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Exploring the reporting lag among JSE-listed entities

A research report submitted by

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Abstract

This thesis investigates how variations in “inherent”, “control” and “detection risk” may account for reporting lags for entities listed on the Johannesburg Stock Exchange (JSE) from 2017 to 2021. The reporting lag is the time between the financial year-end and the date of the audit report. Seven hypotheses are tested using panel regression and a sample of 100 companies listed on the JSE from 2017 to 2021. The regression analysis was performed to identify if client factors (classified as sources of inherent and control risk) or auditor characteristics (classified as sources of detection risk) may impact the reporting lag. A battery of sensitivity tests is used to confirm the findings. The model developed using inherent, control and detection risk, was able to explain the reporting lag. Entities characterised by higher levels of inherent and control risk show an increase in the reporting lag. An increase in detection risk also leads to an increase in the reporting lag. The article proposes a novel conceptual model for classifying client and auditor characteristics in terms of the risk which material misstatements in financial statements go undetected. The inherent, control and detection risk framework provides a comprehensive assessment of reporting lag determinants grounded in a well-established risk and assurance discourse which resonates with both academics and practitioners. Findings complement a relatively large body of work on reporting lags which prioritise developed economies. The results offer one of the first accounts of the reporting lags from a key African economy while controlling for the effects of pre-and post-COVID impacts.

Keywords – Reporting lag, Audit Report Lag, Risk of Material Misstatement, Auditing, South Africa

Foreword

This thesis investigates how variations in “inherent”, “control” and “detection risk” may account for reporting lags for entities listed on the Johannesburg Stock Exchange (JSE) from 2017 to 2021. Section 1 introduces the reporting lag. Section 2 provides background information and derives the applicable hypotheses. Section 3 discusses the research method followed. Section 4 discusses the results and the sensitivity teats. Section 5 concludes and suggests areas for future research. The first five sections of this dissertation have been structured as a research paper. At the time of writing, the paper was under review at “The International Journal of Auditing”. Review reports are pending.

Sections 1 – 5 are complemented by eight core appendices.

- Appendix A provides the regression models this study was based off, and the amendments to the regressions as shown in Appendix A. The details in Appendix A should be read with the methodology (Section 3) to provide additional detail and context.
- Appendix B provides additional information on the reporting lag when stratifying industry and firm type on a year-by-year basis. The details in Appendix B should be read with the results under Section 4 to provide additional detail and context.
- Appendix C supplements Section 4.1. It provides additional analysis of the Kendal’s tau-b and Spearman’s rho tests on a year-by-year basis.
- Appendix D supplements Section 4.2. It provides all the assumption testing for the OLS regression.
- Appendix E supplements Section 4.3.3. It provides the tabulated results of the auditor specialist sensitivity test.
- Appendix F supplements Section 4.3.5. It provides the tabulated results when controlling for unobserved firm effects.
- Appendix G supplements Section 4.3.7. It provides the tabulated results when controlling for the impact of Covid-19 on the reporting lag.
- Appendix H is a technical report. This report provides a practitioner-focused executive summary of certain aspects of Sections 1 – 5. The report was prepared as part of an initiative led by the CCAAR and is due for publication by “Accounting for People, Planet and Profit” (https://www.appp.co.za/).

Sincerely,



Matthew Ritzlmayr

February 2024

1: Introduction

The “reporting lag” is defined as the delay between the financial year-end and the date of the audit report. The lag is widely regarded as providing a sense of financial reporting timeliness and, by inference, the extent of material complications which are identified by either the company or its auditor and which need to be corrected before the financial statements can be issued (Abbott et al., 2012).

Prior research has found that the timeliness of audit reports reduces information asymmetry (Givoly & Palmon, 1982) and improves the quality of information that impacts firm value (Beaver et al., 1980). Asthana (2014) point out that the reporting lag contains essential information about earnings quality while sending a signal to the market about the integrity of the reporting entity’s financial statements. Most recently, Kalelkar and Xu (2023) found that proxies for the reporting lag are positively and significantly associated with the cost of equity, suggesting that investors associate longer reporting lags with less credible financial reporting and increased risk.

Despite the importance of the reporting lag for investor confidence in financial statements and as a proxy for financial transparency (Bamber et al., 1993; Owino, 2017), the extent and determinants of the reporting lag remain under-examined. This provides the basis for the current paper which investigates the delay between the reporting lag for entities listed on South Africa’s Johannesburg Stock Exchange (JSE) between 2017 and 2021.

Studying the reporting lag of South African listed entities makes, at least, three important contributions. Firstly, the determinants of the reporting lag have been tested in some detail but mainly in the context of developed economies like Spain (Bonsón-Ponte et al., 2008), USA (Asthana, 2014) and Australia (Dyer & McHugh, 1975). Little is known about the reporting lag outside of US, European or Oceanic regions. This is especially true when it comes to jurisdictions like South Africa which provide an interesting setting for further analysis of the reporting lag.

South Africa boasts one of the largest capital markets in Africa and is well-regarded for the quality of financial and extra-financial reporting (Maroun et al., 2022). It has established codes on corporate governance and codified investor protection measures. The stock exchange is at least semi-strong efficient with a relatively high volume of traded instruments (Robinson & Bangwayo-Skeete, 2017). The JSE is also committed to a cyclical review of issuers’ financial statements for compliance with applicable accounting standards in the interest of promoting market efficiency and transparency (Louw & Maroun, 2017). At the same time, insights into the nature and determinants of the reporting lag based on South Africa-specific data should be broadly applicable. JSE-listed companies must prepare financial statements in compliance

with International Financial Reporting Standards which have not been modified for local reporters. Independent audits are conducted in accordance with International Standards on Auditing (ISA) and codes on corporate governance are grounded in well-established principles of stakeholder centrism and responsible capitalism (IOD, 2016).

Secondly, previous research has concentrated on investigating the factors that contribute to reporting delays using signalling theory (Kalelkar & Xu, 2023). This provides a broad framework for studying factors which influence the lag but earlier studies are not sufficiently refined to highlight the underlying facts and circumstances at organisations which lead to longer or shorter lags. Consequently, the current paper deals with the reporting lag and its determinants from a different perspective. It considers how inherent, control, and detection risk, which are well-established auditing (IAASB, 2022b) and governance (COSO, 2013) principles, may be extending or shortening the reporting lag. To the authors' knowledge, this paper is the first to adopt this approach for studying the reporting lag in the interest of bridging the technical assurance literature (IAASB, 2022b) with the broader theoretical stances adopted by earlier studies on the reporting lag (Kalelkar & Xu, 2023; Spence, 1978).

Thirdly, this research not only complements the existing body of South African-specific literature but also provides one of the first post-COVID accounts of how reporting lags are changing. It is important to understand the auditing dynamics in developing economies and what may be impacting the reporting lags. This is especially the case post-COVID-19 because there are few studies considering the after-effects of the pandemic on international markets (Bajary et al., 2023) and none from Africa. Gontara and Khlif (2021) and Chalu (2021) provide some insights into reporting lag in South Africa but are limited in terms of the time period under review, or the number and types of companies studied. The findings detailed below offer a current assessment of the reporting lag and its determinants from one of Africa's most important capital markets.

Focusing on only a single jurisdiction to study the reporting lag is an inherent limitation but audit reporting structures in South Africa are well-established and informed by international best practice. This means that the findings from this region can be relevant to a wider audience, especially in emerging economies where audited financial statements are crucial for capital markets (Abernathy et al., 2017; Choi & Wong, 2007; Francis et al., 2003). This is because news outlets and financial intermediaries are underdeveloped in the developing world and regulatory authorities are less effective than those in developed countries (Abernathy et al., 2017; Fisman & Love, 2003). As a result, Abernathy et al. (2017) believe that users of financial statements and regulators follow the reporting lag of listed companies

and use this as a basis for assessing the credibility or reliability of the information contained in published financial statements.

Finally, the proposed inherent risk, control risk, and detection risk model used by this study provides a structured and systematic framework for assessing the determinants of reporting lags. By categorising these determinants into the three key risk components, the model facilitates a more comprehensive understanding of the multifaceted nature of reporting lags. The model will be useful to investors and other stakeholders wanting to evaluate the reporting lag and understand the facts and circumstances which influence the reporting lag.

The remainder of this paper is structured as follows. Section 2 provides background information and derives the applicable hypotheses. Section 3 discusses the research method followed by results in Section 4. Section 5 concludes and suggests areas for future research.

2. Background and hypothesis development

According to signalling theory, companies convey information about their performance to stakeholders directly and indirectly. The results presented in the financial statements are an example of the former. The reporting lag is an example of the latter (Spence, 1978; Watts & Zimmerman, 1986). A shorter reporting lag can signal efficiency, transparency, and proactive management to stakeholders (Beaver et al., 1980; Givoly & Palmon, 1982). Presenting financial statements sooner rather than later can enhance a company's reputation and investor confidence (Givoly & Palmon, 1982). This implies that companies will try to shorten their reporting lag as it sends a positive signal to the market.

In addition to focusing on the absolute length of the reporting lag, stakeholders will also be interested in the determinants of the reporting lag (Afify, 2009). Even though companies aim to shorten their reporting lag, they may not be able to do so. This could be due to various factors resulting in delays in issuing financial statements. For example, more complex industries may be characterised by prolonged audit processes, increasing the lag. The use of more experienced and well-known auditing firms, which have better access to advanced technologies and more specialised staff, may contribute to a shorter reporting lag compared with engagements completed by second-tier firms (Lee & Jahng, 2008).

2.1: The determinants of the reporting lag

Research on the reporting lag spans some 50 years (Beaver, 1968; Owino, 2017), with numerous articles assessing the specific determinants of the reporting lag (see Abernathy et al., 2017; Afify, 2009; Habib et al., 2019; Lee & Jahng, 2008). Much of this has focused on audit-specific features which contribute to longer or shorter lags (Dao & Pham, 2014; Lee &

Jahng, 2008; Lee et al., 2009). This approach may be biased as it overlooks how management's actions can affect reporting timing (Afify, 2009).

In emerging economies, the reporting lag is influenced by various distinct factors. These factors frequently arise from difficulties and circumstances which are particular to these areas, such as inadequate infrastructure, underdeveloped financial markets, regulatory limitations, and under-developed systems of corporate governance. In these contexts, management may play a greater role in causing delays in reporting than auditors do (Afify, 2009). As a result, it is crucial to take into account both company-specific and audit-related factors when examining reporting lag, while also recognising the unique difficulties presented by the economic environment (Khlif & Samaha, 2014). The current paper adopts this approach but refines the classification of reporting lag determinants by dealing with sources of inherent and control risk indicators (arising at the client level) and detection risk indicators (arising at the auditor level) which may contribute to longer or shorter reporting lags. Each is outlined in more detail below and used to derive the hypotheses tested in Section 4.

2.2: Client-specific determinants: Inherent and control risks

Company-specific factors, such as internal processes and practices, are indicators of inherent and control risks which may impact the reporting lag. Inherent risk encompasses the level of risk associated with the potential for financial inaccuracies stemming from a company's fundamental business operations, transactions, or the industry in which it operates (IAASB, 2022b). In other words, inherent risk reflects the susceptibility of certain transactions or events to errors or misstatements caused by the underlying complexities of or uncertainties about a company's operations. A higher level of inherent risk signifies that specific transactions or events are more likely to include errors or misstatements, necessitating more scrutiny during the audit process (IAASB, 2022b).

Control risk refers to the probability that a company's internal control mechanisms may not effectively prevent, detect, or correct misstatements in its financial reporting (IAASB, 2022b). Control risk is affected by the effectiveness of the safeguards and internal control in place to ensure accurate financial reporting. Control risk assesses how well the control environment, monitoring of controls and specific control activities either prevent or detect errors or fraudulent activities (IAASB, 2022b). A higher control risk implies that the company's internal controls might be less effective in ensuring the accuracy and reliability of financial statements, potentially leading to a higher risk of material misstatements.

In practical terms, several client-specific features will point to an increase or decrease in inherent and control risk. These risks can also be inter-related. For example, the context in which an entity operates may result in greater inherent risk but also lead to management

developing more robust checks and balances which reduce control risk. As a result, inherent and control risks are often considered concurrently. Specific client features which can lead to a net increase or decrease in the risk that financial statements may be materially misstated and require a more rigorous and time-consuming audit are outlined below, based on earlier research.

2.2.1 Determinants

Larger clients will have more operating locations, a greater number of operations and more logistical/coordination challenges than smaller firms. As a result, inherent risk increases with firm size (Curtis & Turley, 2007) and may, in turn, contribute to a longer reporting lag. However, larger organisations tend to have more formalised reporting structures, internal operating policies and systems of internal control systems than smaller firms. This reduces their control risk and should lead to a shorter reporting lag. The prior research suggests that the effect of lower control risk at larger firms outweighs the effect of an increase in inherent risk. For example, Dyer and McHugh (1975) found a negative correlation between the reporting lag date and the size of Australian-listed companies. Bonsón-Ponte et al. (2008) examine 105 companies listed on the Madrid Stock Exchange from 2002 to 2005 and reached the same conclusion. Larger firms typically have stronger internal control systems, which help to reduce the likelihood of significant fraud or errors, contributing to a reporting lag being pre-empted (Carslaw & Kaplan, 1991).

The same logic should hold in a South African context where prior research has shown that larger companies invest more heavily in the application of internal control systems (Maroun & Cerbone, 2020) and benefit from fewer reporting issues because of robust monitoring by management and governing bodies (Lowe & Maroun, 2016).

> **H1: An increase in company size contributes to a decrease in the reporting lag of JSE-listed companies for the period under review.**

Some industries have a more complicated business process than others do leading to more inherent risk (Afify, 2009; Colbert, 1988). Manufacturing companies often deal with intricate supply chains, production processes, and inventory management, leading to greater inherent risk and lengthier audits. Financial services companies develop complex financial instruments and are subject to extensive regulatory requirements, factors which may increase inherent risk and lead to greater reporting lags. In contrast, entities in the financial services sector tend to have sophisticated risk management systems, robust monitoring by management and proactive governing bodies (Gericke et al., 2018). These characteristics may lead to lower control risk and contribute to shorter reporting lags.

Prior research divided industries into financial and non-financial categories for analysis (Afify, 2009; Hossain & Taylor, 2008). Bamber et al. (1993) found that the reporting lag is expected to be shorter for companies in the financial services industry because they hold little inventory or fixed assets. The time to perform the audit work may be longer for the companies that hold more inventories due to the increased resources and time needed to complete the audit when compared to the financial services industry (Afify, 2009). However, companies in the financial services industry need to apply complex standards. IFRS 9 contains complex accounting provisions. Its application is a source of increased inherent risk because it requires the use of judgement and estimates which are subjective, time-consuming to generate and prone to fraud or error (Beerbaum & Piechocki, 2016; Ramirez, 2015). As a result, more complex accounting can lead to a longer reporting lag. At the same time, routine controls may be insufficient to ensure the integrity of reporting. More tailored monitoring and review by management and governing bodies will be required adding further to the reporting lag.

H2: The reporting lag will be longer for companies in the financial services industry of JSE-listed companies for the period under review.

The profitability of the client may also have an impact on the reporting lag. Dyer and McHugh (1975) concluded that there was no association between the reporting lag and a company's profitability. However, Fujianti and Satria (2020) found that high profitability provides investors with positive news, encouraging companies to present their financial reports on time and decreasing their reporting lag. Conversely, companies which incur losses will try to delay the publication of their financial results.

Highly profitable companies typically exhibit lower inherent risk, as they have fewer incentives to manipulate their financial results (Fujianti & Satria, 2020). This is because inaccuracies or misstatements can erode their reputation and investor confidence, which is critical for maintaining profitability. Therefore, their financial reports are less likely to require extensive corrections or adjustments.

In contrast, companies facing losses may have a higher inherent risk. They might be tempted to manipulate their financial results to appear more profitable than their actual circumstances (Chan et al., 2016). This manipulation introduces a higher likelihood of errors or misstatements, increasing the inherent risk. Consequently, the reporting process becomes more intricate, and the auditor must expend additional time and effort to test the financial statements (IAASB, 2022b), contributing to a longer reporting lag.

H3: An increase in profitability contributes to a decrease in the reporting lag of JSE-listed companies for the period under review.

Leverage is a commonly used indicator of a company's financial health (Habib et al., 2019) and can be used as a proxy for an increase in combined inherent and control risk (Owusu-Ansah, 2000). The structure of a company's debt has a significant impact on the effectiveness of its internal control system. When a company allocates a growing portion of its resources to service debt obligations, it might find it challenging to allocate adequate funds to maintain robust internal controls, effective management, and governance systems (Ettredge et al., 2006). Resource constraints can lead to an increase in control risk. When a company relies heavily on debt financing, it may face heightened pressure on its management to present favourable financial results. This pressure can stem from the need to demonstrate financial stability to creditors and investors (Habib et al., 2019; Krishnan, 2005). Consequently, there is an elevated risk of management manipulating results to meet these expectations, which increases inherent and control risk.

H4: An increase in leverage contributes to an increase in the reporting lag of JSE-listed companies for the period under review.

High-quality integrated reports are indicative of a sophisticated reporting environment and an underlying system of internal control (De Villiers, Hsiao, et al., 2020; Maroun et al., 2023; Lindani Myeza et al., 2023). In South Africa, integrated reports include either full or summarised financial information. The requirement to explain the interconnection between financial and extra-financial performance in an integrated report (IIRC, 2021) means that the benefits of an improved system of internal control, which contributes to higher integrated reporting quality in general, will also lower the control risks applicable when preparing the financial statements which form part of those integrated reports. All else equal, better quality integrated reporting points to lower control risk and, in turn, a shorter reporting lag.

H5: An increase in the IRQ contributes to a decrease in the reporting lag of JSE-listed companies for the period under review.

2.3: Auditor-specific determinants: Detection risk

Auditor-specific factors also have a significant influence on the reporting lag (Dao & Pham, 2014; Lee et al., 2009). These factors encompass how auditors approach their responsibilities and assessments during the audit process. Among these factors, one of the key determinants is the concept of detection risk, (IAASB, 2022a).

Detection risk encapsulates the probability that auditors may inadvertently fail to uncover material misstatements or errors within a company's financial statements during their comprehensive audit procedures (IAASB, 2022a). Essentially, it represents the risk that auditors might overlook substantial financial inaccuracies without any intent to do so. Several

indicators of detection risk are highlighted by the prior research and used to develop a set of auditor-specific hypotheses related to the reporting lag.

2.3.1 Determinants

The reporting lag literature has consistently distinguished between audits conducted by the Big N audit firms and audits conducted by smaller audit firms (Lee & Jahng, 2008). Big 4[1] auditing firms, having better access to advanced technologies and more specialised staff, may experience a shorter audit reporting lag when compared to non-Big 4 firms (Lee & Jahng, 2008). This is attributed to differences in well-programmed audit procedures and technologies between the two groups of auditors (Lee & Jahng, 2008; Schwartz & Soo, 1996). Put simply, larger audit firms have more resources, experience and expertise than smaller firms. This means that they provide better quality audits or audits which are subject to lower levels of detection risk (Palmrose, 1988). Lower detection risk associated with an audit conducted by the Big 4 should contribute to a shorter reporting lag (Francis, 2023; Lee & Jahng, 2008).

H6: The use of the BIG 4 auditors contributes to a decrease in the reporting lag of JSE-listed companies for the period under review.

Long audit tenures may compromise independence, primarily because of the growing familiarity between auditors and their clients (Marx & Harber, 2020; Tepalagul & Lin, 2015). This familiarity can inadvertently lead to complacency, where auditors may be less inclined to rigorously scrutinise their clients' financial statements or challenge questionable practices. This may lead to an increase in detection risk. However, longer-serving auditors have a better understanding of the clients, something which allows them to conduct more effective risk assessments and respond more efficiently to the combined effects of inherent risk and control risk. It follows that long-running engagements may be conducted in shorter periods for a given level of inherent or control risk. This is especially the case if auditors introduce safeguards to manage any threats to their independence because of long-standing relationships with their clients.

In addition, shorter auditor tenures (ranging from two to three years) have been linked to lower audit quality compared to longer tenures (four to eight years) (Carcello & Nagy, 2004; Lee et al., 2009). This is because when auditors accept a new client, detection risk should increase due to the time necessary for the auditor to become acquainted with the new client's records, operations, internal controls, and the prior period working papers (Caramanis & Lennox, 2008)

[1] In South Africa, the Big 4 are PwC, KPMG, EY, and Deloitte

H7: A longer audit firm tenure contributes to a decrease in the reporting lag of JSE-listed companies for the period under review.

3. Research Method

The top 100 JSE-listed companies by market capitalisation[2] were studied. Examining only the top 100 companies controls the possibility of (1) a lack of resources or technical expertise (De Villiers et al., 2017); (2) volume and frequency of trades; (3) level of analyst coverage and (4) different listing requirements for the main[3] and secondary[4] board may be impacting the reporting lag.

The study covers 2017 to 2021. The starting date coincides with the introduction of the requirement for auditors to report Key Audit Matters (KAMs) for listed companies. KAMs are widely regarded as one of the most significant auditing developments in recent years (Gold & Heilmann, 2019; Iwanowicz & Iwanowicz, 2019) and result in a material change in the nature and format of audit reports (Gold & Heilmann, 2019) it is also possible that the requirement to report KAMs could have impacted how audits are conducted with resulting implications for the reporting lag.

The IAASB introduced a set of updated auditor reporting standards in 2015, effective for audits of financial statements for periods ending *on or after December 15, 2016*[5]. Therefore, any financial year ending on or after December 15, 2016, would use KAMs. The 2017 financial year is the first period when it was compulsory for all listed firms to include KAMs in audit reports. The ending date as the last full year for which published financial statements were available at the time of data collection.

Overall, the five year-period provides a reasonable timeframe for studying reporting lag determinants and is consistent with the approach followed by earlier studies (Habib & Bhuiyan, 2011; Lee et al., 2009). The 2021 period also allows for the opportunity to assess whether the COVID-19 pandemic had a material impact on the reporting lag.

As discussed in Section 1, South African companies are selected because the country has a well-developed reporting environment (IOD, 2016; Maroun et al., 2014). South Africa has established a comprehensive regulatory framework for financial reporting and auditing, which

[2] As at 01/03/2023
[3] Johannesburg Stock Exchange
[4] Alt - X
[5] This was issued in response to demands from stakeholders for more precise and transparent audit reports.

includes laws, regulations, and standards. This framework, often aligned with international best practices, sets clear guidelines and requirements for companies and auditors to follow.

3.1 Data collection

Content analysis was used to evaluate the length of the reporting lag among JSE-listed companies and data were hand collected. Content analysis is normally a qualitative tool (Leedy et al., 2014). Details from audit reports are evaluated with little application of judgement to determine the time/length of the reporting lag. The content analysis is, therefore, more objective and quantitative than is typically the case with qualitative work.

In total, 100 companies were assessed over 5 years (500 expected reports). Only 466 reports were used in total. This is because some companies in the sample either listed or delisted during the 2017 – 2021 time period and so the auditor's report was not available. The 34 reports excluded will not materially impact the results. By "fixing" the top 100 as at 31 March 2023, this may result in certain companies that were part of the top 100 in earlier periods not being included. Similarly, some companies that were in the top 100 as at 31 March 2023 may subsequently fall out. This is a limitation of the study, but would not materially impact the results.

For validity and reliability, the coding process was piloted with ten companies before the entire sample was analysed. To avoid inter-coder reliability problems, the lead researcher coded all the data. Additionally, one database (IRESS) was used to ensure the consistency of the data collected. The coded results were reviewed by a research assistant for accuracy. Any differences were examined and resolved by the lead researcher. Given the relative simplicity of the underlying data captured, there was no researcher bias or judgement involved. A battery of sensitivity tests and control measures are also introduced to ensure validity and reliability of results. Please refer Appendix D.

3.2 Data analysis

An ordinary least square regression with fixed firm and year effects were used to explore the combined effects of inherent, control and detection risk factors on reporting lag. The following model is used:

$$LAG = \beta_0 + \beta_1 Size + \beta_2 Industry + \beta_3 Profitability + \beta_4 Leverage + \beta_5 IRQ + \beta_6 BIG\ 4 + \beta_7 Tenure + \beta_8 Controls + \varepsilon$$

The model is based on Abdillah et al. (2019); Habib and Bhuiyan (2011); Kalelkar and Xu (2023) but some modifications have been made. These are explained in Appendix A. Table 1 summarises the measurement of each variable.

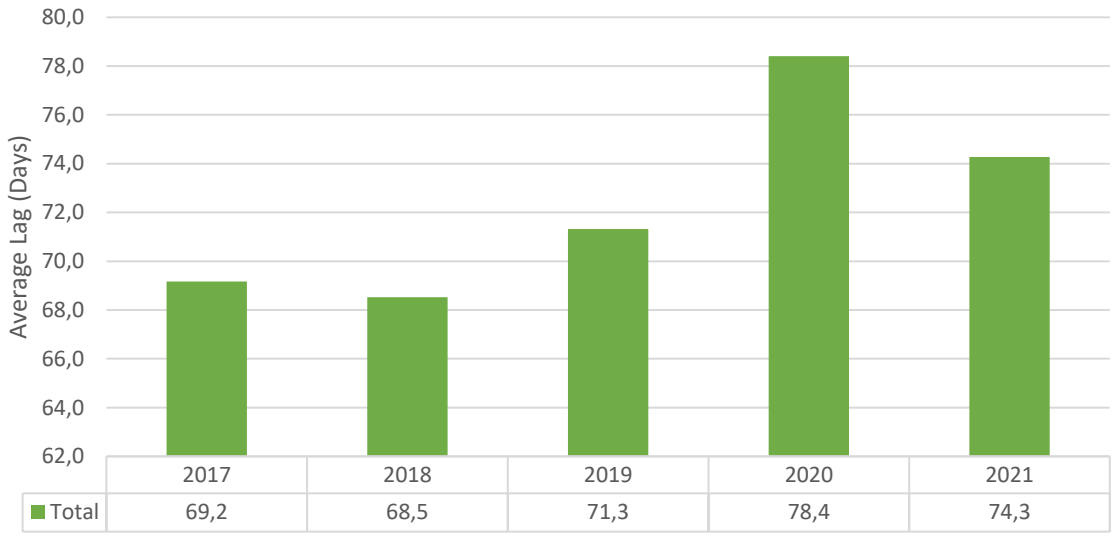
Table 1: Independent and control variables to be used in the regression		
Variable	**Measurement**	**Reference**
Lag	Number of days from a company's year-end to the date of the audit report.	(Afify, 2009; Kalelkar & Xu, 2023; Lee & Jahng, 2008; Schwartz & Soo, 1996)
Independent variables		
Size	The natural log of each entity's total assets	(Fujianti & Satria, 2020; Lee et al., 2008)
Industry	Entities will be allocated based on their nature as [1] financial or [0] non-financial	(Afify, 2009; Schwartz & Soo, 1996)
Profitability	The return on assets for each entity	(Fujianti & Satria, 2020; Vuko & Čular, 2014)
Leverage	The debit-equity ratio for each entity	(Fujianti & Satria, 2020; Kalelkar & Xu, 2023)
IRQ	Based on the rankings of companies, ranging from "excellent" to "progress to be made", an ordinal score will be allocated to measure the quality of integrated reporting. (The IRQ score is between 0 and 5). The scores are obtained from the EY "Excellence in Integrated Reporting Awards"	(EY, 2022)
BIG 4	Firms will be allocated based on their Big 4 [1] or non-Big 4 status [0]	(Dao & Pham, 2014; Kalelkar & Xu, 2023; Lee et al., 2009)
Short Tenure	A value of 1 if audit firm tenure is less than or equal to 3 years, and 0 otherwise	(Dao & Pham, 2014; Lee et al., 2009)
Long Tenure	A value of 1 if audit firm tenure is more than or equal to 9 years, and 0 otherwise	(Dao & Pham, 2014; Lee et al., 2009)
Control variables		
KAMS	Firms will be allocated 1 – 8 based on the number of key audit matters they disclose.	(Ecim et al., 2023)
Non–audit services	Entities will be allocated based on their disclosure of non-audit fees: [1] Disclosed non-audit fees, [0] No non-audit fees disclosed.	Adapted from (Kalelkar & Xu, 2023)
Busy Season	Entities will be allocated a 1 if their financial year end is in December, 0 otherwise.	(Kalelkar & Xu, 2023)

4: Results

Section 4 presents the results of the reporting lag for JSE-listed entities. Firstly, the general descriptive statistics are presented. This is followed by Section 4.1 presenting the univariate analysis and Section 4.2 presenting the multivariate analysis. Section 4.3 presents the sensitivity analysis.

Figure 1 illustrates the average reporting lags from 2017 to 2021.

Figure 1: Average reporting lags 2017 - 2021



	2017	2018	2019	2020	2021
Median	62	63	65	73	69
Standard Deviation	24.64	21.06	23.24	23.50	21.96
Interquartile Range	79	79.50	81.5	90	83

The reporting lag increased significantly from 2017 and 2021 (H=-2.237, p<5%). This is possibly because of changes in auditing standards over the same period. Most notably was the impact of ISA 701. This standard caused a significant change in the way audit procedures are conducted and the requirements for reporting. ISA 701 has increased the importance of the auditor's duty to evaluate and disclose significant audit matters in the auditor's report. These measures were implemented with the objective of offering stakeholders a more thorough and clear understanding of a company's financial well-being (IAASB, 2016b). As a result, auditors had to deal with more complex reporting guidelines, which required them to spend more time and effort. This ultimately led to the observed increase in the reporting lag, particularly between 2017 and 2019. Post 2019, the pandemic would have had a material impact on the lag period.

The 2020 financial year was impacted by COVID-19 (de Villiers, Cerbone, et al., 2020). When 2020 is excluded, there is an average increase in the reporting lag of 7.36% which remains statistically significant (H=7.290, JT=2.459, p<5%). Focusing on the impact of the pandemic, the reporting lag increases by 9.96% between 2019 and 2020 (U = 2.590, p<5%) followed by a decrease of 5.23% from 2020 to 2021 (U = -0.778, p>5%)

As was the case globally, COVID-19 lead to liquidity problems and heightened fraud risks for South African entities (Bajary et al., 2023). Supply chain interruptions and lower consumer spending severely impacted companies (L. Myeza et al., 2023) leading to higher inherent and control risk (Atkins et al., 2020). As a result, auditors required more time and resources to analyse these risks and ensure accurate financial reporting, including a thorough evaluation of the going concern assumption. For more comprehensive analyses of reporting lag by industry and audit firm type, please refer to Appendix B.

Table 2 presents descriptive statistics for 466 audit reports.

Table 2: Descriptive statistics															
	Mean					Standard deviation					U-stat				H-stat
Variables	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021	2017-2018	2018-2019	2019-2020	2020-2021	2017-2021
Lag	69.2	68.5	71.3	78.4	74.3	24.6	21.0	23.3	23.5	22.0	-0.036	0.842	2.590**	-0.778	-2.237*
Size	24.7	24.3	24.3	24.4	24.4	2.9	4.5	4.4	4.3	4.3	-0.131	-0.272	0.823	-0.337	0.000
Industry	0.3	0.3	0.3	0.4	0.3	0.5	0.5	0.5	0.5	0.5	0.156	-0.005	0.093	-0.104	-0.145
Profitability	8.0	6.8	7.6	5.0	11.1	10.4	12.8	9.8	12.1	13.4	-0.153	-0.466	-0.667	2.070**	-1.262
Leverage	1.8	1.9	3.6	4.9	4.7	2.9	2.9	15.8	16.9	17.2	-0.114	0.765	0.484	0.379	-1.524
IRQ	2.2	2.1	2.2	2.2	2.2	1.7	1.6	1.6	1.6	1.6	-1.260	0.406	-0.252	-0.264	0.134
Big 4	1.0	1.0	1.0	1.0	1.0	0.2	0.2	0.2	0.2	0.2	0.042	0.041	-0.328	0.029	0.215
Short Ten	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.237	1.188	0.859	-0.109	-2.149*
Long Ten	0.7	0.6	0.6	0.5	0.4	0.5	0.5	0.5	0.5	0.5	-0.310	-0.883	-1.465	-0.559	3.178**
KAMS	2.7	2.7	2.4	2.5	2.3	1.4	1.4	1.4	1.5	1.5	0.657	-1.091	0.332	-0.555	0.720
NAS	0.9	0.9	0.9	0.9	0.9	0.3	0.3	0.3	0.3	0.3	-0.381	-1.046	-0.372	0.051	0.096*
BUSY	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.5	0.5	0.177	0.010	0.093	0.058	-2.10
**significant at the 1% level (2-tailed); *significant at the 5% level (2-tailed)															

4.1 Univariate analysis

Table 3 reports the Spearman and Kendal's tau-b pairwise correlations among the variables. LAG reports a statistically significant and negative correlation with the size (SIZE), profitability (PROF) and companies' IRQ scores (IRQ). Larger companies, companies with a higher profitability and companies with a higher IRQ score tend to have shorter reporting lags. These results tend to hold when the correlations are run for each year individually, refer to Appendix C for the year-on-year analysis.

Table 3: Results from the Kendal's tau-b and Spearman's rho tests

	LAG	SIZE	INDUSTRY	PROFITABILITY	LEVERAGE	IRQ	BIG 4	SHORT TEN	LONG TEN
LAG	1	-0.071*	-0.020	-0.074*	0.027	-0.103**	-0.049	-0.024	0.045
SIZE	-0.107*	1	0.119**	-0.134**	0.140**	0.195**	0.116**	-0.015	-0.030
INDUSTRY	-0.024	0.145**	1	-0.420**	-0.168**	-0.185**	-0.173**	0.084	-0.063
PROFITABILITY	-0.110*	-0.191**	-0.514**	1	-0.147**	0.113**	0.033	0.102**	-0.059
LEVERAGE	0.039	0.207**	0.205**	-0.217**	1	0.017	-0.031	-0.023	0.056
IRQ	-0.141**	0.272**	-0.209**	0.153**	0.026	1	0.155**	-0.051	0.036
BIG 4	-0.060	0.142**	-0.173**	0.040	-0.038	0.175**	1	-0.096*	0.033
SHORT TEN	-0.029	-0.018	0.084	0.125**	-0.028	-0.58	-0.096*	1	-737**
LONG TEN	0.240	-0.036	-0.063	-0.072	0.069	0.041	0.033	-737**	1

**significant at the 1% level (2-tailed); *significant at the 5% level (2-tailed)

Kendal's Tau-b above the diagonal; Spearman's rho below the diagonal

4.2 Multivariate analysis

The regression results are reported in Table 4. In Model 1, LAG is treated as a continuous variable. Model 2 presents results for a logit regression after differentiating between firms with reporting lags above (LAG =1) or below (LAG = 0) the median. In Model 3, firms are assigned to quartiles based on their reporting lags and the results from an ordered logistic regression are reported.

Table 4: Results from the regression analysis

	Model 1		***Model 2***		***Model 3***	
Variable	**Coefficient**	***p***	**Coefficient**	***p***	**Coefficient**	***p***
Size	-0,152	0,002***	0,922	0,006***	0,938	0,009***
Industry	-0,139	0,005***	0,454	0,002***	0,726	0,004***
Profitability	-0,074	0,136	0,992	0,109	0.994	0,815
Leverage	0,033	0,512	1,166	<0,001***	1,021	<0,001***
IRQ	-0,106	0,030**	0,823	0,004***	0,827	0,003***
BIG 4	-0,129	0,009***	0,906	0,869	0,991	0,864
Short Tenure	0,005	0,937	1,060	0,857	0.010	0,930
Long Tenure	0,106	0,121	1,661	0,096*	1,626	0,094*
KAMS	0.104	0.032**	1,162	0,052*	1,171	0.046**
Non–audit services	-0.002	0,963	0,806	0,572	1,076	0.675
Busy Season	-0,023	0,614	0,922	0,952	0,950	0,964
Model summary						
N = 466						
Fixed year effects	Yes		Yes		Yes	
Fixed firm effects	Yes		Yes		Yes	
Adjusted R2	0.067					

***significant at the 1% level (2-tailed); **significant at the 5% level (2-tailed); **significant at the 10% level (2-tailed)

The variance inflation factor (VIF) scores for all variables are less than 2, suggesting that multicolinearity is not having a material effect on the results. Plots of standardised residuals and predicted values are approximately normal. There is no indication of material homoscedasticity. Refer to Appendix D for a detailed explanation of the assumption testing.

Relationship between size and the reporting lag.

Consistent with earlier research (Bonsón-Ponte et al., 2008; Dyer & McHugh, 1975), larger firms have shorter reporting lags (β = -.115, p<1%). In a South African context, prior research has shown that larger South African companies tend to invest more heavily in internal control systems and formalised reporting structures than do smaller firms (Maroun & Cerbone, 2020). As a result, while firm size may be leading to higher levels of inherent risk, this is probably offset by reduced control risk with a net reduction in reporting lag.

Relationship between industry and the reporting lag.

The reporting lag is expected to be shorter for companies in the financial services industry because they hold little inventory or fixed assets (Afify, 2009; Bamber et al., 1993) pointing to lower inherent risk. More complex accounting for financial instruments may contribute to higher inherent risk but this may be offset by more robust governance systems which lower control risk.

These assertions are supported by the results per Table 5. There is a negative relationship between the reporting lag and the finance industry (β = -.139, p<1%). In addition to the inherent and control risk factors discussed by earlier studies, the fact that companies in the financial services industry are audited by joint auditors may also be relevant. Joint audits involve two independent auditing firms being appointed to conduct the audit of a company's financial statements (ICAEW, 2019). The results in Table 5 lend weight to the arguments that joint audits can be conducted effectively and promote the publication of timely financial statements. Further research will, however, be required to confirm this proposition because only 34% of the observations involved joint audits.

Relationship between profitability and the reporting lag.

There is no significant relationship between profitability and the reporting lag (β = -0.074, p>5%) contrary to prior research (Abdillah et al., 2019; Fujianti & Satria, 2020) which found that as profitability increases the reporting lag decreases. It was expected that profitable companies exhibit lower inherent risk which would require less extensive testing by auditors and lead to shorter reporting lags (Fujianti & Satria, 2020). In a South African context this does not appear to be the case.

Relationship between leverage and the reporting lag.

Companies experiencing financial difficulties do not have significantly longer reporting lags lag (β = 0.033, p>5%), a finding consistent with the results from outside South Africa (Firnanti & Karmudiandri, 2020; Fujianti & Satria, 2020). It was expected that companies with higher leverage would have higher inherent and control risk leading to longer reporting lags. For

example, resource constraints can lead to an increase in control risk and heightened pressure on management to achieve favourable financial results can lead to an increase in inherent risk (Habib et al., 2019; Krishnan, 2005). This does not appear to be the case in South Africa.

Relationship between IRQ and the reporting lag.

Higher-quality integrated reports point to the operation of more robust management systems, operating processes and governance systems (Churet & Eccles, 2014; Ecim & Maroun, 2023). As explained by Barth et al. (2017), integrated report quality is a proxy for a "real effect" which captures improved strategic and management practices. Integrated thinking requires an interconnected approach to managing financial and extra-financial factors affecting a firm's performance. It facilitates a more thorough understanding by management of the business, its operations and how different elements interact (see Bridges & Yeoman, 2020). Overall, integrated thinking should mitigate inherent risks. Integrated thinking also enhances the adaptability and scope of internal control systems, suggesting lower control risk (see 'Bui & De Villiers, 2018). Consistent with these positions, firms characterised by a commitment to integrated thinking, proxied by the quality of their integrated reports, have shorter reporting lags (β = -0.106, p<5%).

Relationship between Big 4 and the reporting lag

Consistent with prior research (Lee & Jahng, 2008; Schwartz & Soo, 1996), when a company is audited by the one of the Big 4 auditors its reporting lag is shorter (β = -0.129, p<1%). This can be attributed to the fact that Big 4 auditing firms have better access to advanced technologies and more specialised staff (Francis, 2023) with the result that they conduct their engagements more effectively and efficiently than do non-Big 4 firms. This means that they provide better quality audits or audits which are subject to lower levels of detection risk (Palmrose, 1988). Lower detection risk associated with an audit conducted by the Big 4 should contributed to a shorter reporting lag (Francis, 2023; Lee & Jahng, 2008).

Relationship between short tenure, long tenure and the reporting lag

Consistent with prior studies, the results concerning auditors with short tenure are consistent with the notion that they require more time to issue audit reports due to the need to become acquainted with their clients' operations (Dao & Pham, 2014; Habib & Bhuiyan, 2011). This is because when auditors accept a new client detection risk should increase due to the time necessary for the auditor to become acquainted with the new client's records, operations, internal controls, and the prior period working papers (Caramanis & Lennox, 2008). The coefficients on short (β = 0.005, p<5%) and long audit tenures (β = 0.106, p<5%) are positive

but not significant in our model. As a result, there is insufficient evidence to conclude that audit tenures drive the reporting lag.

Relationship between KAMs and the reporting lag.

Research on the link between KAMS and the reporting lag are limited. Abdullatif et al. (2023) is a notable exception. They find that there is no association between between the reporting lag and the number of KAMs reported by Jordanian companies. Table 5, however, reports a different outcome. A greater number of KAMs drives an increase in the reporitng lag (β = 0.104, p<5%).

According to ISA 701, Key Audit Matters (KAMs) are “those matters that, in the auditor’s professional judgement, were of most significance in the audit of the financial statements of the current period” (IAASB, 2016a, p. 2). A higher number of KAMs would indicate that there are multiple areas requiring increased audit attention (Pinto & Morais, 2019) resulting in an increased reporting lag. KAMs may only provide generic information (Ecim et al., 2023) or reflect inherent and control risk factors already captured by variables like firm size and industry type (Abdelfattah et al., 2021; Ecim et al., 2023; Segal, 2019). They can, however, serve as a latent variable for factors like the application of professional judgement by the engagement leader, the experience of the engagement leader and how the audit team internalised and reacted to the combined effect of inherent and control risk (Rousseau & Zehms, 2020).

Relationship between non-audit services, busy season and the reporting lag

There is much debate on the impact of non-audit services on audit quality. Some argue that auditors' independence is compromised when they provide non-audit services (Schneider et al., 2006; Wines, 1994). Others assert that external auditors' consulting activities do not impact audit quality (Ashbaugh et al., 2003; Chung & Kallapur, 2003; Frankel et al., 2002; Lee et al., 2009).

Knechel and Payne (2001) found that the combination of management advisory services and audit services reduces the reporting lag because of the potential synergistic relationship between management advisory services and audit services. There is, however, an increase in the reporting lag when tax services are introduced, suggesting that management advisory services could provide advantageous effects while tax services may introduce additional complications. A more recent study found that there is a significant negative association between tax services and the reporting lag and that, in general, the provision of non-audit services is negatively associated with the reporting lag (Lee et al., 2009).

Both Lee et al. (2009) and Simunic (1984) argue that providing non-audit services enables auditors to exercise professional judgement and scepticism more effectively when providing

assurance services, possibly because of an enhanced understanding of the client . In turn, non-audit services may reduce starting costs for audits and improve engagement efficiency leading to shortened reporting lags (Lee et al., 2009).

There is insufficient evidence that the reporting lag is impacted by the rendering of non-audit services (β = -0.002, p>10%). These findings should, however, be interpreted with caution because of specific regulatory limitations on the provision of non-audit services by auditors per the Auditing Profession Act No. 26 of 2005 and Companies Act No. 71 of 2008. Consequently, the range and extent of non-audit services provided by auditors to the sample of auditees is limited. In this context, the results suggest only that the current range of non-audit service offerings are not impacting the reporting lag. It should also be noted most non-audit work often involves tasks which require little management judgement or which are unrelated to the financial statements.

The busy season is an additional factor which can influence the reporting lag. Because of the large number of South African public companies with December year-ends (31% of the entire sample), audit firms experience a busy season where they conduct multiple audits concurrently in the early months of the calendar year. This may lead to resource limitations, which can result in extended audit delays (Lee et al., 2009). According to Ashton et al. (1989), conducting audits during the busy season can either increase or decrease the reporting lag. The outcome depends on how the increased workload is managed. Our results demonstrate there is no relationship between busy season and the reporting lag (β = -0.023, p<5%). This can be attributed to auditors working overtime during busy seasons or increasing capacity by securing support from other offices with lighter workloads (Habib et al., 2019).

4.3 Sensitivity tests

Several sensitivity tests are run to corroborate the findings presented in Section 4.2.

4.3.1 Effect of partner and firm switch

Prior research suggests that firm or partner rotations can influence detection risk. When auditors rotate, there is often a transitional phase during which the new audit team familiarises itself with the client's operations, internal controls, and prior audit working papers. This transition period can introduce a degree of uncertainty or delay in identifying and addressing critical issues which, in turn, influences detection risk during the audit process (de Ricquebourg & Maroun, 2023). Consequently, controls for whether a firm or partner change has taken place was included in the base model. Both are dummy variables assigned a value of 1 when a firm or partner change, respectively, has occurred and 0 when this is not the case.

The results indicate that a firm (β = 0.010, p>5%) and partner switches (β = 0.026, p>5%) have no material impact on the reporting lag. See Table 5.

Table 5: Results from the regression analysis (Firm and partner switch)		
Variable	**Coefficient**	***p***
Size	-0,151	0,002***
Industry	-0,139	0,005***
Profitability	-0,073	0,140
Leverage	0,033	0,518
IRQ	-0,106	0,030**
BIG 4	-0,129	0,009***
Short Tenure	0,000	0,997
Long Tenure	0,106	0,120
KAMS	-0.104	0,032**
Non–audit services	-0.003	0,957
Busy Season	-0,023	0.616
Firm Switch	0,010	0,850
Partner Switch	0.026	0.569
***significant at the 1% level (2-tailed); **significant at the 5% level (2-tailed): *significant at the 10% level (2-tailed)		

4.3.2 Effect of industry sensitivity on the reporting lag.

Results in Section 4.2 differentiate between firms in the financial and non-financial industries. To provide a more refined analysis, other industries are introduced to address the possibility of complex operations, regulatory environments and sector-specific reporting requirements can be affecting lag times. Revised industry classifications were based on Ecim et al. (2023), with minor adjustments. The results from the OLS regression after including a measure for industry complexity are reported in Table 6.

As industry complexity increases, so too does the reporting lag (β = -0.178, p<5%), consistent with the original findings in Section 4.2

Table 6: Results from the regression analysis (Industry sensitivity)		
Variable	**Coefficient**	***p***
Size	-0,153	0,002***
Industry	-0,178	<0,001***
Profitability	-0,073	0,133
Leverage	0,037	0,460

Table 6: Results from the regression analysis (Industry sensitivity)		
IRQ	-0,106	0,027**
BIG 4	-0,132	0,007***
Short Tenure	0,019	0,778
Long Tenure	0,112	0,099*
KAMS	0.109	0,024**
Non–audit services	0,011	0,826
Busy Season	-0,153	0,291

4.3.3 Effect of auditor specialist on the reporting lag

Dao and Pham (2014) examined the relationship between the reporting lag and its impact on auditor industry specialisation. To account for this, the regression model is re-run with the additional control variable for auditor industry specialisation. The un-tabulated results show that there is a significant relationship between auditor specialisation and the reporting lag ($\beta = -0.168$, $p<1\%$). Specialists, because of their in-depth industry knowledge, contribute to lower detection risk and shorter reporting lags. Please refer to Appendix E for tabulated results.

4.3.4 Change Analysis

A change analysis is employed to mitigate the likelihood that endogeneity and unobserved factors linked to reporting lag are affecting the findings. In this analysis, we explore the relationship between year-on-year changes in the reporting lag and the changes in the applicable independent variables and control variables. The un-tabulated results generate qualitatively similar findings to those presented in Section 4.2. The same is true when firm or partner rotations are incorporated in the change model and after introducing more refined industry classifications as per Section 4.4.2.

4.3.5 Unobserved firm effects

As a further endogeneity control, companies were assigned to 5 random groups to control for unobserved firm effects. The results, generate qualitatively similar findings to those reported in Section 4.2. The researchers also introduce a measure for the robustness of firms' corporate governance systems as a further check for un-observed firm characteristics which may affect the findings. The variable is an ordinal score per Thomson Reuters/Refinitiv. The "Governance Pillar Scores[6]" (GPS) incorporate three broad indicators. A management dimension

[6] These scores are an "enhancement and replacement to the existing ASSET4 ratings" (Thomson Reuters, 2017).

"measures a company's commitment and effectiveness towards following best practice corporate governance principles". The shareholder element focuses on the consistent treatment of shareholders. A corporate social responsibility component deals with how financial and extra-financial factors are integrated into internal decision-making processes (Thomson Reuters, 2017). After including GPS, the results for LAG in Section 4.2 continue to hold. Refer to Appendix F for the tabulated results.

4.3.6 Variable measurements

To determine if the findings are sensitive to how the independent variables were measured, size was captured by the natural log of revenue instead of assets ($\beta = -0.228$, $p<1\%$). As the size of the company, based on revenue, increases, the reporting continues to decrease. Return on equity is used as an alternate measure for profitability and whether or not an entity is loss making is introduced as an additional control variable. Results continue to hold. Table 7 summarises the outcomes.

Table 7: Variable measurements

Variable	Measure	Alternate Measure	Same Result
Size	Total Assets	Revenue	YES
Profitability	N/A	Loss-making	YES
Profitability	Return on Asset	Return on Equity	YES

4.3.7 Control for COVID – 19

The last sensitivity test excluded data from the year 2020 to account for the effect of COVID-19 on reporting lags. The results for 2020 and for the remaining financial years are qualitatively consistent with those presented in Section 4.2. This suggests that while COVID-19 affected the reporting lag, it did not alter the effect which other indicators of inherent and control risk have on the time taken to authorise financial statements. Please refer to Appendix G for the tabulated results of the regression excluding the 2020 year.

5: Discussion and conclusion

This study examined the reporting lags of companies listed on the JSE and identified factors which accounted for longer or shorter lapses between a company's financial year end and the issue date of their financial statements. Findings are summarised in Table 8.

Table 8: Summary of the drivers of the reporting lag			
Driver of the reporting lag	**General findings from earlier research**	**Results consistent with expectations**	**Results consistent with prior research?**
Size	Increase in size results in a decrease in the reporting lag	YES	YES
Industry	The reporting lag will be longer for companies in the financial services industry.	YES	NO
Profitability	An increase in profitability results in a decrease in the reporting lag	NO	NO
Leverage	There is no relationship between the reporting lag and leverage	YES	YES
IRQ	No prior research	YES	No prior research
Big 4	The use of the BIG 4 auditors results in a decrease in the reporting lag	YES	YES
Short Tenure	A shorter tenure contributes to an increase in the reporting lag	NO	NO
Long Tenure	There is no relationship between the reporting lag and long tenure	YES	YES

This article made an important theoretical and empirical contribution. Firstly, it considers how inherent, control, and detection risk, may be extending or shortening the reporting lag. This approach provides a new theoretical framework for studying the reporting lag, in the interest of bridging the technical assurance literature with the broader theoretical stances adopted by earlier studies on the reporting lag.

Secondly, the study provides a comprehensive assessment of the determinants of the reporting lag. It confirms the relevance of client and auditor characteristics for the time taken to finalise financial statements. At the same time, the study examines factors which had not

been considered by earlier studies, including the impact which integrated thinking and KAM requirements are having on the reporting lag.

Thirdly, the current paper responds to calls for additional research on auditing and corporate reporting from developing economies. Much of the work on the report lag deals with the USA, Europe and Oceania. Little remains known about reporting practices in Africa. This includes Africa's key capital markets such as South Africa. The results will be relevant for local practitioners and regulators interested in understanding the nature of the reporting lag and its determinants. Findings will also be interesting for international investors and academics concerned with intra-jurisdictional comparisons.

Finally, this article provided one of the first post-COVID accounts of how reporting lags are changing. The findings confirm the impact which the pandemic had on reporting and assurance practices and the fact that COVID did not have the long-term effects on corporate reporting which were originally predicted.

As with any study of this type, there are limitations. Not every determinant of the reporting lag is necessarily covered. The current paper offers a framework for explaining how inherent, control and detection risk impact the reporting lag. A valid contribution can be made by testing additional lag determinants. This study focused solely on South African listed firms, so generalisations must be made cautiously. Reporting regulations and practices can vary across countries and regions. Future research can conduct cross-jurisdictional analyses to understand better the factors which impact the reporting lag.

Future research could investigate how digital transformation, artificial intelligence, blockchain and other technology can impact the reporting lag. In particular, the use of real-time data analytics in reducing the reporting lag, may be an area of interest, especially for smaller audit firms, where there may be barriers to adopting such technology. The impact of other types of crises on the reporting lag can also be explored.

As extra-financial reporting is becoming more significant, particularly considering the International Sustainability Standard Board's (ISSB) new sustainability standards, understanding the factors the effect the timeliness of non-financial assurance lags, will be a valuable contribution to understanding lags. Lags in an extra-financial reporting space are particularly unpredictable because of the complexity in environmental, social and governance metrics, changing regulatory requirements and management information system, which may not be well suited to gathering this type of information. In line with this, the impact of these changing regulations can also be explored in the context of lags.

Finally, this study did not directly involve engaging with companies and auditors to investigate reasons for the reporting lag. Future research can rely on detailed interviews with audit partners, engagement teams, preparers and governing bodies to provide a more refined account of factors contributing to longer or shorter lags.

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Appendix A: Regression modifications

Abdillah et al. (2019); Habib and Bhuiyan (2011); Kalelkar and Xu (2023) used the models detailed below to study reporting lag determinants.

(Habib & Bhuiyan, 2011)

$$LAG = \beta_0 + \beta_1 FYE + \beta_2 INDUM + \beta_3 SIZE + \beta_4 LOSS + \beta_5 FINCOND + \beta_6 SUB + \beta_7 NAF + \beta_8 STEN + \beta_9 LTEN + \beta_{10} OWNCON + \beta_{11} SPEC + \varepsilon$$

(Abdillah et al., 2019)

$$LAG = \beta_0 + \beta_1 ACEFEC + \beta_2 ZFC + \beta_3 SUBS + \beta_4 ROA + \beta_5 REP + \beta_6 TEN + \beta_7 ASI + \varepsilon$$

(Kalelkar & Xu, 2023)

$$\begin{aligned} LAG = \beta_0 &+ \beta_1 LnSIZE + \beta_2 POWER + \beta_3 CURR2TA + \beta_4 LEV + \beta_5 LOSS + \beta_6 ZSCORE \\ &+ \beta_7 CURRATIO + \beta_8 ROA + \beta_9 RET + \beta_{10} EGROWTH + \beta_{11} INVAT \\ &+ \beta_{12} lnSEG + \beta_{13} FRGN + \beta_{14} CONTINGENCY + \beta_{15} BIG4 + \beta_{16} EXPERT \\ &+ \beta_{17} SWITCH + \beta_{18} TENURE + \beta_{19} OPINION + \beta_{20} BUSY + \beta_{21} LNAF \\ &+ \beta_{22} CITYDUM + \beta_{23} DMAN + \beta_{24} DUTILITY + \beta_{25} ARLC_M + YEARFE + \varepsilon \end{aligned}$$

The modifications made for the purpose of the current study are explained per variable. Refer to Table 9 for an explanation of the final variables included in the paper's model. Variables excluded from the model are explained in Table 10.

Table 9: Variables Used

Variable used by reference studies	Included in current study	How the variable is covered in the current study	Explanation
FYE/BUSY (Financial Year End)	YES	Control	Refer to Table 1
INDUM (Industry)	YES	Independent	Refer to Table 1

SIZE (Company Size)	YES	Independent	Refer to Table 1
LOSS (Loss Making Company)	YES	Sensitivity Test	Loss will be used as another proxy for financial condition in the sensitivity test. 1 if loss making, 0 otherwise
FINCOND (Financial Condition)	YES – but measured differently	Independent	Habib and Bhuiyan (2011) used the company's probability of bankruptcy, estimated from Zmijewski's (1984) bankruptcy prediction model to proxy for financial condition. This study will use leverage, as this is a commonly used proxy for financial condition.
NSUB (Number of Subsidiaries)	YES	Sensitivity Test	The number of subsidiaries will be used as another proxy for complexity in the sensitivity test.
Short Tenure	YES	Independent	Refer to Table 1
Long Tenure	YES	Independent	Refer to Table 1
NAF (Non-Audit Fees)	YES	Control	Refer to Table 1
ROA (Return on Assets)	YES	Independent	Refer to Table 1
REP (Auditor Reputation – Big 4/Non-Big 4)	YES	Independent	Refer to Table 1
SWITCH: (Auditor Switch)	YES	Sensitivity Test	Auditor switch will be used is to be used in the sensitivity tests
EXPERT/ SPEC/ASI (Auditor is an expert in the field)	YES	Sensitivity Test	Auditor is an expert in the field will be used is to be used in the sensitivity tests

**Standard errors are clustered at a company level*

Table 10: Variables excluded from the regression		
Variable	**Included**	**Reason for excluding**
OWNCON (Ownership concentration)	NO	Bamber et al. (1993) argue that "The more widely held the client's shares, the greater the number of individual investors that rely on the client's financial statements. Greater reliance on the client's financial statements

		by diverse individual investors increases the client's (and auditor's) exposure to litigation [risk]... thereby increasing auditor business risk." This study's regression deals with an increased exposure to litigation risk, which results in an increase inherent and control risk, as part of "Leverage". In addition, arguments about ownership concentration are less relevant in South Africa because of the size of the market relative to the one examined by Bamber and colleagues. The study further controls for holding concentrations by excluding companies listed on the ALT-X from the sample.
POWER (Client Bargaining Power)	NO	Larger clients may have more ability to delay their audits than smaller ones. The effect is captured by including a control for firm size (see Table A) and, as a result, would be double-counted using "POWER".
Litigation risk (CURR2TA, LEV, LOSS, ZSCORE, CURRATIO, ROA, RET and EGROWTH),	NOT ALL	Kalelkar and Xu (2023) grouped the following variables under litigation risk. • **CURR2TA**: Current assets divided by current liabilities. • **LEV:** Leverage. • **LOSS:** Loss making companies. • **ZSCORE**: Z-score calculated following Zmijewski's (1984) • **CURRATIO:** Current Ratio. • **ROA:** Return on Assets • **RET:** One-year stock return calculated over the 12-month period. • **EGROWTH:** Percentage change in the client's earnings from last year) For the purposes of this research the most common proxies for litigation risk (**LEV** and **ROA**) will be used as independent variables to test for the impact of litigation risk on the reporting lag. This will further be tested in the sensitivity test using **LOSS**. This ensures a wide range of proxies for litigation risk are used.
Audit complexity (INVAT, LnSEG, FRGN, CONTINGENCY)	NOT ALL	Kalelkar and Xu (2023) grouped the following variables under audit complexity. • **INVAT:** The ratio of inventory to total assets. • **LnSEG**: The natural logarithm of number of business segments. • **FRGN**: Client has foreign operations. • **CONTINGENCY**: Does the client report a contingent liability

		For the purposes of this research, the most common variables for audit complexity **(IND** and **SIZE**) will be used as independent variables to test for the impact of audit complexity on the reporting lag. This will further be tested in a sensitivity test using **SUBS**. This ensures a wide range of proxies for audit complexity are used.
Industry (DMAN, DUTILITY and ARLC_M)	NO	Kalelkar and Xu (2023) grouped the following variables as proxies for complex industries. • **DMAN**: Manufacturing industry. • **DUTILITY**: Utility industry. • **ARLC_M**: The mean value of ARLC for the two-digit SIC industry in the current year). Prior research as commonly split industries into Financial and Non-Financial for analysis purposes. For the purposes of this research for industry Financial and Non-Financial industries will be used for analysis purposes. Alternate industry groupings will be explored as part of the sensitivity tests.
CITYDUM (City Dummy)	NO	Kalelkar and Xu (2023) used CITYDUM as equals one if the audit office is located near one of the following costliest cities: New York, Los Angeles, Chicago, San Diego, Boston, San Francisco, Philadelphia, Honolulu, and Tacoma, else zero. This is not applicable in the South African context.
OPINION: (Audit Opinion)	No	All companies listed on the JSE had unmodified opinions except for 1 company, therefore including this variable is not relevant.

Appendix B: Industry and audit firm type on a year-by-year basis

This appendix stratifies the reporting lag on a year-by-year basis for both industry and audit firm type, refer to Section 4.1. In Section 4, the industry groupings were based on financial and non-financial information. However, to explore alternate industry groupings we split the industries into 7 different groups.

Reporting lags stratified by these alternate industry groupings are presented in Figure 2 below. These industry classifications were based on Ecim et al. (2023), with minor adjustments. The alternate industry classifications are displayed in Table 11 below.

Table 11: Alternate Industry Classifications
Mining
Retail Trade
Manufacturing
Transportation and Public Utilities
Services
Finance, Insurance, Real Estate
Public Administration

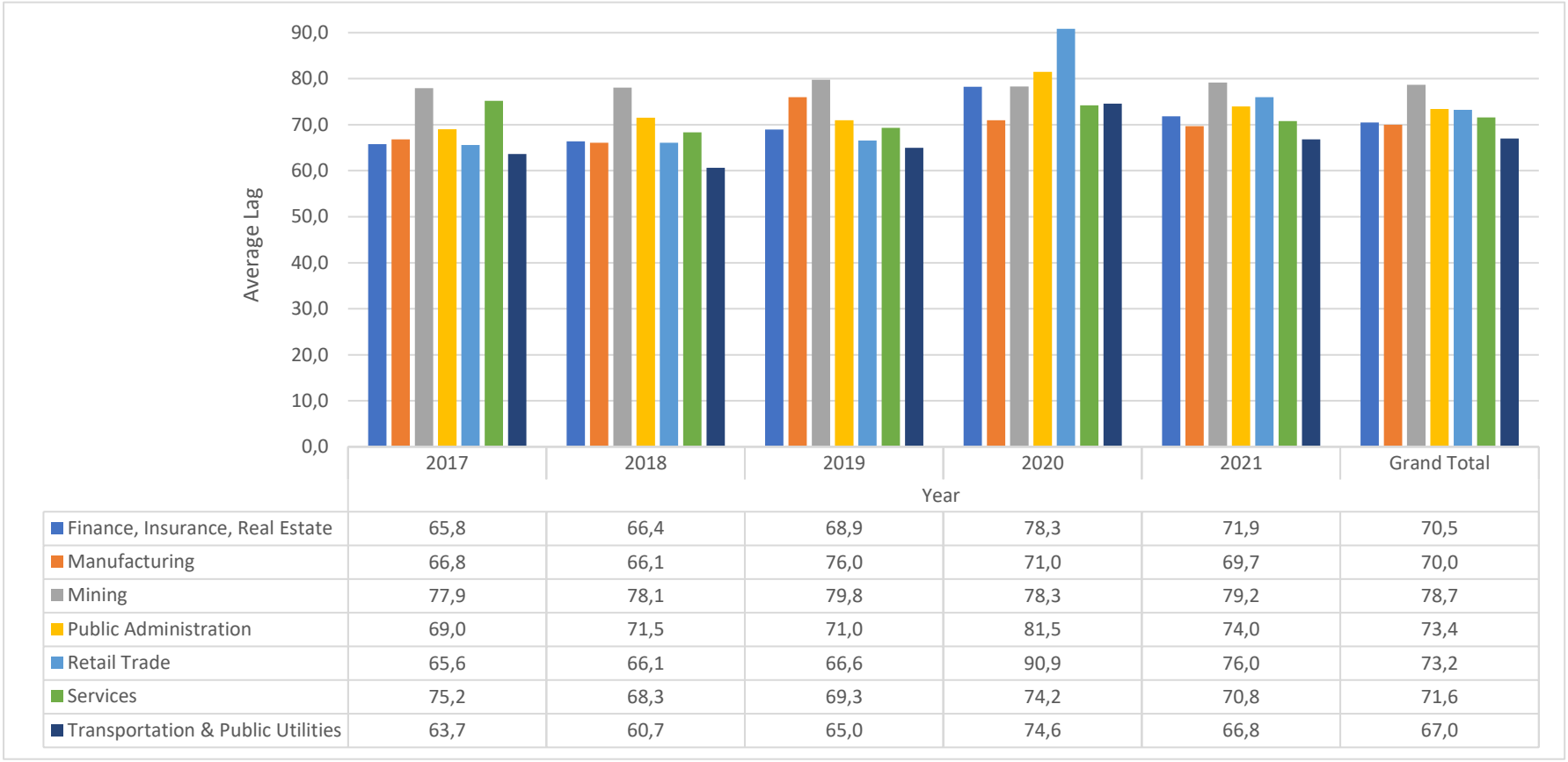
The mining industry (78.7 days) had the longest reporting lag. This could be because the mining industry involves complex operations, (Domingues et al., 2017) undertaken in multiple locations (Domingues et al., 2017) and subject to stringent regulatory requirements (Humby, 2015). Similarly, entities in the public administration (73.4 days) and retail sector (73.2 days) often involve larger groups with diverse operations and inherent complexities, factors which may be contributing to longer reporting lags (Afify, 2009). The finance industry (70.5 days) has a shorter lag than most sectors, a finding which corresponds with prior research (Bamber et al., 1993) This may be the result of regulatory factors, coupled with scrutiny by institutional investors, which leads to tighter auditor reporting deadlines. To ensure the graph shown under Figure 2 has robust findings, we conduct a Mann Whitney – U and a Kruskal Wallis test over the 5-year period, these are displayed in Table 12.

Table 12: Results of the U-stat and H- stat for industry					
	U-stat				**H-stat**
	2017-2018	**2018-2019**	**2019-2020**	**2020-2021**	**2017-2021**
Industry	-0.138	-0.018	-0.129	0.085	-0.145

When examining Table 12 it is evident that the changes within the industries have not significantly changed over the 5-year period (H= -0.145, p>5%), nor have the industries

significantly changed on a year- to year basis as evident by the U-statistic. However, linking to Section 4.3.2, when these industry groupings are added to the regression, there is a significant difference between the reporting lag and these alternate industry types.

Figure 2: Differences in the reporting lag among industries[7]



	2017	2018	2019	2020	2021	Grand Total
Finance, Insurance, Real Estate	65,8	66,4	68,9	78,3	71,9	70,5
Manufacturing	66,8	66,1	76,0	71,0	69,7	70,0
Mining	77,9	78,1	79,8	78,3	79,2	78,7
Public Administration	69,0	71,5	71,0	81,5	74,0	73,4
Retail Trade	65,6	66,1	66,6	90,9	76,0	73,2
Services	75,2	68,3	69,3	74,2	70,8	71,6
Transportation & Public Utilities	63,7	60,7	65,0	74,6	66,8	67,0

[7] One industry, agriculture, farming, and fishing was removed from the analysis. One company out of the JSE top 100 fell into this industry. There was an anomaly in 2021 where the reporting lag exceeded 170 days due to a reportable irregularity. Should this industry have been included it would have skewed the data.

The reporting lag literature has consistently distinguished between audits conducted by the Big N audit firms and audits conducted by smaller audit firms (Lee & Jahng, 2008). Big 4[8] auditing firms, having better access to human, technological and other resources have a shorter audit reporting lag than other assurance providers (Lee & Jahng, 2008).

Table 13 displays the reporting lag among auditing firms over the 5-year period.

Table 13: Reporting lag among auditing firms

Audit firm type	Average 2017	Average 2018	Average 2019	Average 2020	Average 2021	Average lag over the 5-year period
Panel 1						
Big 4	66.7	67.3	71	78.1	73.2	71
PwC	75.3	70.6	73.4	78	76.5	75
Deloitte	50.1	53.9	54.5	70.1	65	57.9
KMPG	73.4	76	83.8	86.9	74.9	77.8
EY	68	68.6	72.1	77.5	76.4	73.1
Panel 2						
Non-Big 4	94.3	76.3	86.7	100.5	84	88.8
Joint Auditors	65.3	70	66.6	74.7	66.8	68.4

Over the 5-year period, the Big 4 had an average reporting lag of 71 days, while non-Big 4 auditors had an average lag of 88.8 days. Put differently, Big 4 auditors were, on average, 17.8 days faster in completing their audits when compared to non-Big 4 auditors over the 5-year period.

It is noticeable that Big 4 auditing firms had significant variations in their reporting lags over the 5-year period. KPMG had the longest average reporting lag of 77.8 days. PwC closely follows with an average reporting lag of 75 days while EY comes in close behind at 73.1 days. Deloitte stands out with the shortest reporting lag among the four, averaging at 57.9 days.

These differences in the reporting lags can be attributed to various factors. Firstly, each of the Big 4 firms have different auditing methodologies they follow when conducting their audits. Each of these different methodologies can influence the efficiency of an audit, which in turn contributes to different reporting lags. Differences in the audit methodologies will contribute to variations in the reporting lag among the Big 4.

Secondly, each of the Big 4 firms have a unique and different client base, which can play a role in the variation of the reporting lags. Firms who have clients from more complex industries, such as mining and retail trade, as observed above, may experience a longer reporting lag

[8] The auditing firms contained in the Big 4 were PWC, KPMG, EY, and Deloitte

when compared to their counterparts as the nature and complexity of these clients can have an impact on the time taken to complete the audit.

Joint auditors had the shortest reporting lag with an average of 68.4 days over the 5-year period. Joint audits involve two independent auditing firms being appointed to conduct the audit of a company's financial statements (ICAEW, 2019). Joint audits were only encountered in the finance, insurance and real estate industry. Table 14 below displays the Mann Whitney – U and a Kruskal Wallis test over the 5-year period.

Table 14: Results of the U-stat and H- stat for audit firm type

	U-stat				**H-stat**
	2017-2018	**2018-2019**	**2019-2020**	**2020-2021**	**2017-2021**
Firm Type	0.042	0.041	-0.328	0.029	0.215

When examining Table 14 it is evident that the changes within the audit firms have not significantly changed over the 5-year period (H= 0.215, p>5%), nor have the audit firms significantly changed on a year- to year basis as evident by the U-statistic. However, linking to Section 4.2, when these audit firm type groupings are added to the regression, there is a significant difference between the reporting lag and audit firm types.

Appendix C: Kendal's tau-b and Spearman's rho tests on a year-by-year basis

This Appendix illustrates the results from the Kendal's tau-b and Spearman's rho tests on a year-by-year basis. Linking back to Section 4.1, these results tend to hold when the correlations are run for each year individually. Tables 14 – 18 below show the results from the Kendal's tau-b and Spearman's rho tests on a year-by-year basis. Table 14 Shows the results from the Kendal's tau-b and Spearman's rho tests for the 2017 year. Table 15, for the 2018 year. Table 16 for the 2019 year. Table 17 for the 2020 year. Finally, Table 18 for the 2021 year

There was a significant correlation between LAG and SIZE in the years 2017 and 2021. The results show that as SIZE increases, LAG tends to decrease. Similarly, there was a significant correlation between LAG and IRQ in the years 2017 and 2018. The results show as IRQ increases; LAG tends to decrease. Profitability showed a significant correlation in the 2019 year, as profitability increases, the reporting lag tends to decrease. Additionally, in the 2021 year, long tenure had a significant correlation with the reporting lag, the results showed that as tenure increases the reporting lag tends to also increase.

These results are fairly consistent with the overall results from the Kendal's tau-b and Spearman's rho tests over the 5 – year period, linking back to Section 4.1. The results for the tests run on a year-by-year basis are displayed below.

Table 15: Results from the Kendal's tau-b and Spearman's rho tests for 2017									
	LAG	SIZE	INDUSTRY	PROFITABILITY	LEVERAGE	IRQ	BIG 4	SHORT TEN	LONG TEN
LAG	1	-0.072*	-0.065	-0.056	0.033	-0.123*	0.027	-0.011	0.028
SIZE	-0.100*	1	0.148	-0.140	0.150*	0.168**	0.080	0.050	-0.119
INDUSTRY	-0.079	0.180	1	-0.321**	-0.178*	-0.252*	-0.134*	0.098	-0.121
PROFITABILITY	-0.085	-0.197	-0.391**	1	-0.052	0.113	0.010	0.111	-0.012
LEVERAGE	-0.055	0.230*	0.217*	-0.088	1	0.085	-0.035	-0.098	0.057
IRQ	-0.170*	0.233*	-0.283**	0.152	0.018	1	0.010	-0.127	0.076
BIG 4	-0.033	0.098	-0.134	0.013	-0.043	0.012	1	0.100	-0.134
SHORT TEN	-0.013	0.061	0.098	0.136	-0.119	-0.142	0.100	1	-0.748**
LONG TEN	0.034	-0.145	-0.121	-0.015	0.070	0.085	-0.134	-0.748**	1

**significant at the 1% level (2-tailed); *significant at the 5% level (2-tailed)

Kendal's Tau-b above the diagonal; Spearman's rho below the diagonal

Table 16: Results from the Kendal's tau-b and Spearman's rho tests for 2018									
	LAG	SIZE	INDUSTRY	PROFITABILITY	LEVERAGE	IRQ	BIG 4	SHORT TEN	LONG TEN
LAG	1	-0.039	-0.003	-0.095	0.018	-0.158*	-0.002	-0.036	-010
SIZE	-0.063	1	0.143	-0.145*	0.182*	0.194*	0.079	-0.077	-0.007
INDUSTRY	-0.004	0.174	1	-0.377*	0.112	-0.230*	-0.126*	0.098	-0.048
PROFITABILITY	-0.140	-0.208*	-0.459**	1	-0.084	0.169*	-0.114	0.015	-0.049
LEVERAGE	0.034	0.261*	0.136	-0.125	1	0.073	-0.006	-0.088	0.103
IRQ	-0.207*	0.267*	-0.260*	0.222*	0.112	1	0.003	-0.183	0.085
BIG 4	-0.002	0.096	-0.126*	-0.138	-0.007	0.004	1	-0.102	-0.138
SHORT TEN	-0.044	-0.094	0.098	0.019	-0.107	-0.206	-0.102	1	-0.743**
LONG TEN	-0.012	-0.008	-0.048	-0.059	0.126	0.096	0.138	-0.743**	1

**significant at the 1% level (2-tailed); *significant at the 5% level (2-tailed)

Kendal's Tau-b above the diagonal; Spearman's rho below the diagonal

Table 17: Results from the Kendal's tau-b and Spearman's rho tests for 2019									
	LAG	SIZE	INDUSTRY	PROFITABILITY	LEVERAGE	IRQ	BIG 4	SHORT TEN	LONG TEN
LAG	1	-0.023	0.017	-0.125*	0.052	-0.139	-0.070	-0.039	-0.014
SIZE	-0.037	1	0.127	-0.136	0.095	0.202*	0.080	-0.093	0.068
INDUSTRY	0.020	0.154	1	-0.436**	0.144	-0.165	-0.252*	0.148	-0.073
PROFITABILITY	-0.197*	-0.191	-0.530**	1	-0.076	0.113	0.102	0.085	-0.078
LEVERAGE	0.074	0.139	0.175	-0.108	1	-0.044	-0.097	0.032	0.026
IRQ	-0.185	0.276**	-0.186	0.153	-0.061	1	0.197*	-0.115	0.078
BIG 4	-0.085	0.097	-0.252*	0.125	-0.118	0.222*	1	-0.271**	0.215*
SHORT TEN	-0.047	-0.113	0.148	0.104	0.038	-0.130	-0.271**	1	-0.792**
LONG TEN	-0.017	0.083	-0.073	-0.095	0.032	0.089	0.215*	-0.792**	1

**significant at the 1% level (2-tailed); *significant at the 5% level (2-tailed)

Kendal's Tau-b above the diagonal; Spearman's rho below the diagonal

Table 18: Results from the Kendal's tau-b and Spearman's rho tests for 2020									
	LAG	SIZE	INDUSTRY	PROFITABILITY	LEVERAGE	IRQ	BIG 4	SHORT TEN	LONG TEN
LAG	1	-0.099	-0.009	-0.009	0.058	-0.049	-0.097	-0.055	0.144
SIZE	-0.145	1	0.085	-0.122	0.121	0.188*	0.153	0.008	-0.057
INDUSTRY	-0.011	0.103	1	-0.483**	0.188*	-0.122	-0.174	0.017	-0.049
PROFITABILITY	-0.020	-0.158	-0.588**	1	-0.167*	0.045	0.062	0.176*	-0.071
LEVERAGE	0.090	0.181	0.229*	-0.249*	1	-0.008	-0.005	0.008	0.047
IRQ	-0.070	0.261**	-0.138	0.065	-0.013	1	0.258**	0.004	-0.033
BIG 4	-0.118	0.187	-0.174	0.075	-0.006	0.290**	1	-0.163	0.093
SHORT TEN	-0.067	0.009	0.017	0.215*	0.009	0.005	-0.163	1	-0.730**
LONG TEN	0.174	-0.069	-0.049	-0.086	0.058	-0.037	0.093	-0.730**	1

**significant at the 1% level (2-tailed); *significant at the 5% level (2-tailed)

Kendal's Tau-b above the diagonal; Spearman's rho below the diagonal

Table 19: Results from the Kendal's tau-b and Spearman's rho tests for 2021									
	LAG	SIZE	INDUSTRY	PROFITABILITY	LEVERAGE	IRQ	BIG 4	SHORT TEN	LONG TEN
LAG	1	-0.104*	-0.016	-0.014	-0.026	-0.055	-0.074	-0.052	0.203*
SIZE	-0.154*	1	0.100	-0.175*	0.121	0.232**	0.162	0.019	-0.018
INDUSTRY	-0.019	0.122	1	-0.522**	-0.211*	-0.160	-0.176	0.072	-0.033
PROFITABILITY	-0.012	-0.244*	-0.635**	1	-0.284**	0.135	0.103	0.133	-0.62
LEVERAGE	-0.031	0.188	0.257**	-0.418**	1	-0.030	-0.037	-0.032	0.108
IRQ	-0.085	0.319**	-0.180	0.181	-0.038	1	0.259**	0.109	0.000
BIG 4	-0.090	0.197	-0.176	0.126	-0.045	0.293**	1	-0.165	0.076
SHORT TEN	-0.063	0.024	0.072	0.162	-0.039	0.123	-0.165	1	-0.662*
LONG TEN	0.245*	-0.021	-0.033	-0.075	0.131	0.000	0.076	-0.662**	1

**significant at the 1% level (2-tailed); *significant at the 5% level (2-tailed)

Kendal's Tau-b above the diagonal; Spearman's rho below the diagonal

Appendix D: Assumption testing

This Appendix discusses the assumption testing of the OLS regression.

A battery of sensitivity tests and control measures are introduced to ensure the validity and reliability of the results[9].

Measurement of the dependent variable

Before any results are compiled, the researcher will review each audit report twice to ensure that all the information inputted is accurate. A second coder[10] will review a sample of the information to ensure that all the data is accurately captured. Material differences will be flagged for the attention of the lead researcher, who will adjust the data as needed.

The nature of collecting this data is simple and objective, where all the required information will be in the audit report and the annual financial statements. There is no subjectivity required when assessing the data collected.

Before analysing the entire sample, the elasticity of the reporting lag was piloted with ten listed companies to ensure that the lags fluctuate and do not remain constant year-to-year. If the lags were to remain constant on a yearly basis, it would suggest a lack of responsiveness or flexibility in the reporting process. By observing variations in the reporting lags, this study gains reliability as it demonstrates that the reporting lag is influenced by external factors and not just the date management sets that the auditor needs to adhere to.

Univariate analysis

The researcher has reviewed the core assumptions for the Mann-Whitney U and Kruskal-Wallis tests.

- The dependent variable (the reporting lag) is measured on a continuous scale. Each independent variable (Size, Industry, Profitability, Leverage, IRQ, Big 4 and Tenure) consists of two or more categorical and independent groups. Refer to Table 2
- Observations within any one category/level of the dependent variable are not to be included in another category or group. To avoid dependent observations, the non-parametric tests will be run for each year separately.
- The distributions within each group of a specific independent variable are assumed to follow a similar distribution from one to another.

[9] Sensitivity tests in quantitative research assess the robustness of findings by examining the consistency of results when various aspects of the analysis are altered. Control measures involve incorporating additional variables to enhance accuracy by accounting for potential confounding factors. These practises improve the credibility of the research results.

[10] Supervisor

- Each group of a specific independent variable has a sample size larger than 5 companies.

Multivariate analysis

- To assess the presence of multicollinearity among independent variables used in the study, the Variance Inflation Factor (VIF) method will be employed. The VIF is a measure that determines the strength of the linear relationship between a predictor and other predictors. In conjunction with the VIF, the tolerance statistic is also considered, which is the reciprocal of the VIF (1/VIF). If the VIF exceeds 10, it raises concerns about multicollinearity (Bowerman & O'connell, 1990; Myers & Myers, 1990). A VIF value above this threshold suggests a substantial correlation between the predictor and other variables. Conversely, the tolerance statistic below 0.1 shows there is a significant problem, indicating a high degree of collinearity among predictors.
- For the regression model, a Durbin-Watson test will be used to determine if the module residuals are independent. Additionally, a histogram and normal probability plot of standardised residuals against standardised predicted values will be used to test for the constant variance of residual terms (homoscedasticity) and normally distributed errors. This will be confirmed using the Kolmogorov-Smirnov test.
- The Breusch-Pagan L test will be used to confirm if the results from the pooled OLS regression are valid. If the test requirements are not met, only the panel model results will be reported. The Hausman test results will guide the use of either a fixed or random effects panel model.

Additional sensitivity tests

- The results for the regression are corroborated by changing the measures of the grouping variables. For example, company size will be evaluated using the log of total revenue rather than total assets.
- Additional control measures will also be introduced to account for potential alternative explanations for the reporting lag. For example, the prior research suggests that firm and partner rotations may influence detection risk. Controls for whether or not a firm or partner change has taken place will be included in the base model.
- A change analysis will be implemented to address endogeneity concerns. This entails using the same base model as above but where year-on-year changes in the applicable dependent, independent and control variables are used.
- To control for the impact of how the dependent variable is measured, it will be converted to a binary score (based on lags above or below the median score) and an ordinal score (based on the quartiles into which company lags fall). The results from the OLS/panel

regression will be corroborated using a probit regression (binary lag score) and ordered logit regression (quartile-based lag score). The probit and ordered logit regressions will be run on the base model and with changes in the applicable independent and control variables.

- As a further endogeneity control, companies will be assigned to random groups to control for unobserved firm effects and the dependent variable will be converted into scores, specifically above and below the median. A probit regression analysis will be used to confirm the results.

Normality Assumption

To assess whether the data was normally distributed, a P-P plot was generated. Based on the observations from Figure 3, it is evident that the data points are not normally distributed. Additionally, to test for normality a Kolmogorov-Smirnov Test and Shapiro-Wilk Test was conducted. The results from these tests reveal that the data is not normally distributed. This shows that the normality assumption was violated. To overcome the violation to the normality assumption the results from the OLS regression were corroborated using a probit regression (binary lag score) and ordered logit regression (quartile-based lag score). The probit and ordered logit regressions were run on the base model and with changes in the applicable independent and control variables. Additionally, a battery of sensitivity tests was performed in Section 4.3 to ensure the robustness of the findings. Violating this assumption is not uncommon in research and steps were taken to ensure the robustness of the findings.

Multicollinearity Assumption

The tolerance values for all the variables exceed 0.1, and the VIF values are below 3. Therefore, it can be deduced that none of the independent variables in the regression model tested in this study exhibit multicollinearity. The VIF scores and tolerance values are displayed in Table 20 below.

Table 20: VIF Scores and Tolerance Values

Variable	VIF Score	Tolerance Value
Size	1,264	0,828
Industry	1,143	0,833
Profitability	1,216	0,828
Leverage	1,291	0,779
IRQ	1,170	0,860
BIG 4	1,196	0,838
Short Tenure	2,276	0,440

Table 20: VIF Scores and Tolerance Values		
Variable	**VIF Score**	**Tolerance Value**
Long Tenure	2,295	0,447
KAMS	1,236	0,820
Non–audit services	1,160	0,874
Busy Season	1,264	0,956

Heteroscedasticity Assumption

The scatterplot depicted in Figure 4 displays a dispersion of data points without any discernible accumulation or distinctive pattern. This observation leads to the conclusion that the results of this test indicate the absence of heteroscedasticity symptoms, suggesting that the regression model is not afflicted by heteroskedasticity, and homoskedasticity prevails. Additionally, an un-tabulated White's test was conducted and revealed that material homoscedasticity was not impacting the results.

Autocorrelation Assumption

The Durbin–Watson statistic computed for the regression yields a value of 0.869. This value falls within the range indicative of an absence of autocorrelation, typically between -2 and +2. Consequently, it can be inferred that the regression model remains free from autocorrelation.

Test for Outliers

In order to test for outlier's scatter plots were employed to assess for any obvious outliers. Additionally, the data was filtered in Excel to further assess for any obvious outliers. Furthermore, in our regression analysis using SPSS, the examination of Cook's distance[11] revealed that all computed values were less than 1. Values less than 1 generally indicate that no single observation disproportionately affects the overall regression model[12]. These results suggest that the inclusion of any individual data point has a limited impact on the regression coefficients and does not substantially alter the model. This finding implies that there are no influential observations that would warrant special attention or consideration for exclusion in order to maintain the stability and reliability of the regression results.

Please find Figure 3 and Figure 4 below.

[11] Un-tabulated

[12] University of Witwatersrand course notes

Figure 3: Normality test chart

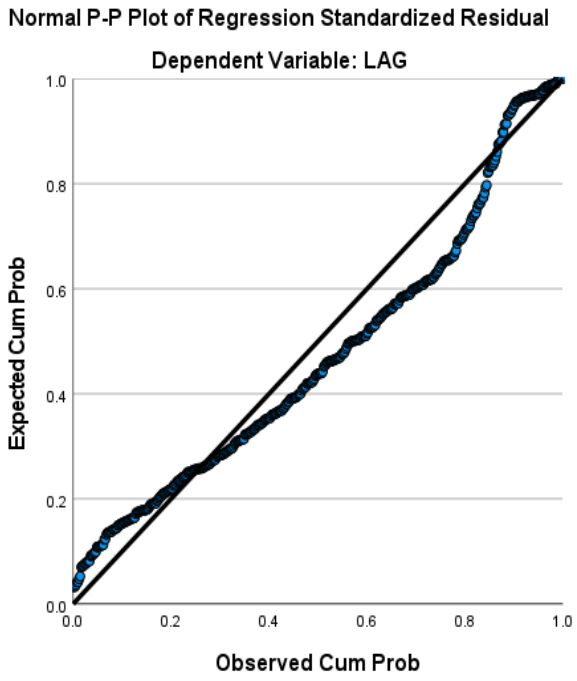
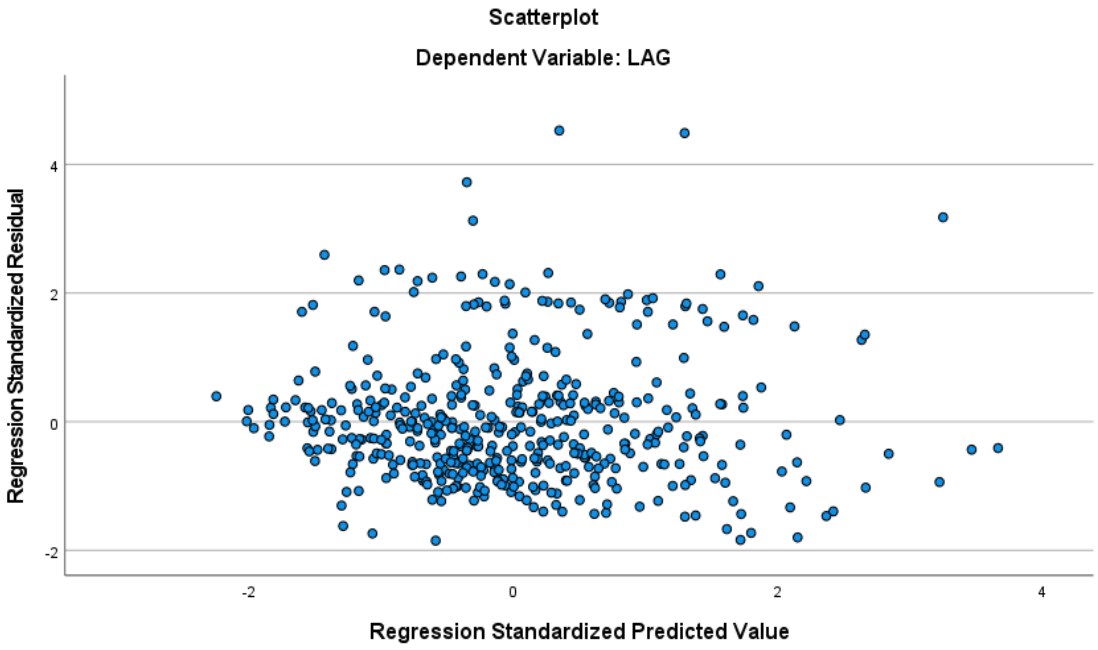


Figure 4: Heteroscedasticity test



Appendix E: Impact of auditor specialist

Appendix E displays the results of the regression analysis when including the impact of auditor specialist on the reporting lag, linking back to Section 4.3.3

Table 21: Results from the regression analysis (Auditor specialist)		
Variable	**Coefficient**	***p***
Size	-0,151	0,002***
Industry	-0,112	0,023**
Profitability	-0,084	0,088*
Leverage	0,013	0,796
IRQ	-0,110	0,027**
BIG 4	-0,100	0,007***
Short Tenure	0,024	0,720
Long Tenure	0,128	0,058*
KAMS	0.076	0,116
Non–audit services	-0,007	0,887
Busy Season	-0,011	0,817
Specialist	-0.168	<0.001***

Appendix F: Unobserved firm effects and GPS score

Table 22 displays the results of the regression when including the impact of unobserved firm effects, the results of the original regression hold, linking back to Section 4.3.5.

Table 22: Results from the regression analysis (Unobserved firm effects)		
Variable	**Coefficient**	***p***
Size	-0,138	0,006***
Industry	-0,130	0,009**
Profitability	-0,068	0,171*
Leverage	0,021	0,676
IRQ	-0,104	0,033**
BIG 4	-0,125	0,011**
Short Tenure	0,016	0,819
Long Tenure	0,113	0,095*
KAMS	0.099	0,040**
Non–audit services	0.005	0,921
Busy Season	-0,007	0,880

Table 23 displays the results when including the GPS score, the results of the original regression hold, in most respects, linking back to Section 4.3.5

Table 23: Results from the regression analysis (GPS Score)		
Variable	**Coefficient**	***p***
Size	-0,41	0,569
Industry	-0,214	0,003**
Profitability	-0,151	0,018**
Leverage	0,064	0,345
IRQ	-0,045	0,499
BIG 4	-0,107	0,064*
Short Tenure	-0.010	0,909
Long Tenure	0,044	0,615
KAMS	0.168	0,004***
Non–audit services	-0.012	0,821
Busy Season	0.106	0,084*

It is interesting to note when including the GPS score, Size and IRQ are no longer significant in the regression, while profitability, industry and KAMS are all significant at the 5% level of significance. There is an inherent limitation to using the GPS score as not all companies were allocated a GPS score, and the regression was only run on the companies to which there was a GPS score. This does not take away from the results using the GPS score but may explain why Size and IRQ are no longer significant due to the lower sample size.

Appendix G: Control for Covid -19

Table 24 displays the results of the regression when controlling for the impact of COVID - 19, the results of the original regression hold, linking back to Section 4.3.7.

Table 24: Results from the regression analysis (Control for Covid – 19)		
Variable	**Coefficient**	***p***
Size	-0,181	0,001***
Industry	-0,155	0,007**
Profitability	-0,056	0,331
Leverage	0,028	0,630
IRQ	-0,115	0,039**
BIG 4	-0,122	0,028**
Short Tenure	-0.035	0,643
Long Tenure	0,074	0,340
KAMS	0.096	0,082*
Non–audit services	0.002	0,976
Busy Season	-0,016	0,753

Appendix H: Technical report

The following technical report was presented for practitioners. This summarises the thesis in simpler terms that can be understood and operationalised by the non-academic community.

1: PURPOSE OF THIS REPORT

This report investigates the lag between financial year ends and the audit report date of the top 100 JSE -listed entities from 2017 and 2021. This "reporting lag" is a function of both client- and auditor-specific factors (Abernathy et al., 2017; Habib et al., 2019; Rochmah Ika & Mohd Ghazali, 2012). Of specific interest for this paper is how the reporting lag varies over time, among industries and among audit firms.

Examining the reporting lag is important because it gives a sense of financial reporting timeliness and, by inference, the extent of material financial reporting issues which may have been identified by the company or its auditor and needed to be corrected before the financial statements could be issued (Abbott et al., 2012). Researchers have raised questions about a possible relationship between the credibility of financial reporting and the reporting lag (Abernathy et al., 2017; Krishnan & Yang, 2009). The majority of empirical studies, however, overlook South Africa. This paper provides a current assessment of reporting lags by JSE-listed entities which will be relevant for financial statement users. It also lays out areas for further research.

2: BACKGROUND

The reporting lag is an important issue as it can impact the transparency, accuracy, and reliability of financial and non-financial information provided to stakeholders (Givoly & Palmon, 1982). According to signalling theory[13], companies use various signposts to convey information about their financial position and performance to stakeholders (Spence, 1978; Watts & Zimmerman, 1986). The reporting lag is important as a shorter reporting lag can signal efficiency, transparency and proactive management to stakeholders (Beaver et al., 1980; Givoly & Palmon, 1982). Meeting or exceeding their expectations can enhance the company's reputation and investor confidence (Givoly & Palmon, 1982).

Prior research has found that the timeliness of audit reports reduces information asymmetry (Givoly & Palmon, 1982) and improves the actual or perceived quality of reported information . For example, proxies for the reporting lag are positively and significantly associated with the

[13] Signalling theory discusses how parties with differing information affect behaviour and perceptions through signals. The receiver interprets signals from the sender to make educated decisions [8].

cost of equity, suggesting that investors associate longer reporting lags with financial reporting issues (Kalelkar & Xu, 2023).

Audit is essential for the sound functioning of capital markets. This is especially the case in developing economies where other sources of financial information unavailable, financial intermediaries post limited information and the applicable regulatory authorities are less effective than in developed economies (Abernathy et al., 2017; Fisman & Love, 2003). As a result, audit experts, company management, users of the financial statements, and standard setters may benefit from identifying and understanding the reporting lag in various settings by understanding the causes and implications of reporting lag and adapting practices to increase audit efficiencies globally (Abernathy et al., 2017).

The aim of this report is to examine the degree of the reporting lag by companies listed on the JSE. This includes looking at the lags over the years (2017-2021) and exploring the lag between company type (industry/sector) and audit firm type (Big 4/Second Tier/Joint Audits).

3: METHODOLOGY APPLIED TO THE STUDY

The study is based on the top 100 JSE-listed companies by market capitalisation as at 31 March 2023. Focusing on the largest listed companies controls for the possibility of a lack of resources or technical expertise may be impacting the reporting lag (De Villiers et al., 2017). Using the JSE top 100 also deals with the fact that the Alt-X have different listing rules and are infrequently traded.

South African companies are selected because the country has a well-developed reporting environment (IOD, 2016; Maroun et al., 2014). South Africa has established a comprehensive regulatory framework for financial reporting and auditing. This framework is aligned with international best practices. It sets clear guidelines and requirements for companies and auditors to follow (Maroun et al., 2014).

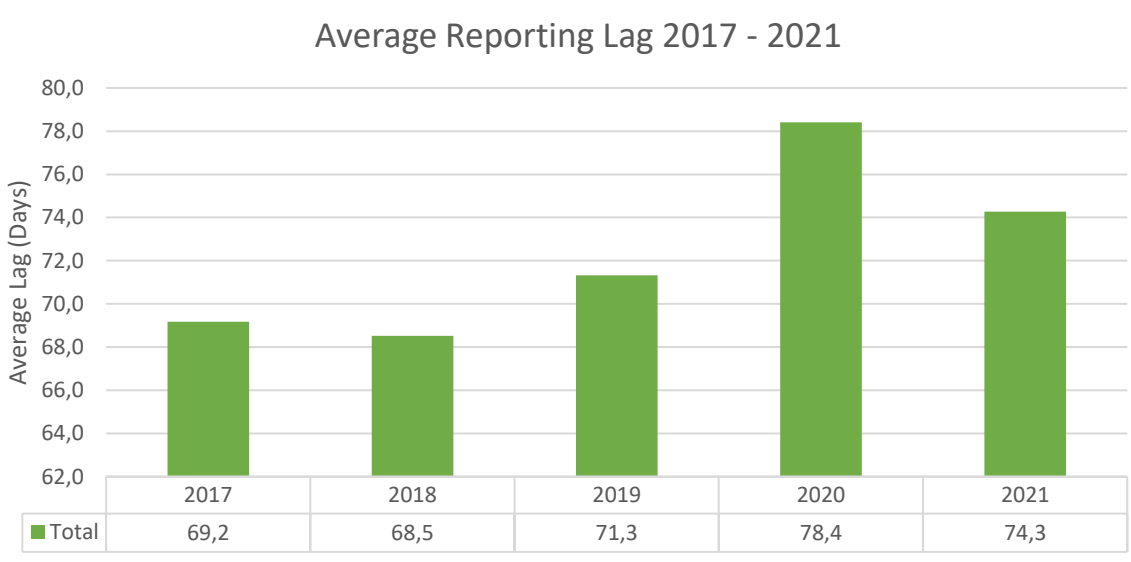
Qualitative content analysis is used to collect data. The annual financial statements for each company-year were reviewed to identify the financial year end, the audit report date, the audit firm, partner details, tenure of firm and partner, materiality (if provided), audit opinion and other details included in the audit report. Descriptive statistics and appropriate plots are used to summarise the data and present findings. To provide context, the reporting lags will also be stratified by grouping variables. These include year (2017-2021), company type (industry/sector) and audit firm type (Big 4/Second Tier/Joint Audits).

Table 1 presents general statistics related to the assessment of the 466 audit reports. The average reporting lag over the 5-year period is 72 days. This average is within the JSE's 3 months (90 days) reporting window for listed entities.

Table 1: General statistics	
Total number of audit reports assessed	466
Mean lag over 5-years	72
Minimum lag	26
Maximum lag	182
Interquartile Range	25.5
Median	67

Figure 1 illustrates the average reporting lags from 2017 to 2021.

Figure 1: Average reporting lags 2017 - 2021



While there was a decrease in the reporting lag from 2020 to 2021 (5.52%), there is an effective 7.37% increase for the 5 years under review. This demonstrates that the reporting lag has had a progressive increase over the 5-year period.

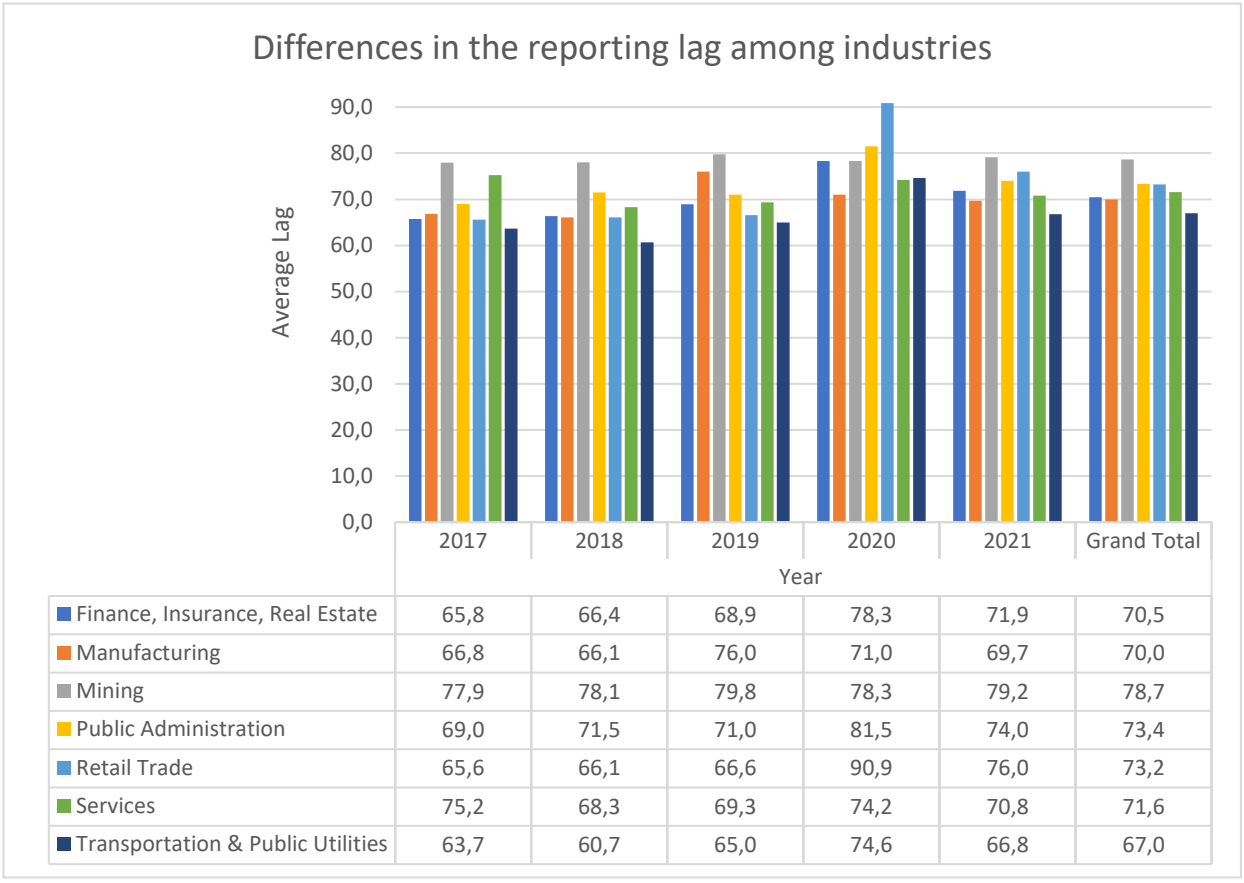
The reporting lag in 2020 increased to 78.4 days, largely attributed to the COVID-19 pandemic's impact. The epidemic brought cash flow and heightened fraud risks to accounting and auditing (Bajary et al., 2023). Lockdowns, supply chain interruptions, and lower consumer spending may have severely impacted companies (L. Myeza et al., 2023). As a result, auditors

required more time and resources to analyse these risks and ensure accurate financial reporting, including a thorough evaluation of the going concern assumption. The increased cash flow risks (Bajary et al., 2023) faced by companies across all the different industries was one of the key elements contributing to the increased reporting lag in 2020.

Figure 2 shows that companies in the mining (average 79.2), public administration (average 73.4) retail trade (average 73.2) industries had the longest reporting lag over the 5-year period. Companies in the transportation & public utilities (average 67) and manufacturing (average 70) industries had the shortest reporting lag over the 5-year period.

Reporting lags stratified by industry are presented in Figure 2.

Figure 2: Differences in the reporting lag among industries[14]



	2017	2018	2019	2020	2021	Grand Total
Finance, Insurance, Real Estate	65,8	66,4	68,9	78,3	71,9	70,5
Manufacturing	66,8	66,1	76,0	71,0	69,7	70,0
Mining	77,9	78,1	79,8	78,3	79,2	78,7
Public Administration	69,0	71,5	71,0	81,5	74,0	73,4
Retail Trade	65,6	66,1	66,6	90,9	76,0	73,2
Services	75,2	68,3	69,3	74,2	70,8	71,6
Transportation & Public Utilities	63,7	60,7	65,0	74,6	66,8	67,0

[14] One industry, agriculture, farming, and fishing was removed from the analysis. One company out of the JSE top 100 fell into this industry. There was an anomaly in 2021 where the reporting lag exceeded 170 days due to a reportable irregularity. Should this industry have been included it would have skewed the data.

The mining industry (78.7 days) had the longest reporting lag. This could be because the mining industry involves complex operations, (Domingues et al., 2017) undertaken in multiple locations (Domingues et al., 2017) and subject to stringent regulatory requirements (Humby, 2015). Similarly, entities in the public administration (73.4 days) and retail sector (73.2 days) often involve larger groups with diverse operations and inherent complexities, factors which may be contributing to longer reporting lags (Afify, 2009). The finance industry (70.5 days) has a shorter lag than most sectors, a finding which corresponds with prior research (Bamber et al., 1993) This may be the result of regulatory factors, coupled with scrutiny by institutional investors, which leads to tighter auditor reporting deadlines.

The reporting lag literature has consistently distinguished between audits conducted by the Big N audit firms and audits conducted by smaller audit firms (Lee & Jahng, 2008). Big 4[15] auditing firms, having better access to human, technological and other resources have a shorter audit reporting lag than other assurance providers (Lee & Jahng, 2008).

Table 2 shows the reporting lag among auditing firms over the 5-year period.

Table 2: Reporting lag among auditing firms

Audit firm type	Average 2017	Average 2018	Average 2019	Average 2020	Average 2021	Average lag over the 5-year period
Panel 1						
Big 4	66.7	67.3	71	78.1	73.2	71
PwC	75.3	70.6	73.4	78	76.5	75
Deloitte	50.1	53.9	54.5	70.1	65	57.9
KMPG	73.4	76	83.8	86.9	74.9	77.8
EY	68	68.6	72.1	77.5	76.4	73.1
Panel 2						
Non-Big 4	94.3	76.3	86.7	100.5	84	88.8
Joint Auditors	65.3	70	66.6	74.7	66.8	68.4

Over the 5-year period, the Big 4 had an average reporting lag of 71 days, while non-Big 4 auditors had an average lag of 88.8 days. Put differently, Big 4 auditors were, on average, 17.8 days faster in completing their audits when compared to non-Big 4 auditors over the 5-year period.

It is noticeable that Big 4 auditing firms had significant variations in their reporting lags over the 5-year period. KPMG had the longest average reporting lag of 77.8 days. PwC closely follows with an average reporting lag of 75 days while EY comes in close behind at 73.1 days. Deloitte stands out with the shortest reporting lag among the four, averaging at 57.9 days.

[15] The auditing firms contained in the Big 4 were PWC, KPMG, EY, and Deloitte

These differences in the reporting lags can be attributed to various factors. Firstly, each of the Big 4 firms have different auditing methodologies they follow when conducting their audits. Each of these different methodologies can influence the efficiency of an audit, which in turn contributes to different reporting lags. Differences in the audit methodologies will contribute to variations in the reporting lag among the Big 4.

Secondly, each of the Big 4 firms have a unique and different client base, which can play a role in the variation of the reporting lags. Firms who have clients from more complex industries, such as mining and retail trade, as observed above, may experience a longer reporting lag when compared to their counterparts as the nature and complexity of these clients can have an impact on the time taken to complete the audit.

Joint auditors had the shortest reporting lag with an average of 68.4 days over the 5-year period. Joint audits involve two independent auditing firms being appointed to conduct the audit of a company's financial statements (ICAEW, 2019). Joint audits were only encountered in the finance, insurance and real estate industry.

There has been conflicting evidence on the efficiency of joint audits from earlier studies (Ezat, 2015). On the one hand, joint audits may be more efficient because of resource availability and the complementary specialisations of audit offices. On the other hand, joint auditors may be characterised by weaknesses such as duplication of work effort and the added coordination challenges. While only a handful of sampled companies are jointly audited, the results in Table 2 lend weight to the arguments that joint audits can be conducted effectively and promote the publication of timely financial statements.

5: CONCLUSION

This report provides a detailed overview of the reporting lag in South Africa from 2017 to 2021. The findings show that the reporting lag has steadily increased over the years. 2020 saw a significant increase in the reporting lag, this can primarily be attributed to the impact of the COVID 19 pandemic, which was accompanied by additional risks and challenges.

Reporting lags vary with industry reflecting the context-specific conditions under which financial statements are being prepared and audited. The Big 4 are completing their engagements faster than smaller audit firms Despite the fact that the largest companies are being audited by the Big 4, these auditors have access to greater serves of human, intellectual and other key capitals than their smaller counterparts (Lee & Jahng, 2008; Schwartz & Soo, 1996). Joint auditors were, however, the fastest to complete their audits. This could be due to efficiency gains from sharing of workloads, complementary expertise and effective peer-review (Ezat, 2015).

The research provides insights into the extent to which JSE-listed entities are publishing audited financial statements timeously. Within a South African context, the findings are valuable due to the country's well-developed audit reporting environment (IOD, 2016; Maroun et al., 2014), which can be applied to a broader audience. The research helps investors assess the timeliness of financial reports, impacting their decision-making. It offers benchmarking data for JSE-listed entities to evaluate reporting practices and audit quality considerations for management, stakeholders, and auditors.

Areas of future research include investigating the quality of the audit reports when compared to the reporting lag. Furthermore, comparing the reporting lag to additional factors such as the number of Key Audit Matters and the integrated report quality score may be of interest to regulators, investors and academics. Another important area for future research is to engage with audit partners, audit teams and audit clients to understand possible determinants of longer reporting lags. The current paper's findings are based only on aggregated information contained in corporate reports. Understanding the drivers and consequences of the reporting lags fully will require additional archival analysis and engagement with applicable stakeholders.

IV: Candidates Declaration

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Faculty of Commerce, Law and Management

Candidate's Declaration

Name of Candidate:	Matthew Ritzlmayr
Person Number:	2089007
Degree:	Mcom (Accounting)
Supervisor / Co-Supervisor:	Warren Maroun & Dusan Ecim
School:	School of Accountancy
Title of Thesis/Dissertation/ Research Report:	Exploring the reporting lag among JSE-Listed Entities

Candidate's Declaration:

i. I hereby submit my PhD Thesis/Masters dissertation for examination (circle applicable).

ii. I confirm that my signed declaration in terms of Rule G9.7 is included in each copy of the thesis/ dissertation.

iii. I have checked all copies of my thesis/ dissertation and declare that no pages are missing or poorly reproduced.

iv. I hereby submit a CD/USB containing a PDF version of my submission for examination and __N/A_____ bound copies.

Candidate's Signature: _____ **Date:** __February 2024___