Iranian Journal of Management Studies (IJMS) 2023, 16(1): 183-204

RESEARCH PAPER

An Examination of Auditor Confirmation Bias and Audit Quality With an Emphasis on the Moderating Role of Client and Auditor Characteristics

Salman Lotfi[1], Zohreh Hajiha[2*], Hamidreza Vakilifard[3]

1. PhD Student, Department of Accounting, Science and Research Branch, Islamic Azad University, Tehran, Iran
2. Professor, Department of Accounting, East Tehran Branch, Islamic Azad University, Tehran, Iran
3. Associate Professor, Department of Accounting, Science and Research Branch, Islamic Azad University, Tehran, Iran

(Received: January 31, 2022; Revised: February 14, 2022; Accepted: March 16, 2022)

Abstract

The main purpose of this study is to explain the effect of confirmation bias on audit quality and the moderating roles of client characteristics (market value and institutional shareholder's ownership) and auditor (industry specialist auditor and first-class stock exchange trusted auditor) on audit quality and the relationship between them. For this purpose, a sample of 146 firms listed on the Tehran Stock Exchange, including 1314 firm-year during 2012-2020, was collected and analyzed. In this study, financial restatement and the absolute value of discretionary accruals were used as audit quality proxy. The results showed that confirmation bias has a negative effect on audit quality. The results also demonstrated that the adverse effects of confirmation bias on audit quality are less for clients with high market value, high institutional ownership percentage, and audits performed by industry specialist auditors and first-class stock exchange trusted auditors. The findings of this research could lead to the development of theoretical foundations in the audit context, especially audit judgment and audit risk assessment. Further, the study results suggest that additional training in order to mitigate the auditors' use of heuristics may be beneficial.

Keywords: confirmation bias, audit risk, financial restatement, discretionary accruals, audit quality.

1. Introduction

The continuous growth and complexity of society justify the need for relevant economic information and information systems and information-producing processes. They also extend the market for auditing as part of the financial reporting process. The use of auditing services in different parts of society will be maximized if the role of auditing in society is clearly defined through a comprehensive effort (Salehi et al., 2021). Clarifying this role requires understanding the nature of auditing and its inherent limitations. The auditors' report is the end product of the auditing process. The role of auditors – i.e., to provide adequate and appropriate assurance to control the economic affairs of companies – has now evolved. Of course, the responsibility for ensuring the adequacy of corporate internal controls by management is still in place. On the other hand, auditing is one of the fundamental pillars of the accountability process because accountability requires reliable information, and the ability to rely on information requires reviewing them by a person independent of the information provider. This importance is conducted through the audit process; the audit creates added

* **Corresponding Author, Email:** drzhajiha@gmail.com

value by making relevant comments by determining the information's validity in the accountability process. A bridge is thus created between the auditors' findings and those inside and outside the company in the form of audit comments, which play an important role in warning users of financial statements to recognize the problems facing the company. If there are any objections and distortions, the audit company will not easily pass it and will affect the audit opinion.

Previous research has shown that individuals (including auditors) use exploratory methods to infer sample information. Studies should now try to identify audit tasks in which specific discoveries may lead to poor judgments and provide ways to mitigate the adverse consequences of those discoveries (Kinney & Uecker, 1982; Seifzadeh et al., 2022). This study aims to identify situations in which the consequences of auditors' use of an exploratory method can be revealed, and empirical evidence on the costs associated with auditors' use of an exploratory method can be provided using a wide range of stakeholders. Specifically, this study focuses on the use of the exploratory method in one of the most critical audit tasks, namely the process of the risk assessment process, and links the use of the exploratory method during the risk assessment process to adverse audit results. Theoretical evidence suggests that individuals rely on exploratory methods to reduce the complexity of judging and deciding on the probability of uncertain outcomes (Tversky & Kahneman, 1974). In the auditing field, the exploratory approach, especially as a potentially negative impact on the auditor's decision, includes the tendency to availability, overconfidence, the tendency to anchor, and the confirmation bias (Dalwai et al., 2021; KPMG, 2011). Previous empirical research in accounting provides extensive evidence that heuristics have a negative effect on auditors' judgments (Joyce & Biddle, 1981; Kinney & Uecker, 1982; McMillan & White, 1993). However, there is little empirical research in accounting that examines the impact of auditors' heuristics on audit results. This is probably because the judgment process using archival research methods is uncontrollable and invisible, and it is challenging to consider situations where the use of exploratory methods is likely to be critical and to use archival data. In order to minimize these problems, we focus on a confirmation bias hedging approach and identify situations where auditors' use of this hedging approach is likely to contribute to adverse audit results (Cassell et al., 2021).

Confirmation bias refers to "the tendency to seek and overweight confirming information in the information gathering and evaluation steps and to favor conclusions that are consistent with initial beliefs or preferences. The confirmation tendency can bias a wide variety of auditor judgments, ranging from an auditor only seeking evidence that is consistent with client's explanation for an unusual pattern in financial data, to placing disproportionate weight on audit evidence that is consistent with a preferred outcome" (Chang & Luo, 2021). Confirmation bias is one of the types of cognitive bias and is one of the errors systematically observed in inductive reasoning. The term confirmation bias was first used by Wason (2003), a leading psychologist at University College London. He is one of the pioneers of reasoning psychology (as one of the branches of cognitive sciences). This branch of cognitive science studies the way of thinking and reasoning in individuals, the processes that lead to conclusions in mind, and the way these processes shape the process of problem-solving and decision making. According to Wason (2003), individuals are immediately drawn to information and knowledge that confirms their assumptions, perceptions, and beliefs. This bias manifests itself the most when one is selective in gathering or recalling information and when one interprets vague evidence as confirmation of one's current position. Confirmation bias is more pronounced when it comes to exciting topics or beliefs that one is prejudiced against. This bias is used to explain various cognitive phenomena, including polarization of attitudes (in which group members' disagreements increase concerning the same set of

evidence), stability of belief (in which the presentation of evidence of violation strengthens one's belief in a proposition), the effect of irrational precedence (in which the individual relies more on information encountered earlier), and the imaginary correlation (in which the individual makes some correlation between unrelated variables or events) (Nickerson, 1998).

Wason (1960) showed that individuals tend to search for and interpret new information in ways that confirm their previous ideas. In line with the confirmation bias affecting auditors' judgment, a survey of auditors and field studies provide evidence that auditors rely on last year's audit plan when developing this year's audit plan and that auditors underestimate the level and scope of the audit test in response to risk change (Bedard, 1989; Mock & Wright, 1999). In this regard, it is assumed that auditors may rely on their previous experience and client perceptions when assessing risk this year. As a result, the assessed level of risk is likely to be inadequate (too high or too low) when auditors' prior understanding of risk is not commensurate with the actual risk in the current period.

Although empirical research on the negative consequences of auditors' use of heuristics was recommended more than 30 years ago, this is one of the first empirical studies to provide such evidence. It is expected that the results of this research can have the following scientific achievement and value-added. First, the results of this research can lead to the development of theoretical foundations in the field of auditing, especially audit judgment and audit risk assessment. Second, the results of this study can provide additional knowledge about reducing auditors' use of exploratory and intuitive methods through additional training. Third, they can guide regulatory auditors and capital market regulators. Fourth, the research results can suggest new ideas for conducting new research in behavioral auditing and the impact of other psychological biases on auditors' judgment.

2. Theoretical Foundations and Review of Literature

2.1. Auditor's Confirmation Bias and Audit Quality

Psychological theories show that individuals use a variety of exploratory (intuitive) methods to reduce the complexity of judging and deciding on the probability of uncertain outcomes (Tversky & Kahneman, 1974). Previous empirical research in accounting provides extensive evidence that auditors are prone to using hedging methods throughout the audit process. For example, Kida (1984) investigated whether auditors' judgments are affected by the initial "framing" of a hypothesis. He provided participants with identical information about the viability of an audit client, asking some of the participants to estimate the likelihood that the client would "fail" and others to estimate the likelihood that the client would "remain viable." He found evidence that auditors provided with the "remain viable" frame were more likely to use information suggesting that the client would remain viable than auditors in the "fail" frame. Joyce and Biddle (1981) found that auditors' estimates of the prevalence of fraud are affected by meaningless anchors and that auditors fail to sufficiently adjust their estimates away from these anchors when given new information. Similarly, Kinney and Uecker (1982) found that auditors anchor on unaudited financial information when making judgments during analytical review and compliance testing.

Audit regulators and practitioners have long been aware of the potential negative effects of the use of heuristics on auditors' judgments. Auditing standards require auditors to maintain independence (PCAOB AS No. 1005) and exercise professional skepticism throughout the audit process (PCAOB AS No. 1015). Specifically, these standards require auditors to "be without bias" (PCAOB AS No. 1010, par 2:82), maintain an attitude that includes "a questioning mind

and a critical assessment of audit evidence" (PCAOB AS No. 1015, par 7:125-6), and objectively gather and evaluate audit evidence. However, recent anecdotal evidence indicates that auditors' use of heuristics continues to be a concern. For example, both KPMG (2011) and Fay and Montague (2015) urge auditors to guard against the potential negative effects of using heuristics. They identify the availability tendency, overconfidence, anchoring tendency, and confirmation bias as specific heuristics that auditors should be aware of.

We should emphasize that regulator and practitioner concerns about the effects of cognitive biases suggest that such biases (which originate at the individual level) can persist in affecting decisions made at the group (audit team) level. Psychology theories provide a number of explanations for this. Schulz-Hardt et al. (2000) argue that groups tend to accentuate the tendencies that dominate among their members. Stasser and Titus (1985) suggest that groups tend to focus their discussions on information that supports group members' existing preferences. Similarly, groupthink theory suggests that groups make suboptimal decisions because they are influenced by a strong desire to seek concurrence (Turner & Pratkanis, 1994). Consistent with this, Turner et al. (1992) suggest that individuals' preferences may influence groups in an effort to protect shared positive group identity.

The psychology literature also provides strong empirical evidence that confirmation bias persists in groups and that its effects are similar in group and individual settings (Gorman et al., 1984; Schulz-Hardt et al., 2000). Evidence of cognitive biases manifesting at the team/group level is documented in a variety of settings, including criminal prosecutions (Burke, 2007), forensic science (Cole, 2013; Kassin et al., 2013), and medical research (Cox & Popken, 2008). The key engagement audit team members are required to meet and discuss "the company's selection and application of accounting principles… and…the susceptibility of the company's financial statements to material misstatement due to error or fraud" (PCAOB AS No. 2110:115) as audit teams could be susceptible to the effects of confirmation bias.

More specific to our study, experimental research in accounting provides evidence consistent with auditors and other accountants being susceptible to the effects of confirmation bias. For example, Cloyd and Spilker (1999) found that tax professionals overestimate the level of support for a client's desired tax position and that this "confirmation bias" leads tax professionals to make overly aggressive tax recommendations. Specific to the auditing context, Church (1991) came to the conclusion that auditors strongly committed to a hypothesis place more importance on confirmatory relative to dis confirmatory evidence. McMillan and White (1993) maintained that auditors who begin an audit judgment process with the perception that material errors are unlikely are more likely to discount new evidence suggesting that material errors exist. Glover et al. (2000) investigated whether auditors' perception of management's incentives to misstate the financial statements affects the likelihood that the auditors will revise their preliminary audit plans after analytical procedures indicate significant, unexpected fluctuations. They found that when auditors believe that incentives to misstate are absent, they are less likely to revise the audit plan than when they believe that incentives to misstate are present.

Although Bedard and Johnstone (2004) provided field study evidence maintaining that auditors plan increased audit hours for clients with perceived earnings manipulation risk, other field studies and surveys of auditors have given in evidence suggesting that auditors rely heavily on prior-year audit programs when creating current year programs (i.e., that audit programs vary little over time). For example, Bedard (1989) surveyed audit seniors and found little variation in planned substantive audit tests from the previous year. Mock and Wright (1999) gathered data on risk assessments and evidential plans from audit workpapers and found little

evidence that audit programs are adjusted for risk. It is noteworthy that because auditors are specifically trained to practice professional skepticism, it is not obvious that auditors' judgment will be biased by their perception of risk from prior engagements (Cassell et al., 2021). Ashton and Ashton (1988) provided some support for this. They came to the conclusion that auditors revise their beliefs when they receive new evidence and that they revise their beliefs to a greater extent when the new evidence is disconfirming. In addition, Wright (1988) provided evidence that auditors that have access to client information from the prior year have higher overall audit performance than auditors that only have access to current year information. Nevertheless, most prior work suggests that auditors are susceptible to the use of heuristics, including confirmation bias, in making audit judgments.

It is noteworthy that practitioners continue to urge audit firms to guard against relying on audit procedures and programs from prior years and plan the audit using a risk-based approach (Gartland, 2017; Koziel, 2017), suggesting overreliance on prior audits is an ongoing concern.

Perera et al. (2020) investigated confirmation bias in the reporting judgments of accountants when applying International Financial Reporting Standards (IFRS) for small and medium-sized enterprises (SMEs). The results show that accountants' judgments are biased towards the recognition and measurement principles of full IFRS when applying IFRS for SMEs. The results also suggest that confirmation bias in judgments can be mitigated by increasing accountants' awareness of justification requirements and using appropriate decision aids. In a study, Chang and Luo (2021) showed that data visualization could trigger and/or aggravate the common cognitive biases in the audit. Such biases may adversely affect auditors' judgment and decision-making if not properly addressed.

In Iran, various studies have been conducted in the cognitive bias context. Hormozi et al. (2016) concluded that the psychological biases of overconfidence, reliance, and availability negatively affect auditors' professional skepticism, and the existence of these biases is the auditors' ability to apply an appropriate level of professional skepticism in reducing the audit process. Akbari Naftchali et al. (2017) found that experience in highly skilled auditors was able to moderate the effect of positive prediction. In another study, Khani and Sakeni (2020) investigated the effects of fraud-triangle decomposition on sensitivity and quality of auditor's fraud risk assessment based on Iranian Auditing Standard Number # 240. The results of covariance analysis showed that the use of the decomposed method leads to assessments of overall fraud risk, which is more sensitive to change in the level of fraud risk. In other words, using the decomposed method could increase the auditor's attention to a high level of fraud risk. However, when comparing the two methods, the fraud risk assessments with decomposed and holistic methods were not significantly different. In addition, the assessment of the sensitivity of situational risk (opportunities and incentives) to changes in the level of fraud risk was not significantly different when using decomposed and holistic methods. In addition, the results indicated that using decomposed and grouping methods could not increase fraud risk quality. Surprisingly, the auditor's judgment was more consistent with the experts' judgments in the holistic method. Arab Abadi et al. (2021) examined the relationship between cognitive style and auditor's judgment. Their findings supported the existence of the effects of the order of information (recency effect) during sequential processing of inconsistent evidence of a complex task, but the cognitive style did not reduce the bias of effect of the information order. Experimental results also show that auditors' judgment regarding continue as an ongoing concern follows the Schroeder, Driver, and Straffer Theory. Due to the complexity of this bias, abstract auditors process more information than objective auditors and have a broader range of beliefs. Karimi et al. (2022)

investigated the effect of auditors' individual psychological bias and personality dimensions on audit quality. The results showed a significant effect by psychological bias on the audit quality but not any significant effect on the audit quality. Mohammadzadeh Moghaddam et al. (2022) examined the effect of auditors' cognitive bias on the intellectual intelligence and style of the auditor. Their results indicated that auditors' cognitive biases significantly affect intellectual intelligence and auditor style.

Based on the foregoing discussion, we expect that confirmation bias is likely to contribute to adverse audit outcomes in situations where: 1) the auditor has prior experience with a client who has a historically stable risk profile, and 2) the client experiences a significant increase in their risk profile during the current year (Cassell et al., 2021). We posit that auditor-client relationships that satisfy both conditions are likely to be susceptible to the effects of confirmation bias because auditors are likely to develop a perception that a continuing client is low risk when they have a historically stable and low-risk profile. We assume that auditors of these clients are likely to search for and interpret current year information in ways that confirm their prior perceptions of the client as low risk. Accordingly, we expect that auditors' risk assessment in the current year will be too low (as evidenced by a higher likelihood of misstatement) for auditor-client relationships that satisfy both conditions. In other words, the auditor's confirmation bias is expected to have a negative impact on audit quality.

2.2. Factors That Reduce the Auditor's Confirmation Bias

In order to further investigate the effect of the auditor's confirmation bias on audit quality, specific factors related to the client and the auditor that can reduce the auditor's confirmation bias are discussed below.

2.2.1. Client Characteristics

In the present study, following Cassell et al. (2021), we considered two client characteristics (market value and institutional shareholder ownership) that we expected could mitigate the extent to which auditors are susceptible to confirmation bias. First, we assumed that auditors would be less susceptible to confirmation bias when the client is highly visible because the revelation of an audit failure for a highly visible client is likely to impair the reputation of the auditor to a greater degree than for less visible clients (Aobdia & Petacchi, 2017; Miller, 2006; Weber et al., 2008). As a proxy for high visibility, we created an indicator variable set equal to one if the client's market value of equity is in the top quartile of the sample and zero otherwise (*HIGH_MKT*).

Second, because strong external monitors are likely to demand higher financial reporting quality (Bushee, 1998; Hadani et al., 2011; Kane & Velury, 2004; Velury & Jenkins, 2006), we assumed that auditors would be less susceptible to confirmation bias when external monitoring is stronger. We made a proxy for external monitoring strength using institutional ownership and created an indicator variable set equal to one if the client's institutional ownership percentage is in the top quartile of the sample and zero otherwise (*HIGH_INST*). Accordingly, the high market value and the high institutional shareholder's ownership are expected to reduce the auditor confirmation bias and weaken the negative effect of the auditor confirmation bias on audit quality.

2.2.2. Auditor Characteristics

Auditor-specific factors can also reduce the auditor confirmation bias. We considered two

auditor characteristics (industry specialist auditor and first-class auditor) that we expected could mitigate the extent to which auditors are susceptible to confirmation bias. Both characteristics are motivated by the idea that confirmation bias will be less likely to manifest when the auditor has more training, expertise, and firm-level quality assurance mechanisms that are designed, at least in part, to mitigate cognitive biases such as confirmation bias (KPMG, 2011). Prior literature shows that industry specialists and Big Four auditors are associated with higher audit quality. These results are generally attributed, at least in part, to better training, technical expertise, and quality assurance (Balsam et al., 2003; Francis et al., 1999; Lennox & Pittman, 2010; Reichelt & Wang, 2010). Accordingly, the industry specialist auditor and the first-class auditor are expected to reduce the auditor confirmation bias and weaken the negative effect of the auditor confirmation bias on audit quality.

3. Research Hypotheses

Based on the foregoing discussions, the following hypotheses are proposed:

H1: The auditor confirmation bias has a negative effect on audit quality.

H2: The client-specific characteristics moderate the effect of confirmation bias on audit quality.

H3: The auditor-specific characteristics moderate the effect of confirmation bias on audit quality.

4. Research Methodology

The statistical population of the present study was comprised of the companies listed on the Tehran Stock Exchange. The research period was between the years 2012 to 2020. To measure some variables (such as the financial misstatements risk, sales volatility, and operating cash flow volatility), information from 2009 to 2011 were used, too.

In the present study, to determine the statistical sample, the systematic targeting method was used, the criteria of which are as follows:

1. The company's fiscal year should end at the end of March of each year, and the company should not have changed the fiscal year during the period under review.

2. Companies should not be part of investment companies, holding companies, leasing companies, credit institutions, or banks.

3. Their information and data should be available.

Due to the mentioned limitations, the statistical sample of the present study included 146 companies (1134 firm-year). It should be noted that following Cassell et al. (2021), we employed separate samples to mitigate concerns that our results would be attributable to two potential confounding factors. We adopted the same auditor sample to mitigate concerns that our results would be attributable to the unique characteristics of new auditor-client relationships. We used the risk increase sample to reduce concerns that our results could be attributable to a mechanical relation between actual misstatement risk and financial statement misstatements. Although using two separate samples provides important identification advantages, it also has a potential cost. Specifically, this approach only allowed us to investigate whether the effects of confirmation bias were *worse* when a second condition was imposed on a sample restricted to observations with the other condition. Therefore, assuming that the company's independent auditor was the same in three consecutive years, the same auditor sample included 671 firm-year and assuming that the risk of this year had increased, the risk increase sample consisted of 226 firm-year. It is worth mentioning that the data were

collected from the audited financial statements of Stock Exchange firms at the Codal Website and available information in Official Accountants and Stock Exchange Organization websites.

5. Research Models and Variables

The following models are used in this study to test research hypotheses based on the models used in previous research (i.e., Cassell et al., 2021; Mohammad Rezaei et al., 2016; Mohammad Rezaei & Golchehreh, 2017) and according to the Iranian capital market environment:

H1 test model:

$$(RESTATE_{it} \text{ or } ABSDAC_{it}) = \beta_0 + \beta_1(RISK\_INC \text{ or } SAME\_AU)_{it} + \beta_2 F\_SCORE_{it} + \beta_3 SIZE_{it} + \beta_4 AGE_{it} + \beta_5 ROA_{it} + \beta_6 INVT_{it} + \beta_7 RECT_{it} + \beta_8 ISSUE_{it} + \beta_9 MTB_{it} + \beta_{10} SALESGROWTH_{it} + \beta_{11} LOSS_{it} + \beta_{12} CFO_{it} + \beta_{13} CFOVOL_{it} + \beta_{14} SALEVOL_{it} + \beta_{15} LEV_{it} + \beta_{16} MATWEAK_{it} + \beta_{17} SPECIALIST_{it} + \beta_{18} TENURE_{it} + \beta_{19} 25TOP_{it} + \sum \beta_i IndustryDum + \sum \beta_k YearDum + \varepsilon_{it} \quad (1)$$

H2 test model:

$$(RESTATE_{it} \text{ or } ABSDAC_{it}) = \beta_0 + \beta_1(RISK\_INC \text{ or } SAME\_AU)_{it} + \beta_2(HIGH\_MKT \text{ or } HIGH\_INST)_{it} + \beta_3(RISK\_INC \text{ or } SAME\_AU)_{it} * (HIGH\_MKT \text{ or } HIGH\_INST)_{it} + \beta_4 F\_SCORE_{it} + \beta_5 SIZE_{it} + \beta_6 AGE_{it} + \beta_7 ROA_{it} + \beta_8 INVT_{it} + \beta_9 RECT_{it} + \beta_{10} ISSUE_{it} + \beta_{11} MTB_{it} + \beta_{12} SALESGROWTH_{it} + \beta_{13} LOSS_{it} + \beta_{14} CFO_{it} + \beta_{15} CFOVOL_{it} + \beta_{16} SALEVOL_{it} + \beta_{17} LEV_{it} + \beta_{18} MATWEAK_{it} + \beta_{19} SPECIALIST_{it} + \beta_{20} TENURE_{it} + \beta_{21} 25TOP_{it} + \sum \beta_j IndustryDum + \sum \beta_k YearDum + \varepsilon_{it} \quad (2)$$

H3 test model:

$$(RESTATE_{it} \text{ or } ABSDAC_{it}) = \beta_0 + \beta_1(RISK\_INC \text{ or } SAME\_AU)_{it} + \beta_2(HIGH\_MKT \text{ or } HIGH\_INST)_{it} + \beta_3(RISK\_INC \text{ or } SAME\_AU)_{it} * (HIGH\_MKT \text{ or } HIGH\_INST)_{it} + \beta_4 F\_SCORE_{it} + \beta_5 SIZE_{it} + \beta_6 AGE_{it} + \beta_7 ROA_{it} + \beta_8 INVT_{it} + \beta_9 RECT_{it} + \beta_{10} ISSUE_{it} + \beta_{11} MTB_{it} + \beta_{12} SALESGROWTH_{it} + \beta_{13} LOSS_{it} + \beta_{14} CFO_{it} + \beta_{15} CFOVOL_{it} + \beta_{16} SALEVOL_{it} + \beta_{17} LEV_{it} + \beta_{18} MATWEAK_{it} + \beta_{19} SPECIALIST_{it} + \beta_{20} TENURE_{it} + \beta_{21} 25TOP_{it} + \sum \beta_j IndustryDum + \sum \beta_k YearDum + \varepsilon_{it} \quad (3)$$

The variables used in the above models are defined as follows:

Dependent variables:

RESTATE: Financial Restatement. We used the financial restatement index to indicate the appropriateness of the auditor's understanding of risk. Financial Restatement is an indicator variable set equal to one if the client subsequently restates the current year financial statements, and zero otherwise.

ABSDAC: Absolute value of performance adjusted discretionary accruals following Kothari et al. (2005), which is as follows:

$$TAC_{it} = \alpha_0 + \alpha_1 (\Delta REV_{it} - \Delta AR_{it}) + \alpha_2 PPE_{it} + \alpha_3 ROA_{it-1} + \varepsilon_{it} \quad (4)$$

Where

TAC: Total accruals measured by the difference between operating earnings and operating cash flow;

ΔREV: Change in the sales revenue of the current year compared to the previous year;

ΔAR: Change in receivable accounts in the current year compared to the previous year;

PPE: Sum of property, plant, and equipment; and

ROA: Net earnings for the previous year

All variables in Equation (4) were divided by the company's total assets in the previous year. It should be noted that to control the specific characteristics of each industry and control the effects of the year, the relationship (4) was estimated separately for each industry-year.

Independent Variables:

In the present study, following Cassell et al. (2021), the two indicators, RISK_INC and SAME_AU, were used to measure the auditor's confirmation bias variable. RISK_INC: The current year's risk increase index is an indicator variable set equal to one if a client has an F-score below one in years t-2 and t-1 and an F-score above one in year t, and zero otherwise.

SAME_AU: The same Independent Auditor Index is an indicator variable set equal to one if a client engages the same audit firm during years t-2 through t, and zero otherwise.

F_SCORE: The index developed by Dechow et al. (2011) that measures the financial misstatements risk as follows:

$$Predicted\ Value = -7.893 + 0.790\times(rsst\_acc) + 2.518\times(ch\_rec) + 1.191\times(ch\_inv) + 1.979\times(soft\_assets) + 0.171\times(ch\_cs) - 0.932\times(ch\_roa) + 1.029\times(issue) \quad (5)$$

Where,

rsst_acc equals (Δfin + Δwc + Δnco) divided by the average of total assets. wc equals current assets minus cash and short-term investments minus current liabilities;

nco equals total assets minus current assets minus investors minus total liabilities minus current and long-term debt. fin equals short-term investment plus long-term investment minus total long-term debt, current debt, and preferred stock;

ch_rec equals the change in accounts receivable during the current period divided by the average assets;

ch_inv equals the change in inventories over the current period divided by the average assets;

soft_assets is equal to total assets to the deduction of property, plant, and equipment and cash, and its equivalent divided by total assets;

ch_cs equals the percentage change in cash sales, calculated by selling the current period minus the change in accounts receivable;

ch_roa is equal to the change in the return on assets, which is obtained by dividing the net profit by the average of the assets; and

the issue is an indicator variable assigned for a company that has issued bonds or securities; otherwise, it is zero.

To calculate F_SCORE, the forecast probability is obtained by dividing $e^{PV} / (1 + e^{PV})$ by the unconditional probability of misstatement of financial statements (0.0037), where PV is the predicted value obtained from Equation (5).

5.1. Moderating variables:

HIGH_MKT: Indicator variable is set equal to one if the client's market equity value is in the top quartile of the sample distribution and zero otherwise.

HIGH_INST: Indicator variable is set equal to one if the client's institutional ownership percentage is in the top quartile of the sample distribution, and zero otherwise.

SPECIALIST: Industry specialist auditor indicator variable is set equal to one if the client's auditor audits more than 33 percent of the current year total revenue in the client's industry, and zero otherwise. It should be noted that this variable is considered as a moderator variable in Eq. (3).

TOP25: First-class auditor indicator variable is set equal to one if the auditor is one of the 25 trusted private audit firms of the Exchange and Securities Organization belonging to the "first" class, and zero otherwise. It should be noted that this variable is considered as a moderator variable in Eq. (3).

5.2. Control variables:

F_SCORE: The financial misstatements risk. In order to measure this variable, the index developed by Dechow et al. (2011) is used as defined above.

SIZE: Natural log of total assets;

AGE: Natural log of the number of years of company establishment until the current year;

ROA: Net earnings divided by total assets;

INVT: Total inventory divided by total assets;

RECT: Total receivable accounts divided by total assets;

ISSUE: Capital increase indicator variable. If the company has increased capital, one is assigned; otherwise, it is zero.

MTB: The ratio of market value to book value. It is measured by dividing the market value of equity by the book value of equity.

SALESGRWOTH: Sales growth is achieved by dividing the difference between this year's sales and the previous year by last year's sales.

LOSS: Loss indicator variable. If the company reports a loss, number one is assigned; otherwise, it is zero.

CFO: Operating cash flow. It is measured by dividing operating cash flow by net assets over total assets.

CFOVOL: Operating cash flow volatility. It is measured by the standard deviation of the operating cash flow ratio to total assets over the previous three years to the current year.

SALEVOL: Sales volatility is measured by the standard deviation of sales to total assets ratio over the previous three years to the current year.

LEV: Financial leverage is measured by dividing total debt by total assets.

MATWEAK: The indicator variable of material weakness in internal control is set equal to one if the client has one or more material weaknesses in internal control identified by the auditor, and zero otherwise.

SPECIALIST: Defined above. It should be noted that this variable is considered as a control variable in Eq. (1) and Eq. (2).

TENURE: The auditor's tenure represents the number of consecutive years the client has engaged the auditor. Prior literature often uses an indicator variable for short auditor tenure (e.g., three years or less) rather than a count of auditor tenure as a control. We use a count version in order to avoid confounding effects with *SAME_AU*. Nonetheless, if we replace the continuous tenure measure with a short tenure indicator variable in the same auditor sample, our inferences are unchanged. Note that we cannot do this in this risk increase sample because *SAME_AU* and short tenure are perfectly collinear in this sample;

TOP25: Defined above. It should be noted that this variable is considered as a control variable in Eq. (1) and Eq. (2);

IndustryDum: Indicator variables for each industry; and

YearDum: Indicator variables for each fiscal year.

6. Empirical Results

6.1. Descriptive Statistics

Descriptive statistics of the observations used in the research are presented in Table 1. According to panel A of Table 1, the average absolute value of discretionary accruals is 11.4%, which is consistent with the descriptive statistics of previous studies such as Mohammad Rezaei and Mohammad Rezaei (2015) and Zeghal et al. (2011), which were in turn based on the model proposed by Kothari et al. (2005). The average variable of firm size (natural log of total assets) is 14.541, which is consistent with the studies by Mohammad Rezaei and Mohammad Rezaei (2015), Mohammad Rezaei and Golchehreh (2018), and Akhgar and Dadejani (2015). The average ROA in the sample is 12.9%, and the average financial leverage is 56.1%, which indicate that 56.1% of the assets of the surveyed companies are financed through debt. These results are consistent with the study Mohammad Rezaei et al. (2016), and Moayedi and Aminfard (2012). The average inventory ratio is 23.6%, and the average ratio of accounts

receivable is 28.6%, which indicate that 23.6% of corporate assets are inventory and 28.6% of corporate assets are receivables.

Table 1. Descriptive Statistics of Research Variables

Panel A: Dependent variables

Variable	N	Mean	Median	Maximum	Minimum	Std. Dev.
ABSDAC	1314	0.114	0.079	0.378	0.007	0.103
F_SCORE	1314	1.070	0.750	4.999	0.022	1.283
SIZE	1314	14.541	14.386	17.601	12.357	1.344
AGE	1314	3.657	3.761	4.234	2.639	0.347
ROA	1314	0.129	0.103	0.418	-0.065	0.131
INVT	1314	0.236	0.218	0.526	0.045	0.133
RECT	1314	0.286	0.260	0.636	0.045	0.168
MTB	1314	4.290	2.587	16.408	0.814	4.112
SALESGRWOTH	1314	0.318	0.253	1.222	-0.278	0.399
CFO	1314	0.108	0.092	0.355	-0.078	0.115
CFOVOL	1314	0.082	0.070	0.203	0.016	0.052
SALEVOL	1314	0.159	0.122	0.479	0.027	0.122
LEV	1314	0.561	0.573	0.897	0.175	0.202
TENURE	1314	4.013	3	14	1	4.198

Panel B: T-test in firms with the restatement and non-restatement financial statements

Variable	Restatement (N=716)	Non-restatement (N=598)	t-statistic
ABSDAC	0.1322	0.0994	5.744***
F_SCORE	1.2336	0.9342	4.241***
SIZE	14.2857	14.8461	-7.693***
AGE	3.6363	3.6823	-2.394**
ROA	0.1036	0.1609	-7.965***
INVT	0.2434	0.2297	1.861*
RECT	0.2892	02836	0.597
MTB	5.8403	2.9958	12.679***
SALESGRWOTH	0.4178	0.2349	8.383***
CFO	0.0728	0.1508	-7.131***
CFOVOL	0.0838	0.0797	1.436
SALEVOL	0.1640	0.1562	1.157
LEV	0.5836	0.5332	4.258***
TENURE	4.6455	3.4846	4.920***

Panel C: Chi-Square test in firms with restatement and non-restatement

Variable	Restatement (N=716)	Non-restatement (N=598)	Chi-square statistic
RISK_INC	121	105	25.093***
SAME_AU	342	329	16.477***
SPECIALIST	429	454	37.862***
TOP25	233	243	3.996**
ISSUE	179	167	1.439
LOSS	90	50	6.063**
MATWEAK	305	178	23.080***

RESTATE: financial restatement; ABSDAC: the absolute value of discretionary accruals; RSIK-INC: risk growth in the current year; SAME-AU: similar independent auditor; SPECIALIST: industry specialist auditor; TOP25: first-class auditor; FSCORE: financial restatement risk; SIZE: firm size; AGE: firm age; ROA: return on assets; INVT: inventory ratio; RECT: accounts receivable ratio; ISSUE: capital increase; MTB: market value to book value ratio; SALESGROWTH: sales growth; LOSS: firm loss; CFO: operational cash flow; CFOVOL: operational cash flow volatility; SALEVOL: sales volatility; LEV: financial leverage; MATWEAK: material internal control weakness; TENURE: auditor tenure

***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

1. We winsorize all continuous variables at the 1st and 99th percentiles to reduce the effect of outliers, and we cluster standard errors by the client.

According to panel B of Table 1, the results of the t-test show that at 95% confidence level, the average absolute values for discretionary accruals, the risk of misrepresentation of financial statements, the ratio of market value to book value, sales growth, financial leverage, and auditor tenure in companies with restatement financial statements are more and

significantly different compared to the values of the companies without restatement financial statements. On the other hand, the average variables of firm size, firm life, return on assets, and operating cash flow ratio in companies with financial restatements are less and significantly different from the values of the companies without financial restatement.

According to Panel C, the results of the Chi-square test show that at the 95% confidence level, the frequency of risk increase of the current year, the same independent auditor, the loss of the company, and internal control material weakness in companies with conducted restatements are higher compared to companies without restatement, and the difference is significant. However, the frequency of industry specialist auditors and first-class auditors in companies with financial restatement is less and significantly different from those without financial restatement.

6.2. Results of Hypothesis Testing

In this paper, two criteria of financial restatement and absolute value of discretionary accruals are used to measure audit quality. In this regard, the presented results in Tables 2 and 3 are used for testing H1. In each table, the study model is estimated in two sub-samples once assuming that the firms' independent auditor is the same (in three consecutive years) and once by assuming risk increase in the current year. The desired variables for testing H1 in each model are estimated coefficients of RISK-INC and SAME-AU.

As shown in Table 2, assuming the same independent auditor (model 1), the coefficient of RISK_INC is 0.728, which indicates the positive and significant effect of the auditor confirmation bias on the financial restatement. By assuming the risk increase of the current year (model 2), the results also show that the auditor confirmation bias influenced the financial restatement positively and significantly.

Table 2. The Results of H1 Testing- Auditor Confirmation Bias and Financial Restatement

Variable	Model (1)		Model (2)	
	SAME_AU=1 Dependent variable: Restatement		RISK_INC=1 Dependent variable: Restatement	
	Coefficient	**Z-statistic**	**Coefficient**	**Z-statistic**
C	-3.442*	-1.936	-6.717	-1.518
RISK_INC	**0.728****	**2.301**		
SAME_AU			**0.541****	**2.308**
F_SCORE	0.664**	2.047	0.458**	2.384
SIZE	-0.140**	-2.360	-0.276	-1.209
AGE	-0.619***	-2.862	-1.725***	-2.925
ROA	-3.086***	-2.876	-7.508**	-2.227
INVT	0.175	0.257	0.739	0.381
RECT	0.323	0.546	1.474	0.834
ISSUE	-0.005	-0.034	0.338	0.743
MTB	0.008	0.240	0.045	0.644
SALESGRWOTH	1.718***	3.138	1.581***	2.610
LOSS	0.720***	2.962	0.776***	2.889
CFO	-2.042**	-2.377	-1.994***	-3.657
CFOVOL	0.751	0.523	10.136**	2.147
SALEVOL	1.019	1.521	1.673	0.863
LEV	1.747***	4.217	1.897***	3.642
MATWEAK	0.802***	3.169	0.504**	2.358
SPECIALIST	-1.114***	-3.221	-0.778***	-3.423
TENURE	0.100***	3.940	0.167*	1.786
TOP25	-1.018***	-2.606	-0.863***	-4.872
Industry fixed effects	Included		Included	
Year fixed effects	Included		Included	
McFadden R-squared	0.346		0.401	
LR statistic	321.866***		125.088***	

***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

As shown in Table 3, assuming the same independent auditor (model 1), the coefficient of RISK_INC is 0.250, which indicates the positive and significant effect of the confirmation bias of the auditor on the absolute value of discretionary accruals. Assuming the risk increase of the current year (model 2), the results also show that the auditor confirmation bias influenced the absolute value of discretionary accruals positively and significantly.

Table 3. The Results of H1 Testing- Auditor Confirmation Bias and Discretionary Accruals

Variable	Model (1) SAME_AU=1 Dependent variable: Discretionary accruals		Model (2) RISK_INC=1 Dependent variable: Discretionary accruals	
	Coefficient	**T-statistic**	**Coefficient**	**T-statistic**
C	0.071	1.139	0.062	0.423
RISK_INC	**0.250*****	**3.357**		
SAME_AU			**0.295*****	**3.645**
F_SCORE	0.262***	3.883	0.122**	2.073
SIZE	-0.051***	-5.627	-0.071**	-3.014
AGE	0.004	0.495	0.020	0.937
ROA	-0.247***	-5.301	-0.209**	-2.552
INVT	0.030	1.097	0.058	0.901
RECT	0.235***	2.901	0.054*	1.966
ISSUE	0.002	0.269	0.025	1.363
MTB	0.002	1.620	0.001	0.044
SALESGRWOTH	0.034***	4.078	0.054**	4.640
LOSS	0.013	1.489	0.004	0.305
CFO	-0.142***	-3.158	-0.465*	-1.792
CFOVOL	0.653***	12.190	0.867***	5.504
SALEVOL	0.024	0.867	0.065	0.812
LEV	-0.058***	-2.711	-0.056***	-5.600
MATWEAK	0.187***	2.859	0.268***	2.720
SPECIALIST	-0.232***	-2.904	-0.306***	-3.638
TENURE	0.030	1.301	0.049	0.695
TOP25	-0.220***	-3.296	-0.397***	-3.770
Industry fixed effects	Included		Included	
Year fixed effects	Included		Included	
Adjusted R-squared	0.298		0.272	
Durbin-Watson statistic	1.779		1.889	
F-statistic	13.369***		7.343***	

***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

6.3. An Additional Test of H1

In our main analyses (Tables 2 and 3), we used separate samples to mitigate concerns that our results were attributable to two potential confounding factors. We employed the same auditor sample to mitigate concerns that our results were attributable to the unique characteristics of new auditor-client relationships. We adopted the risk increase sample to reduce concerns that our results were attributable to a mechanical relation between actual misstatement risk and financial statement misstatements. Although using two separate samples provides important identification advantages, it also has a potential cost. Specifically, this approach only allows us to investigate whether the effects of confirmation bias are *worse* when a second condition is imposed on a sample restricted to observations with the other condition (Cassell et al., 2018).

An alternative way to test H1 is to use a sample of all available observations, where the full sample includes observations that fail both conditions for susceptibility to confirmation bias.

This approach allows us to investigate whether confirmation bias susceptibility conditions individually affect audit quality or it is the joint presence of the two factors that drive the observed effect.

As shown in Table 4, the desired variable for testing H1 in each estimated model of the estimated coefficient is the interactive variable of RISK_INC*SAME_AU. In model (1), the estimated coefficient of the interactive variable is 0.433, which is significant at 95% of confidence level. This is indicative of the positive and significant effect of auditor's confirmation bias on the financial restatement. The results of model (2) also show that auditor's confirmation bias has a positive and significant effect on the absolute value of discretionary accruals.

Table 4. The Results of H1 Testing-Pooled Sample with Interaction

Variable	Model (1) SAME_AU=1 Dependent variable: Restatement		Model (2) RISK_INC=1 Dependent variable: Discretionary accruals	
	Coefficient	**z-statistic**	**Coefficient**	**T-statistic**
C	-3.379*	-1.925	0.069	1.118
RISK_INC	**0.887****	**2.267**	**0.140****	**2.360**
SAME_AU	**0.774*****	**3.904**	**0.213*****	**2.746**
RISK_INC*SAME_AU	**0.433****	**2.401**	**0.274*****	**3.798**
F_SCORE	0.682***	2.609	0.229***	2.957
SIZE	-0.143***	-3.171	-0.048***	-5.560
AGE	-0.618***	-2.850	0.004	0.498
ROA	-3.179***	-2.953	-0.248****	-5.313
INVT	0.157	0.230	0.030	1.106
RECT	0.316	0.532	0.235****	2.934
ISSUE	-0.005	-0.032	0.001	0.257
MTB	0.007	0.203	0.002	1.577
SALESGRWOTH	1.695***	2.773	0.035***	4.120
LOSS	0.783**	2.295	0.013	1.482
CFO	-1.890**	-2.049	-0.143***	-3.171
CFOVOL	0.686	0.475	0.653***	12.189
SALEVOL	1.009	1.505	0.024	0.864
LEV	1.934***	3.972	-0.059***	-2.724
MATWEAK	0.889**	2.451	0.182***	2.704
SPECIALIST	-1.469***	-3.447	-0.269***	-4.002
TENURE	0.098***	4.703	0.025	1.403
TOP25	-1.063***	-2.600	-0.229***	-2.957
Industry fixed effects	Included		Included	
Year fixed effects	Included		Included	
McFadden R-squared	0.296			
Adjusted R-squared			0.298	
Durbin-Watson statistic			1.779	
LR statistic	535.486***			
F-statistic			13.379***	

***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

The results presented in Tables 5 and 6 are used for testing H2. In each table, research model estimation in the following two samples is carried out once by assuming the same independent auditor (in three consecutive years) and once by assuming the risk increase in the current year. The desired variable for testing H1 in each estimated model is the coefficient of the interactive effect of RISK_INC or SAME_AU with variables of HIGH_MKT or HIGH_INST.

As can be seen in Table 5, assuming the same independent auditor (model 1), the estimated coefficient of the interactive variable of RISK_INC*HIGH_MKT is -0.1423, which is indicative of the negative and significant effect of high firm market value on the relationship between auditor's confirmation bias and financial restatement. In sum, the results of Table 5 show that high firm market value and high shareholders' institutional ownership undermine the positive effect of auditor's confirmation bias on the financial restatement. In other words, high firm market value and institutional shareholders' ownership cause the weakening of the negative effect of auditor's confirmation bias on the audit quality.

Table 5. The Results of H2 – Interactive Effect of Auditor Confirmation Bias With Client Characteristics and Financial Restatement

Variable	Model 1		Model 2		Model 3		Model 4	
	Market Value				Institutional Ownership			
	SAME_AU=1 Dependent variable: Restatement		RISK_INC=1 Dependent variable: Restatement		SAME_AU=1 Dependent variable: Restatement		RISK_INC=1 Dependent variable: Restatement	
	Coefficient	Z-statistic	Coefficient	Z-statistic	Coefficient	Z-statistic	Coefficient	Z-statistic
C	-3.387*	-1.927	-3.450*	-1.935	-3.424*	-1.951	-3.579**	-2.007
RISK_INC	**0.581****	**2.102**			**0.564*****	**2.771**		
SAME_AU			**0.528****	**2.524**			**0.468****	**2.242**
HIGH_MKT	-1.755***	-2.644	-1.584***	-3.431				
HIGH_INST					-1.197***	-2.909	-1.556***	-3.337
RISK_INC*HIGH_MKT	**-1.423*****	**-2.821**						
RISK_INC*HIGH_INST					**-1.536*****	**-2.614**		
SAME_AU*HIGH_MKT			**-1.199*****	**-2.619**				
SAME_AU*HIGH_INST							**-1.433****	**-2.536**
F_SCORE	0.675**	2.054	0.451**	2.027	0.605**	2.514	0.379**	2.144
SIZE	-0.175**	-2.033	-0.176**	-2.110	-0.168**	-2.514	-0.181**	-2.115
AGE	-0.615***	-2.833	-0.621***	-2.864	-0.600***	-2.740	-0.612***	-2.790
ROA	-3.184***	-2.956	-3.038***	-2.830	-3.145***	-2.907	-2.946***	-2.731
INVT	0.158	0.232	0.154	0.226	0.134	0.197	0.109	0.161
RECT	0.315	0.531	0.300	0.505	0.293	0.491	0.383	0.645
ISSUE	-0.007	-0.043	-0.009	-0.055	-0.003	-0.020	-0.008	-0.050
MTB	0.005	0.124	0.005	0.122	0.009	0.246	0.009	0.249
SALESGRWOTH	1.652***	3.384	1.734***	3.253	1.619***	3.414	1.678***	3.568
LOSS	0.676***	2.947	0.670***	3.115	0.494**	2.446	0.488**	2.466
CFO	-1.591**	-2.107	-1.511***	-2.907	-1.583***	-3.400	-1.214***	-2.683
CFOVOL	0.683	0.473	0.729	0.508	0.655	0.453	0.638	0.443
SALEVOL	1.000	1.489	1.030	1.533	1.027	1.522	1.070	1.589
LEV	1.868***	3.226	1.810***	3.326	1.778**	2.472	1.697***	2.699
MATWEAK	0.945***	2.789	0.821***	4.072	0.936***	4.009	0.831***	3.604
SPECIALIST	-1.444***	-3.350	-1.109***	-3.734	-1.191***	-2.612	-0.801***	-3.542
TENURE	0.098***	4.709	0.100***	3.939	0.097***	4.663	0.103***	4.031
TOP25	-0.990***	-3.676	-0.864***	-3.016	-1.012***	-3.261	-0.831***	-4.604
Industry fixed effects	Included		Included		Included		Included	
Year fixed effects	Included		Included		Included		Included	
McFadden R-squared	0.346		0.402		0.347		0.408	
LR statistic	322.034***		125.532***		322.630***		127.556***	

***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

As can be seen in Table 6, assuming the same independent auditor (model 1), the estimated coefficient of the interactive variable of RISK_INC*HIGH_MKT is -0.088, which is indicative of the negative and significant effect of high firm market value on the positive relationship between auditor's confirmation bias and the absolute value of discretionary accruals. In sum, the results of Table 6 show that high firm market value and high shareholders' institutional ownership undermine the positive effect of auditor's confirmation bias on the absolute value of discretionary accruals. In other words, high firm market value

and institutional shareholders' ownership cause the weakening of the negative effect of auditor's confirmation bias on the audit quality.

Table 6. The Results of H2 – Interactive Effect of Auditor Confirmation Bias With Client Characteristics and Discretionary Accruals

Variable	Model 1		Model 2		Model 3		Model 4	
	Market Value				Institutional Ownership			
	SAME_AU=1 Dependent variable: Discretionary accruals		RISK_INC=1 Dependent variable: Discretionary accruals		SAME_AU=1 Dependent variable: Discretionary accruals		RISK_INC=1 Dependent variable: Discretionary accruals	
	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic
C	0.067	1.088	0.067	1.074	0.066	1.075	0.066	1.051
RISK_INC	**0.095*** **	**3.148**			**0.059*** **	**3.132**		
SAME_AU			**0.094*** **	**3.568**			**0.091*** **	**3.621**
HIGH_MKT	-0.069**	-2.231	-0.076**	-2.310				
HIGH_INST					-0.062**	-1.974	-0.076**	-2.232
RISK_INC*HIGH_MKT	**-0.088*** **	**-2.858**						
RISK_INC*HIGH_INST					**-0.051*** **	**-2.632**		
SAME_AU*HIGH_MKT			**-0.066** **	**-2.409**				
SAME_AU*HIGH_INST							**-0.062*** **	**-3.089**
F_SCORE	0.120***	4.993	0.103**	4.428	0.107***	4.627	0.111***	4.322
SIZE	-0.051***	-5.263	-0.048**	-1.981	-0.062***	-2.599	-0.046**	-1.981
AGE	0.004	0.508	0.004	0.480	0.003	0.357	0.003	0.359
ROA	-0.245***	-5.157	-0.244***	-5.177	-0.251***	-5.318	-0.252***	-5.343
INVT	0.030	1.094	0.029	1.064	0.029	1.046	0.028	1.001
RECT	0.162**	2.254	0.154***	4.609	0.158***	2.874	0.132***	3.160
ISSUE	0.002	0.283	0.001	0.263	0.002	0.299	0.002	0.354
MTB	0.003**	1.986	0.003*	1.924	0.001	1.493	0.002	1.573
SALESGRWOTH	0.035***	4.108	0.034***	4.054	0.034***	4.109	0.033***	3.962
LOSS	0.012	1.403	0.012	1.407	0.012	1.461	0.012	1.458
CFO	-0.080**	-2.367	-0.075**	-2.267	-0.082***	-4.397	-0.088***	-2.625
CFOVOL	0.652***	12.071	0.652***	12.142	0.650***	12.162	0.648***	12.070
SALEVOL	0.023	0.855	0.023	0.843	0.025	0.901	0.026	0.936
LEV	-0.058***	-2.652	-0.057***	-2.640	-0.060***	-2.765	-0.063***	-2.877
MATWEAK	0.176**	2.448	0.128**	2.511	0.115***	3.146	0.183**	2.399
SPECIALIST	-0.259***	-2.815	-0.212***	-3.247	-0.252***	-4.035	-0.209***	-3.448
TENURE	0.001	0.928	0.001	0.650	0.001	0.884	0.001	0.621
TOP25	-0.162**	-2.254	-0.183**	-2.399	-0.160***	-5.443	-0.116**	-2.211
Industry fixed effects	Included		Included		Included		Included	
Year fixed effects	Included		Included		Included		Included	
Adjusted R-squared	0.329		0.269		0.323		0.273	
Durbin-Watson statistic	1.732		1.822		1.746		1.840	
F-statistic	7.989***		7.271***		7.813***		7.297***	

***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

Statistically, the results of H3 are also similar to that of H2. As can be seen in Table 7, assuming the same independent auditor (model 1), the estimated coefficient of the interactive variable of RISK_INC*SPECIALIST is -1.772, which is indicative of the negative and significant effect of Industry specialist auditor on the positive relationship between auditor's confirmation bias and financial restatement. In sum, the results of Table 7 show that industry specialist auditors and first-class auditors undermine the positive effect of auditor's confirmation bias on the financial restatement. In other words, the industry specialist auditors and first-class auditors cause the weakening of the negative effect of auditor's confirmation bias on the audit quality.

Table 7. The Results of H3 –Interactive Effect of Auditor Confirmation Bias With Auditor Characteristics and Financial Restatement

Variable	Model 1		Model 2		Model 3		Model 4	
	Industry specialist auditor				First-class auditor			
	SAME_AU=1 Dependent variable: Restatement		RISK_INC=1 Dependent variable: Restatement		SAME_AU=1 Dependent variable: Restatement		RISK_INC=1 Dependent variable: Restatement	
	Coefficient	Z-statistic	Coefficient	Z-statistic	Coefficient	Z-statistic	Coefficient	Z-statistic
C	-2.378	-0.931	-7.070	-1.580	-2.347	-0.934	-7.022	-1.597
RISK_INC	**0.463****	**2.291**			**0.483*****	**2.656**		
SAME_AU			**0.882****	**1.998**			**1.358****	**2.058**
SPECIALIST	-0.965***	-3.323	-1.376***	-2.852				
TOP25					-0.921**	-2.380	-1.439**	-2.050
RISK_INC*SPECIALIST	**-1.772****	**-2.510**						
RISK_INC*TOP25					**-1.837*****	**-3.014**		
SAME_AU*SPECIALIST			**-1.508*****	**-3.530**				
SAME_AU*TOP25							**-1.867****	**-1.963**
F_SCORE	0.502***	5.118	0.535***	3.559	0.418***	2.973	0.598**	2.013
SIZE	-0.122**	-1.972	-0.192**	-2.423	-0.259***	-3.948	-0.209***	-3.062
AGE	-0.661*	-1.950	-1.828***	-3.015	-0.473	-1.400	-1.842***	-3.092
ROA	-3.720**	-2.266	-7.563**	-2.208	-3.660**	-2.249	-7.090**	-2.019
INVT	0.701	0.644	0.556	0.285	0.733	0.679	0.618	0.319
RECT	1.219	1.320	1.372	0.775	1.228	1.334	1.758	0.941
ISSUE	-0.022	-0.095	-0.453	-0.968	-0.007	-0.030	-0.341	-0.727
MTB	0.019	0.381	0.045	0.648	0.018	0.362	0.056	0.797
SALESGRWOTH	1.871**	2.367	1.807**	1.992	1.633***	2.638	1.525*	1.909
LOSS	0.476***	2.776	0.562	0.789	0.620**	2.041	0.629	0.823
CFO	-2.007*	-1.802	-0.704	-0.290	-2.087*	-1.871	-0.575	-0.237
CFOVOL	3.873*	1.865	9.380**	2.021	3.861*	1.849	10.413**	2.122
SALEVOL	2.653***	2.651	1.065	0.545	2.681***	2.697	1.754	0.944
LEV	1.688*	1.824	1.298***	2.818	1.121***	2.681	1.118***	2.676
MATWEAK	0.977***	3.737	0.980**	2.388	0.995***	3.843	0.624	1.305
TENURE	0.127***	4.209	0.188**	2.050	0.119***	3.857	0.225**	2.399
Industry Fixed Effects	Included		Included		Included		Included	
Year Fixed Effects	Included		Included		Included		Included	
McFadden R-squared	0.346		0.397		0.346		0.414	
LR statistic	322.143***		123.991***		321.785***		129.144***	

***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

As can be seen in Table 8, assuming the same independent auditor (model 1), the estimated coefficient of the interactive variable of RISK_INC*SPECIALIST is -1.772, which is indicative of the negative and significant effect of industry specialist auditor on the positive relationship between auditor's confirmation bias and the absolute value of discretionary accruals. In sum, the results of Table 8 show that the industry specialist auditors and first-class auditors undermine the positive effect of auditor's confirmation bias on the absolute value of discretionary accruals. In other words, the industry specialist auditors and first-class auditors weaken the negative effect of auditor's confirmation bias on the audit quality.

Table 8. The Results of H3 –Interactive Effect of Auditor Confirmation Bias With Auditor Characteristics and Discretionary Accruals

Variable	Model 1		Model 2		Model 3		Model 4	
	Industry specialist auditor				First-class auditor			
	SAME_AU=1 Dependent variable: Discretionary accruals		RISK_INC=1 Dependent variable: Discretionary accruals		SAME_AU=1 Dependent variable: Discretionary accruals		RISK_INC=1 Dependent variable: Discretionary accruals	
	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic
C	0.135*	1.781	0.067	0.458	0.133*	1.668	0.048	0.329
RISK_INC	**0.041****	**1.977**			**0.047*****	**4.627**		
SAME_AU			**0.046****	**2.309**			**0.054****	**1.999**
SPECIALIST	-0.057***	-4.302	-0.065***	-6.681				
TOP25					-0.092***	-4.541	-0.099***	-3.796
RISK_INC*SPECIALIST	**-0.071****	**-2.061**						
RISK_INC*TOP25					**-0.065*****	**-2.911**		
SAME_AU*SPECIALIST			**-0.045*****	**-2.817**				
SAME_AU*TOP25							**-0.078*****	**-3.033**
F_SCORE	0.114*	1.817	0.178***	3.394	0.140**	2.511	0.177***	5.702
SIZE	-0.074***	-4.263	-0.077***	-4.175	-0.069***	-3.766	-0.073***	-2.911
AGE	0.003	0.246	0.018	0.858	0.002	0.158	0.020	0.961
ROA	-0.234***	-4.267	-0.206***	-3.141	-0.230***	-4.672	-0.259***	-3.992
INVT	0.046	1.284	0.059	0.915	0.045	1.337	0.057	0.883
RECT	0.082***	3.171	0.222**	2.034	0.084***	3.053	0.187***	5.063
ISSUE	0.000	0.021	0.024	1.315	0.000	0.051	0.024	1.306
MTB	0.001	0.977	0.000	0.050	0.001	0.971	0.001	0.262
SALESGRWOTH	0.026**	2.170	0.039***	4.039	0.027**	2.507	0.033***	3.390
LOSS	0.003	0.221	0.002	0.055	0.003	0.229	0.000	0.013
CFO	-0.044	-0.873	-0.047	-0.498	-0.046	-1.299	-0.053	-0.570
CFOVOL	0.740***	10.605	0.880***	5.532	0.745***	11.081	0.861***	5.405
SALEVOL	0.041	1.189	0.069	0.866	0.041	1.264	0.066	0.820
LEV	-0.070***	-3.769	-0.056	-0.956	-0.057***	-3.013	-0.063*	-1.848
MATWEAK	0.172***	2.651	0.193***	3.806	0.101***	4.021	0.093***	3.206
TENURE	0.009	1.135	0.001	0.430	0.001	0.687	0.001	0.406
Industry fixed effects	Included		Included		Included		Included	
Year fixed effects	Included		Included		Included		Included	
Adjusted R-squared	0.323		0.304		0.326		0.311	
Durbin-Watson statistic	1.749		1.852		1.946		1.876	
F-statistic	8.102***		7.361***		8.194***		8.341***	

***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

7. Conclusion

The purpose of this study was to identify a setting in which the consequences of auditors' use of heuristics are likely to be revealed and to provide archival evidence about the costs associated with auditors' use of heuristics using a broad sample of clients. Specifically, we focused on the use of heuristics in one of the most important audit tasks, the risk assessment process, and we linked the use of heuristics during the risk assessment process to adverse audit outcomes.

There is little archival research in accounting that investigates the effect of auditors' use of heuristics on audit outcomes. This is likely because the judgment process is unobservable using archival research methods. In order to minimize these difficulties, following Cassell et al. (2021), we focused on one heuristic and confirmation bias, and identified situations in which auditors' use of this heuristic is likely to contribute to adverse audit outcomes.

Specifically, we expected that confirmation bias is likely to contribute to adverse audit outcomes in situations where: 1) the auditor has prior experience with a client who has a historically stable risk profile, and 2) the client experiences a significant change in their risk profile during the current year (Cassell et al., 2021). In particular, we focused on situations

where there is a significant increase in risk in the current year. We posited that auditor-client relationships that satisfy both conditions are likely to be susceptible to the effects of confirmation bias because auditors are likely to develop a perception that a continuing client is low risk when they have a historically stable and low risk profile. We expected that the auditors of these clients are likely to search for and interpret current year information in ways that confirm their prior perceptions of the client as low risk. Accordingly, we anticipated that auditors' risk assessment in the current year would be too low (as evidenced by a higher likelihood of misstatement) for auditor-client relationships that satisfy both conditions. In other words, the auditor confirmation bias was expected to have a negative impact on audit quality.

Empirical evidence obtained in the present study from the information analysis of 146 companies listed on the Tehran Stock Exchange from 2012 to 2020 showed that the auditor confirmation bias has a positive and significant effect on the financial restatement and the absolute value of discretionary accruals. The results also demonstrated that clients with high market value, high institutional shareholder ownership, industry specialist auditor, and first-class auditor undermine the positive effect of the auditor confirmation bias on the financial restatement and the absolute value of discretionary accruals. In other words, the results indicated that confirmation bias has a negative effect on audit quality. The results also suggested that the adverse effects of confirmation bias on audit quality are less for clients with high market value, high institutional ownership percentage, and audits performed by industry specialist auditors and first-class stock exchange trusted auditors.

This study has two primary contributions. First, we provide archival evidence that complements the existing experimental research investigating the effects of heuristics on auditor decision making. To the best of our knowledge, this is the first broad archival study to investigate whether confirmation bias negatively affects auditors' assessment of risk in practice. Second, our findings indicate that, despite current audit standards that emphasize the need to maintain professional skepticism, audit firm awareness of heuristics, and quality control procedures designed to mitigate the use of heuristics, auditors are still influenced by their perception of risk from prior experience with a client. Thus, our findings suggest that additional training or more targeted training may be beneficial and that additional guidance from standard setters about reliance on information from prior audits may be needed.

Our study was subject to two important limitations. As discussed previously, confirmation bias is not the only heuristic likely to affect the risk assessment process and, because of limitations inherent in archival research methods, our tests do not allow us to disentangle the effects of different heuristics on audit outcomes fully. Moreover, although our research design and choice of control variables aimed to minimize concerns about omitted variables, we acknowledge that we cannot completely rule out the possibility that omitted variables confound the interpretation of our results.

References

Akbari NaftChali, I., Pourheidari, O., & Khodamipour, A. (2017). The effect of experience on auditors' involuntary behaviors. *The Financial Accounting and Auditing Researches*, *11*(41), 197-228. (In Persian)

Akhgar, M. O., & Dadejani, R. (2016). The relationship between financial restatement and information asymmetry: Evidence from Iran. *Quarterly Financial Accounting Journal*, *7*(28), 79-104. (In Persian)

Aobdia, D., & Petacchi, R. (2017) *Consequences of low-quality audits for engagement partners* [working paper]. Georgetown University and Northwestern University. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2983900.

Arab Abadi, R., Baharmoghddam, M., & Khodamipour, A. (2021). Cognitive style and auditor's judgment: Does cognitive style mitigate the impact of recency bias on the auditors' belief revision process? *Journal of Audit Science*, *21*(1), 5-27. (In Persian)

Ashton, A. H., & Ashton, R. H. (1988). Sequential Belief Revision in Auditing. *The Accounting Review*, *63*(4), 623–641. http://www.jstor.org/stable/247903

Balsam, S., Krishnan, J., & Yang, J. (2003). Auditor industry specialization and earnings quality. *Auditing: A Journal of Practice and Theory*, *22*(2), 71-97.

Bedard, J. (1989). An archival investigation of audit program planning. *Auditing: A Journal of Practice & Theory*, *9*(1), 57-71.

Bedard, J., & Johnstone, K. (2004). Earnings manipulation risk, corporate governance risk, and auditors' planning and pricing decisions. *The Accounting Review*, *79*(2), 277-304.

Burke, A. (2007). R & D Considerations for the Performance and Application of Electrochemical Capacitors. *Electrochimica Acta*, 53, 1083-1091.

Bushee, B. (1998). The influence of institutional investors on myopic R&D investment behavior. *The Accounting Review*, *73*(3), 305-333.

Cassell, C., Dearden, S., Rosser, D., & Shipman, J. (2021). The effect of confirmation bias on auditors' risk assessments: Archival evidence. *Auditing: A Journal of Practice & Theory*,88-102. https://doi.org/10.2308/AJPT-2020-035

Chang, C. J., & Luo, Y. (2021). Data visualization and cognitive biases in audits. *Managerial Auditing Journal*, *36*(1), 1-16.

Church, B. (1991). An examination of the effect that commitment to a hypothesis has on auditors' evaluations of confirming and disconfirming evidence. *Contemporary Accounting Research*, *7*(2), 513-534.

Cox, L. A. (T.), Jr., & Popken, D. A. (2008). Overcoming confirmation bias in causal attribution: A case study of antibiotic resistance risks. *Risk Analysis*, 28(5), 1155–1171

Cloyd, C., & Spilker, B. (1999). The influence of client preferences on tax professionals' search for judicial precedents, subsequent judgments and recommendations. *The Accounting Review, 74*(3), 299-322.

Dalwai, T., Mohammadi, S. S., Chugh, G., & Salehi, M. (2021). Does intellectual capital and corporate governance have an impact on annual report readability? Evidence from an emerging market. *International Journal of Emerging Markets.* Advance online publication. https://doi.org/10.1108/IJOEM-08-2020-0965

Dechow, P., Ge, W., Larson, C., & Sloan, R. (2011). Predicting material misstatements. *Contemporary Accounting Research*, *28*(1), 17-82.

Fay, R., & Montague, N. (2015). I'm Not Biased, Am I? Avoid five common judgment biases that can affect accounting and auditing decisions. *Journal of Accountancy*, *219*(2), 26-31.

Francis, J., Maydew, E., & Sparks, H. (1999). The role of big 6 auditors in the credible reporting of accruals. *Auditing: A Journal of Practice and Theory, 18*(2), 17-34.

Gartland, D. (2017). The importance of audit planning. *Journal of Accountancy, 224*(3), 129-146.

Glover, S., Jiambalvo, J., & Kennedy, J. (2000). Analytical procedures and audit-planning decisions. *Auditing: A Journal of Practice & Theory, 19*(2), 27-45.

Glover, S. M., & Prawitt, D. F. (2014). Enhancing auditor professional skepticism: The professional skepticism continuum. *Current Issues in Auditing*, *8*(2), 1-10.

Gorman, M., Gorman, M., Latta, M., & Cunningham, G. (1984). How disconfirmatory, confirmatory and combined strategies affect group problem solving. *British Journal of Psychology*, 75(1), 65-79.

Hadani, M., Goranova, M., & Khan, R. (2011). Institutional investors, shareholder activism, and earnings management. *Journal of Business Research, 64*(12), 1352-1360.

Hormozi, S., Nikoomaram, H., Royaee, R., & Rahnama Roodposhti, F. (2017). The effects of psychological biases on auditors' professional skepticism. *Empirical Research in Accounting, 6*(4), 123-148. (In Persian)

Joyce, E., & Biddle, G. (1981). Anchoring and adjustment in probabilistic inference in auditing. *Journal of Accounting Research, 19*(1), 120-145.

Kane, G., & Velury, U. (2004). The role of institutional ownership in the market for auditing services: An empirical investigation. *Journal of Business Research, 57*(9), 976-983.

Karimi, Z., Yaghoobnezhad, A., SamadiLorghani, M., & Pourali, M. R. (2022). Evaluating the effect of auditors' individual psychological bias and personality dimensions on audit quality. *Financial Accounting and Auditing Research, 13*(3), 23-52 (In Persian).

Khani, A., & Sakeni, M. (2020). Effects of fraud-triangle decomposition on sensitivity and quality of auditor's fraud risk assessment based on Iranian Auditing Standard Number # 240. *Journal of Accounting Knowledge, 11*(3), 167-194. (In Persian)

Kida, T. (1984). The impact of hypothesis-testing strategies on auditors' use of judgment data. *Journal of Accounting Research, 22*(1), 332-340.

Kinney, W., & Uecker, W. (1982). Mitigating the consequences of anchoring in auditor judgments. *The Accounting Review, 57*(1), 55-69.

Kothari, S. P., Leone, A., & Wasley, C. (2005). Performance matched discretionary accruals measures. *Journal of Accounting & Economics, 39*(1), 163-197.

Koziel, M. (2017). 4 strategies for efficient, effective audit documentation. *Journal of Accountancy*,15 (2),99-115. https://www.journalofaccountancy.com/issues/2017/nov/ effective-audit-documentation.html.

KPMG. (2011). Elevating professional judgment in auditing and accounting: The KPMG professional judgment framework. www.kpmg.com

Lennox, C., & Pittman, J. (2010). Big five audits and accounting fraud. *Contemporary Accounting Research, 27*(1), 209-247.

McMillan, J., & White, R. (1993). Auditor's belief revision and evidence search: The effect of hypothesis frame, confirmation bias, and professional skepticism. *The Accounting Review, 68*(3), 443-465.

Miller, G. (2006). The press as a watchdog for accounting fraud. *Journal of Accounting Research, 44*(5), 1001-1033.

Moayedi, V., & Aminfard, M. (2012). Iran's post-war financial system. *International Journal of Islamic Middle Eastern Financing and Management*, 1, 264-281.

Mock, T., & Wright, A. (1999). Are audit programs risk-adjusted? *Auditing: A Journal of Practice & Theory, 18*(1), 55-74.

Mohammad Rezaei, F., Dianati Deilami, Z., & darvand, R. (2020). Audit opinions, the number and types of clauses of the conditional auditor's remarks: The role of economic crisis. *Journal of Management Accounting and Auditing Knowledge, 9*(3), 25-39. (In Persian)

Mohammad Rezaei, F., & Golchehreh, M. (2018). audit failure, audit opinion and auditor's remarks: The role of audit partner busyness. *Quarterly Financial Accounting Journal, 9*(3), 1-31. (In Persian)

Mohammad Rezaei, F., & Mohammad Rezaei, M. (2015). Audit firms ranking and audit quality. *Journal of Management Accounting and Auditing Knowledge, 4*(14), 1-14. (In Persian)

Mohammad Rezaei, F., MohdSaleh, N., Jaffar, R., & Hassan, M. S. (2016). The effects of audit market liberalization and auditor type on audit opinions: The Iranian experience. *International Journal of Auditing, 20*(1), 87-100.

Mohammadzadeh Moghaddam, M., Ismailzadeh Moghari, A., & Khosravi Pour, N. (2022). The effect of auditors' cognitive bias on the intellectual intelligence and style of the auditor. *Journal of Management Accounting and Auditing Knowledge*, *11*(3), 341-355.

Nickerson, R. S. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology*, *2*(2), 175–220.

Perera, D., Chand, P., & Mala, R. (2020). Confirmation bias in accounting judgments: The case for International Financial Reporting Standards for small and medium-sized enterprises. *Accounting & Finance*. *4*(4), 4093-4119.

Reichelt, K., & Wang, D. (2010). National and office-specific measures of auditor industry expertise and effects on audit quality. *Journal of Accounting Research*, *48*(3), 647-686.

Salehi, M., Ghaderi, A., Hashemisima, H., & Zahedi, Z. (2021). The relationship between different types of leadership, client's identity, and self-confidence and auditors' impartiality. *The TQM Journal*, Advance online publication. https://doi.org/10.1108/TQM-01-2021-0022

Schulz-Hardt, S., Frey, D., Luthgens, C., & Moscovici, S. (2000). Biased information search in group decision making. *Journal of Personality and Social Psychology, 78*(4), 655-669.

Seifzadeh, M., Salehi, M., Khanmohammadi, M., & Abedini, B. (2022). The relationship between management attributes and accounting comparability. *Journal of Facilities Management, 20*(1), 1-18. https://doi.org/10.1108/JFM-08-2020-0058

Stasser, G., & Titus, W. (1985). Pooling of unshared information in group decision making: Biased information sampling during discussion. *Journal of Personality and Social Psychology 48*(6), 1467-1478.

Turner, M., & Pratkanis, A. (1994). Social identity maintenance prescriptions for preventing groupthink: Reducing identity protection and enhancing intellectual conflict. *The International Journal of Conflict Management, 5*(3), 254-270.

Turner, M., Pratkanis, A., Probasco, P., & Leve, C. (1992). Treat, cohesion, and group effectiveness: Testing a social identity maintenance perspective on groupthink. *Journal of Personality and Social Psychology, 63*(5), 781-796.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science,* 185(4), 1124-1131.

Velury, U., & Jenkins, D. (2006). Institutional ownership and the quality of earnings. *Journal of Business Research, 59*(9), 1043-1051.

Wason, P. (1960). On the failure to eliminate hypotheses in a conceptual task. *Quarterly Journal of Experimental Psychology, 12*(3), 129-140.

Wason, P. (2003). Peter Wason (1924-2003) Thinking & Reasoning, 9 (3), 177-184

Weber, J., Willenborg, M., & Zhang, J. (2008). Does auditor reputation matter? The case of KPMG Germany and ComROAD AG. *Journal of Accounting Research*, *46*(4), 941-972.

Wright, B. A. (1988). Attitudes and the fundamental negative bias: Conditions and corrections. In H. E. Yuker (Ed.), *Attitudes toward persons with disabilities* (pp. 3–21). Springer Publishing Company.

Zeghal, D., Chtourou, S., & Sellami, Y. M. (2011). An analysis of the effect of mandatory adoption of IAS/IFRS on earnings management. *Journal of International Accounting, Auditing and Taxation, 20*(2), 61–72.