Examining the Impact of the Effectiveness of Internal Control System on Firm's Financial Health: Evidence from Egypt

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Abstract:

The main objective of this study is to examine the impact of the Effectiveness of Internal Control System (EICS) on firm's financial health measured by Modified Altman Z-score (Z″- score) and Refined Economic Value Added (REVA). In this study, a sample of 40 Egyptian listed firms is used during the period from 2018 to 2022 with a total of 200 observations. The Generalized Least Square (GLS) regression analysis is employed to test the research hypotheses. The results of the study revealed that EICS has an insignificant impact on firm's financial health measured by Z″-score. In contrast, it is found that EICS has a significant positive impact on firm's financial health measured by REVA.

Keywords: Effectiveness of Internal Control System, Financial Health, Modified Altman Z-score, Refined Economic Value Added.

المستخلص:

الهدف الرئيسى من هذه الدراسة هو دراسة تأثير فعالية نظام الرقابة الداخلية على الصحة المالية للشركة المقاسة بكل من نموذج Altman Z-score المعدل والقيمة الإقتصادية المضافة المعدلة. استخدمت هذه الدراسة عينة تتكون من ٤٠ شركة من الشركات المصرية المدرجة بالبورصة خلال الفترة من عام ٢٠١٨ حتى عام ٢٠٢٢ بإجمالى عدد مشاهدات ٢٠٠ مشاهدة. اعتمدت هذه الدراسة على أسلوب تحليل الانحدار بطريقة المربعات الصغرى لإختبار فرضيات الدراسة. وقد أوضحت نتائج الدراسة إلى عدم وجود تأثير معنوى لفعالية نظام الرقابة الداخلية على الصحة المالية المقاسة بنموذج Altman Z-score المعدل، فى حين أن لفعالية نظام الرقابة الداخلية تأثير إيجابى معنوى على الصحة المالية للشركة المقاسة بالقيمة الإقتصادية المضافة المعدلة.

الكلمات المفتاحية: فعالية نظام الرقابة الداخلية، الصحة المالية، نموذج Altman Z-score المعدل، القيمة الإقتصادية المضافة المعدلة.

1. Introduction:

Several large-scale financial scandals that occurred in the early 2000s have shaken public trust in financial reporting. This financial crisis highlighted weaknesses in many firms' internal controls and revealed the need for effective Internal Control Systems (ICSs). Maintaining an effective ICS is vital for organizations to achieve their objectives, safeguard assets, and ensure reliable financial reporting. ICS encompasses policies, procedures, and practices that

help identify and manage risks, prevent fraud, promote compliance, and enhance overall operational efficiency, accountability, and stakeholder confidence, which in turn will provide a solid foundation for sustainable growth and success.

ICS is considered an essential element for the survival of any business organization. It plays a critical role for organizations whether internally for decision making processes or externally for financial reporting quality. Lakis & Giriūnas (2012) defined the ICS as methods and tools employed to ensure the accomplishment of the organization's main objectives, achieving high financial and economic performance, adherence to accounting principles, and maintaining effective control of risks, which in turn reduces the possibility of intentional and unintentional errors and prevents committing fraud in the financial reporting process.

Moreover, Lemi (2015) highlighted that, there are two general perspectives to the role of Internal Control (IC) which are financial control perspective and administrative control perspective. Financial control perspective includes controls to safeguard assets from inappropriate disbursement and to ensure the accuracy and reliability of financial reports for proper decision making process. While, the administrative control perspective includes controls to ensure the adherence to rules, policies, laws and regulations, as well as ensure the achievement of the organizational goals and the efficiency and effectiveness of operations procedures.

Prior literature revealed that ICSs have a multifaceted impact on various financial aspects. Internal controls can enhance the quality of financial reporting, thereby diminishing the likelihood of financial misstatements and bolstering investor confidence. Additionally, these controls can alleviate operational inefficiencies, minimize waste, and improve profitability. Therefore, effective ICS serves as a shield against potential risks, ensures adherence to financial regulations, improve operational efficiency, and decrease the probability of fraud or financial misreporting which in turn will be reflected positively on firm's financial outcomes (Vu & Nga, 2022; Uwineza et al., 2022; Tuan, 2020; Julie, 2019; Gao, 2019; Zhou et al., 2016).

On the other hand, ICS may have an insignificant impact on firm's financial performance. Internal controls may be either inadequately implemented or merely superficial in nature, lacking genuine operational enhancements. Ineffective internal controls may fail to yield the desired advantages, resulting in negligible or insignificant effect on financial performance (Lotfy et al., 2021; Al-Thuneibat, 2015). Moreover, industries that are subject to less regulation may not experience the same degree of influence from internal controls on their overall performance, compared to certain industries which are highly regulated.

Further, the EICS is influenced by the regulatory framework, corporate governance standards, and cultural perspectives regarding compliance and risk management within a given country. Thus, in

countries characterized by weaker governance frameworks, the same internal controls may exhibit diminished effectiveness, resulting in insignificant effect on financial performance. In contrast, in countries where financial regulations are strictly enforced, ICSs may yield more favorable financial results.

Moreover, many studies focus on short-term financial indicators, which may not reflect the long-term benefits of effective ICS. Effective ICSs often yield enduring benefits, including increased stability, diminished risk, and sustainable growth, which may not be adequately represented in short-term financial results. Consequently, ICS may have insignificant effect on short-term financial indicators.

Furthermore, from reviewing the prior literature, it is shown that most previous studies are concerned with studying the effect of EICS on firm's financial performance using the traditional accounting measures. These studies do not take into consideration the holistic view of firm's financial position. Therefore, this study focuses on firm's financial health to represent a more inclusive image of the firm's financial position. Financial Health can be defined as the firm's ability to operate efficiently and profitably, survive, grow and react to the opportunities and threats. Moreover, it can be used as a measure of company's policies, procedures and operations in monetary terms and also can reflect the ability of the firm to create value for its shareholders. But, till now "The ability to predict correct

financial health of the firm is thought critical by many analysts and other users such as investors, credit rating agencies, banks, underwriters, auditors and regulators etc"(Kumar & Anand, 2013). Hence, this study tries to use different combination of measures to reflect both accounting and economic position of firms. Accordingly, Modified Altman Z″- score and REVA are employed in this study to measure firm's financial health.

Based on the characteristics of the Altman Z″- score model and its implications, this model is regarded as a comprehensive reflection of a firm's financial status (Wu et al., 2020). It considers key aspects of any firm, including liquidity, profitability, leverage, and solvency, providing a single comprehensive score to evaluate the firm's condition—whether it is financially healthy, at risk of distress, or lies in the grey zone. While REVA is regarded as a measure of the effectiveness of company management in enhancing the added value for the organization, it emphasizes the value created by management for the benefit of its owners, taking into account the cost of capital (Sabol & Sverer, 2017). Consequently, REVA aims to bridge the gap between accounting profit and economic profit by focusing on market value to calculate capital costs.

According to the previous discussion, till now, there is an obvious gap in the prior literature examining how the EICS directly affect a firm's financial health. In particular, the association between the EICS and key financial health indicators such as

Altman Z″- score and REVA remains under- unexplored. Accordingly, the main objective of this study is to examine the impact of EICS on firm's financial health measured by both Z″-score and REVA. Since, Understanding the influence of ICS on firm's financial health will provide valuable insights for enhancing corporate governance, fortifying risk management, and refining regulatory frameworks, all of which are pivotal for enhancing a firm's resilience and ensuring its sustained financial success.

Therefore, the current study will contribute to the extant literature by providing novel evidence on the influence of EICS on firm's financial health measured by both Z″- score and REVA. According to the limits of knowledge of the researcher, it is one of the few studies to investigate the association among these variables in a developing country; Egypt. Thus, the associations between these variables are still vague which need further research. Since numerous previous studies have focused on the use of traditional financial performance and firm's market value indicators, the current study takes into account both economic and accounting-based comprehensive measures in order to provide a holistic view on the firm's financial health. The inclusion of both measures complements the respective strengths and limitations of each kind of measures in studying its association with the EICS.

Moreover, applying this research in Egypt which is characterized by inefficient capital market with a higher level of

information asymmetry compared to capital markets in developed countries would provide interesting results regarding theses associations. Given the context's unique characteristics, it is necessary to examine the effect of EICS and their impact on firm's financial health in Egypt as an example of emerging market.

Finally, the findings of the study will be advantageous to practitioners, policymakers and the Egyptian Stock Exchange Authority, since they highlight the significant role played by EICS within firms and its influence on the overall firm's financial health.

The remainder of this paper is organized as follows. Section 2 provides a theoretical background for the study. Section 3 introduces the prior literature and illustrates the developed research hypotheses. Section 4 introduces the research design. Section 5 presents the empirical results. Section 6 discusses the findings of the study, and section 7, presents the study conclusion.

2. Theoretical background of Internal Control System:

2.1. The Concept of Internal Control System and its Objectives:

Initially, the concept of Internal Control (IC) was limited to a range of methods and procedures that ensure the preservation of the enterprise's assets from theft and embezzlement. After that, the concept of IC has been developed to include the tools used to reduce the potential occurrence of errors and fraud in financial

data, as well as the protection of cash and other assets (Al-Mashhadi, 2021; Lakis & Giriūnas, 2012).

Then, the concept of IC has been evolved as a result of the expansion in the size and growth of projects, the complexity of their operations and activities, the complexity of the decision-making process, and the need for periodic reliable information. Thus, in 1992, the report of COSO (Committee of Sponsoring Organizations of the Treadway Commission) introduced the concept of ICS which refers to the comprehensive framework that provides the structure and guidelines for establishing, implementing, and monitoring internal controls throughout the organization. According to COSO (1992), p.1, ICS is defined as "A process, affected by an entity's board of directors, management, and other personnel, designed to provide reasonable assurance regarding the achievement of objectives related to effectiveness and efficiency of operations, reliability of financial reporting and compliance with applicable laws and regulations.

Then the objectives of ICS has been developed according to COSO report issued in 2013. These objectives can be divided into three main groups; Operations objectives, Reporting objectives, and Compliance objectives. Operations objectives are related to the efficiency and effectiveness of the entity's operations. They include operational and financial performance objectives, as well as protecting the organization's assets from risks such as theft, embezzlement, and misuse. Reporting

objectives are related to the preparation of internal, external, financial and non-financial reports, which should have specific characteristics such as reliability, timeliness, transparency, completeness, and any other characteristics stipulated in the standards or policies of the organization. Compliance objectives are related to compliance with laws and regulations to which the organization is subject to.

Consequently, it is concluded that ICS can be defined as a system which employ proper mechanisms and following the organization's plans, rules, policies and procedures in order to provide reasonable assurance of the efficiency and effectiveness of operations, ensure the accuracy, completeness and reliability of all types of reporting for effective decision making process, ensure compliance with prescribed laws and regulations, and maintain effective control of risks by identification of any deviations and correcting them through continuous follow-up of operations and activities.

2.2. Components of Internal Control System:

COSO issued the final IC report "Internal Control – Integrated Framework" in 1992 which is considered the most important stage in the development of the concept of IC. It has become the internationally recognized standard regarding the understanding and design of effective ICSs in all businesses. It expanded the scope of components of the ICS by adding two components (risk assessment and monitoring), after it was only

three components (control environment, control activities, and information and communication). After that, it has been updated in 2013.Therefore, according to this report, the ICS consists of five basic components that are interrelated and essential for achieving the objectives of the IC process. These components represent the criteria by which the EICS can be evaluated. These components are presented in details as follows:

2.2.1. The First component:- Control Environment:

The control environment is a foundation for all other components of IC (Uwineza et al., 2022; Muhunyo & Jagongo, 2018). It is a set of standards, policies and procedures that establishes the basis for effective IC by promoting a positive control mindset throughout the enterprise and providing the necessary support and resources for its implementation (Abiodun, 2020; Lemi, 2015; Abdi, 2015). The control environment consists of seven sub-components (integrity and ethical values, commitment to competence, board of directors and audit committee, management's philosophy and operating style, organizational structure, assignment of authority and responsibility, human resources policies and practices).

2.2.2. The Second Component:- Risk Assessment:

The risk assessment component, constituting the second pillar of ICS. It is a crucial practice for all size enterprises as every enterprise faces different kinds of risks (El-shetry & Ismael, 2022).

According to COSO IC, the risk assessment process involves three key steps. The first step is to identify and recognize potential risks that can affect the achievement of organizational objectives. The second step is to analyze and evaluate the identified risks, and assess their likelihood and potential impact of each risk on the organization in order to prioritize them effectively. The third step is to develop and implement strategies to mitigate or manage these risks (El-shetry & Ismael, 2022; Worku, 2017; Lemi, 2015). Thus, effective risk assessment is an ongoing, dynamic practice that enables organizations to proactively address uncertainties and make informed decisions.

2.2.3.The Third Component:- Control Activities:

Control activities refer to the policies and procedures taken by the enterprise's management to ensure that its instructions and directives are implemented effectively (Elsehetry & Ismael, 2022; Tjiueza, 2018; Worku, 2017; Abdi, 2015). In addition, these control activities ensure that appropriate and necessary procedures and precautions are taken to confront risks that threaten the achievement of the enterprise's objectives (Elsehetry & Ismael, 2022; Muhunyo & Jagongo, 2018).

Generally, these controls are classified in terms of preventive, corrective, detective, and directive control activities. Preventive controls reduce risks by proactively addressing errors and fraud through the segregation of duties and access restrictions. Detective

controls identify issues after they occur by using methods such as reconciliations and audits for early detection. Corrective controls respond to identified problems, minimizing their impact, preventing their future occurrences, and rectifying errors through procedures, discipline, and process redesign. Directive controls guide employees' actions, ensuring alignment with organizational policies through clear instructions and effective communication channels (Abiodun, E.A., 2020; Lemi, 2015).

2.2.4.The Fourth Component:- Information and Communication:

The information and communication component is very important, as it represents the link between all components of the ICS, parties involved in the ICS such as employees, management and external parties, and between activities, functions and departments (Muhunyo & Jagongo, 2018). This component is concerned with determining the relevant information that should be obtained. After that, determining how to obtain this information. Thus, it is important to establish effective communication channels to facilitate the exchange of information within the enterprise and between the enterprise and external parties. (Tjiueza, 2018; Bett & Memba, 2017). Then, it is important to consider how to communicate the information. This information can be conveyed through open channels of communication that allow for the flow of information both vertically and horizontally within an organization (Worku, 2017; Lemi, 2015).

2.2.5.The Fifth Component:- Monitoring Activities:

According to COSO (2013), the term "Monitoring" is adjusted to become "Monitoring Activities" with the aim of broadening the scope of monitoring process. The monitoring process is carried out to ensure that internal controls work continuously to achieve the control objectives in an efficient and effective manner (Abiodun, 2020; Tjiueza, 2018). These internal controls are operationalized through reviews over operations and financial reports, communications from external parties, enterprise structure and direct supervision of clerical activities, periodic physical inventories, and asset reconciliation (Abiodun, 2020; Lemi, 2015). Thus, an enterprise needs to establish a variety of ongoing monitoring activities for evaluating the quality of ICS performance on an ongoing basis in order to take the necessary corrective actions in a timely manner (Elsehetry & Ismael, 2022; Muhunyo & Jagongo, 2018; Lemi, 2015).

2.3. Limitations of the Effectiveness of Internal Control System:

Although ICSs play a vital role in organizations, they have some limitations that should be taken into consideration. These limitations may restrict the EICS and the accomplishment of ICS' objectives. Some limitations of the EICS are presented as follows (Chalmers et al., 2019; Tjiueza, 2018; Worku, 2017; Lemi, 2015; Dhaliwal et al., 2011):

- **Human Limitations:** ICSs are implemented and supervised by individuals who are bound by certain limitations. These limitations include human error, limited knowledge, and bias, which can hinder effective execution and oversight of ICS. Proper selection, training, and understanding of roles are essential to ensure competence and maintaining the effectiveness of the EICS.
- **Cost-Benefit Trade-Off:** Implementing and maintaining effective ICS can be costly, requiring investments in technology, training, and monitoring. For smaller organizations with limited resources, these costs may outweigh the benefits. A cost-benefit analysis is crucial, ensuring that the advantages gained from ICS are balanced against the expenses incurred.
- **Complexity and Adaptability:** ICS may become complex in larger organizations, making it difficult to manage all risks. As organizations grow and evolve, ICS must adapt to new risks, technologies, and processes. Ensuring the ongoing effectiveness and adaptability of these systems presents a significant challenge.
- **Limited Scope:** ICSs primarily concentrate on financial reporting and compliance matters. Although these aspects are of utmost importance, internal controls may not address all operational and strategic risks encountered by an organization. They may not provide a comprehensive

coverage of areas such as strategic decision-making, reputation management, or emerging risks that can potentially affect the organization's objectives.

- **Management Override:** There is a potential for management to override or influence the control environment negatively. This situation arises when management has the authority to manipulate or invalidate controls for personal benefit or to accomplish specific goals. Accordingly, such actions not only reduce the EICS but also create opportunities for fraudulent activities or unethical behaviors.
- **Limitations of Monitoring:** Monitoring activities may not always detect all deviations or control failures. Additionally, the monitoring process itself may suffer from a lack of objectivity or independence, thereby negatively affecting the EICS.

It is worth noting that ICSs may have some limitations, but they continue to serve a vital purpose in reducing risks, fostering accountability, and safeguarding an organization's assets. Therefore, regular assessments and proactive actions should be taken to address these limitations and ensure that ICSs remain effective, efficient, and adaptable to the ever-changing circumstances.

3. Literature Review and Hypotheses Development:

By reviewing the prior literature, it should be noted that the impact of ICS on firm's financial health is an empirical issue. There is a scarcity of studies which examined the association

between ICS and firm's financial health. Therefore, this group presents studies which examined the impact of ICS on firm's financial performance, firm value, financial distress, cost of debt and cost of equity as indicators or sub-components of firm's financial health in order to provide a base for the potential impact of ICS on firm's financial health.

The prior literature revealed that there is mixed and inconsistent results between previous studies about the impact of EICS on firm's financial performance and overall financial health. Several studies found that there is a significant positive impact of EICS on firm's FP and firm value measured by traditional ratios such as Return on Assets (ROA), Return on Equity (ROE), Earnings per Share (EPS), Profit Margin (PM), Tobin's Q and market to book ratio. For instance, Vu & Nga (2022) aimed to determine whether high quality of ICS could enhance firm's profitability. This study was based on a sample of 2,500 Vietnamese 20 SMEs from manufacturing industry using surveys over a period from 2011 to 2015. The results of the study emphasized that the better the ICS, the higher the Vietnamese firm's profitability. It was indicated that the existence of effective ICS alleviated the legal infractions and the incidence of bribes. In addition, the use of effective ICS improved the efficiency and effectiveness of firm's operations and increased the reliability of firms' financial reporting. Thus, effective ICS would have a

positive impact on firm's long-term development and aided firms to obtain financial and technical government support.

In Rwanda context, Uwineza et al. (2022) documented that ICS and its five components had a significant positive impact on the profitability proxied by ROE, whereas ICS had an insignificant impact on profitability proxied by gross profit margin, earnings before interests and tax margin, and net profit margin. These results suggested that SMEs in Rwanda context should make sure that effective control environment, control activities, risk assessment, information and communication and monitoring activities were maintained to ensure the existence of effective ICS that would led to improvement in SMEs profitability. Consistently, the empirical evidence of Tuan (2020) study elucidated that there was a significant positive influence of applying ICS, including its five components on the performance of Vietnamese firms. It implied that enhancing the application of ICS in the construction sector would improve firm performance. Especially, the findings highlighted that strengthening the implementation of monitoring procedures, upgrading information systems used by companies, and enhancing the execution of control activities could minimize risks and control business operations, which in turn would lead to improving Vietnamese firms' performance and achieving firms' goals.

Julie (2019) investigated the effect of IC practices on financial performance based on a sample of 66 agro-processing

companies in Kenya. On the basis of questionnaires used for data collection, the results of the study showed that all components of ICS had a significant positive impact on financial performance of agro-processing firms. These results highlighted that maintaining an effective ICS ensured systematic reviews of the reliability, integrity and transparency of financial reporting, in addition to evaluation of the controls used to minimize the risk of asset misappropriation. Besides, effective ICS confirmed the compliance of employees with management procedures, policies, laws and regulations, as well as assessment of the efficiency and effectiveness of the firm's operations. Hence, it was concluded that the higher the EICS, the higher the firm's FP, and the lower the fraud committed as compared to weak or ineffective ICSs.

Moreover, in the Chinese setting, Gao (2019) found that there was a significant positive association between Internal Control Quality (ICQ) and financial performance measured by developing an index including "debt-payment ability, operation capacity, profitability and development ability". This result implied that high ICQ guarantees the transparency of corporate information disclosed to the market which would help internal users to identify issues in the company and take the appropriate actions for further enhancement, in addition to helping external users to evaluate the company more fairly. As a result, this would significantly minimize both management cost and financing cost which in turn led to an improvement in firm's financial performance. Further, the

empirical evidence revealed that the impact of ICQ varies by industry, indicating that the association in technology intensive industries was stronger than that in capital-intensive industries and labor intensive industries. Therefore, it was suggested that Chinese firms should increase investment of human, financial and material resources in IC to fully exploit the favorable impact of IC in enhancing corporate performance.

In the same vein, the empirical evidence of the study of Zhou et al. (2016) elucidated that IC measured by IC index developed by Chen et al. (2013), had a significant positive impact on corporate performance measured by ROA. The existence of effective ICS would mitigate the opportunistic behavior of managers and controlling shareholders, decrease corporate business risks, and enhance information quality. This would result in better decision-making by managers, which in turn led to enhancing corporate performance of Chinese firms. Also, further analysis showed that the effect of IC on corporate performance differed by the different stages of firm life cycle. These analyses revealed that the positive effect of IC on corporate performance was more pronounced in the maturity and shake-out stages than other stages, suggesting that management should be concerned with the EICS especially when firms were in these life cycle stages.

On the other hand, some studies found different effects of the components of ICS on firm's financial performance. It is indicated that some components of ICS have a significant impact on financial

performance, while other components have an insignificant impact on financial performance. This implies that some components of IC are implemented effectively and other components are not implemented effectively. For example, Lotfy et al. (2021) examined the association between the quality of IC structure and firm's financial performance on a sample consisted of 60 companies listed on the Egyptian Stock Exchange covering a time span from 2012 to 2017. The findings of the study revealed that the higher the quality of IC structure, the higher the financial performance measured by EPS. Also, it was indicated that control activities was considered the only component of IC structure components which had a significant positive influence over EPS. However, the other four components of IC structure had insignificant influence over EPS. These results could back to the lack of rules, laws and regulations that force managers to disclose appropriately the status of firm's IC structure. Hence, the internal audit which was responsible for assessing the IC structure quality was still immature. However, Al-Thuneibat (2015) indicated that there was a high degree of compliance with the requirements of IC in Saudi firms. It was found that compliance with ICS requirements had a positive influence on ROA and ROE, while it had an insignificant influence on EPS and PM. The detailed analyses highlighted that risk assessment and control activities had a significant influence on ROA, ROE and EPS. While control environment, information and communication and monitoring activities had an insignificant

influence on ROA, ROE and EPS. However, it was found that all IC components had an insignificant influence on PM. These results implied that some components of IC were implemented effectively and other components were not implemented effectively.

These disagreements may be due to using different samples with different characteristics related to different industries and different countries with different rules, laws and regulations. Also, these inconsistent results can back to the different stages of firm life cycle, in addition to using different measures for EICS and FP as well as using different statistical techniques.

Furthermore, another stream of previous studies found that EICS has a significant adverse influence on cost of debt and cost of equity. For instance, Khlif et al. (2019) aimed to investigate the direct impact of ICQ on cost of equity capital, in addition to determining the moderating impact of ICQ on the association between voluntary disclosure and cost of equity capital in Egypt context as an emerging market. ICQ was measured by IC checklist filled by external auditors using questionnaires. Level of voluntary disclosure proxied by a content analysis of annual reports, while cost of equity capital was estimated by using capital asset pricing model (CAPM). The findings of the study documented that there was a significant negative impact of ICQ on the cost of equity capital, implying that better EICS could minimize the firm's cost of equity capital. Moreover, it was articulated that ICQ had a moderating impact on the association between voluntary disclosure

and cost of equity capital, implying that voluntary disclosure had a significant negative influence on cost of equity capital only in firms which had an effective ICS. These findings concluded that ICQ seems to replace poor CG structure and low-disclosure environment by reducing uncertainty and information asymmetry among market participants, either directly by influencing the cost of equity capital or indirectly by increasing value relevance of voluntary disclosure.

Consistently, Guidara et al. (2016) assessed the influence of IC weaknesses and family ownership on cost of debt capital in the Tunis context as an emerging market. The results of the study documented that IC weaknesses and family ownership had a significant positive impact on cost of debt. In addition, it was revealed that the positive influence of IC weaknesses on cost of debt was more prominent in firms which were characterized by high family ownership. Moreover, the results indicated that the positive influence of internal control weaknesses on cost of debt is more evident and pronounced in industrial firms which were audited by non-big 4 audit firms. Hence, these results concluded that enhancing the firm's ICQ could restrain the negative influence of family ownership and increase firm's financial reporting transparency. This would be reflected positively on creditors, as they were more concerned about managerial integrity and expropriation risks, resulting in lower cost of debt. Also, it was articulated that big 4 audit firms played a crucial role as an external CG mechanism in mitigating the negative

influence of IC weaknesses and family ownership, indicating that these factors served as a substitute for IC deficiencies.

Moreover, some studies documented that EICS has played a crucial role in mitigating the stock price crash risk. For example, the study of Xue & Ying (2022) revealed that IC level measured by "Dibo IC disclosure index" of Chinese listed firms had a significant impact in reducing and restraining the stock price crash risk particularly in mature firms. Besides, it was documented that information disclosure quality had a mediating role between IC and stock price crash risk, implying that IC could significantly reduce stock price crash risk through improving the information disclosure quality. In the same vein, Chen et al. (2017) found that control environment, information and communication, and monitoring had a significant negative impact on stock price crash risk, while other components including risk assessment and control activities had insignificant impact on reducing crash risk. In addition, it was indicated that the adverse impact of IC on stock price crash risk was more prominent in firms with poor internal and external corporate governance mechanisms, located in low developed market, with low accounting conservatism, and with weak capability to alleviate the effects of severe negative events.

Therefore, it can be concluded that the higher the EICS, the higher the firm's ability to constrain earnings management practices, the higher the reliability and transparency of financial

reporting, the lower the tendency to hide bad news and the higher the protection of firm's shareholders' interests. Thus, the existence of effective ICS can mitigate the stock price crash risk but the components of ICS may differ in its influence of alleviating the withholding of bad news and thereby stock price crash risk.

Further, it should be noted that the majority of the studies which examined the EICS depend on primary data using questionnaires and interviews which lacks objectivity in measuring the EICS (eg. Vu & Nga, 2022; Uwineza et al., 2022; Tuan, 2020; Julie, 2019; Khlif, 2019; Eniola, & Akinselure, 2016). While other few studies used a developed IC index depending on secondary data for measuring EICS more accurately (eg. Xue & Ying, 2022; Gao, 2019; Chen et al., 2017; Zhou et al., 2016).

Consequently, it can be concluded that since the EICS affects financial performance, firm value, cost of debt, cost of equity, and stock price crash risk, it is expected that EICS has a significant impact on a firm's financial health. Moreover, this problem may be attentive in some emerging markets such as Egypt, since these markets do not have a developed index that is collectively reflect the main five components of EICS. Therefore, the current study seeks to prove if EICS measured by developed IC index has a significant impact on firm's overall financial health in the Egyptian stock market. Thus, based on the previously mentioned debate, the following hypotheses has been developed:

H_1: There is a significant impact of the Effectiveness of Internal Control System on firm's Z-score.

H_2: There is a significant impact of the Effectiveness of Internal Control System on firm's refined economic value added.

4. Research Design:

This section introduces how the sample has been selected; sources of data collected, variables used in this research and their measurement and the empirical models have been applied.

4.1. Sample Selection:

The population for this study comprises all Egyptian companies listed in the EGX100 index, which are mandated to adhere to the Egyptian accounting standards. The final sample is selected based on the following criteria. First, the final sample includes all sectors except for all financial institutions such as banks, insurance firms and brokerage firms due to the distinct nature of their capital structures, which differ significantly from those of other industries. Additionally, these entities are subject to unique characteristics, regulations, and specific disclosure requirements. Second, firms that provide its financial statements on a date other than the 31st of December as well as firms that don't publish consolidated financial statements are excluded from the sample in order to make the financial statements of firms are homogeneous with each other. Finally, firms with

missing data are excluded from the sample. The sample of this study covers a period of five years from 2018 to 2022. The final sample consists of 40 firms with 200 observations. The researcher depends on secondary data in order to conduct statistical analysis. Data are collected from the annual board of directors' reports, annual financial statements, Minutes of the General Assembly, and corporate governance reports which are available through the EGX website, Mubasher website, investing website and the official website of the companies. Table (1) presents details of the sample selection:

Table (1): Sample Selection

Description	Number of Firms
Initial Sample	100
Less: Banks and Financial Institutions	(21)
Firms that publish their financial statements on a date other than the 31st of December	(18)
Firms that publish standalone financial statements	(13)
Firms with missing data	(8)
Final Sample	40

4.2. Research Variables and Models:

This study aims to investigate the impact of EICS on firm's financial health. The EICS is the main independent variable. In this study, the Effectiveness of Internal Control Structure is measured using secondary data based on some questions of the internal control quality index (IC-Index) which is developed by

the study of Chen (2017) as shown in Table (2) in appendix. This index is filtered in such a way that suits the Egyptian environment. This index is presented in appendix.

This index consists of a set of questions to assess the effectiveness of each component of the internal control system, which are represented by; control environment, risk assessment, control activities, information and communication and monitoring activities. These questions are answered depending on company's annual financial statements, the reports of the board of directors, the minutes of the general assemblies, the company's website, and the company's news which is published in newspapers and electronic news websites.

The index's questions are divided into two types of questions:

1. Questions answered with yes or no (where Yes=1, No=0), and other questions (where Yes=0, No=1).
2. Standard questions (where the question is answered by the actual number from the firm's actual data, then the largest value that was answered to this question is determined at the level of all sample, and this value is considered the standard upon which the answers of the rest of the sample are evaluated to this question.

The quality of each component of the internal control system is evaluated by combing the answers of the questions related to each component and dividing the result by the

number of questions related to this component, where the quality of each component of the internal control system ranges from (zero to one). The quality of the component is reduced according to the specified percentage if the punishment questions were answered yes.

Then, evaluate the quality of the internal control system for each of the sample companies by calculating the average for the quality of the five basic components of the system, where the quality of the internal control system ranges from zero to one.

Financial health is the dependent variable in this study. Modified Altman Z-score (Z″- score) and REVA are used to provide a comprehensive measure for firm's financial health. Z″-score is employed to reflect the firm's current financial stability, making it a short-term indicator of financial health. While, REVA is employed to reflect the value creation overtime by measuring the firm's ability to generate returns above its cost of capital, making it a long-term indicator of financial health. It should be noted that the main difference between EVA and REVA is that REVA takes in to consideration the market value of equity. Therefore, REVA can also reflect the market's valuation of the firm capital, providing a more comprehensive and market-sensitive measure of financial health.

First, according to the Z″- score, four perspectives are taken into consideration including liquidity, profitability, leverage, and solvency which were selected to construct the Z-score. In this equation, different weights to four financial indicators were assigned to calculate the Z-score (Kumar & Anand, 2013 & Demirkan & Platt, 2009). *Z″*- score is presented as follows (Altman et al., 2017; Altman, 1983):

$$\mathbf{Z''\text{- score} = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4}$$

Where, $\mathbf{X_1}$ = Working Capital/Total Assets Ratio; $\mathbf{X_2}$ = Retained Earnings/Total Assets; $\mathbf{X_3}$ = Earnings before Interest and Taxes/Total Assets; and $\mathbf{X_4}$ = Book Value of Equity/Total Liabilities. Generally, the higher the Z-score index, the higher firm's financial health.

Second, using REVA as an indicator of firm's financial health emphasizes on shareholders' value (wealth) creation over time by the management for the interest of owners as it takes into consideration the cost of capital employed. According to (Omneya et al. (2021), Nakhaei et al. (2016), Ashraf (2018), Nugroho (2018), REVA is calculated as follows:

$$\mathbf{REVA = NOPAT - (WACC \times M\text{-}Capital)}$$

Where, NOPAT is net operational profit after tax in period t, WACC is weighted average cost of capital, M CAPITAL is the company's market value at the beginning of period t.

It should be noted that:

NOPAT = Earnings before Interest and Tax (1- Tax Rate)

WACC = $\frac{D}{V}\ x\ RD\ x\ (1 - TC) + \frac{E}{V}\ x\ RE$

MCapital = Company Market Value of Equity + Total Debt + Minority Interest

Notation that WACC= Weighted average cost of capital; D/V = "(Total Debt/Total Debt and Equity); V= Total debt (D) + Total equity (E); RD = cost of debt = (Interest Expense/Total Debt); E/V = (Total Equity/Total Debt and Equity); and RE = cost of equity. In this study, cost of equity is measured based on model of Omran and pointon (2004) since this model takes into account the higher market volatility, asymmetrical risk, and firm-specific factors, and adaptability to less efficient markets. According to Omran and pointon (2004), cost of equity is calculated as follows:

Cost of equity = 1/ [PE ratio – (e_0 -d_0)/ e_0]

Where, **PE ratio** = price-earnings ratio (earnings multiplier) = market share price / EPS; **EPS** = net income after tax divided by weighted average of common shares outstanding (Bagh et al., 2016); $\mathbf{e_0}$ = EPS; and $\mathbf{d_0}$ = dividends per share.

Finally, the amount of REVA is divided by total invested capital in order to reduce the impact of extreme values. Generally, the higher the REVA, the higher the firm's financial health.

Concerning to control variables, Empirical models used in this study include control variables which are expected to have an effect on firm's financial health. Based on the prior literature, the control variables include Firm Size (SIZE), Market to Book Ratio (MB), Debt Ratio (DR), Firm Age (AGE), and Covid 19 (COVID) (Dewri, 2022; Shahwan & Habib, 2020; Farooq et al., 2020; Liu & Wang, 2017; Jakub et al., 2015; Moradi et al., 2012; and Demirkan & Platt, 2009). SIZE is measured by using the natural logarithm of firm's total assets. MB is computed by the ratio of market value to the book value of equity. Market value of equity is calculated by multiplying stock closing price to total shares outstanding. DR is computed by the ratio of total debt to total shareholders' equity. AGE is calculated by subtracting the founding year from the current year. Covid-19 (COVID) is a dummy variable that takes the value of (1) during the pandemic years and (0) for all other periods. This control variable was added because the pandemic period had a considerable impact on indicating the growth potential of firms (Ali, 2022).

Based on the previous discussion, the following multiple regression models are developed focusing on the impact of EICS on firm's financial health measured by Z″- score and REVA.

In order to test H_1 which focuses on the impact of EICS on Z″-score, the following regression model is developed:

$$Z''\text{- score}_{i,t} = ß_0 + ß_1\, EICS_{.t} + ß_2\, SIZE_{i.t} + ß_3\, MB_{i.t} + ß_4\, DR_{i.t} + ß_5\, AGE_{i.t} + ß_6\, AQ_{i.t} + ß_6\, COVID_{i.t} + €_{i,t} \quad \text{(Model 1)}$$

In order to test H_2 which focuses on the impact of EICS on REVA, the following regression model is developed:

$$REVA_{i,t} = ß_0 + ß_1\ EICS_{,t} + ß_2\ SIZE_{i,t} + ß_3\ MB_{i,t} + ß_4\ DR_{i,t} + ß_5\ AGE_{i,t} + ß_6\ AQ_{i,t} + ß_6\ COVID_{i,t} + Ɛ_{i,t}$$ (Model 2)

5. Empirical Results:

5.1. Descriptive Statistics of the Research Variables:

Table (3): Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Z"score	200	3.358	1.99	-1.34	8.79
REVA	200	-.009	.023	-.079	.045
EICS	200	.662	.044	.529	.741
SIZE	200	9.653	.61	8.214	11.134
MB	200	1.372	1.02	-1.001	4.341
DR	200	.542	.214	.093	1.205
AGE	200	33.582	15.286	6.563	72.305

The descriptive statistics presents the means, standard deviations, as well as the maximum and minimum values of the study variables in order to describe the characteristics of the sample. The mean value of Z″- score is 3.358, suggesting that on average, the firms in the sample are in a relatively stable financial position, but the standard deviation of 1.99 indicates that there is a considerable variability in financial health among firms. Concerning to REVA, the mean value of REVA is slightly negative at -0.009, with a small standard deviation of 0.023, suggesting that on average, firms are not generating sufficient

returns to cover the cost of capital. The minimum (maximum) values of Z″- score and REVA are -1.34 (8.79) and -0.079 (0.045) respectively, indicating that while some firms are underperforming, others are performing better.

Furthermore, the descriptive statistics shows that EICS represent on average 0.662, with a slight standard deviation of 0.044. This suggests that the majority of firms have moderate EICS, with only slight fluctuations within the sample (ranging from a minimum of 0.529 to a maximum of 0.741).

With regard to control variables, it is shown that Size with a mean value of 9.653 and a standard deviation of 0.61 shows relatively lower variation compared to other variables, while MB display considerable variability with a mean of 1.372 and a standard deviation of 1.02. Further, the mean value of DR is 0.542, suggesting that on average, firms are financing around 54.2% of their assets with debt, while the wide range (0.093 to 1.205) with a standard deviation of 0.214 reflects the substantial variability in leverage across firms. Finally, the mean value of firm age is 33 years, indicating that, on average the firms are relatively mature, while a standard deviation of 16 years shows a high diversity among firms in the sample.

5.2. Diagnostic Tests:

Testing the assumptions of Ordinary Least Squares (OLS) regression is crucial for ensuring the validity and reliability of the model's results. OLS regression is predicated upon several

fundamental assumptions, including the absence of multicollinearity among the independent variables, independence of errors, and homoscedasticity. If these assumptions are violated, the OLS estimates may become biased, inefficient, or inconsistent, resulting in incorrect inferences and predictions.

In order to check the existence of multicollinearity problem, a Variance Inflation Factor (VIF) analysis is conducted. The findings from the VIF test indicate that none of the independent variables in all models used exceed the threshold value of 10. This suggests that multicollinearity problem does not pose a concern for the subsequent analysis (Hair et al., 2018). Further, in order to check the existence of heteroskedasticity problem, Breusch-Pagan / Cook-Weisberg test is conducted. The findings of Breusch-Pagan / Cook-Weisberg test is significant at ($p < 0.05$) in the first model, whereas it is insignificant in the second model, indicating that there is heteroskedasticity problem in the regression residuals of the first model only. Moreover, in order to check the existence of serial correlation (autocorrelation) problem in the residuals, the Durbin Watson test is employed. It ranges from 0 to 4 and the ideal score ranges from 1.5 to 2.5. According to the results, the values of Durbin-Watson of the models used are below (1.5), indicating that there is a serial correlation problem in the residuals of the models.

5.3. Regression Analysis:

The current study analysis will depend on Generalized Least Square (GLS) regression to test the hypotheses of the study. Specifically, the Feasible Generalized Least Square (FGLS) regression is used to test the first hypothesis of the study. FGLS is considered the best linear estimator used in the existence of both heteroskedasticity and autocorrelation problems (Gujarati and Porter, 2022). With regard to the second model, Prais-Winsten regression is used as it is considered the most suitable estimator employed in case of existence of autocorrelation problem. Prais-Winsten regression, a type of GLS that specifically accounts for autocorrelation. The Prais-Winsten approach adjusts for first-order autocorrelation (AR(1)) in the error terms. All empirical models in this study employ SIZE, SG, DR, AGE and COVID as control variables. This section presents the findings of all empirical models used.

Table 4 presents regression analysis to determine the impact of RPTs on Z″- score, testing H_1 using Model (1).

Table (4): FGLS Regression Results on the Impact of EICS on Z″- score

Z″- score	Coef.	St.Err	t-value	p-value	[95% Conf	Interval]	Sig
EICS	2.374	1.766	1.34	.179	-1.086	5.835	
SIZE	-.337	.174	-1.93	.053	-.678	.005	*
MB	.3	.088	3.42	.001	.128	.471	***
DR	-2.412	.385	-6.26	0.000	-3.166	-1.657	***
AGE	.042	.005	7.83	0.000	.032	.053	***
AQ	-.265	.095	-2.78	.005	-.452	-.078	***
COVID	-.028	.041	-0.67	.501	-.108	.053	
Constant	4.556	1.699	2.68	.007	1.226	7.885	***
Mean dependent var		3.358		SD dependent var		1.990	
Number of obs		200		Chi-square		193.764	

*** *p<.01*, ** *p<.05*, * *p<.1*

Table (4) shows the Chi-square value which measures how well the model fits the data. A large Chi-square value (193.764) indicates that the model explains a significant amount of the variance in the dependent variable (Z″- score). In addition, It is indicated that the coefficient of the main independent variable (EICS) is positive (2.374) and is statistically insignificant (.179) which is greater than 0.05. This implies that there is insignificant impact of EICS on Z″-score, indicating that the EICS cannot affect the short-term financial status of the firm. Thus, the first main hypothesis (H_1) is rejected. Concerning to control variables, the results of the regression analysis revealed that DR and AQ have a significant negative impact on Z″-score, while MB and AGE have a significant positive impact on Z″-score. In addition, it is found that SIZE and COVID have insignificant impact on Z″- score.

Table (5) presents regression analysis to determine the impact of EICS on REVA, testing H_2 using Model (2).

Table (5): Prais-Winsten AR(1) Regression Results on the Impact of EICS on REVA

REVA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
EICS	.163	.053	3.08	.002	.059	.267	***
SIZE	-.006	.004	-1.50	.136	-.014	.002	
MB	-.001	.002	-0.65	.515	-.006	.003	
DR	-.017	.006	-2.73	.007	-.029	-.005	***
AGE	0	0	-2.25	.026	-.001	0	**
AQ	-.001	.002	-0.75	.452	-.005	.002	
COVID	0	.001	-0.01	.994	-.003	.002	
Constant	-.032	.047	-0.68	.496	-.125	.061	
Mean dependent var		0.000		SD dependent var		0.031	
F-test		2.817		Prob > F		0.008	

*** $p<.01$, ** $p<.05$, * $p<.1$

Table (5) documents that the significance of the F- test, with a p-value of 0.008, indicating that the model is statistically significant at the 5% level. This suggests that the independent variables included in the model collectively have a substantial impact on the dependent variable (REVA). It is revealed that EICS has a significant positive impact on REVA because its P-value = 0.002. This indicates that the higher the EICS, the greater the value of REVA. Thus, the second main hypothesis (H_2) is accepted. Concerning to control variables; it is found that AGE has a significant positive influence on REVA, whereas DR has a significant negative influence on REVA. With regard to other control variables (SIZE, MB, AQ and COVID) have insignificant influence on REVA.

6. Discussion of the Findings:

This section discusses the main empirical findings of the current study. These findings indicate that the EICS has insignificant impact on firm's financial health measured by Altman Z″- score. This result can be explained through the lens of nature and components of Z″- score. The Modified Altman Z-score serves as a tool for assessing short-term financial health through the utilization of accounting-based ratios related to profitability, liquidity, and solvency that capture both the current and historical performance of a company.

However, the benefits of maintaining an effective ICS often materialize in the long term through its crucial role it plays in helping to prevent fraud, optimize processes, mitigate risks,

ensure compliance, and maintain financial reporting accuracy. Therefore, the influence of the EICS may not directly translate into the components that drive Z″- score ratios, resulting in insignificant impact of EICS on Z″- score. For example, while strong internal controls prevent fraud or misreporting, they do not necessarily lead to immediate improvements in liquidity or an increase in the company's equity-book value.

While an ICS can contribute to the enhancement of operational controls that ultimately lead to improved profitability, its effect on profitability tends to be nuanced and realized on the long-term. Enhancements to the ICS may facilitate a reduction of losses, promote more effective cost management, or improve the quality of internal reporting, but these effects may not be sufficient to cause a significant increase in profitability in the short term.

Further, Internal controls focus on the management of current assets and liabilities, but their influence is more preventive such as avoiding fraud or mismanagement. While these internal controls may contribute to the stabilization or enhancement of working capital over time, they do not inherently enhance liquidity unless improvements in ICS result in more effective cash management or a decrease in excess inventory or receivables.

Concerning to the ratio of book value of equity to total liabilities, it reflects the firm's capital structure and solvency. While ICS is designed to ensure accurate and compliant financial

reporting, its influence on the book value of equity is generally insignificant unless there are substantial changes in asset valuations or liabilities due to errors or fraudulent activities that the ICS can correct. Such instances are infrequent in organizations with effective internal controls, resulting in a limited effect of the ICS on the book value of equity in most circumstances. Moreover, an effective ICS ensures that liabilities are accurately reported, but it doesn't change the firm's actual capital structure. The impact of EICS on this solvency ratio remains minimal in the short term, unless it fosters more disciplined debt management or capital allocation strategies, which typically require time to affect the balance sheet items.

Furthermore, the empirical findings of the study revealed that the EICS has a significant positive impact on firm's financial health measured by REVA which focuses on long-term economic value creation by considering the returns generated over the cost of capital. It reflects how efficiently the firm uses its capital to generate value for shareholders. A well-structured ICS contributes to operational efficiency, reduces costs, and enhances decision-making processes, thereby directly impacting REVA.

An effective ICS is instrumental in mitigating inefficiencies, fraud, and mismanagement that may undermine a firm's operating profits. By ensuring adherence to established policies, enhancing resource allocation, and ensuring comprehensive operational oversight, an effective ICS reduces the risk of profit erosion.

Moreover, the implementation of enhanced risk management practices and effective internal governance, the organization can concentrate on growth initiatives and operational expansion without the concern that internal inefficiencies may compromise performance. This approach fosters sustainable profitability growth, which, in turn, contributes to an increase in NOPAT over time and positively impacting REVA.

A well-structured ICS is essential for the management of financial, operational, and compliance-related risks. By mitigating the organization's exposure to these risks, ICS can positively influence the firm's WACC, which is a critical determinant of REVA.

Effective ICS instills confidence in investors regarding the management quality of the company and mitigates the risks associated with financial misreporting and operational failures. Consequently, this perception of reduced risk results in a lower expected return on equity demanded by investors, as they perceive the investment in the company as a more secure investment. This, in turn, contributes to a reduction in the overall cost of equity component of WACC.

In addition, an effective ICS facilitates the firm's management of its debt obligations, thereby ensuring timely payments and mitigating the risk of default. This proactive approach can enhance the firm's credit ratings, which in turn may result in reduced borrowing costs. By lowering the cost of debt,

the firm's overall Weighted Average Cost of Capital (WACC) is diminished, subsequently leading to an increase in REVA since it reflects the excess of return over cost of capital.

Besides, ICS plays a crucial role in ensuring that the organization adheres to all pertinent regulations and operational standards, thereby minimizing the potential for costly regulatory penalties or operational interruptions. This mitigation of operational and compliance risks are directly associated with a decreased risk premium, which subsequently lowers the overall cost of capital.

Moreover, REVA takes into account the market value of equity, which reflects investor perceptions of the firm's future potential. An effective ICS can enhance the market value of equity through various ways; Increased Investor Confidence, Reduced Perceived Risk, and Optimized Use of Resources.

Effective ICS is essential for ensuring the accuracy and transparency of financial reporting, thereby mitigating the risk of financial misstatements or fraudulent activities. This level of transparency fosters increased trust among investors, which in turn reinforces the company's reputation within the marketplace. Consequently, investors are more inclined to invest in organizations that exhibit sound governance practices, resulting in high demand for the company's stock and thereby increasing its market capitalization.

Additionally, Investors are inclined to attribute a greater valuation to a company with effective internal controls since it signals better risk management and operational stability. A lower

risk is associated with higher market valuation, as investors exhibit increased confidence in the firm's capability to maintain profitability and growth. Consequently, this enhanced market value of equity has a direct positive impact on REVA.

Moreover, a well-structured ICS facilitates efficient utilization of resources, thereby contributing to improved investment decisions and capital allocation. When management successfully optimizes resource allocation, the organization's potential for future growth is enhanced, which is subsequently displayed in an increase in stock price and market value. Higher expectations for future cash flows and profitability boost market capitalization, thereby enhancing the overall value of the firm.

Accordingly, ICS contributes in promoting sustainable long-term value creation which is a fundamental aspect of REVA. Effective ICS ensures that the firm remains on track to meet long-term objectives, including market expansion, product innovation, and diversification by aligning operational activities with strategic goals. The successful attainment of these objectives generates sustained value for shareholders, which is reflected in higher market value and increased REVA. Besides, effective ICS promotes consistency in operations, thereby enabling the organization to generate value in a reliable manner over time. This consistency is recognized by investors, who respond by assigning a higher valuation to the firm, consequently enhancing its REVA.

In conclusion, the insignificant impact of an effective ICS on a firm's Z″- score is due to the fact that the Z″- score is driven by financial ratios related to liquidity, profitability, and solvency, which are not directly affected by governance improvements or risk management. Conversely, REVA focuses on long-term economic value and capital efficiency, making it more responsive to internal governance, resource allocation, and risk management improvements. Thus, while the Z″- score reflects short-term financial health, REVA captures long-term value creation, explaining the differing effects of EICS on these indicators.

7. Conclusion:

This study aims at investigating the impact of EICS on firm's financial health measured by Altman Z″- score and REVA in order to reflect both short-term and long term perspectives of firm's financial health. Employing Z″- score provides an assessment of the firm's current financial stability and risk of bankruptcy, making it a short-term indicator of financial health. While REVA is employed to provide an assessment of the firm's ability to generate returns above its cost of capital to focus on the amount of value created for shareholder's overtime, providing a longer perspective of financial health. In addition, REVA takes into consideration the market's valuation of the firm's capital, providing a more comprehensive and market-sensitive measure of financial health. This study used a sample consisted of 40 Egyptian listed firms over a period of 5 years from 2018-2022.

The findings of this study provide valuable insights into the influence of the EICS on a firm's financial health. The empirical evidence showed that EICS has an insignificant impact on financial health as measured by the Modified Altman Z″- score, which primarily focuses on short-term financial ratios related to profitability, liquidity, and solvency. Although EICS can mitigate fraud and enhance operational efficiency, its impact on liquidity, profitability and solvency is insignificant. Since, the benefits of maintaining an effective ICS often materialize in the long term through its crucial role it plays in helping to prevent fraud, optimize processes, mitigate risks, ensure compliance, and maintain financial reporting accuracy. Therefore, the influence of the EICS may not directly translate into the components that drive Z-score ratios, resulting in insignificant impact of EICS on Z″- score.

In contrast, the results of the study revealed that there is a significant positive impact of EICS on financial health as measured by REVA, which reflects the long-term economic value creation and capital utilization efficiency. An effectively designed EICS promotes operational efficiency, mitigates risks, and bolsters investor confidence, all of which contribute to an increase in market value and a reduction in the firm's weighted average cost of capital (WACC). These enduring enhancements in operational performance, capital structure, and investor perceptions directly improve REVA, highlighting the essential role of EICS in the sustainable value creation for shareholders.

The findings of this study provide significant implications for policymakers and the Egyptian Stock Exchange Authority (EGX) by emphasizing the critical role of the EICS in fostering long-term financial sustainability, as indicated by REVA. Policymakers can use these results to strengthen corporate governance frameworks by mandating stricter IC regulations, improving risk management, and ensuring compliance with laws and regulations. Additionally, these results indicate that the Egyptian Stock Exchange Authority should enforce penalties on listed companies that fail to adhere to the regulations, particularly regarding to disclosure requirements of the EICS. Consequently, this can enforce companies to prioritize the ICS and encourage transparent disclosure of their effectiveness to enhance investor confidence, attract foreign investment, and facilitate greater market transparency.

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Appendix:

Table (2) The Effectiveness of Internal Control Structure Index

Control Environment		
1	"Are the rules of professional conduct and professional ethics applicable in the firm disclosed?"	(Yes=1, No=0)
2	"Chairman of the board also the controlling shareholder?"	(Yes=0, No=1)
3	"Ownership percentage of institutional shareholders"	To be standardized
4	"Number of institutional shareholders in the top 10 shareholder list"	To be standardized
5	"Average percentage of shareholders taking part in the shareholder meeting"	To be standardized
6	"Board size"	To be standardized
7	"Number of board committees"	To be standardized
8	"Any committee in charge of internal control (audit committee or risk management committee at the board level)?"	(Yes=1, No=0)
9	"Number of audit committee members"	To be standardized
10	"Percentage of independent directors on the board"	To be standardized
11	"Is the board chairman and the CEO one person?"	(Yes=0, No=1)
12	"Percentage of executives on the board"	To be standardized
13	"Percentage of shares owned by the management"	To be standardized
14	"Any internal audit department in the company?"	(Yes=1, No=0)
15	"Does the internal audit department report to the board?"	(Yes=1, No=0)
16	"Any human resource policy?"	(Yes=1, No=0)
17	"Does the human resource policy contain provisions on recruiting?"	(Yes=1, No=0)
18	"Does the human resource policy contain provisions on training?"	(Yes=1, No=0)
19	"Does the human resource policy contain provisions on job transferring?"	(Yes=1, No=0)
20	"Does the human resource policy have previsions on rewards or punishments?"	(Yes=1, No=0)
21	"Percentage of shares owned by employees"	To be standardized
22	"Highest reward/honor bestowed on the chairman and the CEO"	(1= if the reward on the national level, 0.5= if the reward on the sector level, 0= otherwise)
23	"Any employee training carried out by the company?"	(Yes=1, No=0)
24	"Any social responsibility report released?"	(Yes=1, No=0)
25	"Any charitable donation?"	(Yes=1, No=0)
26	"Does the company pay attention to environment, safety, and product quality?"	(Yes=1, No=0)
27	"Any corporate culture?"	(Yes=1, No=0)
28	"Any merger or restructuring occurred?"	(Yes=0, No=1)
	Punishment and other negative event	
29	"Any punishment for the firm, executives, directors, and supervisors from the Ministry of Justice, Ministry of Finance, CSRC, or Shanghai/ Shenzhen Stock Exchange?"	(If Yes= the overall rating of IC will be reduced by 50%)
30	"Any irregularity disclosed by the media and other channels?"	(If Yes= the overall rating of IC will be reduced by 30%)
Risk Assessment		
1	"Any committee or department for risk management?"	(Yes=1, No=0)

2	"Any risk evaluation disclosed in the annual report?"	(Yes=1, No=0)
3	"Any significant loss over the past 2 years?"	(Yes=0, No=1)
4	"Any quantitative risk analysis in the annual report or in the internal control evaluation report?"	(Yes=1, No=0)
5	"Any analysis of risk tolerance?"	(Yes=1, No=0)
6	"Any risk management measure taken to control risk?"	(Yes=1, No=0)
7	"Any change in risk evaluation and response from the annual report for last year to that for this year?"	(Yes=1, No=0)
Control Activities		
1	"Any loss of inventories?"	(Yes=0, No=1)
2	"More asset impairment this year than last year?"	(Yes=0, No=1)
3	"Any committee or department for budgeting?"	(Yes=1, No=0)
4	"Is annual budget discussed in the shareholder meeting or other similar setting?"	(Yes=1, No=0)
5	"Any department in charge of performance analysis?"	(Yes=1, No=0)
Punishment and other negative event		
6	"Number of interruptions in operations, such as contractual disputes and inventory losses"	To be standardized
7	"Any significant product safety accident?"	(If Yes= the overall rating of IC will be reduced by 30%)
Information and Communication		
1	"Any channel for internal communication of information?"	(Yes=1, No=0)
2	"Number of board meetings"	To be standardized
3	"Any mechanism for information disclosure?"	(Yes=1, No=0)
4	"Any mechanism for managing relations with investors?"	(Yes=1, No=0)
5	"Any link for investor relations on the corporate website?"	(Yes=1, No=0)
6	"Are all resolutions from board meetings disclosed?"	(Yes=1, No=0)
7	"Is the annual audit opinion a qualified one?"	(Yes=0, No=1)
8	"Any auditor switching?"	(Yes=0, No=1)
9	"Are the periodic reports released on the scheduled date?"	(Yes=1, No=0)
Punishment and other negative even		
10	"Any restatement, correction, or supplement of the financial statements?"	(If Yes= the overall rating of IC will be reduced by 20%)
Monitoring		
1	"Any inspection of internal control from the internal audit department?"	(Yes=1, No=0)
2	"Did the audit committee discuss the internal control inspection in its responsibility report?"	(Yes=1, No=0)
3	"Does the audit committee report include essential observations that need to be addressed?"	(Yes=0, No=1)
4	"Number of meetings of the audit committee during the year"	To be standardized
5	"Are audit committee reports presented to the board of directors?"	(Yes=1, No=0)