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Article

Determinants of industry expertise outsourced IAF: Do company and auditor attributes affect the selection?

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ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

Determinants of industry expertise outsourced IAF: Do company and auditor attributes affect the selection?

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Abstract: Outsourcing the internal aud it function (IAF) is a worldwide practice attractive to companies, practitioners and regulators because it is believed that providers of this function are objective and competent and can provide high-quality audit. This study explores the potential influence of company and auditor characteristics on selecting outsourced IAF providers with industry expertise. Using 334 observations for non-financial companies that outsourced this function to an external provider over the period 2010–2017, logistic regression suggests that company characteristics such as size, issue of new equity, age, and total accruals significantly determine the selection of industry-expertise outsourced IAF (IEOIAF) providers. We report similar findings when considering alternative approaches for measuring industry expertise, using a matching sample method, and controlling for the potential effect of endogeneity. In additional analysis, we explore these

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PUBLIC INTEREST STATEMENT

Outsourcing the internal audit function (IAF) is a form of assigning the IAF activities to a provider outside the company, such as an audit firm. Outsourcing IAF is a worldwide practice for companies who wish to have a higher quality of financial reporting and internal control. Accordingly, a number of studies have discovered the importance of outsourcing IAF in the different context, concluding that the quality of the provider plays a crucial role in ensuring high-quality IAF. This study explores the determinants of selecting a high-quality provider. In particular, it examines whether company- and external auditor-specific characteristics affect the selection of an outsourced IAF provider with industry expertise. It finds that characteristics related to company size and complexity are the primary determinants. It also find evidence linking the characteristics of the company and external auditor with an outsourced IAF provider with industry expertise based on its type, either a big4 or second-tier audit firm. Overall, these findings will interest different stakeholders in capital markets.

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determinants, classifying the IEOIAF providers into big4 or second-tier audit firms; we find that size, leverage, quick ratio, concentrated ownership, loss, assets turnover, age, total accruals, external auditor type, and audit fees are the major determinants in the choice of an IEOIAF provider. Our study is of interest to a variety of users and provides the first empirical evidence for the determinants of outsourced IAF providers with industry expertise.

Subjects: Business, Management and Accounting; Accounting; Corporate Governance

Keywords: IAF; outsourced IAF; industry expertise; company characteristics; auditor characteristics
JEL classfications: M41; M42

1. Introduction

Over the last two decades, requiring public companies to establish an internal audit function (IAF) has become the norm in many capital market authorities worldwide. For example, effective from October 2004, the New York Stock Exchange (NYSE) in the USA mandated that traded companies incorporate IAF, either in-house or through outsourcing. Other capital markets have been influenced by this requirement, either mandating (e.g., Malaysia; China; Oman) or recommending (e.g., UK; Australia) the establishment of IAF for public companies. The premise is that IAF is a major and effective mechanism solving or mitigating the agency problem (Abbott et al., 2016; Anderson et al., 1993; Sarbanes-Oxley Act, 2002). However, it is evident that companies choose different providers (internally or externally) to perform the IAF activities. For example, the 2015 survey of the Institute of Internal Auditors (IIA) revealed that one-third of respondents worldwide outsourced their IAF activities partially or fully to a third party, with the majority expecting to keep or expand the outsourcing in the future (Barr-Pulliam, 2016). Empirical research also reports variation in public companies in regard to the sourcing of IAF activities, suggesting that many of them outsource this function to a third party such as audit firms (Baatwah et al., 2019; Baatwah & Al-Qadasi, 2020; Mubako, 2019; Wan-Hussin & Bamahros, 2013). However, little is known about whether companies differentiate between the providers of outsourced IAF and why they select a particular provider. Thus, this study aims to explain the choice of IAF provider, and particularly the choice of external IAF provider.

The main objective of this study is exploring the determinants of outsourcing IAF. Specifically, it first examines whether company attributes drive companies to select an external IAF provider who is the dominant force in the industry. Another objective is to examine whether external auditor attributes have any influence on the choice of an external IAF provider with industry expertise.[1] These objectives are justified, first, by the worldwide trend in outsourcing IAF to external providers because companies have difficulty in finding qualified IAF staff (Barr-Pulliam, 2016) and would have to invest heavily in developing a high-quality internal audit department (Mubako, 2019). Thus, as IAF is a cornerstone of monitoring, it is contended that outsourcing IAF can help companies to ensure high-quality monitoring at lower costs because these providers are objective and possess the required human and technology resources (Caplan & Kirschenheiter, 2000; Carey et al., 2006; Mubako, 2019). However, it is apparent that selecting an external provider is not a random choice, and that companies have started to differentiate between providers based on their qualities in performing this function and the level of required monitoring. Thus, it is expected that retaining external IAF providers with industry expertise is becoming a priority, because they may improve the monitoring quality at lower cost (Carey et al., 2006). To our knowledge, very limited research examines the determinants or factors influencing the choice of outsourced IAF provider (Baatwah & Al-Qadasi, 2020; Carey et al., 2006), and none of this research examines the factors associated with the choice of industry-expertise outsourced IAF providers (IEOIAF). Accordingly, Mubako (2019) calls for more exploration on the determinants of outsourcing IAF and the types of provider.

Second, most audit firms incorporate IAF services in their business model (Selim & Yiannakas, 2000) and consider it as a major source of revenue (MarketWatch, 2020; Rittenberg & Covaleski, 1997; The Business Research Company, 2018). However, it is anticipated that there is fierce competition among audit firms to provide IAF, and that they might start to follow particular strategies, for example, industry knowledge, to differentiate their IAF services as a way of attracting clients. As a result, some audit firms identify themselves as a specialist provider of IAF; for example, PwC claims on their website that "*With PwC's Internal Audit Solutions, you'll have a partner who thinks about risk in the context of your business*", while Ernst & Young's website clearly states that "*We are a market leader in innovative and transformative internal audit (IA) and internal controls (IC) services … Whatever your company's size, sector, geography or maturity, our IA services are flexible and scalable to help you*".[2] This may be an indicator of sufficient incentive for the audit firms to allocate greater investment in industry knowledge and technologies, in order to develop IAF expertise and industry dominance. However, to the best of our knowledge, little is known about industry expertise in the context of IAF and whether audit firms recognise industry expertise at the level of IAF as a strategy differentiating their IAF service.

Finally, although outsourcing IAF is increasingly being studied, little attention has been paid to its determinants. For example, a growing number of researchers have investigated the determinants of outsourced IAF (e.g., Abbott et al., 2007; Abdolmohammadi, 2013; Carey et al., 2006; Sarens & Abdolmohammadi, 2011; Widener & Selto, 1999), but predominantly concentrating on the factors which explain why companies opt to outsource their IAF activities to an external provider rather than keeping IAF in-house. This research is limited and needs further investigation to understand the phenomena of outsourced IAF (Mubako, 2019). Further, although it has advanced our understanding of the determinants of outsourced IAF, little work has been conducted to expand our knowledge of outsourced IAF by type of provider. Baatwah and Al-Qadasi (2020) provide the first empirical evidence examining the factors associated with the selection of big4 or non-big4 audit firms as external IAF providers. They include a set of explanatory variables related to company attributes and external auditor attributes; the results suggest that the choice of big4 audit firms as IAF providers is significantly influenced by board and audit committee expertise, audit committee size, and type of external auditor, while the selection of non-big4 audit firms is significantly determined by board independence, CEO expertise, profitability, and ownership structure. These results indicate that selecting an independent and expert outsourced IAF provider is a stronger motive than cost saving. Therefore, it is interesting and important to explore what factors motivate companies to select an IEOIAF provider.

Investigating factors influencing the choice of companies to demand high-quality auditors, big4 audit firms or industry specialists, is crucial because relatively limited research has considered this area of research to date (DeFond & Zhang, 2014). In the current study, we concentrate on the determinants of selecting an external IAF provider with industry expertise. At the external audit level, this type of auditor is reported to provide more effective and efficient audit services because they understand the industry phenomena surrounding the client (e.g., business risks and accounting issues) and apply audit techniques and tests fitting the nature of the client (e.g., Balsam et al., 2003; DeFond & Zhang, 2014; Solomon et al., 1999). They accordingly ensure high-quality monitoring of the financial reporting process, internal control system, and compliance with the regulations. Thus, a growing number of publications has emerged examining why firms select external auditors with industry expertise and identifying various variables explaining the selection of an industry-expertise external auditor (e.g., Al-Qadasi et al., 2019; Chen et al., 2005; Darmadi, 2016; Ettredge et al., 2009; Huang & Kang, 2018; Kang, 2014; Srinidhi et al., 2014; Zhang et al., 2019). However, no research has explored the determinants of industry expertise in IAF providers, and this study seeks to fill this void.

Based on agency and signalling perspectives, we use a number of company- and external auditor-specific characteristics as the main determinants of IEOIAF providers. In particular, we consider measures for size, complexity, and business risk as company-related attributes, and audit

firm type, industry expertise, and audit fees as external auditor-related attributes. According to these two perspectives, the incentives for selecting an IEOIAF provider might be explained by size, complexity, and business risks (DeFond & Zhang, 2014). Also, it is found that external auditors rely on the work of internal auditors, especially if the outsourced IAF provider is of high quality (Desai et al., 2011). Some of these characteristics have been considered in prior outsourcing IAF literature (e.g., Abdolmohammadi, 2013; Carey et al., 2006), but none has explored their influence in the context of the type of outsourced IAF provider. We acknowledge the recent findings of Baatwah and Al-Qadasi (2020) who explored some of these characteristics in the context of outsourced IAF types with an exclusive focus on big4 and non-big4 IAF providers.

Using a sample of companies that outsourced IAF over the period 2010–2017 from Oman, a setting with a common practice of outsourcing IAF and the public availability of data on outsourced IAF providers, the major findings of our study show several company and external auditor attributes significantly explaining the choice of external IAF providers with industry expertise. Specifically, we find that company characteristics such as total sales, equity market to book value ratio, and age are positively associated with IEOIAF providers. On the other hand, we observe a negative association between company characteristics such as issue of new equity and total accruals and these providers. However, we find that company characteristics such as leverage, ownership structure, loss, quick ratio, and assets turnover, and external auditor characteristics such as size, industry specialist, and fees are not significantly associated with IEOIAF providers. We verify these findings by conducting a variety of robustness tests and qualitatively conclude similar findings. Expanding this analysis to the firm type of IEOIAF provider reveals that size, leverage, and quick ratio are important determinants for big4 audit firms, while concentrated ownership, loss, assets turnover, age, total accruals, external auditor type, and audit fees are the major determinants for second-tier audit firms.

The current study seeks to make a threefold contribution to the literature. First, while there is research examining why companies select an external auditor with industry expertise for statutory audit (e.g., Al-Qadasi et al., 2019; Chen et al., 2005; Darmadi, 2016), the examination of industry expertise at IAF level is somewhat novel in the audit literature. The industry-expertise auditor represents the main input for high-quality audit, high-quality financial reporting, and a lower level of agency problems (DeFond & Zhang, 2014). To the best of our knowledge, this paper is the first to examine the determinants of the type of outsourced IAF provider, such as an industry specialist. Second, we expand the determinants of outsourced IAF by including new factors (e.g., market to book value; quick ratio; assets turnover; total accruals, and external audit fees) that may play a crucial role in motivating companies to hire an industry-specialist IAF provider. Third, we build on recent research (Baatwah & Al-Qadasi, 2020) to expand the investigation of whether companies differentiate between the industry expertise provided by external IAF auditors based on their type: big4 or non-big4 audit firms. This new stream of research represents a timely response to the calls for exploring the salient feature of outsourcing IAF and the type of provider (Mubako, 2019).

We organise the remainder of this paper in six sections. The next two sections cover the background of the study setting and theoretical framework. The fourth section reviews prior research and the development of hypotheses. The research method is presented in the fifth section. The sixth section reports and discusses the main and additional results. Finally, we conclude the study and its implications in the seventh section.

2. Background to the setting of the study

This study employs data from Oman, as this setting provides a number of attributes enabling the examination of outsourcing IAF determinants. Oman is a developing market located on the south-eastern coast of the Arabian Peninsula. It is a member of the Gulf Cooperation Council (GCC) and shares several cultural, political, and socioeconomic characteristics. For example, the political system is a monarchy, and oil/gas is the mainstay of the economy. In the late 1980s, the country initiated several measures to diversify its economy and considered a solid financial market as

a major development. Accordingly, it established a securities exchange market, the Muscat Security Market (MSM), as a regular marketplace for companies and investors trading securities; and a market regulator, the Capital Market Authority (CMA) (Baatwah et al., 2018). However, like most global capital markets, companies and investors in Oman has experienced capital market shocks resulting from corporate frauds and bankruptcy (Rehman & Hashim, 2020). Thus, and responding to developed markets reforms (e.g., SOX), Omani regulatory authorities took action to recover the investors' trust in the capital market and to increase market efficiency.

One noticeable capital market reform in Oman is the code of corporate governance (CCG). Since 2002, all listed companies are required to implement the code articles and to disclose their compliance in their annual reports, including corporate governance report and auditor's report on corporate governance compliance (Capital Market Authority, 2002). This code was the first to be introduced in the Middle East and North Africa (MENA) region, and is considered to be sophisticated and compatible with codes in developed markets (e.g., USA; UK) (Al-Ebel et al., 2020; Hawkamah, 2006). It contains articles organising and managing the relationship between management, directors, auditors, and investors. For example, it requires the board of directors to be dominated by non-executive directors with at least a third of its membership being independent, and with its chair being independent and/or a non-executive director. Also, the audit committee is required to comprise at least three non-executive directors, the majority being independent; to hold four meetings a year; and to include at least one director with accounting expertise. Relatedly, in parallel with the code, the CMA requires all types of companies to establish an IAF, which can be outsourced (Capital Market Authority, 2020). However, in Oman, the financial statements' auditors are prohibited from providing IAF activities to their clients; the outsourced IAF provider is therefore an audit firm/auditor other than the incumbent external auditor. It is reported that 58 percent of Omani listed companies outsource their IAF to external providers (Baatwah et al., 2019), the majority of whom are from big4 and second-tier audit firms (Baatwah & Al-Qadasi, 2020).

Another important aspect in Oman is the audit practices. Auditors in Oman are regulated by Commercial Companies Law 4/74, Accounting and Auditing Profession Law 77/86, and the CMA regulations, circulars and decisions (Al-Ebel et al., 2020; Baatwah et al., 2018). For example, auditors must apply the international auditing standards when conducting statutory audit and ensure their clients follow international accounting standards in preparing their financial statements. Further, they are required to finalise their audit for listed firms within 60 days after the annual closing date, and be rotated after four consecutive years with a two-year cooling-off period. They are allowed to provide only three types of non-audit services to their clients, after audit committee approval: auditing-related services, tax advisory services, and investigation (Capital Market Authority, 2018). This may create more intense competition between auditors to differentiate their services. It is important to emphasise that the audit market in Oman is distinguished by some unique characteristics. First, big4 audit firms control the external audit market, auditing more than 65 percent of listed companies; on the other hand, non-big4 audit firms dominate the outsourced IAF market (Baatwah et al., 2019, 2018). Second, as indicated on the CMA and MSM websites for the year 2020, the number of companies listed on the MSM is small, around 111, and the number of accredited auditors is 20. Third, the size of audit fees is very small compared with other capital markets, on average USD30,260 (Baatwah et al., 2019, 2015).

Overall, based on the above criteria, we argue that Oman is an appropriate setting in which to examine the determinants of outsourcing IAF. First, financial reporting and audit regulatory frameworks in Oman may motivate auditors to provide high-quality outsourced IAF. Second, the nature of the audit market may also increase the auditors' motivation to conduct distinctive IAF activities in order to penetrate the audit market and/or to compensate for lower external audit fees. Third, a large number of companies use external providers to conduct IAF activities; they are required to disclose in their annual reports the type of IAF provider (in-house; outsourced; co-sourced) and the name of any outsourced provider. This will allow us to examine the factors associated with the selection of particular providers and whether companies consider the expertise

of such providers. Finally, empirical evidence from Oman reveals that companies differentiate between outsourced IAF providers and consider the level of agency problem and the associated costs when selecting an outsourced IAF provider (Baatwah & Al-Qadasi, 2020).

3. Theoretical literature review

Although over the last two decades IAF in various capital markets has been mandated, its establishment is still largely voluntary in others. In recent practice, IAF is dedicated to conducting a review of the financial reporting process, internal controls, and compliance with regulations, and to provide advice on risks and operations (DeFond & Zhang, 2014; Dzikrullah et al., 2020; James, 2003; Jiang et al., 2020; Kabuye et al., 2019; Sarens et al., 2009; Savčuk, 2007). These activities can be assigned to employee(s) within the company or to a third-party specialist or audit firm (Caplan & Kirschenheiter, 2000; Mubako, 2019; Selim & Yiannakas, 2000). Given the difficulty of accessing highly qualified staff, the cost of investment in an in-house department, and the potential threat to objectivity, the primary provider of IAF is a third party, such as a well-known audit firm (Abdolmohammadi, 2013; Barr-Pulliam, 2016; Mubako, 2019). In general, external IAF providers are staffed with more qualified and experienced partners and teams and are more inclined to be independent from management (Caplan & Kirschenheiter, 2000; Carey et al., 2006; Selim & Yiannakas, 2000).

However, the choice of a particular provider of outsourced IAF is still largely in the hands of the company's decision makers. Prior research reports that companies outsource their IAF activities to big4 and second-tier audit firms as well as to other non-big4 audit firms (Baatwah & Al-Qadasi, 2020; Carey et al., 2006; Prawitt et al., 2012). In this study, we focus on the determinants of selecting an external IAF provider with industry expertise; as reported in the external audit literature, an industry specialist auditor provides more effective and efficient audit services that result from understanding the industrial environment of the company (e.g., business risks and accounting issues) and from the application of audit techniques and tests fitting the nature of the company (e.g., Balsam et al., 2003; DeFond & Zhang, 2014; Hsin-Yi & Chen-Lung, 2011; Krishnan, 2003; Liu et al., 2017; Solomon et al., 1999). This implies that the industry specialist can ensure high-quality monitoring of the financial reporting process, internal control system, and compliance with the regulations. Thus, we employ agency theory and signalling theory as boundaries explaining the selection of an external IAF provider with industry expertise. These two theories are common in studies of auditor selection and provide consistent predictions in relation to selection (Firth & Smith, 1992; Morris, 1987).

According to agency theory, a business characterised by large-scale economics and investments has, in most cases, been forced to separate management from ownership (Berle & Means, 1932). Thus, owners or shareholders delegate to managers all strategic and operational decisions, assuming that these decisions will always maximise the wealth of shareholders. However, managers and shareholders have different preferences, and managers' self-interest results in the agency problem (Jensen & Meckling, 1976). This problem is exacerbated by information asymmetry where managers have better knowledge about the company than shareholders (Healy & Palepu, 2001). Thus, shareholders, regulators, and scholars have suggested several mechanisms to reduce this problem (Healy & Palepu, 2001; Jensen & Meckling, 1976). Agency theory suggests that internal auditors can eliminate the adverse selection and reduce information asymmetry as they contribute to the quality of monitoring and disciplining the opportunistic behaviours of managers (Anderson et al., 1993; Widener & Selto, 1999). This monitoring is more likely to be strengthened if the provider is an external body possessing greater industry and technology expertise (Baatwah & Al-Qadasi, 2020; Carey et al., 2006). Thus, according to this theory, companies with a higher agency problem which they are seeking to reduce are more likely to select an external IAF provider with industry expertise.

Another perspective we use to explain this selection is signalling theory. According to this theory, the presence of information asymmetry between managers and external users is anticipated (Morris, 1987; Spence, 1973). To convey their capabilities and/or the quality of their work, managers can signal these capabilities and/or qualities to the market, differentiating themselves from

other managers (Morris, 1987; Whelan & Demangeot, 2014). This theory also suggests that managers/directors may select high-quality auditors (e.g., industry specialist) to signal their commitment to shareholders (Morris, 1987); thus, external IAF providers with industry expertise are chosen to signal their good performance.

4. Empirical literature review and hypothesis development

Studying the factors motivating companies to demand high-quality auditors such as big4 or industry specialists is an interesting area of research because the evidence is relatively limited (DeFond & Zhang, 2014). Much of the work on auditor selection has been conducted in the context of external audit (Habib et al., 2019; see for recent literature review on auditor choice). The focus of the literature has been on the selection of auditors with a known brand-name, such as the big4 audit firms (e.g., Abbott & Parker, 2000; Beasley & Petroni, 2001; Ettredge et al., 2009; Simunic & Stein, 1987). While this research has theoretically and empirically advanced our knowledge of the incentives to choosing high-quality auditors, a number of studies have emerged exploring why companies select auditors with industry expertise (e.g., Al-Qadasi et al., 2019; Chen et al., 2005; Darmadi, 2016; Ettredge et al., 2009; Huang & Kang, 2018; Kang, 2014; Srinidhi et al., 2014; Zhang et al., 2019); explanations include ownership structure, business risk, complexity, and corporate governance mechanisms. However, little research has investigated the determinants of selection of external IAF providers with industry expertise. Our study fills this gap and responds to the call for exploring the types of outsourced IAF provider and factors associated with the choice of one provider over another (Mubako, 2019).

Most studies on IAF focus on explaining why companies choose between in-house and outsourced arrangements. For example, one stream of research examines whether company attributes (e.g., size; loss; growth; profitability) drive companies to outsource IAF activities (Abbott et al., 2007; Caplan & Kirschenheiter, 2000; Carey et al., 2006). Another explores the characteristics of IAF providers and their influence on the decision to outsource some or all of their IAF (Abdolmohammadi, 2013; Carey et al., 2006). These characteristics include competencies, age, degree, professional membership, and interaction with the audit committee. A further stream explores how the characteristics of corporate governance mechanisms (board of directors, audit committee, and CEO) affect the decision (Abbott et al., 2007; Abdolmohammadi, 2013; Baatwah & Al-Qadasi, 2020); other characteristics include size, independence, expertise, meetings, tenure, and authority. While the majority of this research reports interesting findings, a limited number of determinants are considered and the results are not conclusive (Baatwah & Al-Qadasi, 2020). Further, the differences between the outsourced providers are ignored, although each type of provider has its own competencies and abilities (Mubako, 2019).

To date, the study by Baatwah and Al-Qadasi (2020) appears to be the only one to differentiate outsourced IAF providers, whether big4 or non-big4. It reports that board expertise, the expertise and size of the audit committee, and the external auditor's type are significantly associated with selecting a big4 audit firm. It also shows that audit committee independence, CEO expertise, concentrated ownership and profitability are associated with non-big4 audit firms. We extend this stream of research by examining how the company and external auditor's characteristics play a role in choosing an external IAF provider with industry expertise.

4.1. Company-specific characteristics

According to the theories adopted by this study (agency and signalling), several factors related to the company may explain the incentives for selecting an industry-expertise external IAF provider. These characteristics, reflecting size, complexity, and risks, are reported to influence the selection of high-quality auditors (DeFond & Zhang, 2014), and the decision to internalise or externalise this function (e.g., Abbott et al., 2007; Baatwah & Al-Qadasi, 2020). The following subsections discuss these characteristics and propose the expected direction of association.

4.1.1. Company size

The size of the company is a common determinant of several auditing and accounting measures. Larger companies tend to appoint a high-quality auditor, with industry expertise, to scrutinise their financial reports and internal controls (Abbott & Parker, 2000; Beasley & Petroni, 2001). Referring to agency theory, larger companies have more shareholders and tend to be associated with greater agency problems (Jensen & Meckling, 1976). Fama and Jensen (1983) contend that the agency cost is a function of company size, implying that as the company grows larger, its agency costs become higher. Therefore, larger companies use high-quality auditors to mitigate the agency problem (DeFond, 1992; Francis & Wilson, 1988; Simunic & Stein, 1987). Similarly, signalling theory suggests that larger companies are prone to greater information asymmetry, given their complexity and business diversity (Beasley & Petroni, 2001; Zhang et al., 2019). Also, they have financial and non-financial resources that enable them to signal their monitoring quality (Girella et al., 2019), through appointing high-quality auditors, and to reduce the information asymmetry. Audit research tends to conclude that larger companies are positively associated with industry expertise of external auditors. For example, Abbott and Parker (2000) find a positive association between the size of a company and the selection of an external auditor with industry expertise. Consistent with this finding, Beasley and Petroni (2001) conclude that larger companies are more likely to hire a high-quality auditor such as one with industry expertise. More recent research continues to assert the positive association between client size and the selection of an external auditor with industry expertise (e.g., Al-Qadasi et al., 2019; Ettredge et al., 2009; Hall et al., 2020; Zhang et al., 2019).

In the context of IAF, limited research also documents that the size of companies is associated with the IAF sourcing decision. For instance, Carey et al. (2006) report that large companies have a greater propensity to outsource the IAF activities to an external provider. Conversely, Baatwah and Al-Qadasi (2020) find a negative association between the size of company and outsourcing IAF activities. However, this research fails to differentiate between the types of outsourced IAF provider, except for Baatwah and Al-Qadasi (2020) who find no significant association between company size and the choice of high-quality IAF providers such as big4 audit firms. Drawing on the agency and signalling theories and on the external auditor literature discussed above, we propose that larger companies which outsource IAF to external providers are more likely to select those with industry expertise. In other words, larger companies face greater agency costs and information asymmetry, and they could appoint an IEOIAF provider to reduce these problems because this provider is more likely to be associated with high-quality IAF and sufficiently powerful to convey this quality to externals. Therefore, the following hypothesis is stated:

H1: Company size is positively associated with industry-expertise outsourced IAF providers.

Following research on external auditor selection (e.g., Abbott & Parker, 2000; Ettredge et al., 2009; Zhang et al., 2019), we employ two proxies for company size. The first is total sales, as the natural log of total sales. This proxy reflects the size of the company in terms of its operational and business diversity. Thus, companies with large sales revenue are considered larger and more likely to have a positive association with IEOIAF providers. The second proxy for company size is the market to book value ratio, reflecting greater information asymmetry between investors and managers and in turn increasing the cost of external funds (Girella et al., 2019). Thus, we also expect a positive association between this proxy and the selection of IEOIAF providers.[3]

4.1.2. Company risk

Companies with a high proportion of operational and financial risk are more likely to suffer from the agency problem (Jensen & Meckling, 1976). Thus, shareholders and market stakeholders require credible information to assess the ability of the company to control or reduce these risks and ensure the company's long-term existence. This will motivate shareholders and other users to demand a high-quality auditor (Abbott & Parker, 2000; Huang & Kang, 2018). Further, companies

may want to signal to market players that they are credible and have strong control over business risks and high-quality information, employing highly qualified external auditors to signal these qualities (Chen et al., 2005; Huang & Kang, 2018). Consistent with these arguments, the external audit literature predicts that high-risk companies, for example, those with large debt or poor performance, are more likely to select high-quality auditors (Abbott & Parker, 2000; Ettredge et al., 2009). However, the empirical findings are not consistent. For example, Abbott and Parker (2000) find that factors associated with financial risk (e.g., leverage, profitability) are not significantly associated with the selection of an external auditor with industry expertise. Chen et al. (2005) find results similar to these findings. Using an international sample, Ettredge et al. (2009) find risk factors such as loss and leverage are significantly associated with the choice of an industry-expertise external auditor. Recent literature also reports inconclusive findings in regard to the association between risk factors and the choice of industry expertise (Al-Qadasi et al., 2019; Huang & Kang, 2018).

Indeed, few IAF studies have used proxies for risk as a determinant of IAF arrangements (in-house or outsourced) (Abbott et al., 2007) or for the types of outsourced IAF provider (Baatwah & Al-Qadasi, 2020). Abbott et al. (2007) find companies with financial troubles outsource IAF activities to a third party. However, they report an insignificant association between profitability and outsourcing IAF. Baatwah and Al-Qadasi (2020) document inconsistent findings on the association between risks and outsourcing IAF. Overall, this literature presents inconclusive evidence to suggest that company risk plays a significant role in selecting an IAF provider. Thus, we draw on agency and signalling theories and on the arguments advanced by the external audit literature positing that companies with high risk are more likely to appoint an industry-expertise auditor. Also, we follow the analytical model of Caplan and Kirschenheiter (2000) which argues that the motivation for outsourcing IAF is increased when the risk is high. Thus, they suggest that high-quality outsourced IAF providers are qualified to reduce these risks. Therefore, we suggest that appointing an external IAF provider with industry expertise can enhance the monitoring quality over financial reports and internal control systems and, accordingly, boost the confidence of market users in the company's ability to manage risk. In other words, companies with a high level of risk are more likely to outsource IAF to an external provider with industry expertise. Thus, we formulate the following hypothesis:

H2: Company risk is positively associated with industry-expertise outsourced IAF providers.

We employ four proxies to measure the extent to which company risk motivates selection of a given type of outsourced IAF provider, consistent with several auditor selection studies that focus on the external auditor (e.g., Chen et al., 2005; Huang & Kang, 2018; Zhang et al., 2019). The first proxy is leverage, in which a high proportion of debt is used to finance company operations and assets, indicating a high risk of bankruptcy or financial distress. Thus, we expect a positive association between leverage and selecting an IEOIAF provider. The second proxy is poor performance as measured by loss. Incurring loss signals to the market the potential risk of company bankruptcy and financial difficulties. Thus, companies with poor performance have greater incentive to engage in high-quality outsourced IAF providers to signal that this performance is incurred in the normal course of business and that they maintain high standards of monitoring to remedy this performance. This implies a positive association between loss and selecting IEOIAF providers.

The third proxy is the quick ratio, an indicator of financial risk: the greater this ratio, the more likely is financial risk to be minor. This suggests that companies with a high quick ratio are less likely to appoint external IAF providers with industry expertise. Thus, a negative association between quick ratio and choosing an external IAF provider with industry expertise is predictable. Finally, assets turnover is the fourth proxy for risk, intuitively similar to the quick ratio. This suggests that companies with higher assets turnover are less likely to suffer financial difficulties,

so less likely to IEOIAF providers. Thus, a negative association is predicted for the association between assets turnover and IEOIAF providers.

4.1.3. Company complexity

Complexity is another determinant used in previous models of external auditor choice (DeFond & Zhang, 2014), associated with high-quality auditors such as industry specialists (e.g., Abbott & Parker, 2000; Chen et al., 2005; Huang & Kang, 2018; Zhang et al., 2019). Indeed, companies with greater complexity can suffer a greater agency problem because complexity is associated with greater information asymmetry and managers' discretion, increasing the opportunity of managers to maximise their interest at the expense of shareholders (Jensen & Meckling, 1976). Further, shareholders and potential investors lack sufficient information on the complex business operations and, consequently, may require additional credible action to reduce this asymmetry. These scenarios may provide companies with the incentive to engage high-quality auditors with industry expertise (Beasley & Petroni, 2001; DeFond, 1992). Consistent with this argument, empirical research finds that more complex companies engaged high-quality external auditors such as those with industry expertise. For example, Beasley and Petroni (2001) report that complexity, proxied by geographic dispersion of the business, is associated with big4 audit firms who are industry specialists. Chen et al. (2005) find complexity is positively associated with industry-expertise external auditors. Other studies (e.g., Abbott & Parker, 2000; Al-Qadasi et al., 2019; Huang & Kang, 2018) report complexity as a major predictor for selecting an auditor with industry expertise, although the results are not consistent.

Although studies have investigated the factors associated with complexity in the context of selecting external auditors, using them in determining IAF sourcing arrangements or the type of outsourced IAF provider is rare. For example, Rönkkö et al. (2018) find complexity positively associated with the establishment of IAF. More closely related, Baatwah and Al-Qadasi (2020), among the pioneer studies that consider complexity factors in outsourcing IAF, observe inconsistent results for the association between complexity measures and the IAF sourcing arrangement but a positive association between complexity and outsourcing IAF if the provider is a non-big4 audit firm. Although the literature on outsourcing IAF provides new insights into its determinants, little is known in the context of industry expertise. Thus, we make our prediction for the association between complexity factors and outsourcing IAF to an industry expert provider based on agency and signalling theories. In particular, we anticipate that companies with greater complexity are more likely to hire external IAF providers with industry expertise. In other words, such providers may be used to reduce agency problems or signal their quality in managing complex business operations and controls. We therefore propose the following hypothesis:

H3: Company complexity is positively associated with industry-expertise outsourced IAF providers.

Similarly to research on external auditor choice (e.g., Beasley & Petroni, 2001; Chen et al., 2005; Darmadi, 2016; Ettredge et al., 2009; Huang & Kang, 2018), we use four proxies for company complexity. The first is ownership structure as proxied by concentrated ownership. Concentrated ownership indicates a lower level of complexity because shareholders can monitor and observe managers' behaviours, updating their information. Also, complexity associated with voting and cash-flow rights is smaller with concentrated ownership. Thus, companies with concentrated ownership structures are less likely to select IEOIAF providers. This suggests a negative association between concentrated ownership and selecting such providers. The second proxy is issuance of new equity. This implies greater complexity because issuing new equity is more likely to be associated with an increased number of shareholders who may demand additional monitoring or extra information. This indicates that companies that issue new equity are more likely to select a high-quality auditor to reduce this complexity and information asymmetry. Thus, a positive association is predicted between issuing new equity and IEOIAF providers.

The third proxy is company age. It indicates less complexity because well-established companies have more experience, and are associated with sophisticated internal control systems that are effective in reducing complexity. Thus, mature companies are less likely to appoint high-quality auditors. This suggests a negative association between company age and IEOIAF providers. The fourth proxy is total accruals. Greater complexity is more likely to be associated with a greater amount of accruals, because it imposes uncertainty and less objective judgements in assessing uncertain conditions. Thus, companies with more accruals are more likely to select high-quality auditors, suggesting a positive association between total accruals and selecting IEOIAF providers.

4.2. External auditor-specific characteristics

Several studies on IAF examine how the source arrangements affect the quality of financial reporting (Abbott et al., 2016; Prawitt et al., 2012) or reliance on the external auditor (Desai et al., 2011; Glover et al., 2008). However, few have examined the determinants of source arrangements/type of outsourced IAF provider employing the characteristics of the external auditor (Baatwah & Al-Qadasi, 2020). It is vital to note that one important input for external audit is the assessment of internal control systems, the major responsibility of IAF. External auditors also rely on the work of internal auditors, especially if the IAF provider is of high quality (Desai et al., 2011). Thus, we include the characteristics of external audit as additional determinants: audit firm type, industry expertise, and audit fees. The following subsections show these characteristics and provide the expected association with IEOIAF providers.

4.2.1. Audit firm type

Research into external and internal auditors' reliance provides insight into the potential association between the type of external auditor and IEOIAF providers (Desai et al., 2011; Glover et al., 2008; Trotman & Duncan, 2018). This research shows that external auditors rely on the work of IAF when conducting their audit, and this reliance is greater if the IAF provider is external (Baatwah & Al-Qadasi, 2020). External auditors, who play a crucial role in regard to the credibility of financial reports and the effectiveness of internal controls, are more likely to be associated with high-quality outsourced IAF providers. Companies use external auditors to mitigate agency problems and to reduce information asymmetry (Anderson et al., 1993; Jensen & Meckling, 1976). However, research differentiates between external auditors in terms of their size and audit quality and considers the big4 audit firms as of higher quality than non-big4 audit firms (DeAngelo, 1981; DeFond & Zhang, 2014), because they are strongly motivated to increase their credibility and reputation and to avoid litigation costs. Thus, a lower agency problem and information asymmetry is predicted for those companies hiring big4 audit firms as external auditor.

Baatwah and Al-Qadasi (2020) argue that companies are more likely to complement the monitoring role of high-quality external auditor (e.g., big4 audit firms) by outsourcing the IAF to external providers. They add that high-quality external auditors are more likely to intervene in the IAF arrangement decision and to support the outsourcing decision. However, little research considers the type of external auditor as a determinant of outsourcing IAF. We acknowledge Baatwah and Al-Qadasi (2020) among the limited research considering the characteristics of external audit on the outsourcing IAF empirical model. They report that big4 audit firms as external auditors are positively associated with outsourced IAF providers, in particular with big4 audit firms, suggesting that the big4 tend to work with or recommend selecting high-quality IAF providers. Consistent with this study and with agency and signalling theories, we assume that external auditors such as big4 audit firms are more likely to be associated with IEOIAF providers. This may represent complementary mechanisms to reduce agency costs and/or signalling high-quality monitoring and control to the capital markets. Thus, we formally state this in the following hypothesis:

H4: Big4 audit firms are positively associated with outsourced IAF providers who have industry expertise.

4.2.2. Audit firm industry expertise

Many studies assert that the industry expertise of external auditors adds value because it enhances their ability to detect and report irregularities in financial reports and controls (Balsam et al., 2003; Solomon et al., 1999; Zalata et al., 2020). Further, this expertise strengthens the external auditor's aim to protecting its reputation and avoid the financial and litigation costs that arise from audit failure. Thus, companies use industry-specialist auditors to reduce the agency problem and signal their quality to external stakeholders (DeFond & Zhang, 2014). However, IAF studies rarely consider the industry expertise of an external auditor as an explanatory variable for sourcing or the type of IAF provider. Based on this, Baatwah and Al-Qadasi (2020) argue that external auditors with industry expertise are more likely to recommend their clients to outsource their IAF to external providers because they rely on them in assessing controls and documentation. However, this study fails to find a significant association between industry-specialist auditors and outsourced IAF activities, or between these auditors and high-quality outsourced IAF providers such as the big4. To our knowledge, the study by Baatwah and Al-Qadasi (2020) is the only one to examine industry specialisation as a determinant of IAF sourcing arrangements and of the type of outsourced IAF provider. Thus, we maintain the similarity of big4 audit firms to industry specialists in relation to the selection of IEOIAF providers, as high-quality external auditors tend to rely on the work of high-quality outsourced IAF providers and may intervene in the decision on IAF sourcing. In other words, we assume a positive association between industry specialists and the choice of IEOIAF providers. We therefore formulate the following hypothesis:

H5: External auditors with industry expertise are positively associated with outsourced IAF providers who have industry expertise.

4.2.3. Audit fees

As indicated by DeFond and Zhang (2014), the fees for external audit are among the indicators of high-quality audit. However, there is little evidence for the association between audit fees and the choice of external auditor and/or outsourcing of IAF, or the types of outsourced IAF provider. Indeed, companies pay higher audit fees to their external auditors to ensure that the financial reports are credible and contain information that represents the true performance and value. This, in many cases, contributes to reducing the agency problem and information asymmetry (DeFond & Zhang, 2014; Jensen & Meckling, 1976). Further, companies hire high-quality auditors such as big4 audit firms, who usually charges high fees, to signal their credibility and good performance (Al-Qadasi et al., 2019; Fan & Wong, 2005; Huang & Kang, 2018). In doing so, external auditors have to spend a correspondingly large amount of time and effort testing and verifying documents and the internal control system (Simunic, 1980; Zalata et al., 2020). Prior research indicates that external auditors use internal auditors or rely on their work in planning and testing the management's assertions on financial statements and internal controls (Desai et al., 2011; Glover et al., 2008). However, in many cases, they require internal auditors to have the required competence and objectivity, and they place more reliance on the internal auditors from outsourced IAF providers (Desai et al., 2011). Thus, if the external auditor relies on the work of high-quality IAF providers, the client is more likely to be charged lower fees as a result of less work.

Given the lack of prior research linking external audit fees with industry expertise, we build our arguments on the association between audit fees and outsourced IAF providers with industry expertise based on our proposed theories and the arguments related to outsourced IAF, as a cost-effective and high-quality function (Mubako, 2019). More specifically, we assume that companies are more likely to assign IEOIAF providers as a way of mitigating the agency problem or signalling quality and, at the same time, reducing the external audit fees. In other words, higher external audit fees may motivate companies to outsource the IAF to a provider with industry expertise

because this provider will increase the quality of the function and the degree of reliance of external auditors. We therefore state the following hypothesis:

H6: External audit fees are positively associated with outsourced IAF providers who have industry expertise.

5. Research design

5.1. Research model

To the best of our knowledge, no research has yet examined the determinants of IEOIAF providers. Thus, following prior research on external auditor selection (e.g., Abbott & Parker, 2000; Beasley & Petroni, 2001), we employ the following logistic regression to test our hypotheses because this method is more appropriate when the dependent variable is dichotomous, as in our case, and it is a common method in accounting research, specifically in audit selection research (Ge & Whitmore, 2010). This regression is a pooled panel data-based analysis. We consider the possible influence of heteroscedasticity and autocorrelation by using firm and year clustered robust standard error to correct these issues. Further, we winsorize all continuous variables to reduce the influence of outliers. All these statistics were implemented using STATA 14 software. The following regression represents the empirical model of this study:

$$INDSOIAF_{it} = \theta_0 + \theta_1 LNSALE_{it} + \theta_2 MB_{it} + \theta_3 LEV_{it} + \theta_4 LOSS_{it} + \theta_5 QUICK_{it} + \theta_6 ATURN_{it} + \theta_7 OWCCO_{it} + \theta_8 NWEQTY_{it} + \theta_9 TACC_{it} + \theta_{10} LNAG_{it} + \theta_{11} ADFSIZE_{it} + \theta_{12} ADFIND_{it} + \theta_{13} LNADFEE_{it} + \theta_{14\text{-}17} YFIX + \theta_{18\text{-}24} INDFIX + \varepsilon_{it} \quad (1)$$

where *INDSOIAF* denotes the dependent variable; *LNSALE, MB, LEV, LOSS, QUICK*, ATURN, OWCCO, *NWEQTY, LNAG*, and *TACC* denote companies' characteristics; *ADFSIZE, ADFIND*, and *LNADFEE* denote external auditors' characterises; *YFIX* and *INDFIX* denote the fixed effects of time and industry respectively; *i* denotes the cross-section dimension and *t* the time dimension. Table 1 presents definitions of these variables and the data source for each.

5.2. Measurement of variables

5.2.1. Measurement of outsourced IAF industry expertise

Following prior research (e.g., Abbott & Parker, 2000; Balsam et al., 2003; Chen et al., 2005; Ettredge et al., 2009), we use a market share approach to identify IEOIAF providers. The process begins by identifying companies that outsource part or all of their IAF activities to external providers (439 observations). Then, we broadly classify these companies into two groups, industrial and service industries, because following the 2(3)-digit SIC industry classification would result in very few observations for each sector in each year. Thus, our classification considers at least 30 observations for each industry and year. For companies with available data, we compute the total sales for each industry in each year, and the total sales for the clients of each outsourced IAF provider in the given industry and year. We use clients' sales as the basis for market share computation because audit fees in relation to outsourcing IAF are disclosed only by very few of the sampled companies. Finally, we consider a provider as having IAF industry expertise if it has at least 30 (20) percent market share (*INDSOIAF30* and *INDSOIAF20*).[4] After these processes of identification, we assign one to outsourced IAF providers designated as having industry expertise, and zero otherwise.

5.2.2. Measurement of company-related characteristics

Several company-specific factors are considered to proxy the three main company characteristics: size, risk, and complexity. Thus, following common measures used in prior external audit research (e.g., Abbott & Parker, 2000; Ettredge et al., 2009; Zhang et al., 2019), this study measures these

Table 1. Variables Definition

Variable	Definitions	
	Dependent variables	**Data sources**
INDSOIAF30	The indicator variable equals 1 if the external IAF provider is an industry specialist who shares 30 percent of market share, 0 otherwise.	CG report & DataStream
INDSOIAF20	The indicator variable equals 1 if the external IAF provider is an industry specialist who shares 20 percent of market share, 0 otherwise.	CG report & DataStream
	Independent variables	
	Company characteristics	
LNSALE	The natural log of total sales.	DataStream
MB	The ratio of equity market to equity book value.	DataStream
LEV	The total debt divided by total assets.	DataStream
LOSS	An indicator variable equals 1 if the company current performance is loss, 0 otherwise.	DataStream
QUICK	The ratio of current assets minus inventory divided by current liabilities.	DataStream
ATURN	The ratio of current sales/revenues divided by total assets.	DataStream
OWCCO	The percentage of common shares held by major shareholders (≤10%).	CG report
NWEQTY	An indicator variable equals 1 if the company issues new common shares in the year, 0 otherwise.	Financial Reports
LNAG	The natural log of the number of years since the company establishment.	Financial Reports
TACC	The proportion of net income minus operating cash flow divided by total assets	DataStream
	External auditor characteristics	
ADFSIZE	An indicator variable equals 1 if the company is audited by one of big4 audit firms, 0 otherwise.	Audit report
ADFIND	The indicator variable equals 1 if the company is audited by industry-specialist audit firm, 0 otherwise.	CG report & Audit report
LNADFEE	The natural log of audit fees paid to external auditor for statutory audit.	CG report
	Control variables	
YFIX	The year indicators for the years from 2010 to 2017.	DataStream
INDFIX	The industry indicators for the industrial, consumer discretionary, materials, and consumer staples.	DataStream

factors as follows. For company size, we proxy it by total sales (*LNSALE*) and market to book value ratio (*MB*); these are measured respectively by the natural log of total sales and the common share market value divided by the common share book value. As for company risk, we employ leverage (*LEV*), loss (*LOSS*), quick ratio (*QUICK*), and assets turnover (*ATURN*). These proxies are respectively measured by: the total debt scaled by total assets; indicator variable equals one if the company incurred loss in the current year, zero otherwise; the current assets minus inventory scaled by current liabilities; the current sales/revenues divided by total assets.[5] For company complexity, we employ concentrated ownership structure (*OWCCO*), issuing new equity (*NWEQTY*), age (*LNAG*), and total accruals (*TACC*). These proxies are respectively measured by: the percentage of common shares held by larger shareholders (≥10%); indicator variable equals one if a company issues new common shares during the year, zero otherwise; the natural log of number of years since the establishment of the company; the difference between sales/revenues and operation cash flow scaled by total assets.

5.2.3. Measurement of external auditor-related characteristics

Following the literature (e.g., Baatwah & Al-Qadasi, 2020; Balsam et al., 2003; DeFond & Zhang, 2014), we consider three important characteristics of high-quality external auditors: auditor size, expertise, and fees. First, audit firm size (*ADFSIZE*) is measured by an indicator variable equalling one if the external auditor is a big4 audit firm, zero otherwise. Second, auditor industry expertise

(*ADFIND*) is also measured by an indicator variable equalling one if the external auditor is designated as having industry expertise, zero otherwise. We use market approach and external audit fees to classify industry expertise; an external auditor who has 10 percent market share is considered as having industry expertise. The final proxy is audit fees (*LNADFEE*) which is the natural log of total fees paid to the external auditor for statutory audit of financial reports.

5.2.4. Control variables

We control for two important factors. First, we control for the industry-specific effects (*INDFIX*) by including four indicator variables representing four sectors: industrial, material, consumer staples, and consumer discretionary. The energy industry is used as the basis for comparison. The second set of control variables are year-specific effects indicators (*YFIX*). Using 2010 as the benchmark for comparison, this set has seven indicator variables representing the years 2011 to 2017.

5.3. Sample selection and data

In line with the objectives of this research, the study population includes all companies listed on the Omani capital market during the period 2010–2017 which outsourced their IAF activities either partially or fully to external providers. Accordingly, we begin the process of data collection by identifying 935 year-observations for all companies listed on the Omani capital market during the period 2010–2017. Then, we exclude 271 observations from financial and investment companies because of their unique structure and regulatory framework and because they are required to have in-house IAF. Further, we delete 225 observations which use in-house IAF providers. This reduces the number of observations to 439. We collect data for these companies from several sources. For example, we use corporate governance reports to identify the name of the outsourced IAF provider and audit fees. We consider DataStream and annual financial reports for collecting data related to company characteristics. We then remove a further 105 observations with missing data, resulting in 334 observations as the observations for testing our hypotheses. Table 2 reports the process of sample selection.

As noted, we use data for companies listed in the Omani capital market where public disclosure for information on the providers of IAF, either in-house or outsourcing, is required. This has advantages over several other settings for conducting this study because the application of IAF activities has been required since 2002, reflecting the maturity of application of companies and the maturity of the IAF profession. Further, outsourcing of the IAF to an external provider is the preferred sourcing arrangement for the majority of companies in Oman (Baatwah et al., 2019; Baatwah & Al-Qadasi, 2020). This might increase the motivation of auditors to develop and strengthen the quality of their service. Finally, Oman is an emerging market with more sophisticated accounting and corporate governance regulatory frameworks than many other emerging markets, and is comparable to developed markets in these frameworks (see Baatwah et al., 2019, for more review). As for the sample period, note that we opt to use data for the period 2010–2017 because 2010 was the first year after the financial crisis that hit most capital markets in 2008, with after-effects in 2009. This should reduce any effect of the crisis on our estimates. 2017 supplied the most recent data when the study was initiated.

6. Empirical results and discussion

6.1. Descriptive results

Table 3 presents the results of descriptive analysis. We observe that the mean of *INDSOIAF30* (*INDSOIAF20*) is 0.243 (0.305), suggesting that 24 (31) percent of companies with outsourced IAF use those with industry expertise. For company characteristics, namely total sales, equity market to book value ratio, leverage, loss, quick ratio, asset turnover, ownership structure, new equity, total accruals, and age, the means are 9.065, 23.963, 0.466, 0.159, 1.901, 0.788, 60.556, 0.138, −0.043, and 2.999 respectively. However, using *INDSOIAF30* to classify the sample into specialist and non-specialist, we find significant differences between companies with industry-specialist and non-specialist outsourced IAF providers in terms of company characteristics. For example, companies with industry-specialist outsourced IAF are larger in size and have a higher growth rate

Table 2. Sample distribution

Panel A: Sample size	**Obs.**
Number of observations for listed companies over the period 2010–2017	935
Less: Observations for financial companies	(271)
Observations for companies with in-house IAF	(225)
Observations with missing data	(105)
Final observations for testing the hypotheses	334
Panel B: Sample distribution by industry	
Industry	Obs.
Manufacturing	30
Energy	43
Consumer discretionary	62
Materials	85
Consumer staples	114
Obs.	334
Industrial	225
Services	109
Obs.	334

Table 3. Descriptive statistics

Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**	**INDSOIAF**	**NINDSOIAF**	**DIFF.**
INDSOIAF30	334	0.243	0.429	0.000	1.000	-	-	-
INDSOIAF20	334	0.305	0.461	0.000	1.000	-	-	-
LNSALE	334	9.065	1.377	0.000	11.604	9.945	8.783	1.162***
MB	334	23.963	409.553	−5.380	7486.34	2.056	1.423	0.633**
LEV	334	0.466	0.280	0.013	1.769	0.483	0.460	0.022
LOSS	334	0.159	0.366	0.000	1.000	0.086	0.182	−0.095**
QUICK	334	1.901	3.845	0.039	62.504	1.291	1.895	−0.604***
ATURN	334	0.788	0.475	0.000	2.538	0.873	0.760	0.112
OWCCO	334	60.556	22.381	13.100	99.130	55.913	62.043	−6.130**
NWEQTY	334	0.138	0.345	0.000	1.000	0.074	0.158	−0.084**
LNAG	334	2.999	0.493	0.000	3.761	3.034	2.998	0.037
TACC	334	−0.043	0.126	−0.829	0.851	−0.057	−0.038	0.019
ADFSIZE	334	0.617	0.487	0.000	1.000	0.765	0.569	0.196***
ADFIND	334	0.320	0.467	0.000	1.000	0.358	0.308	0.050
LNADFEE	334	8.754	0.495	7.783	10.219	9.031	8.666	0.365***

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$;

INDSOIAF is an indicator for outsourced IAF industry specialist sample; NINDSOIAF is an indicator for outsourced IAF non-industry specialist sample; See Table 1 for variables definition.

than those employing non-specialist outsourced IAF providers. We also observe that companies with industry-specialist outsourced IAF providers have less concentrated ownership, less frequent issue of new shares, are less likely to report loss, and have a lower quick ratio. For other variables such as leverage, assets turnover, total accruals, and age, both companies with industry-specialist and non-specialist outsourced IAF providers tend to share quantitatively similar characteristics.

As for external auditor characteristics, we observe that the mean for audit firm size is 0.617, suggesting that 62 percent of our sampled companies use big4 audit firms as external auditor. We also find that 32 percent of the sampled companies hire industry-specialist auditors, and pay remuneration of around 8.754 (fees natural log), on average USD 18,750. In terms of differences between industry-specialist and non-specialist outsourced IAF providers, we find that the former use big4 audit firms more than the latter. Further, companies with industry specialists pay higher fees for external auditors than companies with non-specialist outsourced IAF providers. In regard to employing industry-specialist external auditors, there are similar numbers of companies with industry-specialist and non-specialist outsourced IAF providers.

6.2. Univariate results

Table 4 is the correlation matrix. This analysis provides initial results in relation to most of the factors associated with outsourced IAF industry specialists, and insight into the presence of a multicollinearity problem among our independent variables. We observe that total sales, equity market to book value ratio, assets turnover, big4 audit firms, and audit fees are positively and significantly associated with both measures of IEOIAF providers. We also find that concentrated ownership, new equity issuance, loss, and quick ratio are negatively and significantly associated with IEOIAF providers. For leverage, total accruals, age, and industry-specialist external auditors are not significantly associated with either measure of industry expertise. In terms of the correlation between the independent variables, we observe that the highest are between total sales and audit fees (0.67) and between audit firm size and audit fees (0.55). However, this degree of correlation is lower than 0.70, suggesting that there is no multicollinearity problem. We supplement this analysis by calculating the Variance Inflation Factor (VIF) and, in untabulated results, observe that VIF values are less than 3, again indicating no multicollinearity problem (Gujarati & Porter, 2009).

6.3. Multivariate results

Table 5 shows the results of the pooled panel data logistic regressions for IEOIAF providers, and a set of explanatory variables related to company and external auditor characteristics. Columns 3 and 4 report results for IEOIAF providers using the 30 percent market share measure. Columns 5 and 6 show results for IEOIAF providers using the 20 percent market share measure. We observe that the estimated models are significant at the $p < 0.0001$ level, and the explanatory variables explain 29 (34) percent of the variation in selecting IEOIAF providers. These results indicate that the models are well fitted and sufficiently explain industry expertise selection in the context of outsourced IAF.

Table 5 also shows that company characteristics such as total sales (*LNSALE*) (Estimate = 1.278 (1.811); T.stat = 4.227 (4.448)), equity market to book value ratio (*MB*) (Estimate = 0.169 (0.238); T.stat = 1.805 (2.282)), issuing new equity (*NWEQTY*) (Estimate = −1.315 (−1.526); T.stat = −1.976 (−2.093)), total accruals (*TACC*) (Estimate = −6.024 (−6.223); T.stat = −2.692 (−3.197)), and age (*LNAG*) (Estimate = 1.366 (2.619); T.stat = 2.058 (3.996)) are significantly associated with both measures of IEOIAF providers, at least at the $p < 0.05$ level, except for the association between equity market to book value ratio and the 30 percent market share measure ($p < 0.10$). These predictors represent company size and complexity suggesting that variables measuring company risks are not significantly associated with selecting IEOIAF providers ($p > 0.10$). In particular, total sales and equity market to book value ratio are positively associated with IEOIAF providers suggesting that large companies are more likely to select IEOIAF providers. This result is consistent with agency and signalling theories that suggest larger companies have greater incentives to mitigate the agency problem and signal their quality externally by hiring an industry-expertise auditor (DeFond, 1992). Also, this result is in line with prior IAF studies, suggesting that large companies have greater propensity to employ high-quality providers of IAF (Carey et al., 2006). Overall, we find empirical support for our first hypothesis, suggesting larger companies are more likely to choose an outsourced provider of IAF with industry expertise.

Table 4. Correlation matrix based on Pearson analysis

Variables	−1	−2	−3	−4	−5	−6	−7	−8	−9	−10	−11	−12	−13	−14	−15
(1) INDSOIAF30	1														
(2) INDSOIAF20	0.85*	1													
(3) LNSALE	0.36*	0.42*	1												
(4) LEV	0.03	0.05	0.15*	1											
(5) OWCCO	−0.12*	−0.13*	−0.36*	0.04	1										
(6) NWEQTY	−0.11*	−0.11*	−0.04	−0.04	−0.02	1									
(7) MB	0.17*	0.16*	0.24*	0.04	−0.06	−0.05	1								
(8) LOSS	−0.11*	−0.15*	−0.32*	0.36*	0.15*	−0.06	−0.15*	1							
(9) QUICK	−0.13*	−0.13*	−0.29*	−0.46*	−0.16*	−0.04	0.12*	−0.06	1						
(10) ATURN	0.10*	0.15*	0.33*	0.05	−0.35*	0	−0.02	−0.06	−0.04	1					
(11) TACC	−0.08	−0.07	0.16*	−0.05	−0.11*	−0.07	0	−0.21*	−0.06	0.01	1				
(12) LNAG	0.03	0.08	−0.05	−0.25*	−0.18*	−0.07	−0.38*	0.06	0	0.36*	0.03	1			
(13) ADFSIZE	0.17*	0.16*	0.34*	0.11*	−0.20*	0.10*	0.16*	−0.16*	−0.05	−0.07	0.09	−0.19*	1		
(14) ADFIND	0.05	0.07	0.17*	−0.01	0.04	0.01	0.02	−0.05	−0.12*	−0.15*	0.01	0.08	0.28*	1	
(15) LNADFEE	0.32*	0.33*	0.67*	0.12*	−0.20*	0.01	0.29*	−0.27*	−0.16*	−0.08	0.09	−0.17*	0.55*	0.27*	1

*p < 0.05; See Table 1 for variables definition.

Table 5. Logistic regression results for testing the hypotheses

Variable		(1)		(2)	
	Sign	INDOIAF30		INDOIAF20	
		Estimate	T.stat	Estimate	T.stat
LNSALE	+	1.278***	(4.227)	1.811***	(5.448)
MB	+	0.169*	(1.805)	0.238**	(2.282)
LEV	+	−0.435	(−0.394)	1.002	(0.986)
LOSS	+	0.145	(0.234)	−0.113	(−0.175)
QUICK	-	−0.112	(−0.971)	0.056	(0.512)
ATURN	-	−0.202	(−0.432)	−0.416	(−1.016)
OWCCO	-	−0.003	(−0.298)	0.008	(0.958)
NWEQTY	+	−1.315**	(−1.976)	−1.526**	(−2.093)
LNAG	-	1.366**	(2.058)	2.619***	(3.996)
TACC	+	−6.024***	(−2.692)	−6.223***	(−3.197)
ADFSIZE	+	0.297	(0.618)	0.036	(0.079)
ADFIND	+	0.137	(0.316)	0.125	(0.307)
LNADFEE	+	−0.232	(−0.398)	−0.745	(−1.334)
YFIX	?	CONTROLLED			
INDFIX	?	CONTROLLED			
_cons	?	−13.865***	(−3.322)	−18.352***	(−4.010)
Observations		334	334		
Pseudo R^2		29%	34%		
Wald chi-square	66.57***	72.83***			

*** p < 0.01, ** p < 0.05, * p < 0.10

See Table 1 for definitions.

With regard to measures of complexity, the coefficients on issuing new equity and total accruals are positive while the coefficient on age is negative, indicating that companies that issued new shares and those with a higher proportion of accruals opt to choose non-industry specialist outsourced IAF, while mature companies experience less complexity and are less likely to select IEOIAF providers. We also observe that concentration ownership (*OWCCO*) is not significantly associated with selecting outsourced IAF providers with industry expertise, suggesting that ownership structure as proxied by concentrated ownership is not a major determinant for an IEOIAF provider. These findings are not consistent with the agency and signalling theories (Beasley & Petroni, 2001; DeFond, 1992) or with the prior outsourcing IAF literature, suggesting that companies with greater complexity have an incentive to engage high-quality auditors such as those with industry expertise. Thus, we offer the following explanations to justify these results. In relation to age, we believe that mature companies perceive IEOIAF providers as a way to signal that they manage and control risks and complexity using a competent and objective provider. Alternatively, IEOIAF providers are used as management training ground or as consultants in managing risk and complexity. Thus, they differentiate between the outsourced IAF providers by selecting a provider with industry expertise.

In relation to the results for issuing new equity, we argue that companies may consider the investment in a high-quality external auditor as a worthy signal during the time of issuance of new shares if compared with the investment in IEOIAF providers. Consistent with this, we observe, in unreported results, that 74 percent and 33 percent of companies that issued new equity employ big4 or industry-expertise external auditors, respectively. Another explanation for this result is that issuing new equity increases managers' incentive to manage earnings to attract new investors by reporting good performance. Thus, managers of these companies will try to avoid selecting IEOIAF providers as they are more competent and objective and are likely to discover and report earnings manipulation. For the result of total accruals, we suggest that a large proportion of accruals is not always an indicator of low-quality accruals. Thus, employing IEOIAF providers would not add value to the company. We also suggest that IEOIAF providers will limit managers' accounting flexibility and, in turn, their chance to manipulate earnings. Thus, as managers are involved in the outsourced IAF decision, they are more likely to select a less competent-outsourced IAF provider such as a non-industry specialist. Overall, these findings reject our second hypothesis.

As for other company characteristics related to risk, such as leverage (*LEV*), loss (*LOSS*), quick ratio (*QUICK*), and assets turnover (*ATURN*), these have insignificant associations with the measures of outsourced IAF industry expertise ($p > 0.10$), suggesting that companies with a high proportion of debt, concentrated ownership structure, poor performance, high quick ratio, and/or high proportion of assets turnover do not differentiate between the expertise of outsourced IAF providers, and consider both industry- and non-industry specialist outsourced IAF providers as of high quality. These findings are not consistent with the third hypothesis arguing that companies with a high proportion of operational and financial risks are more likely to suffer from the agency problem and information asymmetry and to use high-quality auditors to reduce these issues (Caplan & Kirschenheiter, 2000; Jensen & Meckling, 1976). These findings are consistent with the limited outsourcing IAF literature which reports that risk factors are not crucial drivers for demanding a high-quality outsourced IAF provider (Abbott et al., 2007; Baatwah & Al-Qadasi, 2020).

In relation to external auditor characteristics such as size (*ADFSIZE*), industry expertise (*ADFIND*), and fees (*LNADFEE*), we observe an insignificant association with the measures of IEOIAF providers, $p > 0.10$. This result is not consistent with our hypotheses in relation to the characteristics of high-quality external auditors, and suggests that companies are less likely to select IEOIAF providers if they are already associated with high-quality external auditors. Also, high-quality external auditors will not push their clients to select IEOIAF providers because the only criterion for using the work of the IAF provider might be outsourcing the function to an external provider without specifying a particular provider. This finding is consistent with Baatwah and Al-Qadasi (2020) report that external auditors with industry expertise are not significantly associated with

outsourcing IAF or either type of provider. Overall, our results support the first hypothesis, but are not consistent any of the others.

6.4. Further analysis

6.4.1. Robustness analysis

To test the robustness of our main results, we conduct a number of sensitive analyses. For example, we use industry total assets, instead of revenues, to determine the market share of outsourced IAF providers. We use similar thresholds to classify industry and non-industry outsourced IAF specialists. This analysis will reduce the sensitivity of our measure for IEOIAF providers. This approach has been used by other audit researchers (e.g., Balsam et al., 2003). We also check whether the significant predictors related to the company characteristics are sensitive to the measurement of the industry expertise of outsourced IAF providers. Prior external audit research (Abbott & Parker, 2000; Ettredge et al., 2009; Huang & Kang, 2018) uses a variety of thresholds to designate a provider as having industry expertise. In the main analysis, we adopted 30 (20) percent of market share as a threshold for considering IAF providers as industry experts. Here, we consider the largest and 10 percent market share thresholds to designate an IEOIAF provider. In untabulated results, we observe qualitatively similar findings of these alternative measures with the main findings.

Another sensitivity method is matching sample analysis, using a 30 percent market share threshold and industry and company size as criteria for matching. Non-specialist companies with the same industry classification and the closest size in terms of revenue are chosen to match companies with specialists. This procedure results in 156 matching observations. The final robustness test is simultaneity concern, one type of endogeneity problem (Larcker & Rusticus, 2010). Under this concern, the selection of IEOIAF providers may be a function of the company's earlier years and auditor characteristics. Thus, we use a lead-lag approach to check the effect of this issue by re-regressing the main equation using a one-year lag for all explanatory variables. In untabulated results, we find that the coefficients and the level of significance for all variables are quantitatively similar to the results reported in Table 5, indicating the robustness of our main findings.

6.4.2. Does the type of industry-expertise outsourced IAF provider matter?

We also examine whether companies consider the audit firm's type of IEOIAF provider in selecting such provider. Accordingly, we classify the IEOIAF provider into two types of audit firm, big4 and second-tier. This analysis is interesting because recent research demonstrates that big4 and second-tier firms deliver similar audit quality (Baatwah et al., 2019; Baatwah & Al-Qadasi, 2020; Boone et al., 2010; Cassell et al., 2013).[6] Thus, results indicating companies differentiated by the expertise of outsourced IAF based on type will advance our knowledge of big4 and second-tier providers in the context of outsourced IAF. This investigation also responds to the call for exploring whether the type of outsourced IAF provider influences the outsourcing decision (Mubako, 2019).

Table 6 reports the results for this analysis using the 30 percent market share threshold for measuring industry expertise, although the 20 percent threshold suggests similar findings. Columns 2 and 3 show results for the determinants of big4 IEOIAF providers, while columns 4 and 5 report results for the determinants of second-tier providers. We find that, in terms of sales, large companies are significantly associated with big4 IEOIAF providers. However, we observe a negative and significant association between equity market to book value ratio, leverage, and quick ratio, indicating that companies which are highly leveraged, large in terms of market and book value ratio, and more liquid are less likely to select big4 IEOIAF providers. For second-tier audit firms, we find that the coefficients on leverage, concentrated ownership structure, assets turnover ratio, age, and big4 as external auditor are positive and significant, suggesting that companies with high debt ratio, concentrated ownership, high assets turnover, and big4 audit firms as external auditors are more likely to select outsourced IAF providers who are second-tier with industry expertise. However, we find negative and significant coefficients for loss, total accruals, and audit fees, indicating that companies with poor performance, a large proportion of total accruals, and higher audit fees are less likely to appoint outsourced IAF providers who are second-tier and have

Table 6. Logistic regression results for the types of INDOIAF30

Variable	(1)		(2)	
	BIG4		SECNDT	
	Estimate	T.stat	Estimate	T.stat
LNSALE	3.125***	(3.159)	0.846	(1.307)
MB	−1.824*	(−1.957)	0.155	(0.811)
LEV	−7.053**	(−2.573)	2.706*	(1.771)
LOSS	−1.771	(−0.959)	−2.458**	(−2.508)
QUICK	−1.363**	(−2.234)	−0.076	(−0.327)
ATURN	−1.937	(−1.562)	1.779**	(2.400)
OWCCO	−0.059	(−1.399)	0.029**	(2.075)
NWEQTY	−0.934	(−0.596)	0.702	(0.736)
LNAG	2.442	(0.804)	3.011**	(2.343)
TACC	3.091	(0.666)	−10.825***	(−3.490)
ADFSIZE	2.325	(1.512)	1.742**	(2.320)
ADFIND	0.493	(0.631)	0.284	(0.308)
LNADFEE	−3.114	(−0.827)	−2.367**	(−2.034)
YFIX	CONTROLLED			
INDFIX	CONTROLLED			
_cons	−22.836	(−0.686)	−21.743***	(−3.829)
Observations	334		334	
Pseudo R^2	57%		42%	
Wald chi-square	221.70***		578.56***	

*** p < 0.01, ** p < 0.05, * p < 0.10

BIG4 is an indicator for the analysis of INDOIAF30 if the type of provider is a big4 audit firm; SECNDT is an indicator for the analysis of INDOIAF30 if the type of provider is a second-tier audit firm; See Table 1 for definitions.

industry expertise. Results for other variables are not significant for either classification. Overall, we conclude that companies do consider the type of industry expertise in selecting outsourced IAF providers.

7. Summary and conclusion

Remarkable attention is being paid to outsourced IAF providers because they are more likely to be competent and objective. Thus, it is suggested that companies may use external IAF providers to reduce agency conflict or to signal their effective monitoring and high-quality financial reports. This study is an empirical investigation exploring the determinants of selecting outsourced IAF providers. Since such research is scarce and rarely focuses on the type of provider (Baatwah & Al-Qadasi, 2020; Mubako, 2019), this study empirically examines factors associated with selecting IEOIAF providers. We adopt factors related to company and external auditor characteristics as the determinants, since research on external auditor choice documents that these characteristics play a significant role in selecting an auditor with industry expertise.

With the analysis of 334 observations from the Omani capital market that outsourced IAF to external providers, we observe in Tables 5 and 6 a number of company and external auditor characteristics which are potential determinants of IEOIAF providers. In terms of company characteristics, we document that size in terms of sales and equity market to equity book ratio, issuing new equity, age, and total accruals are major determinants in selecting IEOIAF providers. These results are robust under a variety of tests. However, we find insignificant results for the association between the selection of IEOIAF providers and risk-related factors (leverage, loss, quick ratio, and assets turnover) and external-auditor attributes (size, expertise, and fees). In further analysis, we

find that companies which are more leveraged, concentrated ownership, higher assets turnover, mature, and hiring big4 as external auditor are more likely to select an IEOIAF provider from second-tier audit firms while companies with bad performance, higher total accruals, and higher external audit fees are not associated with these providers. We also observe that larger companies in terms of sales are associated with an IEOIAF provider if this provider is a big4 audit firm, while companies with higher equity market ratio, more leveraged, and higher quick ratio are less likely to engage in an IEOIAF provider who is a big4 audit firm.

The overall results offer interesting theoretical and practical contributions. By extending the results of previous studies which focus on the role of industry expertise in reducing agency problems or signalling the quality of financial reports in the context of external audit, our study shows that outsourcing IAF to a third party with industry expertise is a measure for mitigating agency problems or reducing information asymmetry. It also expands outsourced IAF research by considering several company and auditor characteristics that have been ignored in earlier models. Our findings show initial evidence indicating that market to book value, quick ratio, assets turnover, total accruals, and external audit fees are relevant determinants of the decision to outsource IAF. Further, we extend the recent call by Mubako (2019) and the empirical evidence of Baatwah and Al-Qadasi (2020) on the types of outsourced IAF provider by examining the factors motivating companies to hire industry specialists. In practice, our results also provide companies, audit firms, and regulators with an indicator of the development of outsourced IAF. In particular, companies can realise that the quality of outsourced IAF providers differs, and that those with industry expertise become a choice to improve or signal the quality of their financial reporting and internal controls. As for audit firms, our findings indicate a new orientation for them to use industry expertise as a means to differentiate them from other providers. Thus, this study may help them to develop and maintain appropriate strategies and programmes to ensure that the quality of outsourcing IAF meets the expectations of their clients. Finally, our study provides interesting inputs to regulatory authorities such as the IIA and Public Company Accounting Oversight Board on the role of outsourced IAF in current practice, encouraging them to establish a common framework for outsourced IAF. In the current IAF framework and IAF best-practice recommendations, neither regulatory authority appears to support or encourage outsourced IAF.

Despite these contributions, this study is subject to theoretical and practical limitations which might be translated into avenues for future research. First, our study focuses on two theories, agency and signalling, as the main motivation for companies in selecting IEOIAF providers. Future research may consider other explanations for formulating and testing the new hypotheses. Additionally, this study takes into consideration only basic company and auditor characteristics. Thus, future research may consider additional determinants related to other characteristics such as governance or ownership. A final limitation is that data on audit fees related to outsourced IAF is unavailable, which forces us to use clients' sales to measure the market share of outsourced IAF providers. It will be interesting if future research collects data on outsourced IAF fees to identify the providers' market share.

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Notes

1. We use the terms "external IAF provider" and "outsourced IAF provider" interchangeably.
2. The URLs of these two audit firms are: https://wwwpwc.com/us/en/services/risk-assurance/internal-audit.html and https://www.ey.com/en_gl/advisory/internal-audit.
3. We have used these proxies instead of the natural log of total assets because in our check for the regression assumptions, we find a high correlation between this measure and audit fees. However, in untabulated results and after deleting the audit fees variable, we find similar results for this measure of size.
4. In robust analysis, we use other classifications to designate an outsourced IAF provider as an industry expert. For example, we use the largest and 10 percent market share as a threshold to classify an outsourced IAF provider as having industry expertise. Also, we consider total assets, instead of total sales, to compute the market share for the outsourced IAF provider. Overall, our robust analysis quantitatively reveals findings similar to those of the main analysis.
5. We recognise other variables to proxy the company's risks (e.g., returns on assets, bankruptcy/distress, and litigation, among others). However, we include these variables in our model because they are common proxies for financial health in accounting research and have been used in prior external auditor change studies to proxy risk (e.g., Chen et al., 2005; Huang & Kang, 2018; Zhang et al., 2019).
6. In classifying audit firms into big4 and second-tier, we consider Deloitte, PwC, EY, and KPMG as big4 audit firms and BDO and Grant as second-tier audit firms.

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