The Effect of Intellectual Capital on Audit Fees Stickiness

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1   **The Effect of Intellectual Capital on Audit Fees Stickiness**

2

3   **Abstract**

4   **Design/methodology/approach-** The study's method is descriptive-correlational based on the

5   information disclosed by listed firms on the Tehran Stock Exchange from 2012 to 2018 using 1316

6   year-firm. The method used for hypothesis testing is linear regression using panel data.

7   **Purpose-** The present study's main objective is to evaluate the effects of intellectual capital

8   efficiency and its components on audit fee stickiness, such as human capital, organisational

9   capital, structural capital, and relational capital. Moreover, the moderating roles of audit industry

10   specialisation, tenure, and auditors' market concentration are also estimated.

11   **Findings-** The results show that all the intellectual capital components, including human capital,

12   structural capital, organisational capital, and relational capital, negatively impact audit fee

13   stickiness. Further analyses also show that the audit industry specialisation moderates the

14   relationship between intellectual capital components and audit fee stickiness.

15   **Originality/value-** This paper is one of the pioneer studies assessing the auditors' response to the

16   riskless environments driven by existing intellectual capital.

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25   **Keywords:** Human capital, organisational capital, relational capital, audit fee stickiness, auditor

26   industry specialisation

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1. Introduction

Recognising cost behaviour is among the critical topics of cost and management accounting. The cost reduction against the sales reduction is less than the cost increase against the sales increase. Such an asymmetrical behaviour of costs is called "cost stickiness" (Anderson *et al.,* 2003). It seems prominent to distinguish between cost stickiness (proposed in the management accounting literature) and fee stickiness (proposed by economics literature). Cost stickiness is highly related to movements in the total expenses, which are under the influence of the managers; in contrast, fee stickiness pertains to the price of a single item (in our study, it is audit fee stickiness (AFS)), which is likely to be determined by negotiation between auditors and their clients (De Villiers *et al.,* 2014).

Early investigations have paid great attention to intellectual capital (IC) and its components, including human capital (HC), structural capital (SC), organisational capital (OC) and relational capital (RC), in the management literature in recent decades. Stewart (1997) succinctly defines the IC as "*packaged useful knowledge*". He further elaborates it as the existing intangibles in an organisation, including systems and processes, patents, technologies, generated experts and employees, and information about suppliers, customers and stakeholders. In this regard, Brooking (1996) comes up with a more comprehensive definition, representing that "IC is the term given to the combined intangible assets that *enable the company to function*".

Alternatively, it is obtained that auditors, as the participator of financial reports preparers, like managers, financial analysers and investors, may perceive the IC efficiency within the client firms (Loulou-Baklouti and Triki, 2018). Additionally, prior literature documented that client firms' voluntary disclosure of non-financial information is likely to influence the auditors' risk assessment of audit work and, subsequently, audit fees (Holland, 2006). Taylor (2000) also finds that specialised auditors evaluate the audit risk more confidently than non-specialised auditors. Following these arguments, we expect specialised auditors to assess the level of IC efficiency, as a risk mediator, within a firm more accurately than non-specialised auditors, which is likely to attenuate the AFS.

Despite a growing body of literature on audit fees, the concept of audit fee behaviour remains unexplored. For example, the perception of auditors about intellectually efficient companies is still not apparent. Therefore, this study may contribute to the literature in two aspects. Firstly,

60   for the first time, it shows how auditors react to the level of IC of firms, as a general intangible

61   asset, by adjusting their fees. In the auditing literature, previous investigations have mostly

62   emphasized the interaction of AFS with variables including tax risk (Talkhabi, 2017), managerial

63   overconfidence (Hasas Yeganeh *et al.,* 2015), internal control weaknesses (Munsif *et al.,* 2011),

64   market competition (Chang *et al.,* 2019), audit quality (Rashidi, 2021), audit hours (Koo *et al.,*

65   2020) and distributed ownership (Dhamasanti, 2021). Thus, in general, the current paper might

66   be considered the first attempt to explore the impact of IC on the sticky behaviour of auditors in

67   determining their fees. Secondly, in a more precise manner, this study may extend auditing

68   literature by explaining auditors' responses to the different ICCs independently if they are

69   noticed. As it is extensively documented in the IC literature, the ICCs are expected to be valued

70   by individuals differently since they have various impacts on firm performance, mainly financial

71   and organizational performance as the primary outcome of businesses (Laallam*et al.,*2022;

72   Bataineh *et al.,* 2022; Bansal *et al.,* 2022; Agomor *et al.,* 2022), as well as corporate social

73   responsibility performance, as the secondary outcome of companies (Nirino *et al.,* 2022, Tsai &

74   Mutuc, 2020; Gallardo *et al.,* 2019; Aras *et al.,* 2011). Consequently, presenting detailed findings

75   addressing the role of individual ICCs in a given company may suggest valuable managerial,

76   practical and social implications. For instance, the firms' authorities are likely to benefit from our

77   results by improving the ICE and its components to mitigate the business risk (agency cost) and

78   performance. As well as, managers are aware that making customers loyal to their companies

79   would result in valuable competitive advantages for their companies, leading to improved

80   performance (Martín *et al.,* 2006). Finally, the paper's outcomes propose to auditors that the ICE

81   level might be considered an indicative measure to evaluate the business risk.

82   This paper seeks to answer the question of which component of IC might reduce the firms'

83   business risk at the sight of auditors, resulting in fewer audit fee demands. This paper measures

84   the AFS following the Simunic (1980) model. Under the approach of his model, other audit fee

85   drivers, including the firm size, the current assets ratio, the current debt ratio, the long-term debt

86   ratio and the specified return ratio, are controlled.

87   The competitiveness and pricing of audit services are more pronounced in emerging markets,

88   Iran, where auditing and using audit services have been required in recent decades by the market

89 and authorities, which turned it into a new field of professional work suffering from many

90 practical gaps as an optimal contract. Thus, we expect that ICCs, which may enhance the firms'

91 performance in many aspects, play a mitigating role in firms' risk-taking, resulting in lower audit

92 work and fees. In this regard, our findings support these expectations according to the negative

93 and significant association documented between HCE, OCE, SCE, RCE and AFS. Alternatively, the

94 incremental growth rate of stock markets in emerging economies, particularly Iran, has drawn

95 equity owners' attention. This issue, especially in recent years, motivates us to examine the

96 potential role of audit industry specialisation (AIS) in the relationship between ICCs and AFS. In

97 this sense, our findings suggest that AIS is willing to moderate the sticky behaviour of audit fees

98 in firms sufficiently invested in ICCs.

99 The remainder of the paper is structured as follows. In the second section, the employed theories

100 and previous studies are elaborated. The third section includes the methodology used and the

101 statistical population investigated. Next, the descriptive and empirical findings are reported in

102 section four. The findings are concluded in the fifth section, and the discussion is presented in

103 the final section.

104 ## 2. Theoretical framework and hypothesis development

105 ### 2.1. ICCs

106 HC is elucidated under existing personal knowledge, skills, capabilities, and employers'

107 experiences to create value and solve business problems. However, managers invest in HC

108 without possessing the right to maintenance within their organisations since employees are the

109 principal owner of HC, not the organisation. Some believe HC is a basis for generating other IC

110 components (Kianto *et al.,* 2017; Dženopoljac *et al.,* 2016). The SC also refers to existing

111 structures and processes in the staff's organisation and is applied to their expertise (Vergauwen

112 & Van, 2005). SC is all non-human knowledge inventory of an organisation that comprises a

113 database, organisational charts, strategies, trends, process guidelines and other things; their firm

114 values are more than their material value (Bontis *et al.,* 2000). The other component is RC (which

115 is also well-known as CC). The central theme of RC is the applied knowledge in the marketing

116 channels of organisations and their relationships with customers (Salehi and Farzaneh, 2018).

117 Thus, it contributes directly to creating firm values.

2.2. ICCs and audit fees stickiness

Theoretically, the intensive agency problem, proposed by Jensen and Meckling (1976), well-known as the agent-principal conflict, might be considered one of the explanatory approaches to identifying the relationship between ICCs and AFS. We expect that the investment in ICCs may reduce the agent-principal agency problems since ICCs have been identified as a measure of efficiently creating and managing the firm's resources to provide a sustainable competitive advantage and value creation for the principals. Primarily, Human resources effectively produce goods and services in a competitive and optimal procedure, which can also be counted as a strong performance and a value creation factor within a firm (De Silva *et al.,* 2014). Also, the dynamically changing nature of IC may strengthen firms to win over their competitors (Jordão, 2017). The conceptual framework of Giacosa et al. (2017) argues that voluntary IC disclosure may be adequate only when the firm's and shareholders' needs are considered to obtain better financial performance. Therefore, intellectual capital efficiency (ICE) might rectify agent-principal agency problems.

Additively, from the auditors' viewpoint, the first year's audit fee might be higher when overestimating audit time and budget more than required. Still, it will be decreased in the upcoming years or even in the current year. Hence, the stickiness will be inverse in the forthcoming and current years (De Villiers *et al.,* 2014). Auditors who have insufficient information about the client's risk level will price their services based on the predicted bearable costs, which might be associated with the primary audit plans and budgets (known as AFS), and will adjust their price infrequently and gradually when they become more informed about the operational environment and general risk of their clients. Supportively, Palmrose (1988) argues that when auditors are willing to make contracts with clients, they consider the audit risk determinants, such as the going concern issue, which may increase the AFS. Charl et al. (2013) audit fees are sticky since they do not immediately or thoroughly adjust to changes in their determinants. Salehi et al. (2020) argue that ICE will likely mitigate audit risk by improving organisational operations. According to these arguments, we expect that more efficient ICCs within a company, which has resulted in lower agency problems between agent and principal, may result in less audit risk and, subsequently, sticky behaviour of audit fees.

147 Based on the previous findings, it is argued that human capital efficiency (HCE) makes a positive

148 contribution to firm performance (Tran and Vo, 2020) and productivity (Smriti and Das, 2018), all

149 of which are likely to be driven by improved physical strength and individuals' intelligence to

150 develop skills and gain knowledge (Schultz, 1961). Thus, the improved HC sends a signal to

151 auditors about a lower level of agency costs and riskiness in firms' operation (Watts &

152 Zimmerman, 1990), leading auditors to devote a lower level of effort and workforce as well as

153 requiring fees stickiness (Gul *et al.,* 2018). Chao et al. (2020) also argue that not only the existence

154 of HC's and spiritual capital's components, including knowledge, skills, expertise, ethics, morals

155 and values, etc. but also the rules, systems and norms within the client firms and its relationship

156 with the customers are all closely related to audit fees.

157 Companies possessing a well-designed organisational structure are likely to pay less audit fees.

158 These companies are expected to enjoy less audit fees by improving their operational procedures

159 and performance. In this regard, Mohammadi and Taherkhani (2017) show that OC is associated

160 with cost stickiness significantly. It means that an effective OC may improve the operation of

161 companies by managing operational and administrative expenditures. Also, Martín et al. (2006)

162 argue that OC may give companies competitive advantages. Additively, Chen et al. (2012) show

163 that HC and OC are antecedents of organisational commitment. Given the above discussion, we

164 expect an efficient level of OC to mitigate the audit risk by improving the organisational

165 procedures and, ultimately, firm performance (Stoel & Muhanna, 2011), and leading to the

166 adjustment of audit pricing by auditors when they become informed about the effective OC of

167 the client firms. Hockensmith et al. (2020) find partial support for the overarching theorising that

168 as OC engenders the integration of new knowledge assets, it moderates the relationship between

169 knowledge acquisition and firm performance such that firm performance is enhanced.

170 Accordingly, it is expected that the improved performance of client firms may impact their

171 business risk and audit fees due to OC.

172 In addition, SC is proposed as a contributing factor to firm riskiness. Ahmad et al. (2019) show

173 that SC has a significant and positive association with the business working environment and

174 performance in the listed companies of Pakistan. AlQershi et al. (2021) show a significant

175 influence of strategic innovation on performance, in which the SC has a moderating role in such

176   a relationship. Sarwenda (2020) finds that SC has an appositive effect on RC and competitive

177   advantage. The RC affects the business performance, likely reducing the business risk. They

178   believe that well-designed processes and operational procedures will likely improve internal

179   controls. Therefore, it is expected that SCE may lead to sticky behaviour of audit fees through

180   reduced agent-principal agency problems, driven by internal control improvement and business

181   performance.

182   Finally, those companies that established an effective and strong link with their customers, as a

183   relational capital efficiency (RCE), might pay less audit fees to their auditors. Krishnan et al. (2019)

184   find that suppliers with loyal customers spend less on audit fees. Their evidence is consistent with

185   the notion that the audit efforts might be reduced due to efficiency gains in the audit process,

186   especially when suppliers with more loyal customer bases share the same auditors with their

187   long-standing major customers. Consequently, the reduced AFS might result from lower audit

188   risk. Thi Mai Anh et al. (2019) discuss that RC can facilitate information sharing and benefit/risk-

189   sharing when firms work together to achieve innovation. Namagembe's (2020) findings indicate

190   that RC influences inter-cluster coordination and service delivery in humanitarian relief chains,

191   resulting in enhanced financial performance. According to the above discussion, we expect the

192   RC to reduce the audit fees by mitigating the business risk and improving the business

193   performance.

194   Recent investigations also document that risk factors of higher competition in the audit market

195   may also explain the sticky reaction of audit fees (Chang *et al.,* 2019; Rashidi, 2021). Biswas (2021)

196   shows that client firms' characteristics, including firm size and ownership structure, may

197   determine the amount of AFS in India. Fung et al. (2021) articulate that earning quality is willing

198   to reduce the AFS. Frino *et al.* (2022) argue that information asymmetry, as a risk element, is

199   positively related to the quantum of audit fees paid. Yongbin and Mengzhe (2022) find that the

200   company's audit fees increase if the CEO and CFO have the same tenure because the CFO has the

201   same tenure with the CEO is more likely to cooperate with the CEO's motivation on earnings

202   management and thus increase the audit cost and audit risk. Thus, given the theoretical principles

203   of audit pricing behaviour, the following hypotheses are developed to test the impact of ICCs on

204   AFS:

205   H_1: There is a significant and negative relationship between HC and AFS.

206   H_2: There is a significant and negative relationship between OC and AFS.

207   H_3: There is a significant and negative relationship between SC and AFS.

208   H_4: There is a significant and negative relationship between RC and AFS.

209   2.3. AIS

210   AIS includes creating constructive ideas (creating added value) to help the client and provide

211   approaches or strategies for clients' topics in related industries (Kend, 2008). According to a

212   market share approach, an industry expert is an audit firm that distinguishes itself from other

213   rivals in market share in a specific industry. Therefore, an audit firm with a larger market

214   proportion has more specialised knowledge about that industry (Salehi *et al.,* 2017). Consistently,

215   Bell et al. (1997) suggest that auditors who developed a wider range of knowledge about their

216   client's businesses and industries are more expected to assess the audit risk. In this regard, Low

217   (2004) shows that auditors' knowledge of the client's industry improves their audit risk

218   assessments. Thus, Industry-specialised auditors can recognise the level of audit risk and ICC's

219   effectiveness. Alternatively, the prior studies have arrived at the consensus of a positive impact

220   of AIS on audit quality. In a meta-analysis, Salehi et al. (2019) show that audit firm size and auditor

221   specialisation are positively associated with audit quality. Therefore, the greater audit fees that

222   specialised auditors require might be expected to be driven by the greater audit quality provided

223   by this type of auditors. Daemigah (2020), according to a meta-analysis, also argues that audit

224   quality and AIS of the audit firm are both positively correlated with audit fees. Stein (2019)

225   supports that client firms engaging industry specialist auditors tend to record larger impairments

226   than those engaging auditors with less specialisation.

227   Considering the above discussions, we expect that AIS may alter the audit pricing behaviour of

228   audit firms in two channels, firstly, through an improved initial audit risk assessment, which ICCs

229   might explain, and secondly, by providing high-quality audit services. The following hypotheses

230   are developed to examine the mediating role of AIS on the association between ICCs and AFS:

231   H_5: AIS positively and significantly impacts the relationship between HC and AFS.

232   H_6: AIS positively and significantly impacts the relationship between OC and AFS.

233   H7: AIS positively and significantly impacts the relationship between SC and AFS.

234   H_8: AIS positively and significantly impacts the relationship between RC and AFS.

235   In order to provide a clearer picture of the above discussions and the process of hypothesis

236   development, Table 1 is presented as follows.

237   **Insert Table 1 here**

238

239   3. Research methodology

240   ***3.1. Study sample***

241   The statistical population of the present study includes all listed firms on the Tehran Stock

242   Exchange from all industries from 2012 to 2018. Having considered the following conditions, the

243   total population of this study consists of 188 firms for 7 years, (188*7) 1316 firm-years

244   observations:

1.   Firms should not be affiliated with financial intermediaries, holdings, and banks
245
          (productive firms). This condition is used because such firms have differences in the
246
          activity and classification of financial statement items.
247

2.   The transaction of firms' stocks should not be stopped entirely during the study (firms'
248
          signs should not exist on the Stock Exchange).
249

250   3.   Firms should be enlisted on the Tehran Stock Exchange at least at the beginning of 2012.

251   4.   All required data should be available during the period of the study.

252   The main reason for the investigation of this period is data availability. The Central Bank, Tehran

253   Stock Exchange official website and Codalwebsite are primary data sources. Table 2 briefly

254   illustrates the information related to model variables for Stock Market data. To analyse the raw

255   data, the Eviews statistical software is used.

256

257   **Insert Table 2 here**

258   ***3.2. Data analysis method***

259   According to analyses of previous studies, we employed the Pulic model to measure IC and its

260   components' potential influences. This statistical measurement is used as it is among the most

261   accredited and famous methods proposed to evaluate the IC within the companies. Furthermore,

262   we employ the STICKY AF and SPEC variables to assess specialisation's potential impact on AFS.

263 To assess the relationship between ICCs (such as HC, OC, and RC) and AFS, the following multiple

264 regression model is used:

$$
\begin{aligned}
STICKY\ AF = {} & \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 OCE_{it} + \beta_4 CEE_{it} + \beta_5 BIG1_{it} + \beta_6 Achange_{it} \\
& + \beta_7 AGE_{it} + \beta_8 ROA_{it} + \beta_9 LEV_{it} + \beta_{10} GRW_{it} + \beta_{11} ART_{it} + \beta_{12} SPEC_{it} + \beta_{13} \\
& SIZE_{it} + \beta_{14} ROE_{it} + \beta_{15} A\_NAR_{it} + \beta_{16} Atenure_{it} + \beta_{17} REST_{it} + \beta_{18} Current_{it} \\
& + \beta_{19} INVE_{it} + \beta_{20} REC_{it} + \beta_{21} MTB_{it} + \beta_{22} HHI_{it} + \beta_{23} BUSY_{it} + \beta_{24} BIND_{it} \\
& + \beta_{25} Dealy_{it} + IND + \varepsilon_{it}
\end{aligned}
$$

266

267 Moreover, the following multiple regression model is used to assess the effect of AIS on the

268 relationship between ICCs (human, organisational, and RC) and AFS:

269

$$
\begin{aligned}
STICKY\ AF \\
= {} & \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 OCE_{it} + \beta_4 CCE_{it} + \beta_5 SPEC_{it} + \beta_6 HCE_{it} * SPEC_{it} \\
& + \beta_7 SCE_{it} * SPEC_{it} + \beta_8 CCE_{it} * SPEC_{it} + \beta_9 CCE_{it} * SPEC_{it} + \beta_{10} BIG1_{it} + \beta_{11} \\
& Achange_{it} + \beta_{12} AGE_{it} + \beta_{13} ROA_{it} + \beta_{14} LEV_{it} + \beta_{15} GRW_{it} + \beta_{16} ART_{it} + \beta_{17} \\
& SIZE_{it} + \beta_{18} ROE_{it} + \beta_{19} A\_NAR_{it} + \beta_{20} Atenure_{it} + \beta_{21} REST_{it} + \beta_{22} Current_{it} \\
& + \beta_{23} INVE_{it} + \beta_{24} REC_{it} + \beta_{25} MTB_{it} + \beta_{26} HHI_{it} + \beta_{27} BIND_{it} + \beta_{28} Dealy_{it} \\
& + \beta_{29} BUSY_{it} + \beta_{30} RST_{it} + IND + \varepsilon_{it}
\end{aligned}
$$

271 3.3 *Variable measurement*

272 Note; all the variables and their measurements are explained in Appendix 1.

273 *3.4. IC components elaboration*

274 According to Appendix 1, the ICCs, including HC, SC, OC, and RC efficiencies, are assessed based

275 on value-added intellectual coefficient (VAIC) degrees. The VAIC degrees are calculated based on

276 the given model and operating profit. VAIC has been proposed by Chan (2009) as a standardised

277 and regulated proxy measuring the IC performance according to reported financial statements

278 of companies. The HC is calculated through the value-added in a given company compared to the

279 employment costs. In other words, the VAIC method shows how effectively a firm's employees

280 work. The VAIC measures the OC, RC, and customer capital efficiency (CCE) by considering the SC

281 and value-added of a firm compared to the advertisement and marketing costs. It implies the

282 comparison of value-added inside a company with the cost of marketing and advertising.

283 Researchers have widely applied this measure to its reliability and suitable data availability. The

284 VAIC method employed in this paper is adopted from Pulic (2000).

285 4. Research findings

4.1. Descriptive statistics

287   This study used two models to evaluate the relationship between ICCs and AFS. The present study

288   has also used a panel data method, including 188 Iranian firms, from 2012 to 2018 in its dataset.

289   ICCs are used for model estimation.

290   The average human, organisational, and CC efficiency is 0.369, 0.010, and 0.320. Besides, the

291   variable of auditor specialisation has an average of 0.429, which shows a specialised auditor

292   audits about 46% of sample firms.

293   Also, to model the ICCs, variables like book value to the firm's equity market (MTB), firm size

294   (Size), and financial leverage were added to the explanatory variable.

295   **Insert Table 3 here**

4.2. Hypotheses testing

297   As presented in Table 3, there is no linearity between variables according to obtained VIF

298   statistics of lower than 10. Thus, none of the variables suffers from linearity problems.

299   All variables are at no unit root by analysing the unit root of research data (stationary). The

300   obtained LM statistic for each variable is reported in Table 4, column 3.

301   **Insert Table 4 here**

4.3. Model estimation and interpretation of results

303   Concerning the proposed model based on preferential tests, the experimental model is estimated

304   based on the panel data's fixed effects method.

305   **Insert Table 5 here**

306   As shown in Table 5, the results of the first hypothesis argue that there is a negative and

307   significant relationship between HCE and AFS; since the HCE's p-value and coefficient are 0.000

308   and -0.184. Employing an efficient level of HC in the companies may decrease audit fee stickiness.

309   Supportively, the agency theory argues that the HCE inform auditors about a lower level of the

310   agent-principal problem within the firm, which makes a positive contribution to firm

311   performance (Tran and Vo, 2020) and productivity (Smriti and Das, 2018), both of which are likely

312   to be driven by improved physical strength and individuals' intelligence to develop skills and gain

313   knowledge (Schultz, 1961). Also, the existence of HCE is a sign of lower risk in firms' operation

314 (Watts & Zimmerman, 1990), leading auditors to devote less effort and workforce and require

315 lower audit fees (Gul *et al.,* 2018).

316 The findings related to the second hypothesis also show that OCE, with the p-value and

317 coefficients of 0.012 and -0.226, is negatively incorporated with AFS. These findings also indicate

318 that a well-designed organisational structure will likely alert auditors of less audit risk in the initial

319 risk assessment, preventing them from showing sticky behaviour at the proceeding stages. In

320 other words, CEOs invested in OC are more likely to meet the principal interests. Since the OC

321 may limit the opportunistic behaviour of managers and improve the firm operational procedures

322 and performance, both of which are likely to be evaluated by auditors in the planning stages;

323 therefore, they may show lower stickiness in their pricing behaviour. In line with our findings,

324 Mohammadi and Taherkhani (2017) find that OC is associated with cost stickiness, meaning

325 effectively structured procedures may reduce general costs of production and improve the firm

326 performance, which provides companies with competitive advantages (Martín *et al.,* 2006).

327 Additionally, Hockensmith et al. (2020) suggest that since OC engenders the integration of new

328 knowledge assets, it moderates the relationship between knowledge acquisition and firm

329 performance such that firm performance is expected to be enhanced, all of which sends positive

330 signals to auditors of the low level of firm riskiness.

331 Further analyses of the third hypothesis also show a negative and significant relationship

332 between SCE and AFS due to the p-value and coefficient of 0.005 and -0.014. These findings

333 demonstrate that SCE plays a mitigating role in AFS by improving internal control efficiency and

334 reducing firm riskiness. To be more precise, the strong internal controls might be considered by

335 auditors as an index for lower agent-principal conflict inside the firm; thus, they may estimate a

336 lower audit risk when planning the audit process and showing lower AFS. In line with our findings,

337 Chao et al. (2020) and Yemen AlQershi et al. (2021) reveal that ICCs, including SCE, might be

338 considered an effective corporate governance mechanism to reduce agency costs, audit risk and

339 fees.

340 Finally, the findings of the fourth hypothesis articulate that RCE also has a negative impact on

341 AFS with an intensity of -0.115 and a p-value of 0.038. Such results denote that companies that

342 established an effective and strong linkage with their customers are less likely to suffer from

343 agency conflict; subsequently, the auditors may consider these firms as less risky clients and

344 ultimately show lower AFS when willing to adjust their price. In line with our findings, Krishnan

345 et al. (2019) recommend that suppliers with loyal customers spend less on audit services; because

346 such strong ties show a lower level of agency conflict within a firm. The underlying theory

347 suggests that auditors are likely to recognise ICE in the companies, which might be translated as

348 a positive sign that it is willing to improve the firm's performance, resulting in fewer clients and

349 audit risk. The lower audit risk is defined as lower audit fees, denoting that the lower client risk

350 reduces the risk of issuing a clean opinion for auditors, alleviating audit procedures and the

351 required efforts necessary for audit planning stages.

352 **Insert Table 6 here**

353 As reported in Table 6, the other analyses, including the fifth, sixth, seventh and eighth

354 hypotheses, demonstrate that AIS negatively impacts audit fee stickiness. Such an argument is

355 obtained due to the p-values (coefficients) of HCE*SPEC, CCE*SPEC, OCE*SPEC, and SCE*SPEC,

356 which are respectively 0.048 (-0.216), 0.031 (-0.124), 0.000 (-0.095), and 0.005 (-0.013) for the

357 fifth to eighth hypotheses. These findings mean that industry-specialised auditors are less likely

358 to show sticky behaviour when they are willing to adjust the audit fees. These findings follow the

359 approach of Kin-Yew (2004), explaining that auditors' knowledge of the client's industry improves

360 their audit risk assessments and directly influences the nature and the extension of the audit

361 tests in the planning stage. Considering this approach, as industry-specialised auditors can

362 recognise the industry-specific information and determine the level of audit risk, they can assess

363 the intensity of ICCs in a specific client compared with other firms competing in the same

364 industry. Kin-Yew Low (2004) explores that changing the audit procedure is remarkably

365 incorporated with auditors' knowledge of their client's industry. He argues that industry-

366 specialized auditors are less likely to change the audit procedure, staff, and hours due to their

367 great knowledge of their firm clients, reducing the likelihood of audit fees for these auditors

368 (Daemi, 2020). Consequently, these auditors are less likely to show sticky behaviour through

369 adjustment of audit fees in current and subsequent years, as they are expected to sufficiently

370 identify the advanced level of ICCs within the firm, compared with the industry average.

371 Supportively, Stein (2019), Gil et al. (2019), and Lowensohn et al. (2004) provide similar findings.

372 However, Pereira et al. (2018) show a positive impact of AIS on audit fees. They argue that such

373 an effect is driven by providing high-quality services, greater market share (BIG4 auditors), and

374 market power. Zerni (2012) believes that, as a general rule, auditors may use specialization

375 strategies to charge their clients differently. The lower production cost of audit services may also

376 explain such behaviour in determining the audit fees. Steven et al. (2008) show that auditor

377 concentration in an industry relates positively to both the level and homogeneity of the

378 investment opportunity set in an industry, while auditor dominance relates negatively to industry

379 investment opportunity set homogeneity, both of which are likely to increase the audit fees. Such

380 costly behaviour might be considered because the auditors' knowledge of the client's industry

381 improves their audit risk assessments and directly influences the nature and perceived quality of

382 their audit-planning decisions (Kin-Yew Low, 2004).

5. Discussion

384 This paper aims to examine the effect of ICE and AIS on the level of AFS. It is expected that the

385 efficiency of ICCs will likely reduce audit fee adjustment by auditors due to the positive

386 contribution of ICCs to a given company. Additionally, the in-depth knowledge of specialised

387 auditors is probably willing to assist them in having a more accurate and decisive assessment of

388 the audit process and fees.

389 According to the observed results of hypothesis testing, all the ICCs, including human,

390 organisational, structural, and RC, will significantly reduce AFS. For the first time in emerging

391 markets, these findings imply the responsive behaviour of auditors when they are willing to

392 propose or adjust the fees of their services. When auditors are eager to plan for audit work,

393 particularly based on initial cognition and pre-testes, they consider all the ICCs, as risk mediators,

394 in their initial measures and subsequent adjustment. In other words, all the ICCs in a specific

395 client may ensure auditors that this client operates in a less risky environment; therefore, audit

396 fee changes or adjustments would be minimised. To be more precise, HCE is willing to reduce

397 audit fees by informing them about a lower level of the agent-principal problem within the firm

398 (Tran and Vo, 2020; Smriti and Das, 2018), and OC may reduce AFS by effectively structured

399 procedures (Martín *et al.,* 2006), as well as SCE may improve a firm's riskiness by effective

400 corporate governance mechanism (Chao *et al.,* 2020; Yemen AlQershi *et al.,* 2021).

401 Further analyses also demonstrate that AIS negatively mediates the relationship between ICCs

402 and AFS. These findings also connote that the deeper comprehension of industry-specialised

403 auditors about the role of ICCs in a given client significantly impacts their pricing behaviour

404 compared to non-specialised auditors. We expect that comparing firms with the average of their

405 own industry, regarding the level of ICCs, as a corporate governance mechanism, significantly

406 assists auditors in employing an accurate and sustainable pricing method. In support, Kin-Yew

407 Low (2004) explores that a lower rate of changing the audit procedure is remarkably incorporated

408 with auditors' knowledge of their client's industry, which reduces the likelihood of audit fees for

409 these auditors (Daemi, 2020).

6. Conclusion

411 The findings of this paper shed more light on the literature body of IC and agency theory

412 approaches. According to the findings of this paper, we provide some contributions in terms of

413 academics and practices. Academically, we have established a link between ICCs and AFS for the

414 first time, which provides future researchers with a basis for exploring the determinants of AFS,

415 such as corporate social responsibility. Practically, the firms' authorities might use our results to

416 improve the ICE and its components to mitigate their business risk (agency cost) and improve

417 their business performance, which may contribute to the outcome of audit work. For example,

418 HCE is likely to improve firm performance by promoting the staff's knowledge and skills (Schultz,

419 1961); Additively, making customers loyal to companies might also provide some competitive

420 advantages for them, resulting in improved performance of companies (Martín *et al.,* 2006) and

421 sustainable audit pricing behaviour. For auditors, we propose that the ICE level might be

422 considered an indicative measure to evaluate the business risk. This may help them predict and

423 assign more effectively at the programming stage and suggest a fair and sustainable audit fee.

424 This may also help auditors to improve their market position by maintaining existing and

425 increasing potential clients. Finally, CEOs may decrease the auditing cost by employing

426 specialised auditors. Since specialised auditors have a deeper comprehension of a given industry,

427 they may charge lower fees to their client firms.

428 Our suggestion for future researchers comes from our academic contributions. Future

429 researchers may contribute to the literature by exploring other factors, such as innovation and

430   corporate social responsibility, on the concept of AFS. They can investigate how auditors are likely

431   to react to other non-financial information.

432   This paper has some limitations, as well. If the study's duration has been longer, the results were

433   generalisable. However, suppose more years were considered for sample selection. In that case,

434   the number of sample firms and the statistical sample should have been lower, decreasing the

435   study's validity and limit and the possibility of the so-called equation. Moreover, the obtained

436   data from financial statements were not adjusted in terms of inflation. Given the difference in

437   the inflation rate in the years under study, if the data used for this purpose were adjusted, the

438   results may differ from the current results.

439

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Table. 1 Summarized previous discussions justifying the association between ICCs and AFS

No.	Author	How ICCs may contribute to AFS
1	Jensen and Meckling (1976) Gul et al. (2018) Chen et al. (2021)	Reducing the agent-principals agency problem by efficient application of sources.
2	Jordão (2017) Mohammadi and Taherkhani (2017) Martín et al. (2006) Ahmad et al. (2019) Sarwenda (2020)	Strengthening firm operation and working environment to provide a competitive advantage.
3	Giacosa et al. (2017) Tran and Vo (2020) Smriti and Das (2018) Namagembe's (2020)	Improving financial performance leading reduced agency problems.
4	Ferraris et al. (2017) Hockensmith et al. (2020) AlQershi et al. (2021) Thi Mai Anh et al. (2019)	Utilising external R&D expenses and knowledge management.

No.	Author	How AIS mitigates the association between ICCs and AFS
1	Bell et al. (1997)	Having core knowledge about the industry specifications, including ICCs.
2	Low (2004)	Having an accurate sense of risk assessment.
3	Salehi et al. (2019) Daemigah (2020) Stein (2019) Gil et al. (2019)	Demanding greater audit fees by providing high quality audit services.

Table 2. The procedure of sample firm selection

	No.	Description	No. of firms
	1	Total listed companies on the Tehran stock exchange	445
Limitations	2	Affiliated firms with financial intermediaries, holdings, banks, and insurance	(88)
	3	Firms with more than six months of transaction halt	(112)
	4	Eliminating firms not entering the Stock Exchange during the study period	(4)
	5	Firms with no available information during the period of the study	(53)
		Total number of sample firms in this study	188

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Table 3. Descriptive statistics

Variable	obs	Mean	Std.Dev	Min	Max
Lnafee	1316	7.339	1.642	2.302	14.390
Big1	1316	0.261	0.439	0.000	1.000
Busy	1316	0.740	0.438	0.000	1.000
Achange	1316	0.335	0.472	0.000	1.000
Age	1316	38.795	13.206	8.000	67.000
Roa	1316	0.106	0.162	-1.063	1.242
Lev	1316	0.604	0.267	0.061	4.003
Grw	1316	1.267	28.188	-0.845	902.671
ART	1316	0.501	0.500	0.000	1.000
SPEC	1316	0.429	0.495	0.000	1.000
Size	1316	14.191	1.494	10.532	19.374
ROE	1316	0.248	0.867	-16.845	10.045
Cata	1316	1.111	2.367	0.064	68.115
A_nar	1316	0.888	0.315	0.0000	1.000
Atenure	1316	3.573	3.768	1.000	17.000
Rest	1316	0.755	0.429	0.000	1.000
HCE	1316	0.369	1.600	-21.030	38.283
SCE	1316	0.631	1.600	-37.283	22.030
CCE	1316	0.620	1.610	-37.283	22.217
OCE	1316	0.010	0.044	-0.438	0.810
Current	1316	1.503	1.078	0.164	13.151
INVE	1316	0.284	0.596	0.000	17.877
REC	1316	0.328	0.695	0.0002	18.808
MTB	1316	4.180	10.797	-200.219	103.153
HHI	1316	0.231	0.218	0.019	1.000
BIND	1316	0.699	0.191	0.000	1.167
Dealy	1316	4.255	0.403	1.946	5.375

| Steaky AF | 1316 | 4.18e-10 | 0.187 | -0.461 | 1.751 |

Table 4. Results of VIF and Hadari unit root tests

Variables	VIF	Hadari unit root
	Level	Level
HCE	1.02	0.1820
OCE	1.11	0.2014
CCE	1.1	0.3367
SPEC	1.52	0.6214
BIND	1.1	0.5871
Big1	1.95	0.3201
Adchange	1.43	0.2197
GRW	1.03	0.2318
Atenure	2.04	0.9347
INVE	3.74	0.954
SIZE	1.42	0.2014
HHI	1.12	0.5523
Dealy	1.13	0.4198
SCE	1.01	0.6321
LEV	2.16	0.1623
MTB	1.05	0.2478
Busy	1.12	0.9754
Age	1.08	0.2174
Roa	2.04	0.3090
ART	1.07	0.2019
ROE	1.12	0.6524
A_Nar	1.06	0.6315
Rest	1.05	0.2099
Roe	1.12	0.6524
Current	1.43	0.5328
REC	3.71	0.954

Table 5. The results of the model (1) estimation

Steaky AF	Coef.	Std.Err.	Z	P>|Z|
HCE	-0.184	0.026	-6.85	0.000
OCE	-0.226	0.088	-2.56	0.012
SCE	-0.014	0.005	-2.80	0.005

CCE	-0.115	0.055	-2.07	0.038
BIG1	-0.036	0.025	-1.45	0.148
Achange	-0.044	0.019	-2.27	0.023
Age	0.013	0.007	1.90	0.057
Roa	0.069	0.026	2.66	0.008
Lev	-0.003	0.002	-2.18	0.030
Grw	-0.033	0.007	-5.04	0.000
ART	0.015	0.008	1.96	0.050
SPEC	0.004	0.001	4.49	0.000
Size	0.002	0.001	1.90	0.057
ROE	-0.036	0.016	-2.27	0.024
Cata	0.045	0.023	2.01	0.046
A_nar	0.036	0.017	2.05	0.042
Atenure	0.033	0.020	1.63	0.104
Rest	0.015	0.007	2.16	0.031
Current	-0.353	0.051	-6.97	0.000
INVE	0.027	0.021	1.28	0.202
REC	-0.096	0.015	-6.53	0.000
MTB	-0.232	0.093	-2.48	0.015
HHI	0.048	0.018	2.69	0.007
BIND	-0.529	0.169	-3.13	0.002
Dealy	-0.004	0.002	-2.05	0.041
_Cons	-0.463	0.187	-2.47	0.013

R-Sq	0.051
R-Sq^2	0.152
F-limer	$F(155,256)=6.81$
	Prob>F=0.000***
Hasman	Chi2(22)=10.62
	Prob>Chi2=0.9797

Prob model		Wald chi2(23)=66.49		
		Prob>Chi2=0.000***		

Table 6. The results of the model (2) estimation

Steaky AF	Coef.	Std.Err.	Z	P>|Z|
HCE	-0.013	0.005	-2.81	0.005
SCE	-0.236	0.068	-3.46	0.001
CCE	-0.034	0.010	-3.32	0.001
OCE	-0.259	0.096	-2.69	0.008
SPEC	0.228	0.098	2.32	0.020
HCE*SPEC	-0.216	0.109	-1.98	0.048
CCE*SPEC	-0.124	0.057	-2.16	0.031
OCE*SPEC	-0.095	0.148	-3.72	0.000
SCE*SPEC	-0.013	0.005	-2.81	0.005
BIG1	-0.036	0.025	-1.43	0.153
Achange	-0.043	0.019	-2.23	0.026
Age	0.054	0.025	2.15	0.031
Roa	0.045	0.021	2.14	0.034
Lev	-0.004	0.002	-2.05	0.041
Grw	-0.003	0.013	-1.92	0.054
ART	0.022	0.017	1.29	0.198
Size	0.001	0.0002	6.00	0.000
ROE	-0.016	0.003	-4.18	0.000
A_nar	-0.016	0.004	-4.18	0.000
Atenure	0.113	0.056	2.04	0.042
Rest	0.033	0.020	1.64	0.101
Current	0.015	0.007	2.17	0.030
INVE	-0.008	0.005	-1.77	0.076

REC	0.027	0.021	1.25	0.211
MTB	-0.008	0.005	-1.77	0.076
HHI	-0.007	0.002	-2.93	0.004
Busy	0.048	0.018	2.67	0.007
BIND	-0.004	0.002	2.05	0.041
Dealy	-0.124	0.057	-2.16	0.031
_Cons	-0.545	0.200	-2.72	0.007

R-Sq	0.0533
R-Sq^2	0.1522
F-limer	F(155,256)=1.46
	Prob>F=0.006***
Hasman	Chi2(24)=2.92
	Prob>Chi2=0.8919
Prob model	Wald chi2(23)=66.49
	Prob>Chi2=0.000***

Note: **significance level of 95%, ***significance level of 99%

Resource: research findings

Appendix 1. Variables definition

Symbol	Variable	Type	Definition
Sticky AF	Audit fees stickiness	Dependent	This variable, following previous studies (Simunic, 1980; Craswell et al., 1995; Ferguson, Francis and Stokes, 2003; Hay et al., 2006; Carson, 2009; Choi et al., 2009; Huang et al., 2009), is measured through the following equation: $LAF = \beta_0 + \beta_1 LTA_{it} + \beta_2 CATA_{it} + \beta_3 QUICK_{it} + \beta_4 DE_{it} + \beta$ LAF: is the natural logarithm of audit fee; LTA: is the natural logarithm of total firm assets; CATA: a current asset-to-total asset ratio; QUICK: a current asset-to-current

			debt ratio; DE: long-term debt to total assets ratio; ROI: earnings before interest and tax to total asset ratio; LOSS: takes 1 if the firm i reports loss, and otherwise 0.
HCE	Human capital efficiency	Independent	This variable is measured through Pulic's (2000) model as follows: $$HCE = VA/HC$$ VA is value-added and is calculated through the following equation: value added= Depreciation of intangible assets + depreciation of fixed assets + cost of workforce + operational earning HC is the total investment in labor, including direct payment, indirect payment, and payment cost of sales, marketing, and office sections
OCE	Organizational capital efficiency	Independent	This variable is measured through Pulic's model as follows: $$OCE = VA/OC$$ VA is value-added and is calculated through the following equation: value added= Depreciation of intangible assets + depreciation of fixed assets + cost of workforce + operational earning OC is organizational capital, which is calculated through the following procedure: $$OCE = (VA/OC)$$ OC is organizational capital, which is calculated through the following procedure. According to Nazari (2010), structural capital comprises two components: customer capital and organizational capital. Thus, we can declare that the efficiency of structural capital is customer capital efficiency (CCE) and organizational capital efficiency (OCE), which is computed by the following equation: $$OC = (SC - CC)$$ SC is structural capital, which is calculated through the following equation:

$$SC = VA - HC$$

VA is value-added and is defined earlier.

HC is the total investment in labor, including direct payment costs, indirect payment, and payment costs of sales, marketing, and office sections

CC is customer capital, which is the total advertising and marketing costs

SCE	Structural capital efficiency	Independent	This variable is measured through the following equation: $$SCE = VA/SC$$ SC is structural capital, which is calculated through the following equation: $$SC = VA - HC$$ VA is value-added and is defined earlier. HC is the total investment in labor, including direct payment costs, indirect payment, and payment costs of sales, marketing, and office sections
CCE	Customer/Relational capital efficiency	Independent	This variable is relational customer capital efficiency (it is also called relational capital efficiency) and is measured through Pulic's model as follows: $$CCE = (VA/CC)$$ VA is value-added and is calculated through the following equation: value added= Depreciation of intangible assets + depreciation of fixed assets + cost of workforce + operational earning CC is customer capital, which is the total advertising and marketing costs
SPEC	Auditor specialization	Independent	This variable is auditors' specialization in the industry i and year t. it is calculated through the following equation: $$\frac{total\ assets\ of\ all\ clients\ of\ each\ special\ audit\ firm\ in\ s}{total\ assets\ of\ all\ clients\ in\ speical\ industr}$$ This paper uses market share as an index for auditor specialization in the industry; because it shows the industry's priority over other auditors; the higher the auditor's market

proportion, the higher in industry specialization and auditor experience. Moreover, firms are selected as industry specialized that their market share, as shown in the above equation, is more than [(number of existing firms) *1.2)]. After calculating an audit firm's market share, if the obtained value is more than the above equation, the audit firm is specialized in the industry. Hence, if an audit firm is industry specialized, it takes 1, and otherwise 0 (Habib and Bhaiyan, 2011).

HHI	Audit market concentration	Control	This variable is market concentration, which is extensively employed by previous literature (see; Brezina et al., 2016; Šindelář and Müllerová, 2017; Clarina and Fitriany, 2020) and is measured through the Herfindahl-Hirschman index as follows: $$HHI = \left(\sum_{i=1}^{n} \frac{sit}{Sjt} \right)^2 * (-1)$$ K: is the number of auditors in the specific industry s: is equal to the total audit fees of the auditor in the particular industry S: is equal to the total audit fees of all auditors in the specific industry
ROA	Return on asset	Control	The proportion of the return on assets measures this variable
ROE	Return on equity	Control	The proportion of the return on equity measures this variable
AGE	Firms age	Control	This variable is the total number of years since establishing individual firms.
ART	Audit report	Control	This dummy variable equals 1 if the auditor issues a clean report and 0 otherwise.
GRW	Growth of sale	Control	The following equation measures this variable: $$\frac{\text{sale of year t} - \text{sales of year t} - 1}{\text{sales of year t} - 1}$$
BiG1	Audit organization	Control	This is a dummy variable equal to 1 if the auditor is an Audit organization and 0 otherwise. According to the Iranian institutional setting, the biggest auditing entity is an audit organization supervised by governmental sectors. The other audit firms are mostly supervised by IACPA, which is significantly smaller than the audit organization.
A change	Auditor change	Control	This dummy variable equals 1 if the auditor changes in the current period and 0 otherwise.
A tenure	Auditor tenure	Control	This variable is measured by the years an individual auditor continuously audits the client.

A_NAR	Auditor Narcissism	Control	This dummy variable equals 1 if the auditor signature contains its first name and otherwise 0.
REST	Restatement	Control	This is a dummy variable, which is equal to 1 if the financial statements are restated, and 0 otherwise
Current	Current ratio		The proportion of current assets to current liabilities measures this variable.
INVE	Institutional ownership		This variable equals the number of shares owned by institutions such as investment, insurance, financial companies, holdings, and public sectors.
REC	Receivable ratio		This variable is measured by the proportion of receivables to the total assets.
Busy	Busy season	Control	This dummy variable equals 1 if the date of the financial statements is the end of March and 0 otherwise.
BIND	Board independence	Control	This variable is measured by the proportion of independent boards' members to the total number of members
Dealy	Audit report delay	Control	This variable is measured by the natural logarithm of the time distance between the end of the financial year and the date of issuing the audit report.
MTB	Book value to market equity of the firm	Control	This variable is the proportion of the market value of equity to the book value of equity
SIZE	Firm size	Control	The natural logarithm of firm assets measures firm size
LEV	Financial leverage	Control	The current debt measures financial leverage to the current asset ratio
IND	Industry index	Control	This is the variable of firms' industry