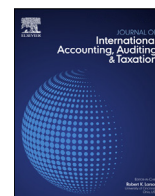


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# Journal of International Accounting, Auditing and Taxation



## The determinants of audit fees in the alternative investment market (AIM) in the UK: Evidence on the impact of risk, corporate governance and auditor size

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### ARTICLE INFO

#### Article history:

Available online 4 February 2023

#### Keywords:

AIM  
Audit Fees  
Audit Risk  
Corporate Governance  
Big 4  
Audit Committee

### ABSTRACT

This study examines the determinants of audit fees for companies listed on the Alternative Investment Market (AIM) in the United Kingdom (UK), which is the secondary market of the London Stock Exchange for small and medium sized companies. AIM companies are expected to present different audit pricing challenges compared to fully listed firms. From an audit demand perspective, AIM companies exhibit different risk and governance characteristics while, from a supply perspective, the AIM is characterized by greater auditor choice than typically found in main markets. We find that audit fees in the AIM are negatively influenced by client liquidity and the length of listing. We also find that higher levels of audit committee disclosures are associated with higher fees, although there is no evidence that individual audit committee characteristics influence audit fees. After controlling for self-selection bias, we find that Big 4 auditors charge higher fees and this premium is especially pronounced for smaller firms. Our findings contribute to the audit pricing literature by illustrating that the determinants of audit fees depends on the institutional setting in which companies operate as well as highlighting the importance of specific risk measures and auditor size in the determination of audit fees for AIM companies.

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## 1. Introduction

Understanding the determinants of audit fees has been a significant research focus ever since Simunic's (1980) seminal paper just over 40 years ago. Subsequent research highlighted several factors as having a reasonably consistent impact on fees, notably audit client size, complexity, and risk as well as certain aspects of the audit client's governance, auditor–client engagement characteristics, and auditor size (Hay et al., 2006; Causholli et al., 2011; Hay, 2013; Hay, 2017). The objective of this article is to extend our understanding of the determinants of audit pricing by studying companies listed on the United Kingdom's (UK) Alternative Investment Market (AIM). The AIM was established in 1995 by the London Stock Exchange (LSE) as a market for small and medium-sized companies to raise new capital. The approximately 800 companies listed on the AIM

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have a total market value of around £1,190 billion (bn) (London Stock Exchange, 2020). Therefore, the AIM represents a significant part of the UK quoted company sector.

Despite AIM's importance, little academic attention has focused on AIM companies with hardly any prior research looking at auditing issues. This article seeks to remedy this by investigating the determinants of audit fees in the AIM. Examining the determinants of audit fees in the AIM can improve our understanding of audit pricing in several respects. First, AIM companies are often relatively young companies without a significant financial track record and frequently list on the AIM to access finance in order to pursue relatively high-risk ventures. Therefore, they often lack a sustained record of performance, and this is expected to pose a particular challenge to auditors in terms of setting an appropriate audit fee. Furthermore, as noted by Gerakos et al. (2013), AIM companies underperform firms on other exchanges and experience a higher failure rate, suggesting that AIM companies may present a more significant and identifiable audit risk than more mature listed firms. Examining the impact of various measures of audit client risk in a market such as the AIM allows us to improve our understanding of how risk more generally impacts the determinants of audit fees.

Second, unlike fully listed companies, AIM companies are not obliged to abide by the UK Corporate Governance Code (2003–2020).<sup>1</sup> As reported by Mallin and Ow-Yong (2012) and Farag et al. (2014), this allows AIM companies greater freedom in the nature and extent of the corporate governance arrangements they choose to use. This presents an opportunity to investigate how auditors incorporate firms' voluntary governance choices in their pricing decisions. By hand collecting our data from AIM companies' annual report and accounts, we are able to investigate the impact of board independence as well as specific characteristics of audit committees on auditors' pricing decisions.

Third, an on-going concern of audit regulators is the high concentration of listed company audits undertaken by Big 4 accounting firms (European Commission, 2011; House of Lords, 2011; Competition & Markets Authority, 2019). AIM companies show richer variation in terms of auditor choice with only 35 % of companies audited by a Big 4 auditor in 2016, and the auditor with the most AIM clients is not one of the Big 4 firms.<sup>2</sup> This provides a rare opportunity to re-examine the impact of auditor size on audit fees, which was not possible in the UK fully listed market for some time and, specifically, to try and ascertain whether Big 4 firms charge higher audit fees. An important issue in relation to studying the impact of auditor size on audit fees is the possibility that any documented Big 4 auditor premium may be compromised by self-selection bias (Chaney et al., 2004; Carson et al., 2012). Therefore, following Chaney et al. (2004) and others, we control for self-selection bias so that we can isolate any such Big 4 auditor premiums for AIM firms. In summary, our study utilizes the AIM to investigate three specific aspects of audit pricing determinants: the impact of client risk, corporate governance, and auditor size. We believe that the AIM is the ideal setting to address these three research objectives and, in doing so, help to better inform our understanding of these aspects of audit pricing more generally.

Our findings can be summarized as follows: audit fees in the AIM are negatively influenced by client liquidity and the length of listing. These findings are consistent with the important role played by audit client risk. We also find that higher levels of audit committee disclosures are associated with higher fees, although there is no evidence that individual audit committee characteristics influence fees in the AIM. After controlling for self-selection bias, we find that Big 4 auditors charge higher fees. These findings hold even after undertaking numerous sensitivity and robustness tests.

Our study represents an important contribution to knowledge in terms of understanding the determinants of audit fees in the AIM. Identifying the emphasis that auditors in the AIM place on specific risk measures is valuable and serves to illustrate the importance of risk in that market. It is also insightful to identify how Big 4 and non-Big 4 auditors emphasize different aspects of the client's risk when determining audit fees as well as the fee premium Big 4 auditors apply to smaller AIM clients. Our finding that stronger corporate governance disclosure is linked to more extensive audits highlights the relationship between voluntary governance disclosure and increased audit quality in a relatively less regulated market such as the AIM. The absence of a relationship among audit committee size, independence, expertise, and busyness suggests that the monitoring of financial reporting and auditing by audit committees may be less intense in the AIM than previously reported for larger listed firms. This may highlight the broader governance role non-executives in the AIM play with a greater balance between advisory and monitoring than may be expected in the case of their fully listed counterparts.

The remainder of the article proceeds as follows: The next section introduces the AIM as well as developing hypotheses on each of the three aspects of audit pricing we investigate. Section three introduces our sample and variables. The empirical results are presented in section four, which also describes the additional sensitivity and robustness checks we undertake. We offer some conclusions as well as suggestions for further work in section five.

## 2. AIM and the determinants of audit fees

### 2.1. The AIM

The AIM is owned and operated by the LSE. AIM was established in June 1995 as a market for small and medium sized companies, offering them the opportunity to raise new capital and allowing their shares to be traded and also to allow own-

<sup>1</sup> The Quoted Companies Alliance (QCA), a body representing the interests of smaller quoted companies and their advisors, have produced guidelines on corporate governance for AIM-listed companies but this is only advisory.

<sup>2</sup> See Appendix 1 for a breakdown of each auditor's market share of the AIM in 2016.

ers to liquidate some of their shareholdings. The more relaxed admission and regulatory rules proved attractive, not just for UK companies but also for overseas companies seeking a UK stock market listing. For example, there is no minimum market capitalization requirement, no minimum trading record, and no minimum percentage of shares required to be held in public hands. As observed by [Mallin and Ow-Yong \(2008\)](#) and [Hornok \(2015\)](#), the more demanding regulatory climate post-Enron in the United States (US) resulted in a significant increase in listings on the AIM. In 2020, approximately 800 companies were listed on the AIM with a total market value of £1,190 bn (LSE, 2020). Of these, 112 firms were international. Since its inception in 1995, AIM has had a total of 3,893 new issues, raising over £120 bn in capital (LSE, 2020).

One attraction of the AIM is the lightness of its regulation. As highlighted by [Gerakos et al. \(2013\)](#), the AIM is regulated by the LSE, its parent organization, rather than by an external formal regulatory agency, such as the UK Financial Conduct Authority (FCA). The LSE establishes the regulatory structure of the AIM, and this is done primarily through delegation to Nominated Advisers (NOMADs). All listed firms have a NOMAD and the NOMAD determines the appropriate level of disclosure for each firm, allowing NOMADs the freedom to evaluate and decide on the type and level of disclosure appropriate for each firm. This amount of regulatory freedom is important because, as highlighted by [Gerakos et al. \(2013\)](#), it means that the firm can relax disclosure, auditing, and corporate governance standards as it deems appropriate; resulting in, amongst other things, a reduced regulatory cost both of an initial listing as well as the maintenance of a listing. As discussed by [Gerakos et al. \(2013\)](#), NOMADs serve as the regulatory gatekeepers on the AIM and are liable to being decertified by the LSE if they fail in their oversight role.

One aspect where AIM companies differ from their fully listed counterparts is in relation to corporate governance and its disclosure. Unlike companies listed on the main market, AIM companies do not have to adhere to the recommendations of the UK Corporate Governance Code (2010–2018) ([FRC, 2010–2018](#)). Instead, the Quoted Companies Alliance (QCA), an association representing smaller listed companies and their advisors, encourages AIM companies to observe the recommendations contained in their publication, *Corporate Governance Guidelines for Smaller Quoted Companies*, the latest version of which was published in 2018 ([Quoted Companies Alliance, 2018](#)).<sup>3</sup> The QCA guidelines are broadly consistent with the nature and spirit of the UK Corporate Governance Code (2010–2018), while appreciating the practical difficulties of relatively smaller companies achieving widespread compliance. There is also a sense of encouragement from the QCA guidelines that AIM companies should have the freedom to develop their own bespoke governance arrangements to suit their specific needs. For the purpose of the current study, the comparatively relaxed regulation for AIM companies and the absence of specific reporting requirements makes the study of audit pricing for AIM companies especially interesting, although, also making data collection more challenging.

## 2.2. Determinants of audit fees in the AIM

As documented by [Hay et al. \(2006\)](#), [Causholli et al. \(2011\)](#), [Hay \(2013\)](#), and [Eirle et al. \(2021\)](#), the past 40 years have witnessed a significant academic interest in the determinants of audit fees. Over that period the many studies undertaken have allowed us to identify some key determinants of audit fees, especially in the context of large listed companies. This work identified the relatively consistent and positive impact of audit client size, complexity, and risk on fees ([Hay et al., 2006](#); [Causholli et al., 2011](#); [Hay, 2013](#); [Hay, 2017](#)). More recent research focuses on the impact of various aspects of the audit client's corporate governance, with several studies showing that more independent boards and higher quality audit committees are associated with higher fees ([O'Sullivan, 2000](#); [Zaman et al., 2011](#); [Ghafran & O'Sullivan, 2017](#); [Mitra et al., 2019](#)). Another key aspect of research investigates the impact of various auditor–client engagement characteristics, specifically the joint provision of non-audit services and the choice of auditor. Research consistently finds a positive relationship between the provision of non-audit services and audit fees ([Ezzamel et al., 1996](#); [Beattie & Fearnley, 2002](#); [Zaman et al., 2011](#)) and the existence of a fee premium in the case of large auditors typically measured as being one of the Big 4/5/6 international accounting firms ([McMeeking et al., 2006](#); [Basioudis & Francis, 2007](#); [Fleischer et al., 2017](#); [Zhang et al., 2017](#); [Eierle et al., 2021](#)).

Apart from being part of a larger comparative study by [Clatworthy and Peel \(2007\)](#), no prior academic attention has investigated audit pricing in the AIM. At one level this is surprising as we believe that the study of the AIM presents us with interesting opportunities to improve our understanding of the wider determinants of audit fees. This motivates the current study. On the other hand, several plausible reasons exist why the AIM may have been ignored by audit pricing scholars. First, by the time the AIM was established, the audit pricing literature was well developed with research primarily focused on the determinants of audit fees in large listed firms. In subsequent years, research continued to explore additional audit fee determinants in the fully listed sector ([Jiang & Son, 2015](#); [Ghafran & O'Sullivan, 2017](#); [Barua et al., 2020](#)).<sup>4</sup> A specific example of this is the focus on the impact of corporate governance and audit committees on audit pricing in the wake of the Enron failure, which applies especially in the case of fully listed firms.

Second, audit pricing studies traditionally relied on large secondary datasets, but the quality and consistency of AIM data is not really comparable. As we show in this study, data capture for AIM firms still relies on a combination of secondary data

<sup>3</sup> For the purposes of our study, the [Quoted Companies Alliance \(2013\)](#) is most relevant.

<sup>4</sup> Numerous studies examined the determinants of audit fees in other contexts. Examples include private firms ([Chaney et al., 2004](#); [Averhals et al., 2020](#)), the public sector ([Clatworthy et al., 2002](#); [Basioudis & Ellwood, 2005](#); [Bradbury, 2017](#)), universities ([Mellett et al., 2007](#); [Xue & O'Sullivan, 2013](#)), and the charity sector ([Beattie et al., 2001](#)).

sources and hand-collected data. This is especially the case in relation to qualitative aspects, such as auditor, engagement, and corporate governance characteristics. This makes such a study time-consuming as it requires the establishment of a bespoke dataset. Related to this is the fact that the AIM is not subject to the same corporate governance regulations as fully listed firms. While this provides AIM firms with greater flexibility in their governance choices and disclosures, it lacks both the reporting consistency and level of detail expected of fully listed companies. This makes the AIM a challenging environment for undertaking empirical research, especially in comparison with more established and more regulated markets.

The remainder of this section summarizes existing research findings in the three areas we focus on, that is risk, corporate governance, and auditor size. It goes on to discuss the specific characteristics of the AIM which has the potential to enhance our existing knowledge in these three areas. Each of the three sub-sections concludes with a relevant hypothesis which we test in our subsequent empirical analysis.

### 2.2.1. Risk and audit pricing in the AIM

Existing research on fully listed companies identified audit client risk as an important determinant of audit fees. Studies traditionally viewed risk in terms of inherent risk and financial risk. As Hay et al. (2006) note, inherent risk is used to capture aspects of the audit that auditors are likely to find most difficult and, as a result, are more likely to be associated with audit error. The expectation is that greater inherent risk will positively impact audit fees. This aspect of risk is typically represented by trade receivables and inventories with a consistent finding of a positive impact of these variables on audit fees (Hay et al., 2006).

Existing studies use a range of variables to capture financial risk, including measures of profitability, levels of liquidity, and leverage. Findings are by no means consistent. Some studies report results consistent with weaker financial performance and liquidity having a positive impact on fees while others report the opposite or no impact (Hay et al., 2006; Causholli et al., 2011). Similarly, in the case of leverage, no clear consensus emerges from existing research with contrasting arguments around whether greater leverage represents increased risk or whether the presence of stronger lender monitoring reduces risk (Chaney et al., 2004; Hay et al., 2006; Causholli et al., 2011). Finally, many studies highlight the potential for litigation to impact audit fees (Bronson, et al., 2017). Studies highlight the possibility that UK companies with liability exposure in the US may be subject to higher fees to cover the increased risk. For example, Seetharaman et al. (2002) and Choi et al. (2009) find higher audit fees for firms cross-listing in the US while O'Sullivan (2000, 2009) finds that UK auditors charge a fee premium for clients with US-based subsidiaries.

We would expect audit pricing in AIM companies to be consistent with those aspects of risk identified in the existing research to influence audit fees in fully listed firms. However, due to the fact that the AIM is a market for relatively new and largely unproven companies, we expect risk characteristics to be a particular focus for audit pricing decisions. As highlighted by Gerakos et al. (2013) and others, there is no shortage of skepticism around the performance of companies on the AIM. There are some suggestions that, compared to other established exchanges, firms on the AIM exhibit weaker post-listing returns and higher failure rates. Therefore, we would expect auditors to look carefully at the established risk measures as they apply to AIM companies and price audits accordingly. In particular, using traditional measures of risk we would expect firms with better financial performance and greater liquidity to be rewarded with lower fees while we would expect firms with higher levels of leverage to be charged higher fees.

It is also worth noting that companies on the AIM often have relatively short trading histories and that some list on AIM in order to raise investment for relatively speculative businesses. We believe that the number of years a firm is listed on the AIM may provide a useful risk measure for auditors with companies having a brief listing experience presenting an increased audit risk. Indeed, Espenlaub et al. (2012) find that the likelihood of company failure on the AIM is negatively associated with the number of years listed. Similarly, there are companies on the AIM that are yet to generate revenue streams, suggesting that these companies may present particular risk and uncertainty as to whether they will ever generate income for their shareholders. Therefore, we expect auditors on the AIM to pay particular attention to risk indicators when making pricing decisions. This allows us to propose the following hypothesis:

H1: Companies on the AIM exhibiting higher risk pay higher audit fees.

### 2.2.2. Corporate governance and audit pricing in the AIM

As interest in corporate governance increased, audit pricing research also recognized the potential impact governance characteristics may have on auditors' pricing decisions (Hay et al., 2008; Hay, 2013). This focused on two aspects of corporate governance – board composition and audit committee characteristics. Prior research in the UK identified that greater non-executive representation on corporate boards positively impacts audit fees (Collier & Gregory, 1996; O'Sullivan, 2000; Chafran & O'Sullivan, 2017). This is typically justified due to the enhanced monitoring responsibilities non-executives now have and an expectation that this encourages a more extensive and expensive audit which may help non-executives undertake their own monitoring role more effectively (O'Sullivan, 2000). Furthermore, as discussed by DeFond and Zhang (2014), regulators encourage higher quality monitoring in the expectation that this will result in higher audit quality, one aspect of which may be more extensive audits.

Audit committees have become a key feature of corporate governance with regulators recommending both the establishment of audit committees as well as specifying their key characteristics (Cadbury, 1992; SOX, 2002; Smith Committee, 2003; UK Corporate Governance Code, 2003–2018). Because the regulation of audit committees tends to focus exclusively on fully listed firms, existing research attempted to investigate the relationship between audit committee characteristics and audit

fees, with a particular focus on those characteristics highlighted by regulators (Zaman et al., 2011; Ghafran & O'Sullivan, 2013).

The available empirical evidence suggests that audit committee size, independence, and expertise have a positive impact on audit fees (Abbott et al., 2003a; Abbott et al., 2003b; Vafeas & Waagelein, 2007; Boo & Sharma, 2008; Krishnan & Visvanathan, 2009; Zaman et al., 2011; Ghafran & O'Sullivan, 2017). The findings regarding meeting frequency are less consistent with Carcello et al. (2002) and Mitra et al. (2007) failing to find a significant impact while Zaman et al. (2011) and Ghafran and O'Sullivan (2017) reporting a positive impact. In their literature review, DeFond and Zhang (2014) suggest that the available evidence is consistent with the desire of regulators to increase audit quality by improving client governance and, in doing so, establishing a positive relationship with audit fees.

As mentioned earlier, AIM companies are not subject to the UK Corporate Governance Code. Instead, they are encouraged, although not obliged, to follow guidelines on corporate governance published by the QCA. In the AIM, bearing in mind the perceived riskiness of AIM companies and the increased monitoring demands this is likely to place on non-executives, we would expect that greater non-executive representation on boards encourages more intensive audits and, as a consequence, lead to a more expensive audit. This is consistent with the complementary relationship between corporate governance and audit fees identified by Hay et al. (2008). In a similar way, companies voluntarily disclosing the existence of audit committees and their characteristics are likely to pay higher fees (Collier & Gregory, 1996). Following the reported findings in relation to fully listed firms, for those companies disclosing audit committees, the available evidence suggests that the higher the quantity of the recommended characteristics is associated with higher audit fees (Zaman et al., 2011; Ghafran & O'Sullivan, 2013). This suggests that for AIM companies, larger and more independent audit committees as well as those with greater levels of financial expertise are expected to be associated with higher audit fees. Therefore, we can propose the following hypothesis:

H2: Companies on the AIM disclosing higher levels of corporate governance pay higher audit fees.

### 2.2.3. Auditor size and audit pricing in the AIM

The potential for auditor size to influence audit pricing is a consistent issue in audit pricing research (Hay et al., 2006). Central to this work is an expectation that larger auditing firms, typically meaning the Big 4/5/6, undertake higher quality audits and this is expected to result in higher audit fees (Francis, 2004; Francis, 2011). In their comprehensive review of work in this area, Hay and Knechel (2017) highlight the large number of studies that addressed the possibility of a large auditor premium and note that the existence of a significant fee premium is supported by a majority of studies. It should be noted though that the evidence on the existence of a large auditor premium is more mixed in respect of UK studies with Pong and Whittington (1994) reporting a premium while O'Sullivan (2000) fails to find such a relationship. In a longitudinal analysis spanning 1985–2002, McMeeking et al. (2006) suggest that the large auditor premium existed in the UK in the 1980s and early 1990s, but has subsequently been eroded.

As with much of the existing research on audit pricing, studies examining the presence of a Big 4/5/6 auditor premium were undertaken predominantly in fully listed markets. However, earlier UK-based studies used data from the 1980s and 1990s, when the degree of auditor concentration was significantly less than it is today. In their investigation into concentration in the audit market, the House of Lords (2011) highlight that in 2010 Big 4 auditors audited 99 % of the FTSE100, 96 % of the FTSE250, and 80 % of remaining fully listed firms. In contrast, in the AIM the Big 4 audit firms are not dominant in terms of market share. Our data for 2016 shows that the auditor with the largest number of AIM clients is not one of the Big 4 firms and that the total market share of Big 4 firms is approximately 35 %. Therefore, it is reasonable to expect that in a market such as the AIM, where the Big 4 auditors have a lower market share, that the level of audit fees are likely to be influenced by auditor size. If larger auditors are able to command a fee premium due to the higher level of audit quality they offer, then we would expect clients of Big 4 auditors in the AIM to pay higher fees.

More recent work questions the research approach adopted in earlier studies to test for a large auditor premium. Specifically, Chaney et al. (2004), Carson et al. (2012), and Peel and Makepeace (2012) argue that the prior approach utilizing a dummy variable to represent auditor size assumes that audit clients are randomly allocated to their auditors. However, it is reasonable to assume that audit clients self-select their auditors and, therefore, simply using a dummy variable may not adequately control for the presence of self-selection bias. Such concerns resulted in the adoption of a Heckman two-step approach in which the first step identifies the impact of client characteristics on the auditor choice decision and the resultant Inverse Mills Ratio (IMR) is then utilized in the subsequent second stage regression to control for the likelihood of self-selection (Chaney et al., 2004; Carson et al., 2012). This is the process we utilize in this study. However, even while controlling for self-selection bias, we still believe that companies in the AIM using Big 4 auditors will pay higher audit fees and thereby propose the following hypothesis:

H3: Companies on the AIM audited by a Big 4 auditor pay higher audit fees.

## 3. Sample and variables

We began constructing our sample by identifying all companies registered on the AIM at the end of December 2016. The full list of AIM companies was taken from the December 2016 edition of *AIM Market Statistics* (London Stock Exchange, 2016). We excluded investment trusts and companies registered overseas. We also excluded companies admitted to the AIM during

2016 as these companies would not have complete financial records for the 2016 financial year. We then ranked our remaining companies in terms of market capitalization and identified the largest 500 as the focus of our study. Because a significant amount of our data is obtained from companies' annual reports, and due to some unusual and inconsistent reporting by some companies, our usable sample reduced to 453 companies.<sup>5</sup> Table 1 includes an industry breakdown of the companies in our sample while Table 2 includes information on the length of time our sample companies were listed on the AIM.<sup>6</sup>

UK legislation requires companies to disclose the fees paid to auditors for audit services, so we use the log of the reported audit fee as our dependent variable (LNAUDIT). As we are focusing on three aspects of audit pricing in the AIM, risk, corporate governance, and auditor size, this section introduces the variables we use to represent each of these aspects. We use several variables to represent audit client risk. First, we use the proportion of total assets in the form of account receivables (DEBTORS) and inventory (INVENTORY) to represent inherent risk. Second, we use a binary variable to indicate if the company has at least one US-based subsidiary to represent the increased litigation risk of having a US presence (USSUB). Third, we seek to capture financial risk in several ways: 1) We use return on assets (ROA) as our indicator of financial performance because better performing companies are expected to pose a reduced financial risk; 2) we represent leverage by the proportion of assets in the form of total liabilities (LEVERAGE) as companies with higher levels of borrowing pose a greater financial risk; and 3) we use the quick ratio (QUICK) to represent liquidity because lower levels of liquidity may indicate weaker financial condition and potential future financial issues. Fourth, in terms of AIM-specific risk measures, LISTTIME represents the number of years since the company was admitted to the AIM, because companies listed on the AIM for longer periods of time are expected to represent a reduced audit risk. We also include a dummy variable to indicate those AIM companies that have yet to generate any revenue (NOREVENUE). The expectation is that these companies present a particular risk to auditors because their future cash flows are especially uncertain and may be more likely to fail. However, the absence of revenue may also reduce the auditor's work due to the significantly fewer transactions for the auditor to verify. Which impact predominates is unclear and is something this study seeks to ascertain.

The second category of variables relate to corporate governance. In common with recent studies, we use a variable representing the proportion of board members who are non-executive directors (NEDS).<sup>7</sup> We also use a dummy variable to identify those companies in the AIM which disclose the existence and full details of their audit committee as would be expected from fully listed companies (ACDIS).<sup>8</sup> In addition, we use three variable measures to represent the specific characteristics of audit committees: 1) ACSIZE captures the size of audit committee; 2) ACEXE is a binary variable indicating instances where at least one executive director is a member of the audit committee<sup>9</sup>; and 3) ACEXP is the proportion of audit committee members with financial expertise.<sup>10</sup> The third aspect of audit pricing we focus on is the role of auditor size, so we use a binary variable to distinguish Big 4 and non-Big 4 auditors (BIG 4).

Following existing UK-based research, we include seven control variables. We measure audit client size using the log of total assets (LNASSET). We measure complexity via the number of subsidiaries (LNSUBS). The log of non-audit fees simultaneously purchased from the auditor is represented by LNNONAUDIT. A binary variable indicating whether the company's financial year ends between December 31 and March 31, inclusive is deemed to be the auditor's busy period (BUSY). A binary variable indicating whether the audit is undertaken by a London-based office is LONDON. A binary variable indicates whether 2016 represents the first year of a new auditor (CHANGE). Finally, in order to control for unobserved heterogeneity, we include the lagged value of the dependent variable as an additional explanatory variable in all our regressions (LNAUDIT2015).<sup>11</sup> Table 3 contains definitions of all our variables as well as indicating the impact each of our explanatory variables is expected to have on audit fees.

## 4. Empirical results

### 4.1. Descriptive statistics

Descriptive statistics for all variables are presented in Table 4. The average audit fee paid by AIM companies is just over £100,000 with a median audit fee of £70,000. Receivables and inventories, respectively, account for 11.45 % and 6.14 % of total assets in our sample firms. 40 % of our sample companies have one or more subsidiaries located in the US. On average, companies in our sample suffered losses in 2016 with a negative ROA of -10.25 % even though the median figure is positive

<sup>5</sup> We excluded some firms even though we could access their annual reports. Among the reasons for exclusion included companies showing no audit fee data, no data on board composition, boards comprising only non-executive directors, and a small number of reports where information on the auditor was absent.

<sup>6</sup> As we are particularly interested in those firms with a relatively brief listing history, in Table 2 we combine firms with tenure on the AIM in excess of 15 years.

<sup>7</sup> Companies on the AIM are not expected to identify those non-executives who are independent, as would be the case for fully listed firms. Hence, we measure board independence by using the proportion of non-executive directors.

<sup>8</sup> ACDIS takes the value of 1 if we can obtain information on audit committee size, independence, number of meetings, and financial expertise from the annual report.

<sup>9</sup> As it is not possible to distinguish between independent and non-independent non-executive directors in AIM companies, we use a dummy variable indicating instances where an executive is an audit committee member as our measure of audit committee independence.

<sup>10</sup> We do not include a specific variable for the number of meetings, because only 303 of our sample companies disclose such information. However, in our additional analysis in section 4.4.4, we explain how we include the number of meetings in additional untabulated analysis.

<sup>11</sup> We are very grateful to one of the anonymous reviewers for this suggestion.

**Table 1**  
Industry breakdown of sample companies.

Industry sector	Number of companies	Percentage
Basic materials	43	9.5
Consumer goods	33	7.3
Consumer services	46	10.2
Financials	57	12.5
Health care	62	13.7
Industrials	89	19.6
Oil and gas	44	9.7
Technology	71	15.7
Telecommunications	5	1.1
Utilities	3	0.7
<b>Total</b>	<b>453</b>	<b>100.0</b>

**Table 2**  
Length of time sample companies listed on the AIM.

Number of years listed on the AIM	Number of companies	Percentage	Cumulative Percentage
1	30	6.6	6.6
2	53	11.7	18.3
3	33	7.3	25.6
4	15	3.3	28.9
5	19	4.2	33.1
6	23	5.1	38.2
7	4	0.9	39.1
8	16	3.5	42.6
9	31	6.8	49.4
10	47	10.4	59.8
11	50	11.1	70.9
12	44	9.7	80.6
13	15	3.3	83.9
14	15	3.3	87.2
15	15	3.3	90.5
15 +	43	9.5	100.0
<b>Total</b>	<b>453</b>	<b>100.0</b>	

at 1.19 %. Sample companies have leverage levels of just under 40 % and an average quick ratio of 3.18 times. The average company in our sample was listed on the AIM for almost nine years with a median list time of 10 years. Nine per cent of sample companies have yet to generate revenue.

Boards in our sample have an average of 55.49 % non-executive representation with a median of 57 %. This is interesting as it suggests that, despite the absence of prescriptive governance recommendations in the AIM, companies still possess, on average, a majority of non-executive directors. In keeping with the more relaxed governance in the AIM, 39 % of sample companies did not disclose complete audit committee information. Of those sample companies disclosing audit committee information, the average audit committee has 2.69 members with a median of three members. In 11 % of audit committees, there is at least one executive director as a member, a characteristic generally expected to reduce the committee's independence from management. On average, 82.68 % of audit committee members possess some level of financial expertise. 44 % of our sample companies are audited by one of the Big 4 audit firms.

Our sample companies average £98.5 million in total assets, ranging from £0.26 million to £3.6 billion and have an average of 14.32 subsidiaries, ranging from none to 165. The fees paid for non-audit services by the sample companies average just over £57,000 with a median of £19,000. 66 % of sample companies have their financial year-end in the busy financial reporting period, between December 31 and March 31, while 42 % of companies are audited by a London-based auditor. Only 7 % of sample companies changed auditor during 2016.

Table 5 contains mean and median comparisons between our sub-samples of firms audited by Big 4 and non-Big 4 auditors. These comparisons highlight significant differences between the two sub-samples. In terms of risk, firms audited by Big 4 auditors have more of their total assets in the form of account receivables and inventories, are more likely to possess at least one US-based subsidiary and have higher leverage levels. It is also noticeable that 6 % of firms generating no revenue are audited by Big 4 auditors compared to 12 % in the case of non-Big 4 auditing firms. In terms of corporate governance characteristics, firms audited by Big 4 auditors possess a higher proportion of non-executives on their boards and are more likely to disclose comprehensive audit committee information. Indeed, 73 % of clients of Big 4 auditors disclose full audit committee information compared to 51 % of clients of non-Big 4 auditors. Regarding our control variables, clients of Big 4 auditors are larger, possess a greater number of subsidiaries, and purchase more non-audit services from their auditor while non-Big 4 audit clients are more likely to use a London-based auditor.

**Table 3**  
Definition of Variables.

Categories	Label	Definition	Hypothesized impact
<i>Dependent Variable</i>	LNAUDIT	Natural logarithm of audit fee	
<i>Risk</i>	DEBTORS	Percentage of total assets represented by receivables	+
	INVENTORY	Percentage of total assets represented by inventories	+
	USSUB	Binary variable equals 1 if auditee has one or more US subsidiaries, and 0 otherwise	+
	ROA	Return on assets is operating profit as a percentage of total assets	-
	LEVERAGE	Leverage is the percentage of total assets represented by total liabilities	+
	QUICK	The ratio of total current assets less inventories divided by total current liabilities	-
	LISTTIME	Number of years since admission to the AIM	-
<i>Corporate Governance</i>	NOREVENUE	Binary variable equals 1 if auditee has no revenue, and 0 otherwise	+/-
	Non-executive directors as a proportion of all directors	+	NEDS
	ACDIS	Binary variable equals 1 if full audit committee information is disclosed, including the existence of an audit committee, identity of the members of the audit committee, and the frequency of audit committee meetings, and 0 otherwise	-
<i>ACEXE</i>	ACSIZE	Number of directors on the audit committee	+
	Binary variable equals 1 if company has one or more executive directors on the audit committee, and 0 otherwise	-	
<i>Auditor Size</i>	ACEXP	Proportion of audit committee members with financial expertise	+
	BIG 4	Binary variable equals 1 if audit done by one of the Big 4 auditors (i.e., KPMG, Deloitte & Touche, Ernst and Young, and PricewaterhouseCoopers), and 0 otherwise	+
<i>Control Variables</i>	LNAUDIT2015	Natural logarithm of audit fee in 2015	+
	LNASSET	Natural logarithm of total assets	+
	LNSUBS	Natural logarithm of number of subsidiaries	+
	LNNONAUDIT	Natural logarithm of non-audit fee	+
	LONDON	Binary variable equals 1 if auditor is located in London, and 0 otherwise	+
	BUSY	Binary variable equals 1 if company's financial year end is between December 31 and March 31, and 0 otherwise	+
	CHANGE	Binary variable equals 1 if auditor changed for the 2016 financial year, and 0 otherwise	-

Notes: All variables relate to the 2016 financial year (except for LNAUDIT2015) and all data is sourced directly from each company's annual report for the 2016 financial year.

#### 4.2. Main regressions

Our main regression results are presented in Table 6.<sup>12</sup> In column one, we present the results for our full sample of firms while in column two we report results for those sample firms also disclosing audit committee information. In all regressions, we control for industry as well as using robust standard errors to calculate the reported coefficients.

In the full sample regression, several of our risk measures have a significant impact on audit fees with both liquidity and the number of years listed having a negative impact. The negative impact of liquidity is consistent with weak financial condition increasing the likelihood of future financial issues and a consequent future risk for auditors. The negative impact of the number of years listed suggests that auditors perceive relatively new companies as presenting a greater audit risk, presumably due to the increased likelihood of failure associated with such firms (Espenlaub et al., 2012). The findings in respect of both liquidity and listing time emphasize the importance of financial risk surrounding AIM companies and auditors attaching a risk premium to the pricing of such audits. The results of the regression in column one also highlights the positive impact of the full disclosure of audit committee information on audit fees. This is consistent with existing theory and empirical work suggesting that stronger corporate governance complements audit quality, in this case represented by the level of audit fee (Zaman et al., 2011; DeFond & Zhang, 2014; Ghafran & O'Sullivan, 2017). We also find that using a Big 4 auditor increases audit fees.

<sup>12</sup> We include a correlation matrix as Appendix 2.



**Table 4**  
Descriptive statistics.

Variables	Mean	Median	Std. Dev	Minimum	Maximum	Number
<i>Audit fee</i>						
AUDITFEE(£000 s)	100.73	70.00	93.31	9.24	1000.00	453
LNAUDIT	4.87	4.85	0.34	3.97	6.00	453
<i>Risk</i>						
DEBTORS (%)	11.45	7.36	12.89	0.00	63.71	453
INVENTORY (%)	6.14	0.49	11.18	0.00	76.31	453
USSUB	0.40	0.00	0.49	0.00	1.00	453
ROA (%)	-10.25	1.19	35.56	-188.78	47.92	453
LEVERAGE (%)	39.49	36.22	27.98	0.25	172.21	453
QUICK	3.18	1.51	5.22	0.03	39.18	453
LISTTIME	8.67	10.00	5.20	1.00	21.00	453
NOREVENUE	0.09	0.00	0.29	0.00	1.00	453
<i>Corporate Governance</i>						
NEDS (%)	55.49	57.14	15.28	0.00	100.00	453
ACDIS	0.61	1.00	0.49	0.00	1.00	453
ACSIZE	2.69	3.00	0.90	0.00	7.00	411
ACEXE	0.11	0.00	0.31	0.00	1.00	410
ACEXP (%)	82.68	100.00	22.17	0.00	100.00	351
<i>Auditor Size</i>						
BIG 4	0.44	0.00	0.50	0.00	1.00	453
<i>Control variables</i>						
LNAUDIT2015	4.81	4.79	0.35	3.48	5.97	451
TOTALASSET(£000 s)	98480.21	38592.00	225926.97	256.59	3587596.00	453
LNASSET	7.61	7.59	0.57	5.41	9.55	453
SUBS	14.32	9.00	16.98	0.00	165.00	453
LNSUBS	2.16	2.20	1.04	0.00	5.11	453
NONAUDIT(£000 s)	57.34	19.00	162.60	0.00	2845.00	453
LNNONAUDIT	3.68	4.28	1.75	0.00	6.45	453
LONDON	0.42	0.00	0.49	0.00	1.00	453
BUSY	0.66	1.00	0.47	0.00	1.00	453
CHANGE	0.07	0.00	0.26	0.00	1.00	450

Note: Definitions of all variables are provided in Table 3.

**Table 5**  
Mean and median comparisons between AIM companies using Big 4 and Non-Big 4 auditors.

Variables	Big 4 (n = 200)		Non-Big 4 (n = 253)		Big 4 vs Non-Big 4	
	Mean	Median	Mean	Median	Mean difference	Median difference
LNAUDIT	5.052	5.070	4.722	4.732	11.603***	10.177***
DEBTORS (%)	13.420	9.023	9.901	6.201	2.909***	3.095***
INVENTORY (%)	7.226	1.008	5.283	0.255	1.842*	2.161**
USSUB	0.500	0.000	0.320	0.000	3.829***	3.772***
ROA (%)	-9.617	2.901	-10.743	-0.348	0.334	1.021
LEVERAGE (%)	43.568	40.331	36.272	32.988	2.777***	2.758***
QUICK	3.191	1.470	3.171	1.545	0.040	-0.945
LISTTIME	8.550	9.000	8.760	10.000	-0.432	-0.426
NOREVENUE	0.060	0.000	0.120	0.000	-2.262**	-2.252
NEDS (%)	56.909	58.571	54.372	50.000	1.759*	1.673*
ACDIS	0.730	1.000	0.510	1.000	4.668***	4.564***
LNASSET	7.859	7.835	7.409	7.401	9.011***	8.255***
LNSUBS	2.464	2.525	1.920	2.079	5.735***	5.780***
LNNONAUDIT	3.947	4.597	3.465	4.079	2.932***	6.764***
LONDON	0.270	0.000	0.530	1.000	-5.847***	-5.644***
BUSY	0.690	1.000	0.640	1.000	0.909	0.909
CHANGE	0.080	0.000	0.070	0.000	0.174	0.175

Notes: Definitions of all variables are provided in Table 3. T-Tests are used to compare means and the Wilcoxon Rank Sum Z-test is used to compare medians. \*, \*\*, and \*\*\* denote statistical significance at 10%, 5%, and 1%, respectively.

In addition to exploring the statistical significance of the regression results, it is also helpful to reflect on what these findings mean in economic terms. Focusing on the results of the full sample regression in Table 6 and assuming all other explanatory variables are held constant, a 10 % increase in liquidity decreases the audit fee by 4 % while a one year increase in list

**Table 6**

Results of Ordinary Least Squares (OLS) regressions examining the impact of risk, corporate governance, and auditor size on audit fees in the AIM.

Variables	Full Sample		Audit Committee Sample	
	Coefficient	T-Statistic	Coefficient	T-Statistic
DEBTORS	0.00055	1.21	0.00057	1.13
INVENTORY	-0.00026	-0.61	-0.00046	-0.95
USSUB	0.01246	1.09	0.00491	0.39
ROA	-0.00008	-0.38	-0.00002	-0.11
LEVERAGE	0.00035	1.40	0.00029	1.00
QUICK	-0.00396	-4.13***	-0.00439	-4.25***
LISTTIME	-0.00454	-4.34***	-0.00487	-4.14***
NOREVENUE	0.01498	0.71	0.00925	0.37
NEDS	0.00041	1.12	0.00069	1.70*
ACDIS	0.01948	1.90*	-	-
ACSIZE	-	-	0.00470	0.49
ACEXE	-	-	0.02740	1.23
ACEXP	-	-	0.00125	0.14
BIG 4	0.04603	4.05***	0.03430	2.66***
LNAUDIT2015	0.72258	20.40***	0.72687	19.14***
LNASSET	0.08348	4.80***	0.09013	4.70***
LNSUBS	0.01418	1.91*	0.01122	1.29
LNNONAUDIT	0.00801	2.35**	0.00445	1.15
LONDON	0.00433	0.39	-0.00234	-0.20
BUSY	0.02378	2.36**	0.02568	2.24**
CHANGE	-0.02969	-1.28	-0.00748	-0.22
Constant	0.65105	5.45***	0.59859	4.75***
Industry Control	Yes		Yes	
Observations	449		348	
R Square	0.9057		0.9085	
F-test	264.42***		175.38***	

Notes: Definitions of all variables are provided in Table 3. \*, \*\*, and \*\*\* denote statistical significance at 10%, 5%, and 1%, respectively.

time reduces the audit fee by about 0.5 %. In respect of corporate governance disclosure, the results in Table 6 suggest that the full disclosure of audit committee information increases audit fees by approximately 2 %. Finally, a Big 4 auditor adds approximately 4.6 % to a company's audit fee. These figures signify the relative importance of specific aspects of risk, corporate governance, and auditor size in the determination of audit fees in the AIM.

In respect of our control variables, the results of the full-sample regression shows that audit fees in the AIM are positively influenced by audit client size and complexity as well as by the amount of non-audit services purchased from the auditor and whether the audit is undertaken in the busy audit season. These findings reinforce existing findings from studies of fully listed firms. As expected, we also find that the 2015 audit fee has a very positive impact on 2016 audit fees.

As we are also interested in the impact of audit committee characteristics on audit fees, column two in Table 6 contains regression results for those sample firms which disclose audit committee information. In this regression we include firms that disclose information on audit committee size, composition, and expertise, resulting in a useable total of 348 firms. As before, we control for industry and use robust standard errors to calculate the reported coefficients. The regression in Table 6 fails to show that any of our audit committee variables have a significant impact on audit fees. This is different to the findings in relation to fully listed companies where Zaman et al. (2011) and Ghafraan and O'Sullivan (2017) find that greater compliance with recommended best practice is associated with higher audit fees.

The regression highlights the positive impact non-executive representation has on audit fees with the proportion of non-executives exerting a positive and statistically significant impact. This is interesting in that, in the audit committee disclosure sample at least, it appears that more extensive audits are driven by the extent of non-executive representation but not specific audit committee characteristics. This suggests that greater non-executive representation enhances audit thoroughness although not necessarily via audit committee characteristics. The results presented in column two also reinforce the positive impact of various measures of risk identified in the full sample regression as well as the positive impact of a Big 4 auditor. Our earlier findings in relation to the control variables are reinforced in column two.

#### 4.3. Sensitivity test - controlling for auditor selection bias

One objective of this study is to ascertain whether auditor size has an impact on audit pricing in the AIM. However, as discussed and documented by Chaney et al. (2004), Carson et al. (2012), Lennox et al. (2012), Peel and Makepeace (2012), and others, there is a significant danger that without adequate correction for the presence of self-selection bias, findings on the impact of auditor size may be unreliable.<sup>13</sup> This arises due to the possibility that a firm's choice of auditor is unlikely

<sup>13</sup> We are very grateful to our anonymous reviewers for highlighting the importance of this approach in our study.

to be random but influenced by factors that may also impact the audit fee. In order to control for this and ensure that the subsequent empirical analysis is not undermined by self-selection concerns, it is recommended that researchers utilize a two-stage regression approach following Heckman's (1979) procedure. As a first step, a probit model of auditor choice is undertaken to estimate the probability of selecting a Big 4 audit firm whereby a bias correction term is calculated, the Inverse Mills Ratio (IMR), and this is then included in the second stage regression (Chaney et al., 2004; Tucker, 2010; Lennox et al., 2012).

Our empirical analysis follows this approach. We run a probit model seeking to explain the choice of auditor, either Big 4 or non-Big 4, and then use the resultant IMR as an additional explanatory variable in the second stage regression. As pointed out by Lennox et al (2012), the absence of exclusion restrictions in the estimated selection model could lead to a multicollinearity issue in the second stage. Consistent with the suggestion of Lennox et al (2012), we include firms' market capitalization (in million) as an exclusion restriction variable which is only used in the first stage but not in the second stage. We believe this is a suitable instrument because the choice of auditor is likely to be influenced by an audit client's market capitalization. In addition, we conduct diagnostic tests to ensure the underlying assumptions of the Heckman model are met<sup>14</sup> and, therefore, our results are not influenced by multicollinearity (Lennox et al., 2012).

The results for the first and second stage regressions for the full sample (Column one) and audit committee sample (Column two) are presented in Table 7.<sup>15</sup> To ensure greater applicability in the case of our audit committee sample, in Column two we re-calculate a revised IMR called IMR(a) from a probit regression of auditor choice involving only the 348 firms that disclosed audit committee information. The coefficients of the risk, corporate governance, and Big 4 variables in the second stage regressions in Table 7 are consistent with those in the main regression. The IMR(a) is statistically significant at 10 % in the full sample while not statistically significant in the audit committee sample. These results suggest that our models are not susceptible to auditor self-selection bias.

In the case of selection models, Lennox et al. (2012) highlight the potential for the results of the second stage regression to suffer from multicollinearity, especially as the IMR variable is derived from the first stage regression and many of the variables are similar between the two regressions. We follow Lennox et al. (2012) and Campa (2013) in reporting the relevant Variable Inflation Factors (VIF)s in Table 7. The average VIF coefficients for both models are around 5, and those associated with the main variable of interest, IMR(a), measure 1.93 and 2.00 in the two models, respectively. Based on these coefficients, we can be confident that multicollinearity is not a significant influence as none of the VIFs are above 10 (Greene, 2008; Lennox et al., 2012). As a further robustness check, we re-run our second stage regressions with the natural log of market capitalization and our original results persist. Finally, similar to Campa (2013), we also re-run our second stage regressions excluding each of the independent variables used in the first stage regression in turn. Our untabulated results indicate that none of these variables has a statistically significant impact on the coefficient associated with either Big 4 or with IMR (or IMRa). All of this gives us confidence in the robustness of our empirical approach and results.

#### 4.4. Additional analysis

##### 4.4.1. Auditor size and audit pricing

In Table 8, we present regression results focusing separately on the determinants of audit fees for clients of Big 4 and non-Big 4 auditors. For each sub-sample, we present results for our full sample and our reduced audit committee sample. In terms of the risk variables, the findings are broadly similar between the two sub-samples with both the quick ratio and the length of time since admission to the AIM having a negative and statistically significant impact on audit fees across all four regressions. This further highlights the importance of these two risk variables in audit pricing decisions in the AIM for all auditor types. It should be noted that the absence of revenue has a positive impact on audit fees in the case of Big 4 auditors while the representation of non-executives has a positive impact in the case of non-Big 4 auditors. Neither sub-sample regressions show that any individual audit committee characteristics have a statistically significant impact. Our results show some significant differences in respect of our control variables with the number of subsidiaries and the levels of non-audit fees both exerting a significant positive impact in the case of the non-Big 4 samples. Similarly, auditor change has a significant negative impact in the case of our non-Big 4 sample.

##### 4.4.2. Audit client size and audit pricing

In addition to exploring the determinants of audit fees in the case of large and small auditors, Table 9 presents a similar analysis in relation to audit client size. As there is significant diversity in firm size on the AIM, we create two sub-samples of firms based on the median value of total assets. As before, for each of the sub-samples we run separate regressions for the full sample of firms as well as the reduced sample disclosing audit committee information. In both sub-samples, audit fees are significantly and negatively influenced by levels of liquidity as well as the number of years listed on the AIM. In the case of the smaller company sub-sample, audit fees are also positively influenced by the levels of assets in the form of trade receivables. This suggests that outstanding amounts due may be a source of audit risk in the case of smaller firms. Our analysis also highlights some interesting differences in respect of the control variables. Specifically, smaller firms pay an audit fee premium to be audited by a Big 4 auditor, the level of non-audit fees paid by smaller firms has a positive impact on audit fees,

<sup>14</sup> We tested for the joint normality of the distribution of residuals.

<sup>15</sup> The Inverse Mills Ratio (IMR) is obtained from the first stage probit regression explaining the choice of Big 4 auditor. The explanatory variables used in the probit regression are: GEARING, ROA, QUICK, USSUBS, and LNNONAUDIT, as well as the natural log of firms' market capitalization.

**Table 7**  
Sensitivity test for self-selection bias - Results of the Heckman Model.

Variables <sup>a</sup>	Full Sample 1st stage probit regression <sup>b</sup> (dependent variable = BIG 4)		Audit Committee Sample 1st stage probit regression (dependent variable = BIG 4)	
	Coeff	T- Stat <sup>b</sup>	Coeff	T- stat <sup>d</sup>
USSUB	0.43115	3.40***	0.45384	3.43***
ROA	0.00016	0.09	-0.00008	-0.04
LEVERAGE	0.00796	3.17***	0.00902	3.45***
QUICK	0.02212	1.67*	0.02817	1.96**
LNASSET <sup>c</sup>	0.00159	3.89***	0.00167	4.01***
(exclusion restriction)				
LNNONAUDIT	0.06093	1.67*	0.09622	2.40**
Constant	-1.10784	-5.59***	-1.42469	-6.47***
	2nd Stage (dependent variable = LNAUDIT)		2nd Stage (dependent variable = LNAUDIT)	
DEBTORS	0.00057	1.27	0.00061	1.21
INVENTORY	-0.00025	-0.59	-0.00042	-0.89
USSUB	-0.00990	-0.57	-0.01450	-0.71
ROA	-0.00007	-0.36	-0.00002	-0.07
LEVERAGE	-8.47e-06	-0.03	-0.00051	-0.13
QUICK	-0.00491	-4.57***	-0.00532	-4.47***
LISTTIME	-0.00449	-4.30***	-0.00481	-4.08***
NOREVENUE	0.01397	0.66	0.00862	0.34
NEDS	0.00044	1.19	0.00071	1.75*
ACDIS	0.01815	1.78*	-	-
ACSIZE	-	-	0.00414	0.43
ACEXE	-	-	0.02758	1.24
ACEXP	-	-	0.00094	0.10
BIG 4	0.04627	4.07***	0.03412	2.64***
LNAUDIT2015	0.72285	20.43***	0.72905	19.16***
LNASSET	0.07133	3.68***	0.07815	3.57***
LNSUBS	0.01507	2.00**	0.01259	1.40
LNNONAUDIT	0.00506	1.32	0.00061	0.13
LONDON	0.00605	0.55	-0.00101	-0.09
BUSY	0.02537	2.56**	0.02727	2.43**
CHANGE	-0.03035	-1.32	-0.00714	-0.21
IMR <sup>e</sup>	-0.07347	-1.83*	-0.05846	-1.37
Constant	0.84165	4.93***	0.77087	4.10***
Industry Control	Yes		Yes	
Observations	449		348	
R Square	0.9064		0.9091	
F-test	263.60***		174.65***	
VIF(IMR) <sup>f</sup>	5.05		5.15	
VIF(Mean)	1.93		2.00	

Notes: <sup>a</sup> Definitions of all variables are provided in Table 3. <sup>b</sup> The independent variables for the first stage probit regression are chosen based on Campa (2013). <sup>c</sup> In the first stage probit regression we use the natural log of firms' market capitalization to represent firm size. This is our exclusion restriction (or exogenous independent variable) which is not used in the 2nd stage regression – in the 2nd stage regression we use the natural log of total assets to represent firm size. <sup>d</sup> \*, \*\*, and \*\*\* denote statistical significance at 10%, 5%, and 1%, respectively. <sup>e</sup> For the audit committee sample, we re-calculated the IMR (IMRa) using a probit regression of auditor choice involving only the 348 firms for which we have audit committee characteristics disclosed. <sup>f</sup> The relevant VIF scores for the IMR and the IMRa are disclosed to ensure the absence of multicollinearity as advised by Lennox et al. (2012) and Campa (2013). We follow Campa (2013) to test the underlying assumptions of the Heckman model and the results of the Shapiro-Wilk W test indicate the joint normality of the distribution of the residuals.

smaller firms pay a premium for audits undertaken during the busy auditing season, and smaller firms earn an audit fee discount when they change auditors. Overall, the results presented in Table 9 highlight several key differences in the determinants of audit fees between larger and smaller AIM companies.

#### 4.4.3. List time and audit pricing

Because list time has a negative and statistically significant impact in all our regressions, we felt it would be useful to investigate this further. Therefore, we split our sample between those firms listed in the AIM for less than 10 years and those listed for 10 years or more and re-run our regressions for each of these sub-samples. Our results in Table 10 show that for firms with less than 10 years' experience on the AIM, audit fees are significantly influenced by our risk measures with higher levels of accounts receivables having a positive impact while greater levels of inventories have a negative impact. Even though liquidity has a negative impact on audit fees in the case of both sub-samples, the negative impact of the length of listing applies only to firms on the AIM for less than 10 years. This represents strong evidence that firms with a shorter listing history pay higher audit fees. Interestingly, in our sample of firms listed for longer than 10 years, we find some evidence that

**Table 8**  
Determinants of audit pricing for clients of Big 4 and non-Big 4 auditors.

Variables	Big 4 Model 1		Model 2		Non-Big 4 Model 1		Model 2	
	Coeff	T- Stat	Coeff	T- Stat	Coeff	T- stat	Coeff	T- Stat
DEBTORS	0.00069	0.84	0.00062	0.72	0.00055	1.10	0.00051	0.93
INVENTORY	0.00036	0.53	0.00035	0.47	-0.00076	-1.54	-0.00117	-1.96*
USSUB	0.00275	0.15	0.00149	0.07	0.01819	1.20	0.00265	0.19
ROA	-0.00033	-0.99	-0.00026	-0.78	0.00015	0.73	0.00024	1.04
LEVERAGE	0.00022	0.49	0.00025	0.52	0.00036	1.27	-0.00029	0.92
QUICK	-0.00599	-2.98***	-0.00559	-2.50**	-0.00292	-2.60***	-0.00377	-3.18***
LISTTIME	-0.00539	-3.10***	-0.00573	-2.89***	-0.00439	-3.24***	-0.00465	-3.29***
NOREVENUE	0.09120	1.80*	0.08099	1.42	-0.00964	-0.46	-0.01982	-0.79
NEDS	0.00085	1.12	0.00093	1.11	0.00060	1.35	0.00088	1.72*
ACDIS	0.01976	1.11	-	-	0.02043	1.54	-	-
ACSIZE	-	-	0.00571	0.36	-	-	0.00269	0.26
ACEXE	-	-	0.02727	0.51	-	-	0.01721	0.81
ACEXP	-	-	-0.00481	-0.34	-	-	0.00797	0.74
LNAUDIT2015	0.74871	13.91***	0.75205	12.85***	0.70432	15.27***	0.71262	14.51***
LNASSET	0.09508	3.30***	0.10042	3.34***	0.06927	3.50***	0.06874	3.14***
LNSUBS	-0.00363	-0.32	-0.00319	-0.25	0.02997	3.51***	0.02571	2.31**
LNNONAUDIT	0.00188	0.40	0.00282	0.48	0.01402	2.64***	0.00576	1.06
LONDON	0.00138	0.06	-0.00114	-0.05	0.01191	0.93	0.00033	0.03
BUSY	0.02681	1.51	0.01773	0.91	0.01365	1.16	0.02340	1.73*
CHANGE	0.02042	0.50	0.03903	0.80	-0.05857	-2.03**	-0.05350	-1.02
Constant	0.52443	2.95***	0.47075	2.29**	0.78551	4.96***	0.78345	4.86***
Industry Control	Yes	-	Yes	-	Yes	-	Yes	-
Observations	197	-	172	-	252	-	176	-
R Square	0.8808	-	0.8788	-	0.8882	-	0.9064	-
F-test	84.73***	-	64.00***	-	168.73***	-	122.82***	-

Notes: Definitions of all variables are provided in Table 3. \*, \*\*, and \*\*\* denote statistical significance of *t*-statistic at 10%, 5%, and 1%, respectively.

**Table 9**  
Determinants of audit pricing for large and small audit clients (based on median of LNASSET).

Variables	Large firms Model 1		Model 2		Small firms Model 1		Model 2	
	Coeff	T- Stat	Coeff	T- Stat	Coeff	T- stat	Coeff	T- stat
DEBTORS	0.00029	0.41	0.00035	0.43	0.00102	1.69*	0.00123	1.87*
INVENTORY	-0.00045	-0.75	-0.00054	-0.78	-0.00037	-0.57	-0.00115	-1.64
USSUB	0.02366	1.40	0.01756	0.99	0.00904	0.51	-0.00410	-0.23
ROA	-0.00027	-0.78	-0.00050	-1.26	0.00002	0.10	0.00021	0.78
LEVERAGE	0.00093	1.87*	0.00085	1.59	-0.00457	0.69	0.00022	0.64
QUICK	-0.00282	-2.11**	-0.00280	-1.96*	-0.00609	-2.71***	-0.00624	-3.25***
LISTTIME	-0.00314	-2.12**	-0.00388	-2.42**	0.02511	-4.11***	-0.00590	-3.66***
NOREVENUE	0.00400	0.10	-0.03438	-1.14	0.00032	0.95	0.04230	1.18
NEDS	0.00061	1.01	0.00058	0.92	0.01272	0.68	0.00088	1.68*
ACDIS	0.02245	1.30	-	-	0.01272	0.91	-	-
ACSIZE	-	-	0.00255	0.17	-	-	0.00295	0.25
ACEXE	-	-	0.03783	0.79	-	-	0.01242	0.53
ACEXP	-	-	0.00986	0.71	-	-	-0.00088	-0.07
BIG 4	0.02325	1.38	0.01158	0.65	0.06940	4.00***	0.05686	2.83***
LNAUDIT2015	0.73323	15.35***	0.74155	14.72***	0.71825	12.61***	0.69455	11.26***
LNASSET	0.08005	2.60***	0.09138	2.85***	0.05655	1.94*	0.06994	2.04**
LNSUBS	0.01327	1.28	0.01445	1.34	0.00718	0.66	-0.00501	-0.32
LNNONAUDIT	0.00249	0.51	-0.00052	-0.09	0.01248	2.52**	0.00867	1.64
LONDON	-0.00098	-0.06	-0.00152	-0.09	0.01433	0.81	0.00348	0.19
BUSY	0.02326	1.52	0.02179	1.30	0.03238	2.19**	0.04850	2.74***
CHANGE	0.00830	0.23	0.00956	0.21	-0.05941	-2.11**	-0.03809	-0.79
Constant	0.61378	2.86***	0.49918	2.29**	0.86964	3.23***	0.89998	3.35***
Industry Control	Yes	-	Yes	-	Yes	-	Yes	-
Observations	224	-	194	-	225	-	154	-
R Square	0.8662	-	0.8720	-	0.8346	-	0.8486	-
F-test	81.08***	-	61.42***	-	81.73***	-	49.45***	-

Notes: Definitions of all variables are provided in Table 3. \*, \*\*, and \*\*\* denote statistically significance of *t*-statistic at 10%, 5%, and 1%, respectively.

audit committees possessing at least one executive member pay higher audit fees. This suggests that it is a particular concern for auditors when more established firms do not possess audit committees comprising non-executives only. Firms registered

**Table 10**  
Firm listed years on the AIM and audit pricing (based on median of LISTTIME).

Variables	Firms listed for 10 years or more				Firms listed for less than 10 years			
	Model 1 Coeff	T- Stat	Model 2 Coeff	T- Stat	Model 1 Coeff	T- stat	Model 2 Coeff	T- stat
DEBTORS	-0.00040	-0.83	-0.00049	-0.90	0.00152	2.13**	0.00173	2.20**
INVENTORY	0.00081	1.55	0.00036	0.59	-0.00142	-2.91***	-0.00153	-2.68***
USSUB	0.01501	1.19	0.00785	0.57	0.00958	0.49	0.00264	0.13
ROA	0.00038	1.79*	0.00032	1.35	-0.00043	-1.43	-0.00037	-1.31
LEVERAGE	0.00040	1.57	0.00026	0.87	0.00044	1.07	0.00034	0.74
QUICK	-0.00267	-2.14**	-0.00294	-2.18**	-0.00375	2.38**	-0.00366	-2.12**
LISTTIME	-0.00179	-0.94	0.00032	0.15	-0.00715	-2.28**	-0.01118	-3.10***
NOREVENUE	0.04233	1.61	0.02183	0.93	-0.02173	-0.58	-0.01776	-0.35
NEDS	0.00050	1.25	0.00062	1.37	0.00050	0.72	0.00076	1.05
ACDIS	0.01739	1.38	-	-	0.01761	1.08	-	-
ACSIZE	-	-	0.01749	1.22	-	-	0.00166	0.14
ACEXE	-	-	0.03710	1.66*	-	-	0.04510	1.18
ACEXP	-	-	-0.00815	-0.76	-	-	-0.00073	-0.05
BIG 4	0.03750	2.90***	0.01211	0.87	0.05199	2.61***	0.05099	2.19**
LNAUDIT2015	0.82133	23.50***	0.86735	22.47***	0.63540	11.45***	0.63659	11.72***
LNASSET	0.03721	2.46**	0.02430	1.48	0.12719	4.52***	0.14473	4.89***
LNSUBS	0.01399	1.74*	0.00728	0.81	0.016756	1.31	0.01607	1.07
LNONAUDIT	0.00747	2.18**	0.00739	1.90*	0.00855	1.35	0.00268	0.38
LONDON	0.00144	0.12	-0.01374	-1.01	0.00832	0.43	0.00582	0.30
BUSY	0.01857	1.73*	0.02111	1.68*	0.03375	1.95*	0.03006	1.59
CHANGE	-0.07591	-3.14***	-0.06308	-2.45**	-0.02913	-0.91	-0.02152	-0.45
Constant	0.49864	3.37***	0.37008	2.29**	0.71927	3.62***	0.19956	3.11***
Industry Control	Yes		Yes		Yes		Yes	
Observations	229		171		220		177	
R Square	0.9442		0.9463		0.8827		0.8985	
F-test	235.00***		133.67***		137.53***		109.14***	

Notes: Definitions of all variables are provided in Table 3. \*, \*\*, and \*\*\* denote statistical significance of *t*-statistic at 10%, 5%, and 1%, respectively.

on the AIM for less than 10 years pay higher audit fees when audited by a Big 4 auditor. Our sub-sample analysis also shows that the positive impact of the amount of non-audit services purchased from the auditor and the negative impact of an auditor change only apply in the sub-sample of longer registered firms. This analysis supports the importance of investigating the length of listing and its impact on audit fees for firms in the AIM.

#### 4.4.4. Additional untabulated tests<sup>16</sup>

In addition to the empirical analysis reported in the regressions in Tables 6 to 10, we undertook quite a few untabulated tests in order to verify further the robustness of our results. First, as highlighted in Table 4, 9% of our sample firms generated no revenue in 2016. There is a danger that including this variable in our regression in Table 6 might overly influence the statistical significance of ROA because firms without revenue, by definition, exhibit negative ROA. In order to counter this, we re-run our full sample regression omitting the no revenue variable. Our untabulated results are identical to those reported in Table 6 with ROA still not statistically significant. Second, as mentioned throughout the paper, one challenge we faced in undertaking this study is the lack of consistent reporting on corporate governance, specifically in relation to audit committee disclosure. Even though we were able to collect for 348 firms data on most audit committee characteristics, including size, independence, and expertise, we could only collect audit committee meeting data for 303 firms. Therefore, we excluded the number of meetings from our main audit committee regressions presented in the paper. However, in untabulated analysis, we re-run the regression in Table 6 and include the number of meetings. Neither the number of meetings nor any of the other audit committee variables are found to be statistically significant.

Third, we looked closely at the biographical details of audit committee members in our sample and, using the definitions used in Ghafran and O'Sullivan (2017), we distinguish between those with accounting and non-accounting financial expertise.<sup>17</sup> We re-run the audit committee regression in Table 6 substituting overall financial expertise with separate variables representing the proportion of accounting and non-accounting expertise. However, neither of the two financial expertise variables are statistically significant and the existing results remain the same. These additional tests reinforce our finding that the disclosure of an audit committee and its characteristics positively impacts audit fees in the AIM, but that individual audit committee characteristics have little impact. Finally, our regression results in Table 6 show that while no audit committee variables are statistically significant, the proportion of non-executive directors has a positive impact. In order to make sure that the presence of our non-executive variable is not disguising an audit committee impact, we re-run our audit committee regression in Table 6

<sup>16</sup> All untabulated analysis mentioned in this section is available from the authors upon request.

<sup>17</sup> 25.80% of audit committee members have a professional accounting qualification, while 68.84% possess non-accounting financial expertise.

without the non-executive variable. However, our findings remain unchanged as our individual audit committee characteristics do not have a significant impact on audit fees in the AIM.

## **5. Conclusions**

This study fills a gap in the audit pricing literature by undertaking an empirical analysis of the determinants of audit fees in the AIM. Studying audit pricing in the AIM is interesting for several reasons. First, companies on the AIM are generally perceived as being higher risk than their fully listed counterparts. We focus on both traditional measures of audit risk as well as some AIM-specific measures to try and ascertain how audit client risk impacts audit pricing in the AIM. Second, companies on the AIM are not subject to the comply or explain approach to corporate governance regulation. Therefore, they enjoy much greater freedom in choosing their own governance arrangements. Thus, we are interested to ascertain the impact of both board independence and audit committee characteristics on audit fees in such a lightly regulated listed environment. Third, unlike the fully listed markets in the UK and elsewhere, there is significant diversity of auditors in the AIM with the Big 4 auditors not enjoying a dominant market share. Consequently, we are interested to ascertain whether the Big 4 audit firms charge an audit fee premium in the AIM.

Our analysis reveals that audit fees in the AIM are influenced by various measures of audit risk, specifically client liquidity and listing history. We find consistent evidence that auditors charge more to client firms with lower liquidity and with a shorter history on the AIM. In further sub-sample analysis, we find that for AIM companies with shorter listing history as compared with more established firms, audit fees are especially sensitive to a range of risk measures. We find evidence that greater audit committee disclosure is associated with more expensive audits, but find no evidence that audit fees are sensitive to individual audit committee characteristics. After controlling for auditor self-selection bias, we find that Big 4 auditors charge a premium for audits in the AIM. When we investigate this further, we find that Big 4 and non-Big 4 auditors emphasize slightly different variables in their audit pricing decisions.

Even though our study represents an important first step in understanding auditing issues more broadly and audit pricing specifically in the AIM, it also highlights potential for further work. An obvious limitation of our work is the single-year focus. Our findings highlight several issues that can be further understood in a more longitudinal study. For example, a key contribution of our work is the focus on the importance of various general and specific aspects of audit client risk. A longer-term study would allow us to better understand the dynamic nature of this and, specifically, how sensitive audit pricing is to changes in those key risk measures over time. An interesting extension would be to study the evolution of both board composition and audit committee disclosure and characteristics over time to understand better the evolution of such voluntary governance characteristics on the AIM and their impact on auditors' pricing decisions. As with many studies examining the impact of non-executives, the audit pricing literature focuses predominantly on the monitoring role of non-executives. In a market such as the AIM, where non-executives are equally as likely to have a key advising and strategic role, they are expected to bring more expertise than necessarily monitoring to their board positions. A useful extension would be to focus on the skills and expertise of non-executives and examine whether the nature of this has an impact on auditors' pricing decisions. Finally, it would be intriguing to find out why some firms on the AIM choose to hire a larger and more expensive auditor while others do not. It would be interesting to ascertain from AIM companies the reasons for their choice of auditor.

## **Data availability**

Data will be made available on request.

## **Declaration of Competing Interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## **Acknowledgements**

We are very grateful for the significant help and encouragement received from the Editor-in-Chief, Professor Larson, and two anonymous reviewers throughout the review process for this paper.

**Appendix 1**

Auditors' market share in AIM companies in 2016.

<b>Auditor</b>	<b>Number of AIM clients</b>	<b>Total market share (%)</b>
BDO	145	15.73
KPMG	132	14.32
Grant Thornton UK	117	12.69
PwC	96	10.41
Deloitte	55	5.97
RSM	55	5.96
EY	44	4.77
Crowe Clark Whitehill	34	3.69
Moore Stephens	26	2.82
PKF Littlejohn	24	2.6
Smith & Williamson (Nexia)	22	2.39
Chapman Davis	17	1.84
Jeffreys Henry	16	1.74
Mazars	16	1.74
UHY Hacker Young Group	13	1.41
Haysmacintyre	12	1.3
Welbeck Associates	12	1.3
Kingston Smith	6	0.65
James Cowper	5	0.54
Kost Forer Gabbay & Kasierer	5	0.54
Saffery Champness	5	0.54
Others (less than 5 AIM clients)	65	7.05
<b>Total</b>	<b>922</b>	<b>100</b>

Note: Source is AIM companies' 2016 annual reports.



## Appendix 2

Correlation table.

No	Variables <sup>b</sup>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
1	LNAUDIT	1.000																					
2	DEBTORS	<b>0.257</b>	1.000																				
3	STOCK	0.075	0.073	1.000																			
4	USSUB	<b>0.226</b>	<b>0.139</b>	0.004	1.000																		
5	ROA	<b>0.191</b>	<b>0.169</b>	<b>0.136</b>	-0.017	1.000																	
6	LEVERAGE	<b>0.334</b>	<b>0.359</b>	<b>0.083</b>	-0.013	<b>-0.167</b>	1.000																
7	QUICK	<b>-0.286</b>	<b>-0.226</b>	<b>-0.167</b>	-0.052	<b>-0.083</b>	<b>-0.430</b>	1.000															
8	LISTTIME	0.006	0.068	<b>0.094</b>	-0.008	<b>0.179</b>	-0.050	-0.073	1.000														
9	NOREVENUE	<b>-0.254</b>	<b>-0.288</b>	<b>-0.163</b>	<b>-0.155</b>	<b>-0.188</b>	<b>-0.205</b>	<b>0.302</b>	-0.049	1.000													
10	NEDS	<b>0.147</b>	<b>-0.082</b>	-0.076	0.050	<b>-0.092</b>	-0.068	0.030	-0.010	<b>0.141</b>	1.000												
11	ACDIS	<b>0.271</b>	0.036	-0.056	<b>0.118</b>	-0.033	0.035	0.009	-0.117	<b>-0.094</b>	0.056	1.000											
12	ACSIZE	<b>0.177</b>	-0.012	0.059	<b>0.101</b>	0.076	0.059	0.007	-0.017	-0.006	<b>0.189</b>	0.081	1.000										
13	ACEXE	<b>0.382</b>	0.001	-0.007	<b>0.119</b>	<b>0.006</b>	0.001	-0.033	0.003	0.033	<b>0.205</b>	<b>0.198</b>	<b>0.114</b>	1.000									
14	ACEXP	<b>-0.166</b>	<b>-0.139</b>	<b>-0.106</b>	<b>-0.134</b>	-0.038	0.021	0.051	0.001	0.016	<b>-0.263</b>	<b>-0.103</b>	0.077	<b>-0.166</b>	1.000								
15	BIG 4	<b>0.480</b>	<b>0.136</b>	0.086	<b>0.177</b>	0.016	<b>0.130</b>	0.002	-0.020	<b>-0.106</b>	<b>0.083</b>	<b>0.215</b>	<b>0.146</b>	<b>0.180</b>	<b>-0.134</b>	1.000							
16	LNASSET	<b>0.716</b>	<b>0.087</b>	<b>0.131</b>	0.076	<b>0.428</b>	<b>0.131</b>	<b>-0.108</b>	0.070	<b>-0.145</b>	<b>0.108</b>	<b>0.242</b>	<b>0.183</b>	<b>0.341</b>	<b>-0.204</b>	<b>0.391</b>	1.000						
17	LNSUBS	<b>0.659</b>	<b>0.237</b>	0.046	0.194	<b>0.281</b>	<b>0.350</b>	<b>-0.327</b>	0.065	<b>-0.255</b>	-0.015	<b>0.115</b>	<b>0.187</b>	<b>0.188</b>	<b>-0.109</b>	0.261	0.537	1.000					
18	LNNONAUDIT	<b>0.322</b>	<b>0.086</b>	-0.013	<b>0.175</b>	<b>0.091</b>	0.016	-0.044	-0.036	-0.078	0.048	0.136	0.203	0.139	-0.057	<b>0.137</b>	<b>0.261</b>	<b>0.205</b>	1.000				
19	LONDON	-0.024	<b>-0.174</b>	<b>-0.197</b>	<b>-0.120</b>	-0.013	-0.048	-0.039	0.075	0.077	-0.067	<b>-0.108</b>	-0.065	0.021	<b>0.173</b>	<b>-0.265</b>	-0.053	-0.032	<b>-0.116</b>	1.000			
20	BUSY	<b>0.117</b>	-0.074	-0.038	0.027	-0.018	0.062	-0.040	-0.013	0.024	0.039	-0.020	-0.045	0.028	0.047	0.043	-0.004	0.007	-0.068	0.074	1.000		
21	CHANGE	-0.003	<b>-0.097</b>	-0.001	<b>-0.091</b>	-0.052	0.051	0.020	-0.039	-0.030	-0.028	<b>-0.105</b>	-0.069	0.051	0.081	0.008	0.045	0.052	-0.019	0.037	0.037	1.000	

Notes: Pearson correlations statistically significant at the 1 % level are shown in bold. Definitions of variables are provided in Table 3.

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