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## **The effect of audit firm size and the Covid-19 pandemic on audit quality: evidence from Belgium**

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**THE EFFECT OF AUDIT FIRM SIZE AND THE  
COVID-19 PANDEMIC ON AUDIT QUALITY:  
EVIDENCE FROM BELGIUM**

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## Abstract

This paper examines the effect of audit firm size (Big 4 versus non-Big 4) and the COVID-19 pandemic on audit quality in Belgium. To assess audit quality in this country, a multiple linear regression analysis is conducted on a sample of 3,343 large and very large Belgian entities spanning from 2016 to 2020. Audit quality is proxied by discretionary accruals determined thanks to the performance-adjusted Jones model (Kothari et al., 2005). The findings present compelling evidence of a statistically significant disparity in discretionary accruals between enterprises audited by a Big 4 and those overseen by alternative auditors in Belgium. Additionally, the study identifies a statistically significant positive correlation between the magnitude of discretionary accruals and the COVID-19 outbreak, suggesting diminished audit quality during this period of disruption. These findings remain robust across various model specifications and empirical designs. Nevertheless, there is no statistically significant correlation between audit quality and the performance of an audit assignment by a Big 4 firm in Belgium during the pandemic. Only a supplementary analysis reveals that negative discretionary accruals were statistically significantly more positive for Big 4 clients throughout the health crisis period. Further tests indicate that corporations with higher returns on assets and sales growth rates exhibit lower audit quality from auditors. The study also uncovers that as Belgian firms expand in terms of total assets, there is a corresponding reduction in their employment of discretionary accruals in absolute value, thereby resulting in an improved level of audit quality. Moreover, our study provides evidence that Belgian companies with progressively elevated long-term debt-to-total-assets ratios and favourable liquidity positions, as assessed by high current ratios, are associated with better audit quality. Conversely, when firms experience losses, they tend to engage in greater manipulation of their financial results through higher levels of discretionary accruals in absolute terms, which leads to a decline in audit quality.

**Keywords:** Audit quality – Earnings management – COVID-19 pandemic – Discretionary accruals – Performance-adjusted Jones model



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## List of abbreviations

CSA	Code des Sociétés et Associations – Code of Companies and Associations
CSR	Collège de Supervision des Réviseurs d'entreprises – Belgian Audit Oversight College
DACC	Discretionary Accruals
EU	European Union
EY	Ernst & Young
FSMA	Financial Services and Markets Authority
GAAP	Generally Accepted Accounting Principles
GAAS	Generally Accepted Auditing Standards
IAASB	International Auditing and Assurance Standards Board
IESBA	International Ethics Standards Board for Accountants
IRE	Institut des Réviseurs d'Entreprises – Institute of Registered Auditors
ISA	International Standard on Auditing
ISQM 1	International Standard on Quality Management 1
KPMG	Klynveld Peat Marwick Goerdeler
NBB	National Bank of Belgium
NDACC	Non-Discretionary Accruals
PwC	PricewaterhouseCoopers
ROA	Return On Assets
TACC	Total Accruals
US	United States



## Introduction

*“Reliable and truthful financial reporting and independent auditing are now highly needed by investors and other stakeholders and have a large role to play in managing outcomes of, and exit from, the sudden calamity” (Dr. Stavros Thomadakis, former President of the IESBA, 2020, p. 1).*

The coronavirus crisis has had a profound impact on every one of us. The health measures implemented by the Belgian government, such as the closure of universities and the imposition of lockdowns, have affected us all. Moreover, we have borne witness to the distressing repercussions of this pandemic on our beloved acquaintances. As a cohesive entity, we collectively espouse the common goal of ensuring that our society never again experiences such tumultuous circumstances in the future. The coronavirus crisis first appeared on our planet four years ago, specifically in 2019 in China. This outbreak has had a considerable influence on people's daily activities (Albitar et al. 2020), and it can be reasonably inferred that this continues to be the case at present. Dr. Stavros Thomadakis, the former president of the International Ethics Standards Board for Accountants (IESBA), stated in 2020 that “disruption of production, loss of business and employment, and financial distress are becoming economic landmarks of the global COVID-19 pandemic” (IESBA, 2020, p. 1). As pointed out by Goodell (2020), the current state of affairs has resulted in extensive economic and financial ramifications on a worldwide level, impacting numerous industries and sectors, including governments, financial markets, banking and insurance, and domestic demands. Without a doubt, financial, economic, and health crises exert a direct influence on the business realm. The COVID-19 outbreak has induced substantial stock market volatility and necessitated the enforcement of restrictions on trade and consumption, thereby creating a significant impact on the prospects for future economic growth (Gormsen & Koijen, 2020). The predicaments and risks encountered by firms affected by such crises can have a cascading effect on diverse parties associated with them. The probability of business failures can have noteworthy economic and social consequences for shareholders, who could suffer losses on their investments, and for management and employees, who might face the possibility of losing their jobs (Charitou et al., 2007). The trust of stakeholders in the financial outcomes of corporations can be eroded, potentially resulting in financial hardship (KPMG, 2020).

The primary role of auditors is to increase confidence that the financial statements fairly represent the financial position of a company (PwC, 2017). The auditing function, which stems from the agency theory of corporate governance, mitigates the information asymmetry between the managers and shareholders of a company by thwarting the managers' attempts to manipulate the reported earnings (Alves, 2013; Chan et al., 1993; Jensen & Meckling, 1976). Amidst the coronavirus crisis, companies across the globe were urged to augment their communication and transparency by offering detailed and accurate disclosures, especially to guarantee that the financial statements accurately reflect the financial reality of the company in these economically precarious times (Clayton & Hinman, 2020). This fair presentation may be distorted by earnings management, which poses a significant challenge for auditors (Barghathi et al., 2018). Indeed, companies may be more urged to report aggressively during a financial crisis (Herrmann et al., 2008).



Financial reporting will play a role in restoring trust in uncertain times by providing reliable and accurate information as well as transparency (EY, 2020). As an example, investors may apply pressure on managers to manipulate the results and present a more favourable depiction (Iatridis & Kadorinis, 2009; Kothari et al., 2016). In general, earnings management denotes a range of business management techniques that are employed by management to distort the perception of the company's financial situation (Healy & Wahlen, 1999; Bernstein & Siegel, 1979).

The literature predominantly examines two types of earnings management: real earnings management and accrual-based earnings management. Roychowdhury (2006) defines real earnings management as “management actions that deviate from normal business practices, undertaken with the primary objective of meeting certain earnings thresholds” (p. 336). Management takes business decisions that do not align with typical company operations, thereby obfuscating the true financial performance of the firm (Roychowdhury, 2006). In contrast to real earnings management, accrual-based earnings management involves “within-GAAP choices that try to ‘obscure’ or ‘mask’ true economic performance” (Dechow & Skinner, 2000, p. 240). In fact, it is possible to adjust earnings upwards or downwards by choosing different accounting methods such as depreciation methods for fixed assets. As opposed to real earnings management, the manipulation of accruals does not directly impact the company's cash flows (Jeanjean, 2003). Given the increased pressure and incentives for managers to engage in earnings management during periods of turmoil, the quality and reliability of financial statement information becomes a critical area of concern (Tsipouridou & Spathis, 2014). Audit quality is crucial to ensure that there is no manipulation of the results by managers, either upwards or downwards. Besides, the focus on audit quality and audit practices becomes even more critical during times of financial crisis (Francis, 2004; Fargher & Jiang, 2008).

DeAngelo (1981) defines audit quality as the probability of discovering material misstatements and signals of financial distress, as well as the probability of the auditor reporting these misstatements and signals. The probability of detecting a breach in financial reporting is contingent on the auditor's technical skills, whereas the likelihood of reporting the breach is predicated on the independence of the auditor (DeAngelo, 1981). In Belgium, auditing firms can take the shape of either a Big 4 or a non-Big 4 entity. The academic literature has continuously examined the notion of audit quality provided by these companies (DeAngelo, 1981; Goldman & Barlev, 1974; Nichols & Price, 1976, DeFond & Zhang, 2014). Nevertheless, ongoing debates persist, particularly regarding the audit quality rendered by the Big 4 in comparison to non-Big 4 auditors, both during periods of crisis and in ordinary circumstances. DeAngelo (1981) posits that the Big 4 exhibit greater independence compared to their counterparts. Major audit companies, owing to their extensive and varied clientele, do not typically depend on any one client financially (Choi et al., 2010). In contrast, smaller audit firms may be susceptible to economic, social, and personal influences from their clients (Sirois et al., 2016). Larger offices are less prone to succumbing to client pressure for lower-quality reports than smaller offices (Choi et al., 2010). Nonetheless, it has been argued that auditors' judgments can be impacted by a downturn in the market. Coffee Jr (2004) and Leone et al. (2013) state that audit quality decreases as auditors may relax their usual scepticism amidst market euphoria. Other authors contend that there is no substantial evidence of a decline in audit quality during a worldwide upheaval, regardless of whether the audit firm is a Big 4 or another audit entity (Shahzad et al., 2018).

Through an empirical analysis based on financial data of large and very large Belgian audited companies, this paper studies the audit quality of Big 4 and non-Big 4 auditors in Belgium before and during the COVID-19 pandemic, spanning from 2016 to 2019 and 2020. This article contributes to providing supplementary evidence in an area that warrants further research, especially in the Belgian context. As the global health crisis continues to unfold, conducting research on its impact has become of utmost significance. Despite the outbreak's wide-ranging and persistent ramifications, there is a conspicuous dearth of research on this subject. Presently, only a limited number of scholarly articles exist that explore the topic of audit quality in Belgium, and none of them specifically investigate the quality of audit services offered by both Big 4 and non-Big 4 in this country during the ongoing health crisis. This presents an opportunity to compare and contrast the audit quality of the two types of audit firms in Belgium and ascertain whether the COVID-19 pandemic and its associated impacts have had a discernible effect on it. In attempting to fill this gap in the existing literature, this research strives to provide fresh perspectives on the role of audit firms during crises and enhance the comprehensive understanding of the auditing profession in Belgium.

The remaining sections of this paper are structured in the following manner. A literature review, partitioned into three distinct parts, is presented. The first section provides an analysis of the concept of audit quality, along with a detailed discussion of the supervisory bodies in Belgium, the ethical standards established by the International Ethics Standards Board for Accountants (IESBA), and the legal framework in Belgium. The second section of the literature review offers a comprehensive analysis of earnings management, elucidating the concept in detail and presenting related measures, such as total accruals, normal accruals, and discretionary accruals. The third section of the literature review presents the hypothesis of this thesis based on the existing body of literature. Following this, the methodology and data collection process are described. Subsequently, two sections are dedicated to the presentation and analysis of the results, culminating in a conclusion that addresses the potential limitations of this study.



# Literature review

## 1. Audit quality

### 1.1. Definition

The definition of audit quality is difficult to standardise as there is no precise universal definition. The outcome of audit quality is not directly or immediately observable (Wooten, 2003). The primary objective of auditing may be perceived differently by the stakeholders. First, investors view the audit as a critical mechanism for detecting significant errors or instances of fraud in financial statements (Wooten, 2003) and rely on the independent auditor to identify such issues (Zhao, 2010). While adhering to the Generally Accepted Auditing Standards (GAAS), an auditor may consider the audit process as a way of managing business risk, as it enables minimising client dissatisfaction and limiting potential damage to their reputation that may result from an unsatisfactory audit (Wooten, 2003).

The literature relates primarily to DeAngelo 1981's definition of audit quality, which defines it as (1) the likelihood that material misstatements and financial distress signals will be discovered and (2) the likelihood that the auditor will report these misstatements and signals. The auditor's technical skills ascertain the likelihood of finding a breach, and the auditor's independence determines the likelihood that the auditor will report the breach (DeAngelo, 1981). In accordance with previous studies (DeAngelo, 1981; Goldman & Barlev, 1974; Nichols & Price, 1976), the likelihood of discovering a breach is positive and fixed, and auditor independence is the primary concern. DeFond and Zhang (2014) refine DeAngelo 1981's definition to "higher audit quality as greater assurance that the financial statements faithfully reflect the firm's underlying economics, conditioned on its financial reporting system and innate characteristics" (p. 276). Indeed, Francis (2004) states that a theoretical continuum with a range of audit quality from very low to very high can be used to conceptualise audit quality (p. 346). In instances where an auditor neglects to apply generally accepted accounting principles (GAAP) in order to uncover material misstatements and financial distress, and subsequently fails to issue a suitable report, the resultant potential audit failures are attributable to inadequate audit quality (Francis, 2004). The occurrence of financial statement catastrophes such as those observed at Enron underscores the responsibility of auditors in the detection and prevention of errors and fraudulent activities that give rise to these scandals (Khushboo & Singh, 2021). Due to audit failures and corporate bankruptcy, perceptions of audit quality have recently emerged as an important concern (Kilgore et al. 2014). The role of the auditor has always been evolving (Baker, 2014), for example, due to corporate failures, rapid technological change, global waves of regulation, and external events such as the coronavirus (KPMG, 2020b). It can thus be posited that these changes and events can exert an influence on audit quality. By the way, the world has recently been hit by the coronavirus pandemic. Goodell (2020) and Albitar et al. (2020) state that the health emergency and its aftermath have impacted audit quality. This event has had a major influence on people's daily activities (Albitar et al., 2020). Goodell (2020) asserts that this outbreak has caused profound economic and financial effects worldwide, impacting several industries and sectors, such as governments, financial markets, banking and insurance, domestic demands, among others. During turbulent periods, companies may possess stronger market-driven incentives to engage in earnings management as compared to regular non-crisis periods (Ljubisavljević & Jakobsson, 2022). Stakeholders' confidence in the financial results of companies can be affected, which can lead to financial distress (KPMG, 2020).

Amid periods of unpredictability, financial reporting assumes a critical role in restoring trust by providing reliable and accurate information, as well as transparency (EY, 2020). This can be achieved through high audit quality. Dr. Stavros Thomadakis, the former Chairman of the IESBA, issued a statement in 2020 during the coronavirus crisis in which he reminds auditors of the good principles that should be followed, especially during this critical situation: reliable and truthful financial reporting as well as independent auditing (IESBA, 2020). These considerations can be linked to high audit quality. Overall, the various definitions of audit quality are all associated with the auditor's levels of competence, diligence, and independence (Bell et al., 2015).

## **1.2. Ethical requirements**

Auditors are encouraged to abide by the ethical requirements put forth by the International Ethics Standards Board for Accountants. The IESBA is an independent standard-setting body. It establishes sound and appropriate global ethical standards for auditors and all professional accountants, including requirements for auditor independence (IESBA, 2022, p. 1). These standards are compiled in the Code of Ethics for Professional Accountants. Dr. Stavros Thomadakis notably reiterated these considerations and requirements during the coronavirus crisis in his statement issued in 2020. Indeed, he declared that "being honest, competent and objective are virtues heavily valued for all professionals, particularly in adversity" (IESBA, 2020, p. 1). He also added that the ethical requirements set out below take on greater meaning in today's particular circumstances (IESBA, 2020).

- **Integrity:** all professional accountants have an obligation to be direct, honest, fair, and accurate, which precludes them from knowingly associating with reports or other forms of communications when they have a reasonable basis to believe that:
  - the financial statements contain materially incorrect or misleading information;
  - the financial statements include information provided recklessly;
  - the financial statements omit or obscure information that ought to be disclosed;
  - the information is presented in the financial statements in a biased or deceptive way (IESBA, 2022, p. 19).
  
- **Objectivity:** all professional accountants are required to conduct themselves in a professional manner and abstain from allowing prejudice, conflicts of interest, or inappropriate external pressure to influence their judgments or actions (IESBA, 2022, p. 20).
  
- **Professional competence and due care:** all professional accountants have an obligation to be competent to provide services. In order to deliver competent professional service, they are required to possess and maintain the necessary professional skills and knowledge. In addition, they are obligated to act with diligence in accordance with applicable technical and professional standards, and to decline engagements that are beyond their capabilities. They are also responsible for ensuring that their personnel receive adequate training and supervision. Finally, professional accountants must inform clients of any limitations that may prevent them from providing the expected level of service (IESBA, 2022, p. 20).
  
- **Confidentiality:** all professional accountants are required to respect the confidentiality of any information they learn about a client's affairs while providing services (IESBA, 2022, p. 21).

- **Professional behaviour:** all professional accountants have a responsibility to abide by applicable laws and regulations and to conduct themselves in a manner that preserves the positive reputation of the profession. With regard to their responsibilities to clients, third parties, other members of the accountancy profession, staff, employers, and the general public, they should refrain from any behaviour that may bring the profession into disrepute (IESBA, 2022, p. 23).

### **1.3. Supervisory bodies in Belgium**

Auditor independence is one of the key elements in the proper conduct of the audit (DeAngelo, 1981). According to Mansouri et al. (2009), audit quality is questionable without independence. By the way, independence takes on even more meaning in periods of turmoil. The enduring relevance of Dr. Stavros Thomadakis's statement from 2020 about the critical importance of reliable and truthful financial reporting and independent auditing cannot be disregarded. In the present context, the paramount significance of dependable and accurate financial reporting, as well as independent auditing, has increased even further, as they are critical in enabling investors and other stakeholders to make well-informed decisions. These practices are essential in mitigating the impact of unexpected crises and facilitating the recovery process (IESBA, 2020). In the wake of the coronavirus outbreak and its fallout, auditors must carefully evaluate their risks and threats to safeguard their independence, a crucial principle they must uphold (IESBA, 2020). Due to the substantial economic and financial effects of the coronavirus crisis on many industries and sectors (Goodell, 2020), many clients have encountered, and are still facing, challenging financial circumstances. As such, these clients may exert intense pressure on auditors to reduce the magnitude of audit fees, particularly if additional audit tasks are required to address the audit-related difficulties caused by the pandemic (IESBA, 2020). This pressure can jeopardise the independence of auditors in relation to their audit assignments.

In the absence of the auditor's independence from the audited company, significant misstatements may go unreported, leading to potential harm to the shareholders due to inaccurate financial statements. The law of December 7<sup>th</sup>, 2016 addresses auditor independence. As per Article 12§1, each auditor completes all audit tasks independently, adhering to the ethical standards and code of conduct. For instance, if there is a financial, a personal, an employment, or any other relationship, whether direct or indirect, the auditor must decline the audit assignment (Art. 12§4. Law of December 7<sup>th</sup>, 2016). The independence of the auditor is evaluated on two indissociable levels:

- the independence of mind: the only considerations taken into account for the audit assignment are those that are about the purpose of the assignment;
- the appearance of independence: any situation that could lead third parties to question the auditor's integrity and objectivity should be avoided (Art. 12§2. Law of December 7<sup>th</sup>, 2016).

The auditor's purpose is to provide assurance to external parties regarding the accuracy and reliability of the financial information presented by companies (PwC, 2017). The COVID-19 pandemic has brought increased attention to the crucial role of auditing and the quality of auditors' reports (Albitar et al., 2020). Numerous Belgian companies have been adversely affected by the economic repercussions of the outbreak, with the hotel and catering industry, retail trade, events, tourism, leisure, art and culture, and the business services sector being among the hardest hit.

As previously noted, the health crisis has resulted in uncertainty surrounding published financial figures, asset valuation, and the collection of receivables. Variations in workforce size, sales, and profit margins have been observed (Dhyne & Duprez, 2021).

Hence, the integrity of corporate financial statements is of paramount importance to their users. The audit market needs to be regulated to ensure that auditors carry out their duties appropriately, that is, to give credibility to the financial statements with reasonable assurance and to issue an opinion on them in accordance with the applicable reporting framework (IAASB, 2014). To achieve this goal, there are several supervisory bodies in the auditing profession, such as the 'Financial Services and Markets Authority', the 'Institute of Registered Auditors' and the 'Belgian Audit Oversight College'.

### **1.3.1. The Financial Services and Markets Authority.**

The Financial Services and Markets Authority (FSMA) is an autonomous public institution created on 1 April 2011. Together with the National Bank of Belgium (NBB), the main objective of the FSMA is the supervision of the Belgian financial sector. This entity is notably competent in six main tasks:

- monitoring of the financial markets and supervision of the financial information disseminated by companies;
- supervision of compliance with the conduct of business rules;
- product supervision;
- supervision of financial service providers and intermediaries;
- supervision of supplementary pensions;
- contribution to improving the financial education of the population (FSMA, n.d.).

### **1.3.2. The Institute of Registered Auditors.**

The 'Institute of Registered Auditors' for 'Institut des Réviseurs d'Entreprises (IRE)' in French was created by a law of July 22th, 1953. The IRE is managed by a council composed of 14 auditors. The principal objectives of this institution encompass facilitating entry into the auditing profession, providing continuous training for auditors, and ensuring the maintenance and regular updating of the public register.

Indeed, the IRE's main mission is to ensure the permanent organisation of a body of specialists capable of fulfilling the auditor's function with the utmost assurance in terms of competence, independence, and professional probity (Art. 64. Law of December 7<sup>th</sup>, 2016).

### 1.3.3. The Belgian Audit Oversight College.

The Belgian Audit Oversight College, known as the ‘Collège de Supervision des Réviseurs d’Entreprises (CSR)’ in French is tasked with the responsibility of supervising the auditing profession. The law of December 7<sup>th</sup>, 2016 brought about significant reforms to the supervision of auditors with the objective of ensuring the proper organisation of the auditing profession and the effective oversight of auditors. The College, the decision-making body of the CSR, is composed of six members:

- two members appointed by the NBB for a period of 6 years – renewable;
- two members appointed by the FSMA for a period of 6 years – renewable;
- one expert who has not been an auditor appointed by Royal Decree for a period of six years – renewable;
- one person who previously was (and has been out of the profession for at least three years) appointed by Royal Decree for a period of 6 years - not renewable (Art. 35. Law of December 7<sup>th</sup>, 2016).

As the CSR is under the supervision of the FSMA, its primary duties are:

- the supervision of the granting of auditor status, the registration of auditors as well as the maintenance and update of the public register;
- the supervision of lifelong training;
- the supervision of the quality control systems;
- the oversight and monitoring of the profession (Art. 32. Law of December 7<sup>th</sup>, 2016).

Quality control based on risk analysis is submitted to all auditors by the CSR at least every six years. This quality control is submitted every three years to auditors who audit one or more large public interest entities<sup>1</sup>. The members of the CSR verify a sample of selected audit files and ensure that:

- the auditors carry out their engagements in accordance with the applicable legal and regulatory frameworks, including the principle of independence;
- the quantity and quality of the resources used in the files audited by the auditors are appropriate;
- the audit fees are fair;
- auditors maintain their professional competence through ongoing training (Art. 52. Law of December 7<sup>th</sup>, 2016).

By means of this quality control mechanism, the CSR verifies the adequacy of the organisational structure established by auditors, which is commensurate with the nature and extent of their operations. Furthermore, it assures adherence to the ethical principles and auditing standards applicable to the profession, thereby instilling confidence in the quality of their services among both the public and supervisory entities.

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<sup>1</sup> The Directive 2014/56/EU defines the concept of a “Public-Interest Entity” as “(a) entities governed by the law of Member State and listed on a regulated market of any Member State, (b) credit institutions and insurance companies, (c) entities that are designated by the Member State as a Public Interest Entity because of the public significance of its size, business or the number of their employees.” (Art 2. 13°, Directive 2014/56/EU, 2014). The Belgian authorities follow the EU definition and outline the concept in the article 1:12 of the CSA.



## **1.4. The audit quality framework**

As previously mentioned, there is no widely accepted definition of audit quality. Several definitions exist, each of which pertains to varying levels of auditor competence, effort, and independence (Bell et al., 2015). Furthermore, evaluating the quality of an audit is challenging since the level of assurance furnished by auditors is not immediately observable (DeFond & Zhang, 2014, Wooten, 2003).

The International Auditing and Assurance Standards Board (IAASB) is an organisation created in 2001 that develops auditing and assurance guidelines and standards for use by all professional accountants. The IAASB's objective is to support global financial stability, improve the quality and consistency of practice worldwide and enhance public confidence in the global audit profession (IAASB, 2014). Based on 'the complexity of defining audit quality', the IAASB developed a 'Framework for Audit Quality' in 2014 (IAASB, 2014, p. 36). The goals of this framework are:

- to heighten awareness of the fundamental components of audit quality;
- To stimulate key stakeholders to contemplate measures for enhancing it;
- to foster greater communication among critical stakeholders concerning audit quality (IAASB, 2014, p. 2).

It encompasses the essential factors that facilitate the conduct of a high-quality audit. These factors are distinct and can be represented as follows:

- i. Inputs;
- ii. Process;
- iii. Outputs;
- iv. Key Interactions within the Financial Reporting Supply Chain;
- v. Contextual Factors (IAASB, 2014, p. 5).

### **1.4.1. Inputs.**

The concept of inputs can be divided into two distinct categories. The first group pertains to the values, ethics, and attitudes of auditors, while the second group comprises factors such as the auditors' level of expertise, experience, and availability of sufficient time to perform the audits. Clients typically rely on visible inputs as a means of evaluating audit quality, rendering input-based proxies an attractive means of evaluation (DeFond & Zhang, 2014). These factors operate at the engagement, firm, and national levels, collectively influencing audit quality (IAASB, 2014, p. 6).

#### **1.4.1.1. Values, ethics, and attitudes – engagement level.**

The audit entity holds the direct responsibility for ensuring the quality of the audit performed. Moreover, the firm is accountable for selecting a team with the requisite values, ethics, and attitudes to conduct the audit engagement to a high standard. These principles comprise independence, professional scepticism, objectivity, and integrity. By adhering to these elevated ethical standards, the audit firm can provide stakeholders with confidence that the audit work is executed with the utmost care and professionalism, and that the resulting audit report attains high quality (IAASB, 2014, p. 8).

#### ***1.4.1.2. Values, ethics, and attitudes – firm level.***

The culture of an audit firm can significantly influence the values, ethics, and attitudes of its auditors. Therefore, it is important for companies to foster a culture that emphasises the importance of high-quality audits and ethical behaviour. Auditors may be affected by the work environment in which they operate, and the firm's culture can play a critical role in shaping their behaviour. For instance, when challenging issues arise, auditors may collaborate to address them, which is a positive indication of audit quality. It demonstrates that auditors are committed to ensuring that each audit is carried out accurately and completely, and that they are willing to have an open and honest conversation to achieve this objective. By fostering a culture of professionalism, transparency, and ethical behaviour, audit firms can enhance the quality of their audit work and provide greater assurance to stakeholders (IAASB, 2014, p. 9).

#### ***1.4.1.3. Values, ethics, and attitudes – national level.***

National audit regulatory activities play a significant role in shaping the values, ethics, and attitudes of auditors and the culture of audit firms. For example, regulators and national standards setters ensure that ethical rules are comprehended and adhered to by auditors, and that organisations adopt optimal methodologies that advance the quality of audits. By providing guidance on ethical behaviour and setting high auditing standards, regulatory activities create a framework that promotes professionalism, transparency, and accountability in the audit industry. Ultimately, these efforts help to build stakeholder confidence in the quality of audit work (IAASB, 2014, p. 9).

#### ***1.4.1.4. Knowledge, skills, experience, and time – engagement level.***

Each audit firm bears the responsibility of ensuring that the auditors assigned to the engagement possess the required skills to competently perform the audit work and obtain sufficient appropriate audit evidence before issuing their audit opinion. This entails guaranteeing that the auditors have sufficient time to conduct the audit effectively, and that they exercise sound professional judgment when making assessments and conclusions. By prioritising these factors, audit firms can contribute to ensuring that the audit work is conducted with utmost diligence and adherence to rigorous standards, thereby fostering reliability and accuracy in the resulting audit report (IAASB, 2014, p. 10).

#### ***1.4.1.5. Knowledge, skills, experience, and time – firm level.***

Auditors' knowledge and experience are shaped by the policies and procedures of their audit firm (IAASB, 2014, p. 10). Ongoing training programs offered by audit firms provide auditors with opportunities to expand their knowledge base, keep up with industry trends, and improve their skills in areas such as risk assessment and fraud detection. By investing in the continuous development of their auditors, audit firms can ensure that their teams possess the necessary skills and knowledge to deliver high-quality audits that meet stakeholder expectations.

#### ***1.4.1.6. Knowledge, skills, experience, and time – national level.***

The competencies of auditors can be determined by a range of factors, such as national requirements for mandatory training and the qualifications required to be recognised as an auditor. These factors can have a significant impact on the knowledge, skills, and abilities that auditors possess, and can ultimately affect the quality of their work and the effectiveness of the auditing process (IAASB, 2014, p. 11).

#### **1.4.2. Process.**

The second fundamental aspect of the framework pertains to the processing stage of auditing, encompassing the meticulousness and precision of the audit procedures and controls implemented to ensure that the audit is conducted in an appropriate and efficient manner (IAASB, 2014, p. 12).

##### ***1.4.2.1. Audit process and quality control procedures – engagement level.***

The audit procedures and controls must comply with standards, such as International Standard on Quality Management 1 (ISQM 1), effective from December 15<sup>th</sup>, 2022. According to ISQM 1, audit firms must establish a quality management system for the different types of engagements they handle. All entities that perform audits or reviews of financial statements, or other assurance or related services engagements, are required to apply ISQM 1 (IAASB, 2014, p. 12).

These activities allow, among other things, better identification of risks or a disciplined approach to the expression of an audit opinion, which promotes a better quality of audit engagement (IAASB, 2014, p. 12).

##### ***1.4.2.2. Audit process and quality control procedures – firm level.***

The audit process is a complicated and diverse activity that requires applying particular tests and controls to evaluate and certify an organisation's financial statements. These procedures and controls are typically defined by the audit firm's methodology and policies, which serve as a roadmap for conducting the audit. One critical aspect of the methodology is the requirement for appropriate audit documentation. The orderly and complete documentation of audit evidence, including the nature, timing, and extent of audit procedures performed and the results of such activities, is an essential requirement for the proper conduct of audit work. Proper audit documentation is crucial for several reasons. First of all, it ensures that the auditors have a thorough understanding of the organisation's financial statements and related information. Secondly, it facilitates the assessment and evaluation of the audit work by other team members, thereby improving the overall quality and accuracy of the audit (IAASB, 2014, p. 12).

### **1.4.2.3. Audit process and quality control procedures – national level.**

The audit process can be influenced by national audit regulatory activities, such as the International Standards on Auditing (ISA) requirements developed by the IAASB. As previously stated, the International Ethics Standards Board for Accountants (IESBA) also establishes rigorous ethics standards for professional accountants. Compliance with these standards is essential in promoting higher-quality audit work. The impact of national audit regulatory activities on the audit process underscores the importance of upholding and adhering to established auditing and ethical standards (IAASB, 2014, p. 13). Such standards guarantee the highest levels of professionalism, integrity, and objectivity in the audit work, fostering confidence and trust among the organisation's stakeholders.

### **1.4.3. Outputs.**

Outcomes are among the most scrutinised factors by stakeholders such as users of audited financial statements, management, those charged with governance, and regulators. Indeed, outcomes are taken into account by stakeholders in their assessment of the audit quality (IAASB, 2014). The appeal of output-based audit quality proxies stems from their attempt to gauge the amount of audit quality actually provided (DeFond & Zhang, 2014). According to the IAASB (2014), “outputs include reports and information that are formally prepared and presented by one party to another, as well as outputs that arise from the auditing process that are generally not visible to those outside the audited organisation” (p. 6). Outputs may originate from various sources, including auditors or audit regulators. Multiple types of outputs exist, although only the primary ones are addressed below.

Foremost among these outputs is the auditor's report, encompassing the audit opinion. The clarity of the audit opinion provides assurance to stakeholders on the reliability of financial information and is seen as a positive signal of the quality of the audit (IAASB, 2014, p. 15). Currently, the audit opinion is the auditor's only direct exchange with shareholders on the audit process and its conclusions (DeFond & Zhang, 2014).

Moreover, auditors have a general responsibility to communicate with those charged with governance in a timely manner on specific matters. For example, auditors are responsible for communicating the planned scope and timing of the audit, as well as any significant findings or issues that arise during the audit, in accordance with the requirements of the revised ISA 260 (IAASB, 2017). In addition to formal communication, less formal discussions and communications between the auditors and the audited companies can also enhance audit quality. Such informal interactions may involve recommendations for improving the entity's financial reporting process, which can be invaluable to those charged with governance in fulfilling their oversight responsibilities. By establishing effective communication channels and proactively engaging with the audited firm, auditors can foster a collaborative and constructive audit process that promotes higher-quality audit outcomes (IAASB, 2014, p. 15).

Subsequent to communication with those charged with governance, auditors also engage with the management of the audited entity, often by preparing a detailed report that outlines their observations. This report serves to demonstrate the thoroughness and diligence of the audit process to the management, thereby bolstering their perception of the audit quality. Additionally, the recommendations and advice provided by the auditors, which may relate to enhancing the entity's systems or complying with regulatory requirements, are highly valued by the management (IAASB, 2014, p. 16).

Moreover, auditors may have a legal obligation to report their findings to regulatory authorities, particularly in cases involving potential illegal acts, such as suspected money laundering. According to the IAASB (2014), “the regulators are likely to give emphasis to the perceived value and timing of such reports when considering overall audit quality” (p. 17).

#### **1.4.4. Interactions.**

Effective communication and collaboration among stakeholders in the financial reporting supply chain are critical determinants of high-quality audits. The quality and efficiency of the audit process can be significantly impacted by the manner in which stakeholders interact with each other. As an illustration, auditors are responsible for collecting audit evidence, and fostering an open and constructive dialogue between the auditors and the management of the audited entity can facilitate the smooth and timely gathering of such evidence. A crucial aspect of conducting a thorough and unbiased audit process is ensuring that auditors have unrestricted access to all pertinent information and individuals, both internal and external to the audited entity. This allows auditors to conduct a comprehensive examination, free from any limitations or constraints that may impact the effectiveness of their work (IAASB, 2014).

#### **1.4.5. Contextual factors.**

Various contextual factors, such as laws and regulations, corporate governance, and the applicable financial reporting framework, can exert a significant impact on audit quality. The existence of robust legal and regulatory frameworks provides a clear framework for high-quality work and ensures that auditors operate within a structured and regulated environment. Additionally, regulatory oversight through an effective quality control regime for auditors can enhance the quality and reliability of the audit process. Furthermore, corporate governance practices, which emphasise transparency and ethical behaviour, play a pivotal role in bolstering audit quality. Finally, the quality of the applicable financial reporting framework, as mandated by the ISAs, is a critical determinant of audit quality. Compliance with these standards can significantly improve the accuracy and completeness of financial reporting, ultimately enhancing the overall quality of the audit process (IAASB, 2014).

## 2. Earnings management

### 2.1. Definition

Due to audit failures and corporate bankruptcy, perceptions of audit quality have recently emerged as an important concern (Kilgore et al. 2014). The Enron scandal, along with other financial statement disasters, brought to light the responsibility of auditors in detecting and preventing errors and frauds in financial reports that led to these crises (Khushboo & Singh, 2021). It has been asserted that the firms' manipulation of accounting information is facilitated by the inherent flexibility of the accounting standards (Alves, 2013). In fact, some managers manipulate their financial statements by exploiting the variability afforded by different accounting methods (Yasser & Soliman, 2008). The foremost duty of auditors is to bolster the trust of stakeholders in the veracity of a firm's financial records, hence, guaranteeing that they faithfully represent the financial status of the company (PwC, 2017). However, earnings management is a significant concern for auditors, as it can distort the fair presentation of financial statements (Barghathi et al., 2018).

Diverse definitions of earnings management can be found in the literature. Schipper's definition (1989) is the most popular one. Schipper (1989) defines earnings management as "purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain" (p. 92). Similarly, Healy and Wahlen (1999) define the occurrence of earnings management as "when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers" (p. 368). Overall, earnings management refers to a variety of business management techniques used by management to distort the perception of the company's financial situation (Healy & Wahlen, 1999; Bernstein & Siegel, 1979). An incentive to manipulate and the opportunity to do so are two conditions for earnings management (Jackson, 2018).

When management employs doubtful accounting methods, auditors grow increasingly concerned (Jones, 2011). The significance of audit quality, which certifies the accuracy of financial reports and subsequently ensures better earnings quality, is thus emphasised by previous studies (Balsam et al., 2003; Cohen et al., 2004; Sani et al., 2018). The auditing function serves as a control mechanism by striking a balance between the interests of managers and shareholders, thereby preventing managers from engaging in opportunistic behaviour by manipulating earnings (Francis & Wang, 2008; Zhan et al., 2020). To further elucidate, the auditing function plays a crucial role in corporate governance by mitigating the information asymmetry between company managers and shareholders. As part of the agency theory of corporate governance, it serves as a control mechanism that ensures managers do not act opportunistically by manipulating reported earnings (Alves, 2013; Chan et al., 1993; Jensen & Meckling, 1976). Indeed, the separation of ownership and control in companies can result in an agency problem between the shareholders and the managers who are more informed than the former (Holmstrom & Milgrom, 1987). Discretion, in the form of earnings management, could be exercised by managers if carried out within the framework of GAAP (Harris & Raviv, 1979; Fama, 1980; Walker, 2013).

The business world is highly susceptible to the adverse impacts of crises, especially during financial or health emergencies. Such crises can trigger credit and liquidity issues, which may further exacerbate the situation and amplify the risk of bankruptcy (Tsipouridou & Spathis, 2014). Additionally, the outbreak of COVID-19 has resulted in substantial stock market fluctuations and the implementation of trade and consumption restrictions, significantly impacting future economic growth (Gormsen & Koijen, 2020). These issues and associated risks have direct consequences for various stakeholders connected with the affected firms. The ramifications of business failures are profound, both from an economic and social perspective, with shareholders risking substantial monetary losses, and management and employees facing the possibility of job insecurity or unemployment (Charitou et al., 2007). Since managers may have greater incentives to manage earnings during crises, the quality of the information they offer in the financial statements is thus the focus of attention (Tsipouridou & Spathis, 2014). In fact, amidst the ongoing health crisis, companies worldwide have been urged to enhance their communication and transparency efforts by providing comprehensive and precise disclosures. This is especially important in ensuring that financial statements accurately depict the financial situation of the company during these turbulent economic times (Clayton & Hinman, 2020). As such, the significance of audit quality cannot be overstated, as it serves as a crucial control mechanism to prevent managers from engaging in upward or downward manipulation of financial results.

## ***2.2. Drivers of earnings management***

The practice of earnings management can be motivated by a plethora of incentives. Management compensation is among the most significant ones. As per the tenets of agency theory, a fundamental divergence exists between the interests and preferences of managers and shareholders within a corporation (Jensen & Meckling, 1976). When making decisions, managers and shareholders may have divergent time horizons and priorities. Moreover, these two stakeholders have distinct risk profiles. Investors have invested their capital in the company and bear the risk of losing it. Managers, on the other hand, only bear risk when it pertains to their human capital. By enjoying benefits without assuming any risk, managers act in a manner that contravenes the interests of the shareholders, thereby leading to the incurrence of agency costs (El Dir, 2018, p. 47).

As a result, shareholders create compensation plans that fit their interests with those of the management to avoid the prior cost (Laux & Laux, 2009), for example through shares or options (Healy, 1985; El Dir, 2018, p. 17). However, managers may have the motivation to engage in earnings management practices to augment the firm's profits, leading to an increase in its stock price. This may result in the timely sale of shares by managers, who often prioritise short-term gains, as opposed to long-term shareholders who are focused on holding onto their shares (Ronen & Yaari, 2008). Similarly, bonuses and other performance-based payments encourage managers to use earnings management (Healy, 1985). By the way, management remuneration includes performance-based incentives in the shape of bonuses and stock options (Perry & Zenner, 2001; Balsam et al., 2003; Jensen et al., 2004). Managers attempt to keep earnings within the minimum and maximum limitations established by the board of directors in order to be eligible for bonuses since these ones generate an incentive to manage earnings (Healy, 1985).

Another reason for using earnings management is related to what is known as the 'big bath policy', especially when a new management team takes over. When newly appointed executives come in, it may be tempting to blame poor performance on previous managers. The new management team holds its predecessors accountable for losses in order to preserve its own reputation (Murphy & Zimmerman, 1993). The big bath policy involves management worsening already poor results (Healy, 1985). The new managers take advantage of deflating profits at the beginning of their tenure to lower shareholders' expectations and deliver better future performance (Geiger & North, 2006; Ronen & Yaari, 2008). Indeed, based on the dismal performance of the prior management team during the current year, they set low expectations for their performance going forward (Murphy & Zimmerman, 1993; Pourciau, 1993).

Additionally, earnings management may be carried out with the intention of meeting and even beating management's or financial analysts' forecasts (Matsunaga & Park, 2001; Moehrle, 2002; Iatridis & Kadorinis, 2009). Analysts act as gatekeepers, keeping an eye on management performance to protect shareholders' interests (El Diri, 2018, p. 82). They are crucial in deciphering complex information presented by management to users of financial reports and in offering pertinent analysis for decision-making (Brennan & Hughes, 1991). Analysts play a crucial role in shaping the financial markets by providing valuable insights into the performance of companies. Their forecasts and reports have a significant impact on market prices since analysts' reports increase the efficiency of sharing financial information and enable investors to make more informed decisions (Brennan & Tamarowski, 2000). By the way, companies with quarterly results that meet or exceed analysts' expectations have higher stock market profitability than those whose earnings announcements fall short of expectations (Bartov et al., 2002). By contrast, if managers fail to meet the forecasts made by the analysts, the market may react badly (Clikeman, 2003).

Last but not least, another reason for using earnings management relates to debt covenants and loan covenants (Iatridis & Kadorinis, 2009). A loan covenant is an agreement between a borrower and a lender which outlines the terms and conditions of the loan policy. The agreement gives the lender some leeway in making loans while yet preserving its lending position. It also gives clear expectations to the borrower (El Diri, 2018, p. 75). In order to protect themselves against any potential default by the company, banks, and other creditors may include debt covenants in loan agreements (Grossman & Hart, 1982). If and when the covenant is broken, the lender may take particular measures, such as requesting immediate repayment of the loan. Lenders also have the option of accelerating loan repayments, limiting credit availability, and changing the cost of capital in the event of a technical default (Roberts & Sufi, 2009; Sufi, 2009). To ensure compliance with the terms of their debt agreements, companies may be subject to debt covenants that provide management with incentives to engage in earnings management practices (Healy & Wahlen, 1999; Clikeman, 2003). Consequently, managers in firms with high covenant risk may be more likely to partake in earnings management to forestall potential covenant violations. During periods of financial distress, companies may further resort to earnings management practices in order to forestall default or to strengthen their bargaining position during debt renegotiations (Defond & Jiambalvo, 1994; Dichev & Skinner, 2002; Sweeney, 1994). By artificially boosting reported earnings, companies may create the perception of financial stability, which can help to ease creditor and investor concerns.



The practice of earnings management may exhibit variations contingent upon the economic climate, especially in times of upheaval within a specific sector. In such periods, companies may face increased pressure from the market to engage in earnings management compared to normal business conditions (Ljubisavljević & Jakobsson, 2022). On the one hand, upward earnings management can be driven by managers' desire to avoid share price declines that could negatively impact their compensation (Charitou et al., 2007). Moreover, external pressures from investors may further incentivise managers to manipulate financial results to present a more favourable picture of the company's financial health (Iatridis & Kadorinis, 2009; Kothari et al., 2016). On the other hand, managers may have incentives to partake in income-decreasing earnings management during a time of crisis (Chia et al., 2007), a phenomenon referred to as the 'big bath' accounting argument (Franceschetti, 2020). In such instances, managers may exploit the poor economic conditions to report even larger losses, attributing the decline in performance to weak macroeconomic outcomes rather than their own managerial shortcomings (Chia et al., 2007; Mollik et al., 2020). This makes it easier for them to achieve their earnings targets in subsequent periods (Hope & Wang, 2018). To ensure the integrity of financial reporting, it is crucial to maintain high levels of audit quality and to monitor for any indications of earnings management, both upward and downward.

### **2.3. Earnings management measure**

Corporations employ various techniques to regulate their financial outcomes. The literature mainly discusses two types of earnings management: cash flow-based earnings management, which involves real earnings management, and accrual-based earnings management, which is an accounting-based method. Irrespective of the approach chosen, the goal of earnings management through these two methods is to enhance the earnings displayed in the financial statements and the understanding of accounting figures by stakeholders (El Diri, 2018).

#### **2.3.1. Real earnings management.**

Roychowdhury (2006) defines real earnings management as “management actions that deviate from normal business practices, undertaken with the primary objective of meeting certain earnings thresholds” (p. 336). Management makes business decisions that don't line up with routine company's operations, which obscures the firm's true performance (Roychowdhury, 2006). Overall, real earnings management provides managers with greater flexibility as it allows them to manipulate operational activities throughout the fiscal year in order to achieve desired financial results (Roychowdhury, 2006; Gunny, 2010).

Real earnings management is typically executed through operational decisions that have a direct impact on a firm's cash flow and can be implemented through various means. First, one common tactic is to expedite temporary sales via discounts, particularly at the end of the fiscal year, with the objective of moving the following year's sales to the current year. This strategy results in an increase in current-period earnings (Cohen & Zarowin, 2010; Roychowdhury, 2006; Dechow & Skinner, 2000). Furthermore, adjusting discretionary spending, such as research and development (R&D), advertising, selling and administrative fees, can result in lower expenses and consequently higher current-year earnings (Osma, 2008; Roychowdhury, 2006; Cheng, 2004; Bushee, 1998). Other techniques of managing real earnings can be used, such as timing the sales of long-term investments and assets during times of low earnings (Bartov, 1993), or overproducing in order to lower the fixed cost per unit, which in turn lowers the cost of sales and goods (Chi et al., 2011; Roychowdhury, 2006).

It can be challenging to identify real earnings management (Jeanjean, 2003). Distinguishing between the inclination to manipulate accounting records and a judicious management decision can prove to be a difficult task (Schipper, 1989). Due to the reduced likelihood of the auditor's scrutiny (Evans et al., 2015), real earnings management may represent a notably tempting tactic for meeting performance benchmarks (Graham et al., 2005).

### **2.3.2. Accrual-based earnings management.**

Accrual-based earnings management represents the second category of earnings management. In contrast to real earnings management, accrual-based earnings management has been subjected to significantly more scholarly inquiry. Dechow and Skinner (2000) postulate that accrual-based earnings management encompasses "within-GAAP choices that try to 'obscure' or 'ask' true economic performance" (p. 240). In fact, it is possible to adjust earnings upwards or downwards based on accounting choices such as depreciation methods for fixed assets. In contrast to real earnings management, the manipulation of accruals does not affect a company's cash flows (Jeanjean, 2003). By the way, it is critical to comprehend the meaning of accruals.

Accruals are defined by Healy (1985) as the sum of "accounting adjustments to the firm's cash flows mandated by accounting standard-setting bodies" (p. 6). They are equal to the difference between net income and operating cash flows (Healy, 1985). Net income is the total revenues minus the total expenses of a business over a period of time, while operating cash flow is the cash that flows in and out of the business for its ongoing operations. Accruals are therefore the part of the net result that does not correspond to actual cash flows, but rather to accounting adjustments related to expenses and revenues that have not yet been paid or received. They consist of all income and expenses recorded in the income statement that did not give rise to any flows during the year. This means that an expense which has not been disbursed or income that has not been received may affect the accounting result for a year (Chtaoui & Benhrimida, 2021).

To better illustrate this concept, an example is perhaps the most effective way to understand it. At the end of its fiscal year, a company has the following financial results:

- recorded revenue: €1,000,000;
- collected revenue: €900,000;
- revenue not yet received: €100,000;
- recorded expenses: €450,000;
- expenses paid: €400,000;
- expenses not yet paid: €50,000.

In this illustration, the operational cash flow can be determined as the discrepancy between the cash inflows and the outflows arising from the company's activities, resulting in €500,000 (calculated as €900,000 minus €400,000). To compute the accruals, it is imperative to calculate the difference between the net income and the operational cash flow. Net income can be derived by deducting total expenses, including unpaid expenses, from total revenue. In this specific case, the net income stands at €550,000, obtained from the difference between €1,000,000 in total revenue and €450,000 in total expenses. By recognising that the accruals represent the variance between net income and operational cash flow, they amount to €50,000 (derived from subtracting €500,000, the operational cash flow, from €550,000, the net income).

Regardless of when cash is received or paid out, accruals ensure that income and expenses are recorded in the appropriate accounting period. This allows companies to shift from cash accounting to accrual accounting, which records income or expenses without requiring a cash flow (Jeanjean, 2003). While cash accounting considers the net result to be the difference between cash received and cash paid, accrual accounting recognises the impact of non-cash expenses, such as depreciation and provisions. Financial managers may exercise their discretion and make accounting choices in financial reporting to manipulate earnings by exploiting undisbursed expenses and uncashed revenues (Healy, 1985). The duration of an asset's useful life or the choice of a depreciation method can be modified to minimise charges and thus manipulate earnings. Therefore, accrual-based earnings management does not involve altering the firm's fundamental economic operations. Rather, it involves selecting the accounting techniques used to depict those activities, as argued by Beneish (2001), Walker (2013), and Kothari et al. (2016). Such manipulation can lead to discrepancies between the operating cash flow and the net income, known as 'accruals' (Chtaoui & Benhrimida, 2021).

### **2.3.3. The trade-off between earnings management activities.**

The literature acknowledges that accrual-based earnings management and real earnings management are alternative methods, primarily based on their relative costs (Cohen et al., 2008; Cohen & Zarowin, 2010; Zang, 2012). In fact, the cost of accrual manipulation is positively connected with real manipulation, while real manipulation and accrual manipulation exhibit an inverse correlation (Zang, 2012). Costs associated with accrual-based earnings management encompass stakeholders' scrutiny, audit quality, and accounting flexibility. The competitive position in the market, financial steadiness, institutional ownership, and the tax ramifications of manipulation are all included in the costs of real earnings management. In order to achieve targeted profit thresholds within a fiscal year, managers resort to real earnings management. If the intended earnings are not realised, they make the transition to accrual-based earnings management at the end of the fiscal year (Zang, 2012).

Nevertheless, the operational and accounting contexts may exert a substantial influence on the selection of profit manipulation methods. For instance, the extent to which a company manages its real and accrual earnings is apt to fluctuate based on the regulatory framework within which it operates (Zang, 2012).

Per prior research, managers demonstrate a preference for manipulating real activities instead of accrual-based ones for the following rationales (Alhadab et al., 2015). First of all, in contrast to real earnings management, the practice of manipulating accrual accounting has garnered heightened scrutiny from standard setters, regulators, and external auditors (Kothari et al., 2016; Walker, 2013; Cohen & Zarowin, 2010; Roychowdhury, 2006; Graham et al., 2005). Because of the opaque nature of real earnings management, which involves operational decisions rather than a collection of accrual estimates subject to the auditor's inspection, monitoring the manipulation of real activities is more challenging than monitoring the manipulation of accruals (Bereskin et al., 2018; Dichev et al., 2013). Contrary to the limitations and restrictions that apply to the manipulation of accruals, there are no clear guidelines on what constitutes an attempt at real earnings management (Kothari et al., 2016). Secondly, Barton and Simko (2002) assert that the likelihood of managers positively inflating earnings by manipulating accruals is restricted by the extent to which net assets are already overstated on the balance sheet. This is attributable to the fact that the latter reflects the cumulative impact of previous accounting decisions, which curtails the manoeuvrability of managers to manipulate accruals. Therefore, the company's ability to manipulate accruals may be limited.

As a result, companies that have relied heavily on accrual-based earnings management in the past are liable to resort to real activity manipulation if they still wish to achieve their desired outcomes (Gunny, 2010). Finally, real earnings management may occur throughout the financial period, while accrual-based earnings management may take place at the end of the year or quarter. The accounting treatments that the auditor will allow at that time are uncertain to managers (Gunny, 2010). By the way, if managers opt to manipulate earnings solely through accrual-based methods and the manipulated amount is below the intended threshold, they may not have sufficient time to utilise real earnings management for the remainder of the year (Gunny, 2010; Roychowdhury, 2006).

#### **2.3.4. Total accruals, normal accruals, and discretionary accruals.**

The concept of accruals is explicitly defined in Section 2.3.2. The literature breaks down this notion into several components. Specifically, total accruals can be partitioned into two categories: normal or non-discretionary accruals, and abnormal or discretionary accruals. Accounting manipulations typically do not pertain to the entire amount of total accruals but rather a portion of them, known as discretionary accruals. Conversely, normal accruals result from an accurate and honest application of accounting standards (Jeanjean, 2003). They are largely influenced by external factors, such as the business environment, and depend on the operating conditions of the business (Callao & Jarne, 2010). Managers have no control over these normal accruals (Elrazaz, 2018). Discretionary accruals, by contrast, are the adjustments made in accordance with the managers' prescriptions. They are thus the part of total accruals by which managers seek to change the results in order to maximise personal gains (Krishnan, 2003). Only discretionary accruals are subject to management's discretion (Healy, 1985). Therefore, discretionary accruals can lead to lower earnings reliability (Elrazaz, 2018).

Outsiders are unable to discern managers engaging in such opportunistic behaviour (Krishnan, 2003). When in doubt about the reliability of the financial statements, users of these statements often rely on audit reports, which provide an independent evaluation of the financial statements, thereby increasing their credibility and transparency (Tsipouridou & Spathis, 2012). The concept of agency theory and the asymmetry of information between managers and investors, also known as the principal-agent problem, becomes apparent in this context (Jensen & Meckling, 1976; Chtaoui & Benhrimida, 2021). The separation of ownership and control in companies gives rise to an agency problem between shareholders and managers, whereby managers possess greater information than shareholders (Holmstrom & Milgrom, 1987). Due to the aforementioned information asymmetry, creditors and investors may require a higher cost of capital to offset the risk of potential losses arising from opportunistic managerial behaviour. As a result, such conduct can lead to an increase in the cost of capital for the firm, potentially reducing its competitiveness in the marketplace (Krishnan, 2003). By the way, companies with high levels of accruals are more susceptible to agency costs compared to those with lower levels of accruals, as noted by Francis et al. (1999). The evaluation of earnings management is most effectively achieved through the examination of discretionary accruals (Elrazaz, 2018; Kothari et al., 2005). By minimising opportunistic earnings management, which contributes to the creation of discretionary accruals (Chtaoui & Benhrimida, 2021), auditing and audit quality play a significant role in reducing these agency costs (Krishnan, 2003). Besides, the auditor's responsibility includes the reduction of information asymmetry between companies and stakeholders as well as agency costs brought on by the managers' opportunistic behaviour (Francis & Wang, 2008).

### 3. Hypothesis development

The principal aim of this thesis is to assess and contrast the audit quality provided by the Big 4 versus the non-Big 4, prior to and amidst the coronavirus pandemic in Belgium. The size of the auditing company is widely used as a proxy for audit quality (DeAngelo, 1981; Vander Bauwhede & Willekens, 2004; Wong et al., 2018). A multitude of studies have been conducted in the literature to juxtapose the quality of auditing services furnished by the Big 4 and the non-Big 4. DeAngelo (1981) was among the pioneers in advocating that audit quality is contingent upon the size of the audit firm: an audit conducted by a Big 4 is more likely to be of higher quality compared to a non-Big 4, as the former has greater incentives and resources to ensure that the audit meets the required standards. Numerous analyses have demonstrated that Big 4 auditors tend to offer higher quality audits than their non-Big 4 counterparts (DeFond, 1992; Francis et al., 1999; Knechel et al. 2013). Since Big 4 auditors have more observable attributes that are typically associated with high quality than other audit firms, such as specialised training and peer review, investors may perceive Big 4 auditors as being of higher quality than other audit entities (Dopuch & Simunic, 1982). In fact, the Big 4 appear to allocate more resources to technology and staff training programs than other audit companies, as they have greater capacity compared to the non-Big 4 (DeAngelo, 1981; Craswell et al., 1995). Additionally, it can be posited that larger audit firms are imbued with a stronger incentive to provide a rigorous and meticulous audit, given that their reputation and financial standing are at greater risk should an audit deficiency come to light (Dye, 1993). The Big 4 encounter escalated litigation expenses or reputational harm in case they jeopardise their independence (DeAngelo, 1981). Hence, they tend to exercise tighter control over their clients' accounting information when the risk of litigation or reputation loss is high (Simunic & Stein, 1996; Francis & Krishnan, 1999). Alternatively, DeAngelo (1981) argues that the Big 4 are more independent than the non-Big 4. Large audit companies enjoy a diverse and extensive portfolio of clients, which lowers their economic reliance on any particular client, thereby diminishing the likelihood of any conflicts of interest that may arise during their capacity as auditors (Choi et al., 2010). In contrast, smaller audit corporations may be exposed to economic, social, and personal pressures from clients (Sirois et al., 2016). Larger offices are less susceptible to give in to clients' pressure for lower-quality reports than smaller offices (Choi et al., 2010).

Despite being supported by various authors and studies, DeAngelo's hypothesis (1981), mentioned earlier, has been challenged, particularly in the 2000s. Khurana and Raman (2004) state that DeAngelo's article (1981) cannot explain why better audit quality is provided by the Big 4 because his study is solely focused on the US market, which has the most stringent legal system worldwide. Therefore, the legal environment regarding the audit quality study takes on importance. Besides, Francis and Wang (2008) point out that the audit quality of large and small audit firms is comparable in countries with low litigation risk and that the gap between the audit quality of Big 4 and non-Big 4 auditors increases when the legal regime becomes stricter. Although several mechanisms have been established with the aim of safeguarding audit quality in Belgium (Gaeremynck et al., 2008), Belgium has a low litigious environment, and a correspondingly low litigation risk (Vanstraelen & Willekens, 2008). Similarly, numerous investigations carried out in diverse countries, such as Belgium, France, Malaysia, Greece, Turkey, Pakistan, Korea, and China, have established that there is no significant variation in the levels of discretionary accruals among companies audited by a Big 4, and non-Big 4 clients (Vander Bauwhede & Willekens, 2004; Othman & Zeghal, 2006; Ching et al., 2015; Tsipouridou & Spathis, 2012; Yasar, 2013; Abid et al., 2018; Jeong & Rho, 2004; Zhan et al., 2020), knowing that discretionary accruals are used as a proxy for audit quality (Jones, 1991).

The literature reports several arguments, including those proposed by Lawrence et al. (2011). One critical point to consider is that all audit firms, irrespective of their size, are bound by the same legal and ethical requirements to maintain a reasonable level of quality. Smaller audit companies may possess even stronger motivations to provide high-quality audits, as they may not possess an equivalent level of insurance support enjoyed by Big 4 firms. This disparity in insurance backing could potentially result in more significant financial risks and consequences in the event of an audit failure (Lawrence et al., 2011).

Ultimately, there is no clear consensus on whether the size of the audit firm affects audit quality, given the conflicting findings and inconclusive outcomes that have been reported (Rodríguez, 2007). This issue remains unresolved, both in regular times and during a crisis. With the onset of the coronavirus disease in 2019, the role and effectiveness of audit firms has become even more critical. Goodell (2020) underscores that the outbreak has introduced unprecedented challenges and uncertainties, and highlights the significance of examining the impact of such situations on audit quality. As managers may have stronger incentives to manage earnings during periods of turmoil, such as the COVID-19 pandemic, ensuring the quality of financial reporting becomes of paramount importance, especially since investors and other stakeholders thoroughly examine the disclosed information (Tsipouridou & Spathis, 2014; Ljubisavljević & Jakobsson, 2022). On the one hand, the upward management of earnings may be employed by executives to avoid share price drops that could adversely affect their compensation (Charitou et al., 2007). In addition, investors may exert pressure on managers to manipulate earnings and portray a more favourable financial outlook of the company (Iatridis & Kadorinis, 2009; Kothari et al., 2016). On the other hand, managers may engage in income-reducing earnings management during times of crisis, taking advantage of the situation to declare even greater losses, as outlined in the 'big bath' accounting argument (Chia et al., 2007). The downturn in firm performance can be attributed to unfavourable macroeconomic outcomes, without questioning the performance of managers (Mollik et al., 2020). This makes it easier for them to boost profits and achieve their objectives in subsequent periods (Hope & Wang, 2018). Once more, auditors hold a critical responsibility in guaranteeing that there is no earnings manipulation by management, whether upwards or downwards. During financial crises, the importance of audit quality and the efficacy of audit practices are magnified, with numerous studies suggesting that the selection of an auditor or the perceived quality of the audit can greatly influence earnings management behaviour (Chia et al., 2007). This has led to increased attention being paid to audit quality in times of distress, with experts and stakeholders recognising the vital role high-quality audits play in enhancing the credibility and reliability of financial information (Francis, 2004; Fargher & Jiang, 2008). While various studies have assessed the audit quality of audit entities, the literature has not fully explored the impact of the size of the audit firm on audit quality in times of crisis. As discussed by Coffee Jr (2004) and Leone et al. (2013), the auditors' decisions are influenced by the downward market situation, potentially leading to a decrease in audit quality as auditors may relax their usual scepticism amidst market euphoria. Despite these arguments, other authors contend that there is no significant evidence of a decline in audit quality during global crises, regardless of the size of the audit firm, as suggested by Shahzad et al. (2018).

Taking into account the contrasting viewpoints regarding the effect of audit firm size and the COVID-19 outbreak on audit quality, the aforementioned discourse gives rise to a null hypothesis:

***H1: Audit quality, as measured by discretionary accruals, is not associated with audit firm size in Belgium, even during the COVID-19 pandemic.***



## Data and methodology

The present paper utilises a quantitative approach to address the research topic, which confers the benefit of handling extensive datasets and populations, leading to more thorough descriptions and generalisable research findings. Nevertheless, this approach necessitates handling larger sample sizes and utilising specialised software for statistical analysis, notably the RStudio software, which is employed for data analysis in this paper.

Our research relies on secondary data, that is, pre-existing data that are sourced from databases. Specifically, financial and auditor information is extracted from the Bel-first database of Bureau Van Dijk. This particular database encompasses financial data of all corporate entities that are required by law to engage an independent auditor to audit their accounts and submit such audited accounts to the National Bank of Belgium in compliance with statutory regulations. The utilisation of secondary data in academic research offers various advantages, including enhanced accessibility, broader geographical and historical coverage, and ease of use. However, certain limitations exist, such as incompleteness and a limited degree of control over the data generation process. Consequently, it may be necessary in certain cases to cleanse the data, as is done in the present study. In this regard, the financial data are extracted from Bel-first in Excel format and undergo thorough cleansing procedures, as described below.

### 1. Sample selection

The sample selected for testing the hypothesis comprises large and very large Belgian firms, which underwent auditing by a single audit firm during the period 2016 to 2019, prior to the health crisis, as well as in the year 2020. The analysis is exclusively focused on the financial data for the year 2020 to examine the quality of audit services performed by the Big 4 and non-Big 4 auditors in Belgium during the COVID-19 outbreak. This year was particularly challenging for Belgian companies due to the exceptional circumstances brought about by the pandemic.

To ensure the relevance of the analysis to the Belgian context, our sample is defined based on several criteria presented in Figure 1. The first criterion is inserted to extract solely the financial information of Belgian companies and associations from the Bel-first database. This yields a sample comprising 2,060,135 firms. To further refine it, a second criterion is introduced, namely that only Belgian entities audited between 2016 and 2020 are included: 2,023,912 entities are excluded from the selection, leaving a total of 36,223 companies. Additionally, the analysis is restricted to companies following the full accounts model. All Belgian entities with the abridged or micro accounting model are thereby removed, eliminating 18,555 firms and bringing the sample size to 17,368 entities. To prevent the potential introduction of biases in the analysis, a purposeful choice is being made to incorporate solely those enterprises classified as either large or very large within the sample. This choice is predicated upon the presumption that the Big 4 audit firms ordinarily cater to companies falling within these two size classifications. Consequently, this criterion results in a reduction of the sample size by 5,897 firms, leaving a total of 11,471 entities.



Furthermore, companies for which financial data are not available in Bel-first for the period spanning from 2016 to 2020 are excluded from the sample. This step is indispensable for securing comprehensive financial information and guaranteeing a rigorous analysis within the scope of this study. Hence, the exclusion of these entities led to the removal of 1,552 cases, ultimately yielding a sample consisting of 9,920 firms.

The ultimate criterion entails the elimination of all entities that have been audited by two or more auditors between 2016 and 2020. Solely Belgian companies with a single auditor during this time frame are deemed appropriate for inclusion in the sample. Certain firms had multiple auditors during the stated period, rendering their consideration unsuitable for two reasons.

Firstly, it is plausible that a joint audit, which involves two audit firms, may result in higher audit quality compared to an audit performed by a single firm. As per Zerni et al. (2012), the adoption of a joint audit is regarded as a means to enhance both auditor independence and audit quality. This approach exhibits reduced susceptibility to client pressure, as it is less likely for both audit firms engaged in the process to be influenced simultaneously (Zerni et al., 2012). However, joint audits may suffer from a potential 'free-rider problem'. Zerni et al. (2012) also contend that one of the auditors may rely on the efforts of the other audit entity, which may lead to a decline in overall audit quality. On the whole, the literature presents various viewpoints regarding how joint audits can influence audit quality in both positive and negative ways.

Secondly, a company may have switched auditors during the period from 2016 to 2020, which may have influenced the quality of the audit provided. The literature has extensively debated the impact of long audit tenure and rotation on audit quality. The shift of auditors may have a detrimental effect on audit quality due to the loss of client-specific knowledge, which undermines the professional competence of auditors, as argued by Arruñada and Paz-Ares (1997). In contrast, limited audit tenure restricts the relationship between auditors and the client, and hence increase the incentive for auditors to maintain their independence (Chung, 2004).

Considering the divergent opinions regarding the impact of joint audits and audit tenure on audit quality, the sample is refined by excluding companies with multiple auditors between 2016 and 2020, as well as those with missing data for both the independent and dependent variables. This is done to ensure that the analysis in this research is unbiased. As a result, a total of 6,577 firms are eliminated from the sample, leading to a total of 3,343 entities. This ultimately yields a database of 16,715 firm-year observations spanning the years 2016 through 2020.

< Insert Figure 1 about here. >

In order to deepen the analysis, the sample distribution is displayed by NACE (2008) two-digit group of industries. We provide detailed information about our population in Table 1. The findings depicted in Panel A reveal a clear trend in the data, indicating that the vast majority of entities included in the sample operate within three key sectors of the economy. Specifically, an overwhelming 29.94% of the entities engage in wholesale and retail trade, while a further 25.04% are involved in the manufacturing sector, as illustrated in Figure 2. Additionally, 8.47% of the entities operate in the construction sector, making it another significant player in the sample. Certain sectors appear to have low representation in the latter, namely the public administration and defence sector, the accommodation and food service activities sector, and the agriculture, forestry, and fishing sector, which account for 0.24%, 0.51%, and 0.51% of the total sample, respectively.

Two sectors exhibit a complete lack of representation, specifically the activities of households as employers and undifferentiated goods- and services-producing activities of households for own use sector, as well as the activities of extraterritorial organisations and bodies sector.

< Insert Figure 2 about here. >

Upon closer examination of Panel B, it becomes apparent that the two sectors with the highest representation are those with the greatest number of audited entities by a Big 4. As illustrated in Figure 3, the wholesale and retail trade sector comprises 24.70% of the audited firms by a Big 4, which corresponds to 9.27% of the total sample. Furthermore, the manufacturing sector contains 30.92% of the audited companies by a Big 4, which is equivalent to 11.61% of the overall population. The agriculture, forestry, and fishing sector, as well as the public administration and defence sector, have a low representation in terms of the number of firms audited by the Big 4. Both of these sectors account for only 0.16% of the subsample, which represents a mere 0.06% of the total sample. In addition, the two sectors that exhibit a complete lack of representation are therefore irrelevant for the analysis of observations subjected to an audit by a Big 4. Overall, 37.54% of the population under examination undergoes auditing procedures performed by one of the Big 4.

< Insert Table 1 and Figure 3 about here. >

## 2. Models for evaluating accruals

Audit quality is difficult to measure (DeFond & Zhang, 2014). Various measurement models are discussed in the literature, but one in particular stands out: the Jones model (1991). The latter distinguishes between the discretionary and non-discretionary components of accruals and employs the magnitude of discretionary accruals as a proxy for audit quality. According to Jones (1991), the model considers changes in a firm's economic conditions, assuming that total accruals are caused by a combination of managerial discretion and changes in the company's economic environment (Elrazaz, 2018).

Nevertheless, the Jones model (1991) is vulnerable to estimation error. It relies on an implicit assumption that revenue fluctuations are not subject to managerial discretion (Dechow et al., 1995). In other words, managers do not have control over revenue recognition (Elrazaz, 2018). However, Dechow et al. (1995) contend that discretionary manipulation of revenue is possible, particularly through the timing of recognition. They further argue that managers have greater flexibility in exercising discretion over credit sales recognition than cash sales recognition, which can significantly impact total accruals for the period.

Consequently, Dechow, Sloan, and Sweeney (1995) have proposed a 'modified Jones model' that addresses the limitations of the Jones original model (1991). As the change in credit sales can be subject to manipulation by management, only the rise in sales that do not have an immediate counterpart in trade receivables explains the non-discretionary accruals (Jeanjean, 2003). Accordingly, the authors suggest correcting the variation in revenue by the variation in trade receivables.

Ten years later, Kothari, Leone, and Wasley (2005) improved this modified Jones model by incorporating an indicator that assesses the economic profitability of companies and monitors their operational performance. They argue that when the Jones model (1991) and the modified Jones model (1995) are applied to samples of firms with extreme financial performance, these models can lead to misspecified tests. Highly profitable and unprofitable companies do not use accruals in the same manner (Le Maux, 2007). Kothari et al. (2005) suggest including return on assets (ROA) as a regressor in the modified Jones model and as an indicator of firm performance in the estimation of normal and discretionary accruals. This model is known as the 'performance-adjusted Jones model'.

In order to determine discretionary accruals (DACC), the first step is to calculate the amount of total accruals (TACC) for each entity by using their reported numbers. In accordance with Dechow, Sloan, and Sweeney (1995), TACC is equal to changes in current assets excluding cash and cash equivalents, minus changes in current liabilities including changes in the portion of the current debt of long-term debt, minus depreciation and amortisation expenses.

$$TACC_{jt} = \Delta CA_{jt} - \Delta CASH_{jt} - \Delta CL_{jt} + \Delta DCL_{jt} - DEP_{jt} \quad (1)$$

where:

$TACC_{jt}$  = total accruals for firm 'j' in year 't';

$\Delta CA_{jt}$  = change in total current assets for firm 'j' in year 't';

$\Delta CASH_{jt}$  = change in cash and cash equivalents for firm 'j' in year 't';

$\Delta CL_{jt}$  = change in current liabilities for firm 'j' in year 't';

$\Delta DCL_{jt}$  = change in short-term debt included in current liabilities for firm 'j' in year 't';

$DEP_{jt}$  = depreciation and amortisation expense for firm 'j' in year 't'.

The subsequent step involves computing the non-discretionary accruals (NDACC), commonly referred to as normal accruals. This calculation is performed using the equation below, which is run cross-sectionally as a regression analysis to estimate the industry-specific coefficients. All the variables of the above regression are scaled by lagged total assets to reduce the potential heteroscedasticity (Jones, 1991). Indeed, one of the assumptions underlying the use of multiple linear regressions is homoscedasticity, which assumes that the variance of the residuals is the same for all independent variables.

$$\frac{TACC_{jt}}{TA_{jt-1}} = \frac{\alpha_0}{TA_{jt-1}} + \frac{\alpha_1(\Delta REV_{jt} - \Delta REC_{jt})}{TA_{jt-1}} + \frac{\alpha_2 PPE_{jt}}{TA_{jt-1}} + \alpha_3 ROA_{jt} + \varepsilon_{jt} \quad (2)$$

where:

$TACC_{jt}$  = total accruals computed in Equation (1) for firm 'j' in year 't';

$TA_{jt-1}$  = total assets for firm 'j' in year 't-1';

$\Delta REV_{jt}$  = change in revenues for firm 'j' in year 't';

$\Delta REC_{jt}$  = change in receivables for firm 'j' in year 't';

$PPE_{jt}$  = property, plant, and equipment for firm 'j' in year 't';

$ROA_{jt}$  = return on assets for firm 'j' in year 't';

$\varepsilon_{jt}$  = error term for firm 'j' in year 't';

$\alpha_1, \alpha_2, \alpha_3$  and  $\alpha_4$  = industry-specific parameters.

Using the estimated coefficients from regression (2), together with the data for each company, the non-discretionary accruals are computed as follows:

$$NDACC_{jt} = \frac{\alpha_0}{TA_{jt-1}} + \frac{\alpha_1(\Delta REV_{jt} - \Delta REC_{jt})}{TA_{jt-1}} + \frac{\alpha_2 PPE_{jt}}{TA_{jt-1}} + \alpha_3 ROA_{jt} \quad (3)$$

In the final step, the total amount of discretionary accruals, that is, the proxy for audit quality, is calculated by subtracting the non-discretionary accruals from the total amount of accruals obtained in the previous steps, as shown by the following equation: (2) – (3)

$$DACC_{jt} = TACC_{jt} - NDACC_{jt} \quad (4)$$

where:

$DACC_{jt}$  = discretionary accruals for firm 'j' in year 't';

$TACC_{jt}$  = total accruals for firm 'j' in year 't';

$NDACC_{jt}$  = non-discretionary accruals for firm 'j' in year 't'.

## 2. Multiple linear regression

A multiple linear regression analysis is conducted to investigate whether the size of the audit firm (Big 4 versus non-Big 4) has had a statistically significant effect on audit quality during the coronavirus pandemic and generally in Belgium. The model includes several control variables related to the characteristics of the audited firms that are recognised to influence discretionary accruals. One of the reasons for the disparity in audit quality between Big 4 and non-Big 4 auditors is the variability in client characteristics, as documented in previous research (Lawrence et al., 2011).

To investigate the research topic and evaluate the hypothesis, the subsequent regression model is estimated. All variable definitions are provided in Table 2. The model establishes a relationship between the magnitude of discretionary accruals in absolute terms and the primary variable of interest, which is the interaction between the dummy variables of interest,  $BIG_{jt}$  and  $COVID_{jt}$ , while controlling for other variables:

$$AbsDA_{jt} = \beta_0 + \beta_1 BIG_{jt} + \beta_2 COVID_{jt} + \beta_3 BIG\_COVID_{jt} + \beta_4 SIZE_{jt} + \beta_5 ROA_{jt} + \beta_6 GROWTH_{jt} + \beta_7 LT\_DEBTS\_TO\_ASSETS_{jt} + \beta_8 CURRENTR_{jt} + \beta_9 LOSS_{jt} + Industry\ dummies + \varepsilon_{jt} \quad (5)$$

where 'j' and 't' are firm and year indicators. The dependent variable,  $AbsDA_{jt}$ , measures the absolute value of discretionary accruals, as calculated through the performance-adjusted Jones model (Kothari et al., 2005). The latter methodology employs the absolute value of discretionary accruals with the purpose of mitigating the influence of both positive and negative accruals on earnings manipulation. This approach reveals a management strategy that is capable of either inflating or deflating earnings, respectively.

$BIG_{jt}$  is measured as a dummy variable that equals '1' if a company is audited by a Big 4, and '0' otherwise. We employ the size of the audit firm as a proxy for audit quality to examine the hypothesis. As per our hypothesis, we expect no discernible difference in audit quality between the Big 4 and other audit companies operating in Belgium. Accordingly, we anticipate that the coefficient on the dummy variable of audit firm size ( $\beta_1$ ) will not be statistically significant.  $COVID_{jt}$  is a dummy variable that takes the value of '1' if an entity is audited during the COVID-19 crisis, in 2020, and '0' otherwise.

The auditors' decisions can be swayed by the downward trend in the market. As such, audit quality can deteriorate when auditors may become less sceptical in the face of market euphoria (Coffee Jr, 2004; Leone et al., 2013). However, some authors argue that there is no clear evidence of a decrease in audit quality during a worldwide upheaval, irrespective of whether the audit entity is a Big 4 or not (Shahzad et al., 2018). Considering these differing perspectives on the impact of the coronavirus pandemic on audit quality, we do not anticipate a significant coefficient on the dummy variable of the health emergency ( $\beta_2$ ).  $BIG\_COVID_{jt}$  is our main independent variable of interest and is measured as a dummy variable that equals '1' if a firm is audited by a Big 4 throughout the pandemic period, and '0' otherwise. By scrutinising the resulting estimate and its statistical significance, we expect to make appropriate inferences regarding the underlying assumptions. The aforementioned independent variable serves as the key determinant of the relative audit quality provided during the coronavirus crisis by the Big 4 in comparison to other audit entities, as well as the temporal shifts in audit quality between the pre-outbreak and outbreak phases ( $\beta_3$ ).

To improve the accuracy and comprehensiveness of our analysis, we expand the model represented in Equation (5) by introducing additional control variables that account for relevant firm-level characteristics that may impact audit quality. We draw inspiration from papers on discretionary accruals and audit quality (Krishnan, 2003; Dechow et al., 1995; Kothari et al., 2005; Jones, 1991). First, we control for the firm's size ( $SIZE_{jt}$ ) through the natural logarithm of total assets. Due to the presence of more robust governance mechanisms and reduced information asymmetry, it follows that larger corporations would resort less frequently to the use of discretionary accruals (Dechow et al., 1995; Meek et al., 2007). Boone et al. (2010) also conclude that the larger the size of companies, the lower the manipulation of results. Therefore, we expect a negative sign for the coefficient associated with the  $SIZE_{jt}$  variable ( $\beta_4$ ). We further take the firm's operational performance into account by including the return on assets ( $ROA_{jt}$ ) as well as the change in sales relative to the previous year ( $GROWTH_{jt}$ ). Studies indicate that corporations exhibiting a greater operating return on assets are generally characterised by enhanced financial stability and decreased proclivity towards earnings manipulation. In contrast, underperforming companies may resort to manipulative measures to counterbalance their feeble financial performance and manage earnings decreases and losses away (Burgstahler & Dichev, 1997; Van Tendeloo & Vanstraelen, 2008). Furthermore, some authors suggest that firms with higher growth rates may be more inclined to engage in manipulative behaviour regarding their reported results. For instance, Boone et al. (2010) put forward arguments to support this theory.

However, McNichols (2000) contends that companies with higher anticipated earnings growth and ROA are more likely to exhibit higher levels of accruals compared to firms with lower anticipated earnings growth and ROA, and that estimates of discretionary accruals are significantly and positively related to return on assets and sales growth. Consequently, due to the contradictory viewpoints, there is no definite expectation for the coefficients linked to these two variables ( $\beta_5$  and  $\beta_6$ ).

Moreover, we take into account the firm's financing structure by controlling for the level of long-term debts divided by total assets (*LT DEBTS TO ASSETS<sub>jt</sub>*). The long-term debt-to-total-assets ratio is a financial metric that quantifies the percentage of long-term debts held by a company in relation to the overall value of its assets. A relatively elevated ratio may signify a heightened risk for a given company and reduced ability to fulfil its long-term debt obligations, whereas a lower ratio may indicate a comparatively stable and secure financial position. Although several studies examine the ratio in question, there is a lack of consensus among scholars. Some researchers suggest that corporations facing financial distress are more likely to use discretionary accruals to avoid breaching debt covenants and other financing constraints (Franz et al., 2014; Dichev & Skinner, 2002; DeFond & Jiambalvo, 1994). However, other studies posit that firms with high leverage may attract greater external scrutiny, leading to reduced utilisation of discretionary accruals (Anagnostopoulou & Tsekrekos, 2017). Therefore, there is no clear expectation for the coefficient associated with the variable ( $\beta_7$ ) due to the conflicting perspectives on the relationship between financial distress and discretionary accruals.

We further control for the firm's liquidity situation by including the current ratio, that is, current assets divided by current liabilities (*CURRENT<sub>jt</sub>*). This ratio is a financial metric that reveals an entity's capability to settle its short-term debts with its current assets. It is commonly utilised as a control variable in studies investigating the correlation between an entity's liquidity position and discretionary accruals. Jiang et al. (2016) and Dyreng et al. (2017) contend that managers interfere with the financial reporting process to avoid the current ratio from falling below the established benchmark of one. These authors posit that such behaviour is instigated by creditors' dependence on the current ratio as a significant measure of liquidity in their credit decisions. In a similar vein, a study conducted by Lancksweerd et al. (2021) in Belgium suggests that managerial intervention in the financial reporting process is undertaken to prevent the current ratio from slipping below one. Therefore, we expect a negative sign for the coefficient associated with the *CURRENT<sub>jt</sub>* variable ( $\beta_8$ ).

We also draw inspiration from Choi et al. (2008) and Healy & Wahlen (1999) who demonstrate that the direction of net income (positive or negative) may influence the amount of discretionary accruals, as companies may attempt to adjust their financial earnings. As a result, the variable for loss reporting firms (*LOSS<sub>jt</sub>*) is included to control for potential differences in audit quality between loss reporting entities and profit reporting corporations (Choi et al., 2008). In order to investigate whether companies utilise accrual-based earnings management to circumvent reporting minor losses, Dechow et al. (2003) examine discretionary accruals in firm-years reporting net income just above and below zero. Their analysis reveals that small-profit and small-loss enterprises display comparable amounts of discretionary accruals. Furthermore, the two groups of organisations exhibit similar changes in net income in the subsequent year. Therefore, Dechow et al.'s (2003) results fail to provide evidence in favour of the hypothesis that firms manipulate discretionary accruals to exceed the zero earnings benchmark (Xu, 2016). In contrast, Ayers et al. (2006) identify a statistically significant and positive association between the level of discretionary accruals and surpassing the zero earnings benchmark.

Van Tendeloo and Vanstraelen (2008) further add that underperforming companies may resort to manipulative measures to offset their weak financial performance. Similarly, Burgstahler and Dichev (1997) conclude that earnings declines and losses are often manipulated or managed away. Consequently, due to the contradictory viewpoints, there is no definite expectation for the coefficient linked to this variable ( $\beta_9$ ).

In Equation (5), we include industry dummies to control for industry fixed effects, such as changes in macro-economic conditions.  $\varepsilon$  are robust standard errors clustered at the industry level.

## Empirical results

After computing discretionary accruals using different industry regressions in Excel, a multiple linear regression analysis is performed in the RStudio program. The normality plots and bell curves indicate that all model variables have a roughly normal distribution.

< Insert Figures 4, 5, 6, 7 and 8 about here. >

### 1. Descriptive statistics

Table 3 displays the descriptive statistics of the complete sample, offering insights into the distribution, central tendency, and variability of the data. A decision is made to employ the winsorisation technique to address the issue of outliers in each of the continuous variables. Winsorisation is a well-established approach widely utilised in financial data analysis to effectively manage anomalous values (Adams et al., 2019; Leone et al., 2019). This method involves replacing extreme values with values that are closer to the central tendency. In the context of this multiple linear regression model, extreme values of continuous variables were substituted with values at the 5<sup>th</sup> and 95<sup>th</sup> percentiles of the distribution of non-outlier values.

With a mean of 0.440 and a standard deviation of 0.341, the values of the dependent variable ( $AbsDA_{jt}$ ) exhibit a considerable degree of dispersion around the mean, indicating variability in the data. This is further supported by the values of the 25<sup>th</sup> and 75<sup>th</sup> percentiles, which are equal to 0.149 and 0.690, respectively. 37.5% of all observations are of entities audited by a Big 4 ( $BIG_{jt}$ ) between 2016 and 2020. The mean value of the  $COVID_{jt}$  variable is 20%, which is logical since the year 2020 is identified as the one most impacted by the pandemic out of the five years of analysis spanning from 2016 to 2020.

Moreover, the companies in our sample exhibit substantial heterogeneity in size ( $SIZE_{jt}$ ), as reflected in the large standard deviation of 23,358.110 in thousands of euros. The average firm experiences slight operational gains and growth in sales, with a return on assets ( $ROA_{jt}$ ) of 5.5% and growth in sales ( $GROWTH_{jt}$ ) of 2.8%. Only a small proportion of the population (15.8%) has recorded a loss between 2016 and 2020 ( $LOSS_{jt}$ ). With respect to the firm's capital structure, an average of around 37.6% of assets is financed through long-term debt ( $LT\ DEBTS\ TO\ ASSETS_{jt}$ ). This indicates that corporations, on average, need to liquidate 37.6% of their assets to meet their long-term obligations. Additionally, the current ratio is roughly equal to 1.567 ( $CURRENTR_{jt}$ ), which implies that firms have an average of 1.567 euros of current assets for each euro of current liabilities, that is, an adequate level of current assets to satisfy their short-term debts. However, the presence of a large standard deviation (0.737) associated with this variable suggests the existence of substantial heterogeneity in the current ratios of the sampled firms.

< Insert Table 3 about here. >



The preponderance of the descriptive statistics derived from the sample comprising large and very large Belgian entities concur with those of other investigations conducted in both Belgium and Europe. Hence, the entire sample utilised in our research is representative of the large Belgian firms. Vander Bauwhede and Willekens (2004) examine the differentiation in audit quality within the private client segment of the Belgian audit market, specifically with a variable related to the size of the audit firm (Big Six versus non-Big Six). They also incorporate a variable equal to the ratio of financial debt to total assets. The descriptive statistics for the first mentioned variable are nearly indistinguishable from those observed in our study, as the mean value of their variable is 0.373, whereas ours is 0.375. The statistics for the variable pertaining to firms' financial structure are comparable between the two studies. Moreover, Lancksweerd et al. (2021) conduct a study on the distribution of the current ratio among large Belgian non-profit organisations. Although the sample is not similar to ours, the quantiles are situated at more or less the same levels. Lastly, Van Raak et al. (2020) investigate the impact of audit market structure on audit quality in Belgium. These authors integrate various control variables such as the total debt-to-total assets ratio, the natural logarithm of total assets, the return on assets ratio, a variable related to the size of the audit firm (Big 4 versus non-Big 4), and an indicator variable for operating losses in the prior fiscal year. These control variables are relatively consistent with those employed in our model. Once again, the mean and median of each corresponding variable are located in the same range as the descriptive statistics of our variables. Nonetheless, disparities in the values of the descriptive statistics may occasionally arise, which can be ascribed to variances in the samples extracted across various years.

## 2. Correlation analysis

In Table 4, we provide the results of the correlation analysis of the relevant variables in our sample. The findings suggest a statistically significant positive correlation between the  $AbsDA_{jt}$  and  $BIG_{jt}$  variables, implying that large and very large Belgian entities audited by a Big 4 exhibit on average larger discretionary accruals compared to non-Big 4 clients.

Similarly, we observe a statistically significant and positive correlation between the  $COVID_{jt}$  and  $AbsDA_{jt}$  variables, indicating that the health crisis has influenced the level of discretionary accruals. However, our analysis reveals a null and statistically non-significant correlation between the  $BIG_{jt}$  and  $COVID_{jt}$  variables, meaning that Big 4 audited companies did not exhibit statistically significant different levels of discretionary accruals relative to non-Big 4 clients during the pandemic. The null coefficient suggests that the quality of audit provided by the Big 4 during the coronavirus outbreak was neither superior nor inferior to that of other providers. Nevertheless, the no statistically significant coefficient does not allow this conclusion to be held with a high level of confidence.

Further, the table shows a statistically significant negative correlation between the absolute value of discretionary accruals and the  $SIZE_{jt}$  variable, with a magnitude of - 0.085, implying that larger companies tend to manage less their earnings. Notably, a weak but positive correlation is also observed between  $AbsDA_{jt}$  and both  $ROA_{jt}$  and  $GROWTH_{jt}$  variables, implicating a positive association between the firm's performance and discretionary accruals.

Regarding the  $LT\ DEBTS\ TO\ ASSETS_{jt}$  variable, there is a statistically significant negative correlation with  $AbsDA_{jt}$ , suggesting that corporations with higher long-term debts are less likely to employ discretionary accruals for earnings management. Additionally,  $LT\ DEBTS\ TO\ ASSETS_{jt}$  and  $CURRENTR_{jt}$  variables are negatively correlated with a correlation coefficient of - 0.269. This implies that an increase in the long-term debt-to-total-assets ratio is associated with a decrease in the company's current liquidity ratio. In other words, a firm faces difficulty in repaying its short-term debts when relying more heavily on long-term financing in Belgium.

Concerning the financial health of the corporations, the  $LOSS_{jt}$  variable is negatively and significantly correlated with the  $ROA_{jt}$ ,  $GROWTH_{jt}$ , and  $CURRENTR_{jt}$  variables. This suggests that businesses experiencing losses face more challenges in maintaining their current liquidity situation and achieving asset profitability and sales growth.

The absence of highly significant correlations between the independent and control variables indicates no concerns about multicollinearity. Moreover, the findings imply that all variables are sufficiently correlated with one another, which justifies the use of regression analysis.

< Insert Table 4 about here. >

### 3. Regression analyses

The correlation analysis conducted in Table 4 reveals a weak but positive correlation between the  $AbsDA_{jt}$  and  $BIG_{jt}$  variables. This correlation could potentially be attributed to the fact that smaller audit entities may possess a stronger motivation to deliver high-quality audits, owing to their comparatively lower levels of insurance support in contrast to their larger counterparts, the Big 4. This, in turn, may expose smaller firms to greater financial risks in the event of an audit failure, as explicated in earlier research (Lawrence et al., 2011).

Furthermore, the lack of correlation between  $BIG_{jt}$  and  $COVID_{jt}$  variables indicates that Big 4 and non-Big 4 audited firms did not demonstrate statistically significant different levels of discretionary accruals during the pandemic in 2020. To ensure the robustness and validity of our findings, several regression analyses are executed. Firstly, the main model specification is tested to ascertain the fulfilment of the parallel trends assumption. Subsequently, diverse model specifications and alternative sample constructions are employed to validate our outcomes.

#### 3.1. Main results

We report the results of Equation (5) in Table 5. The findings do not support Hypothesis 1. According to the statistical analysis, the  $BIG_{jt}$  variable displays a statistically significant positive coefficient of 0.0551 at the 1% level, signifying that companies undergoing a Big 4 audit tend to exhibit a higher degree of discretionary accruals in absolute terms than non-Big 4 clients. Furthermore, the  $BIG\_COVID_{jt}$  variable shows a negative coefficient, suggesting that Big 4 audited companies lowered their employment of discretionary accruals during the COVID-19 pandemic in 2020. However, the latter finding is not statistically significant at the 10% level: caution must be exercised when interpreting these results. The coefficient of the  $COVID_{jt}$  variable is statistically significant at the 1% level and amounts to 0.0303. This means that firms, on average, increased their use of discretionary accruals during the COVID-19 outbreak.

Upon analysing the control variables at the industry level, it is discovered that the likelihood for corporations in our sample to employ discretionary accruals is higher for those that demonstrate greater proficiency in terms of return on assets ( $ROA_{jt}$ ) and sales growth ( $GROWTH_{jt}$ ). The coefficients are statistically significant at the 1% level and stand at 0.4265 and 0.0789, respectively. This suggests that businesses with a higher ROA are inclined to engage in higher levels of discretionary accruals as opposed to those with a lower ratio. Likewise, the aforementioned pattern holds for firms experiencing higher sales growth rates when compared to those with lower sales growth rates.

With respect to the  $SIZE_{jt}$  variable, it demonstrates a statistically significant negative coefficient of - 0.0353 at the 1% level. This implies that larger firms, as measured by their total assets, tend to use less aggressive accounting techniques compared to smaller ones. As for the long-term financing structure of companies, the results indicate that those with a less stable and secure financial position, as demonstrated by a high long-term debt-to-total-assets ratio, are less likely to partake in earnings management practices as opposed to companies with a more stable and secure financial position. Specifically, the coefficient of the  $LT\ DEBTS\ TO\ ASSETS_{jt}$  variable is statistically significant at the 1% level, with a value of - 0.0379. Similarly, the same conclusion can be drawn for companies with a higher current ratio in comparison to those with a worse liquidity situation, given that the coefficient of the  $CURRENTR_{jt}$  variable is statistically significant at the 1% level and equal to - 0.0121.

Lastly, the coefficient of the  $LOSS_{jt}$  variable is statistically significant at the 1% level and positively attested at 0.0397, implying that firms experiencing losses are more inclined to utilise earnings management techniques, particularly through the use of discretionary accruals.

< Insert Table 5 about here. >

### **3.2. Robustness test A**

In order to assess the strength and reliability of the results obtained from our statistical analyses, it is crucial to perform robustness tests. The latter are essential to evaluate the relevance and generalisability of the findings on the one hand, and to enhance the validity and credibility of our empirical study on the other hand. In our research, we employ the ‘performance-adjusted Jones model’ formulated by Kothari et al. (2005). Another widely recognised model in the literature is the ‘modified Jones model’ advanced by Dechow, Sloan, and Sweeney (1995), which is similarly employed to estimate discretionary accruals as a measure of earnings management and audit quality. To test the robustness of our findings, we can apply this model to estimate discretionary accruals alongside the Kothari et al. (2005) model. It is a prevalent convention in academic research to evaluate the resilience and reliability of outcomes by employing various methodologies or models. Through a comparison of outcomes derived from both models, we can ascertain whether our findings are robust and not prone to sensitivity with respect to the choice of model used to estimate discretionary accruals.

Table 5 displays the results of the regression analysis in Equation (5) after calculating discretionary accruals using the model proposed by Dechow, Sloan, and Sweeney (1995). The results of the robustness test are similar to those obtained by Kothari et al. (2005) model in Table 6. Both  $BIG_{jt}$  and  $COVID_{jt}$  variables are statistically significant at the 1% level and amount to 0.0558 and 0.0300, respectively. This implies that being audited by a Big 4 and the COVID-19 pandemic cause an increase in earnings management, as measured by discretionary accruals in absolute terms.

In contrast, the  $BIG\_COVID_{jt}$  variable is negative, indicating that companies which underwent a Big 4 audit during the 2020 health crisis in Belgium employed fewer discretionary accruals. However, caution must be exercised regarding this result, as the coefficient of - 0.0089 is not statistically significant at the 10% level.

As regards the control variables, the  $SIZE_{jt}$  variable exhibits a negative coefficient of - 0.0372 and is statistically significant at the 1% level. This means that larger entities, in terms of total assets, tend to utilise less aggressive accounting techniques compared to smaller businesses. With regard to the two variables related to company's operational performance ( $ROA_{jt}$  and  $GROWTH_{jt}$ ), their coefficients are statistically significant at the 1% level and positive, with values of 0.3274 and 0.0971, respectively. This suggests that firms with higher operational performance and sales growth are more likely to make use of discretionary accruals. Regarding the long-term financing structure of companies, the findings imply that those in the sample with a less stable and secure financial position, as evidenced by a high long-term debt-to-total-assets ratio, exhibit a lower propensity to engage in earnings management practices compared to companies with a more stable and secure financial position. Similarly, the same conclusion can be drawn for companies with a higher current ratio as opposed to those with a weaker liquidity position, given that the coefficient of the  $CURRENTR_{jt}$  variable is statistically significant at the 1% level and equal to - 0.0113. Moreover, that of the  $LOSS_{jt}$  variable is equal to 0.0443 and demonstrates statistical significance at the 1% level. Consequently, entities experiencing losses are more inclined to employ earnings management techniques, specifically through the use of discretionary accruals.

Overall, the results and estimated coefficients obtained from the Dechow, Sloan, and Sweeney (1995) model are approximately comparable to those obtained from the Kothari, Leone, and Wasley (2005) model. Ultimately, our findings are not affected by the methodological selection of our primary model specification, and our results hold for both the Dechow, Sloan, and Sweeney (1995) and Kothari, Leone, and Wasley (2005) models.

< Insert Table 6 about here. >

### **3.3. Robustness test B**

In Equation (5), the absolute value of discretionary accruals is utilised to mitigate the impact of positive and negative accruals on earnings manipulation. By considering the absolute value of discretionary accruals, the performance-adjusted Jones model can account for the effects of both types of accruals on earnings manipulation. Another robustness test involves using the exact values of discretionary accruals computed in Equation (4), that is, without taking their absolute values. This is precisely what various authors have done in the literature for their research (Dechow et al., 1995; Tache, 2021). Accruals refer to the non-cash portion of net income that results from accounting adjustments related to revenues and expenses which have not yet been paid or received. They are calculated as the difference between net income and operating cash flows (Healy, 1985). Accruals can take on either a positive or negative value, depending on whether accounting earnings exceed or fall short of actual cash flows, respectively. As previously mentioned, earnings can be manipulated upwards or downwards by selecting different accounting methods, such as depreciation methods for fixed assets. The use of positive and negative discretionary accruals serves as proxies for earnings management upwards and downwards, respectively. Therefore, not taking the absolute value allows for the analysis of the direction of discretionary accruals, both before and during the COVID-19 pandemic in Belgium.

The findings of the three regressions in Table 7 yield several interesting conclusions. The coefficient of the  $BIG_{jt}$  variable is positive and statistically significant at the 1% level for the subset with positive discretionary accruals. Conversely, the coefficient is negative for the subgroup with negative discretionary accruals and statistically significant at the 1% level. Specifically, they amount to 0.0333 and - 0.0717, respectively, and the difference between them demonstrates statistical significance at the 1% level, as determined by the Wald test. Therefore, the results indicate that positive discretionary accruals are statistically significantly more positive when corporations are audited by a Big 4 compared to non-Big 4 clients. Simultaneously, negative discretionary accruals are statistically significantly more negative for firms audited by a Big 4 than by any other audit entity.

Regarding the  $COVID_{jt}$  variable, each of the three regressions shows a negative coefficient. The difference between the coefficients of the two subsamples demonstrates statistical significance at the 1% level, as determined by the Wald test. The only statistically significant coefficient in the subgroups is associated with negative discretionary accruals, which is estimated at - 0.0540. This suggests that Belgian firms engaged in earnings management to a greater extent during the COVID-19 crisis in 2020, particularly through the downward manipulation of their financial results. The  $BIG\_COVID_{jt}$  variable demonstrates statistical significance for both the total population and the subset characterised by negative discretionary accruals, at the 10% and 5% levels, respectively. The coefficients are equal to 0.0417 and 0.0376, respectively. The latter means that during the period of turmoil, negative discretionary accruals were statistically significantly more positive for Big 4 clients.

With regard to the control variables, several interesting results deserve attention. Firstly, the coefficients for the  $SIZE_{jt}$  variable are statistically significant at the 1% level. The coefficients amount to - 0.0201 for firms with positive discretionary accruals, and 0.0474 for the other subset. The disparity between them demonstrates statistical significance at the 1% level. This implies that positive discretionary accruals exhibit a reduction in positivity as the total asset size of firms increases, whereas negative discretionary accruals show an increase in positivity as the total asset size of entities grows.

Moreover, the three regressions manifest statistically significant coefficients at the 1% level for the variable relating to return on assets ( $ROA_{jt}$ ). Specifically, they amount to - 0.4853 for the entire sample, 0.4275 for the subset with positive discretionary accruals, and - 0.3783 for the subset with negative discretionary accruals. These findings suggest that large and very large companies in Belgium with positive discretionary accruals are more likely to engage in earnings management upward as their ROA increases, while negative discretionary accruals are significantly more negative for the other subset. The second variable related to corporate performance, namely the sales growth rate ( $GROWTH_{jt}$ ), also displays statistically significant positive coefficients in all three regressions. Thus, the results imply that both positive and negative discretionary accruals become significantly more positive as the growth rate increases. Comparable outcomes can be inferred in cases where firms experience an enhancement in liquidity. In particular, the three coefficients for the  $CURRENTR_{jt}$  variable exhibit a positive trend, measuring 0.0404, 0.0033, and 0.0287. It is however relevant to note that only the first and third, which pertain to the total sample and the subset with negative discretionary accruals, respectively, demonstrate statistical significance at the 1% level.

As regards the long-term financial structure of large and very large Belgian enterprises, the coefficients of the  $LT\ DEBTS\ TO\ ASSETS_{jt}$  variable are - 0.0373 for the subsample with positive discretionary accruals, and 0.0413 for the remaining subset. The disparity between them exhibits statistical significance at the 1% level, as determined by the Wald test. These results indicate that, while negative discretionary accruals are statistically significantly less negative, positive discretionary accruals are statistically significantly less positive, as the long-term debt to assets ratio increases.

Lastly, the  $LOSS_{jt}$  variable reveals two negative coefficients for the regression analysis conducted on the total sample and the subset with negative discretionary accruals, as well as one positive coefficient for the regression analysis conducted on the subgroup with positive discretionary accruals. These are respectively equal to - 0.0859, - 0.0451, and 0.0252, and demonstrate statistical significance at the 1% level for the first two estimates and at the 5% level for the positive estimate. The difference between the coefficients of the two subsets is statistically significant at the 1% level. Therefore, positive discretionary accruals tend to exhibit an upward trend, while negative discretionary accruals display a downward trend in the context of Belgian companies reporting a loss.

< Insert Table 7 about here. >

### **3.4. Subsample A: large versus small size**

An underlying statistical artifact driven by the size of firms, in terms of total assets, may affect the level of absolute value of discretionary accruals. In light of this, we partition the population into two subsamples to conduct a regression analysis on each of them, with the aim of exploring the impact of auditor choice and the COVID-19 pandemic on the level of discretionary accruals. The first subgroup includes all observations for which the size is greater than the median size value, which is equivalent to 10.0299. The second subset encompasses all observations equal to or smaller than that threshold. This analytical approach enables us to investigate potential disparities in the effects of auditor choice and the coronavirus outbreak with respect to firm size, in terms of total assets. Notably, entities of varying sizes may confront distinct challenges and risks, which could influence audit quality and shape how companies respond to the challenges posed by the health crisis.

Table 8 depicts the outcomes of the two multiple linear regression analyses carried out on both subgroups. In conformity with the findings obtained from the entire sample, entities subject to an audit by a Big 4 ( $BIG_{jt}$ ) tend to manifest a greater inclination to utilise discretionary accruals. The ascertained coefficient is statistically significant at the 1% level, reporting a positive value of 0.0390 for the observations with a larger size. Conversely, it displays a value of 0.0664 for those with a lower size. As evidenced by the Wald test, the difference between these two coefficients demonstrates statistical significance at the 5% level. Ergo, comparatively smaller organisations in terms of total assets that undergo an audit by a Big 4 exhibit a greater tendency to utilise discretionary accruals.

Regarding the  $COVID_{jt}$  variable, both subsamples are affected by the pandemic, leading to a surge in the use of discretionary accruals. Interestingly, the coefficient of the  $BIG\_COVID_{jt}$  variable for firms with a size lower than the median size is negative, with a value of - 0.0256, whereas it is positive for those with a higher size, amounting to 0.0049. Consequently, smaller corporations in terms of total assets that underwent an audit by a Big 4 during the coronavirus pandemic demonstrate a relatively diminished propensity to resort to discretionary accruals. Nonetheless, due to the non-significance of the coefficients at the 10% level, no conclusive inferences can be drawn concerning these results.

With respect to the other control variables, the findings for both subsamples and the total population appear to be comparable. Companies with positive operational performance and sales growth as well as those reporting losses exhibit a higher absolute value of discretionary accruals. Indeed, the coefficients of the  $ROA_{jt}$ ,  $GROWTH_{jt}$ , and  $LOSS_{jt}$  variables are statistically significant, evincing values of 0.4378, 0.0975, and 0.0305 for firms surpassing the median size, and values of 0.4431, 0.0549, and 0.0497 for entities in the alternative subsample. Furthermore, the coefficient pertaining to the  $LT\ DEBTS\ TO\ ASSETS_{jt}$  variable reveals statistical significance at the 1% level, with a negative trend of - 0.0588 for firms with a size higher than the median size, whereas that for the other subgroup is not statistically significant and virtually negligible at a level of - 0.0042. This suggests that larger Belgian corporations in terms of total assets with a higher long-term debt-to-total-assets ratio manifest a comparatively lower reliance on discretionary accruals. Conversely, the outcomes derived from the regression analysis conducted on two separate subsets reveal that firms with a size lower than the median size value and better liquidity position, as denoted by the current ratio ( $CURRENTR_{jt}$ ), display a statistically significant negative coefficient of - 0.0257. The one for the other subset is estimated at - 0.0003. However, the latter is not statistically significant at the 10% level, which precludes the drawing of confident conclusions.

< Insert Table 8 about here. >

### **3.5. Subsample B: high versus low ROA**

One of the foremost concerns with respect to our database pertains to the variability of performance among entities included in the total population. In order to achieve a more nuanced understanding of the research under consideration, it would be judicious to conduct a regression analysis by partitioning the total sample into two subgroups contingent upon the operational performance of firms ( $ROA_{jt}$ ). The first subset encompasses all observations for which the ROA is greater than the median ROA value, which is equivalent to 0.0444. The second subsample includes those for which the ROA is either equal to or less than that threshold. Dividing the total population based on the median ROA may serve to shed light on whether there exist any differential relationships between the variables of the regression model across the two groups of firms, namely those with a high ROA and those with a low ratio.

The regression analyses conducted in Table 9 yields interesting results. The coefficients of the  $ROA_{jt}$  variable and the difference between them are statistically significant at the 1% level, but exhibit opposite signs across the subgroups. More specifically, the coefficient for firms with greater performance than the upper half of our sample is 0.9394, while the corresponding coefficient for entities with inferior operational performance is - 1.1921. This suggests that Belgian firms with stronger operational performance have a propensity to escalate their employment of discretionary accruals, in absolute magnitude, in contradistinction to those with weaker operational performance.

Concerning the  $LOSS_{jt}$  variable, the statistical examination of its coefficient for the subset comprising businesses with superior operational performance fails to yield a significant result due to the absence of losses in these ones. Indeed, the subsample consisting of entities with a return on assets greater than the median reports a profit rather than a loss in the majority of cases. Conversely, the coefficient of the  $LOSS_{jt}$  variable for firms with inferior performance displays statistical significance at the 5% level, with a negative value of - 0.0286. This suggests that companies experiencing suboptimal operational performance and losses in a relevant period are less disposed towards earnings management practices and, by extension, towards discretionary accruals.

Regarding the  $BIG_{jt}$  and  $COVID_{jt}$  variables, the outcomes are similar to those of the regression analyses conducted on the total population and Subsample A. The coefficients of the  $BIG_{jt}$  variable are positive and demonstrate statistical significance at the 1% level, and the difference between them is likewise statistically significant at the 5% level, as ascertained through the application of the Wald test. Big 4 clients tend to exhibit a greater propensity for engaging in discretionary accruals, irrespective of their return on assets. Similarly, the coronavirus pandemic has had a positive impact on earnings management, as evidenced by the coefficients of 0.0234 for firms with greater performance than the upper half of our sample, and 0.0348 for the others.

The coefficient of the  $BIG\_COVID_{jt}$  variable is observed to be negative for corporations with a ROA lower than the median ROA, with a value of - 0.0251. Conversely, the one for entities with a greater ROA is positive and amounts to 0.0015. These results imply that Belgian companies with suboptimal operational performance undergoing a Big 4 audit during the coronavirus outbreak display a relatively decreased tendency to engage in discretionary accruals. Nevertheless, given that the coefficients of the  $BIG\_COVID_{jt}$  variable for both subsamples fail to attain statistical significance at the 10% level, it is not possible to draw conclusive inferences regarding these findings.

As for the control variables not previously addressed, their coefficients exhibit a similar pattern as observed in the analysis conducted on the entire population, in terms of statistical significance and direction. The findings reveal that companies with larger total assets ( $SIZE_{jt}$ ) are less inclined to employ discretionary accruals in both subgroups, irrespective of their return on assets. This conclusion is also drawn for companies that demonstrate higher levels of long-term financing ( $LT\ DEBTS\ TO\ ASSETS_{jt}$ ) and liquidity ( $CURRENTR_{jt}$ ).

Conversely, enterprises with a higher level of sales growth ( $GROWTH_{jt}$ ) have a greater propensity to partake in earnings management via discretionary accruals, regardless of their return on assets. The coefficient for observations with a high ROA stands at 0.0629 and is statistically significant at the 10% level. For the other subset, it is 0.0973 and statistically significant at the 1% level. However, the lack of statistical significance at the 10% level for the difference between these two coefficients hinders the comparison of their magnitudes.

< Insert Table 9 about here. >



### 3.6. Subsample C: high versus low sales growth rate

The rate of sales growth compared to the previous year, characterised by the  $GROWTH_{jt}$  variable in our regression model, must be taken into consideration regarding firms' incentives to manipulate earnings through discretionary accruals, especially with the objective of meeting certain earnings thresholds (Roychowdhury, 2006). Indeed, corporations with different sales growth rates may face divergent financial pressures and growth opportunities, which can influence their incentives to engage in aggressive accounting practices and, consequently, their level of discretionary accruals.

The two regressions are conducted by dividing the total population based on the median value of the  $GROWTH_{jt}$  variable, which is equal to 0.0251. The results in Table 10 are similar to those obtained from the regression analysis conducted on the unpartitioned sample. Irrespective of the sales growth rate, companies from both subsamples audited by a Big 4 exhibit a proclivity towards greater employment of earnings management, as measured by the level of their discretionary accruals in absolute terms. The estimated coefficient of the  $BIG_{jt}$  variable is statistically significant at the 1% level, amounting to 0.0597 for firms displaying high sales growth rates. The corresponding coefficient for the remaining entities is fairly analogous, at 0.0555.

In regards to the  $COVID_{jt}$  variable, the regression coefficients are again positive, with a value of 0.0152 for firms with the highest growth rates in sales, and 0.0080 for the others. This suggests that the COVID-19 pandemic has had a positive impact on the use of discretionary accruals in Belgium, as sales growth rates increase. However, no definitive conclusion can be drawn, as the aforementioned coefficients are not statistically significant at the 10% level. The same statement can be made for the  $BIG\_COVID_{jt}$  variable, as the two coefficients are negative and approximately similar, but not statistically significant. In a similar vein, the small difference between them lacks statistical significance at the 10% level, as determined by the Wald test. Therefore, it is advisable to exercise caution in drawing any conclusions.

The trends for the control variables remain consistent with those reported in the regression analysis of the total sample. The coefficients of the  $SIZE_{jt}$ ,  $LT\ DEBTS\ TO\ ASSETS_{jt}$  and  $CURRENTR_{jt}$  variables are statistically significant and negative. Regardless of their level of sales growth, larger firms in terms of total assets, those financed more on a long-term basis, and those with good liquidity engage less in aggressive accounting, resulting in a reduced utilisation of discretionary accruals.

As for the variable related to total asset profitability ( $ROA_{jt}$ ), the coefficients are positive and statistically significant at the 1% level. They amount to 0.3274 for firms with sales growth above the median, and 0.6300 for the others. As determined by the Wald test, the disparity between them demonstrates statistical significance at the 5% level. The two coefficients suggest a positive relationship between the level of return on assets and earnings management through discretionary accruals. Therefore, Belgian entities with higher returns on assets tend to use discretionary accruals to manage their earnings to a greater extent than those with lower levels of asset profitability. This pattern is particularly evident when the sales growth of companies is below the median value of the total sample's sales growth rate.

Moreover, the coefficients of the  $LOSS_{jt}$  variable are positive and statistically significant at the 5% level, indicating aggressive earnings management in the event of a loss on the relevant exercise by the firms in the subgroups.

Finally, an interesting result can be gleaned from the analysis of the  $GROWTH_{jt}$  variable. Companies in the subset with the highest sales growth rates resort more to discretionary accruals, as evidenced by the statistically significant and positive coefficient of the variable, which amounts to 0.7231. Conversely, the utilisation of discretionary accruals declines progressively for companies in the other subsample as their sales growth rates rise. The coefficient, with a magnitude of - 0.6340, is statistically significant at the 1% level. The Wald test unequivocally establishes the statistical significance of the difference between the two coefficients at the level of 1%.

< Insert Table 10 about here. >

### **3.7. Subsample D: high versus low long-term debt-to-total-assets ratio**

The  $LT\ DEBTS\ TO\ ASSETS_{jt}$  variable serves as an indicator of the financial structure of companies, and thus their level of risk. The long-term debt-to-total-assets ratio measures the proportion of long-term debts of a company relative to the total value of its assets. A high ratio may signal that a particular company is riskier and less capable of repaying its long-term debts, whereas a low ratio may signify a more stable and solid financial position. Companies with a high level of debt may be under pressure to meet certain financial targets and may therefore be incentivised to use earnings management methods such as discretionary accruals to achieve these targets. Therefore, it is appropriate to further analyse the impact of the long-term financing level of the sample firms on audit quality, as measured by discretionary accruals.

In both subsets, the results of the two linear regressions in Table 11 are consistent with those obtained from the regression conducted on the entire population. The coefficient of the  $BIG_{jt}$  variable is positive and statistically significant at the 1% level for both subsets. Specifically, it amounts to 0.0652 for firms with a long-term debt-to-total-assets ratio greater than the median value of this variable. As for the others, the coefficient is estimated to be 0.0454. As a result, Belgian companies undergoing a Big 4 audit exhibit a higher propensity to resort to earnings management through discretionary accruals, regardless of their long-term financing level.

Furthermore, the coefficient of the  $COVID_{jt}$  variable is positive and almost identical for both subsamples, with a significance level of 1% for firms with a long-term debt-to-total-assets ratio greater than the median value, and 5% for other ones. Therefore, the COVID-19 pandemic has resulted in a heightened use of discretionary accruals in Belgium, irrespective of the financial structure of the companies. As with the previous regressions, the  $BIG\_COVID_{jt}$  variable shows negative coefficients. However, these coefficients and the difference between them, as determined by the Wald test, fail to reach statistical significance at the 10% level, thereby preventing the formation of confident conclusions based on these results.

In relation to the control variables, a noteworthy finding can be made. The coefficient of the  $CURRENTR_{jt}$  variable demonstrates a positive correlation with firms that have a higher long-term debt-to-total-assets ratio, whereas it shows a negative association with the other ones. The coefficients amount to 0.0126, with statistical significance at the 5% level, and -0.0338, with statistical significance at the 1% level. The Wald test indicates that the difference between them is statistically significant at the 1% level. This implies that corporations with higher levels of long-term debt in comparison to their total assets, coupled with sound liquidity, are more prone to employ discretionary accruals, while those with a lower long-term debt-to-total-assets ratio and favourable liquidity tend to rely less on aggressive accounting practices.

Another noteworthy aspect pertains to the  $LT\ DEBTS\ TO\ ASSETS_{jt}$  variable. Regardless of whether a firm's long-term debt-to-total-assets ratio is above or below the median, the coefficients are negative, indicating a downward earnings management, and hence discretionary accruals, as the long-term debt-to-total-assets ratio increases. As per the Wald test, the difference between the two coefficients demonstrates statistical significance at the 5% level. However, only the one for the subset with lower levels of long-term debt is statistically significant, at the 1% level.

The trends observed for the remaining control variables are consistent with those reported in the analysis of the regression conducted on the total sample. The coefficients of the  $ROA_{jt}$ ,  $GROWTH_{jt}$  and  $LOSS_{jt}$  variables are statistically significant and positive. Specifically, the coefficient of the return on assets variable is equal to 0.2002 and statistically significant at the 5% level for corporations with the highest long-term debt-to-total-assets ratio, while it is 0.6197 and statistically significant at the 1% level for the others. The difference between the two coefficients manifests statistical significance at the 1% level. Among other things, this suggests that firms with a high return on assets are more likely to engage in earnings management through discretionary accruals, particularly when their long-term debt-to-total-assets ratio is low.

< Insert Table 11 about here. >

### **3.8. Subsample E: high versus low current ratio**

The  $CURRENTR_{jt}$  variable represents a metric that quantifies an enterprise's ability to satisfy its short-term debt obligations using its current assets. By partitioning the entire dataset into two subsamples based on the median of the  $CURRENTR_{jt}$  variable, which is equal to 1.400, it becomes feasible to explore the potential disparities in discretionary accrual levels between companies with high and low abilities to meet their short-term debt obligations.

Several intriguing findings emerge from the two multiple linear regressions in Table 12. Firstly, we discover that the coefficient for firms with the highest current ratios indicates less reliance on aggressive accounting techniques. It is equal to - 0.0479 and statistically significant at the 1% level. Conversely, that of corporations with the lowest current ratios is positive at 0.1135 and statistically significant at the 1% level. According to the Wald test, the disparity between these two coefficients demonstrates statistical significance at the 1% level. Therefore, Belgian companies with stronger liquidity positions tend to exhibit lower usage of discretionary accruals, whereas those with weaker current ratios are inclined to rely more heavily on such accruals.

Moreover, the signs of the two coefficients for the  $GROWTH_{jt}$  variable are opposite. The subset containing entities with a high current ratio presents a negative coefficient of - 0.0018, while the one for the other subset is positive at 0.1374 and statistically significant at the 1% level. The difference between them demonstrates statistical significance at the 1% level. As a result, firms with superior liquidity and sales growth exhibit a reduced tendency to engage in earnings management through discretionary accruals, whereas the regression results suggest the opposite for those with weaker current ratios. However, the coefficient of - 0.0018 is not statistically significant at the 10% level, thereby inhibiting the ability to draw conclusions with a high degree of confidence.

Regarding the  $ROA_{jt}$  variable, the coefficients of both subsamples are positive and statistically significant at the 1% level. An interesting point to note is their magnitude: 0.6451 for the entities with a current ratio higher than the median, and 0.1919 for the remaining firms in the other subset. As per the Wald test, the difference between the two coefficients demonstrates statistical significance at the 1% level. Accordingly, Belgian firms with a relatively high current ratio tend to employ discretionary accruals more conspicuously as their operational performance improves, and the same trend is observed for businesses with a lower current ratio, albeit to a lesser extent.

As for the other variables, that is the  $SIZE_{jt}$ ,  $LT\ DEBTS\ TO\ ASSETS_{jt}$  and  $LOSS_{jt}$  variables, the outcomes of both regressions exhibit similarity to the results obtained in the previous regression conducted on the entire population. In addition, the coefficients of the  $BIG_{jt}$  and  $COVID_{jt}$  variables are statistically significant and positive, implying that opting for an audit conducted by a Big 4 firm and the health crisis have a positive impact on the level of discretionary accruals in absolute terms. Lastly, no supplementary findings can be appended concerning the  $BIG\_COVID_{jt}$  variable, as it is not statistically significant at the 10% level. Similarly, the disparities between each pair of coefficients for the three variables of interest lack statistical significance at the 10% level.

< Insert Table 12 about here. >

### **3.9. Subsample F: loss versus profit**

One of the primary concerns regarding our database relates to whether a Belgian company has incurred a loss or generated a profit during a fiscal year. The sign of net income (positive or negative) may have an impact on the level of discretionary accruals, as firms may endeavour to manipulate their financial outcomes (Choi et al., 2008; Healy & Wahlen, 1999). Corporations that have sustained a net loss could potentially possess distinctive financial and operational attributes compared to those that have achieved a net profit. Notably, loss-making entities may be more heavily burdened with debt or exhibit lower rates of growth relative to their counterparts that have reported a profit. The paramount importance of scrutinising the  $LOSS_{jt}$  variable stems from the need to gain deeper insights into how the distinctive financial and operational attributes of loss-making versus profit-generating companies potentially affect the association between the control variables and the dependent variable ( $AbsDA_{jt}$ ).

The results of the regression analyses on the two subsamples are presented in Table 13. The coefficients of the  $BIG_{jt}$ ,  $COVID_{jt}$ , and  $BIG\_COVID_{jt}$  variables display comparable signs to those observed in previous regression analyses conducted on the complete sample and other subgroups. For companies that achieved a profit during the accounting period, the coefficient of the  $BIG_{jt}$  variable equals 0.0505, whereas it amounts to 0.0659 for loss-making businesses. Both demonstrate statistical significance at the 1% level, indicating that the effect of undergoing an audit by a Big 4 on the utilisation of accruals is positive, regardless of whether the company experienced gains or losses. With regard to the variable pertaining to the COVID-19 pandemic, both coefficients are positive and statistically significant at the 1% level for companies that incurred profits in 2020, and at the 5% level for those that suffered losses during this accounting period. Once again, this suggests that the health crisis resulted in an increase in earnings management, irrespective of firms' profitability status in 2020. The coefficients of the  $BIG\_COVID_{jt}$  variable are negative for both corporations with losses and those generating profits. However, no additional results can be provided regarding this variable since it lacks statistical significance. The same applies for the difference between the coefficients as determined by the Wald test.

In reference to the control variables, it is worth discussing the impact of the  $ROA_{jt}$  variable. The coefficient for profit-generating firms is statistically significant and amounts to 0.5855, whereas it is logically negative at -1.0353 and statistically significant at the 1% level for companies that experience losses. The disparity between the coefficients of the two subgroups demonstrates statistical significance at the 1% level. Accordingly, loss-making corporations are increasingly unlikely to use earnings management through discretionary accruals as their return on assets increases. Conversely, a profitable entity tends to employ more aggressive accounting methods as the ROA rises.

The trends for the other control variables remain consistent with those observed in the regression analysis of the total sample. The coefficients of the  $SIZE_{jt}$ ,  $LT\ DEBTS\ TO\ ASSETS_{jt}$  and  $CURRENTR_{jt}$  variables are negative. Notwithstanding their profitability status, Belgian firms with larger total assets, higher long-term debt-to-assets ratios, and stronger liquidity demonstrate a diminished inclination towards employing aggressive accounting practices, which results in a reduced reliance on discretionary accruals. However, the findings pertaining to the  $LT\ DEBTS\ TO\ ASSETS_{jt}$  and  $CURRENTR_{jt}$  variables are only confidently valid for companies that generate profits, given that the coefficients fail to attain statistical significance for loss-making entities. Likewise, only the positive coefficient of the  $GROWTH_{jt}$  variable proves to be statistically significant for profitable firms, amounting to 0.0766.

< Insert Table 13 about here. >

### **3.10. Subsample G: Big 4 versus non-Big 4 auditors**

Numerous studies have been undertaken within the academic literature to assess and compare the audit quality delivered by the Big 4 auditors as opposed to their non-Big 4 counterparts. Considering the contrasting views on the impact of audit firm size on audit quality, the discourse leads to a null hypothesis that has not been confirmed by our previous analyses. However, it is worthwhile to further investigate the factors that elevate or reduce earnings management by companies audited by a Big 4 or a non-Big 4.

Table 14 showcases the results of a regression analysis carried out to examine how the features of audited clients affect the absolute value of discretionary accruals experienced by companies that obtain auditing services from either a Big 4 or a non-Big 4. The diversity in client characteristics, as reported in prior studies (Lawrence et al., 2011), is one of the factors accounting for the discrepancy in audit quality between Big 4 and non-Big 4 firms.

As highlighted in the analysis of the regression on the entire sample, the coronavirus pandemic has increased the employment of more aggressive accounting techniques. The coefficient of the  $COVID_{jt}$  variable is equal to 0.0204 for businesses that underwent an audit by a Big 4 in 2020, while it is 0.0291 for non-Big 4 clients. While both demonstrate statistical significance at the 10% level and 1% level, respectively, the difference between them is not statistically significant at the 10% level, as determined by the Wald test. In relation to the control variables, the results align with the earlier findings. An essential aspect pertains to the magnitude of the coefficients, particularly with regard to the  $ROA_{jt}$  variable. According to the outcomes, Big 4 audited entities tend to engage in more earnings management through discretionary accruals as their return on assets increases, although to a lesser degree compared to non-Big 4 clients. The coefficients are statistically significant, amounting to 0.2455 for Big 4 audited corporations, and 0.5652 for the others. The disparity between them manifests statistical significance at the 1% level.

The patterns observed for the remaining control variables are consistent with those discussed in the analysis of the regression on the entire sample. The coefficients of the  $SIZE_{jt}$ ,  $LT\ DEBTS\ TO\ ASSETS_{jt}$ , and  $CURRENTR_{jt}$  variables are negative, amounting respectively to - 0.0372, - 0.0390, and - 0.0045 for entities subjected to an audit by a Big 4, and to - 0.0332, - 0.0345, and - 0.0189 for non-Big 4 clients. Consequently, companies with larger total assets, higher long-term debt-to-assets ratios, and greater liquidity demonstrate a lower propensity to engage in aggressive accounting practices, which results in reduced use of discretionary accruals.

However, the findings with respect to the  $CURRENTR_{jt}$  variable are solely significant for non-Big 4 clients, as the coefficients fail to attain statistical significance for the other subset. Finally, those for the  $LOSS_{jt}$  and  $GROWTH_{jt}$  variables are positive and statistically significant at the 5% level, indicating that companies experiencing losses or growth in their sales have a greater tendency to resort to discretionary accruals, irrespective of the audit firm size.

< Insert Table 14 about here. >

### **3.11. Subsample H: large versus small size for Big 4 clients**

One of the primary concerns regarding the regression model pertains to the diversification of the audit firms' client base. The literature attests that the Big 4 have a broader clientele composed of larger clients than those of smaller audit companies (Reynolds & Francis, 2000). Therefore, it is worthwhile to perform an analysis on the  $SIZE_{jt}$  variable for the sample companies audited by one of the Big 4.

By partitioning the entire population into two groups based on the median value of this variable, a deeper understanding of the influence of audited company size on discretionary accrual is facilitated, resulting in more precise and statistically significant outcomes. Additionally, this facilitates a more thorough appreciation of the audit quality delivered by the Big 4 to companies of varying sizes and the detection of any dissimilarities in their practices during the period of the COVID-19 pandemic.

Table 15 indicates that there is no statistically significant relationship between receiving an audit from a Big 4 during the health crisis in Belgium and the level of discretionary accruals. Although the coefficients of the  $COVID_{jt}$  variable are both positive, at 0.0221 and 0.0174, respectively, they lack statistical significance, meaning that no firm conclusions can be drawn with a high level of confidence. Similarly, the Wald test reveals that the difference between these two coefficients does not display statistical significance at the 10% level.

Regarding the ROA coefficients, they are positive, at 0.1487 for corporations that have undergone an audit by a Big 4 with a size greater than the median value of 10.7090, and 0.3753 for the other subset. However, only the latter is statistically significant at the 1% level. As a result, smaller Big 4 audited entities tend to adopt more aggressive accounting practices when their operational performance is higher.

Concerning the other control variables, a statistically significant and negative relationship is observed at the 1% level for the  $SIZE_{jt}$  variable in both subsamples. As the total assets of Big 4 clients increase, their propensity to manipulate earnings decreases. A statistically significant negative relationship is also noteworthy for the  $LT\ DEBTS\ TO\ ASSETS_{jt}$  variable when businesses audited by a Big 4 have a size in terms of total assets exceeding the median value of the  $SIZE_{jt}$  variable.

Therefore, these companies progressively exhibit a reduced inclination towards engaging in aggressive accounting practices when confronted with a high long-term debt-to-total-assets ratio. Likewise, the same conclusions can be inferred for firms with a small size, wherein their current ratio demonstrates an increasingly higher value.

Lastly, the coefficient of the  $GROWTH_{jt}$  variable reveals statistical significance at the 5% level and a positive relationship with the absolute value of discretionary accruals at a magnitude of 0.1120 for large enterprises undergoing a Big 4 audit. As the sales growth rate of these companies increases, their inclination to employ discretionary accruals similarly ascends. Analogously, the identical conclusion applies to Belgian loss-making companies with a size in terms of total assets smaller than the median value of the  $SIZE_{jt}$  variable. Regarding the remaining coefficients not yet addressed, their lack of statistical significance renders them uninterpretable for this analysis.

< Insert Table 15 about here. >

## Discussion

The results obtained from the various regressions performed allow for the establishment of certain discussions regarding the level of discretionary accruals of audited companies and the audit quality provided by both Big 4 and non-Big 4 auditors in Belgium, before and during the COVID-19 pandemic, covering the period from 2016 to 2019 and 2020.

The findings do not lend support to Hypothesis 1, which posits that there is no association between audit quality, as measured by discretionary accruals, and audit firm size in Belgium, even amid the COVID-19 crisis. The results of the analysis conducted on the entire sample reveal that large and very large Belgian corporations audited by a Big 4 tend to exhibit a greater degree of discretionary accruals in absolute terms than non-Big 4 clients in normal circumstances. By scrutinising discretionary accruals and their sign, the outcomes provide empirical evidence that positive discretionary accruals are statistically significantly more positive when corporations are subjected to a Big 4 audit in comparison to non-Big 4 clients. Simultaneously, negative discretionary accruals are statistically significantly more negative for firms undergoing a Big 4 audit rather than by any other audit entity. Hence, the quality of audit services provided by the Big 4 is inferior to the one offered by smaller audit companies in Belgium. These findings contradict the results of numerous well-regarded scholarly articles and authors who contend that the Big 4 provide higher quality audits than their non-Big 4 counterparts (DeAngelo, 1981; Francis et al., 1999; Choi et al., 2010; Knechel et al. 2013). However, other investigations conducted in various countries, including Belgium, France, Malaysia, Greece, Turkey, Pakistan, Korea, and China, have demonstrated that there is no significant difference in the levels of discretionary accruals between companies audited by a Big 4 and non-Big 4 clients (Vander Bauwhede & Willekens, 2004; Othman & Zeghal, 2006; Ching et al., 2015; Tsipouridou & Spathis, 2012; Yasar, 2013; Abid et al., 2018; Jeong & Rho, 2004; Zhan et al., 2020), knowing that discretionary accruals are used as a proxy for audit quality (Jones, 1991). By the way, Lawrence et al. (2011) assert that smaller audit entities may exhibit heightened determinations to provide audits of superior quality, considering their potential absence of comparable insurance backing as enjoyed by Big 4 firms. This incongruity in insurance support could thereby engender more pronounced financial risks and repercussions in the event of an audit failure.

Furthermore, the results of the regression analysis performed on the main sample show that large and very large Belgian corporations increased their level of discretionary accruals in absolute terms during the COVID-19 period in 2020. For that matter, additional analysis suggests that these firms engaged in earnings management to a greater extent during the health crisis in 2020, particularly through the downward manipulation of their financial results. Therefore, audit quality can be considered relatively lower during the pandemic in Belgium, both for Big 4 and non-Big 4 auditors. This supports the existing literature, which states that auditors' decisions may be influenced by the downward trend in the market, potentially resulting in a decline in audit quality as auditors may ease their usual scepticism amid market euphoria (Coffee Jr, 2004; Leone et al., 2013). Regarding the main variable of interest, the results of almost all regressions do not reach statistical significance, which implies that there is no evidence to infer that the level of discretionary accruals can be influenced by the completion of an audit engagement by a Big 4 firm during the public health emergency. Nevertheless, the association between the variable pertaining to the coronavirus outbreak and the magnitude of negative discretionary accruals for a Big 4 client is statistically significant and positive. As a result, negative discretionary accruals were significantly more positive for Big 4 clients throughout the health crisis period.



With respect to the first control variable, namely the size of companies measured in terms of their total assets, the regression analysis conducted on the total sample yields results that demonstrate a statistically significant negative correlation between this variable and the absolute value of discretionary accruals. This inference posits that as corporations experience growth in terms of total assets, their inclination towards earnings management diminishes, thereby signifying an elevated level of audit quality within progressively larger firms. Additional subset analyses reinforce this conclusion, adding that the relationship holds regardless of whether the audit services are provided by a Big 4 or a smaller audit firm. Based on the analysis of positive discretionary accruals, it also appears that the income-increasing earnings management practices of Belgian companies during the pre-crisis period become slightly less aggressive as their size, measured by total assets, increases. Similarly, the regression analysis of negative discretionary accruals signifies that firms engage less in more aggressive income-decreasing earnings management practices as their size grows. These results are consistent with the existing literature and align with our expectation of observing a negative relationship between the size of audited entities and the magnitude of discretionary accruals. Given the presence of more robust governance mechanisms and reduced information asymmetry, particularly in Belgium, larger corporations are less likely to resort to the use of discretionary accruals, as documented in prior research (Dechow et al., 1995; Meek et al., 2007). Boone et al. (2010) likewise find that larger companies exhibit a lower propensity for manipulating their financial results.

Moreover, the positive and statistically significant relationship between sales growth and discretionary accruals indicates that audit quality is adversely affected when Belgian corporations with higher sales growth rates tend to partake increasingly in earnings management using discretionary accruals as compared to those with lower sales growth rates. As per the prevailing scholarly literature, companies experiencing higher rates of sales growth are more inclined to manipulate earnings using discretionary accruals, particularly due to the pressure of meeting analysts' long-term earnings growth projections (McNichols, 2000; Roychowdhury, 2006). An additional analysis of two subsamples distinguished by corporations with above-median and below-median sales growth rates reveals that companies with the highest sales growth rates tend to rely more on discretionary accruals. In contrast, Belgian entities with lower sales growth rates use fewer aggressive accounting methods as the rate of sales growth decreases. According to further results, both positive and negative discretionary accruals become significantly more positive as the growth rate rises. As such, it appears that Belgian corporations engage in more aggressive income-increasing earnings management practices as the rate of sales growth escalates. The higher the rate of sales growth, the lower the level of audit quality in Belgium, and vice versa.

As for the long-term financing structure of large and very large Belgian companies, those exhibiting an unstable and insecure financial status, as manifested by a high long-term debt-to-total-assets ratio, are less prone to indulge in earnings management activities in comparison to their counterparts that possess a more stable and secure financial position. The statistically significant and negative correlation between the extent of discretionary accruals in absolute terms and the long-term debt-to-total-assets ratio suggests that audit quality tends to be higher when firms have limited ability to repay their long-term debts. Based on other findings, this conclusion remains consistent regardless of whether the auditor is a Big 4 or not.

Several authors, such as Franz et al. (2014), Dichev & Skinner (2002), and DeFond & Jiambalvo (1994), do not endorse this proposition. According to their research, companies facing financial distress, as evidenced by a higher long-term debt-to-total-assets ratio, are more likely to use discretionary accruals to evade potential breaches of debt covenants and other financing limitations. However, Anagnostopoulou & Tsekrekos (2017) propose that companies with higher leverage levels could face greater external monitoring and scrutiny, which may lead to a reduced inclination to use earnings management techniques, such as discretionary accruals.

The results of the second robustness test further corroborate a positive association between audit quality and the long-term debt-to-total-assets ratio. Belgian companies with positive discretionary accruals are less inclined to engage in upward earnings management practices as the long-term debt-to-total-assets ratio increases, whereas negative discretionary accruals demonstrate a statistically significant reduction in negativity for the second subset.

We further control for the firm's liquidity situation by including the current ratio, that is, current assets divided by current liabilities. The statistical analysis of the full population reveals that the coefficient of the predictor variable exhibits both statistical significance and negativity. Accordingly, the provision of audit services to Belgian clients with superior liquidity positions, reflected in high current ratios, by both Big 4 and non-Big 4 auditors is of superior quality when compared to clients with weaker liquidity positions. The regression analysis conducted on the primary sample is consistent with the initial predictions and extant literature. Jiang et al. (2016) and Dyreng et al. (2017) argue that managers may partake in financial reporting manipulation to avoid a decline in the current ratio below the commonly accepted benchmark of one. Similarly, Lancksweerd et al. (2021) in Belgium have arrived at a similar conclusion. This behaviour is motivated by creditors' reliance on the current ratio as a crucial indicator of liquidity in their credit assessment processes (Jiang et al., 2016; Dyreng et al., 2017).

As per additional results, negative discretionary accruals experience an increase in positivity as the current ratio of Belgian firms rises. Consequently, corporations engage increasingly less in assertive income-decreasing earnings management activities as their liquidity position improves. Furthermore, the subsample analyses yield several intriguing findings. A positive correlation exists between firms with a higher long-term debt-to-total-assets ratio, whereas a negative association is observed with the other ones. The statistical significance of both coefficients and their disparity at the 5% level, as reported by the Wald test, implies that audit quality is comparatively lower in Belgian enterprises with higher levels of long-term debt in proportion to total assets, coupled with sound liquidity. Conversely, companies with a lower long-term debt-to-total-assets ratio and favourable liquidity tend to rely less on aggressive accounting practices, thereby leading to enhanced audit quality. Another notable contribution to the literature is the suggestion that audit quality is higher for Big 4 clients with a small size in terms of total assets when they possess a high current ratio. Specifically, audit quality is more pronounced as firms audited by Big 4 in Belgium have a lower total asset size and a better liquidity position.

In terms of profitability, audit quality for Belgian corporations in the main sample is diminished when they undergo losses. This is evidenced by the statistically significant and positive coefficient of the corresponding variable, which implies that firms experiencing losses are more inclined to employ earnings management techniques, specifically through the use of discretionary accruals. Several authors in the literature come to the same conclusion, such as Ayers et al. (2006), who report a statistically significant and positive correlation between the extent of discretionary accruals and exceeding the zero earnings benchmark. Likewise, Burgstahler & Dichev (1997) and Van Tendeloo & Vanstraelen (2008) argue that companies that experience poor financial performance may adopt manipulative methods to mitigate the impact of their weak financial results and manage earnings decreases and losses away. According to additional analyses, positive discretionary accruals tend to exhibit an upward trend among large and very large Belgian companies reporting a loss, indicating a preference for income-increasing earnings management practices. Negative discretionary accruals tend to demonstrate a downward trend, resulting in a tendency towards income-decreasing earnings management practices, in the same context.

In addition, the more comprehensive findings of the regressions conducted on the subsamples reveal a statistically significant negative association between the loss status and the level of discretionary accruals among firms with a low return on assets. Hence, audit quality is enhanced in large and very large Belgian firms that manifest a loss status and possess a low ROA. This conclusion holds regardless of the sales growth rate of firms. Similarly, audit quality tends to improve when the return on assets ratio of loss-making corporations rises. In contrast, a profitable entity adopts more aggressive accounting methods as the return on assets increases, resulting in lower audit quality. Lastly, a positive association exists between the absolute value of discretionary accruals and loss-making companies, particularly those with a small size that undergo a Big 4 audit. Consequently, the audit quality provided by the Big 4 in Belgium is diminished in loss-making companies with a small size in terms of total assets.

In relation to the variable associated with the return on assets, it is noteworthy to highlight significant findings. Firstly, the regression conducted on the two subsamples distinguished by firms with above-median and below-median returns on assets adds a valuable contribution to the existing literature. While the results derived from the complete population suggest a positive association between the ROA and discretionary accruals, consistent with McNichols' (2000) observations, the subset regression analysis unveils a stronger positive relationship for firms with better operational performance compared to entities with lower performance. In the latter case, the relationship between discretionary accruals in absolute terms and return on assets displays a negative trend. The evidence presented demonstrates that audit quality in Belgium is lower for firms with higher return on assets as opposed to those with lower ROA. This phenomenon is attributed to the tendency of businesses with better operational performance to engage in excessive earnings management, while corporations with lower performance exhibit a lower frequency of earnings management practices. Moreover, the Wald test as well as the regression results reveal that companies audited by a Big 4 are increasingly likely to use discretionary accruals as their return on assets escalates, albeit to a lesser extent compared to their counterparts audited by non-Big 4 auditors. The outcomes of the second robustness test reinforce the negative association between audit quality and asset performance. These findings connote that companies in Belgium with positive discretionary accruals are more inclined to engage in upward earnings management practices, whereas negative discretionary accruals are statistically significantly more negative. As the return on assets rises, the degree of upward or downward earnings manipulation seems to intensify, thereby implying a potential decline in audit quality.

Secondly, the strong and statistically significant positive association between the return on assets and the magnitude of discretionary accruals in absolute terms is particularly apparent when the sales growth of companies falls below the median value of the total sample's sales growth rate. The Wald test and the regression results show that firms exhibiting significant sales growth have a propensity to partake in earnings management as the return on assets progressively escalates. This pattern is comparatively even more evident among their counterparts with lower sales growth. Nevertheless, the positive association between the return on assets and the magnitude of discretionary accruals, irrespective of the sales growth rate, indicates lower audit quality as the ROA increases. The same inference can be drawn for profitable companies, as they tend to rely more on earnings management through discretionary accruals as their return on assets rises. Conversely, Belgian entities that are experiencing losses are inclined to resort to less aggressive accounting techniques as the ROA grows, implying higher audit quality.

Thirdly, the coefficient for the return on assets variable is 0.2002 and statistically significant for corporations with the highest long-term debt-to-total-assets ratio, whereas it is 0.6197 and statistically significant for the remaining businesses. The difference between these two coefficients demonstrates statistical significance at the 1% level, as determined by the Wald test. These findings contribute to the existing literature by suggesting that the quality of audits may be compromised when audit entities undertake audits for Belgian companies displaying a high level of return on assets, particularly when their long-term debt-to-total-assets ratio is low.

The fourth observation pertaining to the return on assets variable is predicated on the regression analyses carried out on two subsamples, distinguished by firms with above-median and below-median current ratios from the total population. Belgian companies with a relatively high current ratio tend to employ discretionary accruals more frequently as their operational performance improves, which entails a decline in audit quality in such a situation. The same trend is observed for businesses with lower current ratios, albeit to a lesser extent. As per the Wald test, the difference between the two coefficients is statistically significant at the 1% level.



## Conclusion

In this paper, we investigate whether the audit quality of the Big 4 differs compared to non-Big 4 audit firms in Belgium, both before and during the COVID-19 pandemic. As a proxy for audit quality, we use discretionary accruals estimated by the performance-adjusted Jones model (Kothari et al., 2005). Based on a sample of 16,715 firm-year observations of 3,343 distinct Belgian large and very large entities, spanning from 2016 to 2019 and 2020, we examine the potential association between audit quality, as measured by discretionary accruals, and audit firm size in Belgium, including during the health crisis.

Empirical evidence substantiates a statistically significant disparity in discretionary accruals between firms audited by Big 4 auditors and those under the supervision of alternative auditors within the Belgian context. Additionally, we discover a positive and significant association between the absolute magnitude of discretionary accruals and the completion of an audit during the health emergency, implying a lower audit quality during this period of disruption compared to normal times. These effects are robust across a myriad of different model specifications and empirical designs. Our findings align with the conclusions drawn by other authors, such as Lawrence et al. (2011), who posit that smaller audit entities may possess even more compelling incentives to provide high-quality audits. This heightened drive can be attributed to their potential absence of comparable levels of insurance support enjoyed by Big 4 firms, thereby subjecting them to potentially more significant financial risks and ramifications in the event of an audit failure. With regard to the COVID-19 pandemic, Coffee Jr (2004) and Leone et al. (2013) contend that the auditors' judgments are influenced by the prevailing downward market situation, potentially leading to a diminution in audit quality as auditors may relax their customary scepticism amidst the prevailing market euphoria. Once again, these assertions provide support for the outcomes of this study.

However, we find no statistically significant relationship between audit quality in Belgium and the execution of an audit by a Big 4 during the coronavirus pandemic. Only a further analysis reveals that negative discretionary accruals were statistically significantly more positive for Big 4 clients throughout the health crisis period.

By the way, one of the reasons for the disparity in audit quality between Big 4 and non-Big 4 auditors is the variability in client characteristics, which is reported in previous research (Lawrence et al., 2011). These characteristics include various indicators such as the return on assets of audited firms, their profitability or loss situation, their size, their incentives to manipulate results, and many others. We conclude that Belgian companies with a higher return on assets and sales growth rate are associated with a greater magnitude of discretionary accruals and, as such, lower audit quality from auditors. This paper also demonstrates that as companies expand in terms of total assets, there is a corresponding reduction in their employment of discretionary accruals in absolute value, thereby resulting in an improved level of audit quality. Moreover, our study provides evidence that Belgian companies with progressively elevated long-term debt-to-total-assets ratios and favourable liquidity positions, as assessed by high current ratios, are linked to better audit quality. Conversely, this study suggests that when firms incur losses, they tend to engage in greater manipulation of their financial results through higher levels of discretionary accruals in absolute value, which leads to lower audit quality. Overall, the results are consistent with the literature.

The contribution of our study extends beyond the analysis of the differences in the magnitude of discretionary accruals between Belgian firms audited by Big 4 and non-Big 4 auditors. Our research provides novel insights into the effects of the COVID-19 pandemic and firm's characteristics on earnings management by managers in Belgium, which has implications for the level of discretionary accruals and audit quality.

Despite the resistance of our findings to a battery of robustness tests, the reliability of the model used to estimate discretionary accruals remains a key concern. Notwithstanding various authors approve the model used in this research, all models applied to computing discretionary accruals have been subject to criticism for providing unreliable estimates. Thus, a consensus has not yet been reached among researchers regarding a specific model for estimating discretionary accruals (Stubben, 2010).

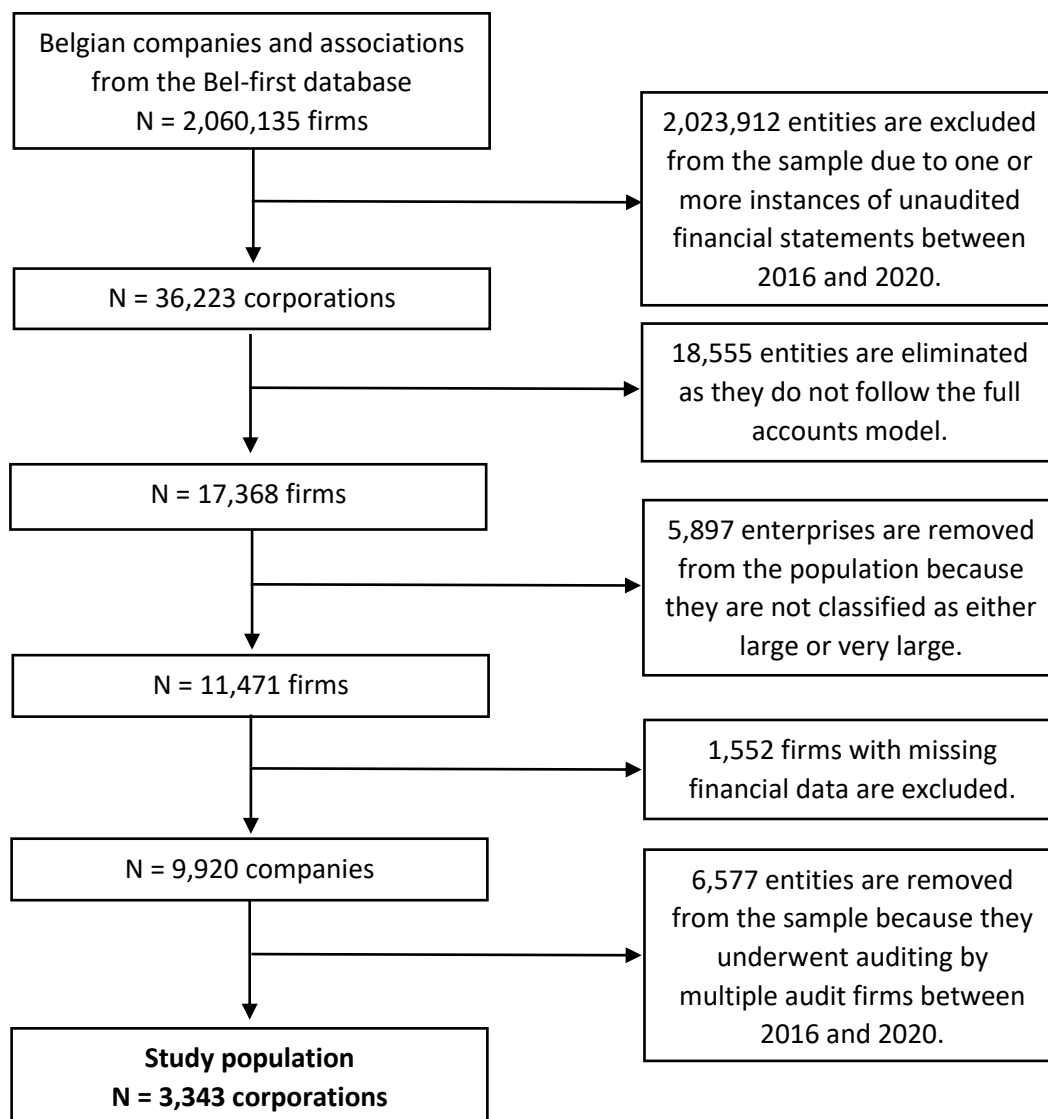
An additional matter of concern pertains to the designation of the year 2020 as the period associated with the coronavirus outbreak in Belgium. Financial information from this year is utilised to represent the health emergency period, while financial data from the years 2016 to 2019 pertain to the pre-crisis period. Nevertheless, some Belgian companies may have already incurred the effects of the crisis by the end of 2019, potentially introducing a minor bias into the analysis.

Given the preliminary nature of this study and the inherent limitations encountered, the outcomes obtained prompt the need for further comprehensive investigations. For instance, a qualitative inquiry may be undertaken to assess the influence of the auditor selection (Big 4 versus non-Big 4) and the COVID-19 pandemic on audit quality, rather than relying solely on quantitative analyses. Thanks to a structured survey to a well-defined sample, it may be plausible to explore whether the auditor-client relationships have deteriorated and subsequently affected audit quality in Belgium. Additionally, future research could concentrate on scrutinising the objectivity and independence of the Big 4 as compared to other audit firms, both during and prior to the health crisis. Lastly, it would be valuable to delve into how the COVID-19 outbreak has impacted audit fees and ascertain, among other things, the evolution of these fees in relation to audit quality.

## Appendices

**Figure 1: Flowchart of the sampling procedure and exclusion criteria**

Figure 1 displays the sampling procedure and exclusion criteria. The sample for testing the hypothesis comprises large and very large Belgian companies audited by a single audit firm from 2016 to 2019, that is, the pre-crisis period, and in 2020, the period coinciding with the outbreak in this paper. The total population consists of 3,343 entities. This ultimately yields a sample of 16,715 firm-year observations spanning the years 2016 through 2020.





**Table 1: Sample description**

This table presents the sample distribution by the NACE (2008) two-digit industry group and by period (pre-pandemic versus pandemic) in Panel A as well as by industry of Big 4 clients in Panel B. Our total population includes 16,715 firm-year observations of 3,343 large and very large Belgian entities over the period 2016–2019 and in 2020. 37.54% of the sample under examination undergoes auditing procedures performed by one of the Big 4, that is, 1,255 entities or 6,275 firm-year observations. All continuous variables are winsorised at the 5<sup>th</sup> and 95<sup>th</sup> percentiles to mitigate the impact of outliers. Variable definitions are provided in Table 2.

**Panel A: Sample distribution by industry and period**

No.	Industry code (21 industries)	# of Obs.	% of Obs.	# of Obs. pre- pandemic (2016- 2019)	# of Obs. pandemic (2020)
1	Accommodation and food service activities	85	0.51	68	17
2	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	0	0	0	0
3	Activities of extraterritorial organisations and bodies	0	0	0	0
4	Administrative and support service activities	670	4.01	536	134
5	Agriculture, forestry, and fishing	85	0.51	68	17
6	Arts, entertainment, and recreation	150	0.90	120	30
7	Construction	1,415	8.47	1,132	283
8	Education	335	2.00	268	67
9	Electricity, gas, steam, and air conditioning supply	130	0.78	104	26
10	Financial and insurance activities	470	2.81	376	94
11	Human health and social work activities	960	5.74	768	192
12	Information and communication	410	2.45	328	82
13	Manufacturing	4,185	25.04	3,348	837
14	Mining and quarrying	55	0.33	44	11
15	Other service activities	150	0.90	120	30
16	Professional, scientific, and technical activities	870	5.20	696	174
17	Public administration and defence; compulsory social security	40	0.24	32	8
18	Real estate activities	495	2.96	396	99
19	Transportation and storage	960	5.74	768	192
20	Water supply; sewerage; waste management and remediation activities	245	1.47	196	49
21	Wholesale and retail trade; repair of motor vehicles and motorcycles	5,005	29.94	4,004	1,001
<b>Total/Total/Total/Total</b>		<b>16,715</b>	<b>100.00</b>	<b>13,372</b>	<b>3,343</b>

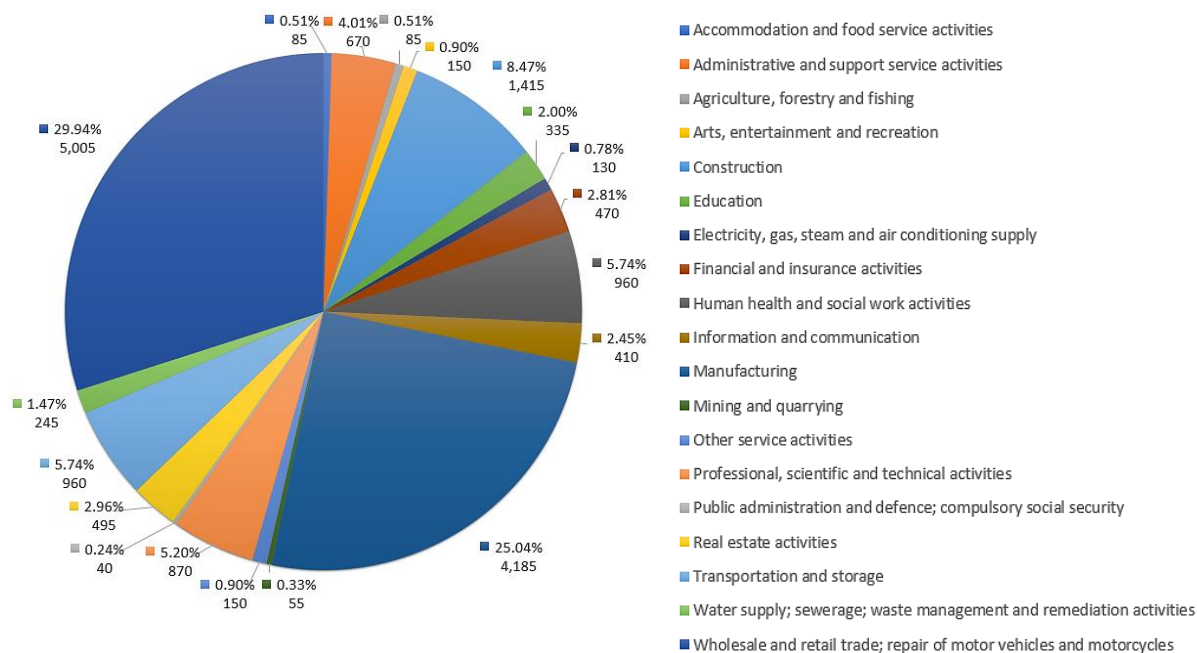
**Panel B: Sample distribution by industry of Big 4 clients**

No.	Industry code (21 industries)	# of Obs. audited by a Big 4	% of Obs. audited by a Big 4	% of the total sample
1	Accommodation and food service activities	35	0.56	0.21
2	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	0	0	0
3	Activities of extraterritorial organisations and bodies	0	0	0
4	Administrative and support service activities	310	4.94	1.85
5	Agriculture, forestry, and fishing	10	0.16	0.06
6	Arts, entertainment, and recreation	65	1.04	0.39
7	Construction	320	5.10	1.91
8	Education	45	0.72	0.27
9	Electricity, gas, steam, and air conditioning supply	105	1.67	0.63
10	Financial and insurance activities	230	3.66	1.38
11	Human health and social work activities	210	3.35	1.26
12	Information and communication	305	4.86	1.82
13	Manufacturing	1,940	30.92	11.61
14	Mining and quarrying	20	0.32	0.12
15	Other service activities	50	0.80	0.30
16	Professional, scientific, and technical activities	410	6.53	2.45
17	Public administration and defence; compulsory social security	10	0.16	0.06
18	Real estate activities	175	2.79	1.05
19	Transportation and storage	410	6.53	2.45
20	Water supply; sewerage; waste management and remediation activities	75	1.19	0.45
21	Wholesale and retail trade; repair of motor vehicles and motorcycles	1,550	24.70	9.27
<b>Total/Total/Total</b>		<b>6,275</b>	<b>100.00</b>	<b>37.54</b>

Source: Author's work, using the Bel-first database

**Figure 2: Pie chart displaying the distribution of the total sample**

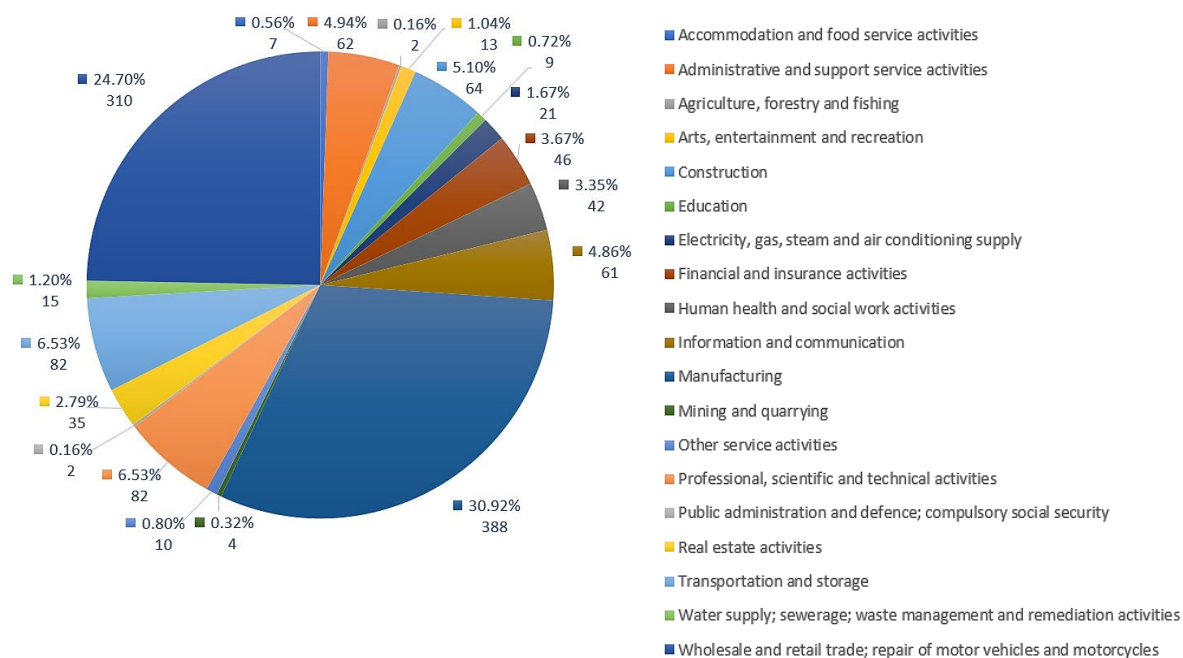
Figure 2 illustrates the distribution of our sample across NACE (2008) two-digit industry groups, as described in Table 1. The population used to test the hypothesis includes large and very large Belgian companies audited by a single audit firm from 2016 to 2019, prior to the COVID-19 pandemic, as well as in 2020, the period coinciding with the outbreak in this paper. The total sample size is 3,343 entities, resulting in 16,715 firm-year observations spanning the years 2016 through 2020. The percentage number in Figure 2 gives the proportion of entities by industry sector compared to the total sample, while the second value indicates the number of firm-year observations.



Source: Author's work

**Figure 3: Pie chart displaying the distribution of Big 4 clients included in the total sample**

Figure 3 shows the distribution of Big 4 clients across NACE (2008) two-digit industry groups, as described in Table 1. The sample used to test the hypothesis includes large and very large Belgian entities audited by a single audit firm from 2016 to 2019, that is, before the coronavirus pandemic, and in 2020, the period coinciding with the outbreak in this paper. The total population consists of 3,343 companies. This ultimately yields a database of 16,715 firm-year observations covering the years 2016 to 2020. The percentage value depicted in Figure 3 denotes the proportion of Big 4 clients by industry sector out of the total number of Big 4 clients in the total sample. The second value indicates the number of entities audited by a Big 4 for each industry sector.



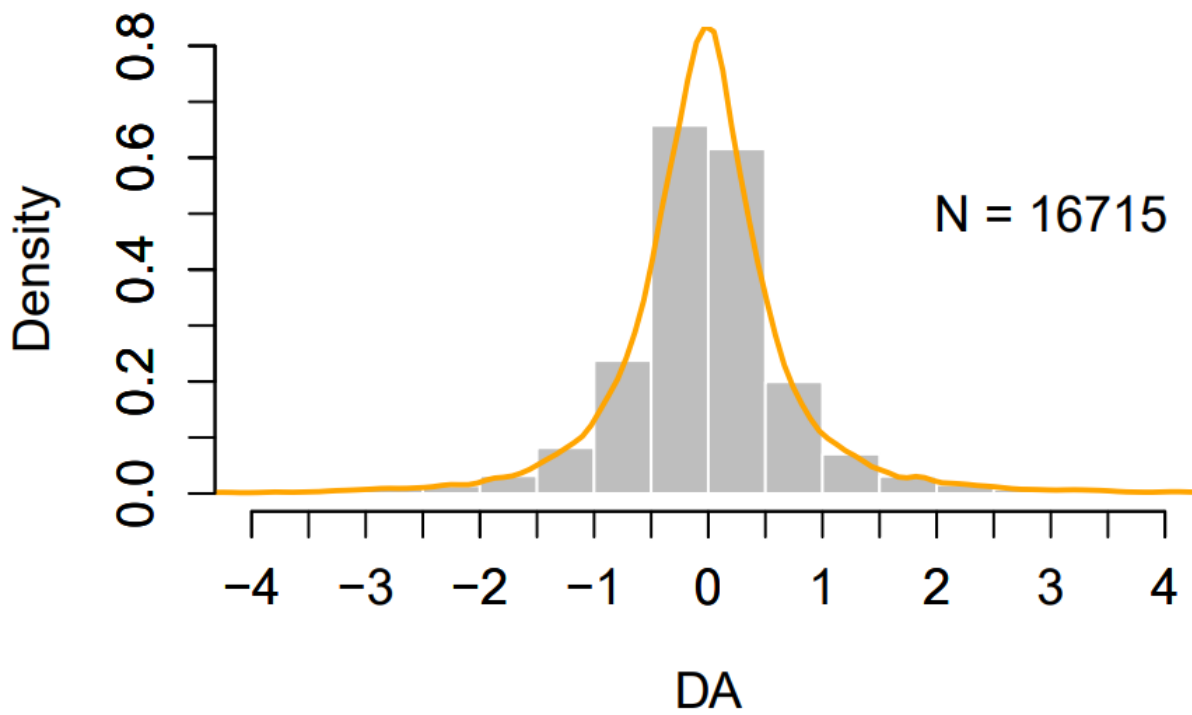
Source: Author's work

Table 2: Variable definitions

Multiple Linear Regression	Definitions
$AbsDA_{jt}$	Absolute value of discretionary accruals, as calculated through the performance-adjusted Jones model (Kothari et al., 2005) for firm 'j' in year 't'.
$BIG_{jt}$	Dummy variable that equals '1' if an entity is audited by a Big 4, and takes the value '0' otherwise.
$COVID_{jt}$	Dummy variable that takes the value of '1' if a firm is audited during the COVID-19 crisis, in 2020, and takes the value '0' otherwise.
$BIG\_COVID_{jt}$	Indicator variable that equals '1' if an entity is audited by a Big 4 throughout the pandemic period, and takes the value '0' otherwise.
$SIZE_{jt}$	Natural logarithm of total assets for firm 'j' in year 't'.
$ROA_{jt}$	Net operating return on assets before tax and finance charges for company 'j' in year 't'.
$GROWTH_{jt}$	Change in sales from the prior year to the current year deflated by the prior year's sales for entity 'j' in year 't'.
$LT\ DEBTS\ TO\ ASSETS_{jt}$	Long-term debts divided by total assets for firm 'j' in year 't'.
$CURRENTR_{jt}$	Current ratio for entity 'j' in year 't'.
$LOSS_{jt}$	Dummy variable that equals '1' if a company has a negative net income, and '0' otherwise.
Additional Variables	
	<b>Equation (1) – Equation (2) – Equation (3) – Equation (4)</b>
$TACC_{jt}$	The total accruals adjusted for firm- and year. These accruals are computed using balance sheet and income statement information: $TACC = \Delta CA - \Delta CASH - \Delta CL + \Delta DCL - DEP$ , where $\Delta CA$ is the change in total current assets from the prior year; $\Delta CASH$ is the change in cash from the prior year; $\Delta CL$ is the change in current liabilities from the prior year; $\Delta DCL$ is the change in short-term debt included in current liabilities from prior year; $DEP$ is the depreciation and amortisation expense.
$NDACC_{jt}$	Normal accruals adjusted for industry- and year. These accruals are obtained by running the following model for each industry and year: $\frac{\alpha_0}{TA_{t-1}} + \frac{\alpha_1(\Delta REV - \Delta REC)}{TA} + \frac{\alpha_2 PPE}{TA_{jt-1}} + \alpha_3 ROA_{jt}$ , where $\frac{1}{TA_{t-1}}$ is the inverse of beginning of year total assets; $\frac{1}{TA}$ is the inverse of year total assets; $\Delta REV$ is the change in revenues from prior year; $\Delta REC$ is the change in receivables from prior year; $PPE$ are the gross property, plant, and equipment; $ROA$ is the net operating return on assets before tax and finance charges.
$DACC_{jt}$	Discretionary accruals adjusted for industry- and year. These accruals are obtained by running the following model by each industry and year: $TACC - NDACC$ .

**Figure 4: Distribution of discretionary accruals**

Figure 4 displays the distribution of discretionary accruals with the normal curve. The bell-shaped normal curve provides a degree of confidence in the validity and reliability of the linear regression model.

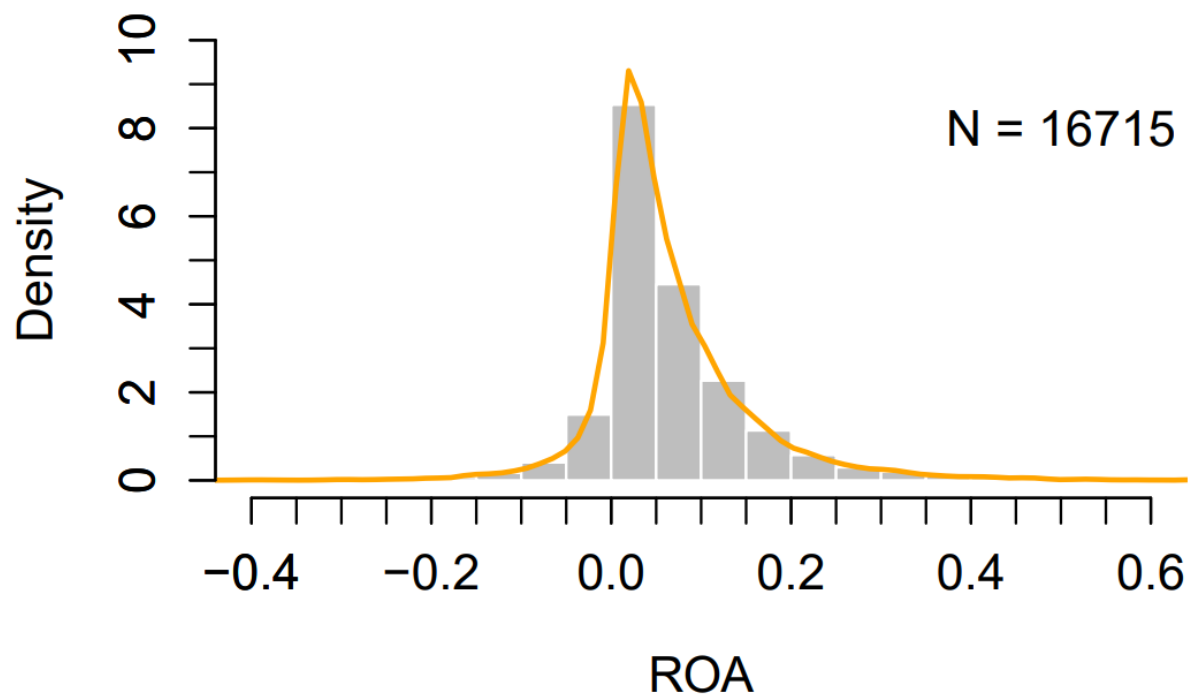


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Source: Author's work, using the RStudio program

**Figure 5: Distribution of the  $ROA_{jt}$  variable**

Figure 5 shows the distribution of the  $ROA_{jt}$  variable with the normal curve. Despite the right-skewed nature of the variable, the bell-shaped normal curve gives a degree of confidence in the validity and reliability of the linear regression model.

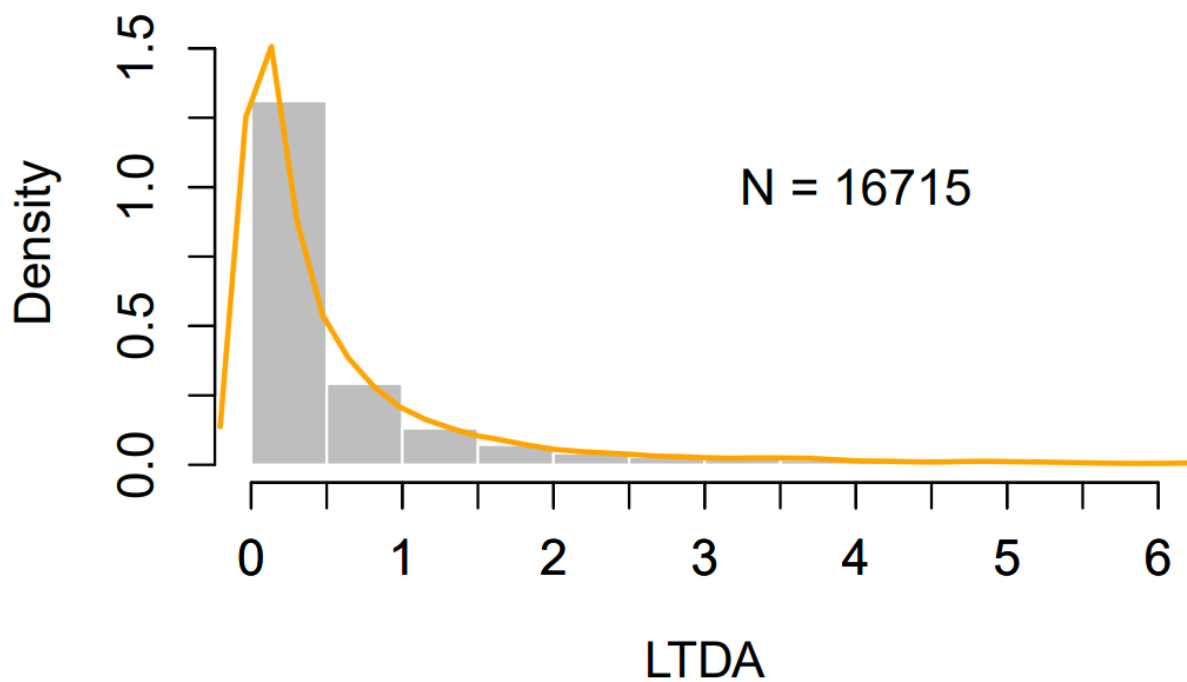


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Source: Author's work, using the RStudio program

**Figure 6: Distribution of the  $LT\ DEBTS\ TO\ ASSETS_{jt}$  variable**

Figure 6 displays the distribution of the  $LT\ DEBTS\ TO\ ASSETS_{jt}$  variable with the normal curve. All observations are positive since the minimum value of the long-term debt-to-total-assets ratio is zero. The bell-shaped normal curve provides a certain level of confidence in the validity and reliability of the linear regression model.



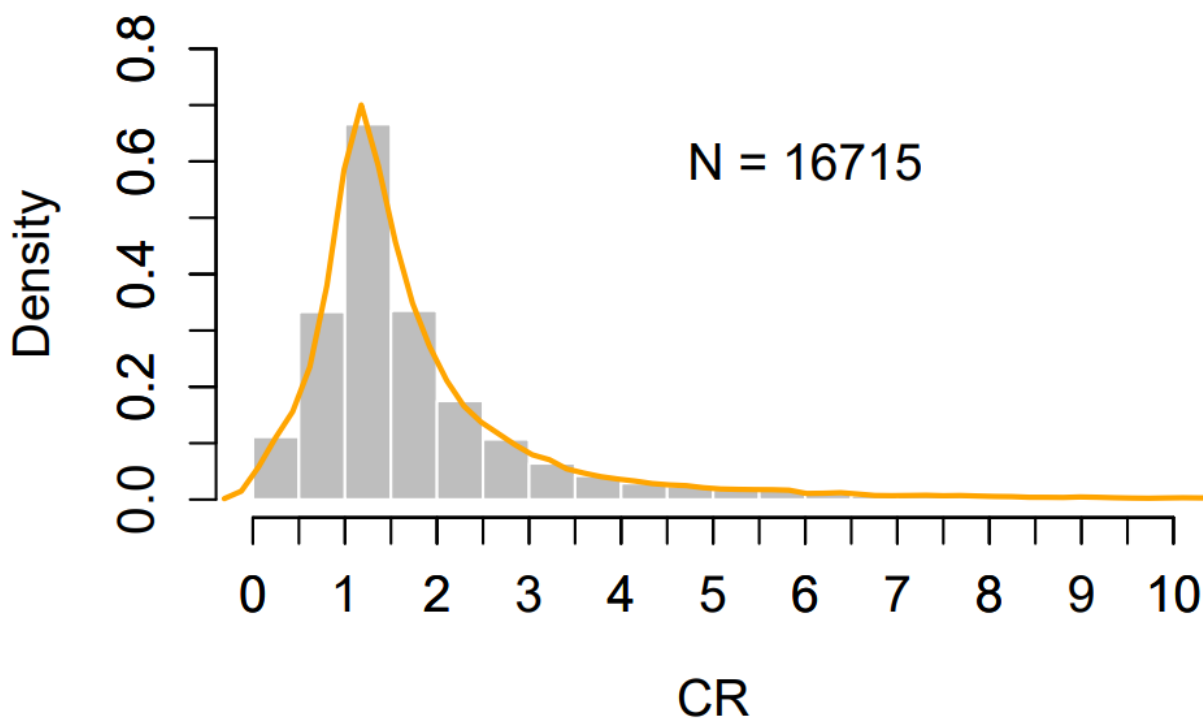
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Source: Author's work, using the RStudio program



**Figure 7: Distribution of the  $CURRENTR_{jt}$  variable**

Figure 7 illustrates the distribution of the  $CURRENTR_{jt}$  variable with the normal curve. All observations are positive since the minimum value of the current ratio is zero. The bell-shaped normal curve indicates a certain level of confidence in the validity and reliability of the linear regression model.

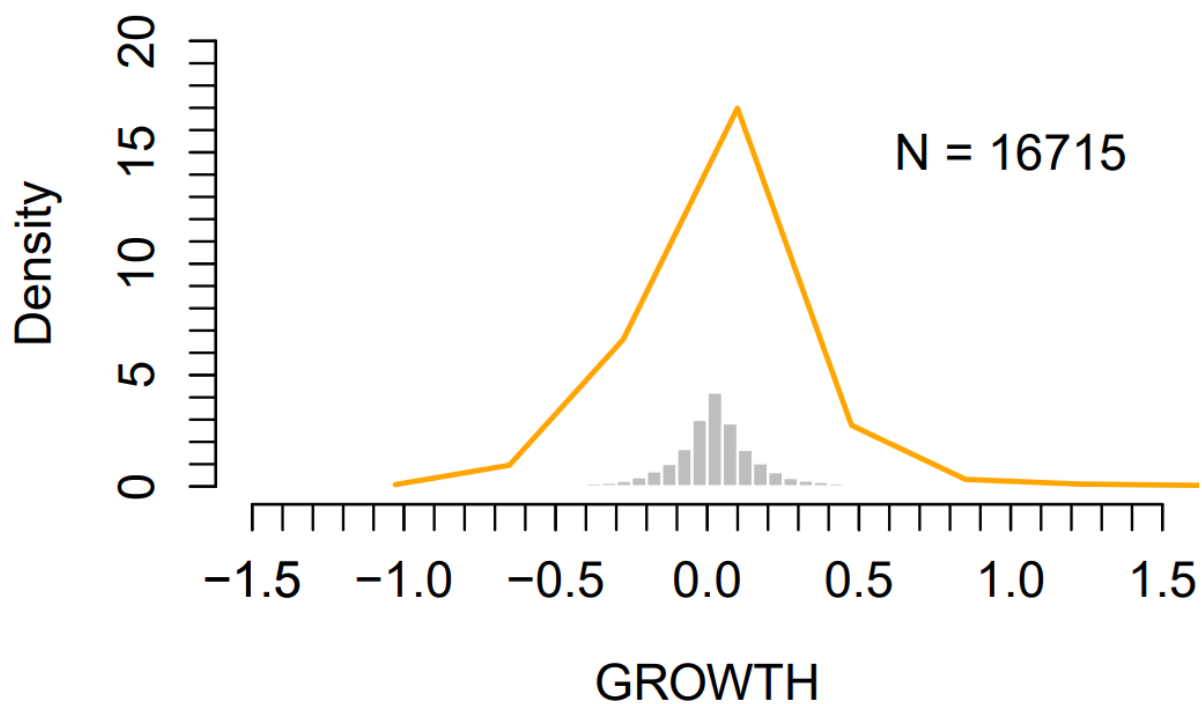


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Source: Author's work, using the RStudio program

**Figure 8: Distribution of the  $GROWTH_{jt}$  variable**

Figure 8 depicts the distribution of the  $GROWTH_{jt}$  variable with the normal curve. The bell-shaped normal curve provides confidence in the validity and reliability of the linear regression model.



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Source: Author's work, using the RStudio program

**Table 3: Summary statistics**

This table presents a comprehensive overview of the statistical summary, comprising the sample size, means, percentiles, and standard deviations of the variables that constitute the foundation of our primary analyses. To minimise the influence of outliers, all continuous variables have undergone a winsorisation procedure, wherein values beyond the 5<sup>th</sup> and 95<sup>th</sup> percentiles are replaced with the nearest threshold. Variable definitions are provided in Table 2.

<b>Variable</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>P25</b>	<b>P50</b>	<b>P75</b>
<i>AbsDA</i>	16,715	0.440	0.341	0.149	0.348	0.690
<i>BIG</i>	16,715	0.375	0.484	0.00	0.00	1.00
<i>COVID</i>	16,715	0.200	0.400	0.00	0.00	0.00
<i>BIG_COVID</i>	16,715	0.075	0.264	0.00	0.00	0.00
<i>SIZE *</i>	16,715	31,358.175	23,358.110	10,591.785	22,694.437	58,754.407
<i>ROA</i>	16,715	0.055	0.055	0.016	0.044	0.096
<i>GROWTH</i>	16,715	0.028	0.123	-0.046	0.025	0.102
<i>LT DEBTS TO ASSETS</i>	16,715	0.376	0.345	0.060	0.240	0.770
<i>CURRENTR</i>	16,715	1.567	0.737	1.050	1.400	2.130
<i>LOSS</i>	16,715	0.158	0.365	0.00	0.00	0.00

*\* Typically, the  $SIZE_{jt}$  variable is represented as the natural logarithm of total assets. To enhance the interpretability of the descriptive statistics, it has been deemed appropriate to present the values of the  $SIZE_{jt}$  variable in their de-logged form, in thousands of euros.*

Source: Author's research results, using the RStudio program

**Table 4: Pearson correlation table**

This table reports the Pearson correlation matrix for the variables in the baseline regression. Continuous variables are winsorised at the 5<sup>th</sup> and 95<sup>th</sup> percentiles to mitigate the impact of outliers. Variable definitions are provided in Table 2. Bold coefficient values indicate that the coefficients demonstrate a  $p$ -value less than or equal to 0.05, which implies a high degree of statistical significance.

Variable	1	2	3	4	5	6	7	8	9	10
1 <i>AbsDA</i>	<b>1.000</b>									
2 <i>BIG</i>	<b>0.035</b>	<b>1.000</b>								
3 <i>COVID</i>	<b>0.021</b>	0.000	<b>1.000</b>							
4 <i>BIG_COVID</i>	<b>0.021</b>	<b>0.368</b>	<b>0.570</b>	<b>1.000</b>						
5 <i>SIZE</i>	<b>-0.085</b>	<b>0.379</b>	<b>0.026</b>	<b>0.149</b>	<b>1.000</b>					
6 <i>ROA</i>	<b>0.073</b>	0.011	<b>-0.031</b>	<b>-0.032</b>	<b>-0.120</b>	<b>1.000</b>				
7 <i>GROWTH</i>	<b>0.031</b>	<b>-0.034</b>	<b>-0.226</b>	<b>-0.146</b>	-0.013	<b>0.155</b>	<b>1.000</b>			
8 <i>LT DEBTS TO ASSETS</i>	<b>-0.061</b>	<b>-0.069</b>	-0.013	<b>-0.032</b>	<b>0.087</b>	<b>-0.198</b>	<b>0.046</b>	<b>1.000</b>		
9 <i>CURRENTR</i>	-0.011	<b>-0.057</b>	<b>0.015</b>	<b>-0.024</b>	<b>-0.066</b>	<b>0.153</b>	<b>-0.076</b>	<b>-0.269</b>	<b>1.000</b>	
10 <i>LOSS</i>	-0.005	<b>0.048</b>	<b>0.051</b>	<b>0.061</b>	<b>0.037</b>	<b>-0.555</b>	<b>-0.132</b>	<b>0.132</b>	<b>-0.105</b>	<b>1.000</b>

Source: Author's research results, using the RStudio program

**Table 5: Main results**

This table displays the findings of an examination into the effect of audit firm size (Big 4 versus non-Big 4) and the COVID-19 pandemic on the level of discretionary accruals in absolute terms. Specifically, the dependent variable,  $AbsDA_{jt}$ , is an indicator of audit quality knowing that discretionary accruals are used as a proxy for audit quality (Jones, 1991). Higher levels of discretionary accruals in absolute terms imply lower audit quality.  $BIG_{jt}$  is a binary variable that takes the value of '1' if a sampled entity is audited by a Big 4, and '0' otherwise.  $COVID_{jt}$  is a dummy variable that takes the value of '1' if a firm is audited during the health crisis in 2020, and '0' otherwise.  $BIG\_COVID_{jt}$  is a binary variable that equals '1' if a sampled company is audited by a Big 4 during the pandemic period, and '0' otherwise. The table reports robust  $t$ -statistics in parentheses, adjusted for clustering at the industry level. Continuous variables are winsorised at the 5% and 95% levels. Statistical significance is denoted by \*\*\*, \*\*, and \*, indicating significance at the 1%, 5%, and 10% levels, respectively. Variable definitions are provided in Table 2.

<b>Dep. Var. =</b>	<b><i>AbsDA</i></b>
<i>(Intercept)</i>	0.6996 *** (18.368)
<i>BIG</i>	0.0551 *** (8.432)
<i>COVID</i>	0.0303 *** (3.651)
<i>BIG_COVID</i>	-0.0106 (-0.792)
<i>SIZE</i>	-0.0353 *** (-13.928)
<i>ROA</i>	0.4265 *** (7.172)
<i>GROWTH</i>	0.0789 *** (3.566)
<i>LT DEBTS TO ASSETS</i>	-0.0379 *** (-4.695)
<i>CURRENTR</i>	-0.0121 *** (-3.156)
<i>LOSS</i>	0.0397 *** (4.611)
Observations	16,715
Adjusted R <sup>2</sup>	0.0422
Industry FE	Yes

Source: Author's research results, using the RStudio program

**Table 6: Robustness test A**

This table reports our first robustness test to our main analysis. In particular, we employ the methodology proposed by Dechow, Sloan, and Sweeney (1995) to calculate discretionary accruals, and subsequently conduct a multiple linear regression analysis using Equation (5). The dependent variable,  $AbsDA_{jt}$ , is an indicator of audit quality, with discretionary accruals acting as a proxy for audit quality (Jones, 1991). Higher levels of discretionary accruals in absolute terms result in lower audit quality.  $BIG_{jt}$  is a binary variable that equals '1' if a sampled firm is audited by a Big 4 firm, and '0' otherwise.  $COVID_{jt}$  is a dummy variable that takes the value of '1' if a firm is audited during the COVID-19 crisis in 2020, and '0' otherwise.  $BIG\_COVID_{jt}$  is a binary variable that equals '1' if a sampled firm is audited by a Big 4 during the pandemic period, and '0' otherwise. The table reports robust  $t$ -statistics in parentheses, adjusted for clustering at the industry level. All continuous variables are winsorised at the 5% and 95% levels. Statistical significance is denoted by \*\*\*, \*\*, and \*, indicating significance at the 1%, 5%, and 10% levels, respectively. Variable definitions are provided in Table 2.

<b>Dep. Var. =</b>	<b><i>AbsDA</i></b>
<i>(Intercept)</i>	0.7153 *** (18.789)
<i>BIG</i>	0.0558 *** (8.536)
<i>COVID</i>	0.0300 *** (3.614)
<i>BIG_COVID</i>	-0.0089 (-0.664)
<i>SIZE</i>	-0.0372 *** (-14.652)
<i>ROA</i>	0.3274 *** (5.507)
<i>GROWTH</i>	0.0971 *** (4.393)
<i>LT DEBTS TO ASSETS</i>	-0.0371 *** (-4.595)
<i>CURRENTR</i>	-0.0113 *** (-2.958)
<i>LOSS</i>	0.0443 *** (5.156)
Observations	16,715
Adjusted R <sup>2</sup>	0.0444
Industry FE	Yes

Source: Author's research results, using the RStudio program

**Table 7: Robustness test B**

The following table presents the results of our second robustness test to validate our main analysis. The dependent variable computed in Equation (4),  $DACC_{jt}$ , is an indicator of audit quality knowing that discretionary accruals are used as a proxy for audit quality (Jones, 1991). Higher levels of discretionary accruals in absolute terms imply lower audit quality.  $BIG_{jt}$  is a binary variable that equals '1' if a sampled firm is audited by a Big 4, and '0' otherwise.  $COVID_{jt}$  is a dummy variable that takes the value of '1' if an entity is audited during the coronavirus crisis in 2020, and '0' otherwise.  $BIG\_COVID_{jt}$  is a binary variable that equals '1' if a sampled firm is audited by a Big 4 during the pandemic period, and '0' otherwise. The table reports robust  $t$ -statistics in parentheses, adjusted for clustering at the industry level. All continuous variables are winsorised at the 5% and 95% levels. Statistical significance is denoted by \*\*\*, \*\*, and \*, indicating significance at the 1%, 5%, and 10% levels, respectively. The statistical significance of differences in  $t$ -statistics is determined with the Wald test and its  $p$ -value in parentheses. Variable definitions are provided in Table 2.

<b>Dep. Var. =</b>	<b>DACC</b>	<b>DACC &gt; 0</b>	<b>DACC ≤ 0</b>
		<i>DACC</i>	<i>DACC</i>
<i>(Intercept)</i>	-0.6924 *** (-11.147)	0.5147 *** (9.243)	-0.8506 *** (-16.461)
<i>BIG</i>	-0.0400 *** (-3.753)	0.0333 *** (3.640)	-0.0717 *** (-7.855)
<i>COVID</i>	-0.0732 *** (-5.402)	-0.0068 (-0.543)	-0.0540 *** (-4.932)
<i>BIG_COVID</i>	0.0417 * (1.915)	0.0282 (1.433)	0.0376 ** (2.109)
<i>SIZE</i>	0.0610 *** (14.739)	-0.0201 *** (-5.570)	0.0474 *** (13.283)
<i>ROA</i>	-0.4853 *** (-5.004)	0.4275 *** (5.002)	-0.3783 *** (-4.645)
<i>GROWTH</i>	0.4597 *** (12.750)	0.2210 *** (7.128)	0.0632 ** (2.027)
<i>LT DEBTS TO ASSETS</i>	-0.0039 (-0.298)	-0.0373 *** (-3.286)	0.0413 *** (3.674)
<i>CURRENTR</i>	0.0404 *** (6.475)	0.0033 (0.611)	0.0287 *** (5.406)
<i>LOSS</i>	-0.0859 *** (-6.127)	0.0252 ** (2.018)	-0.0451 *** (-3.868)
Observations	16,715	8,006	8,709
Adjusted R <sup>2</sup>	0.0316	0.0356	0.0613
Industry FE	Yes	Yes	Yes
Wald test for <i>BIG</i>	65.9917 (< 0,001)		
Wald test for <i>COVID</i>	8.0977 (0.0044)		
Wald test for <i>BIG_COVID</i>	0.1241 (0.7246)		
Wald test for <i>SIZE</i>	176.8665 (< 0,001)		
Wald test for <i>ROA</i>	46.5931 (< 0,001)		
Wald test for <i>GROWTH</i>	12.8886 (< 0,001)		
Wald test for <i>LT DEBTS TO ASSETS</i>	24.2045 (< 0,001)		
Wald test for <i>CURRENTR</i>	11.2434 (< 0,001)		
Wald test for <i>LOSS</i>	16.9242 (< 0,001)		

Source: Author's research results, using the RStudio program

**Table 8: Large versus small size**

The presented table exhibits the outcomes of an examination that explores the impact of audit firm size (Big 4 versus non-Big 4) and the COVID-19 pandemic on the level of discretionary accruals in absolute terms within two distinct subsamples: companies for which the  $SIZE_{jt}$  value exceeds the median value of 10.0299, and those with a value less than or equal to that threshold. The dependent variable,  $AbsDA_{jt}$ , is an indicator of audit quality knowing that discretionary accruals are used as a proxy for audit quality (Jones, 1991). Higher levels of discretionary accruals in absolute terms result in lower audit quality. The table reports robust  $t$ -statistics in parentheses, adjusted for clustering at the industry level. Continuous variables are winsorised at the 5% and 95% levels. Statistical significance is denoted by \*\*\*, \*\*, and \*, indicating significance at the 1%, 5%, and 10% levels, respectively. The statistical significance of differences in  $t$ -statistics is determined with the Wald test and its  $p$ -value in parentheses. Variable definitions are provided in Table 2.

	SIZE > Median SIZE	SIZE ≤ Median SIZE
Dep. Var. =	<i>AbsDA</i>	<i>AbsDA</i>
<i>(Intercept)</i>	0.5758 *** (8.763)	0.8248 *** (9.869)
<i>BIG</i>	0.0390 *** (4.360)	0.0664 *** (6.775)
<i>COVID</i>	0.0218 * (1.701)	0.0380 *** (3.498)
<i>BIG_COVID</i>	0.0049 (0.276)	-0.0256 (-1.164)
<i>SIZE</i>	-0.0283 *** (-5.810)	-0.0445 *** (-5.727)
<i>ROA</i>	0.4378 *** (5.150)	0.4431 *** (5.285)
<i>GROWTH</i>	0.0975 *** (3.179)	0.0549 * (1.731)
<i>LT DEBTS TO ASSETS</i>	-0.0588 *** (-5.330)	-0.0042 (-0.349)
<i>CURRENTR</i>	-0.0003 (-0.062)	-0.0257 *** (-4.247)
<i>LOSS</i>	0.0305 *** (2.629)	0.0497 *** (3.902)
Observations	8,357	8,358
Adjusted R <sup>2</sup>	0.0355	0.0578
Industry FE	Yes	Yes
Wald test for <i>BIG</i>	4.2917 (0.0383)	
Wald test for <i>COVID</i>	0.9300 (0.3349)	
Wald test for <i>BIG_COVID</i>	1.1606 (0.2813)	
Wald test for <i>SIZE</i>	3.130 (0.0769)	
Wald test for <i>ROA</i>	0.0020 (0.9648)	
Wald test for <i>GROWTH</i>	0.9316 (0.3344)	
Wald test for <i>LT DEBTS TO ASSETS</i>	11.2453 (< 0,001)	
Wald test for <i>CURRENTR</i>	10.5870 (0.0011)	
Wald test for <i>LOSS</i>	1.2558 (0.2625)	

Source: Author's research results, using the RStudio program



**Table 9: High versus low ROA**

The table displays the outcomes of a regression analysis that explores the effect of audit firm size (Big 4 versus non-Big 4) and the COVID-19 pandemic on the absolute value of discretionary accruals. The examination focuses on two discrete subsamples of firms: those with a return on assets greater than the median value of 0.0444, and those with a ROA less than or equal to this threshold. The dependent variable,  $AbsDA_{jt}$ , serves as an indicator of audit quality, with discretionary accruals acting as a proxy for audit quality (Jones, 1991). Higher levels of discretionary accruals in absolute terms are indicative of lower audit quality. The table reports robust  $t$ -statistics in parentheses, adjusted for clustering at the industry level. Continuous variables are winsorised at the 5% and 95% levels. Statistical significance is denoted by \*\*\*, \*\*, and \*, indicating significance at the 1%, 5%, and 10% levels, respectively. The statistical significance of differences in  $t$ -statistics is determined with the Wald test and its  $p$ -value in parentheses. Variable definitions are provided in Table 2.

	ROA > Median ROA	ROA ≤ Median ROA
Dep. Var. =	<i>AbsDA</i>	<i>AbsDA</i>
<i>(Intercept)</i>	0.6274 *** (9.360)	0.7291 *** (15.202)
<i>BIG</i>	0.0381 *** (4.144)	0.0662 *** (7.112)
<i>COVID</i>	0.0234 * (1.932)	0.0348 *** (3.061)
<i>BIG_COVID</i>	0.0015 (0.076)	-0.0251 (-1.377)
<i>SIZE</i>	-0.0306 *** (-8.251)	-0.0361 *** (-10.309)
<i>ROA</i>	0.9394 *** (8.858)	-1.1921 *** (-6.119)
<i>GROWTH</i>	0.0629 * (1.960)	0.0973 *** (3.203)
<i>LT DEBTS TO ASSETS</i>	-0.0419 *** (-3.431)	-0.0219 ** (-2.026)
<i>CURRENTR</i>	-0.0148 *** (-3.431)	-0.0147 *** (-2.807)
<i>LOSS</i>	0.0341 (0.878)	-0.0286 ** (-2.534)
Observations	8,353	8,362
Adjusted R <sup>2</sup>	0.0446	0.0456
Industry FE	Yes	Yes
Wald test for <i>BIG</i>	4.6192 (0.0316)	
Wald test for <i>COVID</i>	0.4731 (0.4916)	
Wald test for <i>BIG_COVID</i>	0.9906 (0.3196)	
Wald test for <i>SIZE</i>	1.1341 (0.2869)	
Wald test for <i>ROA</i>	92.33918 (< 0,001)	
Wald test for <i>GROWTH</i>	0.6038 (0.4371)	
Wald test for <i>LT DEBTS TO ASSETS</i>	1.5084 (0.2194)	
Wald test for <i>CURRENTR</i>	0.0004 (0.9838)	
Wald test for <i>LOSS</i>	2.4019 (0.1212)	

Source: Author's research results, using the RStudio program

**Table 10: High versus low sales growth rate**

The table presents the results of two regressions that examine the effect of audit firm size (Big 4 versus non-Big 4) and the COVID-19 pandemic on the absolute value of discretionary accruals in two distinct subsamples of firms. The two regressions are conducted by dividing the total population based on the median value of the  $GROWTH_{jt}$  variable, which is equal to 0.0251. The dependent variable,  $AbsDA_{jt}$ , serves as an indicator of audit quality, with discretionary accruals acting as a proxy for audit quality (Jones, 1991). Higher levels of discretionary accruals in absolute terms result in lower audit quality. The table reports robust  $t$ -statistics in parentheses, adjusted for clustering at the industry level. Continuous variables are winsorised at the 5% and 95% levels. Statistical significance is denoted by \*\*\*, \*\*, and \*, indicating significance at the 1%, 5%, and 10% levels, respectively. The statistical significance of differences in  $t$ -statistics is determined with the Wald test and its  $p$ -value in parentheses. Variable definitions are provided in Table 2.

	<b>GROWTH &gt; Median</b>	<b>GROWTH ≤ Median</b>
<b>Dep. Var. =</b>	<b>GROWTH</b>	<b>GROWTH</b>
	<b><i>AbsDA</i></b>	<b><i>AbsDA</i></b>
<i>(Intercept)</i>	0.5872 *** (10.303)	0.6758 *** (13.307)
<i>BIG</i>	0.0597 *** (6.666)	0.0555 *** (5.910)
<i>COVID</i>	0.0152 (1.128)	0.0080 (0.756)
<i>BIG_COVID</i>	-0.0165 (-0.715)	-0.0081 (-0.489)
<i>SIZE</i>	-0.0329 *** (-9.138)	-0.0367 *** (-10.459)
<i>ROA</i>	0.3274 *** (3.938)	0.6300 *** (7.502)
<i>GROWTH</i>	0.7231 *** (14.815)	-0.6340 *** (-12.361)
<i>LT DEBTS TO ASSETS</i>	-0.0272 *** (-2.382)	-0.0462 *** (-4.115)
<i>CURRENTR</i>	-0.0153 *** (-2.756)	-0.0105 ** (-2.035)
<i>LOSS</i>	0.0332 ** (2.500)	0.0337 *** (3.008)
Observations	8,357	8,358
Adjusted R <sup>2</sup>	0.0617	0.0637
Industry FE	Yes	Yes
Wald test for <i>BIG</i>	0.1014 (0.7501)	
Wald test for <i>COVID</i>	0.1781 (0.6730)	
Wald test for <i>BIG_COVID</i>	0.0882 (0.7665)	
Wald test for <i>SIZE</i>	0.5666 (0.4516)	
Wald test for <i>ROA</i>	6.5586 (0.0104)	
Wald test for <i>GROWTH</i>	367.4081 (< 0,001)	
Wald test for <i>LT DEBTS TO ASSETS</i>	1.4032 (0.2362)	
Wald test for <i>CURRENTR</i>	0.4054 (0.5243)	
Wald test for <i>LOSS</i>	0.0006 (0.9802)	

Source: Author's research results, using the RStudio program

**Table 11: High versus low long-term debt-to-total-assets ratio**

This table showcases the findings derived from a regression analysis that investigates the influence of audit firm size (Big 4 versus non-Big 4) and the COVID-19 pandemic on the absolute magnitude of discretionary accruals. The examination is conducted within two discrete subpopulations of companies, classified by their financing structure using the ratio of long-term debts to total assets. One subsample includes entities with a long-term debt-to-total-assets ratio greater than the median value of 0.2400, while the other subset includes firms with a ratio lower than this value. The dependent variable,  $AbsDA_{jt}$ , serves as an indicator of audit quality, with discretionary accruals acting as a proxy for audit quality (Jones, 1991). Higher levels of discretionary accruals in absolute terms are indicative of lower audit quality. The table reports robust  $t$ -statistics in parentheses, adjusted for clustering at the industry level. Continuous variables are winsorised at the 5% and 95% levels. Statistical significance is denoted by \*\*\*, \*\*, and \*, indicating significance at the 1%, 5%, and 10% levels, respectively. The statistical significance of differences in  $t$ -statistics is determined with the Wald test and its  $p$ -value in parentheses. Variable definitions are provided in Table 2.

Dep. Var. =	LTDA > Median LTDA <i>AbsDA</i>	LTDA ≤ Median LTDA <i>AbsDA</i>
<i>(Intercept)</i>	0.7325 *** (13.128)	0.6546 *** (12.234)
<i>BIG</i>	0.0652 *** (6.869)	0.0454 *** (4.988)
<i>COVID</i>	0.0318 *** (2.828)	0.0294 ** (2.401)
<i>BIG_COVID</i>	-0.0157 (-0.819)	-0.0092 (-0.493)
<i>SIZE</i>	-0.0429 *** (-12.118)	-0.0270 *** (-7.355)
<i>ROA</i>	0.2002 ** (2.262)	0.6197 *** (7.619)
<i>GROWTH</i>	0.1089 *** (3.549)	0.0441 (1.386)
<i>LT DEBTS TO ASSETS</i>	-0.0041 (-0.262)	-0.1402 *** (-2.607)
<i>CURRENTR</i>	0.0126 ** (2.246)	-0.0338 *** (-6.344)
<i>LOSS</i>	0.0209 * (1.893)	0.0635 *** (4.606)
Observations	8,322	8,393
Adjusted R <sup>2</sup>	0.0392	0.0465
Industry FE	Yes	Yes
Wald test for <i>BIG</i>	2.2722 (0.1317)	
Wald test for <i>COVID</i>	0.0220 (0.8820)	
Wald test for <i>BIG_COVID</i>	0.0598 (0.8068)	
Wald test for <i>SIZE</i>	9.6295 (0.0019)	
Wald test for <i>ROA</i>	12.1831 (< 0,001)	
Wald test for <i>GROWTH</i>	2.1530 (0.1423)	
Wald test for <i>LT DEBTS TO ASSETS</i>	5.8955 (0.0152)	
Wald test for <i>CURRENTR</i>	36.0602 (< 0,001)	
Wald test for <i>LOSS</i>	5.8091 (0.0159)	

Source: Author's research results, using the RStudio program

**Table 12: High versus low current ratio**

The table displays the results derived from a regression analysis that examines the impact of audit firm size (Big 4 and non-Big 4) and the COVID-19 pandemic on the absolute magnitude of discretionary accruals in two subpopulations of companies, partitioned according to their liquidity status. The first one comprises firms with a current ratio greater than the median value of 1.400, while the other includes entities with a ratio less than or equal to that threshold. The dependent variable,  $AbsDA_{jt}$ , serves as an indicator of audit quality, knowing that discretionary accruals are used as a proxy for audit quality (Jones, 1991). Higher levels of discretionary accruals in absolute terms imply lower audit quality. The table reports robust  $t$ -statistics in parentheses, adjusted for clustering at the industry level. Continuous variables are winsorised at the 5% and 95% levels. Statistical significance is denoted by \*\*\*, \*\*, and \*, indicating significance at the 1%, 5%, and 10% levels, respectively. The statistical significance of differences in  $t$ -statistics is determined with the Wald test and its  $p$ -value in parentheses. Variable definitions are provided in Table 2.

Dep. Var. =	CURRENTR > Median	CURRENTR ≤ Median
	CURRENTR <i>AbsDA</i>	CURRENTR <i>AbsDA</i>
(Intercept)	0.6373 *** (12.149)	0.6687 *** (11.201)
<i>BIG</i>	0.0449 *** (4.827)	0.0653 *** (7.130)
<i>COVID</i>	0.0207 * (1.818)	0.0392 *** (3.255)
<i>BIG_COVID</i>	-0.0087 (-0.462)	-0.0139 (-0.742)
<i>SIZE</i>	-0.0245 *** (-6.684)	-0.0383 *** (-10.764)
<i>ROA</i>	0.6451 *** (7.855)	0.1919 ** (2.203)
<i>GROWTH</i>	-0.0018 (-0.055)	0.1374 *** (4.486)
<i>LT DEBTS TO ASSETS</i>	-0.0047 (-0.389)	-0.0671 *** (-6.191)
<i>CURRENTR</i>	-0.0479 *** (-6.366)	0.1135 *** (8.925)
<i>LOSS</i>	0.0603 *** (4.500)	0.0259 ** (2.297)
Observations	8,325	8,390
Adjusted R <sup>2</sup>	0.0373	0.0682
Industry FE	Yes	Yes
Wald test for <i>BIG</i>	2.4520 (0.1174)	
Wald test for <i>COVID</i>	1.2443 (0.2646)	
Wald test for <i>BIG_COVID</i>	0.0371 (0.8472)	
Wald test for <i>SIZE</i>	7.3391 (0.0067)	
Wald test for <i>ROA</i>	14.3280 (< 0,001)	
Wald test for <i>GROWTH</i>	9.9516 (0.0016)	
Wald test for <i>LT DEBTS TO ASSETS</i>	14.6560 (< 0,001)	
Wald test for <i>CURRENTR</i>	119.3057 (< 0,001)	
Wald test for <i>LOSS</i>	3.8782 (0.0489)	

Source: Author's research results, using the RStudio program

**Table 13: Loss versus profit**

This table exhibits the findings of a regression analysis that explores the effect of audit firm size, distinguished between Big 4 and non-Big 4, as well as the COVID-19 pandemic on the level of discretionary accruals in absolute terms within two distinct subpopulations of firms. These subpopulations are classified based on their financial status during the accounting period. One subpopulation encompasses companies that incurred losses, while the other comprises those that generated profits. The dependent variable,  $AbsDA_{jt}$ , serves as an indicator of audit quality, given that discretionary accruals are used as a proxy for evaluating audit quality (Jones, 1991). Higher levels of discretionary accruals in absolute terms result in lower audit quality. The table reports robust  $t$ -statistics in parentheses, adjusted for clustering at the industry level. Continuous variables are winsorised at the 5% and 95% levels. Statistical significance is denoted by \*\*\*, \*\*, and \*, indicating significance at the 1%, 5%, and 10% levels, respectively. The statistical significance of differences in  $t$ -statistics is determined with the Wald test and its  $p$ -value in parentheses. Variable definitions are provided in Table 2.

<b>Dep. Var. =</b>	<b>LOSS = 1</b> <b><i>AbsDA</i></b>	<b>LOSS = 0</b> <b><i>AbsDA</i></b>
<i>(Intercept)</i>	0.6890 *** (8.544)	0.6643 *** (15.089)
<i>BIG</i>	0.0659 *** (3.988)	0.0505 *** (7.082)
<i>COVID</i>	0.0466 ** (2.240)	0.0259 *** (2.856)
<i>BIG_COVID</i>	-0.0232 (-0.760)	-0.0088 (-0.590)
<i>SIZE</i>	-0.0320 *** (-5.140)	-0.0340 *** (-12.168)
<i>ROA</i>	-1.0353 *** (-5.003)	0.5855 *** (9.257)
<i>GROWTH</i>	0.0805 (1.513)	0.0766 *** (3.148)
<i>LT DEBTS TO ASSETS</i>	-0.0273 (-1.418)	-0.0348 *** (-3.897)
<i>CURRENTR</i>	-0.0029 (-0.311)	-0.0157 *** (-3.724)
<i>LOSS</i>	- (-)	- (-)
Observations	2,649	14,066
Adjusted R <sup>2</sup>	0.0471	0.0452
Industry FE	Yes	Yes
Wald test for <i>BIG</i>	0.7353 (0.3912)	
Wald test for <i>COVID</i>	0.8335 (0.3613)	
Wald test for <i>BIG_COVID</i>	0.1793 (0.6719)	
Wald test for <i>SIZE</i>	0.0821 (0.7745)	
Wald test for <i>ROA</i>	56.0983 (< 0,001)	
Wald test for <i>GROWTH</i>	0.0045 (0.9468)	
Wald test for <i>LT DEBTS TO ASSETS</i>	0.1247 (0.7240)	
Wald test for <i>CURRENTR</i>	1.5516 (0.2129)	
Wald test for <i>LOSS</i>	- (-)	

Source: Author's research results, using the RStudio program

**Table 14: Big 4 versus non-Big 4 auditors**

The table presents the outcomes derived from a regression analysis that examines the influence of audited client characteristics on the absolute magnitude of discretionary accruals, distinguishing between companies audited by a Big 4 and those by a non-Big 4 firm. The dependent variable,  $AbsDA_{jt}$ , serves as an indicator of audit quality, with discretionary accruals acting as a proxy for audit quality (Jones, 1991). Higher levels of discretionary accruals in absolute terms imply lower audit quality. The table reports robust  $t$ -statistics in parentheses, adjusted for clustering at the industry level. Continuous variables are winsorised at the 5% and 95% levels. Statistical significance is denoted by \*\*\*, \*\*, and \*, indicating significance at the 1%, 5%, and 10% levels, respectively. The statistical significance of differences in  $t$ -statistics is determined with the Wald test and its  $p$ -value in parentheses. Variable definitions are provided in Table 2.

<b>Dep. Var. =</b>	<b>BIG = 1</b>	<b>BIG = 0</b>
	<b><i>AbsDA</i></b>	<b><i>AbsDA</i></b>
<i>(Intercept)</i>	0.7788 *** (12.322)	0.6823 *** (13.693)
<i>BIG</i>	- (-)	- (-)
<i>COVID</i>	0.0204 * (1.848)	0.0291 *** (3.505)
<i>BIG_COVID</i>	- (-)	- (-)
<i>SIZE</i>	-0.0372 *** (-10.035)	-0.0332 *** (-9.352)
<i>ROA</i>	0.2455 ** (2.574)	0.5652 *** (7.376)
<i>GROWTH</i>	0.1028 *** (2.747)	0.0556 ** (2.030)
<i>LT DEBTS TO ASSETS</i>	-0.0390 *** (-2.973)	-0.0345 *** (-3.344)
<i>CURRENTR</i>	-0.0045 (-0.754)	-0.0189 *** (-3.742)
<i>LOSS</i>	0.0355 ** (2.540)	0.0414 *** (3.782)
Observations	6,275	10,440
Adjusted R <sup>2</sup>	0.0390	0.0464
Industry FE	Yes	Yes
Wald test for <i>BIG</i>	- (-)	
Wald test for <i>COVID</i>	0.4017 (0.5262)	
Wald test for <i>BIG_COVID</i>	- (-)	
Wald test for <i>SIZE</i>	0.6172 (0.4321)	
Wald test for <i>ROA</i>	6.8301 (0.0090)	
Wald test for <i>GROWTH</i>	1.0365 (0.3086)	
Wald test for <i>LT DEBTS TO ASSETS</i>	0.0727 (0.7875)	
Wald test for <i>CURRENTR</i>	3.3962 (0.0653)	
Wald test for <i>LOSS</i>	0.1078 (0.7427)	

Source: Author's research results, using the RStudio program

**Table 15: Large versus small size for Big 4 clients**

The table displays the results of a regression analysis that investigates the impact of the COVID-19 pandemic on the absolute value of discretionary accruals experienced by firms that received audit services from one of the Big 4. The analysis is conducted on two separate subpopulations. The first one consists of firms undergoing a Big 4 audit with a  $SIZE_{jt}$  value greater than the median value of 10.7090, while the second subsample consists of Big 4 clients smaller than or equal to that threshold. The dependent variable,  $AbsDA_{jt}$ , serves as an indicator of audit quality, knowing that discretionary accruals are used as a proxy for audit quality (Jones, 1991). Higher levels of discretionary accruals in absolute terms are indicative of lower audit quality. The table reports robust  $t$ -statistics in parentheses, adjusted for clustering at the industry level. Continuous variables are winsorised at the 5% and 95% levels. Statistical significance is denoted by \*\*\*, \*\*, and \*, indicating significance at the 1%, 5%, and 10% levels, respectively. The statistical significance of differences in  $t$ -statistics is determined with the Wald test and its  $p$ -value in parentheses. Variable definitions are provided in Table 2.

	SIZE > Median SIZE	SIZE ≤ Median SIZE
Dep. Var. =	<i>AbsDA</i>	<i>AbsDA</i>
(Intercept)	0.8596 *** (6.067)	0.8167 *** (6.914)
<i>BIG</i>	- (-)	- (-)
<i>COVID</i>	0.0221 (1.458)	0.0174 (1.092)
<i>BIG_COVID</i>	- (-)	- (-)
<i>SIZE</i>	-0.0415 *** (-4.223)	-0.0406 *** (-4.035)
<i>ROA</i>	0.1487 (1.096)	0.3753 *** (2.752)
<i>GROWTH</i>	0.1120 ** (2.175)	0.0809 (1.489)
<i>LT DEBTS TO ASSETS</i>	-0.0630 *** (-3.571)	0.0012 (0.059)
<i>CURRENTNR</i>	0.0117 (1.470)	-0.0262 *** (-2.929)
<i>LOSS</i>	0.0328 (1.766)	0.0368 * (1.732)
Observations	4,297	1,978
Adjusted R <sup>2</sup>	0.02736	0.0371
Industry FE	Yes	Yes
Wald test for <i>BIG</i>	- (-)	
Wald test for <i>COVID</i>	0.0442 (0.8335)	
Wald test for <i>BIG_COVID</i>	- (-)	
Wald test for <i>SIZE</i>	0.0042 (0.9485)	
Wald test for <i>ROA</i>	1.3880 (0.2387)	
Wald test for <i>GROWTH</i>	0.1729 (0.6776)	
Wald test for <i>LT DEBTS TO ASSETS</i>	5.7900 (0.0161)	
Wald test for <i>CURRENTNR</i>	10.0202 (0.0015)	
Wald test for <i>LOSS</i>	0.0203 (0.8867)	

Source: Author's research results, using the RStudio program

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# Executive summary

The global pandemic caused by the coronavirus has had a significant and far-reaching impact on individuals and society as a whole. The economic ramifications of COVID-19 have been substantial, affecting various economic entities. In such circumstances, companies may be incentivised to manipulate their financial results in order to present a more favourable financial situation. This behaviour can be attributed to heightened market pressures or managers' reluctance to see a decline in their company's share price. To safeguard the integrity of financial reporting, auditors play a crucial role in ensuring that there is no manipulation of earnings by management, whether upward or downward. During financial crises, the importance of audit quality and the effectiveness of audit practices are amplified. Several studies suggest that the selection of an auditor (Big 4 versus non-Big 4) or the perceived quality of the audit can significantly influence the behaviour of earnings management.

While many authors have evaluated the audit quality of audit entities, the literature has not fully explored the influence of audit firm size on audit quality during times of crisis. Numerous studies in the literature have compared the quality of audit services provided by the Big 4 and non-Big 4 auditors. However, opinions vary among authors. Some contend that the Big 4 tend to allocate more resources to technology and staff training programs due to their larger capacity in comparison to non-Big 4 entities. Moreover, larger audit entities have a greater incentive to provide a thorough and meticulous audit as their reputation and financial standing are at greater risk in the event of an audit deficiency. Others argue that all audit firms in a given country, regardless of their size, are bound by the same legal and ethical requirements to maintain an acceptable level of quality. Smaller audit firms may harbour increased incentives to deliver audits of superior quality due to their potential lack of commensurate insurance coverage as enjoyed by Big 4 firms. This discrepancy in insurance backing could consequently give rise to heightened financial risks and repercussions in the event of an audit failure. The primary objective of this thesis is to assess and compare the audit quality provided by the Big 4 versus non-Big 4 in Belgium, both prior to and in the midst of the coronavirus pandemic. Specifically, we aim to investigate whether audit quality, as measured by discretionary accruals, is statistically significantly associated with audit firm size in Belgium, even during the health crisis. We conduct a multiple linear regression analysis on a population comprising 3,343 entities, consisting of a database of 16,715 firm-year observations. This sample includes large and very large Belgian companies that were audited by a single audit entity from 2016 to 2019, prior to the COVID-19 pandemic, and in 2020, the period coinciding with the outbreak in this paper.

Empirical evidence demonstrates a statistically significant disparity in discretionary accruals between firms audited by the Big 4 and those under the purview of alternative auditors within the Belgian context. Additionally, our research uncovers a positive and significant correlation between the level of discretionary accruals in absolute value and the health crisis, indicating a decline in audit quality during this period of disruption. These findings are robust across a myriad of different model specifications and empirical designs. However, there is no statistically significant correlation between audit quality and the completion of an audit assignment by a Big 4 firm in Belgium during the pandemic. Only a further analysis reveals that negative discretionary accruals were statistically significantly more positive for Big 4 clients throughout the health crisis period in 2020.

**Keywords:** Audit quality – Earnings management – COVID-19 pandemic – Discretionary accruals – Performance-adjusted Jones model

**Word count** = 26,878