The effect of the effectiveness of internal control structure on the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange: Does the inflation rate matter?

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Abstract

This research focuses on the importance of the internal control structure and the effect of its effectiveness on the accounting reporting complexity in the Egyptian environment, especially through the deficiencies in the regulation and legislation in this environment, with regard to assessing and disclosing the effectiveness of internal control structure, in addition to examining the effect of both; some firm's operational characteristics (firm size, and firm age), and the inflation rate on relationship in question. On the other hand, the effect of other firm's operational characteristics (financial leverage, loss, and sector) on the accounting reporting complexity. And all of that applied to non-financial firms listed on the Egyptian Stock Exchange through (2016- 2021). With regard to the results of the fundamental analyses, the researchers found that there is a positive and significant effect of the effectiveness of the internal control structure on the accounting reporting complexity, as well as, we found that this relationship differs by the change of firm's size and firm's age, in addition to the insignificant effect of the inflation rate as a moderating variable. While results in other analyses shows there is a significant effect of

the nature of ownership (family vs. non-family), as a moderating variable. As well as, the insignificant effect of floatation of exchange rate and the inflation rate as single control variables once, and again the significant of the joint effect of both; the inflation with floatation of exchange rate as an interactive control variable. Also, the study concluded that the preference of the methods used to treat the secondary variables (moderators and control) with the fundamental analyses. And so, this research sheds light on the necessity for the Egyptian Financial Regulatory Authority to oblige firms listed on the Egyptian Stock Exchange to assess and disclose the effectiveness of their internal control structure, in addition to the auditor's report on that event alignment with SOX.

Keywords: The effectiveness of internal control structure, Accounting reporting complexity, Firm's operational characteristics, Inflation rate, The nature of ownership (family vs. non-family), Floatation of exchange rate.

1. Introduction

Accounting reporting complexity is one of the most important issues in the financial reporting environment, resulting from the recurring changes and complex accounting standards and principles, necessary to keep up with the changes and development in the firm's business environment in particular and the economic events in the whole world in general (Cohen, 2020; Khalil, 2023a). Sec (2008) identified two aspects of accounting reporting complexity, which are standards that are difficult to understand and apply, as well as the volume and diversity of accounting standards.

Financial reporting quality is affected by many factors such as accounting complexity and the effectiveness of internal control structure (Soodanian et al., 2013; Al Sayrafi, 2021; Bakheet, 2022). On one hand, accounting reporting complexity leads to less credible financial reports because it increases the likelihood of errors, incorrect application of GAAP, and therefore material misstatements, which

ultimately decrease this quality (Silva et al., 2019; Lai et al., 2020). On the other hand, the importance of the effectiveness of internal control structure is on its ability to limit material misstatement, which increase the reliability and transparency of financial reports and force financial reporting quality as well (Ali, 2020; Lofty et al., 2021).

Prior researches (Bardhan et al., 2015; Smith et al., 2018; Kim et al., 2019; Khalil, 2023b) provide a mixed bag of proxies which affect and is affected the effectiveness of internal control structure such as; firm size, firm age, loss, financial leverage, sector and accounting reporting complexity. As a result of the importance of the influential relationship between the effectiveness of internal control structure and the accounting reporting complexity, some historical studies (Zhang et al., 2018; Lai et al., 2020; Bakheet, 2022; Khalil, 2023b) took up this relationship, directly or indirectly, and reached to mixed and conflicting results on this subject.

So our research problem focused on how to answer the following questions practically; does the effectiveness of the internal control structure of non-financial firms listed on the Egyptian Stock Exchange affect the accounting reporting complexity of these firms? Does this influential relationship differ by the difference of firm's size and firm's age, combined, for those firms once, and the inflation rate, as moderating variables? Do the other firm's operational characteristics affect (financial leverage, loss, and industry sector) as control variables, on the accounting reporting complexity of these firms in the context of the influential relationship under study?

Therefore, this research aims to study and investigate the relationship between the effectiveness of internal control structure and the accounting reporting complexity, as well as testing the difference in this relationship depending on both; some firm's operational characteristics (firm size and firm age), and the inflation rate, in addition to studying and testing the effect of some other firm's operation characteristics (financial leverage, loss, and industry sector) on the accounting reporting complexity of these firms in the context of the influential relationship under study, applied on a sample of non-

financial firms listed on the Egyptian Stock Exchange during the period (2016-2021).

Moving to the importance of this research it verifies through alignment with foreign literature that dealt with studying and testing the effect of the effectiveness of internal control structure on the accounting reporting complexity, and whether this effect differs by the difference of both; firm's size and firm's age, combined, and the inflation rate in different business environment and different periods. And to narrow the gap in the Arabic academic researches, especially the Egyptian one, in this subject. More importantly, the researchers developed an index to measure both; the effectiveness of internal control structure according to the COSO (2013) framework, and the accounting reporting complexity addresses the multidimensional aspects of complexity.

The limitation of this research is obvious in restricting the research sample to only private listed companies excluding both; private companies that are not listed on the Egyptian Stock Exchange, in addition to financial institutions, whether they are listed or not listed on the Egyptian Stock Exchange. Also some other determinants of the firm's operational characteristics (such as; year, and profitability) are outside the scope of the research. Finally, the generalization of the research results is conditioned by the controls used in selecting its' sample and the methodology used to test its hypotheses.

The remainder of the paper will be organized as follows: at first, a section discusses prior literature related to the effectiveness of internal control structure, the accounting reporting complexity, then the relationship between the effectiveness of internal control structure and the accounting reporting complexity, in addition to the analyses of the moderating effect of both; some firm's operational characteristics (firm size and firm age), and the inflation rate, and forming the hypotheses, then section discusses the research methodology and design, and contentious with section presents the empirical results, finally section provides a discussion and conclusion of the results.

2. Literature review and hypotheses development

2.1. The effectiveness of internal control structure

Internal control structure is a strong stone in the firm's internal structure, which take part in achieving this firm targets through its goals. Also, it is considers as a practical mechanism to ensure the reliability of the information of financial reporting, so the internal control structure represent a shield for Stakeholders to protect their interests, according to its accreditation as a tool for achieving financial reporting quality (Ali, 2020; Khalil, 2023a).

According to many prior views (Lai et al., 2020; Bakheet, 2022, Khalil, 2023b), the effectiveness of this shield (ICS) exists when each of the components of the internal control structure works together and in an integrated manner, as they should be, achieving with that its three goals; financial reports free of material misstatements, efficiency and effectiveness operations, and compliance with laws and regulations. As well as, this effectiveness is affected by many drivers such as; firm size, firm age, internal auditing quality, auditor's expertise, and audit fees, but the most important one is the accounting reporting complexity.

By focusing on the measurements of the effectiveness of the internal control structure we concluded that these measures vary from one firm's business environment to another according to the legislative and regulatory environment where firms belong. In countries like the U.S.A the researchers (Bardhan et al., 2015; Hoitash & Hoitash, 2018; Loughran & McDonald, 2019; Dashtbyaz et al., 2019; Lobo et al., 2020; Lai et al., 2020; Bae et; al., 2021) depending on the report of the effectiveness of internal control structure prepared by both management and auditor according to section (404) in SOX (2002). As for researchers in countries that suffer from deficiencies in this field, they either depend on the checklist as a measure of this effectiveness (Saeed, 2014; Pizzini et al., 2015) or use a qualitative and quantitative index depending on (AHP) (Chen et al., 2020; Bakheet, 2022; Abu Alala, 2022).

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Moving to the repercussions of the effectiveness of internal control structure on the accounting reporting complexity, the prior researchers concluded (Hu et al., 2013; Clinton et al., 2014; Chen et al., 2017; Rahman et al., 2019; Ramili, 2020a; Lai et al., 2020; Lobo et al., 2020; Abu Alala, 2021; Bae et al., 2021; Khalil, 2023b) that this effectiveness affected, directly or indirectly, on the credibility and transparency of the information contained on this reports by ensuring that the financial reports are free of material misstatements. Which in turn affects the quality of those financial reports, in light of its impact on the accounting policies and its ability to restrict the illegal actions of management, as well as, the impact of this effectiveness on various financial performance indicators, and its contribution to the improve in the audit quality and investment efficiency, in addition, to reducing the audit fees and stock price crash risk, and all of that enhancing the reliability of financial reporting, thus the repercussions of ensuring that the financial reports free of material misstatements, as the first goal of internal control structure, is the most reflective of the effectiveness of that structure.

The bottom line, we have a strong view about the extent of the importance of the effectiveness of the internal control structure which is its ability to influence on the financial reporting quality, hence stakeholders decisions. In addition to depending on a proxy based on a mixed measure combines both a checklist and the qualitative and quantitative index depending on (AHP) as a measurement of the effectiveness of internal control structure as considered that Egypt is one of these countries that suffers from deficiencies in this field. Therefore, this measure is considered the most appropriate for the Egyptian business environment.

2.2. Accounting reporting complexity

Accounting reporting complexity has been an eternal problem, since the origins of accounting principles, accounting policies, and accounting standards until now with the updating of these standards, which all affect the degree of the accounting reporting complexity and

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thus the financial reporting quality (SEC, 2008; Francis& Gunn, 2015; Silva et al., 2019; Cohen, 2020; Khalil, 2023b).

According to that, Khalil (2023b) defined the accounting reporting complexity as **"the inherent difficulty in applying generally accepted accounting principles (GAAP), choosing and applying accounting policies concerning the description, measurement, presentation, and disclosure, as well as designing and operating the accounting information system that produces information that meets its qualitative characteristics and is useful to its users"**.

Drawing on prior views in this field (Bentley et al., 2017; Silva et al., 2019; Cohen, 2020; Baik et al., 2020; ACCA, 2020; Lai et al., 2020; Morais, 2020; Amr, 2022), it's clear that they agreed on that many drivers and reasons are increasing the degree of the accounting reporting complexity and limiting its reliability and transparency, which in turn decrease the quality of these reports. And the most important ones are; foreign transactions, segments, and branches, multi-products, hedging, derivatives, the nature of ownership especially the family one, financial lease, special purpose entities (SPE), firm's strategy, merger and acquisition (M& A), restatement, and sales growth rate.

By focusing on accounting reporting complexity measures, we found that the majority of researchers (Soodanian et al., 2013; Lawrence et al., 2016; Lo et al., 2017; Bentley et al., 2017; Lawrence et al., 2018; Silva et al., 2019; Cohen, 2020; Lai et al., 2020) depending on some drivers of this complexity to measure it, such as (segments, foreign transaction, restatement, derivatives, M&A, SPE, and multi-products), either individually or aggregated through an index in terms of these drivers. Others (Loughran& McDonald, 2014; Efretuei& Hussainey, 2022) have measured accounting reporting complexity according to the financial reporting readability using the FOG index.

Depending on some complexity drivers, Francis & Gunn (2015) developed an index according to industry guidelines "industry series,

FASB 900" provided by the Financial Accounting Standard Board (FASB topic 900) and the American Institute of Certified Public Accountants (AICPA) and accounting practice guides. On the same page, Loughran & McDonald (2019) formed an index depending on a guide list of 255 words each one considered as a driver or/and reason for accounting reporting complexity such as; foreign transactions, hedging, derivatives, financial lease, special purpose entities (SPE), merger and acquisition (M& A), and restatement. The degree of this complexity is determined by how many times these words have been repeated in financial reports. Finally, we believe that all these measures depend on the firm business environment.

From all of the above we concluded that the accounting reporting complexity is a difficult challenge and an obstacle in the firm's way to have proper quality in its financial reporting, which is a sign that it`s reports is free from any material misstatements, and thus, the reliability and transparency of the information in these reports, which in turn effect on therefore the stakeholder's dependence on the information in this financial reporting to make their decisions. As well as, we adopted an index to measure this complexity depending on the most important drivers in the previous studies, according to our belief that this index especially, is a well representative and more feasible to the Egyptian business environment.

2.3. The analysis of the relationship between the effectiveness of internal control structure and the accounting reporting complexity, and the first research hypothesis development:

The internal control structure, as we mentioned earlier, it is the shield to protect the stakeholder's interests by providing transparent and credible information, for the purpose of making decisions, and that when this structure components work together efficaciously, it prevent or/ and discover or/ and correct any material misstatement in financial reporting in order to improve its quality, and the accounting reporting complexity is one of the most important element in terms of it`s effect, especially in this days, which limits this effectiveness and therefore the ability of internal control structure to achieve its three

goals, and the most important one of them all, financial statement free from any material misstatement (Ali, 2020; Al Sayrafi, 2021; Abu Alala, 2021; Khalil, 2023b).

On the one hand, the previous researchers (Doyle et al., 2007; Zhang et al., 2018; Loughran& McDonald, 2019; Bimo et al., 2019; Amr, 2022; Khalil, 2023b) agreed that the accounting complexity has a remarkable and direct effect on the accounting reporting quality, either by high information asymmetry or the readability of financial reporting, therefore, the dependence of stakeholders on these reports' information. on the other hand, the indirect effect on the credibility and transparent of financial reporting, and consequently the quality of those reports, through the effect of that complexity on the how long and effort that auditor needs, due to the high risk of the material misstatements inherent in that complexity, as a result of the high risk of control and inherent risk, which in turn effects on the audit quality and efficient and audit fees, considering that the audit is a governance and oversight mechanism that adds confidence to the financial reporting. Therefore, according to the above studies, both the effectiveness of internal control and the accounting reporting complexity are one of the most important aspects of the quality of financial reporting.

On the same page, the prior researchers (Hoitash& Hoitash, 2018; Loughran& McDonald; 2019; Silva et al., 2019; Baik et al., 2020; Khalil, 2023b) aptly that accounting complexity creates new management opportunities for fraud in financial reports, as a result of the complexity nature involved in these reports accounts and related with fair value derivatives, hedging, and financial lease, which all generate material misstatements and in turn magnify the risk of these material misstatement, in the same context the ineffectiveness of internal control structure support the negative impact of the accounting complexity on firm's financial reports. Thus the effectiveness of internal control structure works as a filter for these material misstatements, especially for those accounts that are characterized as a complex ones.

And although different methodologies and environments were used in the studies that dealt with the relationship between the effectiveness of internal control structure and the accounting reporting complexity (Saeed, 2014; Bentley et al., 2017; Yazawa, 2015; Bardhan et al., 2015; Zhang et al., 2018; Hoitash& Hoitash, 2018; Chen et al., 2020), they agreed that there is a significant relationship between the effectiveness and complexity, either directly or indirectly, depending on the different dimensions of both variables such as; audit fees, restatement, firm's strategy, foreign transactions, and segments. Also, they found that the firms that disclose material weakness in their internal control structure tend to be more complex the their counterparts, and that supports our belief that the ineffectiveness of internal control structure increases the negative effect of accounting reporting complexity and supports it.

According to the previous discussion, there is a reciprocal relationship between the effectiveness of internal control structure and the accounting reporting complexity. Both of them affect the quality of financial reporting, considering that the accounting complexity causes increasing in the weaknesses of the internal control structure and limits its ability to guarantee that financial reports are free from any material misstatement, the important goal of it. And in the same context the ineffective internal control structure couldn't prevent or/ and discover or/ and correct any material misstatement in financial reporting caused as a result of accounting complexity, then that ineffectiveness of this structure couldn't prevent or decrease the negative effect of complexity on the financial reporting. This supports our head to study and test this relationship in the Egyptian business environment. As well the first hypothesis is derived as follows:

H$_1$: The effectiveness of internal control structure significantly affects the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange.

2.4. The analysis of the moderating effect of some firm's operational characteristics (firm size, firm age) on the essential relationship, **and the second research hypothesis development:**

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The firm's operational characteristics play an essential role in management motivations, which would influence its choices and practices of alternatives and accounting policies (Sharaf, 2019; Khalil, 2023b). And according to historical research (Talkhan, 2017; El Araby, 2022; Khalil, 2023b), the firm's operational characteristics can be defined as "**a set of features that encapsulate technical and organizational dimensions, ownership structures and administrative orientations, funding avenues, accounting policies, and the overall financial health of firms, and their material, human and technological capabilities, which is a basis for distinguishing between them**".

In this context, some prior research focused on studying and testing some of a firm's operational characteristics such as (firm size, firm age, profitability, and financial leverage) as some of the most important and essential features that affect many dimensions such as (the accuracy of auditor's opinion, financial reporting quality, accounting conservatism, internal control structure weaknesses, and accounting reporting complexity), due to the importance of their impact on these dimensions (Ali& Shehata, 2017; Zatoot, 2019; Bimo et al., 2019; El Araby, 2022; Khalil, 2023a). The most influential of these firm's operational characteristics were (firm size, and firm age), given that they are considered important determinants of both the effectiveness of internal control structure and accounting reporting complexity.

From this insight and according to firm size, the historical researches (Smith et al., 2018; Rostami et al., 2019; Silva et al., 2019; Lotfy et al., 2021; Khalil, 2023b) have different viewpoints that the big (small) firms tend to be more complex (less complex), due to the diversity of their products and assets, increasing of market share, and the accounting complexity of its transaction, as result of their encompass tangible, human, and technological resources, that considered an essential reasons of accounting reporting complexity, and in the other hand, these resources support the management to design and operate an effective internal control structure.

Thus according to firm age, some prior researches (Doyle et al., 2007; Soodanian et al., 2013; Bardhan et al., 2015; Ji et al., 2015; Lotfy et al., 2021) agreed that the disclosure of material weaknesses in internal control structure increase in the younger firms compared to the older ones, due to the older firms being more experienced in the risks of the industry, which reflect on its knowledge to design and operate internal control structure fitted in these firms business nature. In the same link, older firms have experienced and wise employees in choosing and applying alternative accounting policies, which in turn decreases the accounting reporting complexity (Smith et al., 2018; Silva et al., 2019; Khalil, 2023b).

Drawing from these insights, the researchers concluded that the bigger and older the firms are, the more experienced and familiar with the risks of their industry nature, and have more resources to support the implications of these risks, and all of these may affect both; firm's ability to design and operate an effective internal control structure and decreasing the complexity of financial reporting. So from our point of view, we believe that both; firm size and firm age affect the essential relationship under the study, thus, we aim to study and test them as moderating variables on the relationship between the effectiveness of internal control structure and the accounting reporting complexity, and derived the second hypothesis as follows:

H$_2$: The significant effect of the effectiveness of internal control structure on the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange differs by the difference of firm's size and firm's age, combined, of those firms.

2.5. The analysis of the moderating effect of the inflation rate on the essential relationship, and the third research hypothesis development:

Inflation and rising interest rates have an essential effect on the accounting reporting complexity, which may be direct or indirect according to the firm's industry, and so the management should evaluate the implications of this inflation on the accounting reporting, and the assumption used in this purpose. On the other hand, firms

should assess the risks of this inflation and its implication on the internal control structure, which may affect, directly or indirectly, on the effectiveness of that structure (EY, 2023).

According to (Zamel et al, 2020; Helaly, 2022; CBE, 2023) we aptly defined the inflation rate as "**the general increase in the price level of goods and services and the erosion and decline in purchasing power**". EY(2022) echoed this sentiment, drawing a link between the effectiveness of internal control structure and the accounting reporting complexity, on the one hand, it indicates that the changes in the inflation rate have an essential effect on some financial reporting items such as (financial estimates, taxes, foreign transactions, financial lease, derivatives and its fair value) and all of that considered as an accounting reporting complexity's drivers and reasons, which may increase the negative impact of complexity on the financial reporting (Khalil, 2023b).

On the other hand, high inflation motivates the firms to revisit their risk assessment of operation and environmental changes, as considered one of the five components of the internal control structure and effect on its effectiveness (COSO, 2013), also if these changes are material and need significant changes in the designing and/or operating the internal control structure, which may have an effect on its ability to prevent or/ and discover or/ and correct any material misstatement in financial reporting (EY, 2023).

Drawing from these insights, the question here is: Does inflation effect on the relationship between internal control structure and the accounting reporting complexity, that's why the researchers considered studying and testing the moderating role of the inflation rate on this essential relationship, and derived the third hypothesis as follows:

H₃: The significant effect of the effectiveness of internal control structure on the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange differs by the difference of the inflation rate.

3. Research Design and Methodology

3.1 Population and sample of the study

The study population consists of non-financial companies listed on the Egyptian Stock Exchange during the period from 2016 to 2021[1]. The research focused on a judgmental sample from this population, where financial companies were excluded from the scope of the study due to the different nature of their activities and the rules governing this activity differs from those of non-financial companies, as well as companies not listed on the Stock Exchange, in addition to companies listed on the stock Exchange but prepare their financial statements in a foreign currency (Abozaid et al., 2020). The final sample consisted of 600 firm-year observations.

3.2 Research design and measurements

The research design presents our view and study hypotheses, as follows:

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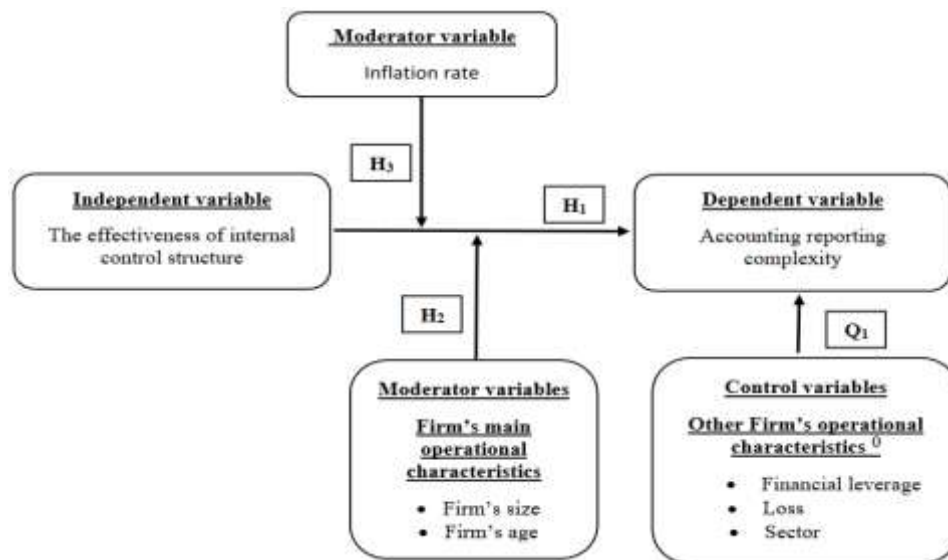
[1] The study period was determined from 2016 to 2021 for more than one reason, the most important of which is; After the adoption of the International Financial Reporting Standards in Egyptian in 2015, some of which focus on the problems of accounting for hedging operations, fair value, comprehensive income and its components, and other areas that require personal judgment on the part of the financial accountant, especially regarding complex accounting reports.

Panel (1)

Source: researchers design

Table 1: definition and measurement of study variables:

variable	Measurement
Independent variable: The effectiveness of internal control structure (ICSE)	Measured by an index according to COSO (2013) framework (Abu Ala, 2022, Khalil, 2023a).
Dependent variable: Accounting reporting complexity (ARC)	Measured by an index content of (25) of the most complex elements in financial reports (ACCA, 2020; Khalil, 2023b).
Moderator variables: firm's main operational characteristics:	
Firm size (Fsize)	Dummy variable that is equal to one if the natural logarithm of the observation total assets is more than the average of sample observations, otherwise it is equal to zero (Amr, 2022; Khalil, 2023b).
Firm age (Age)	Dummy variable that is equal to one if the natural logarithm of the number of years observed since the audit client's firm was registered on the stock exchange until the year of testing is more than the average of sample observations, otherwise it is equal to zero (Amr, 2022; Khalil, 2023b).
Inflation rate (INF)	Measured by the following equation: $$\frac{INF_{xX} - INF_{X-1}}{INF_{X-1}}$$
Control variables: other firm's operational characteristics[2]**:**	
Leverage (LEV)	Dummy variable that is equal to one if the percentage of the total liabilities divided by

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[2] Contentious the effect of a firm's operational characteristics on the accounting reporting complexity. Prior researches (Cetorelli & Goldberg, 2014; Francis & Gunn, 2015; Shu et al., 2018; Silva et al., 2019; Khalil, 2023b) discussed this relation as that characteristics are one of many drivers which may increase or decrease, directly or indirectly, the accounting reporting complexity. So the researchers focused on some of these drivers such as; financial leverage, loss, and industry sector, which in our consideration are the most important and effective in that complexity. According to financial health represented in (leverage and loss), historical researches (Cetorelli & Goldberg, 2014; Francis & Gunn, 2015; Silva et al., 2019; Khalil, 2023b) aptly that firms which characterized as complex firms tend to have high financial leverage, in addition to the possibility of it being exposed to the risk of bankruptcy as a result of the repeated losses, compared to its less complex counterpart. On the other hand, the degree of a firm's accounting reporting complexity is inherent to the nature of its industry sector. According to the regularity rules of each sector and firm's transaction related to that sector which in turn increases the information asymmetry, and decreases the readability and credibility of financial reporting as a result of its complexity (Francis & Gunn, 2015; Talkhan, 2017; Silva et al., 2019; Khalil, 2023b).

	total assets of the observation is more than the average of sample observations, otherwise it is equal to zero (Bae et al., 2021; Khalil, 2023a).
Activity results (LOSS)	Dummy variable that is equal to one if audit client's firm had losses in the end of fiscal year, otherwise it is equal to zero (Zaki, 2022).
Industry sector (SEC)	Dummy variable equal to one if audit client's firm belongs to specific sector, otherwise it is equal to zero (Talkhan, 2017; Zaki, 2018).
Other analyses variables:	
The nature of ownership (family vs. non-family)	Dummy variable equal to one if audit client's firm belongs to family firms, otherwise it is equal to zero (El Madbouly, 2017; Ramili, 2020b).
Floatation of exchange rate	Dummy variable equal to one if the observation year is 2016 otherwise it is equal to zero (according to the CBE decision to float the exchange rate of the Egyptian pound)

3.3 Research model

Sample and multiple linear regression analysis are used to test our relationships and hypotheses, the research models as are follow:

$$ARC = \beta_0 + \beta_1 \, ICSE + \pounds_{it} \tag{1}$$

$$ARC = \beta_0 + \beta_1 \, ICSE + \beta_2 \, Fsize + \beta_3 \, ICSE* \, Fsize + \beta_4 \, Age + \beta_5 \, ICSE* \, Age + \pounds_{it} \tag{2}$$

$$ARC = \beta_0 + \beta_1 \, ICSE + \beta_2 \, INF + \beta_3 \, ICSE* \, INF + \pounds_{it} \tag{3}$$

$$ARC = \beta_0 + \beta_1 \, ICSE + \beta_2 \, LEV + \beta_3 LOSS + \beta_4 \, SEC + \pounds_{it} \tag{4}$$

Where ICSE, INF, Fsize, Age, LEV, LOSS as described in the previous table, ICSE*Fsize, ICSE*Age, ICSE*INF, are the interactive variables of (Fsize, Age, and INF) and the effectiveness of internal control structure, $\pounds$= error term, $_{it=}$ for firm (i) in year (t).

4. Empirical findings

4.1 descriptive statistics of data

Regarding our descriptive statistics and correlation coefficients in table (2, 3). Starting with the dependent variable (ARC) we found that the minimum and the maximum value fluctuate between (.32 – .76), and that the mean value of it (.5527) is higher than its standard deviation (.07710) which statistically means that (ICSE) doesn't

contain abnormal values.

Considering the independent variable (ICSE) it's clear that the minimum and the maximum value fluctuate between (.00 – 1.00), as well the mean value of it (.4533) is lower than its standard deviation (.49823) which statistically means that (ICSE) contains abnormal values, but the researchers believe that variable doesn't contain any of these values due to being measured as a dummy variable equal to one or zero. And by analyzing the correlation coefficient we found that there is a positive and significant association between (ICSE) and (ARC) at the value (.190).

In the same context, we found that the minimum and the maximum values of the variables (Fsize, Age) and their interactive variable (ICSE* Fsize, ICSE* Age) are fluctuating between (.00 – 1.00), and (.00- 1.16) for the inflation rate(INF) and its interactive variable (ICSE*INF), besides that the mean value of both (Fsize, ICSE* Fsize) (.5000- .2850) are lower than there standard deviation (.50042- .45179), however, the researchers believe that both of two variables don't contain any abnormal values because the nature of being dummy variables[3], also, we found that the association between (ARC) and (Fsize, ICSE* Fsize) are positive and significant association at the values (.195- .161).

Contentious that, we found that the mean value of the firm age (Age) (.6733) is higher than its standard deviation (.46939), and the mean of its interactive variable (ICSE* Age) (.3233) is lower than its standard deviation (.46814), however, it doesn't contain any abnormal values according to its dummy nature [4]. In addition to the significant negative association between (ARC) and (Age) at the value (-.123), as well the insignificant association between firm age interactive variable (ICSE* Age) and (ARC) at the value (.043). Also, we found that the

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[3] The interactive variable (ICSE* Fsize) is measured by the product of the firm size variable (Fsize) and the effectiveness of internal control structure (ICSE) variable. Since these variables are measured as dummy variables, they take values (1), (0), which affects the value of the interactive variable (ICSE* Fsize), which ranges between two values (1, 0), as a result of being affected by both measurements.

[4] The interactive variable (ICSE* Age) is measured by the product of the firm age variable (Age) and the effectiveness of internal control structure (ICSE) variable. Since these variables are measured as dummy variables, they take values (1), (0), which affects the value of the interactive variable (ICSE* Age), which ranges between two values (1, 0), also as a result of being affected by both measurements

mean value of both (INF, ICSE* INF) (.2550- .0310) are lower than their standard deviation (.42352- .16567) which statistically means that (INF, ICS*INF) probability contains abnormal values, which was reflected in the insignificant of their correlation coefficients with (ARC) at the values (-.015- .042).

In light of the other firm operational characteristics, we found that the minimum and the maximum values of the variables (LEV, LOSS, Sec Industrial, Sec Commerce, Sec Estates, Sec Services) fluctuate between (.00 – 1.00). Contentious the statistics results, we found that the mean values of these variables (.3933- .2483- .4083- .0383- .2250- .1983) are lower than their standard deviation (.48890- .43241- .49194- .19216- .41793- .39908), as we reviewed previously that the nature of dummy variable makes these variables free of outliers. According to person correlation coefficients, the association between both (LOSS, Sec Commerce) and (ARC) are negative and significant association at the values (-.194- -.089) respectively. On the contrary, we found that there are insignificant associations between (LEV, Sec Industrial, Sec Estates, Sec Services) and (ARC) at the values (.060- -.061- -.080- -.020) respectively, although we believe the vantage of remediation these variables as control variables.

Table2: Descriptive Statistics

	Mean	Min	Max	SD	N
ARC	.5527	.32	.76	.07710	600
ICSE	.4533	.00	1.0	.49823	600
Fsize	.5000	.00	1.0	.50042	600
ICSE* Fsize	.2850	.00	1.0	.45179	600
Age	.6733	.00	1.0	.46939	600
ICSE* Age	.3233	.00	1.0	.46814	600
INF	.2550	.00	1.16	.42352	600
ICSE*INF	.0310	.00	1.16	.16567	600
LEV	.3933	.00	1.0	.48890	600
LOSS	.2483	.00	1.0	.43241	600
Sec Industrial	.4083	.00	1.0	.49194	600
Sec Commerce	.0383	.00	1.0	.19216	600
Sec Estates	.2250	.00	1.0	.41793	600
Sec Services	.1983	.00	1.0	.39908	600

Table 3: Person Correlation

	ARC	ICSE	Fsize	ICSE * Fsize	Age	ICSE * Age	INF	ICSE*INF	LEV	LOSS	Sec Industrial	Sec Commerce	Sec Estates	Sec Services
ARC	1.00													
ICSE	.190**	1.00												
Fsize	.195**	.234**	1.00											
ICSE* Fsize	.161**	.693**	.631**	1.00										
Age	-.123**	.077	.000	.046	1.00									
ICSE* Age	.043	.759**	.171**	.519**	.481**	1.00								
INF	-.015	-.402**	-.001	-.274**	-.067	-.297**	1.00							
ICSE*INF	042	.205**	.059	.154**	.037	.177**	.292**	1.00						
LEV	.060	.028	.252**	.096*	.088*	.063	.022	-.035	1.00					
LOSS	-.194**	-.058	-.166**	-.064	.030	-.001	-.035	-.002	.011	1.00				
Sec Industrial	-.061	.006	.078	.031	.007	-.038	-.002	.001	.011	.072	1.00			
Sec Commerce	-.089*	-.025	-.200**	-.126**	.047	.029	.003	-.033	-.054	-.014	-.166**	1.00		
Sec Estates	-.080	-.042	-.044	-.013	.018	-.006	.003	.016	.065	-.023	-.448**	-.108**	1.00	
Sec Services	-.020	.026	-.104*	-.046	-.037	.031	.001	.049	-.092*	.024	-.413**	-.099*	-.268**	1.00

** = significant at the 0.01 level, * = significant at the 0.05 level.

4.2 Hypotheses testing:

In this section we review our results of hypotheses testing in fundamental analysis as follow:

Table 4: simple and multiple regression results

	Model 1			Model 2				Model3				Model 4			
variables	B	T	Sig	B	T	Sig	VIF	B	T	Sig	VIF	B	T	Sig	VIF
Constant	.539	128.958	.00	.531	70.035	.00	-	.533	96.650	.00	-	.593	65.090	.00	-
ICSE	.029	4.738	.00	.060	4.693	.00	4.443	.036	4.914	.00	1.380	.026	4.427	.00	1.007
Fsize	-	-	-	.036	4.358	.00	1.917	-	-	-	-	-	-	-	-
ICSE* Fsize	-	-	-	-.027	-2.192	.029	3.489	-	-	-	-	-	-	-	-
Age	-	-	-	-.010	-1.145	.252	1.748	-	-	-	-	-	-	-	-
ICSE* Age	-	-	-	-.030	-2.266	.024	4.099	-	-	-	-	-	-	-	-
INF	-	-	-	-	-	-	-	.016	1.809	.071	1.445	-	-		-
ICSE*INF	-	-	-	-	-	-	-	-.014	-.677	.499	1.265	-	-	-	-
LEV	-	-	-	-	-	-	-	-	-	-	-	.007	1.212	.226	1.016
LOSS	-	-	-	-	-	-	-	-	-	-	-	-.029	-4.281	.00	1.016
Sec Industrial	-	-	-	-	-	-	-	-	-	-	-	-.053	-5.582	.00	2.481

Sec Commerce	-	-	-	-	-	-	-	-	-	-	-	-.081	-4.706	.00	1.253
Sec Estates	-	-	-	-	-	-	-	-	-	-	-	-.059	-5.773	.00	2.127
Sec Services	-	-	-	-	-	-	-	-	-	-	-	-.051	-4.776	.00	2.054
R^2	.036				.093				.041				.136			
Adjusted R^2	.035				.086				.037				.126			
F	22.448				12.213				8.592				13.359			
Sig(F)	.00				.00				.00				.00			

Table (4) above shows the results of hypotheses testing, first, we test the hypothesis

(H_1): The effectiveness of internal control significantly affects the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange. According to model (1) results we inducted the significance of the research model to test this relationship, as a result of the calculated value of the (F) statistic (22.448) increased from its tabular value (3.84). In addition to the explanatory power of the adjusted R^2 model was (.035), which means that the independent variable explains (.035) of the dependent value. As a result of analyzing the regression coefficient, **we found that there is a positive and significant effect of the effectiveness of the internal control structure on the accounting reporting complexity by (.029), at a probability value of (0.00)**[5].

Our explication of these results is dependent on our belief that the more ineffective the internal control structure is, the more management relies on more complex policies, which increase the power of management to cover its manipulation in financial reporting, because the weak internal control structure is unable to prevent and/or detect and/or correct material weakness in financial reporting, as well achieve its three goals, and the most important one is the reliability of this reports, which subsequently supports the negative effect of the accounting reporting complexity, this result consistent with (Lai et al., 2020; Brown et al., 2021; Khalil, 2023b).

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[5] We believe in the logic of the positive and significant effect of the effectiveness of the internal control structure on accounting reporting complexity, as we explain above, where we found that the percentage of the firms' observations that are characterized by the ineffectiveness of internal control structure is 54.7%. So this positive effect is only a reflection of the negative effect of this ineffectiveness on the accounting reporting complexity.

Contentious to the second hypothesis **(H₂): The significant effect of the effectiveness of internal control structure on the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange differs by the difference of firm's size and firm's age, combined, of those firms.** And by analyzing the result in model (2) we inducted the significance of the research model to test this relationship, because of the increased value of (F) statistic (12.213) from its tabular one (3.84). Also, we noticed increasing in the explanatory power of the adjusted R^2 from (.035) to (.086), which indicates that adding the moderating variables has an influence effect on the influential relationship under the study, adding to that the (VIF) values of these variables are less than (10), indicates that there is no multicollinearity problem between variables, which reflects the essential effect of these variables on this relationship.

As well as, **we found that there are a negative and significant effect of the both interactive variables (ICSE * Fsize, ICSE* Age) at the values (-.027, -.030) at a probability value at (.029, .024) respectively**. Which indicates the difference in strength and direction influence of the effectiveness of internal control structure on accounting reporting complexity, undertaking considerations of these variables as moderating variables on the influential relationship under the study. We believe the logic of the significant effect of the both interactive variables (ICSE * Fsize, ICSE* Age), our argument depends on that the firms which are characterized as bigger and older have more financial, human, and technological resources, as well as, its experience in assessment risks in business sector, that make it able to design and operate its internal control structure efficacious, which in turn decrease the accounting reporting complexity, this arguments go along with (Khalil, 2023a; Lotfy et al., 2021; Bae et al., 2021; Hoitash& Hoitash, 2018).

Starting with firm size, the positive effect of the big size is a reflection of the power of the economies of scale to reduce the negative effects of complexity, and the interactive between firm size and the effectiveness of internal control it supposed to reduce the negative effects of that complexity, and this is indeed what the results

showed above, that the negative effect of the interactive variable firm size and effectiveness (ICSE * Fsize) it is a reflection of the ability of the big firm's resources to improve the effectiveness and then the joint effect of both to reduce the negative impact of complexity on the financial reporting.

Next with firm age, the negative effect of firm age on the accounting reporting complexity is showed in the claim that older firms have less complexity in their reports, as a result, that the older the firms are, the more knowledge they have, which in turn reduce the negative effect of complexity, and this is what makes these results logic, especially, when the increasing percentage of the firms' observations that characterized as older ones are (67.3%). On the other hand, the interactive between firm age and the effectiveness of internal control structure is also supposed to reduce the negative effects of that complexity, and this is indeed what the results showed above, that the negative effect of the interactive variable firm age and effectiveness (ICSE * Age)) it is a reflection of the power of the older firm's experiences to improve the effectiveness and then the effect of both to reduce the negative impact of complexity on the financial reporting.

And according to the other moderating variable in model (3), we found that the research model continues to be significant after adding the moderator variable the inflation rate (INF) to the essential relationship, as it becomes clear that the calculated value of the (F) statistic (8.592) increased from its tabular value (3.84). As well as, the explanatory power of adjusted R2 was increased to (.037) in the model (3) compared to model (1), which indicated that adding the moderating variable has a strong effect on the relationship under the study by (.002). In addition to the decreasing values of (VIF) of these variables lower than (10), which indicates that there is no multicollinearity problem between variables.

Adding to that, **we found that there is a negative and insignificant effect of the interactive variable (INF* ICSE) at the value (-.014) at the probability value (.499)**. According to this result, we refuse the third alternative hypothesis **(H₃): The significant effect**

of the effectiveness of internal control structure on the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange differs by the difference of the inflation rate of those firms, and accepted the null one. We believe in the logic of the negative effect of the interactive variable (ICSE*INF), although it's insignificant, due to the interactive between (ICSE) and (INF) would support the negative impact of the inflation rate (INF) on the accounting reporting complexity (ARC), because the observations of our study reflected the ineffectiveness of internal control structure at (54.7%), which in this case increase errors and the material misstatements in this reports, that may exist as a result to the rising inflation rate, which in turn support the negative effect of the complexity on the accounting reporting. And we thought that the insignificant effect of the moderator variable is because of the insignificant effect of the inflation rate itself.

Moving to results in the model (4) to answer the following question: **Do financial leverage, loss, and sector of non-financial firms listed on the Egyptian Stock Exchange affect the accounting reporting complexity of these firms in the context of the influential relationship between the effectiveness of internal control structure and this complexity?**, compared to model (1), we found that the research model still significant at value (.00) according to (F) statistic. Besides the increase in its explanatory power of the adjusted R^2 from (.035) to (.126), which shades light on the essential effect of these control variables on the dependent variable (ARC). In addition to the decreasing of (VIF) values of these variables lower than (10), which indicates that there is no multicollinearity problem between variables.

Tracing the regression coefficient, **we found that there is a positive and insignificant effect of (LEV) on (ARC) by (.007) at a probability value at (.226). And the negative and significant effect of (LOSS, Sec Industrial, Sec Commerce, Sec Estates, Sec Services) on (ARC) by (-.029, - .053, - .081, -.059, -.051) respectively at the probability value of (.00)**. According to these results we answered the (Q_1) with "yes" regarding to variables (LOSS, Sec Industrial, Sec Commerce, Sec Estates, Sec Services) and "no" regarding to (LEV).

Thus, our argument about the illogic insignificant effect of (LEV) on (ARC) depends on the decrease in the percentage of the firms' observations that characterized by high leverage is (39.3%), and that because the financial leverage is considered as one of many determents of accounting reporting complexity and support its negative effect, as the leverage reflects the shortage in firm's financial resources and the extent of its need to borrow from others to finance its operations, thus complicating its financial structure and rising the complexity in financial reporting (Cetorelli& Goldberg, 2014; Silva et al., 2019; Khalil, 2023a).

Also, we believe with the logic of the negative and significant effect of (Sec Industrial, Sec Commerce, Sec Estates, Sec Services) on (ARC), due to the different nature and business environment for each sector as well as its transactions, which is reflected in the degree of its complexity (Fracncis & Gunn, 2015; Talkhan, 2017), as we found that the degree of each sector complexity as follows; Sec Industrial was (23%), Sec Commerce was (1%), Sec Estates was (8.8%), and finally Sec Services was (7.8%). On the same page, we believe with the logic of the negative and significant effect of (LOSS) on (ARC), as we referred before, that when the firm achieves losses contentiously in the way that makes it suffer from a shortage in its financial resources and led it to borrow from other to continue, makes it fall in the same issue of the complicated financial structure (Khalil, 2023b).

5. Other analyses:

In this part of the research, we aim to retest the relationships in the fundamental analyses, to compare the fundamental analysis results and the other analyses results, all of that to add more clarity and understanding to the relationship under the study in the fundamental analysis, as well as, to evaluate the strength and the solidity of the fundamental analysis results. And to review the impact of different assumptions that we adopted in the fundamental analysis (Zaki, 2018; Amr, 2022). to verify this, at first we added the nature of ownership (family vs. non-family), as a moderating variable, on the essential relationship under the study. Next, we added the floatation of the

exchange rate, as a control variable once, and in this context, we studied the effect of the inflation rate, as a control variable too, then tested the joint effect of the inflation rate and floatation of the exchange rate. Finally, tested the effect of the effectiveness of internal control structure on the accounting reporting complexity in light of the difference in the treatment method for (firm size, firm age and SEC) variables, as follows:

5.1 Testing the moderating effect of the nature of ownership (family vs. non-family) on the relationship between the effectiveness of internal control structure and the accounting reporting complexity:

In this section, the researchers aim to analyze the moderating impact of nature of ownership (family vs. non-family) on the essential relationship under the study, to get in line with some previous studies (Klein, 2010; Bardhan et al., 2015; Rostami et al., 2019; Chen et al., 2020; Anton et al., 2022; Khalil, 2023b) which agreed that the nature of ownership (family vs. non- family) has an effect on the effectiveness of internal control structure and the accounting reporting complexity, on the one hand, the family ownership is associated either with more internal control structure weaknesses compared to non-family ownership, as a result of conflict of interests between family members (dominant) and the other shareholders (minority), or fewer internal control structure weaknesses, due to the convergence goals and interests. on the other hand, the complexity of the family firms is as a mirror reflating the complexity of the family ownership itself according to the number of family members in the firm, the difference in their age and individual goals, as well as, the materiality of this goals, in addition to the geographic separation, which finally lead to the complexity of its governance. According to that, the fourth hypothesis was derived as follows:

H₄: The significant effect of the effectiveness of internal control structure on the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange differs by the difference of the nature of ownership (family vs. non-family) of those firms.

To test this hypothesis, a multiple regression was used as follows:

$$ARC = \beta_0 + \beta_1\, ICSE + \beta_2\, FAM + \beta_3\, ICSE * FAM + £_{it} \qquad (5)$$

Where FAM as descripted in the table (1), FAM* ICSE, is the interactive variable of (FAM) and the effectiveness of internal control structure, £= error term, $_{it=}$ for firm (i) in year (t).

The following table discusses the comparison the results of fundamental and other analyses (condition 1):

Table 5: comparison between the results of fundamental and other analyses (condition 1)

variables	Model 1			Model 5			
	B	T	Sig	B	T	Sig	VIF
Constant	.539	128.958	.00	.539	120.930	.00	-
ICSE	.029	4.738	.00	.027	4.005	.00	1.178
FAM	-	-	-	.007	.549	.583	2.165
ICSE* FAM	-	-	-	.012	.653	.514	2.402
R^2	.036			.041			
Adjusted R^2	.035			.036			
F	22.448			8.390			
Sig(F)	.00			.00			

Tracing and by analysis the result in Table (5), we found that the research model continues to be significant after adding the moderator variable the nature of ownership (family vs. non-family) on the essential relationship, as it became clear that the calculated value of the (F) statistic (8.390) increased from its tabular value (3.84). as well as, the explanatory power of adjusted R^2 was increased to (.036) in the model (5) compared to model (1), which indicated that adding the moderating variable has a strong effect on the relationship under the study by (.001). In addition to the decreasing of (VIF) values of these variables lower than (10), which indicates that there is no multicollinearity problem between variables.

As well as, **we found that the positive effect of the ineffectiveness of internal control structure on the accounting reporting complexity was decreased, insignificantly, to (0.012) at the probability value (.653), considering the nature of ownership**

(family vs. non-family), as moderating variable, and we believe that these results are illogical because they contradict our view that the family firms tend to have weak internal control structure to cover up its opportunistic behavior against the minority of shareholders, which in turn supports the negative effect of the accounting reporting complexity. And we thought that the insignificant effect of the moderator variable is because of the insignificant effect of the nature of ownership (family vs. non- family) itself, and about the decrease effect of the interactive variable (ICSE*FAM) on (ARC) is due to the decrease of the family firms observations which were (87) compared to non- family firms observations which were (513). Depending on that, we rejected the alternative hypothesis (H_4): **The significant effect of the effectiveness of internal control structure on the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange differs by the difference of the nature of ownership (family vs. non-family) of those firms**, and accepted the null one.

5.2 Testing the effect of the floatation of exchange rate and inflation rate on the accounting reporting complexity, in context of the relationship between the effectiveness of the internal control structure and this complexity:

A starting point, the floatation of the exchange rate and inflation rate are the two most effective elements in the macroeconomic environment and market changes on the accounting reporting complexity, especially in light of the ongoing market uncertainty changes. As well as the direct or indirect effect of these variables on the firm's operations and accounting for them, which in turn affect the financial reporting of these firms. And that according to the firms need to comprehensively consider whether the changes in the floatation of the exchange rate and inflation rate to their operation and disclosure are required including; the additional competitive risks, updates to liquidity and debt classification, accounting policies, changes to the estimates and depreciation and impairments, as well as changes in fair value and the usage of derivatives to hedge these rates, especially, if these firms have foreign transactions (Belghitar et al., 2016; EY,

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2023; Badawy& Zaki, 2023), and all of this elements considered as reasons of accounting reporting complexity (Khalil, 2023b).

So to evaluate the relationship of the macroeconomic changes (floatation of exchange rate and inflation rate) on accounting reporting complexity shows as in the following phases; in the first phase, we studied and tested the effect of floatation of exchange rate and inflation rate on the accounting reporting complexity individually, in the context of the relationship between the effectiveness of the internal control structure and this complexity, each as single. In the second phase, we studied and tested the joint effect of both; inflation with floatation as an interactive control variable on the accounting reporting complexity, in the context of the essential relationship under the study, and the questions to verify this part are as follows:

Q$_2$: Does the inflation rate affect the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange in the context of the influential relationship between the effectiveness of internal control structure and this complexity?

Q$_3$: Does the floatation of the exchange rate affect the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange in the context of the influential relationship between the effectiveness of internal control structure and this complexity?

Q$_4$: Does the joint effect of the floatation of exchange rate and inflation rate affect the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange in the context of the influential relationship between the effectiveness of internal control structure and this complexity?

A multiple regression was used as follows:

$$ARC = \beta_0 + \beta_1\,ICSE + \beta_2\,INF + \text{\pounds}_{it} \qquad (6)$$

$$ARC = \beta_0 + \beta_1\,ICSE + \beta_2\,FLO + \text{\pounds}_{it} \qquad (7)$$

$$ARC = \beta_0 + \beta_1\,ICSE + \beta_2\,FLO*INF + \text{\pounds}_{it} \qquad (8)$$

The following table discusses the comparison the results of fundamental and other analyses (condition 2):

Table 6: comparison between the results of fundamental and other analyses (condition 2)

variables	Model 1			Model 6				Model 7				Model 8			
	B	T	Sig	B	T	Sig	VIF	B	T	Sig	VIF	B	T	Sig	VIF
Constant	.539	128.958	.00	.534	100.698	.00	-	.531	109.561	.00	-	.531	109.561	.00	-
ICSE	.029	4.738	.00	.034	5.020	.00	1.193	.037	5.652	.00	1.134	.037	5.652	.00	1.134
INF	-	-	-	.013	1.680	.093	1.193	-	-	-	-	-	-	-	-
FLO	-	-	-	-	-	-	-	.029	3.388	.001	1.134	-	-	-	-
FLO*INF	-	-	-	-	-	-	-	-	-	-	-	.091	3.388	.001	1.134
R^2	.036			.041				054				.054			
Adjusted R^2	.035			.038				.051				.051			
F	22.448			12.670				17.162				17.162			
Sig(F)	.00			.00				.00				.00			

From the result above, we concluded that the three additional models are significant at the values of the (F) statistic (12.670, 17.162, and 17.162) respectively, which increased from their tabular value (3.84). As well as, the explanatory power of adjusted R2 was increased from (.035) to (.038, .051, and .051) compared to model (1) which indicates that adding secondary variables has an essential effect on the accounting reporting complexity in the context of the relationship under study by (.003, .016, and .016).

According to model (6), **we found that there is a positive and insignificant effect of inflation rate on the accounting reporting complexity, as a control variable**, which agrees with the results in fundamental analyses, although our preference of the method used to treat the inflation rate as a moderator variable, so we concluded that **"the inflation rate doesn't affect the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange in the context of the influential relationship between the effectiveness of internal control structure and this complexity**". And we thought the illogical insignificant effect of the inflation rate on the accounting reporting complexity, as it is considered one of the most important macroeconomic variables that has an essential effect on the financial reporting and increases its complexity.

On the same page and about the results of model (7), **we found that there is a positive and significant effect of the floatation of exchange rate on the accounting reporting complexity, as a control variable**, which supports our claims that the floatation of exchange rate increase the negative effect of the complexity on the financial reporting, as it consider a phenomenon related to the firm's business environment, especially the Egyptian's one, which in turn effect on some of the most important drivers of the accounting reporting complexity such as; foreign transactions, derivatives, transactions at fair values, and it is logical that this phenomenon prompts firms to hedge against changes in exchange rates, which indeed increase that complexity. And as the results show above, the existence of the floatation of exchange rate decreases the ability of the internal control structure to guarantee financial statements free from material misstatements as a result of this changes and its consequences on the accounting reporting complexity as well. So **"the floatation of exchange rate affects the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange in the context of the influential relationship between the effectiveness of internal control structure and this complexity"**.

Contentious to the model (8), **we found that there is a positive and significant effect of the interactive variable (FLO*INF) on the accounting reporting complexity, as a control variable**, as we found that the existing of the two variable (floatation and Inflation) in the same time have an essential effect by increasing the negative effect of the complexity on the financial reports, more than the single effect of each of them, as we found that the effect of the inflation rate and floatation of the exchange rate, as single, on the accounting reporting complexity by (.013, .029), while the joint effect of both (FLO*INF) on the accounting reporting complexity is (.091), which support our claim that the exist of both variables increasing the possibility of that complexity in financial statement accounts. Which answers the question (4) **"Does the joint effect of the floatation of exchange rate and inflation rate affect the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange in the**

context of the influential relationship between the effectiveness of internal control structure and this complexity?" by **"yes"**, according to these results.

Despite of that, the power of the positive and significant effect of the effectiveness of internal control structure on accounting reporting complexity are the same in models (7, and8) by (.037), as consideration of the exists of the floatation of exchange rate once, and the interactive variable (FLO*INF), as control variables. This may refer to the important impact of the floatation of exchange rate on the effectiveness of internal control structure more than the impact of the inflation rate on this effectiveness, we couldn't deny its (INF) essential effect on the two variables, the effectiveness of internal control and accounting complexity, and that we showed in the fundamental analyses before.

5.3 Testing the effect of the effectiveness of internal control structure on the accounting reporting complexity in light of the difference in the treatment method for both (firm size and firm age):

To continue our other analyses, we retested some essential relationships under the study in the fundamental analysis, by changing the treatment method of the moderating variables (firm size and firm age), to compare the results between the fundamental and the other analyses, and that all to verify the priority of the approach used to treatment the secondary variables, so we replaced the second hypothesis of the research (H_2) with the fifth question of the research (Q_5), to verify the control effect of two variables (firm size and firm age) on the accounting reporting complexity in the context of the influential relationship under the study (Li & Nwaeze, 2015; Smith et al., 2018; Silva et al., 2019). The second question of the research is; **(Q_5): Do firm size and firm age of non-financial firms listed on the Egyptian Stock Exchange on the accounting reporting complexity of these firms in the context of the influential relationship between the effectiveness of internal control structure and this complexity?**.

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To answer this question, a multiple regression was used as follows:

$$ARC = \beta_0 + \beta_1 \, ICSE + \beta_2 \, Fsize + \beta_3 \, Age + \pounds_{it} \qquad (9)$$

The following table discusses the comparison the results of fundamental and other analyses (condition 3):

Table 7: comparison between the results of fundamental and other analyses (condition3)

variables	Model 1			Model 2				Model 9			
	B	T	Sig	B	T	Sig	VIF	B	T	Sig	VIF
Constant	.539	128.958	.00	.531	70.035	.00	-	.544	85.629	.00	-
ICSE	.029	4.738	.00	.060	4.693	.00	4.443	.025	4.044	.00	1.065
Fsize	-	-	-	.036	4.358	.00	1.917	.024	3.862	.00	1.058
ICSE* Fsize	-	-	-	-.027	-2.192	.029	3.489	-	-	-	-
Age	-	-	-	-.010	-1.145	.252	1.748	.022	3.438	.001	1.006
ICSE* Age	-	-	-	-.030	-2.266	.024	4.099	-	-	-	-
LEV	-	-	-	-	-	-	-	-	-	-	-
LOSS	-	-	-	-	-	-	-	-	-	-	-
Sec Industrial	-	-	-	-	-	-	-	-	-	-	-
Sec Commerce	-	-	-	-	-	-	-	-	-	-	-
Sec Estates	-	-	-	-	-	-	-	-	-	-	-
Sec Services	-	-	-	-	-	-	-	-	-	-	-
R^2	.036			.093				.078			
Adjusted R^2	.035			.086				.074			
F	22.448			12.213				16.880			
Sig(F)	.00			.00				.00			

It is clear from the results in Table (7) above, that the research model is still significant even after tracing the control approach to testing both variables (firm size and firm age) on the accounting reporting complexity, at the value of the (F) statistic (16.880) which increased from its tabular value (3.84). as well as, the explanatory power of adjusted R^2 was increased from (.035) to (.074) compared to model (1) and decreased from (.086) to (.074) compared to model (2), which indicated that the moderating approach has a strong effect on the relationship under the study than the control one by (.12). In addition to the decreasing of (VIF) values of these variables lower than (10), which indicates that there is no multicollinearity problem

between variables. We also found that there is a positive and significant effect of both (firm size and firm age) on the accounting reporting complexity. So we answered the fifth question of the research with "yes" according to (firm size and firm age), and that despite our belief that the moderating approach is the best one to treat these variables.

5.4 Testing the effect of the sector on the main relationship between the effectiveness of internal control structure and the accounting reporting complexity:

A series of investigations (Francis & Gunn, 2015; Guo et al., 2016; Bentely et al., 2017; Chen & Keung, 2018; Shu et al., 2018; Khalil, 2023b) have unearthed the impact of the sector on both the effectiveness of internal control structure and accounting reporting complexity, that have studied the difference impact of firm's sector on the disclosure of the internal control structure weaknesses, according to the difference of the regulations rules for each sector, as well as, the inherent risk of firm's transactions. In addition to the complexity related to industries which classification as complex industries such as electronic industries, that the audit client's business risk is very high and so effects on the high level of the inherent risk which in turn is related to the presence of the internal control structure weaknesses. So that's why we testing and studying the effect of the sector on the essential relationship between the effectiveness of internal control structure and the accounting reporting complexity, as a moderating variable. The fifth hypothesis was derived as follows:

H$_5$: The significant effect of the effectiveness of internal control structure on the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange differs by the difference of the sector of those firms.

To test this hypothesis, a multiple regression was used as follows:

$$ARC = \beta_0 + \beta_1\, ICSE + \beta_2\, SEC + \beta_3\, SEC * ICSE + \pounds_{it} \qquad (10)$$

Where SEC as described in the table (1), SEC* ICSE, is the

interactive variable of (SEC) and the effectiveness of internal control structure, £= error term, $_{it=}$ for firm (i) in year (t).

The following table discusses the comparison the results of fundamental and other analyses (condition 4):

Table 8: comparison between the results of fundamental and other analyses (condition4)

variables	Model 1			Model 3				Model10			
	B	T	Sig	B	T	Sig	VIF	B	T	Sig	VIF
Constant	.539	128.958	.00	.593	65.090	.00	-	.598	51.625	.00	-
ICSE	.029	4.738	.00	.026	4.427	.00	1.007	.015	.882	.378	7.630
Fsize	-	-	-	-	-	-	-	-	-	-	-
ICSE* Fsize	-	-	-	-	-	-	-	-	-	-	-
Age	-	-	-	-	-	-	-	-	-	-	-
ICSE* Age	-	-	-	-	-	-	-	-	-	-	-
LEV	-	-	-	.007	1.212	.226	1.016	-	-	-	-
LOSS	-	-	-	-.029	-4.281	.00	1.016	-	-	-	-
Sec Industrial	-	-	-	-.053	-5.582	.00	2.481	.067	5.085	.00	4.714
Sec Industrial*ICSE	-	-	-	-	-	-	-	.021	1.100	.272	6.173
Sec Commerce	-	-	-	-.081	-4.706	.00	1.253	.089	3.931	.00	2.133
Sec Commerce*ICSE	-	-	-	-	-	-	-	.010	.286	.775	2.073
Sec Estates	-	-	-	-.059	-5.773	.00	2.127	.069	4.881	.00	3.940
Sec Estates*ICSE	-	-	-	-	-	-	-	.016	.766	.444	4.155
Sec Services	-	-	-	-.051	-4.776	.00	2.054	.057	3.860	.00	3.924
Sec Services*ICSE	-	-	-	-	-	-	-	.004	.188	.851	4.384
R^2	.036			.136				.111			
Adjusted R^2	.035			.126				.097			
F	22.448			13.359				8.151			
Sig(F)	.00			.00				.00			

From the previous results in Table (8) above, we found that the significance of the model isn't affected and it is still significant at the probability value (.00). As it becomes clear that the calculated value of the (F) statistic (8.151) increased from its tabular value (3.84). Also, the explanatory power of adjusted R^2 was increased to (.097) in the model (10) compared to model (1) and decreased compared to model (3), which supports our method to treat the sector variable as a control variable in the fundamental analysis. In addition to no multicollinearity problem between variables because of the decreasing (VIF) values of these variables lower than (10). As well as, the insignificant effect of the interactive variables (Sec Industrial*ICSE, Sec Commerce*ICSE, Sec Estates*ICSE, and Sec Services*ICSE) on the effectiveness of internal control structure, Depending on that, we

rejected the alternative hypothesis (H$_5$): **The significant effect of the effectiveness of internal control structure on the accounting reporting complexity of non-financial firms listed on the Egyptian Stock Exchange differs by the difference of the sector of those firms**, and accepted the null one.

6. Discussion:

The research presents some of the most important dimensions in the business environment, the effectiveness of internal control, accounting reporting complexity and, some macroeconomic variables such as; the inflation rate and floatation of exchange rate, especially these days, although, these dimensions were and still important since their inception. So the research studied and tested the relationships between these variables in the Egyptian business environment during the period (2016- 2021).

Starting with the relationship between the effectiveness of internal control structure and the accounting reporting complexity, and we found that there is a positive and significant effect of the effectiveness of the internal control structure on the accounting reporting complexity, and that positive effect reflects the negative effect of the ineffectiveness of internal control structure on the accounting reporting complexity and increase it as a result of the decrease in the firms observations that characterized by ineffectiveness by (54.7%).

After adding some firm's operational characteristics and macroeconomic variables, as moderator variables, in the influential relationship under the study, at first we studied the moderating role of both firm size and firm age, combined, and we found that there are a negative and significant effect of both interactive variables (ICSE * Fsize, ICSE* Age) on accounting reporting complexity, and we found that results are logical, because of the power of the big firm's resources and older firms experiences to improve the ability of the internal control structure and increase its effectiveness to prevent or/ and discover or/ and correct any material misstatement in financial reporting due to that complexity. Also, we found that there is a

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negative and insignificant effect of the interactive variable (INF* ICSE), which reflects that the inflation rate increases the negative effect of the ineffectiveness of internal control structure on the accounting reporting complexity and increases it.

Due to the importance of a firm's operational characteristics, we take into consideration the effect of other firm's operational characteristics (LOSS, SEC, and LEV), as control variables, on the accounting reporting complexity, in the context of the influential relationship between the effectiveness of internal control structure and this complexity, and we found that the degree of influence of each variables on this complexity depends on its sample observations, which reflected on its significance or not, as we found a significant effect of (LOSS, Sec Industrial, Sec Commerce, Sec Estates, Sec Services), and insignificant effect of (LEV) on accounting reporting complexity (ARC).

Because we believe in the importance of other analyses, so at first, we studied the effect of the nature of ownership (family vs. non-family) on the essential relationship between the effectiveness of internal control structure and the accounting reporting complexity, as a moderator variable, and we found that there is an insignificant effect of the interactive variables (ICSE * FAM) on accounting reporting complexity, and we belief that this result is logical, due to the insignificant effect of (FAM) itself, and the decrease of the family firms observations which were (87) compared to non-family firms observations which were (513).

Then, we took into consideration some macroeconomic variables such as; inflation rate and floatation of exchange rate from different dimensions of the essential relationship under the study, in beginning we studied the effect of the floatation of exchange rate and inflation rate on the accounting reporting complexity, in context of the relationship between the effectiveness of the internal control structure and this complexity, each as a separate variable. And we found that there is an insignificant effect of inflation rate on the accounting reporting complexity, On the contrary, we found that there is a

significant effect of the floatation of exchange rate on the accounting reporting complexity. Then we studied the joint effect of both; inflation with floatation as an interactive control variable on the accounting reporting complexity, in the context of the essential relationship under the study, and we found that there is a significant effect of this joint effect on that complexity. Which indicated the importance of the joint effect of these two variables on increasing the negative effect of the complexity of financial reporting.

In the third phase of our other analyses, we studied the effect of the effectiveness of internal control structure on the accounting reporting complexity in light of the difference in the treatment method for both (firm size and firm age), as control variables combined, and the sector, as a moderator variable. And we concluded that the preference of the methods used to treat the secondary variables (moderators and control) with the fundamental analyses.

7. Conclusion:

The research under talking sheds light on some variables in the Egyptian business environment, which suffer from regularity and legislation deficiencies, in addition to the repaid changes in economic and environmental conditions are met with relatively slow response from the concerned authorities. So this research focused on the variables (the effectiveness of internal control, the accounting reporting complexity, some firm's operational characteristics, the nature of ownership (family vs. non-family), and macroeconomic variables), as considered their importance in the business environment, especially in Egyptian one.

Accordingly, the researchers recommend the need for the financial supervisory authority to compel with firms listed on the Egyptian Stock Exchange to disclose the effectiveness of internal control structure, on the one hand. Also the auditor's report on this event, on the other hand, per SOX law. Thus, it's a need to create and develop a database that includes the classification of the firms that disclosed the effectiveness of internal control structure, and the auditor's report in this event, in accordance with foreign stock exchanges

We also recommend the firms need to continue in evaluation and development of their risk management, especially the financial ones, to avoid any potential for losses or bankruptcy according to the repaid change in macroeconomic variables such as; the rising inflation and floatation of exchange rate, and to hedge against the risks of these changes.

As well as recommending the need for academic accounting researches to include and focus on some points related to the effectiveness of internal control structure and accounting reporting complexity and their determinants. Based on that we recommend studying the effect of the accounting reporting complexity on the readability of financial reporting, also, studying the impact of AI tools on the effectiveness of internal control structure, and the impact of AI tools on the accounting reporting complexity to keep pace with the era of digital transformation in this event, in addition to the relationships related to macroeconomic variables on the readability of financial reporting, the value relevance, the firm value, the accounting reporting quality, and the investing in digital assets.

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