0,00	112 057 000,00	201,50	75 001,00	312 251,00
Tax loss carryforwards	FISCLOSS	8982	0	1 523 209,04	0,00	0,00	37 244 820,56	0,00	2 382 178 000,00	0,00	0,00	0,00
Consulting/compliance Non audit services (NAS) 1	AUDITCONTR1	8982	0	410,22	0,00	0,00	2 767,47	0,00	110 784,00	0,00	0,00	0,00
Consulting/compliance Non audit services (NAS) 2	AUDITCONTR2	8982	0	52,32	0,00	0,00	1 056,40	0,00	46 309,00	0,00	0,00	0,00
Tax Non audit services NAS 1	TAXFEE1	8982	0	241,72	0,00	0,00	2 275,81	0,00	96 294,00	0,00	0,00	0,00
Tax Non audit services NAS 2	TAXFEE2	8982	0	1 655,19	0,00	0,00	11 671,27	0,00	538 079,00	0,00	0,00	0,00
Other Non audit services (Nas) 1	OTHERNAS1	8982	0	448,86	0,00	0,00	3 316,48	0,00	144 375,00	0,00	0,00	0,00
Other Non audit services (Nas) 2	OTHERNAS2	8982	0	361,86	0,00	0,00	3 547,91	0,00	125 748,00	0,00	0,00	0,00
Effective Tax rate	ETR	8982	0	22,69	26,96	0,00	16,94	0,00	99,12	3,60	26,96	33,74
Difference between expected statutory tax rate given accounting profit before taxes and the ETR	STRGAP	8982	0	14,80	9,99	33,99	12,92	0,00	74,14	3,14	9,99	27,81
Difference proxy tax rate and ETR	DIFF	8982	0	-6,21	-0,34	0,00	15,68	-93,33	99,12	-12,40	-0,34	0,95
Absolute value of DIFF	ADIFF	8982	0	10,42	4,32	0,00	13,28	0,00	99,12	0,74	4,32	15,64

a. Multiple modes exist. The smallest value is shown

5. Summary Results of regression analysis

Research Hypotheses	Prediction	Result	Hypotheses
H1: In private firms the audit fees have a positive influence on the tax reconciliation informativeness.	positive	insignificant (Positive)	Not supported
H2: In private firms the auditor's size has a positive influence on the tax reconciliation informativeness.	positive	Significant (positive)	Supported

The table lists the research hypotheses, the prediction of the dependent variable, the results of the correlation and whether the hypotheses were supported.

VIII. Bibliography and references.

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Executive summary

This study investigates the type of relation between auditor characteristics and tax reconciliation informativeness, we used a multiple regression model to examine the relationship between audit firms' characteristics and audit quality in Belgium, utilizing quantitative data from Bel-first by Bureau Van Dijk, which includes 8,982 private companies from 2009 to 2014. The analysis are performed using the SPSS (Statistical Package for the Social Sciences) program. regarding tax and book results differences.

The study's model accounts for approximately 36,1 % of the variability in audit quality (tax reconciliation information.

The results indicate that the size of the audit firm (whether it is a BIG4 firm or not) is positively and significantly associated with audit quality (tax reconciliation informativeness). This suggests that private companies audited by BIG4 audit firms are more transparent and fully disclose differences between book and tax results. However, no significant relationship was found between audit quality and audit fees, this suggests that the audit fees don't have any influence level of transparency of private firms.

This study highlights that the audit firm characteristics especially the size (BIG4 or not) impacts the audit quality, this is important for investors and different stakeholders who are interested in private firms as they trust more transparent companies where they get all information regarding the financial situation of including tax practices, this study reveals in Belgium the most transparent companies are those that are audit by BIG 4 audit companies as they are consistently disclosing valuable information regarding.

The study recognizes certain constraints stemming from the availability of data and the inherent limitations of relying solely on quantitative metrics. These limitations encompass various aspects, such as the scope and depth of the data accessible for analysis. While quantitative data provide valuable insights into the relationship between audit firms' characteristics and audit quality, they may not fully capture the intricate dynamics and contextual factors at play within the audit industry.

Keywords: Tax reconciliation, Private firms, auditor fees, auditors' size, investors, stakeholders.

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