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The role of audit committee characteristics in improving the risk disclosure of companies examining the moderating role of audit quality

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Abstract

This paper examines the association between audit committee characteristics (ACC) and risk disclosure (RD) of firms, focusing on the moderating effect of audit quality (AQ). The importance of RD to investors and stakeholders is that such a practice offers a better evaluation of the overall risk profile of companies. Based on agency theory complemented by the resource dependence theory, this paper therefore suggests that effective audit committees have an effect of reducing information asymmetry while increasing audit quality monitoring capacities and consequently enhance risk disclosure practices. In this respect, the literature sources were reviewed, and a hypothetical framework was developed to test the hypotheses. The sample selection comprises 54 companies with non-financial companies listed in the Egyptian Exchange Market, EGX100, for the period 2018 to 2021, which amounts to 216 observations. According to the results, ACC, such as size and financial expertise, are significant for RD, while ACC relating to meetings and independence are less important for RD. The study further established that AQ moderates the relationship between ACC and RD, implying that the significant influence of ACC is stronger when AQ is high. These inferences are of essence to policy makers and companies in understanding the implication of ACC on RD and the relation to high-quality audits in improving the effectiveness of audit committees. It underlines the importance of audit committees in giving assurance about transparency and accountability in financial reporting.

Keywords Audit committee characteristics, Risk disclosure, Audit quality

JEL Classification M14, G32, O16

Introduction

Risk is an important element that is always present within the business environment. Meanwhile, the risk is utilized to measure the probability of situations that may pose a threat toward achieving business goals and objectives. The risk is employed to identify many uncertain situations regarding the impact that it will cause. On the other hand, it indicates the magnitude of the losses that are associated with situations threatening the business. All the complexities in the business environment give rise

to various risks that create increased uncertainty for the company. Anticipating risks which the company might face requires the expertise needed by companies to properly control the risk so that losses can be minimized, and as a result, no future losses take place. Indeed, RDs are an important component of risk management [15].

RD means such information, provided by the company in the annual reports, that describes the major risks deriving from the course of its operations and the economic consequences that are projected to have a significant impact on the current and future performance. It is a great input within investors' and analysts' decision-making processes. High-quality RDs can facilitate investors in investing according to their preference for risk, while analysts often support their stock recommendations by

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references to firm risk. This area has been attracting a lot of attention from regulatory bodies, investors, academics, and other stakeholders in recent years. But with increased interest, investors and regulators had raised concerns on RD of firms reporting practices; RD has also been criticized for being lengthy and overly general and generic [35].

The responsibility for RD within firms is shared among several key players, including senior management, the board of directors, risk management committee, internal audit, and external auditors. Each of these groups plays a role in ensuring that the company's risk management and disclosure processes are effective and in compliance with relevant regulations. The CEO and CFO are responsible for risk control within firms. This encompasses developing risk management policies and procedures, identifying and assessing risks, implementing risk control measures, monitoring and reporting on risk, and ensuring overall effective risk management [14].

According to Oghuma and Garuba [29], it is stated that a corporation may disclose some information, such as the risks it faces when conducting economic interests during a given accounting reporting period. A common definition of RD is information that provides insight into the risks that businesses confront and the possible ramifications for the firm's long-term financial and non-financial future. The flow of information regarding a company's attributes, strategies, plans, and other aspects that could alter expected outcomes is referred to as RDs. Moreover, the global financial crisis of 2007–2009 seems to have revealed how much managers are willing to take risks without considering how doing so may affect shareholders, which in turn raised serious concerns about RDs in the wake of the crisis. Besides, throughout their operations, businesses face a wide range of hazards. Stakeholders need the data to be distributed as well. The corporation is deemed to have disclosed risks if it informs readers of annual reports of any opportunities, prospects, risks, losses, threats, or exposures that will affect the firm both now and in future. Stakeholder decisions are influenced by RD. As it encourages more transparency in the organization's reporting of risks, RD is a potent corporate governance practice in and of itself. Increased company RD would help investors choose better investments for their portfolios.

An audit committee is a group of people formed by a board of commissioners to help the board of commissioners to do their duty of the oversight function of the performance of the board of directors and agents. A strong audit committee is expected to have the power of knowing the answers of the uncovered problems the knowledge sharing can cause and the improved internal control mechanism that will solve the audit committee

concern because of which RD can also be enhanced [19]. An association of an audit committee is beneficial in several of the functions they often perform in the organization such as internal audit, external audit, risk management, disclosure, and the financial reporting process. The Board of Directors established an auditing officer who will be a part of the committee, the auditing officer, to evaluate the financial status of the company, and the auditing officer becomes the information channel mechanism responsible for monitoring the communication among the stakeholders [2, 15].

The board committees are created by the board as subsets of the board to improve board functioning, and the audit committee is one of such subsets. In addition, the audit committee offers corporate control to management and makes sure that the relevant information is completely disclosed to the stakeholders. It helps in reducing the number of wrong financial reports, indirect improvement of financial report quality, and cutting down of earnings management. Moreover, the audit committee's inclusion of financial expertise is the factor that gives strength to the monitoring function [29]. The audit committee has the responsibility of overseeing financial reporting, internal audit risk, internal control systems, and any ramifications related to risk. A key aspect of the company, which necessarily implies an efficiently functioning management can be established, is the formation and operation of an audit committee. The audit committee is paramount for a company's procurement of profits and wealth for shareholders [27].

As discussed in prior literature, the value of RD is to satisfy the investors' demand for information regarding the company's risk profiling and market value. The relevance of RD increases especially during a crisis or adversity a firm may face, for evaluation of future performance as well as for the safeguard of its wealth. Prior studies have also pointed out various factors that could also drive RD. While ownership structure is not an aspect of the audit committee by nature, it certainly affects the audit committee's ability to carry out effective monitoring of financial reporting and internal controls. Ownership structure, alongside board composition and (AQ), has been noted as a factor that can explain a firm's extent of RD. Furthermore, although this is evidenced, the code of corporate governance recognizes the audit committee as part of the monitoring mechanism, and listed companies often experience less agency cost by disclosing information details. That said, there is still limited literature that explored the relationship between (ACC) in relation to (RD), and it was noted and supported in prior studies, that among other things, audit committee features (characteristics and composition) could influence the organization's RDs in recent years. Among other features of the

audit committee, one major issue or role an audit committee would look to achieve is that the audited annual report that is presented for the organization complies with the regulations of the regulators, while providing appropriate and useful information to the market [1, 4, 19].

RD is critical for a firm's future survival; it often refers to information that gives clarity into the risks that the firm faces and the potential implications on the firm's overall financial and non-financial outlook. Having an effective audit committee can help the firm detect potential risks more efficiently. The audit committee informs investors about the risks that firms may encounter, and it also provides the basis for decision-making. It is also critical to accurately disclose all material RD information regarding the firm's business activities within a certain accounting reporting period. The performance of the audit committee based on previous research findings indicates that audit committees in firms are still not executing their responsibilities adequately. The audit committee is the key to the planning and monitoring of RD efforts toward the achievement of a firm's goals. The main objective of this research is to identify the relationship between the ACC in improving the RD and AQ as a moderating variable in one of the developing countries, which is Egypt.

The agency theory approach is used in this study in analyzing audit committee characteristics, risk disclosure, and the audit quality moderating function. According to Jensen and Meckelson (1976), knowledge asymmetry between the principals and agents creates agency costs, which effective monitoring can reduce. The audit committee monitors the disclosure of risks to avoid asymmetry in knowledge, while high-quality external auditors verify such disclosure. Indeed, [14] opine that better audit committee attributes ranging from size, independence of the members, experience, and the frequency at which meetings are held will obviously increase the effectiveness in monitoring and risk disclosure practices.

Resource dependence theory explains how audit committees support organizational performance by giving resources. According to Weber and Mubig [35], the skills, experience, and contact with the outside environment that members of the audit committee contribute develop and disclose risk factors in the company.

From an agency theory perspective, the high quality of auditors strengthens the monitoring function of audit committees, and from a resource dependence view, they bring more expertise and resources to bear. This could moderate their effect. Jibril et al. [19] indicate that audit committee features may interact and influence risk disclosure more strongly with high-quality external auditors, impelled by duality of the theoretical underpinning.

A number of studies have evaluated audit committee characteristics and means of corporate disclosure. The size, independence, financial knowledge, and meeting frequencies determine the efficiency of audit committees as methods of monitoring. Hasibuan and Auliya [15] demonstrate that effective audit committees strengthen financial reporting and risk management control, which, in turn, influence the level and quality of company disclosure. In such emerging economies characterized by high information asymmetry and agency challenges, audit committees are particularly significant.

Furthermore, resource dependence theory complements the theoretical framework for explaining how audit committees add to organizational effectiveness because of the role they play in providing resources. According to Weber and Mubig [35], the theory avers that the members within audit committees provide important resources by way of expertise, experience, and external connections required in rendering an organization capable of managing and disclosing risks in an effective manner. The underlying rationale may be viewed as a moderating effect of audit quality, conceived from both theoretical lenses: from an agency theory perspective, high-quality auditors serve to enhance the monitoring capability of audit committees, while from a resource dependence perspective, auditors provide additional expertise and resources that complement the audit committee's capabilities. This is supported by a dual theoretical foundation that explains why the effectiveness of audit committee characteristics with respect to risk disclosure would be comparatively high, as proposed by Jibril et al. [19], when combined with high-quality external auditors.

Recent literature shows that risk disclosure lessens the danger of asymmetric information and, as a result, boosts market efficiency. In the words of Oghuma and Garuba [29], the importance of risk disclosure in light of its quality is that such risk disclosures help stakeholders make better decisions about investing based on material relevant information related to the firm's risk profile. While some firms expose detailed, clear material risk disclosures, other firms only release simplified, boilerplate disclosures. This variability has made scholars conduct research in the quality of risk disclosures where corporate governance processes are the central factor.

Nevertheless, the literature still reflects a number of vital gaps. Although multiple studies have focused either on audit committee characteristics and risk disclosure, very limited studies have been conducted with regard to their interaction, especially in emerging economies like Egypt. Particularly, there is a lack of studies that consider the moderating role of audit quality in such relationships. According to [14], audit quality may impact corporate governance mechanisms

substantially, though its impact on audit committee characteristics and risk disclosure is scant. Thirdly, most research have targeted developed markets, with very little data emanating from emerging nations with peculiar institutional and regulatory environments.

In the Egyptian context, much attention has been accorded to the practices of risk disclosure, especially after the country's reforms concerning economic and market liberalization policies. Although it received enormous developments in regard to corporate governance mechanisms on the Egyptian Exchange, the disclosure of risks is still important for investors and regulators. FRA in Egypt has been vocal on and demonstrated the need for good practices development concerning risk disclosure, first amidst the global financial crisis and later the regional economic challenges of 2013. Despite such prompting from regulators, Egyptian listed companies have often been criticized for making generic and boilerplate risk disclosures that do not provide much relevant insight into the company-specific risks and potential impacts thereof [2].

Excluding the above, one of the most important corporate governance developments relevant to the Egyptian business environment has been the shaping of the regulatory framework related to audit committees. The Egyptian Code of Corporate Governance—issued for the first time in 2006 and updated on a wide scale first in 2016 and then in 2020—includes requirements for an audit committee applicable to listed companies. In this respect, Article 7 of the Egyptian Corporate Governance Code gives that an audit committee shall be composed of at least three non-executive members of the board, one of whom at least shall be in possession of financial and accounting experience and also independent. The code also made a demand for the holding of meetings, at the least quarterly, with full minutes being sent to the board of directors [19].

Further regulatory developments came through Decision No. 107 of 2016 of the Egyptian Financial Regulatory Authority, which had the effect of further entrenching audit committee roles in risk oversight. Accordingly, the decision requires audit committees to review and assess the company's systems for risk management and its internal control procedures at least annually. Moreover, with the inclusion of Law No. 17 of 2018, Capital Market Law No. 95 of 1992 imposed additional responsibilities on audit committees for oversight in both financial and non-financial risk disclosures. This regulatory change portrays how Egypt stands committed to the improvement of corporate transparency and its risk management practices [37].

The most recent regulatory enhancement came through FRA's Board of Directors Decision No. 133 of 2021,

which introduced additional requirements in the field of risk disclosure in annual reports. The new requirements call for listed companies to include extensive disclosures on the methodologies adopted to assess their risks, risk appetite frameworks, and specific mitigation strategies for the identified risks. The regulation also mandates that the insurance company disclose information on emerging risks, considering both presently relevant risks and future risks related to technological disruption, environmental concerns, and cybersecurity threats, among others [38].

The Egyptian economy gives a combination of challenges and opportunities that demand a close look at risk disclosure and the effectiveness of an audit committee. The turbulence of the EGX 30 index has reached a high level, showing a strong need for good practices in risk disclosure as a means of investor protection. However, just 45% of Egyptian listed companies make extensive risk disclosures, which means that international investors—who have increased their investments by 78% in recent years—remain largely in the dark about potential risks. Matters are made worse by the fact that weaknesses regarding audit committee practices have been reported, with many committees not even meeting the minimum requirements in terms of meetings held or lacking the financial experience required. This gives great causes for concern in the wake of economic challenges facing Egypt, such as currency devaluation and high inflation, which desperately need to be met with strong oversight and transparency.

Moreover, this is exacerbated by the strategic position of Egypt as the Arab world's third-largest economy and its ambitious Economic Vision 2030 program that aims to attract significant foreign investment. The existing levels of regulatory compliance and quality of disclosures are also a critical research problem that, when responded to, would help in the way of gaining market confidence and realizing the economic development goals set by the Egyptian economy. This cannot be attained without strong effort being exerted in regard to the two issues: the quality of disclosure of risks and the effectiveness of audit committees in ensuring the same practice [19, 39].

Such investigation into the characteristics of audit committee vis-à-vis risk disclosure, against the background of the Egyptian market, represents an exciting platform for various reasons: First, being an emerging market, implementing and enforcing corporate governance mechanisms in Egypt have to be particularly distinctive. Second, and equally importantly, the country's regulatory environment continues to evolve to include greater emphasis on the aspects of transparency and accountability in corporate reporting. Third, the coexistence of state-owned and private enterprises is a diversified corporate landscape in which the effectiveness of

audit committees can be highly variable. Thus, the understanding of such relationships is seen as crucial for policymakers and practitioners who, by the enforcement of regulations and compliance in the Egyptian market, may help to improve the quality of risk disclosure.

Literature review and development of hypotheses

ACC and RD

This audit committee has an essential oversight role in ensuring qualitative financial reporting and reducing the incidence of fraud in financial statements and making more voluntary disclosures in public enterprises. The larger the audit committee, the stronger the power it will have, and the better access to information exchange where issues can be identified and internal control mechanisms put in place, strengthening the effectiveness of the audit committee in monitoring corporate RD. This also applies to the audit committee: Even though it consists exclusively of independent directors and thus would, in principle, be best suited to perform tasks of independent monitoring, it cannot be made sure that through the independence of the audit committee there will be effective oversight and monitoring of the financial reporting process. The main tasks of the audit committee consisted of observing financial reporting, internal audit risk, and internal control systems and the influence of risks upon business finances. Also, it suggests that companies whose audit committees are independent should disclose ethics information on a voluntary basis as early as possible. What's more, it indicates that the RD is positively influenced by the Audit Committee Independence (ACI). The audit committee particularly reassures the stakeholders that full disclosure of material information has occurred and provides the management with further corporate governance. It is thus expected that the ACI is considerably positive toward quality RD, as supported by Nekhili et al. [26] and Gull et al. [13].

Hasibuan and Auliya [15] indicate a negative correlation between the size of the audit committee and the extent of RD. They argue that the mere number of committee members does not influence the quantity of RDs. This observation is further supported by empirical data showing that audit committees often fail to fulfill their oversight roles effectively. Specifically, audit committees typically engage in routine activities such as report evaluations and auditor selections, without critically assessing potential company risks. The frequency of Audit Committee Meetings (ACM) plays a crucial role in enhancing communication and facilitating the disclosure of risks. Regular meetings are associated with improved effectiveness in risk management and a higher level of RD. Meetings allow for better coordination and information sharing among committee members, which in turn

promotes thorough risk reporting and enhances the overall RD process [1, 29].

Zulfikar et al. [36] contend that an audit committee can function as an effective oversight mechanism, reducing agency costs and enhancing accountability. The impact of ASIZE on information disclosure is a common subject of academic debate. Agustin et al. [1] suggest that a larger audit committee enhances monitoring capabilities and improves information quality. Conversely, Salem et al. [30] and Alshirah et al. [6] find a positive relationship between ASIZE and corporate RD, noting that larger committees improve AQ and organizational effectiveness. Barako et al. [8] support this view, highlighting the benefits of a larger committee in reducing agency costs and improving transparency. However, Ibrahim & Hussainey 2019 report a negligible correlation between ASIZE and RD in Saudi-listed banks.

While these findings indicate that there is an association between ASIZE and the disclosure of risks, Hasibuan and Auliya [15], Alshabibi and Hussainey (2021), and Kyari et al. [22] have come to a contrary view showing that there is no significant relationship between ASIZE and RD. They postulate that increasing committee membership size does not necessarily imply more effective RD, and audit committees often fail in performing their role. [9] opine that it is not the mere presence of an audit committee which guarantees effective monitoring of the financial reporting process but the technical ability and substantial accounting expertise which enables the audit committee to adequately oversee the financial reporting by management. [33] states that studies have empirically viewed the accounting and financial attributes among the audit committee members have positive consequential impact on the quality of financial reporting which supports agency and resource dependence theories. An effective audit committee is associated with improved corporate RD. Research indicates that committees with a combination of accounting and industry expertise perform better than those with only accounting experts. Changes in audit committee membership and experience positively affect RD, and committees with substantial financial knowledge are less likely to engage in fraudulent practices [6].

The role of the audit committee in enhancing financial transparency and alleviating RD concerns has remained a matter of significant academic investigation. Research by Hasibuan and Auliya [15], Nekhili et al. [26], and Gull et al. [13] continuously finds that there is a positive relationship between the size and ACI, particularly dominated by independent directors in the effectiveness of monitoring RD. These results thereby indicate the critical role of audit committees in maintaining the integrity of financial reporting and information disclosure, a precept

supported by [13, 28]. On the other hand, the empirical evidence about the consequences of ACI for disclosure practices is less clear-cut considering the conflicting findings that might emerge from different studies.

The available literature also indicates that, from a general perspective, independent audit committees manage risks and help ascertain the validity of financial disclosures. For instance, studies by Kiflee and Khan [21] and Sharif and Islam [31] reveal that the independent audit committee is generally more effective in risk management and more reactive in terms of verifying the accuracy of the financial disclosure associated with the business. For example, the study by Alshabibi et al. [5] shows that a positive relationship exists between ACI and disclosure of risks. From their findings, greater independence showed lesser information asymmetry. On the other hand, Kyari et al. [22] find a minimal correlation between ACI and RD. Regular meetings of the audit committee are essential for effective oversight and transparency. Frequent meetings enhance communication, improve RD, and reduce fraud. Studies by Hasibuan and Auliya [15], Agustin et al. [1], and Alkurdi et al. (2019) show that regular meetings positively impact the effectiveness of the audit committee and the extent of RDs. Mohammad et al. [25] and Melliniawati and Prasetyo [24] further corroborate these findings, demonstrating that frequent meetings increase audit committee activity and disclosure quality, thus reducing agency problems and information asymmetry.

For the purpose of this study, the characteristics of the audit committee are selected on the basis of their underlying fundamental importance to corporate governance and their perceived relationship with RD. An audit committee is considered a vital monitoring mechanism that bridges the gap between management and external stakeholders, especially in terms of financial reporting and risk management aspects. This decision is also in line with the resource dependence theory. This theory states that composition and capability of an audit committee are decisive factors influencing the ability of a firm to manage and disclose risks in an efficient manner. ACC thus has important implications for research studying how specific attributes of the audit committee, such as independence, size, and meeting frequency, improve quality and the level of RD.

In addition, the ambiguity of existing studies in investigating the relationship between ACC and RD demands more research. For example, while Nekhili et al. [26] and Gull et al. [13] report positive associations between selected ACC (independence) and RD, studies conducted by Hasibuan and Auliya [15] and Kyari et al. [22] present conflicting or negligible correlations. These contradictory results would, therefore, indicate that the real

relationship between the two variables of ACC and RD can be more complicated than what initially was perceived, by influencing either contextual factors or methodological approaches.

The regulatory framework related to audit committee requirements in Egypt has direct prescriptions reflecting the business and governance demands of the nation. For instance, the FRA directives instruct that the audit committee needs to consist of a minimum of three non-executive board members, while Egyptian Companies Law No. 159/1981 as amended in 2018 requires similarly. Each committee should also include at least one independent person to chair the committee and at least one member who has extensive experience in finance and accounts. Further, this structure contrasts sharply with that of other countries within the MENA region—for example, the UAE and Saudi Arabia—due to the difference in the requirements for independence and membership numbers.

Other unique features of audit committees in Egypt are related to the dual governance nature of these committees. In this regard, the committees are responsible to the FRA on matters relating to compliance and to the Board of Directors on operational issues. This is further supported at the level of particular operational requirements, including quarterly meetings, direct reporting lines to the board, and full scope risk management responsibilities. The Egyptian framework requires audit committees to establish subcommittees regarding risk management and have quarterly reviews of methodologies regarding risk assessment, among other requirements. They are also supposed to have direct communication channels with external auditors and regulators.

Recently, the Egyptian audit committees have been further differentiated by the introduction of mandatory cybersecurity oversight, ESG risk assessment requirements, and increased disclosure obligations concerning related party transactions, supported by FRA's Decision No. 107/2016, updated in 2021. However, the Egyptian context provides a unique set of challenges to imposing these demands: a restricted population of qualified independent directors, cultural factors impacting committee independence, and resource constraints for smaller listed companies. The Egyptian audit committee structure is unique, with its characteristics and challenges making it an important subject to understand governance mechanisms in emergent markets.

This study examines the correlation between audit committee characteristics and risk disclosure, thereby contributing to the growing academic discourse on this matter. As a result, this research has the potential to provide a wealth of detailed information on the specific aspects of audit committees that affect the nature

and extent of disclosures. This is in accordance with the recommendations of previous research to adopt a more comprehensive perspective on the impact of corporate governance mechanisms on disclosure behaviors [5, 6]. Based on the preceding discussion, the first hypothesis can be formulated as follows:

H1 ACC has a significant impact on RD.

The moderating role of AQ on the relationship between ACC in improving RD

Literature provides precedent for audit quality as a moderating variable in the relationship between ACC and RD. According to agency theory, the role of external auditors is seen as a complement to audit committee oversight. Quality auditors, especially Big 4 auditors, are perceived to possess richer resources, better skills, and superior methodologies that complement audit committee supervisions. Audit committees are able to disclose risk when high-quality auditors work together. Big 4 auditors have a considerable knowledge base and established risk assessment techniques that may be of benefit to audit committee members in the identification and assessment of risks requiring disclosure, especially for those audit committee members possessing financial competence.

Therefore, audit quality was more appropriately considered as a moderator against other factors due to its uniqueness in the role of corporate governance. Whereas ownership structure and some characteristics of the board may relate to the nature of risk disclosure, audit quality influences how audit committees' function and monitor. Weber and Mubig [35] stated that high-quality auditors provide an audit committee with confidence in addition to experience and expertise. According to [19], Big 4 auditors in emerging countries, like Egypt, have a profound impact on governance procedures and corporate disclosures. The audit quality itself is an exogenous variable outside of an organization's control and may enhance or weaken the influence that audit committee attributes have on risk disclosure processes. Hence, audit quality would be a suitable moderating variable in the relationship between audit committee characteristics and risk disclosure processes.

Empirical evidence supports the fact that audit committee efficiency depends largely on the quality of the external auditor, thus supporting audit quality as a moderator. El-Deeb et al. [12] established that the characteristics of audit committees have a better bearing on disclosure quality in instances where Big 4 firms audit corporations. The explanation behind this is because high-quality auditors have the resources and experience necessary for the audit committee to identify, analyze,

and disclose risks efficiently. The greater reputational and liability exposures of Big 4 auditors improve incentives to disclose all risks. Improved monitoring by audit committees also enhances the receptivity of such disclosures.

The concept of AQ and its measurement have been subjects of extensive research in accounting literature. Scholars have employed various proxies to assess AQ, with a particular focus on the differences between Big 4 and non-Big 4 audit firms [32].

One of the most widely used proxies for AQ is dummy variable. The literature also supports that the choice of a dummy variable based on Big 4 audit firms is a proxy for audit quality, anchored essentially in the seminal work of DeAngelo [40] that larger audit firms have greater incentives to conduct high-quality audits since they have more at risk owing to their substantial reputational capital and greater losses if audits fail. The findings that Big 4 auditors are associated with higher audit quality have been consistently documented in subsequent studies. For example, Francis and Yu [41] document that Big 4 auditors issue more going-concern opinions and that their clients have lower abnormal accruals, reflecting higher audit quality. Confirming the above findings, Eshleman and Guo [42] report that Big 4 audits are of higher quality than others, even after controlling for client characteristics. Another reason using a Big 4 dummy variable is practical is that, according to DeFond and Zhang [43], it provides an indicator which is relatively simple and unambiguous, and less vulnerable to measurement error compared to more complex constructs. Lawrence et al. [44] further suggests that at least some of the Big 4 quality effect may relate to client characteristics, which of course supports the notion that companies themselves select Big 4 auditors for the purpose of seeking better quality audits. Against this strong evidence, the use of a Big 4 dummy variable as a proxy for audit quality in our study will, therefore, be consistent with prior research and hence reliable when testing the relationship that exists between audit quality and risk disclosure.

However, the relationship between audit ASIZE and AQ is not unequivocal. Herusetya [16] posits that the rotation of audit partners alone may be insufficient to maintain independence and AQ, particularly in non-Big 4 firms. This finding suggests that audit firm rotation might be necessary to enhance AQ in these cases. Moreover, it highlights that non-Big 4 audit firms can significantly improve AQ, indicating that both Big 4 and non-Big 4 auditors employ different strategies to enhance their AQ.

The impact of AQ on RD has been a subject of debate in the literature. El-Deeb et al. [12] argue that Big 4 firms are perceived to provide higher quality audits and, to mitigate reputational risks, they demand greater RD from their clients. This perspective suggests that the presence

of a Big 4 auditor should lead to increased compliance with RD requirements. Some studies have found evidence supporting this view, particularly in the banking sector, where Big 4 auditors have been associated with more effective monitoring and transparent financial risk reporting.

However, the relationship between AQ and RD is not straightforward. Vandemaele et al. [34] present a nuanced perspective, suggesting that high-quality auditors might have a dual effect on RD. On one hand, the presence of a reputable auditor may enhance investors' trust in the company's financial statements, potentially reducing the perceived importance of RD. On the other hand, high-quality auditors might emphasize the significance of RD, leading to more comprehensive risk reporting. Interestingly, their study did not find a significant link between AQ and the extent of voluntary disclosure.

A similar stance was also held by the findings of Deumes [11], who, in turn, reported no link between AQ and internal controls report issuance. The diverging results once again point at a complex and perhaps contextual nature of an association that may well exist between the quality of the audit and disclosure about risks. The fact that an audit committee is involved in the appointment and assessment of auditors complicates the above-mentioned relationship. Consistent with this, the study of Kao et al. [20], conducted on a sample of US-listed companies, shows that an audit committee with a higher financial expert proportion was strongly associated with a reduction in earnings management. This indicates that the financial expertise in audit committees can conduct demands for higher AQ and hence affect auditor selection and eventually the quality of financial reporting.

Extending this linkage, [23] assumes that audit committee financial accounting experts play the role of moderators in enhancing AQ. Such a view would mean that increased external monitoring through increased financial accounting experts in audit committees may imply a positive effect on both frequency and ACI. Also, audit committees that meet more frequently are likely to be more aware of current auditing challenges and more diligent in performing their tasks. The frequency of ACM has been found to correlate positively with AQ. More frequent meetings are associated with higher engagement and activity levels among audit committee members, which can lead to improved financial reporting. Additionally, audit committees that meet more often are more likely to select high-quality, industry-specialized audit firms, particularly from the Big 4, which can provide superior AQ, especially in terms of constraining earnings management [23].

Some findings from several studies provided evidence regarding the relationship between RD and AQ.

El-Deeb et al. [12], Vandemaele et al. [34], Deumes and Knechel [11] state that, in general, higher disclosure of risk for the Big Four, investors think it is not important. However, a high-quality auditor may emphasize the importance of the disclosure of risk, thus there would be fuller disclosure of risks. This results in the ambiguous relationship between RD and AQ. On the other hand, ACC are associated with AQ. Kao et al. [20], and Mardessi [23], choosing a high-quality auditor will improve the audit's quality. In addition, the quality of an audit is crucial because it assures stakeholders of the accuracy and reliability of a company's financial statements. A low-quality audit can harm the company's reputation and damage stakeholder confidence. Selecting a high-quality auditor and maintaining an effective audit committee are essential to ensure the quality of the audit. The audit committee is responsible for overseeing the audit process, including selecting the auditor, setting the scope of the audit, and reviewing the audit results. An audit committee with members possessing relevant expertise and experience can provide valuable oversight and guidance to the auditor, leading to a higher quality audit. Therefore, audit committees relate to high-quality audits. Audit committees have also been demonstrated to require improved AQ. Strong AC meetings indicate AQ monitoring in association with a high probability of selecting one of the Big 4 auditors, resulting in greater AQ.

In fact, recent studies have been able to establish that information asymmetry decreases while market efficiency increases through risk disclosure. Oghuma and Garuba [29] explain that risk disclosure offers appropriate information to stakeholders in investment decision-making with respect to the risk profile of the company. While some firms detail explicit disclosures regarding their factors of risk, other firms provide only basic boilerplate disclosures. Such heterogeneity has led scholars to study the quality of risk disclosure, with key corporate governance processes at the center of such studies.

Nevertheless, the literature reveals a number of critical gaps. First, audit committee characteristics and risk disclosure were considered separately, while the interrelation between them was not assessed yet, at least for the context of the emerging markets of Egypt. Second, the role of audit quality as a moderating factor in the above relationship is understudied. According to Haj-Salem and Hussainey [14], audit quality can have a significant impact on corporate governance mechanisms; however, its impact on audit committee characteristics and risk disclosure has to be further researched. Third, most studies have focused on developed markets; therefore, there is a lack of data from emerging countries that have different institutional and regulatory environments.

Audit quality can moderate the ACC–RD relationship in several ways. Greater knowledge and resources of superior auditors may enhance the effectiveness of an audit committee in several ways. According to Weber and Mubig [35], quality auditors have the ability to improve both the risk assessment, the internal control, and the risk disclosure. A high-quality auditor could also facilitate the monitoring role of the audit committee, especially if its committee members are financially competent. Thereby, this may reinforce the relationship between audit quality and audit committee characteristics to develop the committee's risk disclosure impact.

The relevance of this interaction of variables is even more striking in the Egyptian context, where recent regulatory reforms placed an accent on audit committee performance and the quality of risk disclosure. According to Jibril et al. [19], Egyptian companies face specific challenges related to adequate corporate governance procedures; therefore, there is a need to demonstrate how audit quality can moderate the characteristics of the audit committee and risk disclosure practices. This would provide significant assistance to policymakers and practitioners in devising adequate systems of governance and transparency. Based on these studies, the following hypothesis has been formulated:

H2 The moderating role of AQ has a positive significant impact on relation between ACC and RD.

Research variables and models

Research variables and model

This study investigates the ACC on RD, taking AQ as the moderating variable. The selection of variables is based on prior literature that suits the research objectives. The dependent variable is RD proxied by using a disclosure index approach according to Ibrahim and Hussainey (2019), and Ismail and Eldeeb [18]. This approach was selected since it is more comprehensive and considered relatively new in the Egyptian context. Our research applies an integrated risk disclosure index comprising 24 items across five categories of risk, namely strategic (10 items), operational (7 items), financial (5 items), damage (2 items), and risk management (2 items). The index is so structured because it represents major risk factors in Egyptian business. Annual reports are carefully studied and scored yes/no for a total score out of 24 points. In order to ensure the reliability of the measures, a pilot test in which two independent coders studied reports of 10 Egyptian listed enterprises by means of a full coding manual was carried out. Being an extensive coverage index of Egyptian mandatory regulations—particularly on financial and operational risks—and voluntary disclosures,

this index is particularly appropriate for such a study on risk disclosure practices in the Egyptian market, such as strategic and damage risks. The independent variables are characteristics of Audit Committee Size (ASIZE), Audit Committee Independence (ACI), Audit Committee Meetings (ACM), and Audit Committee Financial Expertise (ACE). These measures were derived from prior studies of Nekhili et al. [26] and Gull et al., [13].

AQ represents the moderating variable measured for whether a company was audited by a Big 4 firm, using a dummy variable based on Sharpe et al. [32] and El-Deeb et al. [12]. In addition to the above main variables, our analysis also considers several control variables based on prior literature related to both RD and audit committee studies. These include firm size (FSIZE), profitability (ROA), leverage (LEV), and firm age (AGE). A selection of these variables is based on prior literature. ACC and AQ have been found to separately impact RD due to the monitoring and signaling effects based on agency theory. Their combined and interaction effect on RD needs to be tested, especially in the Egyptian context, where such studies are limited. These control variables theoretically support numerous studies into corporate transparency and governance.

The control variables are larger corporations, as they are under more public scrutiny than their smaller counterparts and have more resources to develop and institute sophisticated risk management and disclosure procedures. Dang et al. [10] find that larger enterprises, with higher political costs and information needs by diverse stakeholders, consequently result in better risks disclosed more comprehensively. Firm size also determines the complexity and risk of operations, hence disclosure standards. The other important control variable is leverage (LEV) which impacts risk disclosure, as highly leveraged enterprises are monitored by creditors in addition to incurring increased financial risks. Ibhagui and Olokoyo [17], for instance, found that enterprises with higher leverage ratios make more extensive risk disclosures that reduce creditor knowledge asymmetry and thereby lower debt costs. In Egypt, debt financing plays a critical role in corporate funding systems, and creditors require substantial risk information accordingly. In prior studies on risk disclosure and corporate governance, both control variables were considered, hence justifying their inclusion within the paradigm of our study (Table 1).

Sample and data collection

Our sample comprises 54 non-financial firms listed on the Egyptian Exchange Market (EGX100) for the years from 2018 to 2021, yielding total firm-year observations of 216. There were several compelling reasons for the selection of this study period, 2018–2021. It was in this

Table 1 Variables and measurements

Variable Type	Variable	Type of Measure	Measurement	References
Dependent	Risk Disclosure (RD)	Index	Index	Haj-Salem, and Hussainey, [14] and Ismail and Eldeeb [18]
Independent	Audit Committee Size (ASIZE)	Numeric	Number of audit committee members	Nekhili et al. [26] and Gull et al. [13]
	Audit Committee Financial Expertise (ACE)	Numeric	Number of directors with financial experience/qualification in the audit committee	Nekhili et al. [26] and Gull et al. [13]
	Audit Committee Independence (ACI)	Numeric	Number of non-executive directors in the audit committee	Nekhili et al. [26] and Gull et al. [13]
	Audit Committee Meetings (ACM)	Numeric	Number of meetings held by the audit committee in a year	Nekhili et al. [26] and Gull et al. [13]
Moderating Variable	Audit Quality (AQ)	...	Dummy Variable: 1 if auditor is Big 4, 0 if not	Sharpe et al. [32] and El Deeb et al. [12]
Control Variables	Firm Size (FSIZE)	Numeric	FSIZE = Log of total assets	Dang et al. [10]
	Firm Leverage (LEV)	Financial ratio	LEV = Total debts / Total assets	Ibhagui and Olokoyo [17]

period that Egypt’s new Corporate Governance Code and the implementation of the Financial Regulatory Authority’s Decision No. 107/2016 significantly enhanced audit committee strength and risk disclosure. The beginning of 2018 was because Law No. 17/2018 had markedly amended the Capital Market Law and brought into its fold corporate governance and transparency imperatives. As 2021 is the latest year for which complete data could be obtained, this study assesses FRA’s risk disclosure and audit committee requirements issued at the end of 2020. The period also encompasses two major currency devaluations and significant regulatory reforms in Egypt; it therefore offers a colorful backdrop against which to investigate the underlying risk disclosure behavior under varying economic regimes. Non-financial companies were selected because the nature and regulatory environment of the financial sector vary regarding RD practices. The period is relevant because current practice about RD and audit committee effectiveness can be considered. Data on RD and ACC were hand-collected from annual reports and corporate governance statements. The financial data for control variables was collected from the Egypt for Information Dissemination—EGID database and checked against annual reports for accuracy.

Model specification

For testing hypotheses, the following regression models are formulated. For the 1st hypothesis:

H1 There is a significant impact of ACC on RD.

The following model has been formulated:

Model (1): The relationship between ACC and RD.

$$RD_{it} = \alpha + \beta ASIZE_{it} + \beta ACE_{it} + \beta ACI_{it} + \beta ACM_{it} + \beta FSIZE_{it} + \beta LEV_{it} + \epsilon_i$$

For the 2nd hypothesis:

H2 AQ moderates the relationship between ACC and RD.

The following model has been formulated:

Model (2): The moderation effect of AQ on the relationship between ACC and RD

$$RD_{it} = \alpha + \beta ASIZE_{it} * \beta AQ + \beta ACE_{it} * \beta AQ + \beta ACI_{it} * \beta AQ + \beta ACM_{it} * \beta AQ + \beta FSIZE_{it} * \beta AQ + \beta LEV_{it} * \beta AQ + \epsilon_i$$

Figure 1 presents the model in an intuitively clear manner that summarizes the main thrust of this research. It illustrates how AQ acts as a moderator in the relationship between ACC and RD. This diagram is aimed at making clear exactly how these three critical variables interact with each other in a straightforward yet holistic way of viewing the theoretical framework of our study. The framework in Fig. 1 demonstrates the direct relationships between the independent variables (audit committee characteristics) and the dependent variable (risk disclosure), while also showing how audit quality moderates these relationships. Control variables (firm size and leverage) are included to account for firm-specific characteristics that might influence risk disclosure practices.

Table 2 represents the main index that measures the RD.

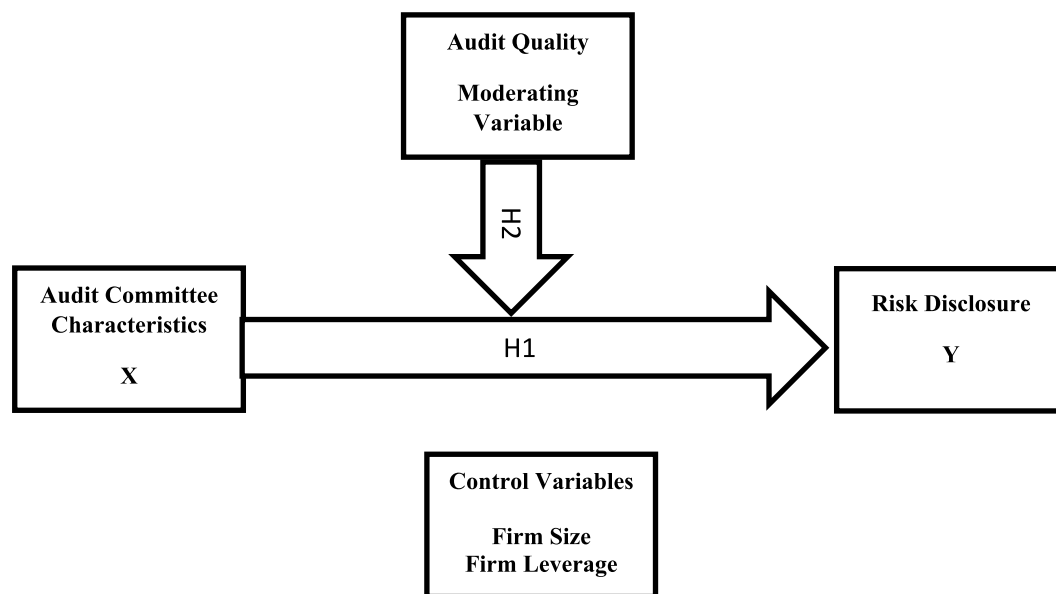


Fig. 1 Research model: AQ moderating the impact of ACC on RD

Research methodology

Sample selection

The primary objective of this study is to investigate the relationship between ACC and RD, with AQ serving as a moderating variable. To address this research question, we employ panel data analysis, a method widely used in similar studies due to its ability to model the interconnectedness of multiple variables simultaneously (e.g., [13, 26]).

Our initial sample comprised 100 firms listed on the Egyptian Exchange (EGX). Using purposive sampling, we focused on non-financial companies to ensure homogeneity in regulatory environments and RD practices. The selection criteria were as follows:

1. The company was listed on the EGX during the period from 2018 to 2021.
2. Annual reports and financial statements were publicly available for the study period.
3. The company had comprehensive data on RD and ACC (Table 3).

After considering the availability of information described above as the selection criteria and excluding firms with incomplete data, our sample contained 54 non-financial companies, yielding a total of 216 firm-year observations. Data were collected from secondary sources, such as annual reports of companies, Egyptian Exchange, Egypt for Information Dissemination (EGID), and databases like <https://www.mubasher.info/>

[countries/eg](#). Original data available on RD and audit committee data were all hand-collected directly from annual reports and statements of corporate governance, although financial data were obtained through EGID and then cross-checked against hard copies of annual reports for accuracy. For this hypothesis testing, the research employs descriptive analysis statistics, Pearson Correlation analysis, panel data analysis-fixed effect method, random effect method, and the Hausman test for selecting between fixed or random methods.

Analysis and results

Descriptive analysis

The descriptive statistics presented in Table 4 offer valuable insights into the characteristics of the sample and the variables under investigation.

RD: The mean RD score of 0.8133903, equivalent to 81.34%, reflects a relatively high level of RD among the sampled companies. This result aligns with the increasing emphasis on transparency and comprehensive risk reporting in contemporary corporate governance. However, the standard deviation of 0.1223384 indicates variability in disclosure practices among firms. This variability may be attributed to factors such as company size, industry differences, or variations in governance structures, as highlighted by previous research (Ibrahim & Hussainey, 2019; Dey et al., 2018).

ACC:

Table 2 Risk disclosure index. *Source:* Ismail and Eldeeb [18]

Category/Item of disclosure	
Category 1	Strategic risk disclosure
1	Market competition
2	Market areas
3	Technological development
4	Regulatory changes
5	Economical changes
6	Mergers and acquisitions
7	Launch of new products
8	Business portfolio
9	Management of strategic risk
10	Research and development
Category 2	Operational risk disclosure
1	Patents and other industrial property rights
2	Information technology risks
3	Reputation and brand name development
4	Environmental
5	Health and Safety
6	Project deliveries
7	Quality controls
Category 3	Financial risk disclosure
1	Interest rate
2	Exchange rate
3	Liquidity
4	Credit
5	Commodity
Category 4	Damage risk disclosure
1	Insurances
2	Significant legal actions
Category 5	Risk management disclosure
1	Risk management policy
2	Risk management organization

Table 3 Sample selection process

Selection step	Number of Companies	Observations
Initial sample (EGX100 companies)	100	400
Less: Financial institutions and banks	(21)	(84)
Less: Companies with missing data	(25)	(100)
Final sample	54	216

(1) The initial sample consists of companies listed on the Egyptian Exchange (EGX100) for the period 2018–2021. (2) Financial institutions and banks were excluded due to their distinct regulatory environment and RD practices. (3) Companies with missing data for any of the study variables during the sample period were removed. (4) The final sample consists of 54 non-financial companies, resulting in 216 firm-year observations over the four-year period

- *ASIZE* The mean size of 0.3134259, with a standard deviation of 1.21446, reveals considerable variation in the sizes of audit committees within the sample. This finding is consistent with studies by Nekhili et al. [26] and Gull et al. [13], who suggest that the size of the audit committee can significantly influence its effectiveness in overseeing RD.
- *ACE* With a mean of 0.5324074, approximately 53% of audit committees in the sample possess financial expertise. This is crucial, as Cohen et al. [9] emphasize the importance of accounting knowledge for effective oversight of financial reporting.
- *ACI* The mean of 2.912037 indicates that, on average, audit committees have about three independent members. This aligns with best practices in corporate governance and supports the findings of Alshabibi et al. [5], who identified a positive relationship between ACI and RD.
- *ACM* The average of 5.115741 meetings per year, coupled with a high standard deviation of 3.984917, points to significant variability in meeting frequency among firms. This variation may affect the effectiveness of audit committees, as suggested by Agustin et al. (2019) and Oghuma and Garuba [29], who found that more frequent meetings are associated with enhanced risk management and disclosure practices.

AQ: The mean AQ score of 0.3194444 indicates that approximately 32% of the sample firms are audited by Big 4 auditors. This proportion is noteworthy, as ElDeeb et al. (2024) suggest that Big 4 auditors are linked to higher AQ and may influence RD practices.

Control Variables:

- *ASIZE:* The mean of 9.360776 (log value), with a relatively low standard deviation of 0.8284453, suggests that the sample comprises firms of similar sizes, which helps control for size-related effects on RD.
- *LEV:* The mean leverage ratio of 0.5630153 indicates that, on average, the firms in the sample maintain moderate levels of debt. Leverage is an important factor to consider as it can impact both risk levels and disclosure practices.

These descriptive statistics establish a foundation for understanding the characteristics of the sample and the variables under study. They underscore the variability in

Table 4 Descriptive analysis

Variable	Obs	Mean	Std. Dev	Min	Max
Risk Disclosure	216	0.8133903	0.1223384	0.3846154	1
Audit Committee Size	216	0.3134259	1.21446	0	7
Audit Committee Financial Expertise	216	0.5324074	0.5001077	0	1
Audit Committee Independence	216	2.912037	1.292786	0	7
Audit Committee Meetings	216	5.115741	3.984917	0	23
Audit Quality	216	0.3194444	0.4673445	0	1
Firm Size	216	9.360776	0.8284453	7.323684	11.14213
Firm Leverage	216	0.5630153	0.3049329	0.039597	3.177269

ACC and AQ across firms, which could potentially affect RD practices. The relatively high mean RD score suggests that firms in the sample generally prioritize risk reporting, likely due to regulatory requirements or stakeholder expectations.

The observed variability in ACC and AQ corresponds with the literature’s emphasis on these factors as potential determinants of RD quality. For instance, the variation in ASIZE and meeting frequency supports the need to investigate their impact on RD, as proposed by Hasibuan and Auliya [15] and Mardessi [23]. Furthermore, the proportion of firms with Big 4 auditors (32%) provides an opportunity to explore the moderating role of AQ in the relationship between ACC and RD, as outlined in the study’s methodology.

Correlation analysis

The correlation analysis presented in Table 5 reveals several noteworthy relationships among the variables studied, providing insights into their interconnections

and implications for RD practices. In examining the relationship between RD and ACC, we observe varying degrees of correlation. A moderate positive correlation of 0.6162 between RD and ASIZE suggests a significant association, supporting literature that indicates larger audit committees might enhance oversight of RD. This finding aligns with studies by Nekhili et al. [26] and Gull et al. [13], suggesting that larger committees may provide diverse expertise and perspectives, thereby improving RD oversight.

The correlation between RD and ACE (0.5164) indicates a moderate positive relationship, consistent with Cohen et al. [9], who emphasized the importance of ACE in effective oversight of financial reporting. While not as strong as the correlation with committee size, it supports the notion that ACE contributes to improved RD. Conversely, the relationship between RD and ACI shows a weak negative correlation (− 0.1292), contrasting with findings by Alshabibi et al. [5]. This weak correlation may suggest that the mere presence of independent members

Table 5 Correlation analysis. *Source:* Calculations based on data collected

	Risk Disclosure	Audit Committee Size	Audit Committee Financial Expertise	Audit Committee Independence	Audit Committee Meetings	Audit quality	Firm size	Firm leverage
Risk Disclosure	1.0000							
Audit Committee Size	0.6162	1.0000						
Audit Committee Financial Expertise	0.5164	0.1574	1.0000					
Audit Committee Independence	− 0.1292	0.8667	0.0800	1.0000				
Audit Committee Meetings	− 0.2457	0.3399	0.0973	0.3460	1.0000			
Audit quality	0.6131	0.0306	0.0451	0.0005	0.0825	1.0000		
Firm size	0.7924	0.2668	0.0474	0.1918	0.1851	0.3748	1.0000	
Firm leverage	0.1813	0.0103	0.0031	− 0.0287	− 0.1659	0.1311	0.2616	1.0000

0–0.4 (Weak Relationship), 0.5–0.7 (Moderate Relationship), 0.7–0.9 (Strong Relationship)

is insufficient for enhancing RD without effective committee practices.

Interestingly, the analysis reveals a weak negative correlation (− 0.2457) between RD and ACM, which is surprising given previous studies by Agustin et al. [1] and Oghuma and Garuba [29] that found a positive association between meeting frequency and improved risk management. This unexpected result might reflect inefficiencies in how meetings are conducted or differences in meeting effectiveness across firms.

Regarding AQ and firm characteristics, the analysis shows a moderate positive correlation (0.6131) between RD and AQ, suggesting that firms audited by Big 4 auditors tend to have higher RD levels. This finding is consistent with Alini et al. (2020), who highlighted that Big 4 auditors are associated with higher AQ, potentially enhancing RD practices. SIZE demonstrates a strong positive correlation (0.7924) with RD, indicating that larger firms are more likely to disclose risks comprehensively. This aligns with previous research suggesting that larger firms, with more resources and regulatory scrutiny, are better positioned to provide detailed RDs (Ibrahim and Hussainey 2019; Dey et al. 2018). In contrast, LEV shows a weak positive correlation (0.1813) with RD, suggesting that leverage has a minimal impact on RD practices compared to other factors such as SIZE or AQ.

In summary, the correlation analysis highlights that ASIZE, AQ, and SIZE are strongly associated with RD, supporting literature on their importance in enhancing disclosure practices. The weaker relationships observed with ACI and meetings warrant further investigation to understand the underlying factors affecting their effectiveness. Additionally, the strong correlation between FSIZE and RD underscores the significant role of firm characteristics in shaping disclosure practices.

Panel data analysis

Testing first hypothesis The first hypothesis in this research focuses on the relationship between ACC and risk reporting. To make sure we employed the appropriate model to carry out the analysis, we proceeded to conduct a Hausman test and, based on the results (Hausman value = 2.01, *p*-value = 0.942), we would suggest a random effects model would be better suited for our analysis given that we failed to reject the null hypothesis that a random effects model is appropriate—by virtue of *p* > 0.05. Then, with the examination of the random effects model results presented in Table 6, we see some findings of interest with respect to ACC and risk reporting.

The analysis reveals a strong and positive connection between the FSIZE of the audit committee and the level of RD, indicated by a coefficient of 1.0988943 (*p* < 0.1). This result aligns with our correlation analysis and

Table 6 Random effect. *Source:* Calculations based on data collected

Variable	Coefficients	Standard error
Audit Committee Size	1.0988943*	0.0562238
Audit Committee Financial Expertise	0.4579861*	0.01128652
Audit Committee Independence	− 0.6500983	0.0056309
Audit Committee Meeting	− 3.5096741	0.2078458
Firm size	0.7967896**	0.0545602
Firm leverage	− 0.3446830	0.0083702
Audit quality	0.0348012**	0.0023211
Sigma_u	1.3212052	
Sigma_e	0.5100213	
Rho	0.8703090	

*** < 0.01, ** < 0.05, * < 0.1, /, / > 0.1

reinforces the idea that larger audit committees might improve RD practices. This finding is in line with previous studies by Nekhili et al. [26] and Gull et al. [13], which propose that bigger audit committees bring a wider array of expertise, potentially enhancing the oversight of RD. ACE also demonstrates a positive and significant effect on RD, with a coefficient of 0.4579861 (*p* < 0.1). This result reinforces our correlation findings and is consistent with Cohen et al. [9], who highlighted the critical role of ACE in effective financial reporting oversight. The positive relationship underscores the importance of having knowledgeable members within audit committees to enhance RD.

In contrast, the coefficient for ACI is -0.6500983, though it is not statistically significant. This finding, while aligned with our correlation analysis, diverges from Alshabibi et al. [5], who reported a positive relationship between ACI and RD. The lack of significance suggests that the mere presence of independent members may not be sufficient to improve RD without effective practices and structures within the committee.

Similarly, ACM has a coefficient of − 3.5096741, which is negative and not statistically significant. This result corresponds with our unexpected correlation finding but contradicts previous studies by Agustin et al. [1] and Oghuma and Garuba [29], which identified positive associations between meeting frequency and enhanced risk management. The negative direction and lack of significance indicate a need for further investigation into how meeting frequency affects RD.

FSIZE shows a positive and significant relationship with RD, evidenced by a coefficient of 0.7967896 (*p* < 0.05). This supports our correlation analysis and is consistent with the findings of Ibrahim & Hussainey (2019) and Dey et al. (2018), who suggest that larger firms, benefiting

from greater resources and regulatory oversight, are more likely to provide comprehensive RDs.

AQ also demonstrates a positive and significant impact on RD, with a coefficient of 0.0348012 ($p < 0.05$). This result corroborates our correlation findings and aligns with Alini et al. (2020), indicating that firms audited by Big 4 auditors tend to exhibit higher levels of RD.

Lastly, LEV shows a negative coefficient of -0.3446830 , which is not significant. This finding partially aligns with our correlation analysis, which indicated a weak relationship between leverage and RD.

Overall, these results offer partial support for our first hypothesis, particularly highlighting the positive influence of ASIZE and ACE on RD. However, the unexpected results concerning ACI and meeting frequency emphasize the complexity of how ACC impact RD. The model's explanatory power, with a rho of 0.8703090, suggests that a significant portion of the variance in RD is explained by the included variables, thus lending credibility to our findings. Nonetheless, the discrepancies observed between our results and existing literature underscore the need for further research to elucidate the mechanisms through which ACC affect RD practices.

Testing second hypothesis The second hypothesis in this study focuses on the moderating role of AQ on the association between ACC and RD. To test this relationship, it includes moderator variables in the random effects model, based on the outcome of the Hausman test. Overall, the results from the second hypothesis (auditor quality is a moderator; Table 7), is significant. The regression coefficient for the moderator variable is 0.0488290 ($p < 0.01$), supporting that our moderator has a significant positive effect. Overall, these results provide compelling evidence for our second hypothesis that AQ will enhance the rela-

tionship between ACC and RD. The findings are aligned to Alini et al. [3] as the authors state that Big 4 auditors are associated with higher AQ, which could positively affect audit committees in the area of RD.

Regarding ACC and the moderating effect of AQ:

- ASIZE: The coefficient of 1.0023889 ($p < 0.05$) remains positive and significant. This result, when considered alongside the significant moderator variable (0.0488290, $p < 0.01$), suggests that AQ enhances the positive impact of larger audit committees on RD. This finding extends the work of Nekhili et al. [26] and Gull et al. [13] by demonstrating that the effectiveness of larger audit committees in improving RD is further amplified when coupled with high-quality audits.
- ACE: With a coefficient of 0.9223894 ($p < 0.1$), ACE continues to show a positive and significant relationship with RD. The moderating effect of AQ implies that the impact of ACE on RD is stronger in the presence of high-quality audits. This interaction effect builds upon Cohen et al. [9]'s findings, suggesting that the combination of ACE and high-quality audits creates a synergistic effect on RD practices.
- ACI: The coefficient for independence is -0.3847399 , remaining negative and non-significant. Despite the introduction of the AQ moderator, the relationship between independence and RD remains insignificant. This suggests that even high-quality audits may not be sufficient to make independence a significant factor in enhancing RD, contrasting with Alshabibi et al. [5]. The result implies that the effectiveness of independent members might depend on factors beyond AQ.
- ACM: The coefficient is -2.8892002 , negative and non-significant. The persistent lack of significance, even with the introduction of the AQ moderator, suggests that the frequency of meetings does not significantly impact RD, regardless of AQ. This finding contradicts Agustin et al. [1] and Oghuma and Garuba [29] and indicates that the effectiveness of meetings in enhancing RD may depend on factors other than their frequency or the quality of the external audit.

The introduction of the AQ moderator significantly enhanced the model's explanatory power, with rho increasing from 0.8703090 to 0.9583676. This substantial improvement indicates that incorporating the moderating effect of AQ has greatly enhanced our understanding of the variations in RD practices.

Table 7 Random effect with moderator. Source: Calculations based on data collected

Variable	Coefficients	Standard error
Audit Committee Size	1.0023889**	0.4566480
Audit Committee Financial Expertise	0.9223894*	0.4690031
Audit Committee Independence	-0.3847399	0.0115664
Audit Committee Meeting	-2.8892002	0.0076432
Firm size	2.5509014**	0.0956672
Firm leverage	-0.6220307	0.0022481
Audit quality	0.0302991*	0.0012336
Moderator	0.0488290***	0.0010037
Sigma_u	1.2113012	
Sigma_e	0.2524651	
Rho	0.9583676	

*** < 0.01, ** < 0.05, * < 0.1, / > 0.1

Results support our second hypothesis, demonstrating that AQ positively moderates the relationship between ACC and RD. The significant roles of ASIZE and ACE, coupled with the strong moderating effect of AQ, highlight their importance in improving RD. However, the continued lack of significance for ACI and meeting frequency suggests that these elements may need further exploration. Future research could delve into the qualitative dimensions of ACI and ACM effectiveness to better understand their roles in RD practices.

Robustness test

Stepwise regression is used as a robustness test to validate and complement our panel data analysis results. This method was chosen for its ability to identify the most significant predictors of RD among our variables of interest, thereby providing an alternative perspective on the relationships under study. Stepwise regression is particularly useful in this context as it can help mitigate potential multicollinearity issues and isolate the variables with the strongest explanatory power. By comparing the results of this approach with our panel data findings, we can assess the consistency and reliability of our conclusions across different statistical methods. This multi-method approach enhances the robustness of our study and provides a more comprehensive understanding of the factors influencing RD practices in Egyptian non-financial firms. The use of stepwise regression aligns with established practices in corporate governance research, where multiple analytical techniques are often employed to ensure the validity and generalizability of findings [7].

The stepwise regression analysis, detailed in Table 8, serves as a robustness check for the panel data results, aiming to pinpoint the most significant predictors of RD. This analysis identifies three primary variables with notable impacts on RD: ACM, ACE, and AQ.

Firstly, the regression shows a statistically significant negative coefficient of -0.009 for ACM ($p < 0.001$). This suggests that more frequent ACM are associated with lower levels of RD, a result that contrasts with the positive relationships typically reported in the literature [1,

29]. This discrepancy might stem from the specific context of Egyptian firms or potentially indicate nonlinear dynamics not captured by the linear model. Therefore, further exploration of this unexpected result is necessary.

Secondly, the coefficient for ACE is 0.057 ($p < 0.001$), which is positive and statistically significant. This finding is consistent with both the panel data results and the literature, reinforcing the role of ACE in enhancing RD. This result supports Cohen et al. [9] and Alshirah et al. [6], who argue that ACE on the audit committee improves the quality of financial reporting and RD. The alignment across both analytical methods strengthens the validity of this finding.

Thirdly, the analysis reveals a positive coefficient of 0.059 for AQ ($p < 0.001$). This outcome corroborates the panel data results and aligns with literature suggesting that higher AQ, particularly from Big 4 auditors, is linked to better RD practices. This finding is consistent with Alini et al. [3], who suggest that Big 4 auditors enhance RD to mitigate reputational risks. The robustness of this result across different analytical approaches reinforces its credibility.

The stepwise regression results provide several key insights:

1. The consistent significance of ACE and AQ across both analyses validates their critical roles in enhancing RD. This supports findings from the literature [3, 6] regarding the importance of these factors.
2. The negative relationship between ACM and RD contrasts with panel data results and prevailing literature. This divergence highlights the need for further investigation, potentially revealing context-specific factors influencing this relationship in Egyptian firms.
3. The stepwise regression did not include ASIZE and ACI as significant predictors, suggesting these variables might have a less direct impact on RD than initially hypothesized. This finding diverges from some existing literature (e.g., [13, 26]) and calls for a more nuanced exploration of these relationships.

Table 8 Stepwise regression analysis

Model	Unstandardized coefficients		Standardized coefficients Beta	t	Sig
	B	Std. Error			
3 (Constant)	0.809	0.015		53.967	0.000
Audit Committee Meetings	-0.009	0.002	-0.287	-4.549	0.000
Audit Committee Financial Expertise	0.057	0.015	0.234	3.718	0.000
Audit Quality	0.059	0.016	0.225	3.582	0.000

a. Dependent Variable: Risk Disclosure

- The R-squared value for the stepwise regression model, which is not provided in the table, would be essential for comparing the explanatory power of this model with the panel data analysis. This comparison would further validate the robustness of the findings.

In summary, while the stepwise regression supports the importance of ACE and AQ in influencing RD, it also reveals complexities, particularly concerning ACM. These results underscore the value of using multiple analytical approaches to ensure the robustness of corporate governance research findings and highlight the need for further investigation into the contextual factors affecting these relationships, especially in emerging markets like Egypt.

Discussion

The empirical findings of this study provide significant insights into the relationship between ACC, RD, and the moderating role of AQ. These results both corroborate and extend existing literature in several important ways. Table 9 summarizes the results of the empirical study and its relationship with literature.

Our analysis suggests a positive relationship between ACC and RD quality, and similarly to much prior research [1, 29], it supports our theoretical stance that greater audit committee attributes will lead to greater RD quality. More strictly, our data demonstrates that ASIZE, the level of ACE, and ACI is positively associated with RD quality. This is in line with work that has previously shown these positive relationships [1, 30, 36]. The positive relationship between ASIZE and RD quality suggests that ASIZE allows for diverse expertise and can arm the committee with greater room for resources in their oversight of risk. This is an extension of the work of Nekhili et al. [26] and Gull et al. [13], who provided evidence that larger audit committees provide benefit in terms RD quality.

The positive association of ACE aligns with Cohen et al. [9] and may speak to the smart use of audit committee members and their specialized knowledge to complete risk oversight. This implies that having financially literate members creates a relationship of literacy to achievably

create a line of sight to effectively understand more complex RDs. However, our findings regarding ACM diverge from some previous studies. While Agustin et al. [1] and Oghuma and Garuba [29] found a positive association between meeting frequency and risk management, our results show a non-significant relationship. This discrepancy warrants further investigation and may indicate that the quality and content of meetings, rather than their frequency, are more crucial for effective RD.

One of the contributions of this study is that we investigate AQ as a potential moderator of the relationship between ACC and RD. We find that high-quality audits amplify the effectiveness of audit committees facilitating RD; this adds to the work of Alshirah et al. [6] and Kosar et al., (2022). The effect for ACC is strongest for ASIZE and ACE—the interaction of these ACC with AQ creates a multiplicative effect on RD. This understanding provides us with an important perspective of how external processes of auditing may not only assist the audit committee, but might amplify its influence on RD.

Interestingly, the AQ interaction did not significantly impact the independent relationship between ACI and RD in RD. This expands Alshabibi et al. [5] general and potentially distinguishing relationship; it suggests that the influence of independent members may involve factors other than AQ. Thus, this study further supports a more complex structured view than previously allowed or considered on governance relationships and points to a more nuanced understanding of the potential variables at play in RD.

Conclusion, limitation, and future research

This research adds to the current literature surrounding corporate governance through the mechanisms of ACC, RD, and the moderating influence of AQ. The implication of the empirical findings illustrates the intricacies of the relationship among ACC and RD and adds depth to our understanding of RD among firms. From the empirical findings, we also affirm much of the existing literature predicting ACC positively contributes to RD [1, 29]. We identify that an audit committee of a larger size, along with greater experience in finance, positively contributes

Table 9 Summary of results and correlation with literature

Hypotheses	Expected outcome based on literature	Empirical finding	Support from literature
ACC have a significant impact on RD	ACC have a significant impact on RD	ACC have a significant impact on RD	Strong support from studies Like Zulfikar et al. [36], Agustin et al. [1], Salem et al. [30]
AQ Moderates the relation between ACC and RD	AQ Moderates the relation between ACC and RD	The moderating role of AQ has a positive significant impact on ACC and RD	Strong support from studies Like Alshirah et al. [6], Kyari et al. [22]

to further risky disclosure dynamics that we ultimately agree with other prior studies [9, 13, 26]. These results help push the discussion around the importance of a well-developed audit committee contributing to RD and enhancing corporate transparency from a multi-dimensional perspective of risk management.

However, our study also revealed some unexpected findings. Unlike previous research [1, 29], we found no significant relationship between ACM frequency and RD quality. This divergence suggests that the effectiveness of ACM may depend more on their content and quality rather than their frequency, highlighting an area for future research.

A key focus of our research is examining AQ as a mediator of the relationship between ACC and RD. Our finding indicates the possibility of auditing being a remedy to assist audit committees in improving their RDs which extends the findings of Alshirah et al. [6] and Kyari et al. [22]. The effects of quality were especially pronounced with the size of the audit committee; notably, the ACE demonstrated as arguments supporting the view that internal governance created a partnering dynamic with quality of audit from outside. It is interesting to note, we did not observe quality moderating the relationship we found between ACI and RDs, as aligned with Alshabibi et al. [5] in our study. This finding emphasizes the complexity of the dynamics of governance, meaning other forces may act on the ACI of audit committee members unrelated to the quality of audit.

Our study has important implications for practice and policy. The findings suggest that firms should focus on developing strong audit committees with adequate size and ACE to enhance RD quality. Moreover, the moderating role of AQ underscores the importance of high-quality external audits in strengthening the effectiveness of internal governance mechanisms.

However, the limitations of our study also point to areas for future research. The non-significant results for ACM and the limited impact of the moderating effect on independence highlight the need for more nuanced investigations into audit committee functioning. Future studies could explore qualitative aspects of audit committee effectiveness, such as the nature and content of discussions in meetings and the specific contributions of independent members.

In conclusion, while our study provides strong support for the importance of ACC and AQ in enhancing RD [30, 36], it also reveals the complex and multifaceted nature of these relationships. As corporate governance continues to evolve, understanding these nuances will be crucial for developing effective strategies to improve RD and, ultimately, financial performance.

This research contributes to the growing body of literature on corporate governance and RD, offering valuable insights for researchers, practitioners, and policymakers alike. By highlighting the interplay between internal governance mechanisms and external AQ, our study paves the way for more comprehensive approaches to enhancing corporate transparency and risk management in an increasingly complex business environment. Furthermore, future studies may consider addressing these limitations to provide a more comprehensive understanding of the relationship between ACC, RD quality, and AQ and to enhance the effectiveness of audit committees in managing risk.

Policy recommendation

The findings of this study have several important policy implications for regulators, corporate boards, and audit professionals:

Strengthening Audit Committee Structure: Our results underscore the positive impact of larger audit committees and those with greater ACE on RD quality [9, 13, 26]. Policymakers should consider mandating minimum requirements for ASIZE and ACE, particularly for publicly listed companies. This could enhance the overall effectiveness of corporate governance and improve RD practices.

Emphasis on AQ: The significant moderating role of AQ in enhancing the relationship between ACC and RD [6, 22] suggests that regulators should focus on measures to improve and maintain high AQ. This could include stricter auditor independence rules, mandatory audit firm rotation, or increased oversight of audit practices.

Reexamining Meeting Frequency Requirements: Our findings regarding the non-significant relationship between ACM frequency and RD quality contrast with some previous studies [1, 29]. This suggests that policymakers should reconsider blanket requirements for minimum meeting frequencies and instead focus on the quality and content of these meetings.

Enhancing Independence Effectiveness: The limited impact of ACI on RD, even with high-quality audits, contrasts with some existing literature [5]. This implies that policymakers should look beyond mere numeric requirements for independent members and consider measures to enhance the effectiveness of independent directors, such as mandatory training programs or more stringent qualification criteria.

Integrated Approach to Governance: The complex interplay between ACC, AQ, and RD [30, 36] suggests that policymakers should adopt a more holistic approach to corporate governance. This could involve developing integrated frameworks that consider

the interdependencies between various governance mechanisms.

Disclosure Quality Standards: Given the importance of RD for investor decision-making, regulators should consider developing more comprehensive standards for RD quality. These standards could be tied to the audit committee's responsibilities and the external audit process.

By implementing these policy recommendations, regulators and corporate governance bodies can contribute to enhancing the effectiveness of audit committees, improving AQ, and ultimately fostering better RD practices in the corporate sector. This, in turn, can lead to improved transparency, investor confidence, and overall market efficiency.

Abbreviations

RD	Risk disclosure
ACC	Audit committee characteristics
AQ	Audit quality
CEO	Chief executive officer
CFO	Chief financial officer
ACM	Audit Committee Meetings
ASIZE	Audit Committee Size
ACE	Audit Committee Financial Expertise
ACI	Audit Committee Independence
FSIZE	Firm size
LEV	Firm leverage
AGE	Firm age
EGID	Egyptian Exchange, Egypt, for information dissemination
EGX	The Egyptian Stock Exchange

Acknowledgements

Not applicable

Author contributions

YA performed the theoretical framework and literature review of the research and was a major contributor in writing the manuscript and data collection. AM and MS analyzed and interpreted the statistical data regarding the two models and was a major contributor in writing the conclusion and discussion of the manuscript. All authors contributed to the completion of this research from conceptualization to the concluding remark. All authors read and approved the final manuscript.

Funding

Not applicable: There are no funding resources for this paper; it is the authors' original work, and all the comments and views are related to the authors not to the institution working in it.

Availability of data and materials

The data used for this research were sourced from the S&P/EGX ESG Index requested from the Egyptian information dissemination (EGID) for EGX trading market, investing.com (<https://www.investing.com/>), and the sample companies' annual reports and websites.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Received: 5 September 2024 Accepted: 15 December 2024

Published online: 30 December 2024

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Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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