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Impact of Mandatory Audits of Small- and Medium-Sized Enterprises on Their Income Tax Compliance: Evidence from the Egyptian Small- and Medium-Sized Enterprise Stock Market

Abouelghit Mahmoud Galal Mohamed [1,2,*] and Shengdao Gan [1]

1 Department of Accounting and Finance, Business School, Sichuan University, Chengdu 610017, China; ganshengdao@scu.edu.cn
2 Department of Accounting and Auditing, Faculty of Commerce, Sohag University, Sohag 82524, Egypt
* Correspondence: mahmoud_aboelghait@commerce.sohag.edu.eg or mgmharraz.mg@gmail.com; Tel.: +86-14708016572

Abstract: Small- and medium-sized enterprises are essential to the economies of nearly all countries, as they directly influence the GDP and tax revenue. In 2019, the European Federation of Accountants and Auditors for SMEs surveyed SME account users, revealing that tax authorities were the most common recipients of the company's accounts, accounting for 61.40% of cases. This study, from a macroeconomic perspective, aims to uncover evidence of the impact of mandatory audits of Egyptian SMEs on their income tax compliance. It also seeks to explore the Egyptian SME tax environment to fill the knowledge gap by exploring perceptions of SMEs' tax performances and their levels of tax. This study provides evidence that the taxpayers' tax compliance behavior is an essential and decisive factor in the compliance of Egyptian SMEs with income tax. The results show that SME management is less persuaded by the potential benefits of mandatory audits on tax compliance than auditors and academics. Also, the study found experimental evidence confirming that the mandatory auditing of SMEs positively impacts their compliance with income tax. Additionally, this study developed a tax compliance scale (the RTRP scale) that effectively suits the nature and characteristics of SMEs, enabling the quantitative measurement of their compliance levels with income tax, as well as comparisons between SMEs.

Keywords: SMEs; mandatory audits; income tax compliance; SME auditing; Egyptian SMEs

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1. Introduction

Taxing small- and medium-sized enterprises (SMEs) creates a promising supply for the Egyptian economy because of its large number. According to the Arab Monetary Fund Organization's latest economic census, almost 99.6% of all enterprises in Egypt are micro-, small-, or medium-sized enterprises (MSMEs) (AMF 2019). However, Hisham Ragab, a member of the Egyptian SME Authority's Board of Directors, reveals that these enterprises contribute only 7% to Egypt's tax revenue, while large enterprises contribute 88% (Economy Plus 2019). Tax compliance increases with firm size, indicating that larger firms bear a more significant tax burden in developing countries, explaining the high number of SMEs in these regions (Todd et al. 2020; Hsieh and Klenow 2014; Hsieh and Olken 2014).

We argue that mandatory audits beyond assuring stakeholders can impact SMEs' income tax compliance, since the audit process may uncover errors or omissions in financial records, necessitating changes to the company's tax liabilities. Conversely, a successful financial audit can demonstrate to tax authorities that the SME's financial records are accurate and complete, reducing the risk of an audit or investigation (see Firth and Tam 2008; Onwumere et al. 2019).

SMEs often prefer the informal economy, because the government does not impose low tax rates or exemptions on them, and they face challenges when dealing with government agencies for registration, licenses, customs, and taxes (Amr 2019). Sebele-Mpofu (2023) found out that tax morale was a strong driver of tax evasion and non-tax compliance in the informal sector. It is important to note that about 85% of SMEs in Egypt are considered informal (Ezzeldeen 2019), similar to many other developing countries, which emphasizes the importance of adequately taxing SMEs (Schneider 2006; Arachi and Santoro 2007).

The authors used mixed methods to investigate the study's results. These methods were a combination of surveys and financial report analyses. Questionnaires were directed to three main stakeholders: 304 auditors, 282 SME owners/managers, and 217 academics/economists. Financial reports were analyzed for all listed Egyptian SMEs from the first listing in 2010 until 2023, which included 56 SMEs.

The findings reflect that auditors believe, more than others, the positive impact of mandatory SME audits on their income tax compliance, while academics and SME management align in being more pessimistic. This may reflect that auditors have a potential conflict of interest with SME management. Additionally, the findings show that there is a significant positive effect of mandatory audits on the SMEs' income tax compliance levels.

This study holds originality and value in uncovering evidence on the positive impact of mandatory audits of Egyptian SMEs on their income tax compliance, since the results show that there is a significant difference before and after applying mandatory audits on Egyptian SMEs' tax compliance. These results were obtained by developing a standardized and concise scale to measure income tax compliance among SMEs based on the releases of the Organization for Economic Co-operation and Development (OECD); this scale is proposed and designed to fit with the unique attributes and features of SMEs, thereby enabling the quantitative evaluation of their adherence to income tax regulations. This scale facilitates inter-SME comparisons and fosters opportunities for future scholarly investigations within this domain.

This study consists of six main sections; the first one is the Introduction to the study. The second one is Tax Compliance, which contains tax compliance definitions and a deep look into the Egyptian SME tax system; the third section is the Analysis of the Relevant Literature and Theoretical Foundations, and we divided it into three categories: studies on SME income tax compliance, studies on the impact of audits on SMEs' income tax compliance, and studies on measuring SME tax compliance. The fourth section is the Methodology, the fifth contains the Results and Discussion, and this study ends with the Conclusions section.

2. Tax Compliance

2.1. Definition

Tax compliance plays a vital role in the smooth operation of the tax system, ensuring the efficient and fair collection of tax revenues while treating taxpayers equitably. It encompasses the actions taken by taxpayers to adhere to tax laws and regulations, including responsibilities such as filing tax returns, paying taxes on time, and maintaining accurate records (OECD 2019). Tax compliance refers to taxpayers fulfilling statutory obligations related to their annual tax liability. This includes registration, record keeping, reporting, facilitating assessments, payment, and engaging in post-assessment adjustment processes. Moreover, tax compliance comprises the timely preparation, submission, and payment of taxes owed within specified periods (Naicker and Rajaram 2019; Nguyen 2019; Le et al. 2020). According to a country's tax laws and regulations, it also includes the accurate filing of tax returns with the appropriate tax liability (Friedman 2011; Newman et al. 2018).

Non-compliance, on the other hand, refers to a taxpayer's failure to accurately report income, claim deductions and refunds, or pay the correct amount of tax on time (Wadesango et al. 2018).

Tax compliance is crucial for both taxpayers and governments. For taxpayers, it reduces the risk of penalties and legal consequences while enhancing their reputation and relationships with stakeholders. Governments, in turn, rely on compliance to ensure the efficient and fair collection of tax revenues, enabling them to fund public goods and services.

Previously mentioned definitions of tax compliance and non-compliance highlight four essential factors: adherence to legislation, reporting, record keeping, and timely payment. These factors serve as the basis for the four general categories of obligations employed by the OECD to define tax-compliant firms, as we will elaborate upon below.

During interviews, Ms. Liu Yan, a tax expert, emphasized the significance of tax compliance in the tax system (liu, Y, personal communication, 14 March 2023). She stressed the need for collaboration between governments and taxpayers to foster and sustain high levels of compliance. In order to maintain public confidence in the tax system and its administration, revenue authorities have the primary objective of collecting taxes and duties in accordance with the law. At the same time, non-compliance with tax legislation may occur due to various factors such as ignorance, negligence, and recklessness.

2.2. The Evolution of the Egyptian SME Tax System and Financial Audit Enforcement

The history of taxation for SMEs in Egypt spans back to the early 20th century. In 1906, the first income tax law was enacted, but SMEs were initially exempt from income tax. This changed in 1991 with the introduction of the Small Enterprises Law, which established a separate tax regime for SMEs based on their annual income.

In 2005, the government took a significant step by introducing the Unified Tax Law, which aimed to create a unified tax system for all taxpayers, including SMEs. Under this law, a flat tax rate of 20% was imposed on all corporate income, irrespective of the company's size or sector. Nonetheless, SMEs still enjoyed specific tax incentives and exemptions. For example, under this law, SMEs were exempt from the minimum tax threshold and benefited from a reduction in stamp duty on capital increases (Law No. 91 of 2005).

In 2015, the tax landscape for SMEs underwent further changes with the introduction of a new tax law that replaced the Unified Tax Law. This new law brought about several modifications to the tax system for SMEs. One notable change was the corporate income tax rate reduction for SMEs with an annual turnover of less than EGP 5 million (EUR 15.25k/USD 16k) to 1%, while larger companies continued to face a 20% tax rate. Additionally, a simplified tax regime was introduced for micro-enterprises with an annual turnover of less than EGP 1 million, allowing them to pay a flat tax rate of 1% on their gross revenues (Law No. 96 of 2015).

More recently, Egypt implemented a self-assessment system, wherein taxpayers are responsible for assessing their tax liabilities based on the current tax law, (Law No. 152 of 2020). This law focuses on developing MSMEs and mandates that taxpayers determine their taxable income, compute their tax liabilities, and submit their tax returns. Compliance with tax regulations is crucial in self-assessment tax regimes, as voluntary compliance directly impacts tax revenues. Yong and Freudenberg (2020) suggest that simplifying tax measures can improve the compliance behavior among SMEs, as highlighted by Hasseldine and Li (1999).

According to the latest tax law in Egypt (Law No. 152 of 2020), MSMEs can estimate their commercial revenues to determine their income tax obligations. If the commercial revenues are less than EGP 250,000 (EUR 7.625k/USD 8k), the firm must pay EGP 1000 (EUR 30.5/USD 32) in annual taxes. For sales between EGP 250,000 (EUR 7.625k/USD 8k) and EGP 500,000 (EUR 15.25k/USD 16k), the tax amount increases to EGP 2500 (EUR 76.25/USD 80) per year, while sales between EGP 500,000 (EUR 15.25k/USD 16k) and EGP 1 million (EUR 30.5k /USD 32k) incur a tax of EGP 5000 (EUR 152.2/USD 160) per year. Firms reporting sales between EGP 1 million (EUR 30.5k/USD 32k) and EGP 2 million (EUR 61k/USD 64k) will be subject to a 0.5% tax, with the tax rate increasing to 0.75% for sales between EGP 2 million (EUR 61k/USD 64k) and EGP 3 million (EUR 91.5k/USD 96k). Finally, sales between EGP 3 million (EUR 91.5K/USD 96K) and EGP 10 million (EUR 305k/USD 320k) are subject to a 1% tax. Despite the efforts to simplify the tax system for SMEs in Egypt, compliance with tax regulations remains a challenge for many of these businesses. The complexity and lack of clarity surrounding tax laws, along with limited access to financial and tax advisory services, contribute to the difficulties faced by SMEs in meeting their tax obligations (Farghaly and El Sayed 2021).

In Egypt, there is a distinction between the audit requirements for listed and non-listed SMEs in the Egyptian stock market. Only listed SMEs are subject to specific regulations and disclosure requirements enforced by the Egyptian Financial Supervisory Authority (EFSA) and the Egyptian Exchange (EGX).

Listed Egyptian SMEs are required to conduct financial audits in accordance with Egyptian accounting and auditing standards and submit their audited financial statements to the EGX and the EFSA. Typically, external audit firms registered with the Central Auditing Organization (CAO) or other reputable authorities conduct these audits. For non-listed SMEs, the audit requirements are more relaxed and optional (NILEX 2014).

3. Analysis of the Relevant Literature and Theoretical Foundations

After extrapolating the literature and theories related to this study, the authors could divide them into three categories: studies on SME income tax compliance, studies on the impact of audits on SMEs' income tax compliance, and studies on measuring SME tax compliance.

3.1. Studies on SME Income Tax Compliance

By analyzing the literature related to SME income tax compliance, we found that it can be categorized into three major categories, as follows:

3.1.1. Tax Compliance Models and Factors

These studies focus on understanding the factors influencing taxpayers' decisions to comply with tax laws and regulations. They explore economic inefficiencies caused by taxation, the impact of market failures, and the role of corrective taxes and subsidies. Scholars in this category analyze the compliance behavior among individuals and SMEs, considering economic, social, psychological, and institutional influences.

Over the years, scholars and policymakers have proposed various tax compliance models that explain the factors influencing taxpayers' decisions to comply with tax laws and regulations. The theoretical foundation for understanding tax compliance among individuals and SMEs is multifaceted and draws upon various models and frameworks. Some significant tax compliance models include social norms, equity, and economic, institutional, and psychological dimensions (Allingham and Sandmo 1972; Kirchler 2007; Alm et al. 1992a; Frey and Torgler 2007).

Institutional theory can explain taxpayers' compliance motives, since it focuses on the influence of social norms, organizational structures, and legal frameworks on the compliance behavior (Baumol and Blinder 2008; Helmke and Levitsky 2004; North 1990). It examines how societal norms, legal systems, and enforcement mechanisms shape taxpayers' attitudes and actions (Horodnic 2018; Williams and Horodnic 2016). This perspective is relevant when considering the impact of mandatory audits, as they are institutional mechanisms designed to promote compliance.

Nevertheless, taxation can also be vital in addressing market failures arising from positive or negative externalities (Alan 1983). Pigouvian taxes, such as those on tobacco and alcohol, are a way to discourage behaviors that create harmful side effects for society. For example, taxing these items is more effective than outright bans, as seen during Prohibition, and taxing cigarettes has been particularly successful in reducing smoking (Avi-Yonah 2011). In such cases, corrective taxes and subsidies are viable tax solutions. Subsidies can incentivize the creation of positive externalities due to the market mechanism's failure to generate them (Abdellaif and Tran-Nam 2022).

The normative theory, which contends that social norms, moral principles, and ethical considerations influence taxpayer compliance, is another theory explaining the factors that affect taxpayer compliance. It posits that individuals are more likely to comply with tax laws if they perceive them as a moral obligation (Stark and Kirchler 2017; Kornhauser 2007; Gordon 1972).

Although SME tax compliance is relevant for tax authorities, it is difficult to achieve, even when tax laws may be made more precise (James and Alley 2014; Wadesango et al. 2018). However, Lignier (2009) discovered benefits for SMEs that comply with tax regulations; he reveals that tax compliance activities improve record keeping and enhance the understanding of financial affairs for most SME taxpayers.

3.1.2. Tax Compliance Behavior among SMEs

This category explicitly examines the tax compliance behavior among SMEs. It addresses the higher risk of tax non-compliance among SMEs, the challenges they face in meeting complex regulatory requirements, and the influence of factors such as trust, perceived fairness, and cultural values on their compliance decisions.

One of the significant challenges the income tax administration faces in developing nations is tax non-compliance, which hampers tax revenue performance (Friedman 2011). Moreover, various tax crimes and avoidance methods involve the use of shell companies to record fraudulent transactions (Arachi and Santoro 2007); these issues are interconnected, as MSMEs find tax evasion enticing due to the high costs associated with compliance and relatively low expected penalties resulting from a tax audit. In many developing countries, there are complicated tax rules, and sometimes corporate taxpayers do not follow them correctly. This makes the MSMEs try to avoid paying taxes. Studies have revealed that these companies think about whether it is worth breaking the tax rules, considering the chance of getting caught (see Daniel and Amos 1979; Atawodi and Ojeka 2012; Soliman et al. 2014).

Kirchler (2007) provided a comprehensive overview of the economic psychology of tax compliance, including examining SMEs' tax compliance behavior. The author argued that various factors, such as social norms, perceived fairness, and the quality of the tax administration, influence tax compliance. Mcgee (2007) assessed the tax system's impact on small businesses in the United States, highlighting how its complexity can result in high compliance costs for SMEs and advocating for simplifying the tax code to improve tax compliance in this group.

Alm and Torgler (2006) explored the connection between cultural values and tax compliance among SMEs in the United States and Europe. They discovered significant differences in tax morale across cultures, with European SMEs exhibiting higher levels of tax compliance than their U.S. counterparts. Cuccia and Carnes (2010) investigated the impact of trust and perceived fairness on tax compliance among SMEs. Their findings indicated that SMEs that perceive the tax system as fair and trustworthy are more inclined to comply with their tax obligations, examining trust's role in SME tax compliance. Feld and Frey (2002) revealed that SMEs are more likely to comply with tax obligations when they perceive the tax authorities as trustworthy and fair.

3.1.3. SME Mandatory Auditing and Ethical Considerations

This category discusses the controversial issue of SMEs being required to conduct financial auditing and its implications for tax compliance. It highlights the conflict of interests between management and the expectations of social and professional groups regarding mandatory audits, framing tax compliance as an ethical issue.

Most tax compliance research has focused on individual taxpayers, with limited studies targeting SMEs (Yong and Freudenberg 2020). SMEs are considered a high-risk tax group, characterized by a higher rate of tax non-compliance, and this is partly attributed to the availability of opportunities for tax evasion, such as engaging in the informal economy. Non-compliance among SMEs may be unintentional, as they often face challenges in meeting complex regulatory requirements, leading to regressive compliance costs (Yong and Freudenberg 2020; Philip and Christopher 2012; OECD 2009; Commonwealth of Australia 2003; McKerchar 2002). Taxation is known to cause economic inefficiencies that decrease the overall economic efficiency. Gauthier and Gersovitz (1997) found that smaller companies are more likely to evade taxes by under-reporting their revenue to the tax authority.

Moreover, compliance and non-compliance can result from the interaction between political, legal, and administrative actors and taxpayer behavior (Friedman 2011; Kidder and Craig 2011).

Overall, research on tax compliance behavior among individuals and SMEs provides a framework for understanding this behavior. These models consider various factors such as economic, social, psychological, and institutional influences on compliance decisions. The literature also presents studies exploring the relationship between tax compliance and SMEs, revealing the factors that affect compliance behavior. Although the findings vary across studies, they emphasize the significance of trust, perceived fairness, and cultural values in shaping tax compliance among SMEs.

The issue of requiring SMEs to conduct financial auditing is controversial despite its importance and positive implications for tax compliance, which represents a macroeconomic trend. However, the management of these SMEs must bear the obligations and costs associated with this decision. Given that tax compliance is primarily an ethical issue, it is expected that due to the conflict of interests, the management of SMEs will refuse to accept this or recognize the anticipated benefits from the mandatory audits for their companies, which may be reflected in the expectations of the social and professional groups concerned with this obligation.

The literature mentions trust and psychological factors but does not delve deep into the social and cultural aspects that might influence the tax compliance behavior among Egyptian SME owners.

Based on prior, the authors suppose that Egyptian SME management's beliefs and attitudes about their willingness to comply with tax and their belief in the positive impact that happens because of mandatory audits are different compared to other related parties.

H1: *There are significant differences between SMEs' management and other respondents regarding the positive impact of SMEs' mandatory audits on income tax compliance*.

3.2. Studies on the Impact of Audits on SMEs' Income Tax Compliance

The literature can be categorized into distinct themes related to the role of auditors in tax compliance and the value of audits for SMEs, including the broader implications of auditing on financial reporting and economic stability as follows:

3.2.1. Auditors' Role in Tax Compliance and Financial Reporting

This category focuses on how auditors ensure that companies adhere to tax and accounting rules, enhancing the accuracy and transparency of financial reporting.

Auditors play a crucial role in ensuring compliance with tax and accounting regulations, which is vital for preparing annual financial statements and tax filings. When companies disclose audited financial statements, regulators indirectly gain third-party assurance of the accuracy of the firm's tax filings (Downing and Langli 2018).

In Malaysia, Mohd Nor et al. (2010) looked at the link between false financial reporting and the firm's characteristics as well as the quality of audits in firms audited by the Inland Revenue Board of Malaysia after the country implemented a self-assessment system. The study found that a firm's size and audit quality have significant negative relationships with fraudulent financial reporting.

The European Federation of Accountants and Auditors for SMEs (EFAA 2019) emphasized the value and benefits of audits for SMEs, particularly concerning taxation. In 2018, Accountancy Europe's information report, "Rediscovering the Value of Audit", shed light on developments in Sweden and Denmark. The report raised concerns about exempting SMEs from audits, highlighting the economic risks this poses. These risks include a potential decline in the quality of published financial statements and a negative impact on tax collection.

Sunardi et al. (2022) studied the influence of financial statement audits on tax compliance, both directly and indirectly, through access to finance. The findings of this study demonstrate that financial statement audits positively impact tax compliance through access to finance. Feld and Frey (2002) examined the relationship between trust in tax authorities, tax compliance, and auditing. They argued that auditing could enhance trust in tax authorities, thereby increasing compliance.

Alm et al. (1992b) used experimental data to investigate the determinants of tax compliance, including the impact of auditing. Their findings indicated that audits positively influenced compliance, especially when the audit process was fair and accurate. Pomeranz (2015) conducted a large-scale field experiment in Chile to examine the role of information in tax compliance behavior. The author discovered that providing taxpayers with information about their tax liabilities increased compliance.

The combination of findings from these studies emphasizes how auditing methods and sharing information can promote a culture of tax compliance. These academic endeavors collectively demonstrate the effectiveness of the approaches in fostering attitudes toward tax compliance, leading to a future marked by improved fiscal responsibility and societal well-being.

On the other hand, auditor expertise can either restrict or promote tax avoidance or tax evasion, depending on the perspective. Auditors as financial experts may detect and discourage tax avoidance or evasion due to their risk-control knowledge, but they can also facilitate it by devising client-beneficial tax strategies (see Wei and Chen 2016; Avi-Yonah 2017; Biondi 2017; Büttner and Thiemann 2017; Kuźniacki 2017). However, when an enterprise makes choices to avoid paying taxes for quick gains, it could end up hurting its reputation in the long run. This could also lead to extra expenses like fines, audits by accounting firms, and harm to the enterprise's reputation (Huang et al. 2018; Sudirjo 2020).

3.2.2. Value of Audits for SMEs

This category emphasizes the benefits of audits for SMEs, including improved tax strategies, financial integrity, and compliance. Kofi and Kwarteng (2016), in their study on Ghana, found that mandatory audits for SMEs increased tax compliance and revenue collection. Similarly, a study in Bangladesh found that mandatory audits for SMEs improved the accuracy of financial reporting and increased tax compliance (Hossain and Islam 2015).

According to many studies, mandatory audits for SMEs are expected to ensure the reliability and accuracy of their financial statements, benefiting stakeholders, including investors and lenders, as well as regulatory bodies. These audits are also expected to assist SMEs in identifying areas for improvement in financial reporting processes, internal controls, and risk management practices, ultimately leading to better decision making and increased profitability (see IFAC 2017; AICPA 2015; CICA 2012).

A study by Downing and Langli (2018) assessed SMEs' compliance with tax and accounting regulations before and after a mandatory auditing threshold change in Norway. The results indicated that audit exemptions could harm SMEs' compliance with accounting and tax legislation in the country. However, this does not imply that audit exemptions are universally undesirable. While they may reduce administrative burdens for smaller firms, there are associated costs. Policymakers should consider these costs when determining whether to implement audit exemptions and setting size thresholds for firms exempt from auditing (Downing and Langli 2018).

From a psychological perspective, Kamleitner et al. (2012) sought to establish a framework to highlight SME owners' tax compliance and the resulting implications. The study found three things that seem to make SME owners' views on their tax situation different: they are more likely to see more chances not to follow the rules than employed taxpayers; they are also more likely to feel like they do not know enough about taxes; and they are more likely to make decisions that see taxes as painful losses.

Overall, the auditor's role is theoretically founded on ensuring compliance with tax and accounting regulations; it is built upon theories of tax compliance, auditing, trust, deterrence, financial reporting quality, and cost–benefit analysis. These theories provide insights into the effectiveness of audits and their impact on the compliance behavior, financial reporting, and the relationship between auditors and taxpayers.

The literature suggests that auditing has a significant positive impact on income tax compliance. The effectiveness of audits depends on factors such as the fairness and accuracy of the audit process, trust in tax authorities, severity of penalties, tax simplification measures, information provision, and enforcement. Audits contribute to improved compliance behavior, enhance the quality of financial reporting, and ensure auditor independence. However, policymakers should carefully weigh the costs and benefits of mandatory audits, particularly for SMEs with limited resources and in jurisdictions with administrative constraints.

Previous studies focused various countries, but more research is needed to examine the Egyptian context specifically. There needs to be more focus on the specific challenges faced by Egyptian SMEs in complying with mandatory audit requirements and income tax regulations. There is a need for more research that addresses the practical implications of mandatory audits on the financial and operational aspects of Egyptian SMEs besides the insufficient exploration of the effectiveness of current income tax compliance mechanisms for Egyptian SMEs. It would be valuable to explore mandatory audits and tax compliance in Egypt as an example of similar developing economies.

Our hypothesis, which aligns with prior research and theoretical underpinnings, contends that mandatorily audited SMEs exhibit higher income tax compliance, consistent with the notion that compulsory audits serve as an efficient compliance mechanism. Therefore, we propose the following hypothesis:

H2: *There is a significant difference between the mean tax compliance levels of SMEs before and after the implementation of mandatory auditing*.

3.3. Studies on Measuring SME Tax Compliance

Tax compliance is a multifaceted issue that has been extensively studied in accounting, economics, and taxation. Numerous measurement tools have been developed to assess and monitor taxpayers' adherence to tax laws and regulations, providing valuable insights into compliance levels and potential revenue losses. The tax compliance measurement can be categorized into three main approaches: accounting, economics, and taxation. Each one measures tax compliance from a different angle, employing specific tools and methods.

3.3.1. Accounting Approach

Accounting research on tax compliance often focuses on the technical and procedural aspects of tax reporting and auditing. This category emphasizes the tools and techniques used by accountants and auditors to ensure accurate tax reporting and compliance.

I. Tax gap analysis:

This tool estimates the difference between the taxes taxpayers are supposed to pay and the taxes they actually pay. It uses random audits to select taxpayers fairly for examination, creating a sample that represents the entire group. Auditors carefully review this sample, identifying discrepancies between the owed amount and what they find. To estimate the total tax gap, they adjust these differences based on the sample's size compared to the entire population. Measuring the tax gap allows authorities to assess the level of non-compliance and the resulting loss of government revenue (The Revenue Administration Gap Analysis Program: An Analytical Framework for Personal Income Tax Gap Estimation 2021).

II. Information reporting systems:

These systems necessitate taxpayers, financial institutions, and other third parties to report specific financial transactions to the tax authorities. Information reporting systems aid tax authorities in detecting and deterring non-compliance while enhancing the accuracy of tax reporting (Adhikari et al. 2020; OECD 2021).

3.3.2. Economic Approach

Economic research on tax compliance examines the broader economic factors and behaviors influencing compliance. This includes behavioral experiments, economic models, and the analysis of compliance costs and benefits.

I. Risk assessment models:

Utilizing statistical analysis and other techniques, these models identify taxpayers who are at a high risk of non-compliance. By deploying risk assessment models, tax authorities can allocate resources more efficiently and effectively, targeting compliance efforts where they are most needed (IRS 2020; OECD 2021).

II. Compliance surveys:

These surveys involve the administration of questionnaires or interviews with taxpayers, collecting data on their compliance behaviors, attitudes, and motivations. They identify factors that influence the taxpayers' compliance behavior and assist in devising effective compliance strategies (Onu 2016; IRS 2020).

3.3.3. Taxation Approach

I. Self-reported surveys and behavioral experiments:

Various studies have explored different methods for measuring tax compliance. Alm and Martinez-Vazquez (2018) provided an overview of techniques such as self-reported surveys, behavioral experiments, and administrative data analysis. They discussed the benefits and drawbacks of each method and emphasized the importance of standardized tax compliance measures for cross-country comparisons and policy evaluations. Torgler (2007) reviewed methods including self-reported surveys, laboratory experiments, field experiments, and administrative data analysis while discussing challenges such as non-response bias, social desirability bias, and measurement error. In order to overcome these methodological issues, a mixed-methods approach, combining surveys, experiments, and administrative data analysis, was recommended.

II. Empirical studies and data analysis

Kawano and Slemrod (2018) discussed empirical evidence on tax compliance and various measurement methods, considering audits, surveys, experiments, and administrative data analysis. They highlighted the significance of contextual factors and study design when interpreting results and discussed the implications for tax policy and administration. Camerer et al. (2018) focused on the behavioral economics approach to tax compliance, reviewing empirical evidence on factors influencing compliance behavior, such as social norms, fairness, and enforcement. They also explored the implications of tax policy, suggesting using behavioral interventions like nudges to encourage compliance. Alm (2012) provided a comprehensive review of tax compliance and enforcement literature, discussing approaches such as surveys and audits, concluding that a combination of these methods is necessary for accurate measurement.

Finally, previous studies discuss tools and techniques for measuring tax compliance in a general context. However, it remains to be seen whether these methods can be directly applied to SMEs. A critical evaluation is needed to determine if there are limitations or necessary modifications required when measuring tax compliance within this specific business segment. Are there inherent challenges in gauging SME tax compliance compared to larger enterprises, and how can existing methodologies be adapted to address these challenges?

The literature primarily focuses on static methods of measuring compliance at a single point in time. However, longitudinal studies that track the compliance behaviors of SMEs over time can offer valuable insights. Understanding how compliance levels change for SMEs as they grow or encounter different economic conditions can inform policy decisions and support strategies for promoting long-term compliance within this sector.

4. Methodology

4.1. The Proposed Scale for Measuring SME Income Tax Compliance (the RTRP Scale)

The authors adopted a compelling argument that the comprehensive solution to many issues, such as tax evasion, reduced tax collection, a shrinking tax base, unequal tax burdens among taxpayers, and the expansion of the informal economy, lies in taxpayers' compliance with tax regulations. Addressing the problem of tax non-compliance would immediately positively impact these issues.

Recognizing the significance of taxation concerns, the OECD has emerged as one of the foremost organizations dedicated to tackling these challenges. Its mission revolves around formulating strategies to ensure proper tax payments in various regions. In pursuit of this goal, the OECD has called for increased conceptual and empirical research into the factors influencing tax compliance levels. As a result, the organization released an important guideline note in 2004 that provides a framework for implementing contemporary compliance risk management principles in the context of tax compliance.

According to the OECD, compliance refers to the extent to which a taxpayer adheres to specific requirements. While the precise obligations of taxpayers may differ based on the type of taxation and jurisdiction, four general categories of obligations apply to most taxpayers worldwide. These significant groups of tax-related obligations encompass (OECD 2004):

I. Registration in the tax system;
II. Timely filing or lodging of necessary tax information;
III. Reporting accurate and complete information with proper record keeping;
IV. Payment punctuality of tax liabilities.

Failure to meet these obligations results in revenue authorities categorizing taxpayers as non-compliant. As the OECD stated in 2004, it is essential to acknowledge the existence of various levels of non-compliance. According to the institutional theory, which emphasizes the influence of formal and informal institutions on taxpayer behavior, perceptions of fairness, quality of services provided, and trust in the tax administration influence compliance levels. Consequently, the authors suggest employing the four dimensions mentioned above as indicators in a proposed scale of tax compliance specifically designed for SMEs, referred to as the "RTRP" scale. Following this scale, an SME that fulfills none of the elements would be classified as having "Low" compliance (0%); an SME that fulfills two of the elements would be classified as having "Moderate" compliance (50%); and an SME that adheres to all of the elements would be classified as having "Very high" compliance (100%).

An SME's adherence to each of these elements can be assessed through various means, including its website, financial statements, and the auditor's report. The auditor's report holds particular significance, as it provides critical information for evaluating the SME's dedication to each of the mentioned elements.

The (RTRP) score for SMEi is computed as follows:

$$RTRP_i = \frac{\sum_{j=1}^{4} Score_{ji}}{4}$$

Accordingly, the tax compliance variable varies from 0 to 1. Table 1 below illustrates the application of these elements and their corresponding degrees of compliance.

Table 1. Suggested scale for degrees of tax compliance.

Applied Elements	Percentage %	Compliance Degree
0/4 to 1/4 items on the RTRP scale	0%:25%	Low
More than 1/4 to 2/4	26%:50%	Moderate
More than 2/4 to 3/4	51%:75%	High
More than 3/4 to 4/4	76%:100%	Very high

4.2. Study Approach

This study used inductive and deductive strategies as well as qualitative and quantitative research methods. The authors used the inductive strategy to discuss the research hypotheses, because it is the best approach that connects research methods to examine the research hypotheses, and the deductive strategy for the application. The author's goals were to obtain assurance that mandatory audits for Egyptian SMEs positively impact income tax compliance, develop a scale for measuring income tax compliance based on the OECD's framework, and illustrate empirical evidence on the impact of mandatory audits on the income tax compliance of Egyptian SMEs.

4.3. Sampling Design

The research scope of the first hypothesis encompasses (1) SME owners and managers without restricting the focus to any particular industry or geographic location. Furthermore, an inclusive perspective is necessary to examine the viewpoints of (2) SME auditors and (3) academics and economists.

In Egypt, only SMEs listed on the Nile Stock Exchange (NILEX) are required to undergo financial statement audits, while this requirement does not extend to other SMEs. This study focuses on all SMEs mandated to perform audits in Egypt since the establishment of NILEX up to the present, totaling 56 SMEs from 2010 to 2023 (NILEX 2023). Consequently, these listed SMEs form the research population for testing the second hypothesis, which examines the impact of mandatory audits on their income tax compliance.

4.4. Sampling Approach

For the first hypothesis, the authors chose the "snowball" sampling approach, which meant sending the electronic questionnaire (Google Forms) directly to the respondents who were asked to fill it out and forwarding it to others they knew to match the survey requirements. The authors also used social media specialist groups on Facebook, WhatsApp, and LinkedIn.

4.5. Methods for Collecting Data

The authors used questionnaires to collect data for the first hypothesis. The questionnaires were focused surveys designed and directed to three respondents: auditors, SME owners/managers, and academics/economists, as shown in Figure 1. The questionnaires consisted of two main sections: the first section included questions about the respondents' demographic details, as shown in Figure 2, and depending on the occupation, the second section focused on the expected economic consequences of Egyptian SMEs' mandatory audits. The questions were close-ended items anchored on a five-point Likert scale (Likert 1932), ranging from "1", "totally disagree", to "5", totally agree". The authors followed basic questionnaire design principles, such as comprehensibility, clarity, and neutrality.

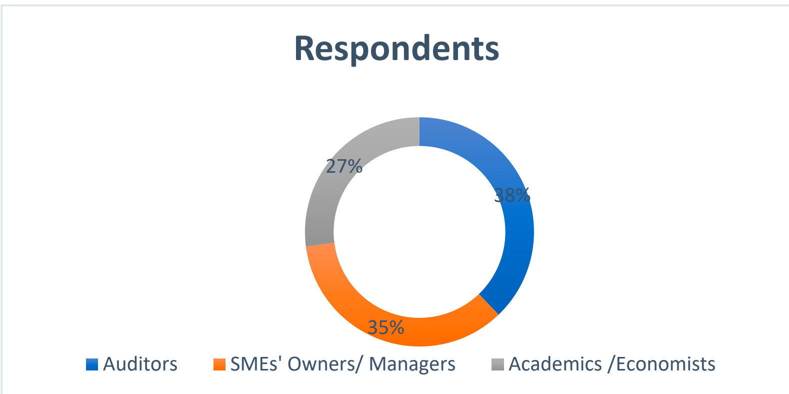

Figure 1. Respondent numbers.

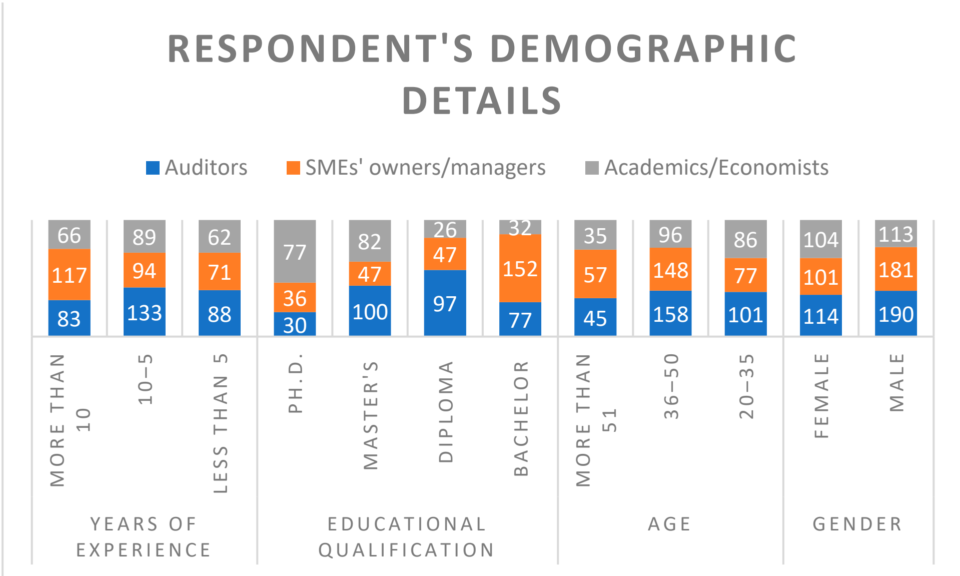

Figure 2. Respondents' demographic details.

For the second hypothesis, the authors relied on Egypt for Information Dissemination (EGID) in collecting the data for all the listed SMEs that were required to be audited. These were the published financial reports and auditors' reports for the listed NILEX SMEs during the study, from the first listing of SMEs in 2010 until 2023, which totaled 56 SMEs (NILEX 2023).

4.6. Statistical Analysis and Results

The authors used Microsoft Excel and SPSS V. 20 to obtain the results. Using the snowball sampling method, they obtained 803 responses. They also obtained evidence from a survey of 304 auditors, 282 SME owners/managers, and 217 academics/economists in Egypt.

To ascertain the questionnaire's validity, the authors consulted some experienced academics and modified it according to their recommendations. The authors changed the sequence and wording of some questions to make them more understandable and relevant to the study's purpose. These changes improved the questionnaire's face validity (Taherdoost 2016; Aithal and Aithal 2020).

Moreover, the authors conducted a pilot survey on some participants before broadly circulating it to the research sample, and some of the comments received from these early participants were related to the wording of the questionnaire. For instance, they observed that some questions needed to be more readily understood, so the authors simplified their wording.

Cronbach's Alpha Test

Cronbach's alpha is a tool for checking the reliability of a measurement. It does this by comparing the degree to which the questions or items in the measurement relate to each other and how much they vary individually. If the measurement is reliable, the items should be strongly related to each other. Cronbach's alpha finds the average reliability that would be obtained after splitting the measurement in half in all possible ways (Collins 2007).

For Cronbach's alpha test of reliability, the generally accepted rule is that an α of 0.6–0.7 indicates an acceptable level of reliability (i.e., Ursachi et al. 2015; Pallant 2001; Sekaran 1992); from the following Table 2 for all questionnaires, $\alpha > 0.6$ makes it acceptable.

Table 2. Cronbach's alpha.

Questionnaire	Cronbach's Alpha
Auditors	0.986
SME owners/managers	0.867
Academics/economists	0.896

5. Results and Discussion

As a result of using a five-point Likert scale (Likert 1932), the authors decided on, according to the following scale, the interval range shown in Table 3.

Table 3. Likert interval range scale.

Intervals of Level	Interval Range (Mean)	Degree of Agreement
Very low level	1.00–1.79	Totally disagree
Low level	1.80–2.59	Disagree
Moderate level	2.60–3.39	Neutral
High level	3.40–4.19	Agree
Very high level	4.20–5.00	Totally agree

5.1. Descriptive Statistics and the Result of Testing H1

Table 4 shows the descriptive statistics for "mandatory audits for Egyptian SMEs positively impact income tax compliance".

Table 4 shows the descriptive statistics for "mandatory audits for Egyptian SMEs impact positively on income tax compliance" among respondents, from which we find that the highest average belongs to auditors, with a mean of 4.47, a median of 5.00, and Std. Deviation of 0.908, followed by academics/economists, with a mean of 4.43, a median of 5.00, and Std. Deviation of 0.825. Finally, the lowest average belongs to the SMEs' owners/managers, with a mean of 4.25, a median of 5.00, and Std. Deviation of 1.098.

The weighted average was 4.38, with a Std. Deviation of 0.944, which indicates that the general trend of mandatory audits for Egyptian SMEs positively impact income tax compliance among respondents is "totally agree" according to the five-point Likert scale, as shown in Table 3 since laying in the interval (4.20–5.00).

So, the average of "mandatory audits for Egyptian SMEs positively impact income tax compliance" among respondents is 4.38, which is considered a very high level, since Table 3 shows the level intervals.

The authors conducted a one-way ANOVA test to test the study's first hypothesis, "H1: There are significant differences between SMEs' management and other respondents regarding the positive impact of SMEs' mandatory audits on income tax compliance". Table 5 shows the test's results and statistical significance.

Table 5 shows the results of the one-way ANOVA. From it, we conclude that there are statistically significant differences in the respondents' perceptions of the positive impact of SMEs' mandatory audits on income tax compliance based on their categories, where Sig. < 0.05. SME management appears to be less persuaded on the potential benefits of mandatory audits on tax compliance than auditors and academics.

Table 4. Questionnaire response.

Respondent		Totally Agree	Agree	Neutral	Disagree	Totally Disagree	Mean	Q1	Median	Q3	STD	Degree of Agreement
Auditor	N	207	52	33	6	6	4.47	4.00	5.00	5.00	0.908	**Totally agree**
	%	68.1%	17.1%	10.9%	2%	2%						
SME owner/manager	N	170	47	38	19	8	4.25	4.00	5.00	5.00	1.098	**Totally agree**
	%	60.3%	16.7%	13.5%	6.7%	2.8%						
Academic/economist	N	134	47	32	3	1	4.43	4.00	5.00	5.00	0.825	**Totally agree**
	%	61.8%	21.7%	14.7%	1.4%	0.5%						
N = 803	**Weighted Mean**										**4.38**	**Totally agree**
	STD. Deviation										**0.944**	

Table 5. Results of the one-way ANOVA.

Categories	Mean	STD	F	Sig.
Auditors	4.47	0.908	4.390	0.013
SME owner/manager	4.25	1.098		
Academic/economist	4.43	0.825		

Table 6 shows that the reason for the statistically significant differences in respondents' perceptions of the positive impact of SMEs' mandatory audits on income tax compliance based on their categories is due to the difference between the perceptions of auditors and SMEs' owners/managers, with a significant difference of 0.225, where the p value was 0.018, which is less than 0.05. At the same time, the difference between auditors and academics/economists and between academics/economists and SMEs' owners/managers was not statistically significant, as the p values of 0.869 and 0.115, respectively, were more than 0.05. This result reflects that the auditors believe, more than others, in mandatory audits. At the same time, academics and SME management align in being more pessimistic, and this may reflect that auditors are in a potential conflict of interest compared to SME management regarding the positive impact of SMEs' mandatory audits on income tax compliance.

Table 6. Result of Scheffe's post hoc test.

Respondent	Mean Difference	Sig.
Auditors vs. SME owners/managers	* 0.225	0.018
Auditors vs. academics/economists	0.045	0.869
Academics/economists vs. SME owners/managers	0.180	0.115

* significant difference.

Previous studies show significant differences between SME management and other respondents (see Lignier 2009; Kofi and Kwarteng 2016; Jemaiyo and Mutai 2016; Sunardi et al. 2022).

5.2. Descriptive Statistics and Testing H2

Table 7 presents the sample distribution by industry and year. Panel (A) presents the observations distribution by industry. Panel (B) presents the observations distribution by the year of applying mandatory auditing.

Table 7. SME sample distribution.

Panel A. Sample Distribution by Industry			Panel B. Sample Distribution by Year		
	N	(%)		N	(%)
Basic resources	3	5.36%	2010	17	30.36%
Chemicals	2	3.57%	2011	5	8.93%
Food, beverages, and tobacco	9	16.07%	2012	5	8.93%
Healthcare and pharmaceuticals	5	8.93%	2013	5	8.93%
Industrial goods, services, and automobiles	10	17.86%	2014	9	16.07%
Real estate	7	12.5%	2015	1	1.79%
Retail	4	7.14%	2016	2	3.57%
Technology	5	8.93%	2017	1	1.79%
Construction and materials	2	3.57%	2018	-	-
Telecommunication	1	1.79%	2019	1	1.79%
Travel and leisure	3	5.36%	2020	-	-
Financial services, excluding banks	1	1.79%	2021	4	7.14%
Contracting and construction engineering	1	1.79%	2022	2	3.57%
Trade and distributors	1	1.79%	2023	4	7.14%
IT, Media, and communication services	1	1.79%			
Shipping and transportation services	1	1.79%			
Total	56	100%	Total	56	100%

This study will use the Wilcoxon signed-rank test; this non-parametric test compares two related samples to assess whether their population mean ranks differ. It is used when the data do not necessarily follow a normal distribution.

Table 8 presents the descriptive statistics for Egyptian SMEs before and after the implementation of mandatory audits on their financial reports and statements using the proposed

RTRP scale, alongside the results of the Wilcoxon signed-rank test, where calculations for tax compliance shown in Appendix A. The data indicate that 53 SMEs experienced positive ranks while 3 SMEs showed ties, leading to the conclusion that there is a statistically significant difference (p-value = 0.000). This supports the study's second hypothesis: "H2: There is a significant difference between the mean tax compliance levels of SMEs before and after the implementation of mandatory auditing".

Table 8. Wilcoxon signed-rank test.

	Total N	Mean	Min	Q1	Median	Q3	Max	Std. Dev	Sig.	Z	Cohen's d
Before	56	41.52	0	25	50	50	100	23	0.000	−6.486	0.867
After	56	81.25	25	75	75	100	100	20.917			

Cohen's d is a standardized measure of the effect size that quantifies the difference between two group means, calculated by dividing the mean difference by the pooled Standard Deviation. According to Cohen (1992), effect sizes are categorized as small (0.2), medium (0.5), or large (0.8). In this context, a Cohen's d value of 0.867 indicates a large effect, suggesting that mandatory audits significantly enhance SMEs' tax compliance.

The effect size, as measured using Cohen's d, was d = 0.867, indicating a significant effect. This means that mandatory audits have a large effect on SMEs' tax compliance.

Table 9 details the Wilcoxon signed-rank test results for SMEs after the implementation of mandatory audits, using a hypothesized median of 74, which represents "high" income tax compliance. The findings indicate that 48 SMEs had positive ranks, and 8 had negative ranks compared to the hypothesized median. The significant p-value (0.000) confirms a statistically significant difference between the level of income tax compliance of audited SMEs and the hypothesized value.

Table 9. Wilcoxon signed-rank test against hypothesized median (74).

Test Value (Hypothesized Median = 74)											
Total N	**W**	**Std. Error**	**Min**	**Q1**	**Median**	**Q3**	**Max**	**Std. Dev**	**Z**	**Sig.**	**Cohen's d**
56	387.5	120.2	25	75	75	100	100	20.917	4.185	0.00	0.56

Cohen's d value of 0.56 denotes a medium effect size, implying that mandatory audits have a moderate impact on enhancing tax compliance among SMEs.

Figure 3 below shows tax compliance using the RTRP scale before and after applying mandatory auditing to Egyptian SMEs.

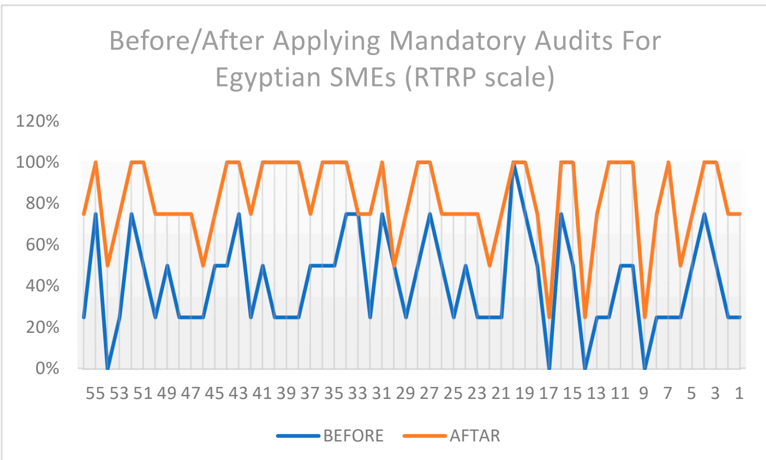

Figure 3. Tax compliance using the RTRP scale.

By using the proposed RTRP scale to calculate tax compliance and conducting the Wilcoxon signed-rank test and computing Cohen's d, the study provides robust evidence of the impact of mandatory audits on the tax compliance levels of SMEs in Egypt, with the results indicating both statistically significant and practically meaningful improvements post-implementation.

5.3. Robustness Checks for H2

To ensure the reliability and robustness of the findings concerning the impact of mandatory audits on tax compliance for SMEs, we apply alternative measures for calculating the level of tax compliance. We adopt the net compliance rate (NCR), one of the tax gap ratios, to provide a relative measure of compliance. According to Internal Revenue Service (IRS 2019), "the net compliance rate (NCR) is defined as the sum of all timely and enforced and late payments divided by total true tax, expressed as a percentage. The NCR is a complement to the net tax gap. It is also equal to 1 minus the ratio of the net tax gap to total true tax". Thereby, the NCR can be calculated using the following equation:

$$NCR = \sum_{i=1}^{n} \frac{\text{Tax paid voluntarily and on time} + \text{Enforced and late payments}}{\text{Total true tax}}$$

Table 10 presents the descriptive statistics for Egyptian SMEs before and after the implementation of mandatory audits on their financial reports and statements using the NCR scale, alongside the results of the Wilcoxon signed-rank test. The data indicate that 50 SMEs experienced positive ranks, while 6 SMEs showed negative ranks, leading to the conclusion that there is a statistically significant difference (p-value = 0.000). This supports the study's second hypothesis: "H2: There is a significant difference between the mean tax compliance levels of SMEs before and after the implementation of mandatory auditing".

Table 10. Wilcoxon signed-rank test.

	Total N	Mean	Min	Q1	Median	Q3	Max	Std. Dev	Sig.	Z	Cohen's d
Before	56	49.31	0	30.73	52.51	70.97	93.47	24.99	0.000	−6.338	0.846
After	56	84.92	30	84.24	90.17	96.81	99.67	17.69			

The effect size, as measured using Cohen's d, was d = 0.846, indicating a significant effect. This means that mandatory audits have a large effect on SMEs' tax compliance.

Table 11 details the Wilcoxon signed-rank test results for SMEs after the implementation of mandatory audits, using a hypothesized median of 74, which represents "high" income tax compliance. The findings indicate that 48 SMEs had positive ranks, and 8 had negative ranks compared to the hypothesized median. The significant p-value (0.000) confirms a statistically significant difference between the level of income tax compliance of audited SMEs and the hypothesized value.

Table 11. Wilcoxon signed-rank test against hypothesized median (74).

Test Value (Hypothesized Median = 74)											
Total N	**W**	**Std. Error**	**Min**	**Q1**	**Median**	**Q3**	**Max**	**Std. Dev**	**Z**	**Sig.**	**Cohen's d**
56	387.5	122.584	30	84.24	90.17	96.81	99.67	17.69	3.777	0.000	0.504

Cohen's d value of 0.504 denotes a medium effect size, implying that mandatory audits have a moderate impact on enhancing tax compliance among SMEs.

Figure 4 below shows tax compliance using the NCR scale before and after applying mandatory auditing to Egyptian SMEs.

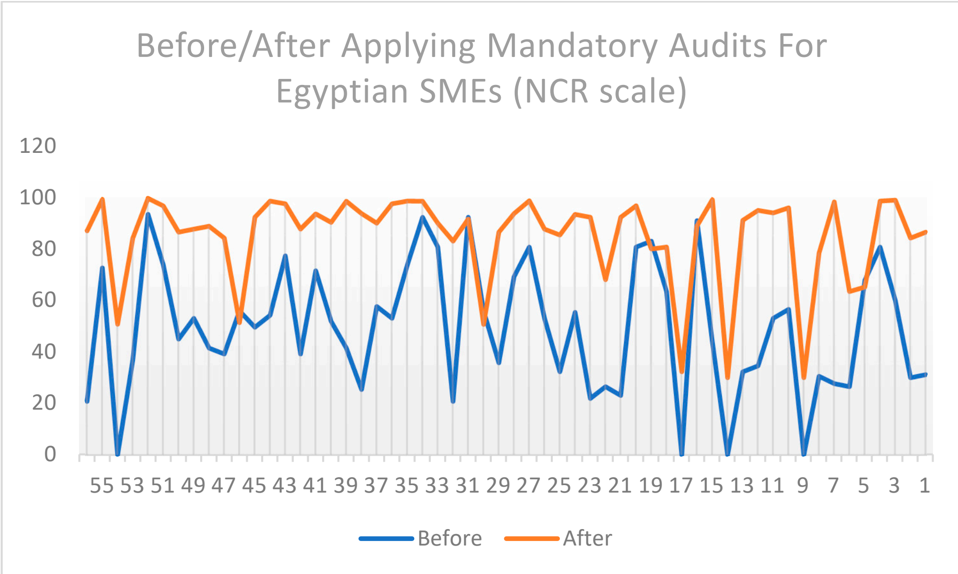

Figure 4. Tax compliance using the NCR scale.

By using the NCR scale to calculate tax compliance and conducting the Wilcoxon signed-rank test and computing Cohen's d, the study provides robust evidence of the impact of mandatory audits on the tax compliance levels of SMEs in Egypt, with the results indicating both statistically significant and practically meaningful improvements post-implementation.

5.4. Results of Testing H2

Both the RTRP and NCR scales show a clear improvement in tax compliance after the introduction of mandatory audits. This indicates that the audits were effective in enhancing compliance, regardless of the measurement method used.

The results exhibit a broad range of compliance improvements, demonstrating that while some enterprises significantly improved, others showed more modest gains. This suggests variability in the impact of audits on different enterprises.

The analysis of these two measurement methods provides insight into the effectiveness of mandatory audits in enhancing tax compliance among SMEs. The significant improvements observed in both the RTRP and NCR scales post-implementation suggest that audits are a crucial tool for improving tax compliance. However, the differences in how each scale measures compliance highlight the need for a multifaceted approach to compliance assessment.

The substantial improvements across both scales underscore the effectiveness of mandatory audits. This aligns with the existing literature that suggests audits can deter tax evasion and improve overall compliance through increased scrutiny and accountability (see Downing and Langli 2018; Kofi and Kwarteng 2016; Hossain and Islam 2015).

In conclusion, the analysis of tax compliance using RTRP and NCR scales before and after the implementation of mandatory audits among 56 SMEs in Egypt demonstrates clear improvements in their compliance. While both methods show effectiveness, their differences highlight the importance of using varied measures to capture the full impact of policy interventions on tax compliance.

6. Conclusions

Based on a review of previous studies regarding tax compliance, the authors conclude that tax compliance refers to how taxpayers adhere to tax laws and regulations. It involves fulfilling tax obligations, such as filing tax returns, paying taxes on time, and maintaining accurate records. According to the OECD (2019), tax compliance is essential for the functioning of the tax system, as it ensures efficient and equitable tax revenue collection and the fair treatment of taxpayers.

Mandatory audits for SMEs can improve their tax compliance in several ways, such as increasing financial record accuracy, enhancing internal control, boosting credibility with tax authorities, and raising tax awareness. However, there are also potential drawbacks to mandatory audits for SMEs. These audits can be costly and time consuming, particularly for SMEs with limited resources, and they can increase the administrative burden on tax authorities, especially in jurisdictions with limited resources and capacity.

The study's results indicate that auditors are more supportive of mandatory audits than academics and SME management, who are more pessimistic. This may reflect a potential conflict of interest, as auditors may benefit from the positive impact of mandatory audits on their income.

Additionally, the study finds that mandatory auditing for Egyptian SMEs resulted in a high level of income tax compliance, suggesting that mandating audits for all Egyptian SMEs could increase income tax compliance and integrate these SMEs into the formal economy.

For limitations and further research, it is important to consider that the study's geographical scope is limited to Egypt. The focus was on NILEX-listed SMEs, Egypt's only mandatorily audited SMEs, covering 56 SMEs from 2010 to 2023. Future research could examine the effect of SME management ethics on tax compliance decisions at all audit levels and explore the complex dynamics of SME tax compliance. This study also presents an objective and simplified scale (the RTRP scale) that effectively measures SMEs' compliance with income tax, allowing for comparisons between SMEs and facilitating future research in this field.

For policy implications, policymakers should consider the implementation of mandatory audits as a strategy to enhance compliance. However, they should also be aware of the need for diverse compliance measures to ensure a thorough assessment of tax behaviors.

Finally, it is strongly advised that the Egyptian government implements audits specifically tailored for SMEs. This strategic move, supported by adherence to guidelines, holds great potential for delivering numerous benefits to the broader Egyptian economy. By requiring audits for SMEs, the government can foster an environment that encourages transparency, accountability, and sustainable development within the sector, thereby directly enhancing tax compliance.

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Conflicts of Interest: The authors declare no conflict of interest.

List of Abbreviations

SMEs	Small- and medium-sized enterprises
EFAA	The European Federation of Accountants and Auditors for SMEs
MSMEs	Micro-, small-, or medium-sized enterprises
OECD	The Organization for Economic Co-operation and Development
EFSA	The Egyptian Financial Supervisory Authority
EGX	The Egyptian Exchange
NILEX	The Nile Stock Exchange

Appendix A. Tax Compliance Calculations

Table A1. Tax compliance calculations.

Company	The RTRP Scale										The NCR Scale	
	Before Mandatory Audits					After Mandatory Audits					Before Mandatory Audits	After Mandatory Audits
	R	T	R	P	AVG%	R	T	R	P	AVG%	AVG%	AVG%
SME1	1	0	0	0	25%	1	1	1	0	75%	31.16	86.55
SME2	1	0	0	0	25%	1	1	1	0	75%	30.00	84.24
SME3	1	0	1	0	50%	1	1	1	1	100%	60.01	99.00
SME4	1	1	1	0	75%	1	1	1	1	100%	80.78	98.60
SME5	1	1	0	0	50%	1	1	1	0	75%	67.85	65.24
SME6	1	0	0	0	25%	1	1	0	0	50%	26.54	63.47
SME7	1	0	0	0	25%	1	1	1	1	100%	27.70	98.30
SME8	1	0	0	0	25%	1	1	1	0	75%	30.58	78.47
SME9	0	0	0	0	0%	1	0	0	0	25%	0.00	30.00
SME10	1	1	0	0	50%	1	1	1	1	100%	56.55	96.00
SME11	1	1	0	0	50%	1	1	1	1	100%	53.08	94.00
SME12	1	0	0	0	25%	1	1	1	1	100%	34.62	95.00
SME13	1	0	0	0	25%	1	1	1	0	75%	32.31	91.17
SME14	0	0	0	0	0%	1	0	0	0	25%	0.00	30.00
SME15	1	1	0	0	50%	1	1	1	1	100%	43.85	99.20
SME16	1	1	1	0	75%	1	1	1	1	100%	91.01	89.00
SME17	0	0	0	0	0%	1	0	0	0	25%	0.00	32.31
SME18	1	1	0	0	50%	1	1	1	0	75%	63.47	80.78
SME19	1	1	1	0	75%	1	1	1	1	100%	83.09	80.00
SME20	1	1	1	1	100%	1	1	1	1	100%	80.75	96.82
SME21	1	1	1	1	25%	1	1	1	0	75%	23.08	92.32
SME22	1	1	1	0	25%	1	1	0	0	50%	26.54	68.09
SME23	1	1	1	0	25%	1	1	1	0	75%	21.93	92.32
SME24	1	1	0	0	50%	1	1	1	0	75%	55.39	93.47
SME25	1	0	0	0	25%	1	1	1	0	75%	32.31	85.40
SME26	1	1	0	0	50%	1	1	1	0	75%	53.08	87.70
SME27	1	1	1	0	75%	1	1	1	1	100%	80.78	98.74
SME28	1	1	0	0	50%	1	1	1	1	100%	69.24	93.74
SME29	1	0	0	0	25%	1	1	1	0	75%	35.77	86.55
SME30	1	1	0	0	50%	1	1	0	0	50%	55.97	50.70
SME31	1	1	1	0	75%	1	1	1	1	100%	92.32	91.64
SME32	1	0	0	0	25%	1	1	1	0	75%	20.77	83.09
SME33	1	1	1	0	75%	1	1	1	0	75%	80.78	90.01
SME34	1	1	1	0	75%	1	1	1	1	100%	92.32	98.54
SME35	1	1	0	0	50%	1	1	1	1	100%	73.86	98.63
SME36	1	1	0	0	50%	1	1	1	1	100%	53.08	97.54
SME37	1	1	0	0	50%	1	1	1	0	75%	57.70	90.01
SME38	1	0	0	0	25%	1	1	1	1	100%	25.39	93.75
SME39	1	0	0	0	25%	1	1	1	1	100%	41.54	98.54
SME40	1	0	0	0	25%	1	1	1	1	100%	51.93	90.33
SME41	1	1	0	0	50%	1	1	1	1	100%	71.55	93.65
SME42	1	0	0	0	25%	1	1	1	0	75%	39.24	87.70
SME43	1	1	1	0	75%	1	1	1	1	100%	77.32	97.53
SME44	1	1	0	0	50%	1	1	1	1	100%	54.24	98.64
SME45	1	1	0	0	50%	1	1	1	0	75%	49.62	92.32
SME46	1	0	0	0	25%	1	1	0	0	50%	55.93	51.39
SME47	1	0	0	0	25%	1	1	1	0	75%	39.24	84.24
SME48	1	0	0	0	25%	1	1	1	0	75%	41.54	88.86
SME49	1	1	0	0	50%	1	1	1	0	75%	53.08	87.70
SME50	1	0	0	0	25%	1	1	1	0	75%	45.01	86.55

Table A1. *Cont.*

Company	The RTRP Scale										The NCR Scale	
	Before Mandatory Audits					After Mandatory Audits					Before Mandatory Audits	After Mandatory Audits
	R	T	R	P	AVG%	R	T	R	P	AVG%	AVG%	AVG%
SME51	1	1	0	0	50%	1	1	1	1	100%	73.86	96.76
SME52	1	1	1	0	75%	1	1	1	1	100%	93.47	99.67
SME53	1	0	0	0	25%	1	1	1	0	75%	36.93	84.24
SME54	0	0	0	0	0%	1	1	0	0	50%	0.00	50.78
SME55	1	1	1	0	75%	1	1	1	1	100%	72.70	99.25
SME56	1	0	0	0	25%	1	1	1	0	75%	20.77	87.05

Appendix B. Correspondents' Demographic Details

Table A2. Correspondents' demographic details.

	SME Management	Auditors	Academic
Age:			
20–35	77	101	86
36–50	148	158	96
More than 50	57	45	35
Total	282	304	217
Gender:			
Male	181	190	113
Female	101	114	104
Total	282	304	217
Education Qualification:			
Bachelor	152	77	32
Diploma	47	97	26
Master's	47	100	82
Ph.D.	36	30	77
Total	282	304	217
Years of Experience:			
Less than 5 years	71	88	62
From 5 to 10 years	94	133	89
More than 10 years	117	83	66
Total	282	304	217
Degree of Agreement:			
Totally disagree	8	6	1
Disagree	19	6	3
Neutral	38	33	32
Agree	47	52	47
Totally agree	170	207	134
Total	282	304	217

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