The effect of intellectual capital on audit fees stickiness

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Abstract

Purpose – This study aims to evaluate the effects of intellectual capital (IC) efficiency and its components on audit fee stickiness (AFS), such as human capital (HC), organisational capital (OC), structural capital (SC) and relational capital (RC). Moreover, the moderating roles of audit industry specialisation (AIS), tenure and auditors' market concentration are also estimated.

Design/methodology/approach – This study's method is descriptive-correlational based on the information disclosed by listed firms on the Tehran Stock Exchange from 2012 to 2018 using 1,316 year-firm. The method used for hypothesis testing is linear regression using panel data.

Findings – The results show that all the intellectual capital components (ICCs), including HC, SC, OC and RC, negatively impact audit fees (AFS). Further analyses also show that the AIS moderates the relationship between ICCs and AFS.

Originality/value – This paper is one of the pioneer studies assessing the auditors' response to the riskless environments driven by existing IC.

Keywords Human capital, Organisational capital, Relational capital, Audit fee stickiness, Auditor industry specialisation

Paper type Research paper

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, such as 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, for the first time, it shows how auditors react to the level of IC of firms, as a general intangible asset, by adjusting their fees. In the auditing literature, previous investigations have mostly emphasised the interaction of AFS with variables including tax risk (Talkhabi, 2017), managerial overconfidence (Hasas Yeganeh et al., 2015), internal control weaknesses (Munsif et al., 2011), market competition (Chang et al., 2019), audit quality (Rashidi, 2021), audit hours (Koo et al., 2020) and distributed ownership (Dhamasanti, 2021). Thus, in general, the current paper might be considered the first attempt to explore the impact of IC on the sticky behaviour of auditors in determining their fees. Secondly, in a more precise manner, this study may extend auditing literature by explaining auditors' responses to the different IC components (ICCs) independently if they are noticed. As it is extensively documented in the IC literature, the ICCs are expected to be valued by individuals differently, as they have various impacts on firm performance, mainly financial and organisational performance as the primary outcome of businesses (Laallam et al., 2022; Bataineh et al., 2022; Bansal et al., 2022; Agomor et al., 2022), as well as corporate social responsibility performance, as the secondary outcome of companies (Nirino et al., 2022; Tsai and Mutuc, 2020; Gallardo-Vázquez et al., 2019; Aras et al., 2011). Consequently, presenting detailed findings addressing the role of individual ICCs in a given company may suggest valuable managerial, practical and social implications. For instance, the firms' authorities are likely to benefit from our results by improving the ICE and its components to mitigate the business risk (agency cost) and performance. As well as, managers are aware that making customers loyal to their companies would result in valuable competitive advantages for their companies, leading to improved performance (Martín-de-Castro et al., 2006). Finally, the paper's outcomes propose to auditors that the ICE level might be considered an indicative measure to evaluate the business risk.

This paper seeks to answer the question of which component of IC might reduce the firms' business risk at the sight of auditors, resulting in fewer audit fee demands. This paper measures the AFS following the Simunic (1980) model. Under the approach of his model, other audit fee drivers, including the firm size, the current assets ratio, the current debt ratio, the long-term debt ratio and the specified return ratio, are controlled.

The competitiveness and pricing of audit services are more pronounced in emerging markets, Iran, where auditing and using audit services have been required in recent decades by the market and authorities, which turned it into a new field of professional work suffering from many practical gaps as an optimal contract. Thus, we expect that ICCs, which may enhance the firms' performance in many aspects, play a mitigating role in firms' risk-taking, resulting in lower audit work and fees. In this regard, our findings support these expectations according to the negative and significant association documented between HC efficiency (HCE), organizational capital efficiency (OCE), SC efficiency (SCE), RC efficiency

(RCE) and AFS. Alternatively, the incremental growth rate of stock markets in emerging economies, particularly Iran, has drawn equity owners' attention. This issue, especially in recent years, motivates us to examine the potential role of audit industry specialisation (AIS) in the relationship between ICCs and AFS. In this sense, our findings suggest that AIS is willing to moderate the sticky behaviour of audit fees in firms sufficiently invested in ICCs.

The remainder of the paper is structured as follows. In Section 2, the employed theories and previous studies are elaborated. Section 3 includes the methodology used and the statistical population investigated. Next, the descriptive and empirical findings are reported in Section 4. The findings are concluded in Section 5, and the discussion is presented in Section 6.

2. Theoretical framework and hypothesis development

2.1 Intellectual capital components

HC is elucidated under existing personal knowledge, skills, capabilities and employers' experiences to create value and solve business problems. However, managers invest in HC without possessing the right to maintenance within their organisations since employees are the principal owner of HC, not the organisation. Some believe HC is a basis for generating other ICCs (Kianto *et al.*, 2017; Dženopoljac *et al.*, 2016). The SC also refers to existing structures and processes in the staff's organisation and is applied to their expertise (Vergauwen and Van Alem, 2005). SC is all non-human knowledge inventory of an organisation that comprises a database, organisational charts, strategies, trends, process guidelines and other things; their firm values are more than their material value (Bontis *et al.*, 2000). The other component is RC (which is also well-known as CC). The central theme of RC is the applied knowledge in the marketing channels of organisations and their relationships with customers (Salehi and Farzaneh, 2018). Thus, it contributes directly to creating firm values.

2.2 Intellectual capital components 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, as 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 and Almeida, 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, IC 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, as 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.

Based on the previous findings, it is argued that HCE makes a positive contribution to firm performance (Tran and Vo, 2020) and productivity (Smriti and Das, 2018), all of which are likely to be driven by improved physical strength and individuals' intelligence to develop skills and gain knowledge (Schultz, 1961). Thus, the improved HC sends a signal to auditors about a lower level of agency costs and riskiness in firms' operation (Watts and Zimmerman, 1990), leading auditors to devote a lower level of effort and workforce as well as requiring fees stickiness (Gul *et al.*, 2018). Chao *et al.* (2020) also argue that not only the existence of HC's and spiritual capital's components, including knowledge, skills, expertise, ethics, morals and values, etc. but also the rules, systems and norms within the client firms and its relationship with the customers are all closely related to audit fees.

Companies possessing a well-designed organisational structure are likely to pay less audit fees. These companies are expected to enjoy less audit fees by improving their operational procedures and performance. In this regard, Mohammadi and Taherkhani (2017) show that OC is associated with cost stickiness significantly. It means that an effective OC may improve the operation of companies by managing operational and administrative expenditures. Also, Martín-de-Castro *et al.* (2006) argue that OC may give companies competitive advantages. Additively, Chen *et al.* (2012) show that HC and OC are antecedents of organisational commitment. Given the above discussion, we expect an efficient level of OC to mitigate the audit risk by improving the organisational procedures and, ultimately, firm performance (Stoel and Muhanna, 2011), and leading to the adjustment of audit pricing by auditors when they become informed about the effective OC of the client firms. Hockensmith *et al.* (2020) find partial support for the overarching theorising that as OC engenders the integration of new knowledge assets, it moderates the relationship between knowledge acquisition and firm performance such that firm performance is enhanced. Accordingly, it is expected that the improved performance of client firms may impact their business risk and audit fees due to OC.

In addition, SC is proposed as a contributing factor to firm riskiness. Ahmad *et al.* (2019) show that SC has a significant and positive association with the business working environment and performance in the listed companies of Pakistan. AlQershi *et al.* (2021) show a significant influence of strategic innovation on performance, in which the SC has a moderating role in such a relationship. Sarwenda (2020) finds that SC has an appositive effect on RC and competitive advantage. The RC affects the business performance, likely reducing the business risk. They believe that well-designed processes and operational procedures will likely improve internal controls. Therefore, it is expected that SCE may lead to sticky behaviour of audit fees through reduced agent-principal agency problems, driven by internal control improvement and business performance.

Finally, those companies that established an effective and strong link with their customers, as a RC efficiency (RCE), might pay less audit fees to their auditors. Krishnan *et al.* (2019) find that suppliers with loyal customers spend less on audit fees. Their evidence is consistent with the notion that the audit efforts might be reduced due to efficiency gains in the audit process, especially when suppliers with more loyal customer bases share the same auditors with their long-

standing major customers. Consequently, the reduced AFS might result from lower audit risk. Thi Mai Anh *et al.* (2019) discuss that RC can facilitate information sharing and benefit/risk-sharing when firms work together to achieve innovation. Namagembe's (2020) findings indicate that RC influences inter-cluster coordination and service delivery in humanitarian relief chains, resulting in enhanced financial performance. According to the above discussion, we expect the RC to reduce the audit fees by mitigating the business risk and improving the business performance.

Recent investigations also document that risk factors of higher competition in the audit market may also explain the sticky reaction of audit fees (Chang *et al.*, 2019; Rashidi, 2021). Biswas (2021) shows that client firms' characteristics, including firm size and ownership structure, may determine the amount of AFS in India. Fung *et al.* (2021) articulate that earning quality is willing to reduce the AFS. Frino *et al.* (2022) argue that information asymmetry, as a risk element, is positively related to the quantum of audit fees paid. Yongbin and Mengzhe (2022) find that the company's audit fees increase if the chief executive officers (CEOs) and chief financial officers (CFO) have the same tenure because the CFO has the same tenure with the CEO is more likely to cooperate with the CEO's motivation on earnings management and thus increase the audit cost and audit risk. Thus, given the theoretical principles of audit pricing behaviour, the following hypotheses are developed to test the impact of ICCs on AFS:

H1. There is a significant and negative relationship between HC and AFS.

H2. There is a significant and negative relationship between OC and AFS.

H3. There is a significant and negative relationship between SC and AFS.

H4. There is a significant and negative relationship between RC and AFS.

2.3 Audit industry specialisation

AIS includes creating constructive ideas (creating added value) to help the client and provide approaches or strategies for clients' topics in related industries (Kend, 2008). According to a market share approach, an industry expert is an audit firm that distinguishes itself from other rivals in market share in a specific industry. Therefore, an audit firm with a larger market proportion has more specialised knowledge about that industry (Salehi *et al.*, 2017). Consistently, Bell *et al.* (1997) suggest that auditors who developed a wider range of knowledge about their client's businesses and industries are more expected to assess the audit risk. In this regard, Low (2004) shows that auditors' knowledge of the client's industry improves their audit risk assessments. Thus, industry-specialised auditors can recognise the level of audit risk and ICC's effectiveness. Alternatively, the prior studies have arrived at the consensus of a positive impact of AIS on audit quality. In a meta-analysis, Salehi *et al.* (2019) show that audit firm size and auditor specialisation are positively associated with audit quality. Therefore, the greater audit fees that specialised auditors require might be expected to be driven by the greater audit quality provided by this type of auditors. Daemigah (2020), according to a meta-analysis, also argues that audit quality and AIS of the audit firm are both positively correlated with audit fees. Stein (2019) supports that client firms engaging industry specialist auditors tend to record larger impairments than those engaging auditors with less specialisation.

Considering the above discussions, we expect that AIS may alter the audit pricing behaviour of audit firms in two channels, firstly, through an improved initial audit risk assessment, which ICCs might explain, and secondly, by providing high-quality audit services. The following hypotheses are developed to examine the mediating role of AIS on the association between ICCs and AFS:

H5. AIS positively and significantly impacts the relationship between HC and AFS.

H6. AIS positively and significantly impacts the relationship between OC and AFS.

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

H8. AIS positively and significantly impacts the relationship between RC and AFS.

To provide a clearer picture of the above discussions and the process of hypothesis development, Table 1 is presented as follows.

3. Research methodology

3.1 Study sample

The statistical population of the present study includes all listed firms on the Tehran Stock Exchange from all industries from 2012 to 2018. Having considered the following conditions, the total population of this study consists of 188 firms for 7 years, (188×7) 1,316 firm-years observations:

- Firms should not be affiliated with financial intermediaries, holdings and banks (productive firms). This condition is used because such firms have differences in the activity and classification of financial statement items.
- The transaction of firms' stocks should not be stopped entirely during the study (firms' signs should not exist on the stock exchange).
- Firms should be enlisted on the Tehran Stock Exchange at least at the beginning of 2012.
- All required data should be available during the period of the study.

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 and Almeida (2017) Mohammadi and Taherkhani (2017) Martín-de-Castro *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)	Using 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 1.
Summarised previous discussions justifying the association between ICCs and AFS

The main reason for the investigation of this period is data availability. The Central Bank, Tehran Stock Exchange official website and Codalwebsite are primary data sources. Table 2 briefly illustrates the information related to model variables for Stock Market data. To analyse the raw data, the Eviews statistical software is used.

3.2 Data analysis method
According to analyses of previous studies, we used the Pulic model to measure IC and its components' potential influences. This statistical measurement is used, as it is among the most accredited and famous methods proposed to evaluate the IC within the companies. Furthermore, we use the STICKY AF and SPEC variables to assess specialisation's potential impact on AFS.

To assess the relationship between ICCs (such as HC, OC and RC) and AFS, the following multiple regression model is used:

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

Moreover, the following multiple regression model is used to assess the effect of AIS on the relationship between ICCs (human, organisational and RC) and AFS:

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

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

Table 2.
The procedure of
sample firm selection

3.3 Variable measurement
Note; all the variables and their measurements are explained in Appendix 1.

3.4 Intellectual capital components elaboration
According to Appendix 1, the ICCs, including HC, SC, OC and RC efficiencies, are assessed based on value-added intellectual coefficient (VAIC) degrees. The VAIC degrees are calculated based on the given model and operating profit. VAIC has been proposed by Chan Hang (2009) as a standardised and regulated proxy measuring the IC performance according to reported financial statements of companies. The HC is calculated through the value-added in a given company compared to the employment costs. In other words, the VAIC method shows how effectively a firm's employees work. The VAIC measures the OC, RC and customer capital efficiency (CCE) by considering the SC and value-added of a firm compared to the advertisement and marketing costs. It implies the comparison of value-added inside a company with the cost of marketing and advertising. Researchers have widely applied this measure to its reliability and suitable data availability. The VAIC method used in this paper is adopted from Pulic (2000).

4. Research findings
4.1 Descriptive statistics
This study used two models to evaluate the relationship between ICCs and AFS. The present study has also used a panel data method, including 188 Iranian firms, from 2012 to 2018 in its data set. ICCs are used for model estimation.

The average human, organisational and CC efficiency is 0.369, 0.010 and 0.320. Besides, the variable of auditor specialisation has an average of 0.429, which shows a specialised auditor audits about 46% of sample firms.

Also, to model the ICCs, variables such as book value to the firm's equity market (MTB), firm size (Size) and financial leverage were added to the explanatory variable.

4.2 Hypotheses testing
As presented in Table 3, there is no linearity between variables according to obtained variance inflation factor (VIF) statistics of lower than 10. Thus, none of the variables suffers from linearity problems.

All variables are at no unit root by analysing the unit root of research data (stationary). The obtained LM statistic for each variable is reported in Table 4, Column 3.

4.3 Model estimation and interpretation of results
Concerning the proposed model based on preferential tests, the experimental model is estimated based on the panel data's fixed effects method.

As shown in Table 5, the results of the first hypothesis argue that there is a negative and significant relationship between HCE and AFS; since the HCE's p-value and coefficient are 0.000 and -0.184. Using an efficient level of HC in the companies may decrease AFS. Supportively, the agency theory argues that the HCE inform auditors about a lower level of the agent-principal problem within the firm, which makes a positive contribution to firm performance (Tran and Vo, 2020) and productivity (Smriti and Das, 2018), both of which are likely to be driven by improved physical strength and individuals' intelligence to develop skills and gain knowledge (Schultz, 1961). Also, the existence of HCE is a sign of lower risk in firms' operation (Watts and Zimmerman, 1990), leading auditors to devote less effort and workforce and require lower audit fees (Gul *et al.*, 2018).

The findings related to *H2* also show that OCE, with the p-value and coefficients of 0.012 and -0.226, is negatively incorporated with AFS. These findings also indicate that a well-

Variable	obs	Mean	SD	Min	Max
Lnafee	1,316	7.339	1.642	2.302	14.390
Big1	1,316	0.261	0.439	0.000	1.000
Busy	1,316	0.740	0.438	0.000	1.000
Achange	1,316	0.335	0.472	0.000	1.000
Age	1,316	38.795	13.206	8.000	67.000
Roa	1,316	0.106	0.162	−1.063	1.242
Lev	1,316	0.604	0.267	0.061	4.003
Grw	1,316	1.267	28.188	−0.845	902.671
ART	1,316	0.501	0.500	0.000	1.000
SPEC	1,316	0.429	0.495	0.000	1.000
Size	1,316	14.191	1.494	10.532	19.374
ROE	1,316	0.248	0.867	−16.845	10.045
Cata	1,316	1.111	2.367	0.064	68.115
A_nar	1,316	0.888	0.315	0.0000	1.000
Atenure	1,316	3.573	3.768	1.000	17.000
Rest	1,316	0.755	0.429	0.000	1.000
HCE	1,316	0.369	1.600	−21.030	38.283
SCE	1,316	0.631	1.600	−37.283	22.030
CCE	1,316	0.620	1.610	−37.283	22.217
OCE	1,316	0.010	0.044	−0.438	0.810
Current	1,316	1.503	1.078	0.164	13.151
INVE	1,316	0.284	0.596	0.000	17.877
REC	1,316	0.328	0.695	0.0002	18.808
MTB	1,316	4.180	10.797	−200.219	103.153
HHI	1,316	0.231	0.218	0.019	1.000
BIND	1,316	0.699	0.191	0.000	1.167
Dealy	1,316	4.255	0.403	1.946	5.375
Steaky AF	1,316	4.18e−10	0.187	−0.461	1.751

Table 3.
Descriptive statistics

designed organisational structure will likely alert auditors of less audit risk in the initial risk assessment, preventing them from showing sticky behaviour at the proceeding stages. In other words, CEOs invested in OC are more likely to meet the principal interests. As the OC may limit the opportunistic behaviour of managers and improve the firm operational procedures and performance, both of which are likely to be evaluated by auditors in the planning stages; therefore, they may show lower stickiness in their pricing behaviour. In line with our findings, Mohammadi and Taherkhani (2017) find that OC is associated with cost stickiness, meaning effectively structured procedures may reduce general costs of production and improve the firm performance, which provides companies with competitive advantages (Martín-de-Castro *et al.*, 2006). Additionally, Hockensmith *et al.* (2020) suggest that as OC engenders the integration of new knowledge assets, it moderates the relationship between knowledge acquisition and firm performance such that firm performance is expected to be enhanced, all of which sends positive signals to auditors of the low level of firm riskiness.

Further analyses of the third hypothesis also show a negative and significant relationship between SCE and AFS due to the p-value and coefficient of 0.005 and −0.014. These findings demonstrate that SCE plays a mitigating role in AFS by improving internal control efficiency and reducing firm riskiness. To be more precise, the strong internal controls might be considered by auditors as an index for lower agent-principal conflict inside the firm; thus, they may estimate a lower audit risk when planning the audit process

Variables	VIF Level	Hadari unit root 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 4.
Results of VIF and
Hadari unit root tests

and showing lower AFS. In line with our findings, Chao *et al.* (2020) and Yemen AlQershi *et al.* (2021) reveal that ICCs, including SCE, might be considered an effective corporate governance mechanism to reduce agency costs, audit risk and fees.

Finally, the findings of the fourth hypothesis articulate that RCE also has a negative impact on AFS with an intensity of −0.115 and a *p*-value of 0.038. Such results denote that companies that established an effective and strong linkage with their customers are less likely to suffer from agency conflict; subsequently, the auditors may consider these firms as less risky clients and ultimately show lower AFS when willing to adjust their price. In line with our findings, Krishnan *et al.* (2019) recommend that suppliers with loyal customers spend less on audit services; because such strong ties show a lower level of agency conflict within a firm. The underlying theory suggests that auditors are likely to recognise ICE in the companies, which might be translated as a positive sign that it is willing to improve the firm's performance, resulting in fewer clients and audit risk. The lower audit risk is defined as lower audit fees, denoting that the lower client risk reduces the risk of issuing a clean opinion for auditors, alleviating audit procedures and the required efforts necessary for audit planning stages.

As reported in Table 6, the other analyses, including *H5*, *H6*, *H7* and *H8*, demonstrate that AIS negatively impacts AFS. Such an argument is obtained due to the *p*-values (coefficients) of HCE × SPEC, CCE × SPEC, OCE × SPEC and SCE × SPEC, which are, respectively, 0.048 (−0.216), 0.031 (−0.124), 0.000 (−0.095) and 0.005 (−0.013) for *H5–H8*. These findings mean that industry-specialised auditors are less likely to show sticky behaviour when they are willing to adjust the audit fees. These findings follow the approach of Low (2004), explaining that auditors'

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**		
Hausman Test		Chi2(22)=10.62		
		Prob>Chi2 = 0.9797		
Prob model		Wald chi2(23) = 66.49		
		Prob>Chi2 = 0.000**		

Notes: *Significance level of 95%; **significance level of 99%
Source: Research findings

knowledge of the client's industry improves their audit risk assessments and directly influences the nature and the extension of the audit tests in the planning stage. Considering this approach, as industry-specialised auditors can recognise the industry-specific information and determine the level of audit risk, they can assess the intensity of ICCs in a specific client compared with other firms competing in the same industry. Low (2004) explores that changing the audit procedure is remarkably incorporated with auditors' knowledge of their client's industry. He argues that industry-specialized auditors are less likely to change the audit procedure, staff and hours due to their great knowledge of their firm clients, reducing the likelihood of audit fees for these auditors (Daemigah, 2020). Consequently, these auditors are less likely to show sticky behaviour through adjustment of audit fees in current and subsequent years, as they are expected to sufficiently identify the advanced level of ICCs within the firm, compared with the industry average. Supportively, Stein (2019), Gil et al. (2019) and Lowensohn et al. (2007) provide similar findings.

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**
Hausman Test	Chi2(24)=2.92
	Prob>Chi2 = 0.8919
Prob model	Wald chi2(23)=66.49
	Prob>Chi2 = 0.000**

Table 6.
The results of Model
(2) estimation

Notes: *Significance level of 95%; **significance level of 99%
Source: Research findings

It is argued that such an effect is driven by providing high-quality services, greater market share (BIG4 auditors) and market power. Zerni (2012) believes that, as a general rule, auditors may use specialisation strategies to charge their clients differently. The lower production cost of audit services may also explain such behaviour in determining the audit fees. Steven *et al*. (2008) show that auditor concentration in an industry relates positively to both the level and homogeneity of the investment opportunity set in an industry, whereas auditor dominance relates negatively to industry investment opportunity set homogeneity, both of which are likely to increase the audit fees. Such costly behaviour might be considered because the auditors' knowledge of the client's industry improves their audit risk

assessments and directly influences the nature and perceived quality of their audit-planning decisions (Low, 2004).

5. Discussion

This paper aims to examine the effect of ICE and AIS on the level of AFS. It is expected that the efficiency of ICCs will likely reduce audit fee adjustment by auditors due to the positive contribution of ICCs to a given company. Additionally, the in-depth knowledge of specialised auditors is probably willing to assist them in having a more accurate and decisive assessment of the audit process and fees.

According to the observed results of hypothesis testing, all the ICCs, including human, organisational, structural and RC, will significantly reduce AFS. For the first time in emerging markets, these findings imply the responsive behaviour of auditors when they are willing to propose or adjust the fees of their services. When auditors are eager to plan for audit work, particularly based on initial cognition and pre-testes, they consider all the ICCs, as risk mediators, in their initial measures and subsequent adjustment. In other words, all the ICCs in a specific client may ensure auditors that this client operates in a less risky environment; therefore, audit fee changes or adjustments would be minimised. To be more precise, HCE is willing to reduce audit fees by informing them about a lower level of the agent-principal problem within the firm (Tran and Vo, 2020; Smriti and Das, 2018), and OC may reduce AFS by effectively structured procedures (Martín-de-Castro *et al.*, 2006), as well as SCE may improve a firm's riskiness by effective corporate governance mechanism (Chao *et al.*, 2020; AlQershi *et al.*, 2021).

Further analyses also demonstrate that AIS negatively mediates the relationship between ICCs and AFS. These findings also connote that the deeper comprehension of industry-specialised auditors about the role of ICCs in a given client significantly impacts their pricing behaviour compared to non-specialised auditors. We expect that comparing firms with the average of their own industry, regarding the level of ICCs, as a corporate governance mechanism, significantly assists auditors in using an accurate and sustainable pricing method. In support, Low (2004) explores that a lower rate of changing the audit procedure is remarkably incorporated with auditors' knowledge of their client's industry, which reduces the likelihood of audit fees for these auditors.

6. Conclusion

The findings of this paper shed more light on the literature body of IC and agency theory approaches. According to the findings of this paper, we provide some contributions in terms of academics and practices. Academically, we have established a link between ICCs and AFS for the first time, which provides future researchers with a basis for exploring the determinants of AFS, such as corporate social responsibility. Practically, the firms' authorities might use our results to improve the ICE and its components to mitigate their business risk (agency cost) and improve their business performance, which may contribute to the outcome of audit work. For example, HCE is likely to improve firm performance by promoting the staff's knowledge and skills (Schultz, 1961); additively, making customers loyal to companies might also provide some competitive advantages for them, resulting in improved performance of companies (Martín-de-Castro *et al.*, 2006) and sustainable audit pricing behaviour. For auditors, we propose that the ICE level might be considered an indicative measure to evaluate the business risk. This may help them predict and assign more effectively at the programming stage and suggest a fair and sustainable audit fee. This may also help auditors to improve their market position by maintaining existing and increasing potential clients. Finally, CEOs may decrease the auditing cost by employing specialised auditors. As specialised auditors have a deeper comprehension of a given industry, they may charge lower fees to their client firms.

Our suggestion for future researchers comes from our academic contributions. Future researchers may contribute to the literature by exploring other factors, such as innovation and corporate social responsibility, on the concept of AFS. They can investigate how auditors are likely to react to other non-financial information.

This paper has some limitations as well. If the study's duration has been longer, the results were generalisable. However, suppose more years were considered for sample selection. In that case, the number of sample firms and the statistical sample should have been lower, decreasing the study's validity and limit and the possibility of the so-called equation. Moreover, the obtained data from financial statements were not adjusted in terms of inflation. Given the difference in the inflation rate in the years under study, if the data used for this purpose were adjusted, the results may differ from the current results.

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Symbol	Variable	Type	Definition
StickyAF	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: $LAF = \beta_0 + \beta_1 LTA_{it} + \beta_2 CATA_{it} + \beta_3 QUICK_{it} + \beta_4 DE_{it} + \beta_5 ROI_{it} + \beta_6 LOSS_{it} + \varepsilon_{it}$ 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 labour, 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 labour, 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

(continued)

Table A1.
Variables definition

Symbol	Variable	Type	Definition
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 labour, 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: $$\frac{total\ assets\ of\ all\ clients\ of\ each\ special\ audit\ firm\ in\ special\ industry}{total\ assets\ of\ all\ clients\ in\ speical\ industry}$$ 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 used by previous literature (see; Brezina *et al.*, 2016; Šindelář and Müllerová, 2017 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.

(continued)

Symbol	Variable	Type	Definition
			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		Control	

(continued)

Table A1.

Symbol	Variable	Type	Definition
	Audit report delay		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

Table A1.