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Annual Report Complexity and Firm Profitability: The Roles of Agency Costs and Financial Risk as Moderating Variables: A Case of Egypt

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Abstract

The complexity of annual reports reduces the quality of the communication between companies and users. The literature has demonstrated that annual reports complexity reduces users' ability to understand, interpret, analyze information, and make decisions, resulting in higher information asymmetry, agency costs, financial risk, and lower profitability. This study examines the relationship between annual reports complexity and firm profitability. It also investigates the moderating effect of agency costs and financial risk on the relationship between annual reports complexity and firm profitability. It depends on a sample of 75 Egyptian companies listed on the EGX 100 index with 450 company-year observations during the period 2016-2021. The complexity of annual reports is measured by the LIX index; firm profitability is measured depending on EPS; agency costs are measured by the operating expense ratio; and financial risk is measured using leverage. The results indicate that annual report complexity has a significant negative impact on firm profitability, suggesting that Egyptian companies with more complex annual reports are less profitable. Furthermore, the results reveal that both agency costs and financial risk strengthen the relationship between annual report complexity and firm profitability, suggesting that less-readable annual reports increase information asymmetry, companies' agency costs, and financial risk, which reduce their profitability. While this study extends the previous literature on annual report complexity and firm profitability, it examines the moderating effect of agency costs and financial risk on the relationship between annual report complexity and firm profitability of Egyptian companies.

Keywords: Annual report complexity, Firm profitability, Agency costs, Financial risk.

I. Introduction

Annual reports are the main source of information and an essential communication tool for capital market participants, such as investors, creditors, and financial analysts (Ali 2011; Ertugrul et al. 2017; Xu et al. 2020). The effectiveness of annual reports depends on their presentation, organization, and complexity levels (Hrasky et al. 2009). Hence, the complexity of annual reports affects information transparency and confuses user decisions (Hassan et al. 2019). It also reduces investors' ability to extract relevant information from very long and complex documents such as annual reports (Rennekamp 2012). Furthermore, complex annual reports increase creditors' disagreements in providing resources to companies (Ertugrul et al. 2017; Xu et al. 2020). They also complicate loan terms and requirements, which increases companies' risks and external financing costs (Ertugrul et al. 2017; Xu et al. 2020).

However, the ability to read annual reports improves information quality and ensures that the requirements and expectations of financial statement users are addressed (Thoms et al. 2019; Dalwai et al. 2021). Readability makes it easier for users to read and understand annual reports (De Franco et al. 2015; Dalwai et al. 2021). Annual report readability reduces information asymmetry, a company's risk factors, and uncertainty, which improves information transparency and facilitates user decision-making (Moreno and Casasola 2016; Kuang et al. 2020). It also enhances users' ability to extract and evaluate relevant information (Loughran and McDonald 2014). Furthermore, Aymen et al. (2018) suggest that financial analysts' recommendations have a stronger effect on investor behavior and decisions. Thus, readable annual reports reduce the time and effort financial analysts spend on analyzing and interpreting information, increase their followings, and enhance their forecasts (Plumlee 2003; Dalwai et al. 2021).

Previous studies show that less complex (more readable) annual reports improve company performance (Loughran and McDonald 2011), reduce the cost of capital by increasing information quality (Mousa et al. 2022), and affect investors' decisions to provide resources to companies (Rennekamp 2012). The literature also reveals that annual report readability can influence financial analysts' behavior by reducing their effort to extract relevant information, enhance their forecast accuracy, increase their following (Lehavy et al. 2011), and help companies obtain trade credit (Xu et al. 2020). However, most prior research has focused on developed countries, such as the USA (Li 2008; Lehavy et al. 2011; Bendriouch et al. 2022). In addition, few studies have focused on developing countries such as Qatar (Hassan et al. 2019) and Egypt (El-Din et al. 2022). Furthermore, previous studies have not investigated whether providing more complex (less readable) annual reports can reduce firm profitability, and increase financial risk, and agency costs. Therefore, this study extends the literature by examining the association between the complexity of annual reports and firm profitability, and the moderating roles of agency costs and financial risk on this relationship in Egypt. Furthermore, this study depends on listed companies in the EGX 100 index as a context because it includes top companies in terms of activity and liquidity.

This study aims to answer the following questions. First, to what extent are the less readable annual reports associated with firm profitability?. Second, Luo et al. (2018) revealed that annual report complexity increases the information asymmetry faced by shareholders and potential investors, and reduces the monitoring of corporate insiders, which increases agency costs. This study investigates how agency costs strengthen the relationship between the complexity of annual reports and firm profitability. Third, (Li 2008) suggested that companies with high risk and poor performance tend to provide more complex annual reports to hide this information from users. Hence, this study examines how financial risk strengthens the relationship between annual report complexity and firm profitability. Therefore, this study extends the literature by examining how a company's financial risk and agency costs affect the association between annual report complexity and firm profitability.

To examine the research questions, this study uses a sample of 75 companies listed on the EGX 100 index with 450 company-year observations during the period 2016-2021 after controlling for some factors suggested by the previous literature. This study uses the EPS as a measurement of firm profitability, and the LIX index as a measurement of annual report complexity. Similarly, it depends on the operating expense ratio as a measurement of agency costs, and leverage as a measurement of financial risk. This study's relationship is controlled by some variables such as company size, age, and growth.

The empirical results show that: less-readable annual reports are associated with lower firm profitability. Moreover, this study predicts that agency costs and financial risk strengthen the relationship between annual reports complexity and firm profitability. Consistent with this prediction, the results indicate that companies that provide more complex annual reports have higher information asymmetry, lower information transparency, higher uncertainty, financial risk, and agency costs, which, in turn, reduce their profitability.

This study makes several contributions to prior research that has found a positive association between readable annual reports and firm profitability. However, the relationship between less-readable annual reports, agency costs, and financial risk remains unclear. Therefore, this study addresses this gap in the literature by examining the effect of annual report complexity on firm profitability, along with the moderating roles of agency costs and financial risk on the relationship between annual report complexity and firm profitability. Therefore, to the best of researcher's knowledge, this study is the first to provide evidence of the effects of financial risk and agency costs on the relationship between annual report complexity and firm profitability in Egypt. Moreover, most previous studies (Li 2008; Hsieh et al. 2016; Xu et al. 2020; Mousa et al. 2022) depended on the fog index, and others (Miller 2010; Lehavy et al. 2011; Ahmad and Maochun 2019) depended on the number of sentences and the average sentence length to measure the complexity of annual reports. This study used the LIX index, which can be applied to Arabic and English texts to measure the complexity of annual reports.

The remainder of this paper is organized as follows. Section II reviews the literature and develops the research hypotheses. Section III presents the study's research methodology. Section IV presents the research results and discussions. Finally, Section V provides a research conclusion.

II. Literature review and hypotheses development

Complexity of the annual reports and firm profitability

Annual reporting is an essential tool for the communication between managers and stakeholders (Luo et al. 2018; Julianaldri 2022; Mousa et al. 2022). It is an efficient instrument for presenting a company's strategy, ownership structure, and performance (Wisniewski and Yekini 2015; Bendriouch et al. 2022). It also provides information about past, current, and future company positions, which can affect investors, creditors, and other users' decisions (Dalwai et al. 2021; Bendriouch et al. 2022). The complexity of annual reports makes it difficult for users to understand, interpret, extract, and use information (Filzen and Peterson 2015; de Souza et al. 2019). Thus, the higher the readable (less complex) annual reporting, the more trustworthy of the company will be (Bendriouch et al. 2022; Mousa et al. 2022).

The complexity of annual reporting is a proxy and negative function of readability (El-Din et al. 2022). Readability refers to the ability of investors and analysts to read, understand and analyze annual report information easily and quickly (Dalwai et al. 2021; Hassan et al. 2022). Consequently, it is an important tool for communication between managers and users because it improves information quality and meets the needs of internal and external users (Aymen et al. 2018; Ezat 2019). It measures the degree of annual report information complexity, which affects user judgments (de Souza et al. 2019; Xu et al. 2019; Hassan et al. 2022). Less complex annual reporting increases communication and reduces information asymmetry between managers and stakeholders (El-Din et al. 2021; Moghadam et al. 2022). It also increases analysts' forecasting accuracy, and investors' valuations of the company, and reduces the cost of funding (Dalwai et al. 2021; El-Din et al. 2022).

The style of writing annual reports may confuse users and negatively affect their decisions. Courtis (2004) showed that the presence of obfuscation within an annual report is related to company age, complexity, good or bad news, and writing behavior. The author also found an unclear relationship between annual report complexity and firm profitability. Moreover, companies with good performance have incentives to provide more readable annual reports to reduce costs and risks and increase profitability. In this context, Smith et al. (2006) compared the textual complexity of the chairman’s statement with the financial performance of a sample of 513 Malaysian companies listed on the Kuala Lumpur Stock Exchange in 2002. The authors found a positive association between less complex annual reports and financial performance for profitable companies. In addition, the results pointed out that less complex annual reports improved users' ability to read, understand, and analyze information, which reduced companies' risks, and costs, and improved their performance.

Additionally, companies with poor performance and bad news provide more complex annual reports to hide this information from users. Li (2008) examined the relationship between annual report readability, firm performance, and earnings persistence for 55,719 USA firm-year observations with an annual report over the period 1994-2004. They found that companies with poor performance provided more complex annual reports. Nevertheless, the author found that companies with more earnings persistent provided more readable annual reports. Thus, the author concluded that managers provide more complex annual reports when their performance is poor.

Abu Bakar and Ameer (2011) explored the relationship between the readability of corporate social responsibility reports, firm profitability, liquidity, and performance using a sample of 333 listed companies in Malaysia. They documented that companies with high performance, profitability, and liquidity provided less complex corporate social responsibility reports. Likewise, less complex annual reports increase investors' understanding of a company's current performance and their judgements of its future performance. Tan et al. (2015) explained how annual report readability influences investors' judgement of companies' future performance. They showed that higher readability of annual reports increased investors' understanding and processing of a company's current performance, which in turn improved their judgements of the company's future performance.

More complex annual reports increase investors' suspicion of a company and its managers. This causes investors to reduce their demand for companies' shares, and companies to trade at a discount. On the contrary, Hwang and Kim (2017) investigated the relationship between the readability of annual shareholder reports and firm value for a sample of 92 companies from 2003 to 2013. They found that more readable annual reports increased investors' trust, their assessment of the company and its managers, and their demand for company shares. As shown by Filzenand Gabriela (2017) who depended on 26,484 firm-quarters over the period 1995-2009 to investigate the effect of financial reporting complexity on stock co-movement. Annual report complexity reduced investors' ability to identify the best stocks and business innovators. The authors also found a significant positive relationship between 10-Q complexity and stock returns.

Readability does not change the actual available information about the company, but it ensures the understandability, and clarity of information. It also helps users understand, evaluate, and analyze a company's performance. In this context, Hoitash et al. (2017) examined the relationship between annual report complexity and analysts' behavior for a sample of 6,232 firm-year observations during the period 2012-2014. The results revealed a significant negative association between annual report complexity and analysts' coverage. The results also showed that analysts were less likely to cover firms with more complex annual reports. In addition, annual reports complexity was found to have lower forecast accuracy, higher forecast dispersion, and lower reactivity to earnings announcements. Furthermore, the authors concluded that the lower the accuracy and informativeness of financial analysts' forecast, and the higher the dispersion between them, the lower reliance on analysts' advice will be.

Consequently, in emerging markets and for a sample of 126 companies listed on the Qatar Stock Exchange over the period 2014-2016, Hassan et al. (2019) provided evidence of the relationship between the complexity of corporate report narratives and firm profitability, financial risk, and agency costs. They reported a significant positive association between less complex annual reports, firm profitability, and agency costs. They also found a significant negative association between less complex annual reports and a firm's financial risk.

Providing voluntary information in annual reports increases their complexity and reduces users' understanding of the relevant information, which increases investors' confusion and affects their investment decisions. El-Din et al. (2022) examined the relationship between voluntary disclosure and the complexity of annual reports. They also investigated the moderating effect of a firm’s profitability and earnings management practices on the relationship between voluntary disclosure and annual report complexity. They depended on a sample of 99 companies listed on EGX 100 over the period 2010-2018. The results showed a positive association between voluntary disclosure of the annual report and its complexity. They also found that companies with less profitability and more earnings management practices increased voluntary information in their annual reports, which made them more complex. In the USA, Bendriouch et al. (2022) explored the factors that make companies' annual reports more complex. Using a sample of 14,323 observations for non-financial companies during the period 2010-2018. The results revealed a significant negative relationship between annual report complexity, firms' profitability, and growth opportunities. The authors also found a significant positive relationship between annual report complexity and agency costs.

Overall, based on the preceding evidence, companies with bad news and poor performance have an incentive to provide more complex annual reports to hide this information from users. By contrast, companies with good news and performance have incentives to provide more readable annual reports to increase users' trust and reduce their confusion, which reduces the company's risk, and uncertainty and increases its profitability. Furthermore, most studies found a significant positive relationship between annual report readability and firm value. They concluded that more readable annual reports reduce users' suspicions, and improve their evaluation of the company, which reduces the company's risk and costs, and improves its profitability. Therefore, this study predicts that more complex annual reports reduce firm profitability. Consequently, the first research hypothesis is proposed as follows:

H1. Annual report complexity is negatively associated with firm profitability.

Agency costs, complexity of the annual report and firm profitability.

This study uses agency theory proposed by Jensen and Meckling in 1976 (Pratama et al. 2022). It discusses the relationship between shareholders, as principals, and managers, as agents (Pratama et al. 2022; Tarjo 2022). It also supports their differences in interests (Prabhawa and Harymawan 2022). The agents are responsible for any tasks or decisions that occur within the company on behalf of the principals (Prabhawa and Harymawan 2022). The principal sometimes has goals and interests that differ from those of the agents (Prabhawa and Harymawan 2022; Pratama et al. 2022). This leads to a conflict of interest between the two parties because the agents do not consistently achieve the principal's interests, which causes an agency problem (Pratama et al. 2022). Therefore, agency costs are incurred to control managers' behavior in achieving their interests and maximizing shareholders' wealth (Dalwai et al. 2021).

Agency costs are divided into three types: monitoring, bonding, and residual losses (Prabhawa and Harymawan 2022). Monitoring costs are incurred by monitoring managers' behavior (Dalwai et al. 2021; Prabhawa and Harymawan 2022). The agents incur bonding costs to comply with the mechanism that confirms that the agents will achieve the principal's interest (Prabhawa and Harymawan 2022). Residual losses are incurred because of error, fraud, or manipulation by managers (Prabhawa and Harymawan 2022; Tarjo 2022). The agency problem can be mitigated by providing non- financial information and making annual reports less complex and easier to understand (Hassan et al. 2019). Accordingly, stakeholders can better understand the impact of managers' decisions on a company's operations (Hassan et al. 2019).

According to signaling theory, companies with good performance usually provide more information and readable annual reports to demonstrate their performance (Hassan et al. 2019). In contrast, companies with poor performance, managers prefer to provide more complex annual reports to hide this information from stakeholders

(Aymen et al. 2018; Hassan et al. 2019). However, the readability of annual reports provides clear, simple, identical, readable, and understandable information for all users. Furthermore, less complex annual reports reduce a company's costs and improve profitability and future performance.

Several studies investigated the relationship between annual reports complexity and firm profitability. For example, Tan et al. (2015) documented that more readable financial statements improve investors' understanding and analysis of information, which reduces their suspicion and increases their judgement of the company's costs and performance. Ertugrul et al. (2017) showed that complex annual reports increase information risk, reduce investors' ability to understand reports and make decisions, that affect stock prices, increase companies' agency costs, and reduce their performance. Luo et al. (2018) suggested that annual report readability improves shareholders' monitoring of managers and reduces the conflict of interest between managers and shareholders, which reduces agency costs and improves profitability.

Aymen et al. (2018) analyzed for a sample of 88 companies listed on the French CAC during the period 2009-2014, the effect of financial information readability on financial analysts' behavior. They applied the Gunning Fog index and Flesh Reading Ease formula to measure the annual reports readability. The findings demonstrated a significantly positive relationship between analyst following and financial report readability. The results also indicated that readable financial information reduced information asymmetry, and agency costs, which attracted investors and financial analysts, and increased analysts following.

Based on 19,221 company-year observations of Chinese A-share listed companies for the period 2001-2015, Luo et al. (2018) investigated the relationship between annual report readability and agency costs mediated by external audit quality and analyst coverage. They found that companies with better annual report readability had lower agency costs. They also found that the significant negative relationship between annual report readability and agency costs was stronger for companies with higher external audit quality and analysts coverage. Similarly, Hassan et al. (2019) found a significant positive association between annual report complexity and agency costs. Companies with complex annual reports incurred higher agency costs.

Better audit quality enhances the readability of annual reports and helps users to easily extract relevant information for their decisions. In this context, Ahmad and Maochun (2019) investigated the relationship between annual report complexity and agency costs mediated by external audit quality. They depended on a sample of 21 Pakistani non-financial companies listed on the KSE-30 index for the period 2008-2017. The results indicated that companies with less complex annual reports had fewer conflicts between shareholders and managers and lower agency costs compared to others. The authors also found that external audit quality reduced the complexity of annual reports and agency costs.

Depending on the structural equation modeling approach, Norouzi et al. (2020) examined the moderating effect of managerial ability on the relationship between financial reporting readability and agency costs. They depended on a sample of 116 listed companies on the Tehran Stock Exchange during the period 2013-2017 and found that annual report readability reduced agency costs. They also found that the ability to manage a company's risks improved annual reports readability and reduced agency costs. Similarly, Baghoumian et al. (2021) investigated the relationship between annual report complexity and agency costs mediated by external audit quality for a sample of 160 companies listed on the Tehran Stock Exchange (TSE) during the period 2013-2017. The results revealed a significant positive association between the complexity of annual reports and agency costs. Furthermore, the study found that external audit quality strengthened the relationship between annual report complexity and agency costs.

Previous research found an insignificant relationship between the complexity of annual reports and agency costs. For example, Dalwai et al. (2021) explored the relationship between annual report readability, agency costs, and firm performance. They applied Flesch reading ease, Flesch–Kincaid index, and length of annual report as measurements of readability for a sample of 150 company-year observations of financial sector companies listed on the Muscat Securities Market (MSM) between 2014 and 2018. The findings demonstrated an insignificant relationship between annual reports readability, agency costs, return on assets and stock returns. Further, the study indicated a significant positive association between annual report complexity and return on assets (ROA). They concluded that financial sector companies provided more complex annual reports to prevent investment in assets that did not provide gains. In contrast, Bendriouch et al. (2022) stated that managers have incentives to provide more readable annual reports to meet or beat investors' expectations and forecasts, reduce agency costs, and improve company performance when they are more sensitive to the stock price effects of disclosed information. Therefore, they found a significant positive relationship between annual report complexity and agency costs.

Furthermore, El-Din et al. (2022) reported that more readable (less complex) annual reports increase financial analysts' earnings forecasting accuracy, improve stock liquidity, and enhance investors' valuation of a company, which reduces a company's costs and improves its profitability. A recent study by Soesanto and Wijaya (2022) examined the moderating effect of the value relevance of financial information and analyst coverage on the relationship between annual report readability and agency costs. They depended on a sample of 263 Indonesian companies listed on the Kompas 100 index during the period 2016-2019. The findings pointed out that annual report complexity increased information asymmetry, and reduced company's information transparency, which increased the assets turnover ratio and agency costs. Further, the results indicated an insignificant effect of analyst coverage on the relationship between annual reports complexity and agency costs.

Overall, previous studies have provided evidence of a relationship between annual report complexity and agency costs. Annual reports are the main source of information that allows shareholders to monitor managers' activities and reduce agency problems. Therefore, monitoring managers' behavior and reducing conflict of interest between managers and shareholders can be achieved by reducing the complexity of annual reports. A less complex annual report reduces the information asymmetry between managers and shareholders. It also reduces company risk, costs, and uncertainty. Furthermore, the readability of annual reports reduces the time and cost that users need to understand, evaluate, and analyze a company's position and future performance. However, more complex annual reports reduce users' reliance on such information in decision-making, increase financial analysts' dispersion and suspicion, and reduce their forecast accuracy. Accordingly, less readable (more complex) annual reports reduce users' ability to evaluate and analyze relevant annual report information. They also increase analysts' time, cost, and effort of analyzing annual reports information, which increases forecast dispersion, and reduces forecast accuracy. Moreover, annual report complexity increases information asymmetry, managers' opportunistic behavior, and agency problems, which increases companies' agency costs and reduces their profitability. Thus, the second research hypothesis is proposed as follows:

H2. Agency costs strengthen the negative relationship between annual report complexity and firm profitability.

Financial risk, complexity of the annual report and firm profitability.
Companies provide more readable annual reports when their financial risks are high. Various empirical studies have examined the relationship between annual report complexity and business risk and found that companies with less readable annual reports bear higher financing costs from external sources. For example, for a sample of 136 companies over the period 1996-2003, Nelson and Pritchard (2007) investigated whether companies with a greater risk of securities provide more readable information. The results pointed out that companies with greater litigation risk provided more readable annual reports to reduce their uncertainty and expected litigation costs.

Additionally, the complexity of annual reports increases processing costs, uncertainty, creditors' disagreements, which increases the cost of debt. Bonsall and Miller (2017) examined the association between financial disclosure complexity, favorable rating, bond rating agencies, and the cost of debt. Using a sample of 6851 observations during the period 1994-2014, the authors found that the less favorable ratings, the greater disagreement of the bond rating agency, and the higher cost of debt were associated with more complex financial disclosure.

Likewise, complex annual reports reduce information transparency and increase external financing costs. Ertugrul et al. (2017) investigated the relationship between annual report readability and a company's borrowing costs. They depended on a sample of 32,207 observations during the period 1995-2013. The results revealed that companies with less readable 10-K filings had stringent loan contract terms and collateral requirements. The results also indicated that less readable 10-K filings increased the crash risk of future stock prices. Furthermore, less complex annual reports reduce a company's uncertainty, financial risks, agency costs, and the cost of debt, which improves its performance. Hesarzadeh and Bazrafshan (2018) stated that more complex annual reports increase the time and effort that users need to extract relevant information, reduce their reliance on such information, and their evaluations of company's future performance. Hesarzadeh and Bazrafshan (2018) concluded that less readable annual reports increase companies' costs and risks and reduce their profitability.

Moreover, managers may reduce the complexity of the annual reports when their financial risk is higher to explain the reasons for the high risk and convince users of their ability to manage risks. Hence, Hassan et al. (2019) stated that companies with higher financial risk may provide easy to read annual reports to convince users of managers' ability to manage financial risks and explain the reasons behind the high risk of reducing company's uncertainty and improving its profitability. They also showed an insignificant negative association between preparing easy-to-read annual reports and previous financial risk. Additionally, managers can maintain stable stock prices by hiding adverse information in financial reports. Kim et al. (2019) reported that more complex 10-K reports increase stock price crash risk and reduce firm profitability. They also showed that the relationship between complex financial reporting and crash risk is stronger for companies with negative earnings news, greater stock option incentives for chief executive officers, and lower litigation risk.

Furthermore, less complex annual reports are associated with lenders' decisions regarding loan agreements and terms. Focusing on trade credit, which is an important short-term financing source for constrained and unconstrained companies. Xu et al. (2020) explored the relationship between annual report readability and companies' ability to obtain trade credit from suppliers. Focusing on 10-K filings for a sample of 4,754 companies during 2004–2016, they found that suppliers provided more trade credit for companies with more readable annual reports. The results also showed that trade credit was higher for business service industries companies with more readable annual reports. Chowdhury et al. (2020) explored the relationship between financial statement complexity and the cost of external financing for 76,668 firm-year observations with 10,580 unique companies from 1994 to 2017. The results revealed a significant positive association between financial statement complexity and external financing costs. The authors concluded that companies with less readable annual reports incurred higher financing costs from external sources.

On the other hand, bank managers either prepare easy to read annual reports to reduce information asymmetry or provide more complex annual reports when their risk is higher to hide bad news from investors. Depending on a sample of 390 observations for banks listed on the Gulf Cooperation Council (GCC) Stock Exchange during the period 2014–2019. Hassan et al. (2022) investigated the impact of financial risk on the readability of annual reports. The results revealed a significant positive relationship between banks' higher financial risks and the complexity of annual reports. The authors found that bank managers with high risks provided easy narratives that embedded their ability to manage such risks. A company's profitability may incentivize managers to provide more readable annual reports to reduce costs and risks. El-Din et al. (2022) claimed that more readable (less complex) annual reports reduce information asymmetry, the cost of financing, and litigation risk, which improves a company's profitability.

Furthermore, the more complex the annual reports are, the more difficult it is to make decisions or judgments about providing resources. Bendriouch et al. (2022) reported an insignificant positive relationship between annual reports complexity and business risk. Banks are the main source of financing for companies; however, they depend on effective monitoring tools for companies with complex annual reports. In support of this, Chakraborty et al. (2022) studied how financial statement complexity is associated with the terms of bank loans for a sample of 26,088 observations over the period 2001-2015. They showed a positive association between financial statement complexity and a company's reliance on bank loans. The authors also reported that banks checked loans more carefully, controlled credit supply, and imposed stricter loan terms on companies with more complex financial statements.

Considering the above, previous studies suggest that managers with higher financial risk may provide more readable annual reports to clarify the reasons for their higher financial risk, increase users' trust, and reduce their uncertainty. Consequently, annual report complexity increases information asymmetry, reduces information transparency, and increases users' effort to understand and process relevant information. Additionally, more complex annual reports reduce companies' possibility of obtaining external financing resources. Furthermore, more complex annual reports reduce investors and creditors' potential to make judgments and financing decisions. Therefore, companies with more complex annual reports may obtain higher loan terms and financing costs. Furthermore, more complex annual reports increase a company's risk and uncertainty, which negatively affect its future performance. Accordingly, the third research hypothesis is proposed as follows:

H3. Financial risk strengthens the negative relationship between annual report complexity and firm profitability.

Based on the previous discussion, the researcher derived the following model:

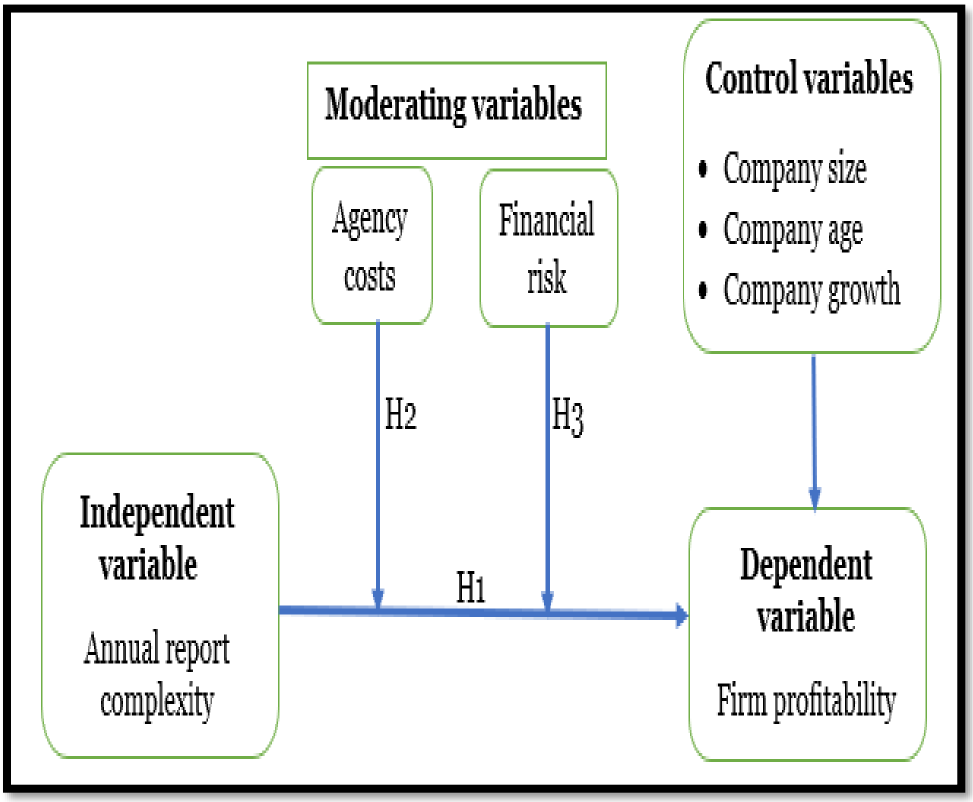

Figure 1: Research model

III. Methodology

Sample and data

The initial sample included all publicly Egyptian companies listed on EGX 100 index during the period 2016-2021. This study depended on annual reports; therefore, 56 observations were discarded due to the unavailability of annual reports. Moreover, 40 observations were excluded because their financial statements were presented in dollars rather than Egyptian pounds. Furthermore, 54 observations for 9 companies were eliminated because they were listed on EGX after 2016. Thus, the final sample consisted of 75 companies with 450 company-year observations, as shown in Table 1. The annual reports of Egyptian companies were collected from companies' websites. Data related to financial risks, company profitability, age, and growth were collected from the market screener, mubasher information, investing, and WSJ markets websites.

Table 1. Sample selection

Descriptions	Number of observatio
Total sample	600
Less: missing annual reports	(56)
Less: annual reports presented in US dollar	(40)
Less: public companies listed on EGX after 2016	(54)
Final sample	**450**

Variables measurement

Dependent variables. The dependent variables are associated with the objectives of the study. The first objective of this study is to investigate the relationship between annual report complexity and firm profitability. Thus, the dependent variable of this objective is firm profitability, which is a measurement of a company's profit compared to its expenses (Akbas et al. 2017; Chen et al. 2018). It is measured by earnings per share (EPS) (Bendriouch et al. 2022).

Independent variables. The independent variable of this study is the annual reports complexity. Consistent with previous studies (Ezat 2019; El-Din et al. 2022) LIX index was used to measure the complexity of annual reports. The complexity of text is considered a function of complex words and sentence length within the annual report (El-Din et al. 2022). It is suitable for measuring the complexity of annual reports whether they are prepared in Arabic or English (El-Din et al. 2022). Some steps were followed to measure the complexity of annual reports. First, PDF annual reports were converted into a word format. Then, all tables and figures have been removed from the Word file. Subsequently, to calculate the complexity level of the annual reports, the Word file was uploaded to the character count tool website. Finally, the LIX index was used to measure the complexity of the annual reports.

The LIX formula is presented as follows (El-Din et al. 2022):

$$\text{LIX-Score} = 100\times(LW/W) + (W/S)$$

Where:
LW is the number of long words.
W is the number of words.
S is the number of sentences.
The complexity level depends on the LIX index score; therefore, if the LIX score is over 60, the text is very complex. Whereas, if the score is less than 50, the text is easy to read, and if the LIX score is between 50 and 60, the text is less complex (Ezat 2019).

Moderating variables. To test the second and third hypotheses, two moderating variables, agency costs, and financial risk were constructed. The second objective of this study is to investigate the moderating effect of agency costs on the relationship between the complexity of annual reports and firm profitability. Therefore, the moderating variable of this objective is agency costs, which refer to the costs associated with the difference in the incentives of agents and principals (Lehavy et al. 2011; Aymen et al. 2018). It is measured by the operating expense ratio, which is the total of administrative expense and sales expense over revenue (Aymen et al. 2018; Luo et al. 2018; Dalwai et al. 2021). The third objective of this study is to investigate the moderating effect of financial risk on the relationship between annual reports complexity and firm profitability. Hence, the moderating variable of this objective is financial risk, which refers to the company's current level of debt, and measures the company's ability to manage its debt (Hsieh et al. 2016; Guay et al. 2016). It is measured by the average total debt divided by the average total assets (Fisher et al. 2019; Hassan et al. 2022).

Control variables. Previous studies (Aymen et al. 2018; Ezat 2019; Dalwai et al. 2021; El-Din et al. 2022) have suggested that adding control variables in empirical regression models reduces the missing or omitted variable bias. Therefore, the five empirical models included some control variables that may affect firm profitability, agency costs and financial risk. Specifically, the control variables include company size, measured as the natural logarithm of a company's total assets. Company age is measured by the number of years the company has been listed on the Egyptian

Exchange (EGX). In addition to company growth, which is measured using the sales growth rate. These control variables diminish the omitted variables bias problem (El-Din et al. 2022).

Empirical models.

The research hypotheses were tested using regression models. Some variables that can affect firm profitability, financial risk and agency costs were controlled. Company size was controlled because large firms have good financial performance, lower financial leverage, and lower agency costs. They also provide readable annual reports (Guay et al. 2016; El-Din et al. 2022). Moreover, company age was controlled because the higher the number of years the company is listed on the EGX 100 index, the better performance will be (Ezat 2019). Furthermore, company growth was controlled because highly profitable companies have lower financial leverage, agency costs, and less complex annual reports (Dalwai et al. 2021).

The first research hypothesis (H1) addresses the impact of annual reports complexity on firm profitability. Therefore, Model 1 was developed to regress the complexity score on firm profitability and the control variables, as follows:

$$EPS_{i,t} = \beta0 + \beta1\ LIX\_Score_{i,t} + \beta2\ Company\ Size_{i,t} + \beta3\ Company\ Age_{i,t} + \beta4\ Company\ Growth_{i,t} + \varepsilon \qquad (1)$$

LIX Score $_{i,t}$ is the annual report complexity score of company i in year t. EPS $_{i,t}$ is the profitability score of company i in year t. The second research hypothesis (H2) investigates how agency costs strengthen the association between annual reports complexity and firm profitability, an interactional between annual report complexity and agency costs was developed. The second empirical model used to test H2 is summarized below:

$$EPS_{i,t} = \beta0 + \beta1 LIX\_Score_{i,t} + \beta2\ Agency\ Costs_{i,t} + \beta3\ LIX\_Score_{i,t} \times Agency\ Costs_{i,t} + \beta4\ Company\ Size_{i,t} + \beta5\ Company\ Age_{i,t} + \beta6\ Company\ Growth_{i,t} + \varepsilon \qquad (2)$$

LIX _Score $_{i,t}$ × Agency Costs $_{i,t}$ describes an interaction between annual report complexity and agency costs.

To test the third research hypothesis, which analyses how a company's financial risk affects the association between annual report complexity and firm profitability, an interactional is developed between annual report complexity and a company's financial risk (LIX _Score $_{i,t}$ × Financial Risk $_{i,t)}$. Therefore, the third empirical model is as follows:

$$EPS_{i,t} = \beta 0 + \beta 1\ LIX\_Score_{i,t} + \beta 2\ Financial\ Risk_{i,t} + \beta 3 LIX\_Score_{i,t} \times Financial\ Risk_{i,t} + \beta 4\ Company\ Size_{i,t} + \beta 5\ Company\ Age_{i,t} + \beta 6\ Company\ Growth_{i,t} + \varepsilon \quad (3)$$

LIX _Score $_{i,t}$ × Financial Risk $_{i,t}$ describes an interaction between annual report complexity and financial risk.

Results and discussion.

Descriptive statistics

Table 2 presents the descriptive statistics for 450 company-year observations of Egyptian companies listed on the EGX 100 index. As can be seen in table 2, by the mean, standard deviation, minimum, and maximum, all variables are highly dispersed in the scores. Table 2 indicates that the average annual report complexity score is (51.7956), indicating that the Egyptian companies' annual reports are less complex, with minimum and maximum scores of (36) and (66), respectively, suggesting that the complexity of annual reports ranges from very easy to very complex. The standard deviation of complexity is (10.7935), indicating a significant difference in annual report complexity across Egyptian listed companies. Agency costs have a mean of (.26055), a standard deviation of (.30246), and minimum and maximum values of (0.0013), and (.928936), respectively, suggesting a huge difference in agency costs across Egyptian listed companies.

The average value of profitability, measured by EPS, is (1.24134), with a standard deviation of (2.6451), minimum and maximum values of (-11.61), and (20.9100), respectively, showing a significant difference in Egyptian listed companies' profitability. The mean value of financial risk is (.103271) with a standard deviation of (.151569), and minimum and maximum values of (0.00), and (.871000), respectively, indicating variation in leverage across Egyptian listed companies. According to the control variables, company size ranges from (5.7449) to (13.2385), with a mean value of (7.72915) and standard deviation of (1.25853). The mean value of company age is (18), with a standard deviation of (8.792), and minimum and maximum values of (1), and (41), respectively. Furthermore, the mean value of company growth is (.239091), with a standard deviation of (.2055332), and minimum and maximum values of (0.10), and (.9942), respectively.

Table 2. Descriptive statistics of variables

Variables	Mean	Min	Max	SD
Panel A: Independent Variables				
Annual report Complexity	51.7956	36	66	10.7935
Panel B: Dependent variables				
EPS	1.24134	-11.61	20.9100	2.6451
Agency costs	.26055	0.0013	.928936	.30246
Financial risk	.103271	0.06	.871000	.151569
Panel C: Control variables				
Company size	7.72915	5.7449	13.2385	1.25853
Company age	18	1	41	8.792
Company growth	.239091	0.10	.9942	.2055332
Number of observations	**450**			

***Correlation analysis*.**

The person correlation matrix presented in table 3 indicates that the complexity of annual reports is significantly and negatively associated with firm profitability (EPS) at -.138. This finding suggests that companies with poor performance and low profitability provide more complex annual reports. Table 3 also shows a significant positive relationship between annual report complexity and agency costs at .612, indicating that the more complex annual reports that companies provide, the higher the agency costs they have. Moreover, annual reports complexity is also significantly and positively associated with financial risk at .722, indicating that the more complex annual reports that companies provide, the higher the financial risk they have. Furthermore, company profitability is significantly and negatively associated with agency costs and financial risk at -.123 and -.164, respectively. This suggests that poorly performing companies have higher agency costs and financial risk. Additionally, agency costs are significantly and positively associated with financial risk at .122, indicating that companies with higher agency costs have a higher financial risk. The correlation between company size and company age is significantly positive at .144, illustrating that larger companies have an older edge. The correlation between company size and company growth is positively insignificant. Finally, the correlation between company age and company growth is positively insignificant at .068.

Table 3. Pearson coefficient correlation matrix

	Complexity	EPS	Agency costs	Leverage	size	Age	Growth
Complexity	1						
EPS	-.138***	1					
Agency costs	.612***	-.123***	1				
Financial risk	.722***	-.164***	.122***	1			
Company size	-.256***	.219***	-.120**	-.113**	1		
Company age	-.013	.152***	-.041	-.031	.144***	1	
Company growth	-.068	.062	-.029	-.035	.059	.068	1

*** Correlation is significant at the 0.01 level (2-tailed).
** Correlation is significant at the 0.05 level (2-tailed).

Multiple regression results.

Table 4 presents the OLS regression results for the first research objective. The first objective of this study is to investigate the relationship between annual report complexity and firm profitability. Model 1 shows a significant negative association between annual reports complexity and EPS at a level of 0.01; the coefficient is -.50, with a negative T-value of -3.140, which confirms H1 prediction, the higher complexity score, the more complex annual reports, and the higher the company's profitability. The model is statistically significant at a level of 1% with F-statistics of 14.559 and an adjusted R^2 of 10.8%. Regarding control variables, company size and age have a significant positive coefficient at a level of 1%, indicating that large companies are more profitable. Company growth explains the variation in the firm's profitability. These results are consistent with those of previous studies (Hassan et al. 2019; El-Din et al. 2022; Bendriouch et al. 2022).

Table 4. Regression results for testing H1

Independent variables	Model 1 DV (EPS) Coefficient	T-value
Constant	-26.775	-1.857
Complexity	-.50	-3.140***
Company size	.204	2.067***
Company age	.041	2.931***
Company growth	.448	1.069
Adjusted R^2	.108	
F-statistics	14.559***	
Number of observations	450	

Note: *** and ** indicate statistical significance at 1% and 5% levels, respectively.

The second objective of this study is to examine the moderating effect of agency costs on the relationship between annual report complexity and firm profitability. Therefore, table 5 reports the multiple regression results for testing the moderating effect of agency costs on the relationship between annual reports complexity and firm profitability for the second research hypothesis. As shown in table 5 the model is statistically significant at a significant level of 1% with F-statistics of 11.915, and an adjusted R^2 of 12.7%. The findings reveal a significant negative relationship between annual report complexity, agency costs and firm profitability, the coefficients are -.060 and -5.202 with T-values of -2.206 and -2.560, respectively. The results of the interaction effect of annual report complexity and agency costs on the company profitability is negatively significant, the coefficient is -.364 with t-value of -5.105. This finding suggests that annual report complexity reduces firm profitability for a company with higher agency costs. Therefore, hypothesis 2 is supported, which indicates that the effect of annual reports complexity on reducing firm profitability may be stronger due to the higher conflict between managers and owners and the higher agency costs that the company have.

Table 5. Regression results for testing H2

Independent variables	Model 2 DV (EPS) Coefficient	T-value
Constant	-10.140	-.457
Complexity	-.060	-2.206***
Agency costs	-5.202	-2.560***
Complexity × Agency costs	-.364	-5.105***
Company size	5.128	3.660***
Company age	.796	4.100***
Company growth	.413	.993
Adjusted R^2	.127	
F-statistics	11.915***	
Number of observations	450	

Note: *** and ** indicate statistical significance at 1% and 5% levels, respectively.

Table 6 presents the regression results for testing the third research hypothesis, the moderating effect of financial risk on the relationship between annual reports complexity and firm profitability. Model 3 is significant at a level of 1% with F-statistics of 9.978 and an adjusted R^2 of 10.7%. The results indicate a significant negative relationship between firm profitability and both annual report complexity and financial risk, the coefficients are -.029 and -.692 and T-values of -2.566 and -.916, respectively. The interaction effect of annual reports complexity and financial risk is significantly negative at a level of 1%, with a coefficient of -.358, and T-value of -3.519. This supports H3 and indicates that higher financial risk may enhance the negative association between annual reports complexity and firm profitability.

Generally, multiple regression results in tables 4–6 provide empirical evidence to support the research hypotheses, H1, H2, and H3. The results suggest that annual report complexity increases information asymmetry, and conflict between managers and shareholders, which increases the company's agency costs. Furthermore, companies with poor performance provide more complex annual reports to hide bad news from users, which increases their uncertainty and financial risk. The results also indicate that agency costs and financial risk strengthen the negative relationship between annual reports complexity and firm profitability.

Table 6. Regression results for testing H3

Independent variables	Model 3 DV (EPS) Coefficient	T-value
Constant	-10.140	-.457
Complexity	-.029	-2.566***
Financial risk	-.692	-.916***
Complexity × Financial risk	-.358	-3.519***
Company size	.198	2.006***
Company age	.041	2.944***
Company growth	.432	1.031
Adjusted R^2	.107	
F-statistics	9.978***	
Number of observations	450	

Note: *** and ** indicate statistical significance at 1% and 5% levels, respectively.

IV. Conclusion.

The complexity of annual reports has received more attention from the capital market (Luo et al., 2018; Dalwai et al. 2021). Annual report complexity has been found to increase the time, cost, and effort that users of financial information need to understand, interpret, and evaluate a company's performance (Hoitash et al. 2017). The impact of annual reports complexity on agency costs, financial risk and firm profitability is unclear (Dalwai et al. 2021). This raises the question of whether annual report complexity increases information asymmetry, conflict problem of interest between managers and shareholders, and agency costs and reduces the company's ability to depend on external funding and its profitability. Accordingly, this study examined the relationship between annual report complexity and firm profitability moderated by agency costs and financial risk for a sample of 75 Egyptian companies listed on EGX 100 index with 450 firm year observations during the period of 2016-2021. To obtain reliable and accurate results for the relationship between annual report complexity, agency costs, financial risk, and firm profitability, this study controlled for some variables such as, company size, age, and growth, which may affect this relationship. The study found that complexity scores of

Egyptian listed companies were less complex with an average of 51.7956.

The multiple regression results for model 1 reported a significant negative association between annual report complexity (measured by the LIX index) and firm profitability (measured by EPS), which supported hypothesis 1, and suggested that providing more complex annual reports increases information asymmetry, companies' risks, and uncertainty, which in turn reduces their profitability.

Furthermore, agency costs (measured by the operating expense ratio) were found to have a moderating effect on the relationship between annual reports complexity and firm profitability. This supports the second research hypothesis and suggests that less readable annual reports reduce information transparency, and increase conflicts of interest between users, which increases companies' agency costs and reduces their profitability. Concerning the third research hypothesis, the results revealed a significant positive relationship between annual report complexity and financial risk (measured by leverage), suggested that companies with less readable annual reports bear higher financial risk. However, after adding financial risk in model 3 and testing the interaction effect of annual report complexity and financial risk on the relationship between annual report complexity and firm profitability, the results supported hypothesis 3 and demonstrated that financial risk strengthened the relationship between annual report complexity and firm profitability.

This study has several theoretical and empirical implications. From an academic view, this study extends the results of the literature that explored the benefits of providing readable information to users by examining the impact of providing complex information on firm profitability. Besides, this study is the first of its kind to investigate the relationship between annual report complexity and firm profitability, with the moderating roles of agency costs and financial risk of Egyptian companies listed on the EGX 100 index. Therefore, this study provides new findings on the relationship between annual report complexity, agency costs, financial risk, and firm profitability in an emerging economy. Furthermore, this study contributes to the literature on complexity of annual reports and firm profitability. This finding suggests that higher annual report complexity is associated with higher agency costs, financial risk, and lower profitability. Further, it encourages researchers to examine such relationships in different countries because of the scarce interest in such a research area.

From an empirical viewpoint, investors and creditors can benefit from reducing the complexity of annual reports by assessing them to evaluate and oversee companies. The results suggest that annual report complexity increases information asymmetry, reduces transparency, increases agency problems between managers and stakeholders, and reduces the companies' sources of funding, which reduces their profitability. Consequently, the readability of annual reports is important for managers to help them reduce their agency costs and obtain more funding. Likewise, Egyptian companies should consider the complexity of annual reports as a primary element of information quality. Further, for Egyptian companies, the results of this study provide evidence of the importance of annual report readability and its role in reducing agency costs, and financial risk, and improving firm profitability. Moreover, regulatory settings should encourage companies to provide more transparent and readable annual reports to help users make better decisions. Additionally, regulators should provide guidelines to help companies provide more readable annual reports to all users.

This study has some limitations that designate future areas of research. **First,** this research focused solely on Egyptian companies listed on the EGX 100 index; and thus, the findings cannot be generalized to all Egyptian listed companies. However, the results can be extended to other publicly listed companies on The Egyptian stock exchange. Future research on annual report complexity can be conducted for other Egyptian listed companies or countries with different regulatory settings. Furthermore, future research can compare the complexity of annual reports across companies in different countries**. Second,** this study depended on the effect of annual report complexity on only three factors: firm profitability, agency costs, and financial risk. Future research can examine the effect of annual reports complexity on other factors such as corporate governance, financial analysts' behavior, and cost of funding. **Third,** this study depended on the complexity of the entire annual report and used the LIX index as a proxy of annual reports complexity. Future research can measure the complexity of specific components of annual reports, such as board of director reports, governance, social and environmental reports, or management discussion reports, they can also depend on a different proxy of annual report complexity, such as the Flesch Reading Ease index, Fog index, and Flesch–Kincaid index.

Fourth, this study measured agency costs using the operating expense ratio, which reflects the managerial consumption and the efficiency in controlling agency costs. Therefore, future research can use different measurements for agency costs that reflect the efficiency of assets utilization, such as the total sales to total assets ratio. **Fifth,** EPS was used as a measurement of firm profitability since the literature does not state the best measurement for firm profitability. However, future research should use a different measure of firm profitability such as ROA or ROE, to ensure the robustness of the results. **Sixth,** this study depended on agency costs and financial risk as moderating variables to strengthen the negative relationship between annual report complexity and firm profitability. Future research can depend on different moderating variables that can strengthen the relationship between annual reports complexity and firm profitability, such as corporate governance. **Finally,** this study focused only on the annual report complexity, whereas the understandability of annual reports measures the ability of users to gain knowledge, accordingly, annual reports understandability goes beyond the study's scope and provide an area for future research. Despite the above limitations this study considered sufficient to evaluate the annual report complexity of Egyptian companies and to provide evidence on the relationship between annual report complexity and firm profitability.

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