# Do investment in and the sourcing arrangement of the internal audit function affect audit delay?

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## ARTICLE INFO

## ABSTRACT

This paper investigates the association between the internal audit function attributes and audit delay using a sample of 432 publicly traded firms in Malaysia in 2009. In this unique setting, we capitalize on the publicly available data concerning the investment in and the sourcing arrangement of internal audit function. We find a negative relationship between the costs incurred for the internal audit function and audit delay. However, we do not find any significant association between the internal audit function sourcing arrangements and audit delay. Additionally, we find that greater audit committee independence and longer auditor–client tenure shorten audit delay, and more frequent audit committee meetings and higher misstatements in the preliminary unaudited earnings are associated with a longer audit delay.

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## 1. Introduction

Audit delay or audit reporting lag represents the number of calendar days between the fiscal year end and the external auditor report date and is a major public concern. Numerous studies show audit delays influence the market reaction to earnings announcements (Chambers and Penman, 1984), cause auditor switching (Mande and Son, 2011), and lead to restatements and going concern modified audit reports in the subsequent years (Carmichael et al., 2011). The empirical evidence by Chambers and Penman (1984) and Kross and Schroeder (1984) indicates that there is a more lukewarm market reaction to the earnings announcements from firms with a longer audit report lag. Carmichael et al. (2011) further show that when audit reporting lags increase by one standard deviation beyond the normal reporting lag the likelihood of restating the prior years' financial statements or being issued a going concern modified audit report increases by 38% and 21%, respectively. They also show that an abnormally long audit delay leads to more frequent auditor resignations in subsequent years.

Given the potentially adverse consequences of a delay in issuing audit reports, there is a sizeable and sustained literature that investigates factors that contribute to the delay and are mostly in the US (for example, Ashton et al., 1987; Bamber et al., 1993; Schwartz and Soo, 1996; Knechel and Payne, 2001; Ettredge et al., 2006; Lee et al., 2009). There is an empirical regularity that the delay is mainly attributed to specific firm characteristics and complexities (firm size, number of subsidiaries, foreign operations and audit fees), audit risks (ownership concentration, financial distress indicators, high-risk accounts, such as inventories and trade receivables, and modified audit opinions), audit firm attributes (Big N international audit firms, tenure, industry specialists and non-audit services) and the content of the firm disclosures (material weaknesses in internal controls and extraordinary items).

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One recent development in the audit delay literature is the consideration of the role of corporate governance on audit delay. Mohamad-Nor et al. (2010) and Abernathy et al. (2011) show that audit committee meeting frequency and audit committee financial expertise, respectively, influence audit delay. Meanwhile, Knechel et al. (2012) show that the strength of a client's corporate governance at the board of directors and audit committee level reduces the risk of financial misreporting and the extent of audit testing. Additionally, there is an emerging line of research that views audit delay as a reflection of both external and internal auditor efforts and considers the internal audit function (IAF) to be a possible determinant of audit delay (Pizzini et al., 2011; Abbott et al., 2011). In the financial reporting process, international auditing standards permit and even encourage external auditors to consider the activities of internal auditing as well as their effect, if any, on external audit procedures. Borrowing insights from previous studies by Felix et al. (2001), Ho and Hutchinson (2010) and Abbott et al. (2012), whose work show that using the work completed by the IAF allows the external auditor to reduce the effort required to complete the audit resulting in a corresponding reduction in the external audit fee, an effective IAF is expected to shorten the audit delay in line with the audit risk model.

Based on the survey data received from Fortune 1000 companies, Abbott et al. (2011) show that the direct assistance provided by the IAF to external auditors contributes to a greater audit efficiency and results in a shorter audit delay. Meanwhile, Pizzini et al. (2011) show that the quality of a firm's IAF shortens the audit reporting lag. A greater IAF quality signifies a reduction in control risk, which prompts the external auditor to reduce the audit effort, which results in a shorter audit lag. The single comprehensive measure of IAF quality used by Pizzini et al. (2011) is based on a survey conducted by the Institute of Internal Auditors' (IIA) Global Auditing Information Network (GAIN) and includes competency (experience, education, certification, and training), objectivity (to whom does the Chief Audit Executive/Head of the IAF functionally report?), quality of fieldwork (such as the use of quality assurance techniques), financial focus (the extent to which the IAF audits various activities related to financial reporting), and the investment in internal auditing (costs of the internal audit department).

However, as acknowledged by Prawitt et al. (2009), Lin et al. (2011) and Prawitt et al. (2011), there are a number of drawbacks in using the IAF data from the GAIN database. First, firms that participated in the GAIN survey tend to be large firms with sophisticated IAFs and may not be representative of most IAFs in practice due to the choice to self-select participation in the survey. Second, the small sample size lowers the power of the statistical tests and further limits the generalizability of the results to a larger population of firms. Third, the reliability of the IAF data is vulnerable due to self-reporting bias inherent in survey data.

Therefore, this study builds on the emerging research on the association between IAF attributes and audit delay and addresses the inherent limitations associated with the IAF proprietary survey data by using publicly available data. Using publicly available information minimizes the sample selection bias that arises from the samples not being drawn randomly, which adds to the generalizability of the results. Additionally, we investigate whether the sourcing arrangements of the IAF (namely whether it is out-sourced to a third party internal audit service provider or performed in-house) have any bearing on the audit delay. Our motivation to examine this link stems from the insights provided by previous research, which indicates that the sourcing of the IAF has a significant effect on the external auditor's assessed quality of the IAF, the external auditor's assessed reliance on the IAF, and the planned external audit effort (Glover et al., 2008; Coram et al., 2008; Munro and Stewart, 2010; Desai et al., 2011). We extend these studies by exploring the effect of the IAF sourcing arrangement on the audit delay.

Malaysia is used as a setting to address the research propositions due to several important considerations. First, IAFs play an increasingly important role in the financial reporting process and corporate governance landscape in Malaysia. Effective from 2007, all listed companies in Malaysia have to establish an IAF. Second, we capitalize on the unique data concerning investment in IAFs, which is publicly available for Malaysian listed companies. The Listing Requirements of Bursa Malaysia mandate the disclosure of whether the IAF is performed in-house or out-sourced and the costs incurred for the IAF in the financial year. Third, there is a scarcity of studies on the contribution of IAFs to financial reporting in developing countries.

Although there are at least four previous studies on audit delay in Malaysia (Abdullah, 2007; Che-Ahmad and Abidin, 2008; Hashim and Abdul-Rahman, 2011; Nelson and Shukeri, 2011), these studies suffer from bias due to omitted variables. Abdullah (2007) and Nelson and Shukeri (2011) analyze board characteristics and audit report timeliness by omitting certain key control variables, such as firm complexity and financial distress indicators. Hashim and Abdul-Rahman (2011) incorporate three audit committee variables and three control variables in their audit delay model. Although Che-Ahmad and Abidin (2008) include more variables (11) in their audit delay model, their study period is before the introduction of the Malaysian Code on Corporate Governance (MCCG), which occurred in 2000. Therefore, they are unable to incorporate corporate governance variables that may potentially explain the audit delay. In this study, we address the limitations in previous Malaysian studies by using a more comprehensive model of audit delay and data after the implementation of the MCCG.

We document a strong negative relationship between the costs incurred for the IAF and the audit delay. However, we do not find support that firms with in-house IAF have significantly different audit delays when compared with their counterparts that out-sourced the IAF. Additionally, we show that audit committee independence and audit firm tenure enhance audit report timeliness, whereas more frequent audit committee meetings and more misstatements in the unaudited preliminary financial results prolong the audit delay. Our results are robust to various alternative specification models.

This study contributes to the literature in the following ways. No previous studies have examined the association between investment in the IAF and audit delay using publicly available data. Our study complements the study by Pizzini et al. (2011), which uses survey data and provides more compelling evidence on the negative association between IAF investments and audit report lag. The findings of this research can alert the regulators when they consider future policy changes to

accelerate the reporting deadline because, currently, Malaysian firms lag behind firms in the US in audit reporting timeliness. The World Bank reports that the stock exchange regulator Bursa Malaysia is planning to shorten the deadline for submitting audited financial statements from the current 4 months after the end of the financial year to 2 months and has embarked on a consultation process with other stakeholders (Report on the Observance of Standards and Codes – Malaysia, Accounting and Auditing, 2012).

The remainder of the paper progresses as follows. The second section reviews the related literature and develops the possible linkages between IAF cost and the sourcing arrangements on audit delay. The third section discusses the research design. The fourth section describes our sample and presents the empirical results. Finally, the fifth section concludes and acknowledges the study limitations.

## 2. Background and hypotheses

In Gambling et al. (2004) four-cornerstones framework of corporate governance, the key parties that have a more direct and immediate impact on corporate governance within a specific organization are the audit committee made up of the board of directors, the executive management, the external auditors and the IAF. As the "eyes and ears of management", the IAF is expected to review and test the effectiveness of controls and communicate the results of ongoing internal audit activities to, ideally, the audit committee. DeFond (1992) notes that the agency theory literature identifies two aspects of the agency relationship that give rise to agency problems: (1) the divergence in preferences of the manager and owner with respect to the manager's actions and (2) the imperfect observability of the manager's action by the owner. DeFond (1992) further argues that managers will voluntarily increase the observability of their actions by hiring internal auditors to monitor their behavior. Adams (1994) and Sarens and Abdolmohammadi (2011) assert that managers incur bonding costs, such as the cost of internal audits, to signal to owners that they are acting responsibly and in a manner consistent with their employment contract. Therefore, the IAF plays an important role in reducing information asymmetries between the owners and the managers (Sarens and Abdolmohammadi, 2011, p. 4). Additionally, Anderson et al. (1993), Carey et al. (2000) and Sarens and Abdolmohammadi (2011) further argue that internal auditing serves as a monitoring response to agency costs. Carey et al. (2000) find empirical support that, in an environment where auditing is voluntary, internal audits are more prevalent than external audits among family businesses, and out-sourcing is a common method for conducting an internal audit.

The usefulness of internal audits as a monitoring mechanism is further reinforced by Coram et al. (2008) who study Australian and New Zealand entities and find that entities with an IAF are more likely than those without to detect and self report misappropriation of assets fraud. This suggests that IAFs are an invaluable corporate governance mechanism by enhancing the control and monitoring environment in detecting and reporting fraud. Prawitt et al. (2009) show that the quality of IAF, based on its competency and independence from management, moderates the level of earnings management. Likewise, Garcia et al. (2010) also show that the presence of an IAF in Spain mitigates earnings management.

Although there is sizeable evidence that internal auditing can have a positive influence on corporate governance, an unsettling issue in the internal auditing literature is the choice to internalize or out-source the internal audit activities. The debate over the benefits of internalization versus externalization of the IAF (i.e. outsourcing to an external auditor or an outside service provider other than auditor) persists hitherto (Rittenberg and Covaleski, 2001; Spekle et al., 2007; Abbott et al., 2007; Prawitt et al., 2011). In line with the objective of this study, which is to further expand the scope of the literature on the impact of the IAF on the financial reporting process, the next section develops our hypotheses concerning the association between the IAF investment and sourcing arrangements (in-house versus out-sourced) and the timeliness of the external audit report.

### 2.1. Investment in IAF and audit delay

The investment in, or the cost expended on, the IAF typically comprises manpower, training, out-sourcing to the service provider and travelling (Exhibit 11, Sample Statement on Internal Audit Function, Bursa Malaysia, Corporate Governance Guide, 2009). Although the financial resources available to the IAF are crucial to enable the IAF to provide effective monitoring and assistance to the audit committee, there is very limited literature that examines the consequences of monetary investment in the IAF.

Prawitt et al. (2009) argue that an IAF that is relatively well funded should have greater monitoring ability to detect and to deter material misstatements because the greater resources enable the IAF to hire and retain more competent personnel. Using the dollar amount spent on internal auditing (deflated by total assets) by the company relative to the amount spent on internal auditing for the industry as one of the six composite measures of the IAF quality, Prawitt et al. (2009) find that the overall composite measure of IAF quality reduces the level of earnings management.

Although no prior studies have examined the association between investment in the IAF and audit delay, it is conceivable that a greater investment in the IAF leads to a shorter audit delay. This proposition is derived from the connected insights obtained from Lin et al. (2011) and Ettredge et al. (2006). Lin et al. (2011) argue that the IAF duties revolve around internal controls over financial reporting (ICFR) and that the IAF quality increases the effectiveness of the ICFR. Therefore, a greater investment in IAF implies more competent IAF personnel are helping management establish stronger controls over financial reporting. With reduced incidence of control deficiencies, external auditors are more likely to reduce evidence gathering,

which permits speedier completion of the audit work. This is supported by Ettredge et al. (2006) who document companies that disclose material weaknesses in the ICFR under Section 404 of SOX have significantly longer delays when compared with companies without material weaknesses in their ICFR. Based on the above discussion, we predict that

**H₁.** A greater investment in the IAF reduces audit lag.

*2.2. IAF sourcing arrangements and audit delay*

A company's IAF can be maintained in-house, out-sourced or a combination of both, i.e., co-sourced. The international auditing standards specify that the external auditor is able to rely on the internal auditor's work if the external auditor is satisfied that standards of competence and objectivity have been met. There are various pros and cons associated with the sourcing arrangements of the IAF. For example, in-house internal auditors have more day-to-day contact with the company, which presents them with more opportunities to discover problems and determine critical facts and issues from employees (Glover et al., 2008). Apart from having more firm-specific knowledge, in-house internal auditors are more attuned to the firm's culture, chain of command and information sources and are more familiar with its vendors, customers and processes (Abbott et al., 2011). However, the disadvantages include limited availability of specialized knowledge and a higher probability of internal auditors giving in to management pressures (Desai et al., 2011). Conversely, third-party internal audit out-sourcing brings potential benefits such as access to specialized knowledge of the independent firm and greater objectivity as the out-sourced internal auditors have less incentive to please or align with management.

Extant studies indicate that internal audit sourcing arrangements have a significant impact on external auditors' perceptions about the quality of the IAF and the extent of reliance placed by the external auditors on the IAF. Ahlawat and Lowe (2004) suggest that an out-sourced IAF is more objective than an in-house IAF. Glover et al. (2008) find that external auditors are more likely to rely on the work of out-sourced rather than in-house internal auditors when the inherent risk is high. However, Coram et al. (2008) discover that organizations that maintain the IAF in-house are more likely to detect and self-report fraud, and they, therefore, infer that an in-house IAF is superior to an out-sourced IAF. Similarly, Munro and Stewart (2010) show that external auditors make greater use of internal auditors as assistants for substantive testing when an internal audit is provided in-house. Given the mixed evidence on the superiority of an in-house versus an out-sourced IAF, our next hypothesis is non-directional:

**H₂.** The IAF sourcing arrangements influence audit lag.

## 3. Research design and model specification

The annual reports of 432 Malaysian public listed firms on the Main and Second Boards for the year 2009 are utilized in this study. The year 2009 is selected because it is the first full year that listed firms have to disclose the amount of investment in the IAF. We model audit delay as a function of investment in the IAF, the IAF sourcing arrangement, and a set of control variables as follows:

$$AUDLAG = \beta_0 + \beta_1 LNIAFINV + \beta_2 IAFSOU + \beta_3 LNFEE + \beta_4 INSIDER + \beta_5 LNASSET + \beta_6 SALES + \beta_7 SEGMENT_P$$
$$+ \beta_8 SEGMENT_G + \beta_9 LOSS + \beta_{10} INVREC + \beta_{11} OPINION + \beta_{12} BIG4 + \beta_{13} TENURE + \beta_{14} ACEXP + \beta_{15} ACIND$$
$$+ \beta_{16} ACSIZE + \beta_{17} ACMEET5 + \beta_{18} BANKRUPT + \beta_{19} VARIANCE + \beta_{20} SECTOR + error\ term. \tag{1}$$

Previous studies have used the audit delay in calendar days from the fiscal year end to the date of audit report (*AUDLAG*) either in its raw form (Bamber et al., 1993; Schwartz and Soo, 1996; Mande and Son, 2011; Abbott et al., 2011) or expressed as a natural logarithm (Ashton et al., 1987; Ng and Tai, 1994; Jaggi and Tsui, 1999). In this study, we report the main results using the raw form, while the log transformation of *AUDLAG* is presented in the extensions. Our main variables of interest are *LNIAFINV*, which is the natural logarithm of the cost borne by the IAF in 2009, and the dummy variable *IAFSOU*, which takes the value of 1 if the IAF is established in-house and is 0 otherwise.

We include several delay factors as control variables. Higher auditor remuneration (*LNFEE*), which is measured by the natural logarithm of the total fees paid to the external auditor, reflects greater audit complexity and engagement effort, which leads to a longer audit delay (Ettredge et al., 2006; Pizzini et al., 2011; Knechel et al., 2012). High ownership concentration by insiders (*INSIDER*), which is proxied by the percentage of closely held shares owned by insiders/blockholders with ownership of at least 5%, indicates low audit risk as fewer people rely on the audited financial statements. With a low auditor's litigation risk, the auditor can afford to put in less audit effort and, consequently, is able to issue timelier audit reports (Bamber et al., 1993; Leventis et al., 2005). We expect a negative association between the firm size, which is measured by the natural logarithm of total assets (*LNASSET*) and the total sales scaled by total assets (*SALES*), because larger firms have incentives to expend more resources to provide for speedier reporting (Ashton et al., 1989; Bamber et al., 1993). Diversified firms, which are proxied by the number of product segments (*SEGMENT_P*) and geographical segments (*SEGMENT_G*), pose a greater audit complexity and are expected to have longer delays (Knechel and Payne, 2001; Krishnan and Yang, 2009; Lee et al., 2009).

**Table 1**
Audit lag (in days) by industry sector.

| Industry sector | N | Mean | Median | Minimum | Maximum | Std. deviation | % of Total |
|---|---|---|---|---|---|---|---|
| Construction | 34 | 100.21 | 110.50 | 56 | 127 | 21.74 | 7.87 |
| Consumer Products | 71 | 96.38 | 101.00 | 40 | 122 | 22.23 | 16.44 |
| Industrial Products | 157 | 100.83 | 110.00 | 34 | 121 | 20.33 | 36.34 |
| Plantation | 22 | 82.82 | 77.50 | 33 | 119 | 25.65 | 5.09 |
| Properties | 29 | 98.93 | 110.00 | 53 | 120 | 23.99 | 6.71 |
| Technology | 14 | 79.36 | 77.50 | 50 | 121 | 26.23 | 3.24 |
| Trading/service | 105 | 98.87 | 106.00 | 41 | 122 | 22.01 | 24.31 |
| Total | 432 | 97.83 | 107.00 | 33 | 127 | 22.36 | 100.00 |

Similarly, poorly performing firms, which are represented by the occurrence of negative earnings (*LOSS*), are associated with higher risk of material misstatement, and hence, a greater extent of audit work is required (Bamber et al., 1993). Firms with greater inherent risk, which is reflected in large inventory and receivables balances that are scaled by the total assets (*INV-REC*), are expected to experience a greater delay in audit completion as these items have a higher risk of error and require specialized audit procedures (Simunic, 1980; Newton and Ashton, 1989).

Auditors also spend considerable time and effort when rendering a qualified opinion; thus, we expect increased audit report lags for firms receiving emphasis of matter or disclaimer audit opinion (*OPINION*), which is consistent with Bamber et al. (1993). We anticipate that clients audited by large international audit firms, namely PricewaterhouseCoopers, Ernst & Young, KPMG or Deloitte (*BIG4*), will have a shorter audit lag due to the auditor expertise (Simunic, 1984). In tandem with Lee et al. (2009) and Pizzini et al. (2011), we expect audit lags to decline as the audit firm tenure lengthens because auditors with a longer tenure have a fuller and more complete understanding of their client's operations. In this study, *TENURE* represents the number of years the firm has used the current (2009) external auditor, and this measure is traced back up to 2002 or since the date of listing if later than 2002. Firms with poor corporate governance mechanisms, reflected by a low proportion of the audit committee having auditing experience (*ACEXP*), a low proportion of independent audit committee members (*ACIND*), and a smaller audit committee size (*ACSIZE*), are predicted to have a lengthy audit delay. These expectations are derived from prior literature that shows that the strength of the audit committee has a bearing on the internal controls over financial reporting and, hence, control risks (Klein, 2002; Abbott et al., 2004; Knechel et al., 2012). As for the number of audit committee meetings, we expect more than four meetings a year is indicative of lengthy negotiations between an auditor and a client concerning unresolved auditing issues, which can prolong audit delays (Abernathy et al., 2011). Thus, the related dummy variable *ACMEET5* takes the value of 1 if more than four audit committee meetings are held during the year and 0 otherwise.

We control for the bankruptcy risk (*BANKRUPT*) using the Altman (1993) Z Score financial distress indicator.[1] Gul (2006) uses the Altman Z Score to predict bankruptcy among Malaysian firms around the 1997–1998 Asian financial crisis, and we use this method based on the claim by Nor and Chin (2002) that the model is appropriate for Malaysian firms. Firms with greater Z Scores are less likely to face financial distress and pose a lower audit risk. Therefore, their auditors will take a shorter time to sign off on the financial statements. Inspired by Kinney and McDaniel (1993), we expect companies that report a greater absolute variance between the audited and the unaudited earnings to have poor internal control quality, which lead to greater audit efforts and deliberations between auditors and management. *VARIANCE* is measured as the difference between the unaudited and audited profit after tax and minority interests deflated by unaudited profit after tax and minority interests (in absolute terms). Finally, we control for firms operating in technology and plantation sectors, as they are relatively easy to audit due to the idiosyncratic nature of these industries, which are typified by the existence of fewer product segments and lower levels of inventory. The dummy variable *SECTOR* takes the value of 1 if firm is classified under plantation or technology sector and 0 otherwise.

Financial and non-financial data, such as total fees paid to an external auditor, sales, total assets, net income, inventories, receivables, current assets, current liabilities, total debt, share ownership, and the number of business and geographical segments, are obtained from Datastream. Other data not available from Datastream, such as audit report date, audit opinion, and the identity of the audit firm over the period 2002–2009, IAF investment and sourcing arrangements, and audit committee attributes, are hand-collected from the annual reports. The industry sector is derived from the Bursa Malaysia classification, and the unaudited preliminary results to compute *VARIANCE* are taken from the Bursa announcements.

## 4. Descriptive and empirical results

### 4.1. Sample profile

Table 1 shows the sample composition and the average audit lag partitioned by industry sector. The sample is widely distributed across industry groups and is in tandem with the distribution of firms in Bursa Malaysia. The majority of the

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[1] *BANKRUPT* = 1.2 ∗ (working capital to total assets) + 1.4 ∗ (retained earnings to total assets) + 3.3 ∗ (earnings before taxes and interest to total assets) + 0.6 ∗ (market value of equity to total liabilities) + 1.0 ∗ (net sales to total assets).

**Table 2**
Descriptive statistics.

|  | Minimum | Maximum | Mean | Median | Std. deviation |
|---|---|---|---|---|---|
| AUDLAG | 33.00 | 127.00 | 97.83 | 107.00 | 22.36 |
| IAFINV (RM'000) | 3.85 | 26300.00 | 371.59 | 81.87 | 1498.32 |
| IAFSOU | 0.00 | 1.00 | 0.52 | 1.00 | 0.50 |
| FEE (RM'000) | 20.00 | 27400.00 | 499.67 | 165.50 | 1576.76 |
| INSIDER | 0.00 | 100.00 | 52.63 | 55.36 | 21.06 |
| ASSET (RM million) | 31.59 | 71363.01 | 1870.25 | 374.35 | 6002.18 |
| SALES | 0.01 | 5.04 | 0.79 | 0.66 | 0.62 |
| $SEGMENT_P$ | 1.00 | 5.00 | 2.91 | 3.00 | 1.52 |
| $SEGMENT_G$ | 1.00 | 10.00 | 2.27 | 1.00 | 1.89 |
| LOSS | 0.00 | 1.00 | 0.22 | 0.00 | 0.42 |
| INVREC | 0.00 | 1.42 | 0.33 | 0.32 | 0.19 |
| OPINION | 0.00 | 1.00 | 0.04 | 0.00 | 0.19 |
| BIG4 | 0.00 | 1.00 | 0.65 | 1.00 | 0.48 |
| TENURE | 1.00 | 8.00 | 6.27 | 8.00 | 2.47 |
| ACEXP | 0.00 | 1.00 | 0.27 | 0.33 | 0.21 |
| ACIND | 0.50 | 1.00 | 0.86 | 1.00 | 0.16 |
| ACSIZE | 2.00 | 6.00 | 3.28 | 3.00 | 0.54 |
| ACMEET5 | 0.00 | 1.00 | 0.64 | 1.00 | 0.48 |
| BANKRUPT | −3.69 | 33.47 | 2.76 | 2.05 | 3.56 |
| VARIANCE | 0.00 | 1.93 | 0.03 | 0.00 | 0.13 |
| SECTOR | 0.00 | 1.00 | 0.08 | 0.00 | 0.28 |

Variable definitions: AUDLAG = the number of calendar days from the fiscal year end to the date of the audit report; IAFINV = the cost borne by the IAF in 2009; IAFSOU = 1 if IAF is established in-house and is 0 otherwise; FEE = the total fees paid to the external auditor; INSIDER = the percentage of closely held shares owned by insiders/blockholders with an ownership of at least 5%; ASSET = total assets; SALES = ratio of sales to total assets; $SEGMENT_P$ = the number of product segments; $SEGMENT_G$ = the number of geographical segments; LOSS = 1 if ROA (ratio of net income to total assets) is negative and is 0 otherwise; INVREC = ratio of inventories and receivables to total assets; OPINION = 1 if emphasis of matter or disclaimer audit opinion is issued and is 0 otherwise; BIG4 = 1 if the auditor is PricewaterhouseCoopers, Ernst & Young, KPMG or Deloitte and is 0 otherwise; TENURE = the number of years the firm has used the current (2009) external auditor (traced back up to 2002 or since the date of listing if later than 2002); ACEXP = the proportion of audit committee members who have auditing experience; ACIND = the proportion of independent nonexecutive directors on the audit committee; ACSIZE = the number of audit committee members; ACMEET5 = 1 if more than four audit committee meetings are held during the year and is 0 otherwise; BANKRUPT = 1.2 ∗ (working capital to total assets) + 1.4 ∗ (retained earnings to total assets) + 3.3 ∗ (earnings before taxes and interest to total assets) + 0.6 ∗ (market value of equity to total liabilities) + 1.0 ∗ (net sales to total assets), which is based on the Altman Z Score (Altman, 1993); VARIANCE = the difference between unaudited and audited profit after tax and minority interests, which is deflated by unaudited profit after tax and minority interests (in absolute terms); and SECTOR = 1 if classified under plantation or technology sector and is 0 otherwise. Sample size is 432.

samples come from the industrial product (36%) and the trading and service (24%) sectors. Only 8% of the sample companies are involved in the plantation and technology sectors. The remaining sample companies are from consumer products (16%) and construction and properties (15%). The average audit lag in 2009 for Malaysian companies in our sample is 98 days, which is comparable to Yaacob and Che-Ahmad (2011) for the period 2004–2008 (100 days) and Nelson and Shukeri (2011) who document the average audit delay of 101 days for 703 firms in 2009. However, it is approximately a month longer than the average delay for US firms (Carmichael et al., 2011). On average, a shorter time period is taken to complete the statutory audit in the plantation (83 days) and technology (79 days) sectors.

Table 2 shows the descriptive statistics for the sample. The audit lag ranges from 33 days to 127 days with one company exceeding the mandatory 4-month reporting deadline. The average (median) investment in the IAF is RM371,590 (RM81,870). Based on the survey data, Mustapha and Che-Ahmad (2011) document an average internal audit cost of RM280,896 for a sample of 235 Malaysian firms in 2006, which suggests an increasing trend in internal audit expenditure. There is slightly more in-house IAFs in our sample than out-sourced IAFs. There are four companies in our sample that co-sourced their IAF, and we classify these companies as out-sourced in the main analysis.[2] The study by Mustapha and Che-Ahmad (2012) reveals that 49% of Malaysian companies have in-house IAFs, 43% out-source their IAFs, and the remaining companies either co-source or have no IAFs. The average (median) fees paid to external auditors are approximately RM500,000 (RM165,000). The average percentage of closely held shares is 53%, which suggests that the sample companies have a greater ownership concentration. Mahenthiran and Kasipillai (2012) obtain a similar percentage of ownership from the top five largest shareholders in Malaysia for their sample of Malaysian listed companies in 2008. The average (median) firm size in terms of total assets is RM1.87 billion (RM374 million).

The sample companies have, on average, three product segments and two geographical segments. Twenty-two percent of the sample companies incur losses in 2009, and nearly 4% have qualified audit opinions. The frequency of qualified audit opinions in 2009 is slightly lower than during the period of 1999–2003 (4.6%) as documented by Md-Ali et al. (2009). Approximately one-third of the total assets of our sample companies are comprised of inventories and receivables, which is consistent with Mustapha and Che-Ahmad (2011). Almost two-thirds of the sample companies are audited by a Big 4

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[2] In the extensions, we also report the robustness of our main results when the co-sourced firms are (i) reclassified as in-house and (ii) removed from the sample.

**Table 3**
Comparisons between short versus long audit delays.

| Variable | Up to 107 days (n = 223) | | More than 107 days (n = 209) | | p-Value (t-test)# | p-Value Mann Whitney |
|---|---|---|---|---|---|---|
| | Mean | Median | Mean | Median | | |
| LNIAFINV | 4.888 | 4.605 | 4.343 | 4.288 | 0.000 | 0.000 |
| IAFSOU | 0.561 | 1.000 | 0.474 | 0.000 | 0.071 | 0.026 |
| LNFEE | 2.364 | 2.286 | 2.248 | 2.158 | 0.011 | 0.000 |
| INSIDER | 54.487 | 56.440 | 50.652 | 53.800 | 0.059 | 0.044 |
| LNASSET | 13.281 | 12.999 | 12.761 | 12.635 | 0.000 | 0.000 |
| SALES | 0.835 | 0.724 | 0.741 | 0.619 | 0.113 | 0.059 |
| SEGMENT$_P$ | 2.691 | 3.000 | 3.134 | 3.000 | 0.002 | 0.001 |
| SEGMENT$_G$ | 2.368 | 1.000 | 2.172 | 1.000 | 0.284 | 0.085 |
| LOSS | 0.139 | 0.000 | 0.311 | 0.000 | 0.000 | 0.000 |
| INVREC | 0.306 | 0.309 | 0.352 | 0.327 | 0.010 | 0.007 |
| OPINION | 0.004 | 0.000 | 0.072 | 0.000 | 0.000 | 0.000 |
| BIG4 | 0.713 | 1.000 | 0.579 | 1.000 | 0.003 | 0.001 |
| TENURE | 6.543 | 8.000 | 5.981 | 8.000 | 0.018 | 0.012 |
| ACEXP | 0.279 | 0.333 | 0.250 | 0.333 | 0.172 | 0.280 |
| ACIND | 0.867 | 1.000 | 0.859 | 1.000 | 0.577 | 0.508 |
| ACSIZE | 3.291 | 3.000 | 3.273 | 3.000 | 0.719 | 0.810 |
| ACMEET5 | 0.552 | 1.000 | 0.727 | 1.000 | 0.000 | 0.000 |
| BANKRUPT | 3.634 | 2.547 | 1.827 | 1.507 | 0.000 | 0.000 |
| VARIANCE | 0.013 | 0.000 | 0.043 | 0.001 | 0.017 | 0.000 |
| SECTOR | 0.117 | 0.000 | 0.048 | 0.000 | 0.010 | 0.004 |

*Variable definitions: LNIAFINV* = the natural logarithm of the cost borne by the IAF in 2009; *IAFSOU* = 1 if the IAF is established in-house and is 0 otherwise; *LNFEE* = the natural logarithm of total fees paid to the external auditor; *INSIDER* = the percentage of closely held shares owned by insiders/blockholders with an ownership of least 5%; *LNASSET* = the natural logarithm of the total assets; *SALES* = ratio of sales to total assets; *SEGMENT$_P$* = the number of product segments; *SEGMENT$_G$* = the number of geographical segments; *LOSS* = 1 if ROA (ratio of net income to total assets) is negative and is 0 otherwise; *INV-REC* = ratio of inventories and receivables to total assets; *OPINION* = 1 if emphasis of matter or disclaimer audit opinion is issued and is 0 otherwise; *BIG4* = 1 if the auditor is PricewaterhouseCoopers, Ernst & Young, KPMG or Deloitte and is 0 otherwise; *TENURE* = the number of years the firm has used the current (2009) external auditor (traced back up to 2002 or since the date of listing if later than 2002); *ACEXP* = the proportion of audit committee members who have auditing experience; *ACIND* = the proportion of independent nonexecutive directors on the audit committee; *ACSIZE* = the number of audit committee members; *ACMEET5* = 1 if more than four audit committee meetings are held during the year and is 0 otherwise; *BANKRUPT* = 1.2 $*$ (working capital to total assets) + 1.4 $*$ (retained earnings to total assets) + 3.3 $*$ (earnings before taxes and interest to total assets) + 0.6 $*$ (market value of equity to total liabilities) + 1.0 $*$ (net sales to total assets), which is based on the Altman Z Score (Altman, 1993); *VARIANCE* = the difference between unaudited and audited profit after tax and minority interests, which is deflated by unaudited profit after tax and minority interests (in absolute terms); and *SECTOR* = 1 if classified under plantation or technology sector and is 0 otherwise. #*t*-test is based on equal variances not assumed.

auditor, and the average audit firm tenure is 6 years. In terms of audit committee composition, 27% of the members have prior auditing experience and 86% are independent directors. The average size of the audit committee is three with nearly two-thirds of the audit committees conducting more than four meetings per year. Less than 2% of the sample companies have less than four audit committee meetings per year (untabulated) in 2009; whereas, in 2002, Mohamad-Nor et al. (2010) find that 5% of their sample companies conduct less than four audit committee meetings per year. The average absolute variance between the unaudited and audited profit after tax and minority interests for the sample companies is 3%.

### 4.2. Univariate analysis

Table 3 compares descriptive statistics and reports the results of univariate tests for companies with short and long audit delays using the median audit delay (i.e., 107 days) as the cutoff. The results from parametric *t*-tests and non-parametric Mann–Whitney tests reveal striking differences in firm characteristics between the two groups. Companies with a longer audit lag have a significantly lower investment in their IAF and a lower likelihood to keep the IAF in-house. This provides preliminary support for both our hypotheses. A longer audit lag is also associated with a lower external auditor compensation, total assets, incidence of using a Big 4 auditor, and audit firm tenure. Companies with a longer audit lag are also more likely to have more product segments, incur losses, receive qualified audit opinions, have a greater proportion of inventories and receivables, have more frequent audit committee meetings, have a greater probability of bankruptcy, and greater absolute divergence between unaudited and audited profits.

Table 4 presents the Pearson and Spearman correlation coefficients for the dependent and independent variables. *AUDLAG* is negatively correlated with *LNIAFINV* ($r = -0.29$, $p < 0.01$) and *IAFSOU* ($r = -0.14$, $p < 0.01$). Again, these provide preliminary support for H$_1$ and H$_2$. There are a few paired independent variables that are highly correlated with correlation coefficients greater than 0.7, and these correlated variables are, namely, total assets (*LNASSET*) and external auditor compensation (*LNFEE*), total assets and investment in IAF (*LNIAFINV*), and investment in the IAF and external auditor compensation. To avoid multicollinearity in the multivariate analysis, four iterations of Eq. (1) are carried out with different combinations of the three highly correlated variables. In model 1, all the variables in Eq. (1) are included except for *LNASSET* and *LNFEE*.

**Table 4**
Pearson (Spearman) correlation above (below) diagonal.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *1 AUDLAG* | 1 | −.285** | −.141** | −.177** | −.049 | −.280** | −.062 | .139** | −.039 | .189** | .177** | .169** | −.175** | −.165** | −.025 | −.076 | .266** | −.098* | −.337** | −.221** | .103* |
| *2 LNIAFINV* | −.210** | 1 | .495** | .717** | −.011 | .735** | .056 | .248** | .186** | −.209** | −.163** | −.089 | .248** | .129** | −.026 | −.004 | .037 | .226** | .047 | .018 | .012 |
| *3 IAFSOU* | −.122* | .546** | 1 | .319** | .097* | .351** | .028 | .159** | .134** | −.087 | −.056 | −.032 | .086 | .046 | −.022 | .105* | −.035 | .084 | .019 | −.028 | .049 |
| *4 LNFEE* | −.142** | .672** | .350** | 1 | −.016 | .824** | .006 | .315** | .393** | −.160** | −.136** | −.074 | .261** | .101* | −.029 | .019 | .140** | .224** | −.055 | .010 | .058 |
| *5 INSIDER* | −.061 | .034 | .089 | .033 | 1 | .003 | .019 | .012 | .017 | −.051 | .040 | −.024 | .092 | .043 | −.014 | .058 | −.042 | .039 | .066 | −.041 | −.018 |
| *6 LNASSET* | −.195** | .683** | .384** | .780** | .050 | 1 | −.113* | .267** | .259** | −.198** | −.261** | −.096* | .279** | .132** | −.094 | .038 | .055 | .270** | .047 | .037 | −.014 |
| *7 SALES* | −.078 | .072 | .045 | .047 | .072 | −.144** | 1 | −.159** | .110* | −.094 | .315** | −.066 | −.013 | .071 | .015 | −.070 | −.091 | −.004 | .165** | −.130** | −.022 |
| *8 SEGMENT$_P$* | .145** | .240** | .159** | .289** | .006 | .256** | −.147** | 1 | .163** | −.022 | −.012 | −.020 | −.055 | −.016 | −.104* | .040 | .095* | .027 | −.123* | −.058 | −.014 |
| *9 SEGMENT$_G$* | −.068 | .176** | .150** | .363** | −.011 | .260** | .125** | .131** | 1 | .032 | .005 | −.048 | −.035 | −.037 | .006 | .087 | .038 | −.021 | .049 | .041 | −.012 |
| *10 LOSS* | .211** | −.213** | −.087 | −.170** | −.063 | −.203** | −.164** | −.021 | .029 | 1 | −.035 | .278** | −.166** | −.065 | −.003 | .066 | .172** | −.104* | −.214** | .020 | .058 |
| *11 INVREC* | .146** | −.143** | −.050 | −.087 | .033 | −.232** | .427** | −.018 | .021 | −.030 | 1 | −.001 | −.080 | −.099* | .007 | .030 | .035 | −.086 | −.163** | −.198** | .104* |
| *12 OPINION* | .225** | −.092 | −.032 | −.071 | −.036 | −.094 | −.060 | −.021 | −.049 | .278** | −.086 | 1 | −.035 | −.036 | −.100* | .021 | .046 | −.012 | −.134** | −.015 | .003 |
| *13 BIG4* | −.175** | .244** | .086 | .274** | .102* | .289** | −.030 | −.055 | −.010 | −.166** | −.086 | −.035 | 1 | .404** | .052 | −.111* | −.093 | .143** | .169** | .064 | −.025 |
| *14 TENURE* | −.145** | .103* | .039 | .080 | .031 | .116* | .043 | .004 | −.013 | −.079 | −.085 | −.023 | .380** | 1 | −.007 | −.088 | −.094* | .042 | .123* | .025 | −.014 |
| *15 ACEXP* | −.039 | −.049 | −.043 | −.045 | −.037 | −.133** | .027 | −.110* | .018 | .012 | .008 | −.096* | .041 | −.026 | 1 | .038 | −.031 | −.096* | .046 | −.026 | .018 |
| *16 ACIND* | −.051 | .013 | .110* | .054 | .031 | .068 | −.045 | .041 | .116* | .060 | .045 | .018 | −.104* | −.098* | .043 | 1 | −.023 | −.168** | .032 | .032 | .051 |
| *17 ACMEET5* | .233** | .006 | −.035 | .120* | −.048 | .038 | −.104* | .093 | .052 | .172** | .019 | .046 | −.093 | −.077 | −.039 | −.020 | 1 | .119* | −.093 | −.051 | .059 |
| *18 ACSIZE* | −.054 | .210** | .094 | .189** | .052 | .247** | −.044 | .054 | .014 | −.110* | −.101* | −.022 | .139** | .030 | −.185** | −.089 | .119* | 1 | .097* | −.003 | .014 |
| *19 BANKRUPT* | −.365** | .123* | .075 | .006 | .101* | .020 | .432** | −.155** | .058 | −.401** | .030 | −.208** | .210** | .138** | .063 | −.003 | −.169** | .114* | 1 | .282** | −.079 |
| *20 SECTOR* | −.186** | .017 | −.028 | −.004 | −.026 | .041 | −.130** | −.058 | .021 | .020 | −.242** | −.015 | .064 | .029 | −.027 | .032 | .002 | .143** | .143** | 1 | .018 |
| *21 VARIANCE* | .263** | −.045 | .044 | .064 | −.050 | −.053 | −.080 | .063 | .045 | .026 | .068 | .101* | −.082 | −.076 | −.002 | .020 | .078 | −.060 | −.137** | −.019 | 1 |

*Variable definitions:* AUDLAG = the number of calendar days from fiscal year end to the date of audit report; LNIAFINV = the natural logarithm of the cost borne by the IAF in 2009; IAFSOU = 1 if IAF is established in-house and is 0 otherwise; LNFEE = the natural logarithm of the total fees paid to the external auditor; INSIDER = the percentage of closely held shares owned by insiders/blockholders with an ownership of at least 5%; LNASSET = the natural logarithm of the total assets; SALES = ratio of sales to total assets; SEGMENT$_P$ = the number of product segments; SEGMENT$_G$ = the number of geographical segments; LOSS = 1 if ROA (ratio of the net income to total assets) is negative and is 0 otherwise; INVREC = ratio of inventories and receivables to total assets; OPINION = 1 if emphasis of matter or disclaimer audit opinion is issued and is 0 otherwise; BIG4 = 1 if the auditor is PricewaterhouseCoopers, Ernst & Young, KPMG or Deloitte and is 0 otherwise; TENURE = the number of years the firm has used the current (2009) external auditor (traced back up to 2002 or since the date of listing if later than 2002); ACEXP = audit committee members with auditing experience; ACIND = independent audit committee members; ACMEET5 = 1 if there are more than four audit committee meetings and is 0 otherwise; ACSIZE = the number of audit committee members; BANKRUPT = 1.2 ∗ (working capital to total assets) + 1.4 ∗ (retained earnings to total assets) + 3.3 ∗ (earnings before taxes and interest to total assets) + 0.6 ∗ (market value of equity to total liabilities) + 1.0 ∗ (net sales to total assets), which is based on the Altman Z Score (Altman, 1993); SECTOR = 1 if classified under plantation or technology sector and is 0 otherwise; and VARIANCE = the difference between unaudited and the audited profit after tax and minority interests (in absolute terms), which is deflated by unaudited profit after tax and minority interests. Sample size is 432.
* Significant at 5% (two-tailed).
** Significant at 1%.

**Table 5**

Regression results on the determinants of audit delay.

| Variable | Sign | Dependent variable = AUDLAG | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
| | | Coeff. | p-Value | Coeff. | p-Value | Coeff. | p-Value | Coeff. | p-Value |
| LNIAFINV | − | −4.584 | 0.000 | −3.633 | 0.001 | −2.971 | 0.008 | −2.972 | 0.011 |
| IAFSOU | ? | 0.257 | 0.903 | 0.008 | 0.997 | 0.099 | 0.962 | 0.099 | 0.962 |
| LNFEE | + | | | −4.777 | 0.162 | | | 0.016 | 0.997 |
| INSIDER | − | −0.027 | 0.573 | −0.029 | 0.548 | −0.028 | 0.546 | −0.028 | 0.548 |
| LNASSET | − | | | | | −2.530 | 0.021 | −2.533 | 0.069 |
| SALES | − | 0.441 | 0.779 | 0.490 | 0.755 | −0.251 | 0.873 | −0.252 | 0.874 |
| SEGMENT$_P$ | + | 2.462 | 0.000 | 2.632 | 0.000 | 2.601 | 0.000 | 2.601 | 0.000 |
| SEGMENT$_G$ | + | 0.015 | 0.975 | 0.352 | 0.502 | 0.310 | 0.512 | 0.310 | 0.554 |
| LOSS | + | 1.122 | 0.591 | 0.751 | 0.723 | 0.576 | 0.786 | 0.576 | 0.787 |
| INVREC | + | 5.851 | 0.250 | 5.118 | 0.316 | 3.587 | 0.495 | 3.586 | 0.496 |
| OPINION | + | 12.078 | 0.000 | 12.015 | 0.000 | 11.495 | 0.001 | 11.494 | 0.001 |
| BIG4 | − | 0.487 | 0.829 | 1.197 | 0.601 | 1.338 | 0.547 | 1.337 | 0.557 |
| TENURE | − | −0.687 | 0.082 | −0.692 | 0.076 | −0.670 | 0.087 | −0.670 | 0.088 |
| ACEXP | − | 0.365 | 0.929 | 0.374 | 0.928 | −0.840 | 0.838 | −0.841 | 0.838 |
| ACIND | − | −12.815 | 0.029 | −12.251 | 0.038 | −11.331 | 0.055 | −11.331 | 0.055 |
| ACSIZE | − | −2.054 | 0.313 | −1.748 | 0.385 | −1.358 | 0.505 | −1.359 | 0.506 |
| ACMEET5 | + | 10.163 | 0.000 | 10.638 | 0.000 | 10.327 | 0.000 | 10.325 | 0.000 |
| BANKRUPT | − | −1.257 | 0.000 | −1.341 | 0.000 | −1.279 | 0.000 | −1.279 | 0.000 |
| VARIANCE | + | 13.621 | 0.087 | 14.540 | 0.081 | 13.407 | 0.103 | 13.403 | 0.101 |
| SECTOR | − | −10.050 | 0.023 | −9.936 | 0.024 | −10.308 | 0.021 | −10.309 | 0.022 |
| Constant | | 129.335 | 0.000 | 133.180 | 0.000 | 151.415 | 0.000 | 151.430 | 0.000 |
| $R^2$ | | 0.319 | | 0.322 | | 0.329 | | 0.329 | |

*Variable definitions: AUDLAG* = the number of calendar days from the fiscal year end to the date of audit report; *LNIAFINV* = the natural logarithm of the cost borne by the IAF in 2009; *IAFSOU* = 1 if the IAF is established in-house and is 0 otherwise; *LNFEE* = the natural logarithm of the total fees paid to the external auditor; *INSIDER* = the percentage of closely held shares owned by insiders/blockholders with an ownership of at least 5%; *LNASSET* = the natural logarithm of the total assets; *SALES* = ratio of sales to total assets; *SEGMENT$_P$* = the number of product segments; *SEGMENT$_G$* = the number of geographical segments; *LOSS* = 1 if ROA (ratio of net income to total assets) is negative 0 otherwise; *INVREC* = ratio of inventories and receivables to total assets; *OPINION* = 1 if emphasis of matter or disclaimer audit opinion is issued and is 0 otherwise; *BIG4* = 1 if the auditor is PricewaterhouseCoopers, Ernst & Young, KPMG or Deloitte and is 0 otherwise; *TENURE* = the number of years the firm has used current (2009) external auditor (traced back up to 2002 or since the date of listing if later than 2002); *ACEXP* = the proportion of audit committee members who have auditing experience; *ACIND* = the proportion of independent nonexecutive directors on the audit committee; *ACSIZE* = the number of audit committee members; *ACMEET5* = 1 if more than four audit committee meetings are held during the year and is 0 otherwise; *BANKRUPT* = 1.2 ∗ (working capital to total assets) + 1.4 ∗ (retained earnings to total assets) + 3.3 ∗ (earnings before taxes and interest to total assets) + 0.6 ∗ (market value of equity to total liabilities) + 1.0 ∗ (net sales to total assets), which is based on the Altman Z Score (Altman, 1993); *VARIANCE* = the difference between the unaudited and the audited profit after tax and minority interests, which is deflated by unaudited profit after tax and minority interests (in absolute terms); and *SECTOR* = 1 if classified under plantation or technology sector and is 0 otherwise. *p*-values are two-tailed. Sample size is 432.

In model 2, all variables are included except for *LNASSET*. In model 3, all variables are included except for *LNFEE*. In model 4, all the variables in Eq. (1) are included.

### 4.3. Multivariate analysis

Table 5 presents the ordinary least squares (OLS) regression results. The *p*-values (two-tailed) reported in our regression results are based on White's (1980) standard error corrected for heteroscedasticity. The audit lag models that we use in this study have a good explanatory power with $R^2$ slightly more than 30%, which is comparable to Ettredge et al. (2006), Pizzini et al. (2011) and Abbott et al. (2011) and considerably greater than the previous Malaysian studies on audit delay.

In all four models, the hypothesized variable *LNIAFINV* is highly significant. This indicates that companies with a greater investment in their IAFs have a shorter audit delay, which is consistent with the univariate finding and H$_1$. The multivariate results further show that companies with an in-house IAF have a longer audit delay, which is in contrast to the univariate results. However, the association between the IAF sourcing arrangement and the audit lag is not statistically significant. Therefore, we fail to find evidence to support H$_2$.

Focusing on model 4, the coefficients on all the control variables have the expected signs except for *BIG4*. The variables *LNASSET*, *SEGMENT$_P$*, *OPINION*, *TENURE*, *ACIND*, *ACMEET5*, *BANKRUPT*, *VARIANCE* and *SECTOR* are statistically significant. The multivariate analysis suggests that larger firms have a significantly shorter audit delay. External auditors also require more effort and time to audit highly complex firms with more product segments and firms receiving qualified audit opinions. We also find supporting evidence that long-tenured audit firms take less time to issue their audited financial statements, which is consistent with Lee et al. (2009) and Pizzini et al. (2011). To the best of our knowledge, this is the first study outside the US that replicates the inverse relation between audit lag and audit firm tenure.

Our study suggests that two audit committee attributes have some influences on audit delay. The audit committee independence appears to mitigate audit delay. Therefore, the recent revision to the Malaysian Code on Corporate Governance

**Table 6**
Two stage least squares test of investment in internal audit function with audit delay.

| Variable | Dependent variable = AUDLAG for Panels A, C and D and LNIAFINV for Panel B | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Panel A – OLS | | Panel B – first stage | | Panel C – second stage | | Panel D – OLS | |
| | Coeff. | p-Value | Coeff. | p-Value | Coeff. | p-Value | Coeff. | p-Value |
| LNIAFINVp | | | | | −4.002 | 0.097 | | |
| LNIAFINV | −2.763 | 0.020 | | | | | −2.972 | 0.011 |
| IAFSOU# | −0.952 | 0.664 | 0.745 | 0.000 | | | 0.099 | 0.962 |
| SALES | −0.260 | 0.870 | 0.251 | 0.001 | | | −0.252 | 0.874 |
| LNFEE | −0.138 | 0.974 | 0.987 | 0.000 | 1.106 | 0.815 | 0.016 | 0.997 |
| INSIDER | −0.026 | 0.580 | −0.002 | 0.256 | −0.029 | 0.506 | −0.028 | 0.548 |
| LNASSET | −2.517 | 0.070 | 0.359 | 0.000 | −2.081 | 0.177 | −2.533 | 0.069 |
| SEGMENT_P | 2.617 | 0.000 | 0.036 | 0.216 | 2.656 | 0.000 | 2.601 | 0.000 |
| SEGMENT_G | 0.326 | 0.532 | −0.067 | 0.006 | 0.244 | 0.664 | 0.310 | 0.554 |
| LOSS | 0.587 | 0.783 | −0.127 | 0.241 | 0.432 | 0.861 | 0.576 | 0.787 |
| INVREC | 3.638 | 0.489 | −0.224 | 0.365 | 3.395 | 0.520 | 3.586 | 0.496 |
| OPINION | 11.522 | 0.001 | −0.003 | 0.990 | 11.516 | 0.022 | 11.494 | 0.001 |
| BIG4 | 1.330 | 0.559 | 0.041 | 0.680 | 1.370 | 0.541 | 1.337 | 0.557 |
| TENURE | −0.670 | 0.089 | 0.005 | 0.793 | −0.663 | 0.101 | −0.670 | 0.088 |
| ACEXP | −0.865 | 0.834 | 0.182 | 0.348 | −0.632 | 0.885 | −0.841 | 0.838 |
| ACIND | −11.038 | 0.064 | −0.249 | 0.357 | −11.384 | 0.059 | −11.331 | 0.055 |
| ACSIZE | −1.370 | 0.500 | 0.048 | 0.550 | −1.308 | 0.471 | −1.359 | 0.506 |
| ACMEET5 | 10.258 | 0.000 | 0.007 | 0.933 | 10.259 | 0.000 | 10.325 | 0.000 |
| BANKRUPT | −1.279 | 0.000 | 0.004 | 0.737 | −1.271 | 0.000 | −1.279 | 0.000 |
| VARIANCE | 13.606 | 0.095 | −0.069 | 0.826 | 13.498 | 0.056 | 13.403 | 0.101 |
| SECTOR | −10.391 | 0.020 | 0.107 | 0.494 | −10.271 | 0.003 | −10.309 | 0.022 |
| Constant | 150.800 | 0.000 | −2.726 | 0.000 | 147.527 | 0.000 | 151.430 | 0.000 |
| Adjusted $R^2$ (partial $R^2$) | 0.296 | | 0.649 (0.174) | | 0.298 | | 0.296 | |
| F-stat (partial F-stat) | 10.066 | | 42.93 (43.34) | | 10.858 | | 10.035 | |

*Variable definitions: AUDLAG* = the number of calendar days from the fiscal year end to the date of the audit report; *LNIAFINV* = the natural logarithm of the cost borne by the IAF in 2009; *LNIAFINVp* = the predicted value of *LNIAFINV* using the coefficient estimates in Eq. (2); *IAFSOU* = 1 if IAF is established in-house and is 0 otherwise; *LNFEE* = the natural logarithm of the total fees paid to the external auditor; *INSIDER* = the percentage of closely held shares owned by insiders/blockholders with an ownership of at least 5%; *LNASSET* = the natural logarithm of the total assets; *SALES* = ratio of sales to total assets; *SEGMENT_P* = the number of product segments; *SEGMENT_G* = the number of geographical segments; *LOSS* = 1 if ROA (net income to total assets) is negative and is 0 otherwise; *INVREC* = ratio of inventories and receivables to total assets; *OPINION* = 1 if emphasis of matter or disclaimer audit opinion is issued and is 0 otherwise; *BIG4* = 1 if the auditor is PricewaterhouseCoopers, Ernst & Young, KPMG or Deloitte and is 0 otherwise; *TENURE* = the number of years the firm has used the current (2009) external auditor (traced back up to 2002 or since the date of listing if later than 2002); *ACEXP* = the proportion of audit committee members who have auditing experience; *ACIND* = the proportion of independent nonexecutive directors on the audit committee; *ACSIZE* = the number of audit committee members; *ACMEET5* = 1 if more than four audit committee meetings are held during the year and is 0 otherwise; *BANKRUPT* = 1.2 * (working capital to total assets) + 1.4 * (retained earnings to total assets) + 3.3 * (earnings before taxes and interest to total assets) + 0.6 * (market value of equity to total liabilities) + 1.0 * (net sales to total assets), which is based on the Altman Z Score (Altman, 1993); *VARIANCE* = the difference between the unaudited and the audited profit after tax and minority interests, which are deflated by unaudited profit after tax and minority interests (in absolute terms); and *SECTOR* = 1 if classified under plantation or technology sector and is 0 otherwise. # Firm which co-sourced the IAF is treated as if all the IAF is maintained in-house in Panels A, B and C, and treated as out-sourced in Panel D. p–values are two-tailed. Sample size is 432.

(revised 2007), where the independence aspect of an audit committee is strengthened by barring executive directors from membership, appears capable of improving the financial reporting process by enhancing the audit report timing. It also appears that more frequent audit committee meetings are related to more stringent levels of auditing and, thus, longer delays, which is consistent with Abernathy et al. (2011) but contrasts an earlier Malaysian finding by Mohamad-Nor et al. (2010). However, the results from Mohamad-Nor et al. (2010) may suffer from bias due to omitted variables. External auditors also tend to devote extra care to audit companies in financial distress. Consistent with Kinney and McDaniel (1993) and Abbott et al. (2011), we show that a higher magnitude of correction to the previously reported unaudited profits after tax and minority interest induces a longer audit delay. In tandem with the univariate results presented earlier, audit delay generally declines for firms in the plantation and technological sectors.

Unlike previous Malaysian evidence presented by Mohamad-Nor et al. (2010) that is based on 2002 data, we find that in 2009, audit delay among clients of the Big 4 auditors is longer, albeit insignificantly, than clients of the non-Big 4 auditors. We posit that this unexpected result stems from the anticipated greater inspection of the audit working papers of the Big 4 auditors due to the new regulatory power of the Audit Oversight Board (AOB), which is an independent audit regulatory body under the Securities Commission Malaysia and began on 1 April 2010. Our conjecture is supported by the following evidence taken from the AOB 2010 annual report:

> "The AOB commenced its inspection of audit firms in August 2010. Over the five months leading to the end of 2010, the AOB conducted seven inspections involving six audit firms, covering over 93%, if measured by market capitalization of PLCs, or 73% if measured by the number of PIEs. These included six regular inspections of the Big Four Audit Firms and two major firms

with more than 10 partners, and one special inspection on one of these firms." (Audit Oversight Board Annual Report 2010, Part 5-1)[3]

### 4.4. Extensions

We also conduct a variety of sensitivity checks to assess the robustness of our results to alternative variables, interactions between independent variables and endogeneity threats. To allow us to compare the results of our study with Bamber et al. (1993), Jaggi and Tsui (1999) and Lee et al. (2009), we remeasure BANKRUPT using Zmijewski's (1984) financial distress index[4] and obtain a significant positive coefficient for BANKRUPT (not reported here) that is consistent with the main results. The results for the other variables are qualitatively similar except VARIANCE is mildly significant.

When we replace the categorical variable ACMEET5 with the number of audit committee meetings, we also obtain qualitatively similar results albeit with a much reduced $R^2$ (approximately 28–29%, untabulated). Previous studies have also incorporated busy audit season. Fifty-seven percent of our sample has December as the financial year end. When we add a new dummy variable to Eq. (1) to reflect the busy period where this variable takes a value of 1 for firms with financial year ending December and 0 otherwise, the results remain unchanged except TENURE and VARIANCE are mildly significant, and the variable representing busy audit season is insignificant and positive (untabulated).

We also consider the interaction between independent variables IAFSOU and TENURE and include the interaction term IAFSOU ∗ TENURE to Eq. (1). The results (untabulated) show that TENURE is no longer significant. However, IAFSOU is positively significant, whereas, the interaction term IAFSOU ∗ TENURE is negatively significant. The significance levels of the remaining variables are identical to the main results. These results suggest that longer audit firm tenure moderates the audit delay for firms that maintain their IAF in-house.

As it is likely that the relation between LNIAFINV and AUDLAG is non-linear, we explore the level of investment in the IAF that manifests in a shorter audit lag. Similar to Knechel et al. (2012), we derive quintile categories of LNIAFINV. We then regress AUDLAG on four dummy variables for LNIAFINV quintiles, and all other variables shown in Eq. (1). Our results show that the coefficient of the LNIAFINV variable is negative and significant for the last quintile only. This result implies that the benefit, in terms of shorter audit, that arises from investment in the IAF does not accrue from the first dollar of the IAF investment. Rather, the tipping point for investment in the IAF to manifest a shorter audit delay is when a moderate amount is invested in the IAF. For our Malaysian firm sample, the minimum investment required is RM312,000 (untabulated).

As mentioned in footnote 2, given that four of our sample companies co-sourced the IAF, we then test the robustness of our main results by reclassifying the four companies as in-house, and the results are qualitatively similar to the main results, as shown in Table 6, Panel A. When we remove the four IAF co-sourced companies from our sample, we also obtain qualitatively similar results (untabulated). Our results are also robust to using a logged transformation of the audit delay instead of the raw audit delay data (untabulated).

Larcker and Rusticus (2007, 2010) argue that many accounting and auditing studies fail to address endogeneity bias caused by simultaneity, such as when the outcome and the explanatory variables are jointly determined. Similarly, Carcello et al. (2011) caution researchers to be more careful in dealing with endogeneity in governance research as governance characteristics and accounting and auditing outcomes of interest may be affected by some of the same variables. We attempt to mitigate the possibility of threats to validity arising from the potential endogeneity of the hypothesized variable LNIAFINV by performing a two-stage least squares (2SLS) regression with the instrumental variables (IVs). In identifying the appropriate IVs, we seek to find instruments that may affect LNIAFINV but not AUDLAG. Our first IV is IAFSOU, this choice is guided by prior studies on the determinants of investment in internal auditing by Barua et al. (2010) and Carcello et al. (2005) where they show that higher proportion of internal auditing that is outsourced is associated with lower investment in internal auditing. We believe IAFSOU provides a good instrument as our main OLS results, as shown in Table 5, indicate that IAFSOU has no significant relationship with AUDLAG. Our second IV is SALES as it is conceivable that higher sales would drive clients to provide additional investment in internal audits to improve the internal controls to prevent leakages or fraud in the sales cycle. Furthermore, SALES is found not to be related to AUDLAG in the OLS.

The original OLS model in Eq. (1) is rewritten as Eqs. (2) and (3) to address the endogeneity concern. In the first regression, LNIAFINV is regressed on the same independent variables in Eq. (1) as specified by Eq. (2). In the second regression, AUDLAG is regressed on the instrumented (predicted) natural logarithm of the investment in the IAF (LNIAFINV$_P$) and other variables (excluding the IVs namely IAFSOU and SALES), as shown in the following equation.

$$
\begin{aligned}
LNIAFINV = {} & \beta_1 + \beta_2 IAFSOU + \beta_3 LNFEE + \beta_4 INSIDER + \beta_5 LNASSET + \beta_6 SALES + \beta_7 SEGMENT_P + \beta_8 SEGMENT_G \\
& + \beta_9 LOSS + \beta_{10} INVREC + \beta_{11} OPINION + \beta_{12} BIG4 + \beta_{13} TENURE + \beta_{14} ACEXP + \beta_{15} ACIND + \beta_{16} ACSIZE \\
& + \beta_{17} ACMEET5 + \beta_{18} BANKRUPT + \beta_{19} VARIANCE + \beta_{20} SECTOR + error\ term.
\end{aligned}
\tag{2}
$$

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[3] PLCs is public listed companies, and PIEs is public interest entities.
[4] BANKRUPT = −4.336 − 4.513 ∗ (net income to total assets) + 5.679 ∗ (total debt to total assets) + 0.004 ∗ (current assets to current liabilities).

$$
\begin{aligned}
AUDLAG = {} & \beta_1 + \beta_2 LNIAFINV_P + \beta_3 LNFEE + \beta_4 INSIDER + \beta_5 LNASSET + \beta_6 SEGMENT_P + \beta_7 SEGMENT_G + \beta_8 LOSS \\
& + \beta_9 INVREC + \beta_{10} OPINION + \beta_{11} BIG4 + \beta_{12} TENURE + \beta_{13} ACEXP + \beta_{14} ACIND + \beta_{15} ACSIZE \\
& + \beta_{16} ACMEET5 + \beta_{17} BANKRUPT + \beta_{18} VARIANCE + \beta_{19} SECTOR + error\ term.
\end{aligned} \tag{3}
$$

The results for the two stage least squares are reported in Table 6, and the specification tests for the weak instruments and the over-identifying restrictions are described below. In the first stage estimation (Panel B), the IVs are highly associated with the potentially endogenous variable LNIAFINV, and the partial $R^2$ is reasonably high and the partial F-statistic is statistically significant, which suggests that the model is unlikely to be plagued with weak instrument problems. Furthermore, the Sargan over-identifying restriction (Sargan statistics = 0.001, p-value = 0.973) indicates that IAFSOU and SALES are exogenous, and the Hausman test (Chi-square = 0.229, p-value = 0.632) accepts no endogeneity of LNIAFINV. As shown in Panel C of Table 6, under 2SLS, the negative association between LNIAFINV and AUDLAG persists and is consistent with the OLS albeit with a slightly greater magnitude of the coefficient (−4.002 for the 2SLS versus −2.763 for the OLS). However, based on the Hausman tests, it is unlikely that the IV estimation using 2SLS represents an improvement over OLS. Therefore, the OLS estimates are likely to be more consistent and efficient estimators than the IV estimates.

Another potential issue with the research design we employ is that it is likely that the hypothesized relationship between the IAF investments and the audit delay is backwards because it is conceivable that, in an attempt to reduce the audit delay due to the adverse consequences it generated, firms that suffer from having a long audit delay may respond by increasing their investment in their IAF. To resolve this concern, we rerun Eq. (2), shown above, by adding the audit delay for the previous year (2008) to the left hand side and find that the lagging audit delay variable has no significant relationship with the investment in the internal auditing in the subsequent year (untabulated). Based on this, we believe that reverse causality is not a particular concern in this study.

## 5. Conclusion

This paper extends prior research on the determinants of audit delay by investigating the association between the IAF attributes and the audit delay using a sample of publicly traded firms in Malaysia in 2009. Unlike Pizzini et al. (2011), who use survey data to determine the IAF quality, we capitalize on the unique Malaysian setting where data concerning the investment in and the sourcing arrangements of the IAF are publicly available. To support our first hypothesis, we find a negative relationship between the costs incurred for the IAF and audit delay. As for the second hypothesis, although the univariate analysis indicates that firms with an in-house IAF have a significantly lower audit delay than their counterparts that out-source the IAF, the association is insignificant in the multivariate analysis. We also find that audit lag is decreasing in the audit committee independence and the audit firm tenure. Furthermore, larger corrections to the previously reported unaudited financial results and more frequent audit committee meetings are associated with a longer audit delay. One implication of our study is that regulators may wish to encourage companies to strengthen their internal controls through a greater investment in their IAF before embarking on policy changes to accelerate the release of their audited financial statements.

We are unable to find a clear association between the IAF sourcing arrangement and audit delay. The heterogeneity in the effects of the IAF sourcing arrangement on audit delay suggests that the mechanism through which the IAF sourcing arrangement may create audit efficiency is much more complex that the simple dichotomy of in-house versus out-sourced arrangement. Future research may consider whether a broad array of other non-audit services provided by the out-sourced IAF service provider, subject to data availability, plays any role in influencing audit delay.

This study raises several other issues that warrant further examination. The unexpected result concerning the lack of association between the Big 4 auditors and audit lag raises an interesting research question on the effect of the Audit Oversight Board (AOB) targeting the Big 4 auditors in the annual inspection activities on the Malaysian audit market.[5] More work is required to gain a deeper insight on whether there are differential effects between Big 4 and non-Big 4 auditors on audit lag and audit quality before and after the establishment of the AOB. There are several caveats in the study that should be recognized when interpreting the evidence presented. As the data only cover a 1-year period and originate from a country with a unique institutional setting, the findings are possibly not generalizable across other time periods and countries. Finally, although our sample size is relatively large, there may be a sampling bias as 20% of the listed companies generally do not disclose the cost incurred by the IAF and are excluded from our sample although such disclosure is mandated in the Listing Requirements (Minority Shareholder Watchdog Group, 2011).

## Acknowledgements

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[5] The Big 4 and two major audit firms which have more than 10 partners and audit more than 40 public interest entity clients are subject to annual regular inspection, whereas the inspection of the mid-tier audit firms and sole proprietors are conducted within a pre-determined inspection cycle (Audit Oversight Board Annual Report 2011).

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