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The Relationship between Intellectual Capital and Audit Fees

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Abstract: The present study investigates whether intellectual capital (IC) is related to audit fees and financial statement restatements in companies listed on the Iraq Stock Exchange (ISE). The present study is a pioneer investigation of this topic in emerging markets. Using a sample of all listed companies on the ISE from 2014 to 2020, the research hypotheses are tested with multiple regression based on panel data and the fixed-effects model. The results demonstrate that intellectual capital is positively and significantly related to normal and abnormal audit fees. Moreover, findings indicate direct and significant relationships between intellectual capital components and normal and abnormal audit fees. This means investment in IC components is likely to determine the auditors' evaluation of a given client's riskiness. Thus, an efficient IC investment level might be considered a key factor that companies are expected to consider. The findings of this study provide valuable implications for users of financial statements, analysts, and policymakers with information regarding IC, risk determinants, and audit fees. Policymakers can improve market efficiency by implementing regulations that foster IC disclosure as a risk-determinant factor.

Keywords: intellectual capital; human capital; structural capital; relational capital; financial restatement; audit fees

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1. Introduction

Owing to the financial reporting scandals, such as Enron and WorldCom in the U.S., Lernout and Hauspie in Belgium, and Parmalat in Italy, in which auditors also played a role (Vanstraelen and Zou 2020), and the high complexity of transactions, effective auditing must take into account the different structures of organizations, the incentives of the information providers, the occurrences of agency problems, organization size, and the ability or inability of stakeholders and investors to directly access all the information of firms. Because financial statements presented a particular part of the required information for investors, creditors, and other firm users, the need for an independent professional to give credibility to financial reports was felt more than ever, which led to the emergence of the audit profession (Salehi 2020). Moreover, considering the importance of audit services, the factors influencing audit workload must be identified to properly determine audit fees, which has become one of the main concerns of managers, audit clients, and audit firms (Kanakriyah 2020; Kirana and Ramantha 2020; Visvanathan 2017).

Audit fees are the fees paid to the audit firm for all the services provided to the audit client and can be affected by client size, complexity, audit risk, and generally, audit effort and litigation risk (Simunic 1980; Salehi et al. 2022a). Prior research has examined the effects of different factors on audit fees, such as ownership structure (Tee 2018; Shan et al. 2019; Liang et al. 2021), corporate governance and its mechanisms (Salehi et al. 2018a; Al-Najjar 2018), a firm's intangible assets (Datta et al. 2020; Prabhawa and Nasih 2021), and organizational capital (Habib et al. 2020).

In the present era, there is a trend of global growth and a shift from industrial to knowledge-based economies. Firms attempt to create value and competitive advantage by managing knowledge resources and intangible assets, such as intellectual capital. They are more willing to value work and increase their intellectual assets. Corvino et al. (2019) state that intellectual capital includes an organization's ability to innovate and introduce new goods and services to the market and build a lasting relationship with customers and suppliers. Increasing a firm's intellectual capital or intangible assets leads to firm growth. However, it is also associated with an increased complexity of operational assessments, and thus an increase in the auditor's work pressure and higher risk (Salehi et al. 2022c), leading to greater auditing task complexity and litigation risk (Visvanathan 2017; Salehi et al. 2022b). Assessing intellectual capital requires more time and effort (Simunic 1980; Salehi and Zimon 2021). Intellectual capital comprises human capital, structural capital, and relational capital. The stronger the human capital or the workforce's expertise, the greater the auditor concentration needed to assess this type of capital, which is directly related to higher audit fees. Furthermore, an organization's structural capital, such as technology, inventions, databases, etc., increases the level of auditor concentration (Salehi et al. 2020b). Intangible assets, including patents and copyright, can be infringed by others, even unintentionally, and thus, the firm and the auditor may be engaged in protracted litigation (Datta et al. 2020).

Furthermore, firm growth depends on investment in relationships with customers and foreign firms, leading to increased auditor concentration, and consequently, higher audit costs or fees (Lotfi et al. 2022). Therefore, since intellectual capital as an intangible asset affects firm performance (Ramírez et al. 2021), auditors monitor, assess, review, and give credibility to the firm's information. Thus, it is expected that the valuation of these assets requires more time and greater auditor concentration, which leads to higher audit fees. This is the first study examining intellectual capital's effect on audit fees. Therefore, the current research seeks to answer whether there is a significant relationship between intellectual capital and audit fees.

The purpose of the empirical findings in any research is to help different stakeholders in different ways, and the present study is no exception. Considering that Iraq's economy has difficult financial conditions and crises caused by inflation, this research seeks to determine whether intellectual capital in a country similar to Iraq, known as a developing country, can have a relationship with the audit fee. The point discussed in this research is that if the companies use the real potential of their intellectual capital, this process can increase the audit fee. This means that the presence of dynamic and skilled intellectual capital in companies may reduce the challenges in the audit process. Therefore, such companies may face a lower audit risk than other companies, and usually, less effort is needed from the auditors, which decreases the auditors' fees. In this case, it can be said that because the auditors pay attention to intellectual capital, the research results can act as a guideline to determine the amounts of their audit fees. Hence, this study provides analysts, legal entities, and the firms' quantitative and qualitative information with valuable insights into intellectual capital and its components and their effects on audit fees.

The current study extends the intellectual capital and auditing literature to some extent. Firstly, this study is among the pioneer investigations conducted in developing countries. As previous studies have primarily focused on markets considering the intellectual capital components as a means of risk element assessment and audit pricing (Duff 2018; Demartini and Trucco 2016), this paper, conducted in the Iraq business environment, may shed more light on risk rectifier elements in the literature. However, a similar study was conducted in Iran (Tarighi et al. 2022), in which the auditing specifications of Iran and Iraq were found to differ significantly. For example, Iranian companies are entirely audited by their domestic national audit institutions, the standards of which are based on national auditing and accounting standards, whereas Iraq has adopted the IFRS, and international auditors, such as Big N instead, audit the listed companies. Therefore, the audit pricing behavior of these two countries fundamentally differs; the international pricing scales are applicable for Iraq, and the authors expect that international audit firms, such as Big N, are likely to evaluate the intellectual capital components differently from Iranian domestic and national auditors. Secondly, Iraq, which was mostly engaged in the ISIS crisis, is also unique regarding intellectual capital components investment and audit pricing behavior. It is also expected that the negative impact of ISIS on Iraq's economy and the financial market may alter auditors' estimations of intellectual capital components (Salehi et al. 2023, 2021). This aspect of Iraq may suggest further contributions for academic bodies, practitioners, and policymakers.

The rest of the paper is structured as follows. Section 2 is dedicated to the literature review and hypothesis development. Section 3 contains a methodology and a statistical population. In Section 4, descriptive and empirical findings are reported. Finally, the conclusions and discussion in Section 5.

2. Literature Review and Hypothesis Development

2.1. Variable Definition

2.1.1. Audit Fees

In the present era, due to the development of society and the economy, the crucial topic of the separation of ownership and management, and agency conflict between controlling and non-controlling shareholders, the evaluation of the provided reports by managers to shareholders is one of the most important topics.

The European Commission called on member states to exercise independent oversight of financial reporting in the eighth revised directive (2006).

According to professional auditing standards, auditors must conduct audits to ensure that financial statements are free from material misstatement. Zimmerman and Nagy (2016) state that hiring an independent auditor can indicate that management fulfils its obligations to investors. Audit fees can be considered a cost paid by the client to the auditor for fulfilling these obligations. According to the contract or agreement, audit fees are costs paid to the audit firm or the auditor for their services (Salehi 2020). Identifying and controlling the factors affecting audit fees can help to reduce audit fees; furthermore, by identifying these factors, auditors can price their services properly. Habib et al. (2018) suggest that several factors, such as the required time, services, and workforce for completing the audit process, affect audit fees. Other studies (Ghadhab et al. 2019; Januarti and Wiryaningrum 2018) find that the main factors affecting audit fees are the characteristics of the audit client, such as firm size, risk, and complexity. Habib et al. (2020) suggest that agency problems and intangible assets cause risk and firm complexity.

2.1.2. Intellectual Capital

Today, intellectual capital is considered the primary capital in organizations because it is the basis of innovation and renewal and the driving force of organizational change and creativity. This capital relates to the quality of an individual's performance, service, or other superior strategies (Alnassafi 2022). Some researchers believe that the economic wealth of organizations comes from intangible assets, such as intellectual capital and proper management (Peces Prieto and Holgado 2019).

Intellectual capital (IC) includes non-monetary resources or intangible assets, such as innovation, employee training, knowledge, research and development, customer satisfaction, etc. (Salvi et al. 2020; Salehi et al. 2022d). It shows that the firm's value-creation processes rapidly become essential inputs for investment decisions (Vitolla et al. 2019).

Intellectual capital represents the knowledge and creative and innovative ideas belonging to the institution that help increase its ability to face crises. Therefore, organizations have realized that they should pay more attention to intellectual capital (Ibarra Cisneros et al. 2020).

IC is a crucial pillar forming the foundation of an organization and can guarantee the creation and maintenance of competitive advantages and the achievement of business goals and future benefits (Abdulaali 2018). Since intellectual capital is a valuable tool for companies and can influence many organizational factors, it has attracted more attention from companies, managers, and researchers, which is why organizations care about intellectual capital (Lee and Lin 2019; Dabić et al. 2018). Through IC, firms can rapidly adapt to changes and stay competitive in markets (Abdulaali 2018). The benefits of IC are illustrated by the shift from an industrial economy to a knowledge-based economy in developed countries (Forte et al. 2019). Therefore, developing countries, such as Iraq, must acquire and extend this knowledge to transform their economy. Thus, firms must pay attention to their knowledge and skills to improve performance (Smriti and Das 2018). Such situations have highlighted the value of IC information.

Because traditional financial disclosures cannot capture IC, stakeholders have long requested that firms voluntarily disclose information concerning their intangible assets to enable proper assessment of firm performance and value-creation mechanisms (Salvi et al. 2020). Firms have provided information on their IC through annual, environmental, and corporate social responsibility (CSR) reports and IC statements (Vitolla et al. 2019). Researchers focusing on IC disclosure have such documents (Salvi et al. 2020).

In this respect, while providing for the inclusion of IC information (De Villiers and Sharma 2017), including structural, human, and relational capital, the accounting framework still cannot demonstrate how IC information combines with tangible assets or affects the value creation processes of firms.

According to Amin et al. (2018), IC comprises three main elements, namely, human, structural, and relational capital. Bontis (1998) suggests that human capital consists of the individuals of a firm. Swart (2006) states that human capital is a strategic source of creativity and innovation. Moreover, human capital consists of social competence, professional competence, leadership ability, employee motivation, and experience and expertise gained in a business and over the employees' careers (Abdulaali 2018).

Structural capital includes non-physical infrastructures (i.e., patents, tools, information systems, databases, technological knowledge, etc.) that a firm has acquired over the years. Structural capital includes knowledge and intangible assets acquired from the processes that are the property of an organization and remain in the organization when employees leave (Bueno et al. 2011). Moreover, structural capital consists of infrastructural assets that provide activities and codified knowledge, such as databases, documents, and intellectual property rights. Bueno et al. (2011) define relational capital as skills embedded in an organization and its individuals. De Pablos (2004) defines relational capital as skills (including individual training and knowledge), attitudes (behavioral factors, such as incentive and leadership characteristics), and intellectual agility (including the ability of the members of the organization to innovate, engage, and adapt to new situations).

2.2. *Hypothesis Development*

Determining the Relationship between Intellectual Capital and Audit Fees

Financial reporting is a tool that connects different groups in a company with stakeholders (Rahim et al. 2017; Ningsih et al. 2020). Financial reports provide information about the financial statements, quality, and economic conditions of the company so that they can be used for decision-making (Amin and Anwar 2020). Auditing is a systematic method that follows various techniques commonly used to analyze accounting records during the audit process (Muhaimin et al. 2019). The time that can be spent on the audit process depends on the complexity and size of the company, which leads to the determination and receipt of fees by the auditor for audit services according to the type of audit work (Muslim et al. 2020).

One of the most critical topics that usually occupy the minds of business owners and auditors and is always discussed between them is the fee for auditing services. The audit fee includes all the amounts paid to the auditor or the auditing firm for audit services per the contract or agreement with the auditor (Amran et al. 2021). According to Simunic (1980), audit fees are a function of audit hours, and the risk premium the auditor considers due to litigation risk and likely future losses of the client (Kirana and Ramantha 2020) is of great importance to audit clients, audit firms, policymakers, and regulators. Factors leading to litigation and client business risk affect audit fees since they require more auditing effort.

According to the resource-based theory (RBT), firms can achieve a competitive advantage if they have superior resources, which can be tangible and intangible assets (Sari and Astika 2021). The future advantages of intangible assets are measured less often than tangible assets. The effectiveness of intangible assets, such as IC, is not usually presented in the balance sheet and financial statements (Spiceland et al. 2017). This leads to information asymmetry and higher audit risk caused by valuing intellectual capital; thus, auditing efforts increase due to auditor concentration on valuing tangible assets, which results in higher audit fees. Auditing intangible assets pose different challenges than auditing tangible assets, such as property, plants, and equipment. On the one hand, tangible assets require physical verification, which may be time-consuming and costly, while intangible assets do not. On the other hand, the valuation of tangible assets might be easier than intangible assets. Thus, auditors need more time to value intangible assets. Zimmerman and Nagy (2016), Visvanathan (2017), and Akhtaruddin and Ohn (2016) indicate a significant relationship between IC and intangible assets and audit fees. An increase in intangible assets and IC positively affects the acceptable audit risk. Because an audit is "labor-consuming" and conducted by the workforce, the more complex the audit of the client, the higher the need for a workforce with more experience and expertise, leading to higher costs associated with supplying an experienced and expert workforce. Thus, the auditor demands higher fees to meet the associated higher costs.

As valuing intangible assets is more complicated than valuing tangible assets, and because investments in intangible assets are more difficult to verify or liquidate (Sim et al. 2013), they involve higher complexity and audit risk. Therefore, when determining audit fees, auditors consider complexities associated with intangible assets that lead to higher audit effort and litigation risk (Datta et al. 2020). Therefore, looking at international research, we can see that since companies with more effective intellectual capital have better financial performance, they are less likely to engage in earnings management activities, and have lower audit risks (Jaya et al. 2021). Furthermore, auditors receive abnormal fees in addition to normal fees. Abnormal audit costs include abnormal profits and more audit effort. The existence of IC leads to more audit effort and auditor concentration. Consequently, auditors demand higher audit fees in relation to IC. Thus, we expect a significant relationship between IC and audit fees. Studies have investigated the relationship between intangible assets, such as intellectual capital and its components, with risk and audit fees, and can be mentioned as follows. Visvanathan (2017) found that there is a significant relationship between intangible assets and audit fees. Prabhawa and Nasih (2021) suggest that the greater the IC of a firm, the higher the audit fees its auditor requests. Datta et al. (2020) suggest a positive and significant relationship between audit fees and intangible assets. They also show that firms with greater intangible assets are linked to greater audit efforts, and litigation risk for auditors is reflected in higher audit fees. Habib et al. (2020) find a positive and significant relationship between organizational capital and audit fees. Alrashidi et al. (2021) demonstrate that finance providers consider audit and non-audit fees as signals of high-quality audits that increase the creditability of financial statements and positively affect firms' access to finance. Tarighi et al. (2022) found that companies with high intellectual capital reduce audit risk and fees to a negligible amount. Mohammadzadeh (2020) showed a positive and significant relationship between the company's audit fee and the ratio of intangible assets, and there is a negative and significant relationship between the audit fee and intellectual capital.

As argued above, an increase in IC investment probably rectifies agency conflicts, as IC is proposed as a tool for generating and applying a corporations' assets to improve its competitiveness in the market and create value for its owners. The elements of the IC, efficient and effective IC management may enhance the quality and quantity of generated services and goods in the competitive markets, resulting in an ameliorated performance and enhanced value for a firm (De Silva et al. 2014), particularly in competitive markets, depending on the riskiness of managerial behavior (Salehi et al. 2020a). Additionally, since the nature of IC, particularly human capital, is dynamical and changeable, its effectiveness may empower companies to promote their positions over their competitors in the market (Jordão and de Almeida 2017). Therefore, IC efficiency can mitigate agency issues between owners and managers. Additionally, according to the recommendations of auditing literature, auditors typically consider audit risk factors, such as the risk of issuing a going concern opinion, when determining their fees. In addition, Salehi et al. (2019b) reveal audit quality as an important factor in the market that also determines audit fees, besides client characteristics, such as size (Daemigah 2020). Salehi et al. (2020a) demonstrate that IC may reduce the observed risk of auditors by enhancing organizational operations. In light of the presented arguments, it is generally expected that further investment in IC within a firm may lead to lower audit risk, and subsequently, lower audit fees through rectified agent–principal agency issues.

To be more precise, previous studies argue that human capital positively contributes to firm development (Tran and Vo 2020) and efficiency and effectiveness (Smriti and Das 2018) through enhanced use of tangible assets, skilled human resources, and knowledge within a company (Schultz 1961). Therefore, enhanced human capital informs auditors that there is a reduced number of agency problems in the client firms and a lower audit risk (Watts and Zimmerman 1990), which in turn requires lower effort and workforce as well as audit fees (Gul et al. 2018). Chao et al. (2020) also believe that human capital, spiritual capital, rules, systems, and norms within the client firms are markedly correlated with audit fees, because these factors are likely to assist companies in managing difficult situations and distress, both of which have been documented as determinants of audit quality and fees (Salehi et al. 2019a).

Alternatively, firms with well-organized operational structures may pay lower audit fees, since they have improved operational processes and performance. In this sense, Mohammadi and Taherkhani (2017) find that organizational capital is linked with cost stickiness, which reveals that influential organizational capital is likely to enhance the processes within firms by managing administrative and operational costs. Salehi et al. (2018b) indicate a significant relationship between administrative, sale, material, labor, and overhead costs and financial reporting. In addition, Martín-de-Castro et al. (2006) discuss that organizational capital provides firms with a competitive advantage in the market. Furthermore, Chen et al. (2012) state that human and organizational capital is critical for organizational commitment. Consequently, it is expected that an increase in organizational capital may lead to a decrease in audit risk through the enhancement of organizational processes and performance (Stoel and Muhanna 2011). Additionally, a lower audit charge is expected by auditors when they are informed of adequate organizational capital in the client firms.

The other component of IC, structural capital, has been identified as a critical factor in firm riskiness. Ahmad et al. (2019) reveal that structural capital is significantly related to firms’ business performance. AlQershi et al. (2021) argue that strategic innovation positively impacts performance, and structural capital moderates their association. Sarwenda (2020) states that structural capital increases the competitive advantage of firms in the market by reducing business risk. They argue that developed structural capital and operational procedures may promote the efficiency and effectiveness of internal controls. Hence, it is probable that structural capital leads to lower audit fees by mitigating agency problems, due to better internal controls and business performance.

Finally, it is argued that companies establishing an effective and strong relationship with their stakeholders, such as their customers, are likely to pay lower audit charges. Krishnan et al. (2019) state that firms with loyal customers pay lower audit fees. Their argument is in accordance with the notion that audit efforts are able to be lowered due to effectiveness in the audit process, particularly in the case of loyal customers. Thi Mai Anh et al. (2019) argue that relational capital may optimize the sharing of information in order to achieve innovation. Namagembe’s (2020) results also suggest that relational capital affects financial performance positively. Liu et al. (2022) argue that intellectual capital improves the financial performance of SMEs, and physical and human capital are the main contributors. In addition, the impact of intellectual capital and its elements on the financial performance of Chinese manufacturing SMEs is different in different types of industries. Specifically, capital-intensive SMEs show a greater impact of IC on financial performance than labor- and technology-intensive SMEs; labor-intensive SMEs have a higher efficiency of physical capital, while technology-intensive SMEs have higher human capital efficiency. The results of Xu and Wang (2018) show that intellectual capital positively impacts financial performance and companies' sustainable growth. In addition, companies' performance and sustainable growth are positively related to physical capital, human capital, and relational capital. Relational capital is found to be the most influential factor. Finally, innovative capital captures additional information on structural capital, which negatively affects the performance of Korean manufacturing companies. Xu and Li (2022) identify that intellectual capital can enhance firm performance in China's manufacturing sector. Overall, earnings are affected by physical capital, human capital, and structural capital, and profitability and productivity are influenced by physical capital, human capital, structural capital, and relational capital. Physical capital is the most influential contributor to firm performance. Xu and Li (2019) also reveal a significant difference in intellectual capital between high-tech and non-high-tech SMEs. The results further indicate a positive relationship between relational capital and the financial performance of high-tech and non-high-tech SMEs. Specifically, intellectual capital is positively associated with firms' earnings, profitability, and operating efficiency. Additionally, capital efficiency, human capital efficiency, and structural capital efficiency are found to be the most influential value drivers for the performance of two types of SMEs. In contrast, relational capital efficiency possesses less importance. Accordingly, we expect relational capital to reduce audit fees by decreasing firms' riskiness and increasing business performance. Therefore, the research hypotheses are stated as follows.

H1: *There is a significant relationship between IC and audit fees.*

H2: *There is a significant relationship between IC and abnormal audit fees.*

3. Research Methodology

The statistical population of the present study comprises all the companies listed on the ISE from 2014 to 2020.

3.1. Sampling Method

The final sample is presented in Table 1.

Table 1. The number of companies in the statistical community and application of conditions for sample selection.

Number of Companies Listed on the Iraqi Stock Exchange	Number of Companies	Selected Companies
Number of banking companies	39	
Number of insurance companies	5	
Number of investment companies	9	
Number of service companies	10	6
Number of industrial companies	25	15
Number of hotel and tourism companies	10	8
Number of agricultural companies	6	6
telecommunication	2	
Financial delivery company	17	
Total company samples	123	35

3.2. Data Collection Method and Tools

The data required for testing the research hypotheses were collected from the ISE database and the reports presented by the Iraqi securities commission.

3.3. Data Analysis Method

A multiple linear regression model was used to test the research hypotheses, and descriptive and inferential statistical methods were used to analyze the obtained data. At the inferential level, the F-Limmer test, Hausman test, normality test, and multiple linear regression were used to test the research hypotheses.

3.4. Research Model

The following multiple regression models were used to test the research hypotheses. Model (1) was used to test the first hypothesis, and model (2) was used to test the second hypothesis.

Model (1)

$$\begin{aligned} \text{LNAFEE}_{i,t} = \beta_0 \quad & +\beta_1\text{INCAP}_{i,t} + \beta_2\text{INVERC}_{i,t} + \beta_3\text{A Type}_{i,t} + \beta_4\text{ARL}_{i,t} + \beta_5\text{AUDIT Tenure}_{i,t} + \beta_6\text{SIZE}_{i,t} \\ & +\beta_7\text{INTSALES}_{\ i,t} + \beta_8\text{LOSS}_{i,t} + \beta_9\text{LEV}_{i,t} + \beta_{10}\text{ROA}_{i,t} + \beta_{11}\text{MTB}_{i,t} + \beta_{12}\text{AGE}_{i,t} \\ & +\beta_{13}\text{AUDIT CHANGE}_{i,t} + \beta_{14}SPEC_{i,t} + \beta_{15}\text{OPINION}_{i,t} + +\beta_{16}\text{Industry}_{i,t} + \beta_{17}\text{Year}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

Model (2)

$$\begin{aligned} ABAFEE_{i,t} = \beta_0 \quad & +\beta_1\text{INCAP}_{i,t} + \beta_2\text{INVERC}_{i,t} + \beta_3\text{A Type}_{i,t} + \beta_4\text{ARL}_{i,t} + \beta_5\text{AUDIT Tenure}_{i,t} + \beta_6\text{SIZE}_{i,t} \\ & +\beta_7\text{INTSALES}_{i,t} + \beta_8\text{LOSS}_{i,t} + \beta_9\text{LEV}_{i,t} + \beta_{10}\text{ROA}_{i,t} + \beta_{11}\text{MTB}_{i,t} + \beta_{12}\text{AGE}_{i,t} \\ & +\beta_{13}\text{AUDIT CHANGE}_{i,t} + \beta_{14}SPEC_{i,t} + \beta_{15}\text{OPINION}_{i,t} + +\beta_{16}\text{Industry}_{i,t} + \beta_{17}\text{Year}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

To obtain better results, we tested the research hypotheses with IC components using Models 3 and 4:

Model (3)

$$\begin{aligned} \text{LNAFEE}_{i,t} = \beta_0 \quad & +\beta_1\text{SCE}_{i,t} + \beta_2\text{HCE}_{i,} + \beta_3\text{CCE}_{i,t} + \beta_4\text{INVERC}_{i,t} + \beta_5\text{A Type}_{i,t} + \beta_6\text{ARL}_{i,t} + \beta_7\text{AUDIT Tenure}_{i,t} \\ & +\beta_8\text{SIZE}_{i,t} + \beta_9\text{INTSALES}_{i,t} + \beta_{10}\text{LOSS}_{i,t} + \beta_{11}\text{LEV}_{i,t} + \beta_{12}\text{ROA}_{i,t} + \beta_{13}\text{MTB}_{i,t} + \beta_{14}\text{AGE}_{i,t} \\ & +\beta_{15}\text{AUDIT CHANGE}_{i,t} + \beta_{16}SPEC_{i,t} + \beta_{17}\text{OPINION}_{i,t} + +\beta_{18}\text{Industry}_{i,t} + \beta_{19}\text{Year}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

Model (4)

$$\begin{aligned} ABAFEE_{i,t} = \beta_0 \quad & +\beta_1\text{SCE}_{i,t} + \beta_2\text{HCE}_{i,} + \beta_3\text{CCE}_{i,t} + \beta_4\text{INVERC}_{i,t} + \beta_5\text{A Type}_{i,t} + \beta_6\text{ARL}_{i,t} + \beta_7\text{AUDIT Tenure}_{i,t} \\ & +\beta_8\text{SIZE}_{i,t} + \beta_9\text{INTSALES}_{i,t} + \beta_{10}\text{LOSS}_{i,t} + \beta_{11}\text{LEV}_{i,t} + \beta_{12}\text{ROA}_{i,t} + \beta_{13}\text{MTB}_{i,t} + \beta_{14}\text{AGE}_{i,t} \\ & +\beta_{15}\text{AUDIT CHANGE}_{i,t} + \beta_{16}SPEC_{i,t} + \beta_{17}\text{OPINION}_{i,t} + +\beta_{18}\text{Industry}_{i,t} + \beta_{19}\text{Year}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

3.5. Research Variables and Measurement Method

3.5.1. Dependent Variable

Audit fees (LNAFEE) were measured through the natural log of audit fees.

Abnormal audit fees (ABAFEE) were measured by the adjusted model of Blankley et al. (2012) as follows.

$$\begin{aligned} \text{LNAFEE}_{i,t} = \beta_0 \quad & +\beta_1\text{SIZE}_{i,t} + \beta_2\text{CR}_{i,t} + \beta_3 CA\_TA + \beta_4 ARINV_{i,t} + \beta_5\text{ROA}_{i,t} + \beta_6\text{LOSS}_{i,t} + \beta_7\text{LEV}_{i,t} \\ & +\beta_8 OPINION_{i,t} + \beta_9\text{Industry}_{\ i,t} + \beta_{10}\text{Year}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

where CR is the current assets divided by current liabilities and SIZE is the proxy for firm size, measured by the natural logarithm of total assets. The ratio of current assets to total assets is calculated as CA_TA. ARINV is measured by the sum of accounts receivable and inventory divided by total assets. ROA is the net income divided by total assets. LOSS is a dummy variable, if a firm report is lost, it equals 1; otherwise, 0; long-term debt divided by total assets measures LEV. OPINION is a dummy variable that equals 1 if the audit opinion is qualified; otherwise, 0. The industry refers to the category in which a firm is included based on its activity and mass production type according to ISE proposed category. The year is the dummy variable of the year.

3.5.2. Independent Variable

INCAP: This study employed the Value Added Intellectual Coefficient (VAIC) developed by Pulic (2000) and adjusted by Chang (2007) to measure IC. According to Pulic's model, Value Added (VA) is the difference between the output and the input.

$$VA = OUT\text{-}IN$$
$$\text{Added Value} = \text{Output} - \text{Input}$$

Salary costs are not included in the input due to the active role of employees in the value-creation process. Therefore, employee costs are not considered as costs but as investments.

$$VA = OP + EC + D + A$$

Value Added = operating profit + employee cost + depreciation of fixed assets + amortization of intangible assets

Human capital efficiency (HCE):

Chang's human capital efficiency measurement means how much value-added has been gained for one salary.

$$HC = IHR$$
$$\text{Investment in human resources} = \text{human capital}$$
$$HCE = VA \div HC$$
$$\text{Human capital efficiency} = \text{value-added} \div \text{human capital}$$

Human capital includes direct salary expenses, indirect salaries, and the salary expenses of sales, marketing, and administration sections.

Structural capital efficiency (SCE):

This coefficient shows the value created by the processes and structures in a firm. What percentage of the firm's value-added is due to structural capital (Chang 2007)? Pulic states that there is a proportionate inverse relationship between structural capital and human capital; thus, structural capital and structural capital efficiency are calculated as follows:

$$SC = VA - HC$$
$$\text{Structural capital} = \text{value-added} - \text{human capital}$$
$$SCE = SC \div VA$$
$$\text{Structural capital efficiency} = \text{structural capital} \div \text{value-added}$$

Nazari (2010), using the model of Edvinsson and Malone (1997), suggests that structural capital consists of the customer and organizational capital. Therefore, the efficiency of structural capital comprises customer capital efficiency (CCE) and organizational capital efficiency (OCE), which is calculated as follows:

$$SCE = (CC \div VA) + (OC \div VA)$$
$$\text{Structural capital efficiency} = (\text{customer capital} \div \text{value-added}) + (\text{organizational capital} \div \text{value-added})$$

Then, the following equations are used to calculate customer and organizational capital.

$$OC = D\&S$$
$$\text{Customer capital} = \text{marketing and advertising cost}$$

$$CC = SC - OC$$
$$\text{Organizational capital} = \text{structural capital} - \text{customer capital}$$

$$CCE = CE \div VA$$
$$\text{Relational capital efficiency} = \text{relational capital} \div \text{value added}$$

$$\text{INCAP} = \text{HCE} + \text{SCE} + \text{CCE}$$

3.5.3. Control Variables

LAT is the log of end-of-year total assets; this variable is added since prior studies document that the company's size is correlated with audit fees (Moradi et al. 2021; Zimon et al. 2021; Daemigah 2020).

ROA is net income divided by total assets (Mohammadzadeh 2020).

LEV is long-term debt divided by total assets, which is used to control the risk of stakeholders and creditors (Zimon et al. 2021).

OPINION equals 1 if the audit opinion is qualified; otherwise, 0.

ARL is between a firm's fiscal year-end and the audit report date. OPINION and ARL are applied to control the risk of audit reports, which may impact audit fees (Alkebsee et al. 2022).

AGE is the time difference between the current year and the firm's establishment. It is added since previous findings show that older firms are less risky (Moradi et al. 2021; Zimon et al. 2021).

MTB is the ratio of the market value of equity to the book value; this variable is added to observe the firm economic growth opportunities impacting the future risk of firms (Mohammadzadeh 2020).

Audit tenure equals the years the audit client has hired the auditor.

Audit change equals 1 if the firm's auditor has changed; otherwise, 0. The audit tenure and change are added in order to observe the potential risk of auditors' switch (Mohammadzadeh 2020).

SPEC: Habib and Bhuiyan's (2011) model calculates auditor specialization. This variable was added since prior researchers have documented that specialized auditors are likely to demand greater audit fees (Daemigah 2020)

$$\frac{\textit{the sum of the assets of all the clients of a given audit firm in a given industry}}{\textit{the sum of the assets of all the audit clients in a given industry}}$$

If the value obtained from the above equation is greater than [1/the number of firms × 1.2], the auditor industry specialization is confirmed. Then, the value 1 is allocated to industry-specialist audit firms, and 0 is allocated to other audit firms.

INTSALES is calculated by subtracting the previous year's sales from the current year's sales and dividing the difference by the previous year's sales. This variable was added to control the growth sale opportunity showing the efficiency of firms (Zimon et al. 2021).

ATYPE: If the audit firm is one of the big firms, it equals 1; otherwise, 0. As big auditors require greater fees, we added this variable (Mohammadzadeh 2020).

Industry: The industry refers to the category in which a firm is included based on its activity and mass production type. In this regard, the categories defined in the ISE are used.

Year: The dummy variable of the year. Industry and Year are added to the control for potentially omitted variables of a firm's specific characteristics, which are not observed by other control variables (Ahmed and Duellman 2007).

4. Data Analysis

4.1. Descriptive Statistics

As shown in Table 2, the lowest mean with a value of −6.43 belongs to ABAFEE, and the greatest mean with a value of 124.09 belongs to MTB. Additionally, INVREC has the smallest standard deviation, with 0.304 and MTB, with a value of 271.096, has the greatest standard deviation. INCAP has the lowest value, equal to −15.870, and MTB has the greatest value, equal to 970.772. Among the model's variables, audit firm type (ATYPE), the firm's loss (LOSS), auditor change (AUDIT CHANGE), auditor specialization (SPEC), and audit opinion (OPINION) are qualitative in nature and dummy variables. The information related to these variables is presented in Table 3.

Table 2. The Descriptive statistics.

Symbol	Variable	Average	Standard Deviation	Min	Max
LNAFEE	Audit fees	10.79	1.216	6.851	16.48
ABAFEE	Extraordinary auditor fee	−6.43	1.06	3.572	3.983
INCAP	Intellectual capital	3.661	7.145	−15.87	27.289
INVERC	Auditor complexity	0.354	0.304	0.005	1.303
ARL	Delay in issuing audit reports	4.766	0.606	1.098	6.716
TENURE	Audit tenure	3.45	2.729	1	11
SIZE	size of the company	0.866	1.347	0.03	10.131
INTSALES	The ratio of total sales to industry sales	0.391	1.603	−0.999	6.879
LEV	Financial leverage	0.417	0.583	0.001	2.808
ROA	Return on assets	0.243	0.661	−0.69	4.937
MTB	The ratio of market value to book value	124.09	271.096	−0.569	907.772
AGE	Company age	33	13.05	12	73
CCE	Efficiency—customer capital	0.637	3.189	−8.106	13.685
HCE	Efficiency—human capital	2.162	2.587	−2.778	10.322
SCE	Efficiency—structural capital	0.622	1.97	−3.971	8.662

Table 3. The descriptive statistics of dummy variables.

Symbol	Variable	Average	Standard Deviation	Number of Zero	Number of One
ATYPE	Type of auditing firm	0.636	0.482	84	147
LOSS	Company losses	0.264	0.441	170	61
ACHANGE	Change of auditor	0.385	0.487	142	89
SPEC	Auditor specialization	0.714	0.452	66	165
OPINION	Auditor's opinion	0.636	0.482	84	147

Table 3 contains descriptive statistics of the employed dummy variables. ATYPE's statistics show that, on average, 0.63 of firms are audited by big N audit firms, in which big auditors audit 147 firm-year observations. Moreover, on average, 0.26 of investigated companies reported a loss in their income statements. On average, 0.38 and 0.71 companies, respectively, changed their auditors and employed the services of specialized auditors. Finally, the OPINION shows that more than 0.63 companies received a modified audit opinion.

4.2. Normality Test

Considering the normality test results reported in Table A1, all the variables except MTB, LNAFEE, and ABAFEE follow a normal distribution. Different methods can be used to normalize these variables, but applying them causes the relationships between the variables to be broken; thus, their coefficients will not be significant. Moreover, the small number of years of observation mean that other normality tests cannot be used. Furthermore, according to the central limit theorem (CLT), regardless of the population's distribution, if the number of sample observations is more than 30, the selected sample will have an approximately normal distribution. Thus, parametric tests, such as t-test, F-test, and z-test can test the research hypotheses.

4.3. Multicollinearity

Considering the obtained statistics in Table A2, the VIF for all four models' variables is less than 10, and there is no multicollinearity among the variables of these models. Therefore, multicollinearity does not cause a problem in these regressions.

4.4. The Results of the Integration Test

Considering the integration test results reported in Table A3, the calculated F-statistics for the research Models 1–4 equal 3.49, 3.62, 0.57, 0.58, 3.09, and 3.50, respectively. The null hypothesis suggests that all four models reject the pooled data at 99%. Therefore, the panel data method should estimate the coefficients of models 1, 2, 3, and 4.

4.5. The Results of the Hausman Test

The results of the Hausman test are presented in Table A4. The Hausman test statistics for Models 1, 2, 3, and 4 equal 7.80, 4.84, 9.25, and 6.87. Considering the χ^2 statistics for Models 1, 2, 3, and 4, the null hypothesis suggesting the appropriateness of the random-effects model is not rejected.

4.6. The Correlation Matrix

The correlation matrix shows the correlations between pairs of variables in models, as shown in Table A5. The diagonal elements of this matrix are always equal to 1 because each variable is perfectly correlated. The closer the correlation coefficient is to 1, the stronger the direct correlation between the two variables, and correlation coefficients equal to zero indicate no correlation. The negative correlation coefficients show an inverse correlation.

4.7. Model Estimation and Results Interpretation

4.7.1. The First Model Estimation

Considering Table 4, the intercept of this model equals 9.795, which is significant at 99%. The coefficient of IC equals 0.099. Therefore, if INCAP increases by 1%, LNAFEE increases by 0.099% at 99%.

Table 4. The results of estimating the first model by the stochastic effects method.

Variable	Coefficient	Deviation Standard	Z Statistics	*p*-Value
INCAP	0.099	0.012	8.22	0
INVERC	0.014	0.003	4.13	0
ATYPE	0.336	0.339	0.99	0.322
ARL	0.18	0.15	1.2	0.231
TENURE	0.014	0.007	1.89	0.058
SIZE	−0.013	0.058	−0.23	0.818
INTSALES	−0.005	0.039	−0.15	0.881
LOSS	0.002	0	−3.31	0.001
LEV	0.022	0.146	−0.15	0.879
ROA	0.02	0.009	0.52	0.026
MTB	9.66	0	0.04	0.965
AGE	−0.003	0.01	0.13	0.724
ACHANGE	0.087	0.192	0.04	0.65
SPEC	0.051	272	0.19	0.851
OPINION	−0.199	0.074	−2.69	0.007
Y2016	0.333	0.132	2.52	0.012
CONS	9.795	1.004	9.75	0
R2	0.036			
Wald Test	41.98			
Normality of Resid		0.958		

Among the control variables of the first model, OPINION and INVERC at 99%, ROA at 95%, and TENURE at 90% are the causes of an increase in LNAFEE. In contrast, the variable LOSS is the cause of a decrease in LNAFEE at 99%. Among the years of the research data, 2016 had the greatest mean LNAFEE at a 95% confidence level.

Variables ATYPE, ARL, SIZE, INTSALES, LEV, MTB, AGE, ACHANGE, and SPEC and all the year and industry dummies are insignificant and do not affect the variable LNAFEE.

After estimating the model using the random-effects method, the normality of residuals was tested. According to the obtained results, the calculated *p*-value for this test equals 0.958. Thus, the residuals of the first model follow a normal distribution. Therefore, parametric tests, such as z-test, t-test, and F-test, could be used.

Considering that the first model is estimated with the robust random-effects method, the four regression assumptions, including no multicollinearity among variables, exogeneity of explanatory variables, homogeneity of variance, and no autocorrelation among residuals, are verified.

Additional Estimations of the First Regression Model

The first model's additional regressions were estimated, including the panel data fixed-effects regression and the ordinary least squares (OLS) regression.

Table 5 shows that the intercept of this model equals 11.032, which is significant at 99%. The coefficient of INCAP is equal to 0.060. Therefore, if INCAP increases by 1%, LNAFEE increases by 0.060% at 99%.

Table 5. The results of estimating the first model using the fixed-effects method.

Variable	Coefficient	Deviation Standard	T Statistics	*p*-Value
INCAP	0.06	0.019	3.09	0.002
INVERC	1.02	0.612	1.67	0.096
ATYPE	0.044	1.204	0.04	0.097
ARL	0.159	0.15	1.06	0.292
TENURE	0.011	0.006	1.66	0.097
SIZE	−0.086	0.09	−0.96	0.34
INTSALES	−0.022	0.05	−0.45	0.652
LOSS	−0.048	0.018	−2.61	0.009
LEV	0.107	0.235	0.46	0.648
ROA	0.02	0.006	3.01	0.003
MTB	0	0	0.026	0.511
AGE	−0.041	0.041	0.059	0.322
ACHANGE	0.053	0.17	0.031	0.755
SPEC	0.1	0.482	0.21	0.836
OPINION	−0.107	0.009	1.18	0
Y2016	0.344	0.206	1.67	0.096
CONS	11.032	0.533	6.97	0
R2	0.61			
Wald Test	7.78			0

Among the control variables, TENURE and INVERC at 90% and ROA and OPINION at 99% cause an increase in LNAFEE. In contrast, the variable LOSS causes a decrease in LNAFEE at the 99%

Variables ATYPE, ARL, SIZE, INTSALES, LEV, MTB, AGE, ACHANGE, and SPEC, and all the year and industry dummies are insignificant and do not affect the variable LNAFEE.

As presented in Table 6, the intercept of this model equals 9.896, which is significant at 99%. The coefficient of INCAP is equal to 0.084. Therefore, if INCAP increases by 1%, LNAFEE increases by 0.084% at 99%.

Among the control variables, OPINION, INVERC, ROA, and TENURE cause an increase in LNAFEE at 99%. In contrast, the variable LOSS causes a decrease in LNAFEE at 99%. Among the years of the research data, 2016 had the greatest mean LNAFEE at the 99% confidence level.

Variables ATYPE, ARL, SIZE, INTSALES, LEV, MTB, AGE, ACHANGE, and SPEC, and all the year and industry dummies are insignificant and do not affect the variable LNAFEE.

Then, considering the selected variables, the model specification test was used to check for the omitted variable bias in the model. The results of this test are presented in Table A7.

As presented in Table 6, the F-statistic of Ramsey's RESET test equals 0.49, smaller than the F-statistic in the Table. Thus, the null hypothesis suggesting that the model has no omitted variables is not rejected.

Table 6. The results of estimating the first model by the OLS method.

Variable	Coefficient	Deviation Standard	T Statistics	p-Value
INCAP	0.084	0.027	3.12	0.002
INVERC	0.231	0.054	4.24	0
ATYPE	0.281	0.299	0.94	0.348
ARL	0.188	0.147	1.28	0.202
TENURE	0.081	0.026	3.09	0.002
SIZE	0.01	0.082	0.12	0.902
INTSALES	0.017	0.054	0.32	0.751
LOSS	−0.006	0.002	−2.88	0.004
LEV	−0.069	0.004	−0.39	0.696
ROA	0.062	0.003	13.72	0
MTB	−0.001	0.006	0.52	0.603
AGE	−0.002	0.018	0.53	0.708
ACHANGE	0.121	0.327	0.16	0.518
SPEC	0.012	0.034	0.37	0.709
OPINION	0.719	0.021	−2.69	0.007
Y16	0.026	0.068	3.83	0
CONS	9.896	0.703	12.79	0
Obs	231			

4.7.2. The Second Model Estimation

The dependent variable of the second model is ABAFEE. The intercept of this model is not significant. The coefficient of INCAP is equal to 0.045. Thus, if INCAP increases by 1%, ABAFEE increases by 0.045% at the 99% confidence level which the results are presented in Table 7.

Table 7. The results of estimating the second model by the stochastic effects method.

Variable	Coefficient	Deviation Standard	T Statistics	p-Value
INCAP	0.045	0.005	7.74	0
INVERC	0.038	0.005	7.59	0
ATYPE	0.022	0.005	4.31	0
ARL	0.094	0.1416	0.67	0.503
TENURE	−0.021	0.029	−0.73	0.468
SIZE	0.045	0.052	0.86	0.388
INTSALES	0.029	0.032	0.91	0.361
LOSS	0.095	0.225	0.42	0.671
LEV	0.119	0.098	1.21	0.226
ROA	−0.042	0.06	−0.66	0.509
MTB	−0.017	0	−2.33	0.02
AGE	−0.004	0.009	−0.44	0.658
ACHANGE	−0.111	0.012	−9.15	0
SPEC	−0.12	0.331	−0.36	0.716
OPINION	0.304	0.026	11.65	0
CONS	−0.495	1.016	−0.49	0.626
R2	0.315			
Wald Test	33.71			0.003
Normality of Resid	0.807			0

Among the model's control variables, ATYPE, OPINION, and INVERC are the causes of an increase in ABAFEE at 99%. In contrast, the variables ACHANGE and MTB are the causes of a decrease in ABAFEE at 99% and 95%, respectively.

Variables SPEC, AGE, SIZE, ROA, TENURE, ARL, LEV, LOSS, SIZE, and INTSALES, and all the year and industry dummies are not significant and do not affect the variable ABAFEE.

After estimating the model with the random-effects method, the normality of the residuals was tested. Based on the obtained results, the p-value equals 0.807; thus, the model's residuals follow a normal distribution. Therefore, parametric tests such as z-test, t-test, F-test, etc., could be used.

After estimating the model, the homogeneity of residual variances was tested. Considering the results in Table A8, the $\chi 2$ statistic equals 5.27, which is greater than the $\chi 2$ in Table, and the null hypothesis suggests the homogeneity of variance is rejected at 99%. Thus, the residual variances are heterogeneous.

Considering that the second model is estimated with the robust random-effects method, the four assumptions of regression, including no multicollinearity among variables, exogeneity of explanatory variables, homogeneity of variance, and no autocorrelation among residuals, do not cause a problem.

Additional Estimations of the Second Model Regression

To ensure the obtained results, the additional regressions of the second model, including the panel data fixed-effects regression and the feasible generalized least squares (FGLS) regression, were also estimated.

According to the results presented in Table 8, the intercept of this model equals 0.158, which is not significant. The coefficient of INCAP equals 0.043. Therefore, if INCAP increases by 1%, ABAFEE increases by 0.043% at the 99% confidence level.

Table 8. The results of estimating the second model by the method of fixed effects.

Variable	Coefficient	Deviation Standard	T Statistics	*p*-Value
INCAP	0.043	0.016	2.7	0.007
INVERC	0.052	0.023	2.17	0.03
ATYPE	0.099	0.021	4.61	0
ARL	0.07	0.13	0.54	0.589
TENURE	−0.031	0.043	−0.71	0.477
SIZE	0.007	0.079	0.01	0.992
INTSALES	0.022	0.043	0.5	0.614
LOSS	0.125	0.183	0.68	0.497
LEV	0.306	0.206	1.49	0.139
ROA	−0.038	0.132	−0.29	0.774
MTB	−0.015	0.005	−2.64	0.008
AGE	−0.023	0.036	−0.66	0.511
ACHANGE	−0.013	0.012	−10.54	0
SPEC	−0.179	0.422	−0.42	0.672
OPINION	0.274	0.039	6.94	0
CONS	0.274	1.383	0.11	0.909
R2	0.038			
Wald Test	64.65			0

Among the model's control variables, ATYPE, OPINION, and INVERC cause an increase in ABAFEE at 99% and 95%, respectively. In contrast, the variables MTB and ACHANGE cause a decrease in ABAFEE at 99%. Variables SPEC, AGE, SIZE, ROA, TENURE, ARL, LEV, LOSS, SIZE, and INTSALES, and all the year and industry dummies are not significant and do not affect ABAFEE.

Then, due to the heterogeneity of residual variances in the second model, this model is also estimated with the FGLS method, and the results are presented in Table 9.

The intercept of this model is equal to −0.618 and is not significant.

The coefficient of INCAP equals 0.845. Therefore, if INCAP increases by 1%, ABAFEE increases by 0.845% at the 99.

Among the model's control variables, ATYPE, OPINION, and INVERC are the causes of an increase in ABAFEE at 95% and 99%, whereas the variables MTB and ACHANGE are the causes of a decrease in ABAFEE at 99%. Variables SPEC, AGE, SIZE, ROA, TENURE, ARL, LEV, LOSS, SIZE, and INTSALES, and all the year and industry dummies are not significant and do not affect the variable ABAFEE.

Table 9. The results of estimating the second model by the FGLS method.

Variable	Coefficient	Deviation Standard	T Statistics	*p*-Value
INCAP	0.845	0.027	3.12	0.002
INVERC	0.016	0.005	3.19	0.001
ATYPE	0.017	0.007	2.4	0.0166
ARL	0.119	0.124	0.96	0.337
TENURE	−0.016	0.032	−0.52	0.605
SIZE	0.071	0.07	1.02	0.31
INTSALES	0.04	0.046	0.87	0.383
LOSS	0.056	0.177	0.32	0.75
LEV	−0.131	0.151	−0.86	0.387
ROA	−0.04	0.125	−0.32	0.749
MTB	−0.048	0.016	−0.23	0.004
AGE	−0.001	0.005	−9.92	0.816
ACHANGE	−0.136	0.013	0.42	0
SPEC	0.117	0.278	10.51	0.673
OPINION	0.29	0.027	−0.96	0
CONS	−0.618	0.643		0.336
LOG LIKELIHOOD	−336.95			
Wald Test	155.32			0

Then, considering the selected variables, the model specification test is used to check for the omitted variable bias in the model. The results of this test are presented in the Table below.

Table A9 shows that the F-statistic of Ramsey's RESET test equals 0.93, which is less than the F-statistic in the Table. Therefore, the null hypothesis suggesting that the model has no omitted variables is not rejected.

4.7.3. The Third Model Estimation

Table 10 results show that the model's intercept is 9.946, significant in the 99% confidence level. The coefficient of structural capital efficiency is 0.016, so with a 1% increase in the SCE variable, the auditor's fee at a 99% confidence level increased by 0.016%. Moreover, with a one percent increase in the variable of HCE, the auditor's fee at 95% confidence will increase by 0.012% and by a one percent increase in CCE, the auditor's fee at 99% level will increase by 0.063%.

Among the control variables of the model, the variables of INVERC and ROA at 99% and 95% confidence levels are the factors for an increase in auditing variables. In contrast, the LOSS variable at a 90% confidence level is the reductive factor for LNAFEE.

SPE, INTSALES, ACHANG, AGE, MTB, ATYPE, SIZE, TENURE, ARL, LEV, and OPINION are dummy industry variables; dummy variables are not significant and do not affect LNAFEE.

After estimating the model by the random effects method, the normality of the disruptive component has also been assessed. According to the results, the obtained probability level for the test is 0.845, so model residuals enjoy normal distribution, and we can utilize the conventional tests of Z, t, and F.

After estimating the model, the heterogeneity variance of disruptive components is assessed. Given the obtained results in Table A10, the chi-square is 3.44, higher than the same value in the Table, so the null hypothesis concerning variance homogeneity at 99% of confidence is rejected, and the disruptive components of the variance model are heterogeneous.

Since the third model is estimated as robust using the random effects method, the obtained results from four classic regression assumptions, including collinearity among variables, exogeneity of descriptive variables, homogeneity variance and existence of heterogeneity variance, and serial autocorrelation.

Table 10. The results of estimating the third model by the stochastic effects method.

Variable	Coefficient	Deviation Standard	T Statistics	*p*-Value
SCE	0.016	0.003	4.62	0
HCE	0.012	0.005	2.34	0.019
CCE	0.063	0.014	4.23	0
INVERC	0.011	0.001	10.51	0
ATYPE	0.353	0.395	0.89	0.372
ARL	0.192	0.138	1.39	0.164
TENURE	−0.133	0.041	−0.32	0.751
SIZE	0.006	0.079	−0.08	0.934
INTSALES	0.005	0.049	0.1	0.919
LOSS	−0.062	0.007	−7.81	0
LEV	−0.018	0.197	−0.09	0.927
ROA	0.047	0.022	2.08	0.037
MTB	0	0	0.07	0.946
AGE	−0.005	0.01	−0.54	0.592
ACHANGE	0.056	0.165	0.34	0.731
SPEC	0.043	0.387	0.11	0.911
OPINION	0.161	0.203	0.79	0.427
Y2016	0.565	0.025	22.09	0
CONS	9.946	0.806	12.34	0
R2	0			
WALD TEST	32.03			0
Normality of Resid	0.845			

Additional Estimations of Third Model Regression

Given the results in Table 11, the model's intercept is 10.959, significant at 99%. The coefficient of structural capital efficiency is 0.012, so with a 1% increase in the SCE variable, the auditor's fee at a 99% confidence level increases by 0.012%. Moreover, by a one percent increase in the variable of HCE, the auditor's fee at 95% increases by 0.013%, and by a one percent increase in CCE, the auditor's fee at 99% increases by 0.045%.

Table 11. The results of estimating the third model using the fixed-effects method.

Variable	Coefficient	Deviation Standard	T Statistics	*p*-Value
SCE	0.012	0.004	2.99	0.003
HCE	0.013	0.006	2.01	0.044
CCE	0.045	0.006	7.08	0
INVERC	0.011	0.004	2.73	0.007
ATYPE	0.077	1.209	0.06	0.949
ARL	0.17	0.152	1.112	0.265
TENURE	−0.017	0.05	−0.34	0.734
SIZE	−0.077	0.091	−0.85	0.399
INTSALES	−0.016	0.051	−0.32	0.749
LOSS	−0.095	0.022	−4.26	0
LEV	0.108	0.236	0.46	0.648
ROA	0.017	0.009	1.84	0.066
MTB	0	0	0.69	0.488
AGE	−0.039	0.041	−0.94	0.348
ACHANGE	0.037	0.171	0.22	0.827
SPEC	0.123	0.487	0.25	0.8
OPINION	−0.199	0.233	−0.85	0.394
Y2016	0.426	0.038	11.1	0
CONS	10.959	1.595	6.87	0
R2	−0.55			
WALD TEST	1.76			0.02

Among the control variables of the model, the variables of INVERC and ROA at 99% and 90% confidence levels are the factors for an increase in auditing variables. In contrast, the LOSS variable at a 99% confidence level is the reductive factor for LNAFEE. Among the years of the study, 2016, at 99%, had a mean audit fee larger than other years.

SPEC, INTSALES, ACHANG, AGE, MTB, ATYPE, SIZE, TENURE, ARL, LEV, and OPINION are dummy industry variables; dummy variables are insignificant and do not affect LNAFEE.

Next, due to heterogeneity variance in the first model, the model is also estimated using the FGLS method; the results are reported in Table 12. The model intercept is 10.196, significant with a 99% level. The coefficient of structural capital efficiency is 0.234, so with a 1% increase in the SCE variable, the auditor's fee at a 95% confidence level increases by 0.234%. Moreover, with a one percent increase in the variable of HCE and CCE, the auditor's fee at 99% of confidence increases by 0.001% and 0.062%, respectively.

Table 12. The results of estimating the third model by the FGLS method.

Variable	Coefficient	Deviation Standard	T Statistics	*p*-Value
SCE	0.234	0.096	2.44	0.015
HCE	0.062	0.016	3.9	0
CCE	0.001	0.002	7.51	0
INVERC	0.01	0.004	2.54	0.011
ATYPE	0.359	0.284	1.26	0.206
ARL	0.211	0.138	1.53	0.127
TENURE	−0.027	0.036	−0.76	0.448
SIZE	0.014	0.077	0.19	0.849
INTSALES	0.031	0.051	0.6	0.547
LOSS	−0.046	0.022	−2.1	0.036
LEV	0.068	0.167	−0.41	0.681
ROA	0.023	0.014	1.65	0.099
MTB	0	0	−0.51	0.612
AGE	−0.007		1.15	0.25
ACHANGE	0.059	0.006	0.33	0.74
SPEC	0.036	0.177	0.12	0.906
OPINION	0.124	0.309	−0.7	0.483
Y2016	0.393	0.177	14.25	0
CONS	10.196	0.027	14.92	0
LOGLIKELIHOOD	−360.059			
WALD TEST	26.46			0.089

Among the control variables of the model, the variables of INVERC and ROA at 99% and 95% confidence levels are the factors for an increase in auditing variables. In contrast, the LOSS variable at a 99% confidence level is the reductive factor for LNAFEE.

SPEC, INTSALES, ACHANG, AGE, MTB, ATYPE, SIZE, TENURE, ARL, LEV, and OPINION are dummy industry variables; dummy variables are insignificant and do not affect LNAFEE.

The model specification test is used to assess omitted variables in the model and the main results regarding the selected variables. Table A11 displays the results.

As seen in the Table, the F statistic of the Ramsey-Reset test is 1.53, which is smaller than the same value in the Table, so the null hypothesis concerning the absence of omitted variables in Table 12 is not rejected.

4.7.4. The Fourth Model Estimation

The dependent variable of the fourth model is ABAFEE. According to Table 13, the intercept of this model is equal to 0.560, which is not significant. The coefficient of SCE equals 0.062. Thus, if SCE increases by 1%, ABAFEE increases by 0.062% at the 99% confidence level. Additionally, if HCE and CCE increase by 1%, at the 95% confidence level, ABAFEE increases by 0.051% and 0.077%, respectively.

Table 13. The results of estimating the fourth model by the stochastic effects method.

Variable	Coefficient	Deviation Standard	T Statistics	*p*-Value
SCE	0.062	0.017	3.56	0
HCE	0.051	0.021	2.37	0.018
CCE	0.077	0.036	2.14	0.032
INVERC	0.01	0	10.21	0
ATYPE	0.069	0.033	2.08	0.039
ARL	0.104	0.12	0.87	0.385
TENURE	−0.02	0.037	0.54	0.587
SIZE	0.049	0.07	−0.7	0.481
INTSALES	0.027	0.042	0.63	0.529
LOSS	0.118	0.174	0.68	0.498
LEV	0.433	0.08	5.52	0
ROA	0.037	0.125	0.3	0.765
MTB	−0.024	0.009	−2.6	0.009
AGE	0.004	0.01	−0.39	0.693
ACHANGE	0.01	0.143	−0.07	0.944
SPEC	0.076	0.347	0.22	0.827
OPINION	0.03	0.013	2.32	0.02
CONS	0.56	0.719	0.32	0.436
R2	0.39			
WALD TEST	81.6			0
Normality of Resid	0.902			

Among the control variables of the model, variables INVERC, ATYPE, OPINION, and LEV are the causes of an increase in ABAFEE at 99%, 95%, 99%, and 95%, respectively. In contrast, the variable MTB is the cause of a decrease in ABAFEE at the 99% confidence level.

Variables INTSALES, SPEC, ACHANGE, AGE, SIZE, ROA, LOSS, TENURE, and ARL, and all the year and industry dummies significantly do not affect the variable ABAFEE.

After estimating the model with the random-effects method, the normality of the model's residuals is tested. Based on the obtained results, the *p*-value for this test equals 0.902. Thus, the residuals of the model follow a normal distribution. Therefore, parametric tests such as z-test, t-test, F-test, etc., can be used.

After estimating the model, the homogeneity of residual variances is tested. Based on the obtained results in Table A12, the $\chi 2$ statistic equals 12/42, which is greater than the $\chi 2$ in the table. The null hypothesis suggests the homogeneity of variance is rejected at 99%. Thus, the residual variances are heterogeneous.

Considering that the fourth model is estimated with the robust random-effects method, the four regression assumptions include no multicollinearity among variables, exogeneity of explanatory variables, homogeneity of variance, and no autocorrelation among residuals, which do not cause a problem.

Additional Estimations of the Fourth Regression Model

In addition to the panel data random-effects regression, the fourth model's additional regressions, including the panel data fixed-effects regression and feasible generalized least squares regression (FGLS), are estimated.

According to Table 14, the intercept of this model equals 0.222, which is not significant. The coefficient of SCE is equal to 0.013. Therefore, if SCE increases by 1%, ABAFEE increases by 0.013% at the 95% confidence level. Additionally, if HCE and CCE increase by 1%, ABAFEE increases by 0.084% and 0.023% at the 99% confidence level.

Among the control variables of the model, variables INVERC, ATYPE, OPINION, and LOSS are the causes of an increase in ABAFEE at the 90%, 95%, 99%, and 99% confidence levels, respectively. In contrast, the variable MTB is the cause of a decrease in ABAFEE at the 99% confidence level.

Table 14. The results of estimating the fourth model using the fixed-effects method.

Variable	Coefficient	Deviation Standard	T Statistics	*p*-Value
SCE	0.013	0.006	2.25	0.024
HCE	0.084	0.012	6.84	0
CCE	0.023	0.009	2.52	0.012
INVERC	0.021	0.012	1.76	0.087
ATYPE	0.082	0.037	2.19	0.028
ARL	0.09	0.132	0.68	0.496
TENURE	−0.025	0.044	−0.57	0.569
SIZE	0.003	0.08	0.04	0.969
INTSALES	0.015	0.044	0.34	0.737
LOSS	0.097	0.021	4.55	0
LEV	0.303	0.207	1.46	0.145
ROA	−0.031	0.132	−0.24	0.81
MTB	−0.046	0.015	−3.08	0.002
AGE	−0.028	0.036	−0.79	0.433
ACHANGE	−0.019	0.15	−0.13	0.896
SPEC	−0.126	0.427	−0.3	0.768
OPINION	0.024	0.007	3.47	0.001
CONS	0.222	1.396	0.16	0.873
R2	0.376			
WALD TEST	73.83			0

Variables INTSALES, SPEC, ACHANGE, AGE, SIZE, ROA, LEV, TENURE, and ARL, and all the year and industry dummies are insignificant and do not affect the variable ABAFEE. Then, due to the heterogeneity of variance in the fourth model, this model is also estimated with the FGLS method.

As shown in Table 15, the intercept of this model equals 10.885, which is not significant. The coefficient of SCE is equal to 0.072. Thus, if SCE increases by 1%, ABAFEE increases by 0.072% at 99%. Additionally, if HCE and CCE increase by 1%, ABAFEE increases by 0.052% and 0.042%, respectively, at the 99% confidence level.

Table 15. The results of estimating the fourth model by the FGLS method.

Variable	Coefficient	Deviation Standard	T Statistics	*p*-Value
SCE	0.072	0.008	8.81	0
HCE	0.052	0.027	1.89	0.059
CCE	0.042	0.009	4.58	0
INVERC	0.017	0.009	1.93	0.054
ATYPE	0.149	0.164	0.91	0.363
ARL	0.147	0.18	0.81	0.415
TENURE	0.063	0.044	1.43	0.151
SIZE	0.402	0.05	7.9	0
INTSALES	−0.901	0.369	−2.44	0.015
LOSS	0.077	0.16	0.48	0.631
LEV	0.059	0.022	2.64	0.009
ROA	−0.113	0.412	−0.27	0.784
MTB	0.001	0.013	0.15	0.88
AGE	−0.007	0.005	−1.42	0.157
ACHANGE	0.127	0.203	0.63	0.531
SPEC	0.134	0.15	0.89	0.374
OPINION	0.355	0.14	2.54	0.011
Y2014	−0.044	0.022	−2	0.046
Y2015	−0.083	0.024	−3.4	0.001
CONS	10.885	1.129	9.64	0
LOGLIKELIHOOD	−309.971			
WALD TES	36.1			0.01

Among the control variables of the model, the variable INVERC at the 95% confidence level and variables ATYPE and LOSS at the 99% confidence level cause an increase in ABAFEE, whereas the variables MTB at the 90% confidence level and OPINION at the 99% confidence level cause a decrease in ABAFEE.

Variables INTSALES, SPEC, ACHANGE, AGE, SIZE, ROA, LEV, TENURE, and ARL, and all the year and industry dummies are insignificant and do not affect the variable ABAFEE.

Then, considering the selected variables, the model specification test is used to test the existence of omitted-variable bias in the model. The results of this test are presented in Table A13.

According to the results presented in Table A13, the F-statistic of Ramsey's RESET test equals 0.88, which is less than the F-statistic in the Table. Therefore, the null hypothesis suggesting that the model has no omitted variables is not rejected.

5. Discussion

The present study investigates the relationships between intellectual, human, and structural capital efficiency and normal and abnormal audit fees in the companies listed on the ISE.

The study results indicate that intellectual, human, relational, and structural capital is significantly and positively associated with audit fees. That is, the greater the IC and its components, the higher the audit fees because the existence of intangible assets increases audit risk. Consequently, audit fees increase, which is consistent with the results of the studies by Zimmerman and Nagy (2016), Visvanathan (2017), Akhtaruddin and Ohn (2016), and Prabhawa and Nasih (2021), suggesting that the greater the IC of a firm, the higher the audit fees its auditor requests.

Moreover, rapid technological advances have changed how people communicate and economic activities and have accelerated information processing, updating, and transmission. Undeniably, the competition between companies is the competition between their human capital. Human capital affects the process of preparing financial reports; that is, stronger and better human capital results in fewer human errors, more accurate annual reports, and higher-quality financial reports, and thus, enhanced audit quality, which is one of the reasons for higher audit fees. Therefore, based on the results and theoretical arguments, it can be concluded that human capital leads to an increase in audit fees, consistent with the results of Akhtaruddin and Ohn (2016).

High levels of structural capital increase individuals' value to the organization's overall value, leading firms to hire higher-quality auditors to improve their value and position in society and ensure the quality of annual financial reports. It provides the users with timely audited financial statements because firms with greater IC seek to achieve a good position and fulfil their social responsibilities (Dal Mas 2019). As audit fees are determined based on audit quality, higher-quality auditors are expected to request higher fees. Thus, enhanced structural capital leads to higher audit fees, which is indirectly consistent with Chao et al. (2020) and Akhtaruddin and Ohn (2016).

Relational capital can be seen as structural capital and provides a favorable condition for human capital to function. Relational capital is an organization's key external relationships, and accounting firms mainly consider the characteristics of the relationship with clients. Long-term cooperation improves the communication of both sides in relationships, and auditors need time to increase their client-specific knowledge (Stanley and DeZoort 2007). Auditor tenure might positively affect audit quality.

The results suggest a positive relationship between relational capital and audit fees, which is consistent with the theoretical underpinnings and the results of Wang and Zhu (2018) and Akhtaruddin and Ohn (2016).

Furthermore, the results demonstrate that intellectual, human, relational, and structural capital is significantly and positively related to abnormal audit fees. Greater IC induces higher abnormal audit fees, since identifying and measuring intangible assets requires time and expertise. The study of Datta et al. (2020) shows that firms with greater intangible assets face challenges in the audit process because they are linked to higher audit risk and usually require more audit efforts; thus, there is a strong positive relationship between intangible assets and audit fees.

Vanstraelen and Zou (2020) suggest that the long-term auditor–client relationship is related to a higher likelihood of an unqualified opinion, and thus, lower audit quality. The long-term auditor–client relationship increases audit risk and the possibility of fraud being committed by both sides. Thus, the authors believe that abnormal audit fees increase to cover the illegal activities of the client, which is consistent with the results obtained in this study and the studies of Vanstraelen and Zou (2020) and Stanley and DeZoort (2007), suggesting that the greater relational capital, the higher the abnormal audit fees.

Relational capital can be seen as the continuation of structural capital and enables human capital to perform its function. Therefore, the study results indicating that an increase in human and structural capital leads to higher abnormal audit fees are consistent with the theoretical underpinnings and the findings of Vanstraelen and Zou (2020) and Stanley and DeZoort (2007). Furthermore, these results confirm the findings of Wang and Zhu (2018), suggesting that mandatory audit firm rotation positively affects audit quality and reduces abnormal audit fees.

6. Conclusions

Considering the obtained results, there are several implications for company authorities, stakeholders, auditors, and policymakers. As the stockholders' agents, firm managers and boards of directors are aware that inefficient investment in IC may intensify the agency problems between them and the principals. Therefore, making a balance between physical capital and IC, as well as adjusting investment among the IC components, may play a significant role in determining firm risk-levels as well as audit pricing behavior. Additionally, for auditors, the findings suggest that an in-depth analysis of firms' IC components may reveal other aspects of risk, increasing their understanding of a given client and the audit effort needed to compensate for the potential risks. Policymakers can improve market efficiency by designing and implementing regulations that force companies to disclose their IC investments; the IC components are recognized as risk-determinant factors based on the findings of our study.

Researchers face limitations in most research, and the current research is no exception. Considering the large number of control variables in this research, other variables, such as the sensitivity of financial statements, were not used. Future researchers can consider the relevant variables in their research.

7. Further to the Study

Conducting a study comparing concepts between Iraq and Iran, as two neighbouring countries, may contribute to the market efficiency in the Middle East by exploring different aspects of market specifications regarding auditor appointment and pricing behavior. In addition, measuring the cultural and social differences between an Arab nation and a Persian nation may also explain the different volumes of investment in physical capital and IC investment that result in varied financial and social responsibility performances.

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Appendix A

Table A1. The test results for the normality of variables.

Variable	Level	Variable	Level
ROA	0.128	SCE	0.295
MTB	0.024	HCE	0.733
AGE	0.109	INTSALES	0.794
CEE	0.123	LOSS	1
INVERC	0.341	LEV	0.395
ATYPE	1	ARL	0.323
INCAP	0.351	TENURE	0.982
SIZE	0.244	LNAFEE	0.001
ABAFEE	0.058	SPEC	1
ACHANGE	1		
OPINION	0.001		

Table A2. The VIF test of the first model.

Variable	VIF	VIF/1	Variable	VIF	VIF/1
Y16	1.06	0.943	ATYPE	3.22	0.31
SPEC	3.38	0.295	INVERC	2.12	0.471
AGE	1.17	0.852	INCAP	1.13	0.885
SIZE	1.9	0.526	MTB	1.27	0.786
LOSS	1.31	0.762	ROA	1.48	0.676
OPINION	1.25	0.799	ARL	1.23	0.81
TENURE	1.65	0.605	ATYPE	3.22	0.31
ACHANGE	1.64	0.772			
MEAN VIF	1.64				
ATYPE	3.2	0.312	ROA	1.47	0.679
SPEC	3.37	0.296	LEV	1.66	0.601
AGE	1.17	0.853	ARL	1.21	0.823
ACHANGE	1.29	0.777	MTB	1.27	0.787
SIZE	1.9	0.527	INTSALES	1.16	0.859
LOSS	1.31	0.765	INCAP	1.13	0.888
OPINION	1.24	0.804	INVERC	2.12	0.471
TENURE	1.65	0.605			
MEAN VIF	1.68				
Y16	1.07	0.937	INTSALES	1.19	0.843
SPEC	3.42	0.292	LEV	1.66	0.602
AGE	1.26	0.795	ARL	1.23	0.811
HCE	1.38	0.726	CCE	6.29	0.158
ACHANGE	1.31	0.763	MTB	1.31	0.762
SIZE	1.91	0.524	SCE	6.24	0.16
LOSS	1.4	0.713	ATYPE	3.28	0.305
OPINION	1.27	0.785	INVERC	2.13	0.468
TENURE	1.72	0.528	ROA	1.48	0.675
MEAN VIF	2.2				
OPINION	1.27	0.789	INTSALES	1.18	0.486
SPEC	3.41	0.293	LEV	1.66	0.602
AGE	1.26	0.795	ARL	1.21	0.824
ROA	1.47	0.678	CCE	6.29	0.158
ACHANGE	1.3	0.769	MTB	1.31	0.763
SIZE	1.9	0.525	SCE	6.24	0.16
TENURE	1.71	0.583	ATYPE	3.25	0.307
INVERC	2.13	0.468			
MEAN VIF	2.26				

Table A3. The integration test results.

	Statistics	Probability Level
The first model	3.49	0
The second model	3.62	0
The third model	3.09	0
The fourth model	3.5	0

Table A4. The Hausmann test results.

	Calculated Statistics	Probability Level
The first model	7.8	0.954
The second model	4.84	0.099
The third model	9.25	0.953
The fourth model	6.87	0.986

Table A5. The correlation matrix results of research model variables.

	L~EE	A~EE	INCAP	SCE	HCE	CCE	I~RC	A~PE	ARL	T~RE	SIZE	IN~ES	LOSS	LEV	ROA	MTB	AGE	A~GE	SPEC	O~ON
L~EE	1																			
A~EE	0.856	1																		
INCAP	0.021	−0.001	1																	
SCE	0.09	0.01	0.784	1																
HCE	−0.055	−0.015	0.474	−0.023	1															
CCE	0.027	−0.027	0.805	0.907	−0.076	1														
I~RC	−0.092	−0.028	−0.183	−0.083	−0.198	−0.064	1													
A~PE	0.148	0.131	0.085	0.057	0.164	0.048	−0.147	1												
ARL	0.04	0.032	0.054	0.027	0.011	0.028	0.226	−0.093	1											
T~RE	0.092	−0.090	−0.050	0.007	−0.072	−0.040	−0.053	−0.259	−0.069	1										
SIZE	−0.062	0	−0.024	0.022	−0.049	0.015	0.535	−0.110	0.011	0.091	1									
IN~ES	0.054	0.045	0.053	−0.025	0.166	−0.042	−0.038	0.057	−0.033	−0.038	−0.020	1								
LOSS	−0.06	−0.000	−0.069	0.027	−0.300	0.112	−0.016	−0.031	0.003	−0.095	−0.109	−0.220	1							
LEV	−0.073	−0.046	0.035	0.087	−0.096	0.094	0.533	−0.069	0.267	−0.044	0.349	0.001	0.057	1						
ROA	0.062	0	0.013	−0.023	0.085	−0.042	0.125	−0.087	0.102	−0.092	0.35	0.253	−0.328	0.056	1					
MTB	−0.023	−0.036	−0.059	−0.035	−0.160	0.022	−0.039	0.137	−0.152	0.164	0.119	0.127	0.134	−0.091	0.002	1				
AGE	−0.022	−0.011	−0.076	0.041	−0.249	0.038	0.02	−0.032	0.163	−0.159	0.065	0.015	0.132	0.187	0.105	0.047	1			
A~GE	0.096	0.057	−0.0362	−0.016	0.018	−0.040	0.114	0.142	0.052	−0.424	0.046	0.074	−0.090	0.081	0.157	−0.066	0.015	1		
SPEC	0.132	0.121	0.105	0.097	0.087	0.101	−0.127	0.809	−0.089	−0.331	−0.208	0.018	0.074	−0.017	−0.178	0.051	−0.052	0.146	1	
O~ON	0.069	0.009	0.095	0.069	0.147	0.012	−0.076	0.076	0.117	0.204	0.093	0.02	−0.016	0.155	0.055	−0.136	0.047	−0.104	0.039	1

Table A6. The results of the variance heterogeneity test of the first model.

Test	Statistics X2	*p*-Value
Breusch–Pagan test	1.990	0.158

Table A7. The specification test results of the first model.

Test	Statistics F	*p*-Value
Ramsey RESET test 1	0.490	0.691

Table A8. The results of the variance heterogeneity test of the second model.

Test	Statistics X2	*p*-Value
Breusch–Pagan test	5.270	0.021

Table A9. The results of the second model specification test.

Test	Statistics F	*p*-Value
Ramsey RESET test	0.930	0.429

Table A10. The results of the third model variance heterogeneity test.

Test	Statistics X2	*p*-Value
Breusch–Pagan test	3.440	0.063

Table A11. The specification test results of the third model.

Test	Statistics F	*p*-Value
Ramsey RESET test	1.530	0.208

Table A12. The results of the fourth model variance heterogeneity test.

Test	Statistics X2	*p*-Value
Breusch–Pagan test	12.420	0.000

Table A13. The results of the specification test of the fourth model.

Test	Statistics F	*p*-Value
Ramsey RESET test	0.880	0.450

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