Received: 19 August 2016 | Revised: 17 May 2018 | Accepted: 24 June 2018

DOI: 10.1111/ijau.12136

ORIGINAL ARTICLE

WILEY

Determinants of audit report lag: A meta-analysis

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This paper provides a meta-analysis of the determinants of audit report lag, defined as the period between a company's fiscal year end and the audit report date. We group the meta-analyzed studies into three categories: (a) audit and audit-related determinants, (b) corporate governance-related determinants, and (c) firm-specific determinants. We find that audit opinion and audit season variables increase audit report lag, whereas Big 4 affiliation, nonaudit services, and auditor tenure decrease audit report lag. Among the corporate governance determinants, the existence of a financial expert member on an audit committee, and ownership concentration, reduce audit report lag. Finally, an examination of firm-level characteristics reveals that firm complexity increases audit report lag, whereas profitability reduces it. We employ a meta-regression technique and identify publication bias. Although we find some evidence of journal quality as a contributor to publication bias, the extent of publication bias from this source is small.

KEYWORDS

audit report lag, corporate governance, external audit

1 | INTRODUCTION

The purpose of this paper is to provide a meta-analytic review of the determinants of audit report lag (ARL). In their seminal article, M. C. Jensen and Meckling (1976) argued that a well-structured corporate governance system is essential for mitigating agency costs emanating from the divergence of interest between professional managers and shareholders. One purpose of a governance structure is to ensure the credibility of externally reported financial statements, a topic of extensive research (Cohen, Krishnamoorthy, & Wright, 2004). The external audit serves as a monitoring device and is, thus, a crucial part of the corporate governance structure. Auditors are considered to be watchdogs, since an external auditor can build a reputation only by providing an independent verification of the financial statements prepared by corporate management (Watts & Zimmerman, 1983, 1986). External stakeholders consider audit reports to be of great value, and hence the timing of the release of an audit report, proxied by the ARL, becomes an important input for investment decision-making.

ARL is defined as the period between a company's fiscal year end and the audit report date, and it is one of the few externally observable audit output variables that allow outsiders to gauge audit efficiency (Bamber, Bamber, & Schoderbek, 1993). Because the audit report contains the auditor's opinion regarding the credibility of the financial statements, investors generally prefer short ARL. In the USA, the first regulation stipulating a 90-day time period after the fiscal year end for submitting the audited annual reports came in 1970 (Bryant-Kutcher, Peng, & Weber, 2013). In September 2002, the Securities & Exchange Commission (SEC) adopted a new regulation reducing the filing deadline to 75 days for registrants meeting the "accelerated filers" criteria.[1] The SEC argued that advancement of information technology and accounting systems should enable firms to file more quickly, an act that would facilitate more efficient valuation and pricing of securities (SEC, 2002). However, Bryant-Kutcher et al. (2013) found an increase in subsequent accounting restatements for firms that are required to file more quickly. Lambert, Jones, and Brazel (2011) found that the acceleration of filing deadlines increased discretionary accruals, suggesting that the quick filing deadline may have impacted the auditors' ability to detect material misstatements. Further regulatory changes regarding the filing deadline took effect for the fiscal year beginning December 15, 2006, when the SEC further accelerated the 10-K filing deadline by decreasing the statutory

due date from 75 to 60 days for firms considered "large accelerated filers."[2] Outside the USA, the adoption of International Financial Reporting Standards as well as the implementation of new Chinese accounting standards have been found to affect the ARL (Habib, 2015; Habib & Bhuiyan, 2011).

Since the ARL is expected to vary cross-sectionally, because of firm and audit-specific characteristics, an understanding of the possible determinants of ARL should provide insights into audit efficiency. Prior research on ARL focuses on identifying and expanding the set of variables likely to explain the ARL in the USA, as well as in countries outside the USA. General findings from this research indicate that ARL is affected by audit and auditor attributes (e.g., auditor affiliation, auditor tenure, nonaudit services [NASs], going-concern opinion, and auditor changes), firm-specific fundamental variables (e.g., the complexity of the audit due to client size, foreign operations, or number of subsidiaries), client financial condition (existence of loss and/or distress risk), and organizational risk (e.g., leverage). However, there remains large variation in the reported results with respect to the determinants of ARL across and within countries.

A recent paper by Abernathy, Barnes, Stefaniak, and Weisbarth (2017) has provided a first comprehensive review on the determinants of ARL in an international setting. Abernathy et al. (2017) concluded from their review that "the ARL literature as it relates to audit characteristics provides evidence that companies audited by Big *N* auditors and industry specialist auditors have shorter ARL." Yet our meta-analysis reports that about 53% of the published results provide insignificant coefficients on the Big 4 variable, despite the compelling theoretical arguments that Big 4 auditing reduces ARL. The same holds for the "busy season" variable, where 54% of the studies report insignificant coefficients whilst 16% of the studies report a coefficient that is contrary to the expected positive sign. Such mixed results are also reported for other audit, corporate governance, and firm-specific determinants of ARL (to be explained in Section 4). Unlike literature reviews on ARL that summarize prior research, irrespective of the quality of its publication outlets, meta-analysis is often used to summarize prior research findings that seem mixed. It seems appropriate to apply meta-analysis to the ARL setting, to reconcile the conflicting findings across countries and jurisdictions (Hay, Knechel, & Wong, 2006; Hwang & Lin, 1999; Khlif & Chalmers, 2015; Lin & Hwang, 2000). In particular, we test for the presence or absence of publication bias using a meta-regression analysis technique (Hay & Knechel, 2017).

Although narrative literature reviews may include a large number of studies on particular research themes, such reviews can be misleading and often inconclusive (Hunter & Schmidt, 1990; Lin & Hwang, 2000). In some cases, there may be several studies with varying results that are subject to variations in sample size, time period, and setting. As a result, different researchers may reach different conclusions about a set of individual studies. By contrast, meta-analysis aggregates results statistically across individual studies and corrects for statistical artefacts like sampling and measurement errors, thereby providing much greater precision with respect to the findings, compared with narrative reviews (Hay et al., 2006; Lin & Hwang, 2000).

Despite the importance of conducting meta-analysis, there has been little such research in the accounting discipline, and particularly in the subdiscipline of auditing. Khlif and Chalmers (2015) identified 27 previous meta-analyses in the accounting discipline, with only seven in the area of auditing. Prior meta-analyses in auditing include Trotman and Wood (1991) on internal control evaluation judgements by different auditors, Kinney and Martin (1994) on audit-related adjustments and pre-audit earnings and assets, Hay et al. (2006) and Hay (2013) on client, auditor, and engagement attributes and audit fees, Lin and Hwang (2010) on audit quality and earnings management, Habib (2012) on nonaudit fees (NAFs) and accounting information quality, and Habib (2013) on the determinants of audit opinion decisions.

We employ the Stouffer combined test to identify the potential determinants of ARL. We aggregate results statistically across 59 published studies and a sufficiently large number of explanatory variables. We categorize the potential determinants of ARL into (a) auditor and/or audit engagement characteristics, (b) corporate governance characteristics, and (c) firm-specific characteristics. Meta-analysis results indicate that, among the audit-related variables, audit fees, audit opinion, auditor change, auditing season, and internal control weakness (ICW) increase the ARL, whereas auditor-provided NASs decrease the ARL. With respect to corporate governance characteristics, we find that ownership concentration and board independence reduce ARL, whereas chief executive officer (CEO) duality increases ARL. Finally, firm-level characteristics across a number of studies provide generally consistent evidence that firm complexity increases ARL and profitability reduces it. Importantly, ARL increases for firms reporting losses, extraordinary items, and announcing accounting restatements. A novel contribution of our meta-analysis is the application of a meta-regression technique recently applied in meta-analysis on the magnitude of the fee premium for Big 4 auditors (Hay & Knechel, 2017). We find the presence of publication bias in our meta-analyzed results. We then break down the bias into some contextual settings. Although we find some evidence of journal quality as a contributor to publication bias, the extent of publication bias from this source is small.

We contribute to the auditing literature by applying a meta-analysis technique to an important audit output variable, ARL. Many of these findings have policy implications. For example, restrictions on NASs have been imposed in order to protect auditor independence, yet our meta-analysis shows that high levels of NASs actually lead to a shorter ARL, and this often implies lower audit fees and less problematic audits (Knechel & Payne, 2001; Knechel & Sharma, 2012). This is evident in studies within the USA, where the SEC has already prohibited most NASs offered by the incumbent auditors, and in studies outside the USA. Globally, audit regulation is encouraging a change of auditor at regular intervals to ensure the release of timely audit reports. However, our findings suggest that changing auditors has an adverse effect on ARL, implying that it takes time for a newly appointed auditor to become familiarized with the client.

Our findings also reveal that a number of corporate governance components (i.e., financial expertise on the audit committee, board independence, and CEO duality) are more effective in improving audit reporting timelines. In July 2015, the SEC called for input on "possible revisions to audit committee disclosures" and for more research in understanding the attributes of the audit committee members that contribute to effective oversight of the financial reporting process in listed companies (SEC, 2015). Apparently, the US regulators still have

concerns over whether and what specific skills and characteristics are of importance for audit committee members. Our meta-analysis results documenting a negative association between audit committee financial expertise (ACFE) and ARL can thus serve as policy input.

Outside the USA, the UK Corporate Governance Code followed by the London Stock Exchange, in principle, requires one member of the audit committee to have relevant financial experience, but no further precise definition of "financial experience" has been provided. More emphasis has been placed on the relevant industry knowledge (Financial Reporting Council, 2016). Such requirements are surprisingly vague and relaxed given that our meta-analysis finds ACFE significantly improves reporting timeliness. Our findings provide valuable insights to the UK regulators, in understanding the need for a precise and stricter rule in the ACFE. On the other hand, the China Securities Regulatory Commission (2002) mandates, strictly, that at least one independent director shall be appointed on the audit committee, and specifically requires this independent director to have accounting expertise. The China Securities Regulatory Commission further requires that the independent director who has accounting expertise should chair the audit committee. We recommend that such a practice be adopted more widely in other countries.

As at 2018, the Chinese regulators have not imposed any rule on CEO duality, and there are no guidelines or principles to follow for the appointment of chairman of the board. Our meta-analysis results shed some light on this issue. The UK and US regulators impose stricter rules. The UK Corporate Governance Code requires that the chairman both meet the "independence criteria" (Code B.1.1) and not be a chief executive of the same company. The 2017 *Spencer Stuart U.S. Board Index*, based on the S&P 500, finds 51% of the boards in the USA separate CEO and board chair roles, whereas only 28% of the boards have independent chairs (SpencerStuart, 2017). Since our findings support the notion that CEO duality increases ARL, regulators globally could consider imposing a stricter rule on separating the board chair and CEO roles.

The paper proceeds as follows: Section 2 develops the hypotheses; Section 3 describes the meta-analysis procedure; Section 4 provides the meta-analysis results; and Section 5 concludes.

2 | HYPOTHESES DEVELOPMENT

In this section we develop some hypotheses commonly found in the ARL literature and provide meta-analysis results for the hypothesized associations in Section 4.

2.1 | Auditor- and audit-related variables

2.1.1 | Auditor affiliation and ARL

ARL varies by auditor affiliation; for example, Big 4 vs. non-Big 4 auditors, and industry specialist vs. nonspecialist auditors. A large audit firm has a better opportunity to attract skilled personnel, to deploy such resources to train staff, and to engage more powerful technologies, thus reducing the time of audit work (Owusu-Ansah & Leventis, 2006). On the other hand, large audit firms are more independent and, hence, are more likely resist client pressure in the case of audit-related conflicts, compared with small audit firms. Arguably, since negotiation with clients takes time and large audit firms are likely to negotiate more, it can be surmised that the ARL increases for clients audited by large audit firms. Furthermore, large audit firms are more careful, and conduct relatively more comprehensive audit procedures for a given client, because they have more to lose in litigations, thereby increasing audit delays (Shin, Lee, Lee, & Son, 2017). Given the competing arguments regarding the association between Big 4 auditing and ARL, we develop the following hypothesis:

> **H1A.** *There is an association between large audit firms and ARL.*

Another indicator of auditor expertise is industry specialization.[3] Audit firm industry specialization differentiates audit quality even within the top tier audit group. Industry specialization allows auditors to better evaluate the risks facing each client and, given their superior knowledge of their client's industry, industry-specialist auditors are better able to form appropriate audit opinions. Dominant auditors differentiate themselves by investing in industry-specific specialization costs, and by spreading such costs over more clients, making it difficult for competing auditors to mimic the same level of efficiency (Habib & Bhuiyan, 2011). It is expected that industry-specialist auditors will provide audit reports more promptly than their nonspecialist counterparts because specialist auditors should take less time to become familiarized with clients' financial reporting systems. Evidence in support of this theory is provided by Habib and Bhuiyan (2011). Based on the aforementioned theoretical predictions, we develop the following hypothesis:

> **H1B.** *Audit firm industry specialization decreases ARL.*

2.1.2 | Audit opinion and ARL

Qualified opinions are unlikely to be issued until an auditor has spent considerable time and effort in performing additional audit procedures requiring a longer audit completion period (Bamber et al., 1993). A potentially unfavorable audit opinion may encourage auditors to resolve the conflicting issues through discussion or negotiation (Carslaw & Kaplan, 1991), again requiring a longer audit completion time. Further evidence suggests that average ARL increases for financially troubled companies and immediately before receivership (Blay & Geiger, 2013; Citron & Taffler, 1992). Finally, the higher inherent and control risk of clients vulnerable to going-concern problems requires auditors to exert additional audit work because of a higher likelihood of misstatements (Ireland, 2003). The following hypothesis is developed:

> **H2.** *Firms receiving qualified audit opinions experience longer ARL than firms receiving clean audit opinions.*

2.1.3 | Economic bonding of the auditors and ARL

Economic theory suggests that producing a timely audit report could involve additional costs to the auditor (Simunic, 1980). Carcello, Hermanson, and McGrath (1992) surveyed high-ranked audit (Big *N*) partners, financial statement preparers, and financial statement users and found that perceived audit quality is related to how quickly the audit is conducted. Therefore, the auditees may be willing to pay

higher fees for a quicker completion of the audit procedures. The higher fees are also justified because a quicker completion of audit requires concentrated audit resources, additional staff, and overtime work, which mean a higher opportunity cost for the auditor (Rubin, 1992). A negative association, therefore, is expected between audit fees and the ARL. However, extant literature considers audit fees, more specifically abnormal audit fees, as a proxy for audit quality (Asthana & Boone, 2012; Lobo & Zhao, 2013). Above-normal audit fees proxies for additional audit effort and, hence, a longer ARL. This suggests a positive association between audit fees and ARL.

Another component of total fees charged by auditors is the NAFs derived from the provision of NASs. Proponents of the beneficial effects of NASs argue that auditors achieve economies of scale by reducing duplication of efforts across services when producing multiple services through a common input (Carlton & Perloff, 2005; Simunic, 1980). This "knowledge spillover benefit" increases auditor expertise, competence, and professional judgment, all of which help reduce the ARL. Empirical evidence supporting this hypothesis includes Knechel and Payne (2001) and Knechel and Sharma (2012). DeFond, Raghunandan, and Subramanyam (2002) suggested that NASs reduce ARL for two different reasons: Knowledge spillover benefits derived from NASs help auditors complete audit sooner, but fee dependence makes auditors more likely to succumb to management pressure for a timelier audit, thus also reducing the ARL.

H3A. *There is an association between audit fees and ARL.*

H3B. *There is a negative association between NAFs and ARL.*

2.1.4 | Audit tenure, auditor change, and ARL

ARL is expected to increase when an audit firm audits a client for the first time, as auditors require more start-up time to become familiar with records, operations, internal control, and prior working papers (Ashton, Willingham, & Elliott, 1987; Carcello & Nagy, 2004; Lim & Tan, 2010). Caramanis and Lennox (2008) evidenced that auditors spend more hours in the initial years of an audit engagement, thus increasing ARL for short-tenured auditors (Habib & Bhuiyan, 2011). On the other hand, auditors with longer tenure could accumulate more client-specific knowledge and, therefore, have a better understanding of their clients' operations. As a result, ARL is expected to be shorter for firms with longer audit tenure (Blankley, Hurtt, & MacGregor, 2014; Dao & Pham, 2014; Habib & Bhuiyan, 2011; Knechel & Sharma, 2012; Lee, Mande, & Son, 2009; Wan-Hussin & Bamahros, 2013).

H4A. *Short (long) auditor tenure is positively (negatively) associated with ARL.*

With respect to the effect of auditor changes on ARL, Schwartz and Soo (1996) found firms that switch auditors early (late) in their fiscal year experience an average reduction (increase). Late change increases ARL because it takes time for the newly appointed audit firm to familiarize itself with the firm and to assess the firm's internal control system (Schwartz & Soo, 1996; Tanyi, Raghunandan, & Barua, 2010). Further on this vein, Tanyi et al. (2010) raised concerns that any such change creates disruption and increases audit risk in the initial year of audit engagement. Prior research has provided fairly consistent evidence that ARL is higher in firms that change auditors in the fiscal year (Dao & Pham, 2014; Ettredge, Sun, & Li, 2006; Harjoto, Laksmana, & Lee, 2015; Munsif, Raghunandan, & Rama, 2012; Xu, Carson, Fargher, & Jiang, 2013). The above arguments lead to the following hypothesis:

H4B. *Auditor change is positively associated with ARL.*

2.1.5 | Auditing season and ARL

Audit time pressure affects an auditor's work processing accuracy negatively (McDaniel, 1990), undermines the effectiveness of the audit technology used by audit managers and partners (Agoglia, Brazel, Hatfield, & Jackson, 2010), and diminishes professional scepticism (Braun, 2000). The auditors' busy season would, therefore, be expected to coincide with audit delays. Prior studies have found that "busy-season" clients result in high levels of workload compression, and thus are likely to have a larger audit delay (Ghosh & Tang, 2015; Harjoto et al., 2015; Kim, Nicolaou, & Vasarhelyi, 2013; Knechel & Payne, 2001; Knechel & Sharma, 2012; Lee, Mande, & Son, 2008; Whitworth & Lambert, 2014). Alternatively, auditors can offset the pressure of workload from the busy audit season by additional overtime, so that the maximum number of clients can be served within a limited available schedule, which can lead to a shorter ARL. However, the former line of reasoning has dominated the auditing literature. Based on that, we develop the following hypothesis:

H5. *The busy audit season increases ARL.*

2.1.6 | ICW and ARL

Ineffective internal control increases business risk, exacerbates agency problems, and reduces contracting efficiency (Ashbaugh-Skaife, Collins, Kinney, & LaFond, 2008; Doyle, Ge, & McVay, 2007; Mitra, Jaggi, & Hossain, 2013). In the context of the Sarbanes–Oxley (SOX) Act implementation in the USA, Doyle et al. (2007) and Ashbaugh-Skaife et al. (2008) documented that effective internal control can eliminate potential accounting errors or accrual adjustments, both intentional and unintentional, and minimize the chance of financial misstatements. Conversely, ineffective internal control has a negative and significant impact on earnings quality. Since the latter increases clients' business risk and, accordingly, audit risk, it is hypothesized that disclosure of ICW will increase ARL. Prior literature has provided some consistent support on the positive association between ARL and material weakness in internal control (Blankley et al., 2014; Dao & Pham, 2014; Ettredge et al., 2006; Harjoto et al., 2015). We, therefore hypothesize the following:

H6. *ICW disclosures increase ARL.*

2.2 | Corporate governance and ARL

2.2.1 | Audit committee characteristics and ARL

An audit committee is a subcommittee of the board of directors with delegated authority for overseeing the auditing and financial reporting-related matters of the firm. Regulation now requires that an audit committee should be equipped with independent and competent members who possess some degree of accounting expertise, to

satisfy public expectations of improving financial reporting quality and audit quality; see Bédard and Gendron (2010) for a comprehensive review. Clients having audit committees with financial experts report more conservatively (G. V. Krishnan & Visvanathan, 2008), report fewer material ICWs (Hoitash, Hoitash, & Bedard, 2009) make fewer accounting restatements (Abbott, Parker, & Peters, 2004) exhibit increased audit committee effectiveness and monitoring ability (Beasley & Salterio, 2001), and better evaluate significant accounting policies and unusual transactions with the auditors, thus reducing the ARL. Further evidence supporting the beneficial effects of audit committees' financial expertise is provided by Abernathy, Beyer, Masli, and Stefaniak (2014) and Sultana, Singh, and Van der Zahn (2015).

A large audit committee assembles sufficient resources by appointing members with a broader set of qualities (Sultana et al., 2015), which shortens ARL by resolving conflicts relating to the financial statements in a timely manner (DeZoort, Hermanson, & Houston, 2003). In contrast, a large audit committee may result in a lack of cohesion in decision-making and poor participation rates, which could deter smooth and effective decision-making (H. L. Jensen & Tang, 1993). An audit committee that meets frequently will be able to address complex financial reporting decisions actively (Abbott et al., 2004; Vafeas, 1999). An audit committee with a high meeting frequency is also likely to eliminate ICW and, subsequently, reduce auditor working hours by minimizing queries from the external auditor. Therefore, we propose the following hypotheses:

H7A. *Audit committee financial expertise reduces ARL.*

H7B. *Audit committee size and meeting frequency are related to ARL.*

2.2.2 | Board characteristics and ARL

Some of the board characteristics investigated in the ARL literature include board size, board meeting frequencies, and board independence. Drawing on organizational theory, Steiner (1972) documented that a larger group will take more time to make decisions; hence, a larger board may incur communication barriers and coordination problems. Consequently, a larger board is often less effective in monitoring management, thereby increasing the ARL (Dimitropoulos & Asteriou, 2010; Lipton & Lorsch, 1992). Hassan (2016) found a positive association between board size and ARL.

An independent board that meets more frequently may demand much higher audit quality for protection of the board's reputation capital (Fama & Jensen, 1983; Gilson, 1990), for promotion of shareholder interests (Carcello, Hermanson, Neal, & Riley, 2002), and for minimizing legal liability (Sahlman, 1990). Higher audit quality will incur more audit costs, which in turn likely increases ARL (H3A). This perspective suggests positive associations between ARL and both board independence and board meeting frequencies. However, more frequent board meetings, with more independent board members, enhance the oversight function of the board and ensure a more timely submission of audited financial reports, thus reducing the ARL (K. H. Chan, Luo, & Mo, 2016).

H7C. *ARL is longer for firms with larger board sizes.*

H7D. *Board independence and board meeting frequencies affect ARL.*

2.2.3 | CEO duality, ownership structure, and ARL

Agency theory argues that CEO duality increases information uncertainty and agency conflicts (Donaldson & Davis, 1991). Empirical research, too, finds that CEO duality reduces board independence and impairs audit committee effectiveness (Bliss, Muniandy, & Majid, 2007; Muniandy, 2007), which raises questions about monitoring quality and, thus, audit risk. In the presence of such poor corporate governance practice, auditors may require more audit hours and substantial audit assurance, tasks that will increase ARL.

The association between ownership structure and ARL relies on the importance of published financial statements for investors. Bamber et al. (1993) argue that:

> *The more widely held the client's shares, the greater the number of individual investors that rely on the client's financial statements. Greater reliance on the client's financial statements by diverse individual investors increases the client's (and auditor's) exposure to litigation [risk] … thereby increasing auditor business risk.*

In order to combat increased business risk, auditors are likely to spend additional hours to complete audits and, hence, the ARL will be increased. Conversely, a negative association between concentrated ownership and ARL has been documented in prior research (e.g., Henderson & Kaplan, 2000; Jaggi & Tsui, 1999; Wan-Hussin & Bamahros, 2013).

H8A. *CEO duality increases ARL.*

H8B. *ARL increases (decreases) for firms with dispersed (concentrated) ownership structure.*

2.3 | Effects of firm-specific characteristics on ARL

2.3.1 | Organizational complexity and ARL

Our first proxy for organizational complexity is firm size. Although larger firms tend to have more complicated accounts being audited, the larger companies normally use larger auditing firms, which have more staff available to complete the audit work sooner (e.g., Garsombke, 1981; Ng & Tai, 1994). This promptness is further facilitated by the stronger internal control systems designed by large firms (Carslaw & Kaplan, 1991). It is also argued that delay in issuing the annual report may increase uncertainty among diverse stakeholders and affect a firm's share price. In order to reduce those uncertainties, larger companies tend to complete their auditing work as soon as possible, to be able to issue annual reports sooner (Afify, 2009; Ashton, Graul, & Newton, 1989).

Business segments, foreign sales, and mergers and acquisitions are the three externally observable factors related to the complexity of business's operations (Woo & Koh, 2001). A greater number of business segments, a higher proportion of sales derived from foreign operations, and the existence of a merger, acquisition, or joint venture often signal greater complexity in a firm's operation and, hence, a greater possibility of material errors (Bamber et al., 1993). Previous literature also suggests that when a business presents segment information in its financial reports, auditors tend to perform additional

audit procedures, resulting in an increased ARL (Bamber et al., 1993; Ng & Tai, 1994).

H9A. *There is a negative relationship between firm size and ARL.*

H9B. *Business segments, foreign sales, and mergers increase a firm's complexity and, hence, increase ARL.*

We consider restatement of financial statements as a complexity measure, in line with Hay et al. (2006, Table 2). Restatements are corrections of a material omission or misstatement, made in a subsequent reporting period (Kinney, Palmrose, & Scholz, 2004; Palmrose, Richardson, & Scholz, 2004; Raghunandan, Read, & Whisenant, 2003). Firms restating financial statements have suffered substantial losses in market values (Palmrose et al., 2004), increases in the cost of capital (Hribar & Jenkins, 2004), and high executive turnover (Hennes, Leone, & Miller, 2008; Srinivasan, 2005). When a restatement is announced, more audit resources are invested to audit financial statements, and more time conferring with the board and audit committee, thus increasing the ARL (Blankley et al., 2014).

Another related complexity factor that could have implications for ARL is the presence of extraordinary items (K. H. Chan et al., 2016; Schwartz & Soo, 1996). Extraordinary items report material events that are not part of a company's normal business operations. It is reasonable that auditors have to take more time and exert additional effort to collect evidence when the audit is complicated because of, for example, the presence of extraordinary items (Leventis, Weetman, & Caramanis, 2005; Ng & Tai, 1994). Moreover, the auditor may face a greater level of uncertainty as to whether a particular item is extraordinary or not. Such uncertainty may lead to extended negotiations between the auditor and the company and, hence, to a longer ARL (Carslaw & Kaplan, 1991).

H9C. *Occurrence of financial restatements is positively related to ARL.*

H9D. *The presence of extraordinary items (*EI*) increases ARL.*

2.3.2 | Inherent risks and ARL

The magnitude of receivables and inventories (*INVREC*) is the most prominent form of inherent risk investigated in the ARL literature. Hay (2013) suggested that a considerable level of receivables and inventories often triggers more audit efforts, as these areas require special audit procedures. Earnings volatility also increases inherent risk. In our meta-analyzed studies, we found this variable to be denoted as *NEWS*. Management tends to delay the disclosure of more volatile earnings, in particular negative earnings. More volatile earnings increase audit work, and thus ARL, if the auditors consider more volatile earnings as increasing the probability of financial failure.

Inherent risk is also an industry phenomenon and, intuitively, such risk is higher in industries with a greater threat of litigation (Bedard & Johnstone, 2004). Firms in the litigious industries are innovative companies, with higher growth opportunities but volatile financial performance (Bonner, Palmrose, & Young, 1998; Francis, Philbrick, & Schipper, 1994; Kasznik & Lev, 1995), and thus they require extensive audit work to mitigate the risk of misstatements and, hence, a longer ARL. However, Ettredge et al. (2006) documented a shorter audit delay for firms from high-technology industries. This might be attributable to their relatively advanced and sophisticated accounting information systems.

H10A. *ARL increases for firms with high levels of receivables and inventories on the balance sheet.*

H10B. *High levels of earnings volatility increase ARL.*

H10C. *ARL is longer in litigious industries.*

2.3.3 | Profitability and ARL

Carslaw and Kaplan (1991) argue that when firms incur losses, companies are likely to delay the announcement of losses by requesting the auditor to schedule the commencement of the audit later than usual. Despite that, auditors may proceed more cautiously if they consider that the reported negative earnings would increase the probability of financial failure or management fraud later. Reporting losses could also be associated with distress risk, which might prompt auditors to conduct more substantive testing to confirm that the company is a going concern. Consequently, auditors are exposed to high levels of audit risks for loss-making entities (e.g., Bamber et al., 1993; Whittred, 1980), which is manifested in an increase in ARL, among other effects.

Fama and French (1995) found that low book-to-market (BTM) firms are value stocks that consistently underperform glamour stock in terms of future profitability. Beaver and Ryan (2000), too, argued that BTM ratio reflects future profitability and, therefore, is an appropriate indicator of earnings growth. Hay (2013) also suggested that BTM is a measure of future growth opportunities. Since more-profitable firms have shorter ARLs, we propose the following:

H11A. *ARL increases for firms reporting negative earnings.*

H11B. *Firms with higher (lower) BTM ratios have shorter (longer) ARLs.*

2.3.4 | Leverage and ARL

Leverage is considered as one of the commonly used indicators of a firm's financial health. A high leverage ratio may increase the likelihood of financial distress (Carslaw & Kaplan, 1991). It is also argued that a firm's debt structure has a significant influence over the effectiveness of the firms' internal control system, and the extent of financial misreporting and financial failure (e.g., J. Krishnan, 2005). As a result, auditors would be more sceptical about the reliability of the financial statements of firms with poor internal control systems that could be the result of high leverage. Prior research provides generally consistent evidence that leverage increases ARL (Haw, Park, Qi, & Wu, 2003; Knechel & Sharma, 2012; Shin et al., 2017). Firms' exposures to bankruptcy risk are also considered to be a significant risk factor that, again, increases audit efforts in terms of verifying the reliability of financial statements.

H12. *A high leverage and bankruptcy risk increases ARL.*

3 | META-ANALYSIS PROCEDURE

3.1 | Search for relevant studies

An exhaustive search was performed via ABI-INFORM, SSRN, Business Source Complete (EBSCOhost), existing literature reviews, and internet sources to identify potential studies published in accounting journals for inclusion in this meta-analysis. The keywords search included "audit lag," "audit report lag," "audit delay," "audit report delay," "audit timeliness," "audit report timeliness," "reporting delay," and "corporate reporting timeliness." One important consideration for any meta-analysis is whether unpublished working papers should be included along with the published studies. Working papers were excluded from this meta-analysis because: (a) the papers have not been adequately vetted by the review process; (b) it is difficult to identify all working papers, and thus to eliminate sample selection bias; (c) unpublished papers may be subsequently published. Such exclusion, however, can result in publication bias, because studies with significant results are more likely to be published, whereas those with insignificant results are not. This is commonly known as the "file drawer" problem and requires the calculation of a fail-safe number *FSN* in order to rule out a "publication bias" explanation for the findings. This procedure is explained in Section 3.4.

We included published papers as per the Australian Dean Business Council (ABDC) 2013 Journal Rankings[4] with a cut-off date of May 31, 2017. Since we meta-analyzed studies that used audit delay, we excluded studies that considered earnings announcement delay. The combined search resulted in 59 published studies with 88 results and a combined sample of 321,650 firm-year observations. A total of 19 studies appeared in A*-ranked journals, followed by 17 in A-ranked journals, 15 in B-ranked journals, and the remaining 8 in C-ranked journals. This distribution, therefore, suggests that 61% of the published studies appeared in elite and good-quality journals. This might induce publication bias, as these journals publish studies that produce results consistent with the hypotheses (we conduct meta-regression analysis later to test for publication bias). A total of 28 studies with 43 results and a combined sample of 210,437 firm-year observations used data from the USA, with the oldest study appearing in *Journal of Accounting Research*, by Ashton et al. (1987). The earliest and latest sample years represented in the meta-analyzed studies are 1977 and 2013 respectively. The number of firm-year observations ranged from a low of only 46 for Palestine, to a high of 46,118 for the USA. The mean ARL ranged from a high of 162 days for Bangladesh in 2003, to a low of 23 days in the USA during the 1988–1993 sample period. The overall-average mean ARL across the published results is 66.08 days. The mean ARL of the US sample is significantly shorter than the mean ARL of the sample for other developed countries (59.52 versus 68.97, the difference significant at $p < 0.05$). This is also the case when the US sample is compared with the developing and emerging country sample (59.52 versus 78.00, the difference significant at $p < 0.01$). However, the difference in the mean ARL between the samples from the developed countries and the developing and emerging countries is insignificant. In terms of the definition of ARL, 75 of the 88 results used the actual number of days between the fiscal-year end date and audit report signature date, and 13 of the 88 results used the natural logarithm of the number of days.[5]

Table 1 provides a detailed overview of the selected studies including the main variables used by the researchers, publication outlets, country of study, sample period, and total number of observations. Table 2 provides variable definitions as defined in the extant literature.

3.2 | Criteria for relevance

The studies included for this meta-analysis had the following characteristics. First, the studies examined, quantitatively, the relationship between ARL and a range of auditor attributes, corporate governance determinants, and firm-specific variables. The reported statistic had to be a *t*-statistic or *p*-value, given the continuous nature of the dependent variable. Reported *t*-statistics and *p*-values were converted into *z*-statistics for calculating the Stouffer combined *Z*-statistic. Second, if a paper reported separate results for individual subsample analyses that were not also reported on a combined basis, each set of results was treated as a separate analysis. For example, Lee et al. (2009) provided results on separate time periods for the same regression tests. As in Hay et al. (2006, p. 147), each result was treated as a separate analysis. Table 1 provides a note on multiple observations.

3.3 | Meta-analysis procedure: Stouffer test

The Stouffer combined test is used to test the hypotheses developed in Section 2. The test converts *p*-values and *t*-statistics from separate analyses to *z*-scores, adds them, and divides by the square root of the number of tests. Importantly, it produces a *Z*-statistic that can be used to test the direction and significance of the effect of the hypothesized variables on the propensity of auditors to issue modified audit opinions. The formula is

$$\text{Unweighted } Z_C = \frac{\sum Z}{\sqrt{N}} \tag{1}$$

where *N* is the number of studies included in the meta-analysis and *Z* is the converted *Z*-statistic. However, not all studies in a meta-analysis should be given equal weight. Some studies use a large sample, whereas others use a much smaller sample that may bias the findings. A weighted *Z*-statistic is calculated for each variable following the formula of Wolf (1986):

$$\text{Weighted } Z_C = \frac{\sum df \times Z}{\sqrt{\sum df^2}} \tag{2}$$

where *df* is the degrees of freedom associated with the statistic of each study.

While performing the meta-analysis we did not adjust for sample outliers, as suggested by Huffcutt and Arthur (1995). They suggest calculating a sample-adjusted meta-analytic deviancy statistic. However, existing research on meta-analysis in accounting makes very little use of this technique. One plausible explanation for this was alluded to by Huffcutt and Arthur (1995, p. 329), who noted that:

> *the issue of whether to exclude extreme studies with no identifiable cause appears to represent a trade-off.*

TABLE 1 Overview of the meta-analysis studies (ordered chronologically with the oldest paper appearing first)

Author (publication year)	Journal	ABDC rank	Mean ARL	Sample period	Country	N	ARL definition	Multiple obs.
Ashton et al. (1987)	JAR	A*	48.79	1982	USA	107	Number of days from the FYE to ARD	
Ashton et al. (1989)	CAR	A*	55.40	1977	Canada	465	Number of days from the FYE to ARD	6 periods
Ashton et al. (1989)	CAR	A*	55.80	1978	Canada	465	Number of days from the FYE to ARD	
Ashton et al. (1989)	CAR	A*	54.90	1979	Canada	465	Number of days from the FYE to ARD	
Ashton et al. (1989)	CAR	A*	54.30	1980	Canada	465	Number of days from the FYE to ARD	
Ashton et al. (1989)	CAR	A*	55.00	1981	Canada	465	Number of days from the FYE to ARD	
Ashton et al. (1989)	CAR	A*	55.00	1982	Canada	465	Number of days from the FYE to ARD	
Newton and Ashton (1989)	AJPT	A*	51.60	1978	Canada	177	Number of days from the FYE to ARD	5 periods
Newton and Ashton (1989)	AJPT	A*	52.50	1979	Canada	177	Number of days from the FYE to ARD	
Newton and Ashton (1989)	AJPT	A*	52.80	1980	Canada	178	Number of days from the FYE to ARD	
Newton and Ashton (1989)	AJPT	A*	53.00	1981	Canada	183	Number of days from the FYE to ARD	
Newton and Ashton (1989)	AJPT	A*	53.90	1982	Canada	181	Number of days from the FYE to ARD	
Carslaw and Kaplan (1991)	ABR	A	87.70	1987	NZ	245	Number of days from the FYE to ARD	2 periods
Carslaw and Kaplan (1991)	ABR	A	93.50	1988	NZ	206	Number of days from the FYE to ARD	
Bamber et al. (1993)	AJPT	A*	40.00	1983–1985	USA	972	Number of days from the FYE to ARD	
Kinney and McDaniel (1993)	AJPT	A*	67.91	197–1988	USA	85	Number of days from the FYE to ARD	
Ng and Tai (1994)	BAR	A	109.60	1991	Hong Kong	292	Number of days from the FYE to ARD	2 periods
Ng and Tai (1994)	BAR	A	109.40	1990	Hong Kong	260	Number of days from the FYE to ARD	
Schwartz and Soo (1996)	CAR	A*	60.10	1988–1993	USA	502	Number of days from the FYE to ARD	
Jaggi and Tsui (1999)	ABR	A	105.88	1991–1993	Hong Kong	393	Log_number of days from the FYE to ARD	
Henderson and Kaplan (2000)	AJPT	A*	23.08	1988–1993	USA	558	Number of days from the FYE to ARD	
Owusu-Ansah (2000)	ABR	A	61.70	1994	Zimbabwe	47	Number of days from the FYE to ARD	
Knechel and Payne (2001)	AJPT	A*	68.09	1991	USA	226	Number of days from the FYE to ARD	
Ahmed (2003)	AiA	B	162.09	1998	Bangladesh	115	Number of days from the FYE to ARD	1 year, 3 countries
Ahmed (2003)	AiA	B	92.04	1998	India	226	Number of days from the FYE to ARD	
Ahmed (2003)	AiA	B	144.61	1998	Pakistan	2,017	Number of days from the FYE to ARD	
Leventis et al. (2005)	IJAud	A	97.56	2000	Greece	171	Number of days from the FYE to ARD	
Ettredge et al. (2006)	AJPT	A*	70.09	2004	USA	2,344	Number of days from the FYE to ARD	2 periods
Ettredge et al. (2006)	AJPT	A*	50.29	2003	USA	2,344	Number of days from the FYE to ARD	
Al-Ajmi (2008)	AiA	B	47.97	1999–2006	Bahrain	231	Number of days from the FYE to ARD	
Bonsón-Ponte, Escobar-Rodríguez, and Borrero-Domínguez (2008)	IJAud	A	81.50	2002–2005	Spain	105	Number of days from the FYE to ARD	
Lee et al. (2008)	JIFMA	B	51.68	2000–2004	USA	9,555	Number of days from the FYE to ARD	
Lee and Jahng (2008)	JABR	C	45.71	1999–2005	Korea	8,950	Number of days from the FYE to ARD	
Afify (2009)	JAAR	C	67.21	2007	Egypt	85	Number of days from the FYE to ARD	
J. Krishnan and Yang (2009)	AH	A	57.33	2001–2006	USA	8,358	Number of days from the FYE to ARD	
Lee et al. (2009)	IJAud	A	49.18	2000	USA	1,704	Number of days from the FYE to ARD	6 periods
Lee et al. (2009)	IJAud	A	50.31	2001	USA	2,661	Number of days from the FYE to ARD	
Lee et al. (2009)	IJAud	A	54.42	2002	USA	3,172	Number of days from the FYE to ARD	
Lee et al. (2009)	IJAud	A	57.13	2003	USA	3,547	Number of days from the FYE to ARD	
Lee et al. (2009)	IJAud	A	67.64	2004	USA	3,681	Number of days from the FYE to ARD	
Lee et al. (2009)	IJAud	A	68.67	2005	USA	3,708	Number of days from the FYE to ARD	
Tanyi et al. (2010)	AH	A	60.12	2002	USA	318	Number of days from the FYE to ARD	2 periods
Tanyi et al. (2010)	AH	A	60.12	2003	USA	318	Number of days from the FYE to ARD	
Tanyi et al. (2010)	AH	A	60.36	2002	USA	384	Number of days from the FYE to ARD	
Tanyi et al. (2010)	AH	A	60.36	2003	USA	384	Number of days from the FYE to ARD	
Habib and Bhuiyan (2011)	JIAAT	B	61.00	2004–2008	NZ	502	Number of days from the FYE to ARD	

(Continues)

TABLE 1 (Continued)

Author (publication year)	Journal	ABDC rank	Mean ARL	Sample period	Country	N	ARL definition	Multiple obs.
Abbott, Parker, and Peters (2012)	AJPT	A*	65.69	2005	USA	134	Number of days from the FYE to ARD	
L. H. Chan, Chen, Chen, and Yu (2012)	JAE	A*	55.24	2000–2009	USA	15,157	Number of days from the FYE to ARD	
Knechel and Sharma (2012)	AJPT	A*	42.54	2000–2003	USA	5,004	Log_number of days from the FYE to ARD	
Knechel, Sharma, and Sharma (2012)	JBFA	A	60.32	2004–2005	NZ	230	Log_number of days from the FYE to ARD	
Munsif et al. (2012)	AJPT	A*	63.51	2008	USA	2,003	Number of days from the FYE to ARD	Accelerated
Munsif et al. (2012)	AJPT	A*	85.93	2008	USA	836	Number of days from the FYE to ARD	Nonaccelerated
Munsif et al. (2012)	AJPT	A*	62.14	2009	USA	1,973	Number of days from the FYE to ARD	Accelerated
Munsif et al. (2012)	AJPT	A*	86.06	2009	USA	866	Number of days from the FYE to ARD	Nonaccelerated
Kim et al. (2013)	JETA	C	46.24	1990–1998	Global	8,610	Number of days from the FYE to ARD	
Walker and Hay (2013)	MAR	C	63.80	2004	NZ	130	Number of days from the FYE to ARD	2 periods
Walker and Hay (2013)	MAR	C	60.31	2005	NZ	260	Number of days from the FYE to ARD	
Wan-Hussin and Bamahros (2013)	JCAE	A	97.83	2009	Malaysia	432	Number of days from the FYE to ARD	
Xu et al. (2013)	A&F	A	78.33	2005–2009	Australia	5,491	Number of days from the FYE to ARD	
Abernathy et al. (2014)	AiA	B	54.97	2006–2008	USA	996	Number of days from the FYE to ARD	
Asthana (2014)	JFRA	C	53.78	2000–2006	USA	22,492	Log_number of days from the FYE to ARD	
Blankley et al. (2014)	AJPT	A*	64.07	2004–2007	USA	7,034	Log_number of days from the FYE to ARD	
Dao and Pham (2014)	MAJ	B	61.95	2008–2010	USA	7,291	Number of days from the FYE to ARD	
Fang, Haw, Yu, and Zhang (2014)	APJAE	B		2004–2009	China	5,825	Number of days from the FYE to ARD	
Khlif and Samaha (2014)	IJAud	A	47.26	2007–2010	Egypt	344	Number of days from the FYE to ARD	
Whitworth and Lambert (2014)	AJPT	A*	65.40	2003–2008	USA	14,948	Log_number of days from the FYE to ARD	
Jha and Chen (2015)	TAR	A*	62.75	2000–2009	USA	28,634	Number of days from the FYE to ARD	
Baatwah, Salleh, and Ahmad (2015)	MAJ	B	52.34	2007–2011	OMAN	603	Number of days from the FYE to ARD	
Ghosh and Tang (2015)	JAE	A*	—	2001–2010	USA	5,342	Log_number of days from the FYE to ARD	
Habib (2015)	IJAud	A	86.66	2003–2011	China	9,969	Number of days from the FYE to ARD	
Harjoto et al. (2015)	MAJ	B	54.89	2000–2010	USA	12,153	Log_number of days from the FYE to ARD	
Mao and Yu (2015)	JBFA	A	61.56	2000–2010	USA	5,371	Log_number of days from the FYE to ARD	
Mitra, Song, and Yang (2015)	AH	A	69.66	2006–2010	USA	11,262	Number of days from the FYE to ARD	
Mitra et al. (2015)	AH	A	63.36	2006–2010	USA	5,893	Number of days from the FYE to ARD	Large Accelerated
Mitra et al. (2015)	AH	A	74.82	2006–2010	USA	5,369	Number of days from the FYE to ARD	Accelerated
Puat Nelson and Norwahida Shukeri (2011)	AIA	B	101.09	2009	Malaysia	703	Number of days from the FYE to ARD	
Pizzini, Lin, and Ziegenfuss (2015)	AJPT	A*	41.95	2000–2004	USA	293	Number of days from the FYE to ARD	
Shu, Chen, and Hung (2015)	APJAE	B	59.50	1999–2010	Taiwan	9,876	Number of days from the FYE to ARD	
Sultana et al. (2015)	IJAud	A	80.67	2004–2008	Australia	494	Log_number of days from the FYE to ARD	
Alfraih (2016)	JFRCOM	C	65.26	2013	Kuwait	174	Number of days from the FYE to ARD	
K. H. Chan et al. (2016)	ABR	A	84.34	2004–2010	China	4,025	Log_number of days from the FYE to ARD	
Hassan (2016)	JAEE	C	62.04	2011	Palestine	46	Number of days from the FYE to ARD	
Farag (2017)	ARJ	B	60.52	2007–2010	USA	6,236	Log_number of days from the FYE to ARD	

(Continues)

TABLE 1 (Continued)

Author (publication year)	Journal	ABDC rank	Mean ARL	Sample period	Country	N	ARL definition	Multiple obs.
M. Huang, Masli, Meschke, & Guthrie, 2017	AJPT	A*	55.72	2008–2012	USA	2,837	Log_number of days from the FYE to ARD	
Meckfessel and Sellers (2017)	MAJ	B	67.47	2000–2009	USA	46,118	Number of days from the FYE to ARD	
Rusmin and Evans (2017)	ARA	B	79.00	2010–2011	Indonesia	407	Number of days from the FYE to ARD	
Shin et al. (2017)	APJAE	B	52.90	2006–2010	Korea	2,702	Number of days from the FYE to ARD	

FYE, fiscal-year-end; ARD, audit report date.

ABR, *Accounting & Business Research*; A&F, *Accounting & Finance*; AH, *Accounting Horizons*; AiA, *Advances in International Accounting*; AJPT, *Auditing: A Journal of Practice & Theory*; APJAE, *Asia-Pacific Journal of Accounting & Economics*; ARA, *Asian Review of Accounting*; ARJ, *Accounting Research Journal*; BAR, *British Accounting Review*; CAR, *Contemporary Accounting Research*; IJAud, *International Journal of Auditing*; JAAF, *Journal of Accounting, Auditing & Finance*; JAAR, *Journal of Applied Accounting Research*; JABR, *Journal of Applied Business Research*; JAE, *Journal of Accounting and Economics*; JAEE, *Journal of Accounting in Emerging Economies*; JAR, *Journal of Accounting Research*; JBFA, *Journal of Business Finance & Accounting*; JCAE, *Journal of Contemporary Accounting & Economics*; JETA, *Journal of Emerging Technologies in Accounting*; JFRA, *Journal of Financial Reporting & Accounting*; JFRCOM, *Journal of Financial Regulation and Compliance*; JIAAT, *Journal of International Accounting, Auditing and Taxation*; JIFMA, *Journal of International Financial Management & Accounting*; MAJ, *Managerial Auditing Journal*; MAR, *Meditari Accountancy Research*; TAR, *The Accounting Review*.

TABLE 2 Variable definitions

Category	Variable	Definitions commonly used
Audit and audit engagement characteristics	BIG4	Categorical variable coded 1 if the firm-year observations are audited by a Big 4 audit firm, and 0 otherwise
	SPEC	Audit firm industry specialization. An auditor is defined as a national (city) industry leader if, in a particular year, the auditor has the largest market share in a two-digit SIC industry and if its market share is at least 10 percentage points greater than the second largest industry leader in a national (city) audit market. Industry specialization is calculated for each industry for each year
	AUDIT_OPIN	A dummy variable coded 1 if the firm year observations had a qualified audit opinion including going-concern opinion, and 0 otherwise
	AF	Natural log of audit fees
	NAF	Natural logarithm of nonaudit fees
	AUDIT_TENURE	Natural log of number of the year the same audit firm is auditing a client
	AUDITOR_CHANGE	A dummy variable equal to 1 if the observation firm changed auditors during the year, and 0 otherwise
	BUSY	An indicator variable that equals 1 if the firm's fiscal year-end is December 31, and 0 otherwise. However, companies in some other countries may have different FYE, and busy season is coded accordingly
	ICW	An indicator variable coded 1 if the firm had any material weakness in internal controls (SOX 404), and 0 otherwise
Corporate governance variables	ACFE	A dummy variable coded 1 if at least one of the audit committee members is a financial expert, and 0 otherwise. In some studies, the proportion of audit committee financial expert to total audit committee members has also been used
	ACSIZE	Natural logarithm of the number of audit committee members
	ACMEET	Number of times in a year that audit committees meet
	BSIZE	Natural logarithm of the number of board members
	BMEET	Number of board meetings held during the year
	BIND	Independent directors as a percentage of total board members
	CEO_DUAL	A dummy variable coded 1 if the CEO is also the chairman of the board
	OWN_CON	The most commonly adopted measures in the meta-analyzed studies are (i) the percentage of company shares held by insiders (e.g., Afify, 2009; Habib & Bhuiyan, 2011; Jaggi & Tsui, 1999); (ii) natural logarithm of average number of shares owned per shareholder (e.g., Bamber et al., 1993; Henderson & Kaplan, 2000; Lee et al., 2008); (iii) the total proportion of shares owned by shareholders holding certain percentage of shares; (iv) owner controlled versus manager controlled (Carslaw & Kaplan, 1991); (v) an indicator variable that equals 1 if the largest shareholder is the government or its agencies; (vi) ranked values of institutional ownership; and (vii) number of major shareholders and block ownership (Abdelsalam & Street, 2007)
Firm-specific variables		
Complexity	SIZE	Natural log of total assets, market value of equity, sales revenue
	SEGMENT	Natural log of number of business/geographic segments the firms are operating in
	FOREIGN	Dummy variable coded 1 if the firm has foreign operations, 0 otherwise. Proportion of foreign sales to total sales
	MERGER	An indicator variable that equals 1 if the firm had a merger or acquisition, and 0 otherwise
	RESTATE	

(Continues)

TABLE 2 (Continued)

Category	Variable	Definitions commonly used
		An indicator variable that equals 1 if the firm has a financial statement restatement, and 0 otherwise
	EI	An indicator variable that equals 1 if the firm reports extraordinary items, and 0 otherwise
Inherent risks	INVREC	The sum of the firm's receivables and inventory divided by its total assets
	NEWS	This variable is defined as the difference between current period earnings and previous period's earnings deflated by prior period earnings/total assets/market value of equity
	LITIGATION	An indicator variable coded 1 if firm-year observations belong to biotechnology (SIC codes 2833–2836 and 8731–8734), computers (SIC codes 3570–3577 and 7370–7374), electronics (SIC codes 3600–3674), and retailing (SIC codes 5200–5961), and 0 otherwise. Primarily for US studies
Profitability	LOSS	An indicator variable that equals 1 if the firm's net income before extraordinary items is negative, and 0 otherwise
	PROFIT	Return on assets (equity) defined as net income available for ordinary shareholders divided by total assets (equity)
	BTM	The firm's book-to-market ratio defined as its book value of equity divided by market value of equity
Risk	LEV	Sum of short-term and long-term debt over total assets
	BANKRUPT	The Altman *Z*-score, a proxy for bankruptcy risk, is based on five financial ratios using the formula $Z = 1.2A + 1.4B + 3.3C + 0.6D + 1.0E$, where *A* is working capital/total assets, *B* is retained earnings/total assets, C is earnings before interest and tax/total assets, D is market value of equity/total liabilities, and E is sales/total assets

> *Eliminating all such studies may lead to underestimation of the true variability … researchers in the social and behavioral sciences appear much more reluctant to eliminate any data.*

3.4 | Meta-regression and publication bias

Publication bias is inherent in accounting and auditing research (Hay & Knechel, 2017). Including only published studies ensures quality but is plagued with a potential weakness. Published studies are papers generating hypothesized results, whereas some unpublished studies might include results that are not consistent with hypotheses and, hence, not considered for publication (Hunter & Schmidt, 1990, p. 83). This phenomenon is referred to as the "file drawer problem," which reflects the possibility that there may be many legitimate but unpublished studies that do not see the light and, hence, are not available for inclusion in the meta-analysis. Earlier meta-analysis studies in accounting and auditing relied extensively on a file-drawer test, calculating a fail-safe number *FSN* that reflects the number of studies failing to report significant results that would be required to reverse a conclusion about a significant relationship between the dependent, ARL, and independent variables (Wolf, 1986, p. 38).

The *FSN* is calculated using the following formula proposed by Rosenthal (1991, p. 261):

$$FSN = \frac{k(k \times z^2 - 2.706)}{2.706} \tag{3}$$

where *k* is the number of studies in the meta-analysis and *z* is the combined standard *z*-value for the meta-analysis. The file drawer issue as represented by the *FSN* becomes a problem only when *FSN* exceeds a critical value *CN* drawer, calculated as follows:

$$CN\,\text{drawer} = (5 \times k) + 10 \tag{4}$$

Although fail-safe estimation to tackle publication bias is relatively straightforward to apply, this has been criticized for not being relevant and, importantly, for providing misleading inferences (Borenstein, Hedges, Higgins, & Rothstein, 2009; Stanley, 2005). Instead, meta-regression has been proposed in the literature as a more robust technique for dealing with publication bias (Stanley, Doucouliagos, & Jarrell, 2008; Stanley & Doucouliagos, 2012). A unique advantage of the meta-regression analysis is that it allows for investigation of the extent to which mixed results of research may be due to publication bias. Additionally, this technique allows the publication bias to be broken down to examine moderating factors that might relate to the publication bias. In this study we use (a) journal quality, (b) country setting, (c) different time periods studied in the meta-analyzed papers, and (d) significant variation in sample size across the studies as four potential moderating variables.

Concerns related to publication bias have been discussed earlier. With respect to country settings, we group studies into USA versus non-USA countries. The US setting is important for two reasons. First, an overwhelming 65% of the observations in our analysis come from US studies. Second, a series of very significant auditing-related regulatory changes (e.g., the SOX and SEC filing regulations) make the USA an ideal candidate for auditing-related comparisons with other countries. SOX is perceived to have increased auditor litigation risk significantly. In order to minimize the litigation threat emanating from improper auditing, audit firms are expected to exert more effort in auditing their clients' financial statements. The inclusion of a period dummy in the meta-regression equation can capture the SOX effects. The inclusion of the filing regulation in the meta-equation is not so straightforward. In order to include this as the contextual variable, the studies had to break down the sample clearly into accelerated, versus nonaccelerated, observations. However, only Munsif et al. (2012) and Farag (2017) provided that information; thus, we were inhibited from carrying out this test. However, we included a *PERIOD* dummy (coded 1 for sample period 2000 and onwards, and 0 otherwise) in our meta-regression, to identify whether the post-2000 regime had impacted ARL more than the pre-2000 regime had.

Finally, sample sizes likely raise concerns regarding publications bias. As reported before, the number of sample observations ranged from a low of only 46 observations for Palestine and a high of 46,118 firm-year observations for the USA. Large sample sizes have statistical properties that might render a greater degree of significance than their small-sample counterparts. Since studies using a large sample generate more significant results, an inherent source of publication bias could emanate from sample size differences.

We follow Hay and Knechel (2017) in developing the test equations that are derived from Stanley et al. (2008). They show that

TABLE 3 Meta-analysis results

Variable	(1) No. of results	(2) No. (+) significant	(3) No. (−) significant	(4) No. insignificant	(5) Stouffer unweighted *Z*	(6) Stouffer weighted *Z*	(7) *FSN* (unweighted)	(8) *FSN* (weighted)	(9) *CN* drawer
(A) Association between auditor or engagement characteristics and the ARL									
BIG4	56	9	16	31	−4.10***	−0.04	19,425.21	N/A	290
SPEC	6	2	1	3	−0.27	−0.33	N/A	N/A	—
AUDIT_OPIN	69	45	8	16	15.64***	14.45***	430,302.90	367,303.03	355
AF	35	22	2	11	13.18***	10.25***	78,604.21	47,526.55	185
NAF	19	1	13	5	−9.68***	−13.52***	12,481.58	24,366.56	105
AUDIT_TENURE	18	6	5	7	2.04**	−0.94	480.28	N/A	100
AUDITOR_CHANGE	22	12	1	9	8.30***	7.83***	12,299.79	10,943.82	120
BUSY	56	17	8	31	5.22***	8.58***	31,522.34	85,258.50	290
ICW	15	13	-	2	11.13***	9.48***	10,285.19	7,457.59	85
(B) Association between corporate governance characteristics and the ARL									
ACFE	7	0	3	4	−3.64***	0.15	232.92	N/A	50
ACSIZE	8	0	4	4	−5.37***	−1.53	674.03	N/A	50
ACMEET	7	1	1	5	1.99**	1.50	64.71	N/A	45
BSIZE	6	2	1	3	1.30	1.12	N/A	N/A	—
BMEET	3	1	1	1	−1.08	0.95	N/A	N/A	—
BIND	8	1	4	3	−4.34***	−5.05***	437.48	595.16	50
CEO_DUAL	8	2	1	5	2.55***	3.66***	145.79	308.82	50
OWN_CON	27	4	10	13	−4.02***	−1.77*	4,326.63	817.01	145
(C) Association between firm-specific variables and the ARL									
Complexity									
SIZE	77	6	52	19	−17.86***	−11.90***	698,825.46	310,198.57	395
SEGMENT	52	22	4	26	8.73***	6.42***	76,104.57	41,133.94	270
FOREIGN	21	4	3	14	1.70*	4.00***	449.99	2,586.54	115
MERGER	12	5	0	6	2.19**	2.99***	243.22	463.75	70
RESTATE	19	11	1	7	9.00***	7.31***	10,786.99	7,109.76	105
EI	58	32	5	21	11.33***	5.57***	159,525.51	38,511.02	300
Inherent risk									
INVREC	12	4	0	8	3.41***	4.48***	606.79	1,056.05	70
NEWS	14	2	8	4	−2.35**	1.17	386.00	N/A	80
LITIGATION	37	14	13	10	0.96	−5.75***	N/A	16,689.74	195
Profitability									
LOSS	62	45	4	13	17.67***	11.87***	443,473.81	200,088.66	320
PROFIT	37	8	17	12	−4.29***	−0.86	9,273.87	337.17	195
BTM	8	2	2	4	−0.27	−2.43**	N/A	131.66	50
Risk									
LEV	45	28	2	15	12.28***	11.39***	112,803.03	97,038.33	235
BANKRUPT	25	15	1	9	7.46***	1.55	12,828.75	N/A	135

***$p < 0.01$, **$p < 0.05$, *$p < 0.10$.

Variable definitions are in Table 2. The Stouffer combined test is used to test the hypotheses developed in Section 2. The test converts *p*-values and *t*-statistics from separate analyses to *z*-scores, adds them, and divides by the square root of the number of tests. It produces a *Z*-statistic that can be used to test the direction and significance of the effect of the hypothesized variables on the propensity of auditors to issue modified audit opinions. See Equations (1), (2), (3), and (4) for unweighted Z_c, weighted Z_c, *FSN*, and *CN* drawer respectively.

Whitworth and Lambert (2014, table 4) reported coefficients for both industry expertise at the office level and industry expertise at the national level. We included the latter to be consistent with other studies. None of the other specialization and ARL studies reports office-level expertise.

whether there is publication bias can be tested by examining whether the standard error in a set of studies is related to their results as follows:

$$\beta_j = \beta + \beta_0 Se_j + e_j \quad (5)$$

where β_j is the reported estimate of the coefficient on the determinants of ARL in the *j*th study, β is the underlying effect, Se_j is the standard error, and e_j is the disturbance term. In the absence of publication bias, the reported effect β_j will vary randomly around the underlying effect β and the coefficient β_0 on Se_j will be zero. If there is publication bias, β_0 will be significant (this is called the funnel asymmetry test). If there is an underlying effect apart from publication bias, then this will be indicated by $\beta \neq 0$ (this is called the precision effect test; Stanley et al., 2008, p. 280; Stanley & Doucouliagos, 2012, p. 60). In executing the aforementioned regression, we use the weighted least squares method, whereby *Se* is weighted by $1/Se^2$ (Stanley & Doucouliagos, 2012, p. 61).

We then decompose the publication bias into four components, as explained before, using the following regression specification:

$$\beta_j = \beta + \beta_0 Se_j + \beta_1 Se{\times}High + \beta_2 USA + \beta_3 Time + \beta_4 Ln\_sample + e_j \quad (6)$$

where *High* is an indicator variable coded 1 for journals ranked A and A* as per the ABDC journal ranking system; *USA* is a dummy coded 1 for studies using US data, and 0 otherwise; *Time* is a dummy variable coded 1 if the sample period is post-2000, and 0 otherwise; and finally, *Ln_sample* is the natural logarithm of the sample size reported in the respective studies.

4 | META-ANALYSIS RESULTS

4.1 | Auditor- and audit-related variables and ARL

Table 3, panel A, provides the meta-analysis results for the effect of auditor and audit-related variables on ARL. The statistical significance of the Stouffer *Z*-statistic is used to evaluate the significance of specific variables for determining ARL.

4.1.1 | Auditor affiliation and ARL

A total of 56 published results examined the association between Big *N* affiliation and ARL (H1A). Researchers have used a dummy variable to differentiate Big *N* versus non-Big *N* affiliation. The Stouffer combined test result indicates that firms audited by Big 4 audit firms have shorter ARL (unweighted *Z*-statistic −4.10, significant at $p < 0.01$). A total of 16 of the 56 results reported statistically significant negative coefficients on *BIG4*, 9 significantly positive coefficients, and the other 31 studies reported insignificant coefficients. The Stouffer weighted *Z*-statistic, on the other hand, shows a negative but insignificant association. Since the weighted measure adjusts for the large variation in sample sizes, the insignificant *Z*-statistic may be a result of some large sample studies generating insignificant coefficients (e.g., Jha & Chen, 2015 report a *t*-statistic of 0.39 on *BIG4* in their sample of 28,634 firm-year observations). Our unweighted meta-results, therefore, refute arguments for a positive association between Big 4 audit and ARL (e.g., Shin et al., 2017). The *FSN* for this variable is 19,425.21, which is significantly greater than the *CN* drawer of 290.

Only six out of 88 results investigated the association between the auditor industry specialization and ARL. Meta-analysis results reveal an insignificant negative coefficient on *SPEC* (Stouffer weighted *Z*-statistic of −0.33). It is rather surprising to see so few studies including auditor specialization in the ARL models, particularly given the large number of studies including *BIG4*.

4.1.2 | Auditor opinion and ARL (H2)

In regard to H2, we argue that firms receiving a modified audit opinion are expected to experience longer ARLs than firms receiving a clean audit opinion. Our meta-results strongly support this prediction, as the weighted *Z*-statistic is 14.45 (significant at $p < 0.001$). A total of 69 results examined the association between ARL and audit opinion, with 45 of them reporting significantly positive coefficients. The *FSN* for the *AUDIT_OPIN* variable is 367,303.03, far greater than the *CN* drawer of 355, and hence raises less concern for publication bias. The reported positive association, therefore, is consistent with prior research on the detrimental effects of qualified audit opinion for ARL (Citron & Taffler, 1992; Ireland, 2003).

4.1.3 | Economic bonding of auditor and ARL (H3A and H3B)

A total of 35 published results investigated the association between audit fees (*AF*) and ARL, whereas the corresponding number for NAFs was 19 studies. A total of 15 studies included both *AF* and *NAF* together in the same regression models. Meta-analysis results reveal a significantly positive Stouffer weighted *Z*-statistic of 10.25 (significant at $p < 0.001$), with 22 of the 35 studies reporting positive and significant coefficients. The finding is more in line with the arguments that timely audit has value and that the auditees may be willing to pay higher fees for a quicker completion of the audit procedures. Auditors, in turn, charge higher audit fees to recoup the additional investments on audit resources.

With respect to the association between NAFs and ARL, we find strong support for the prediction that NAFs shorten ARL (Stouffer weighted *Z*-statistic is −13.52, significant at $p < 0.001$). Thirteen of the 19 results are significantly negative. Our findings are consistent with the notion of "knowledge spillover benefits," where auditors learn through the NASs and become well informed about the client operations, resulting in a shorter ARL. The *FSN* for both *AF* and *NAF* is greater than the *CN* drawer and, therefore, implies no publication bias. The findings reported in here do not support the view that the provision of NASs impairs auditor independence, at least from the perspective of timely auditing, and hence questions the banning of all but a very few of the NASs in the USA (11 of the 13 reported negative and significant coefficients are from the US sample).

4.1.4 | Audit tenure, auditor change, and ARL (H4A and H4B)

A total of 18 published results examined the association between audit tenure and ARL. Meta-analysis suggests a positive and significant coefficient on *TENURE*, but only for the unweighted measure (Stouffer *Z*-statistic 2.04, significant at $p < 0.05$). Significantly positive and negative associations are found in six and five studies respectively, with the

remaining seven providing insignificant results. Some studies have categorized audit tenure into short versus long tenure, to derive more specific hypotheses on these two categories (Dao & Pham, 2014; Habib & Bhuiyan, 2011; Lee et al., 2009). The *FSN* for audit tenure results is 480.28, much greater than the *CN* drawer of 100, hence raising less concern for publication bias.

In regard to the *AUDITOR_CHANGE* variable, the weighted *Z*-statistic is positive and significant (*Z*-statistic 7.83, significant at $p < 0.01$). Twelve of the 22 results are significantly positive, one negative, and the remaining nine results are insignificant. Results are consistent with the hypothesized prediction that changing auditors adversely affects the ARL. However, Schwartz and Soo (1996) and Munsif et al. (2012) are the only studies that considered the timing of the auditor change. In addition, empirical research on auditor change has not differentiated between auditor resignations and auditor dismissal in examining the implications of auditor change for ARL. The *FSN* for *AUDITOR_CHANGE* (10,943.82) is greater than the *CN* drawer of 120 and, therefore, implies less concern for publication bias.

4.1.5 | Auditing season and ARL (H5)

The association between ARL and auditing season (*BUSY*) was examined in 56 results, with mixed results. *BUSY* is defined as an indicator variable, coded 1 if the fiscal year ends in June or December (depending on the economic setting). Of the 56 results, 17 reported a positive statistically significant coefficient and eight a negative statistically significant coefficient. Interestingly, a large number of studies (31) find insignificant association with ARL. The combined Stouffer weighted *Z*-statistic is 8.58 (significant at $p < 0.01$), and thus supports H5. This strong result is also reflected in the *FSN* of 85,258.50, which is much greater than the *CN* drawer of 290. Ashton et al. (1989) argued that performing audit during the busy season could result in either an increase or a decrease in ARL, depending on whether the increased workload is handled by increased overtime or more audit staff. The positive coefficient likely supports the former prediction. The large number of insignificant results may be explained from this perspective.

4.1.6 | ICW and ARL (H6)

A total of 15 results examined the impact of ICW on ARL. An overwhelming majority of these results reported positive and significant coefficients on ICW (e.g., Blankley et al., 2014; Dao & Pham, 2014; Ettredge et al., 2006; Harjoto et al., 2015). The Stouffer combined weighted *Z*-statistic is significantly positive (*Z*-statistic 9.48, significant at $p < 0.01$). The *FSN* of 7,457.59 for these results is much greater than the *CN* drawer of 85. The increase in ARL due to ICW disclosures is unsurprising given the additional audit work required to verify the internal control over financial reporting. Although a shorter ARL is preferred by the stakeholders, ARL naturally increases because of the verification of internal control over financial reporting. Yet the SEC has mandated a reduction in the filing deadlines for certain companies. Whether this contradiction would compromise audit quality is a matter for further empirical investigation.

4.2 | Corporate-governance variables and ARL (H7A–H9D)

4.2.1 | Audit committee characteristics and ARL (H7A and H7B)

We found seven published papers investigating the effects of ACFE on the ARL. As shown in Table 3, panel B, the Stouffer combined test reveals a negative unweighted *Z*-statistic of −3.64 (significant at $p < 0.01$), which is consistent with our expectation (H7A). More specifically, this finding supports the prediction that financial-expert-equipped audit committees enhance assurance in negotiation and reduce the amount of time needed to conduct a successful discussion with external auditors, resulting in a reduced ARL. The weighted *Z*-statistic, however, is insignificant, probably because of the nonsignificant coefficient reported in a large sample of 12,153 observations by Harjoto et al. (2015). The *FSN* is 232.92, which is greater than the *CN* drawer of 50. Interestingly, among the seven studies investigating this variable, only two are US-based studies. For future studies intending to include the *ACFE* variable, a precise definition of financial expertise under its specific institutional setting would be beneficial for understanding the effects of various different interpretations of financial expertise. We further acknowledge that, although having financially expert audit committee members is desirable, many countries may not have a sufficient pool of such resources.

Eight studies tested the association between audit committee size (*ACSIZE*) and ARL, with four reporting negative coefficients and the same number of studies reporting insignificant results as significant results. The Stouffer test exhibits a significant ($p < 0.01$) unweighted *Z*-statistic of −5.37 and an insignificant weighted *Z*-statistic of −1.53. The *FSN* for *ACSIZE* is 674.03, which is greater than the *CN* drawer of 50. Studies that find significant and negative coefficients, however, are based on a relatively small sample size (e.g., Afify, 2009; Hassan, 2016). With regard to the audit committee meeting frequency (*ACMEET*), hypothesis H7C predicts that more frequent audit committee meetings reduce ARL. Five out of the seven studies report no significant result on this variable. The Stouffer unweighted *Z*-statistic is 1.99 (significant at $p < 0.05$), whereas the weighted *Z*-statistic is 1.50 but insignificant. The *FSN* is 64.71, which is greater than the *CN* drawer of 45. Therefore, our meta-analysis does not support the negative association between audit committee meeting frequency and ARL.

4.2.2 | Board characteristics and ARL (H7C and H7D)

We find no evidence of significant association between board size (*BSIZE*; weighted *Z*-statistic of 1.12) and board meeting frequency (*BMEET*; weighted *Z*-statistic of 0.95) with ARL. A total of nine studies examined these two variables for ARL. Three of them reported significantly positive coefficients, two reported significantly negative coefficients, and four reported insignificant results. Among the six studies that tested the *BSIZE* variable, two studies reported a significantly positive coefficient (Hassan, 2016; Shu et al., 2015) and one study reported a significantly negative result (Harjoto et al., 2015). The board demographic characteristics might be quite different across countries, especially between Asian countries and the USA. Such differences apparently are reflected in the mixed results from prior studies. We find strong support for our hypothesized negative association

between board independence and ARL. The Stouffer weighted *Z*-statistic is −5.05 (significant at $p < 0.01$). Four out of eight studies reported negative and significant coefficients. The *FSN* is 595.16, which is greater than the *CN* drawer of 50. Although prior studies across various countries provide competing arguments about the effect of board independence on ARL, our meta-analysis supports the beneficial effects of having an independent board in ensuring timely reporting. This may be used as a justification for the mandatory requirements of having independent board members.

4.2.3 | CEO duality and ARL (H8A)

Eight studies examined the association between CEO duality and ARL (*CEO_DUAL*) with very mixed results. Two studies reported positive and significant coefficients and one reported a negative and significant coefficient, but the remaining five studies reported insignificant results. The Stouffer weighted *Z*-statistic, however, is positive and significant (*Z*-statistic 3.66, significant at $p < 0.01$). This may be because of the significantly positive association between CEO duality and ARL, documented in Shu et al. (2015), for a large sample of 9,876 observations. A positive association may imply that CEOs who are also chairmen of boards are powerful, thus reducing board independence and impairing audit committee effectiveness. Our findings also have a regulatory implication, suggesting that corporate governance regulations should emphasize the discouragement of CEO duality, as this may be likely to increase audit report timeliness.

4.2.4 | Ownership concentration and ARL (H8B)

A total of 27 results are included in our meta-analysis on the association between ownership structure and ARL. Ten of the 27 results find that concentrated ownership reduces ARL. Only four results report significantly positive coefficients, and the remaining 13 find insignificant results. The Stouffer unweighted and weighted *Z*-statistics are negative and significant (−4.02 and − 1.77 respectively, significant at $p < 0.01$ and $p < 0.10$ respectively). The *FSN* of 817.01 associated with the weighted *Z* is greater than the *CN* drawer of 145, suggesting less concern of publication bias. Lee et al. (2009) covered a 6-year horizon, from 2000 to 2005, and found a significantly negative correlation between ownership and ARL in each of those six years. Interestingly, K. H. Chan et al. (2016) found a positive but insignificant effect of ownership concentration on ARL in China, although Chinese listed firms are well known for their highly concentrated ownership structure.

4.3 | Firm-specific variables and ARL

4.3.1 | Organizational complexity and ARL (H9A–H9D)

Four different proxies have been commonly used to proxy for organizational complexity in the ARL literature: firm size (77 results), business segment (52 results), foreign operations (21 results), and merger and acquisitions (12 results). The meta-analysis results for the different proxies of complexity are reported in Table 3, panel C. Consistent with H9A, the meta-analysis results document a significantly negative association between firm size and ARL (weighted *Z*-statistic −11.90, significant at $p < 0.01$). The Stouffer combined test also provides support for the other complexity measures (H9B). A total of 19 results were found for the association between financial restatements (*RESTATE*) as a proxy for organizational complexity and the ARL (H9C), of which 11 reported significantly positive coefficients. The Stouffer weighted *Z*-statistic is significantly positive (*Z*-statistic 7.31, significant at $p < 0.01$). This finding is consistent with our hypothesis that the greater number of restatements requires additional time, effort, and substantive testing, thereby increasing the ARL. Finally, 58 results were reported for the effects of the presence of extraordinary items (*EI*) on the ARL (H9D), of which 32 reported positive and significant coefficients, although 21 of the results were insignificant. The Stouffer weighted *Z*-statistic is significantly positive (*Z*-statistic 5.57, significant at $p < 0.01$).

4.3.2 | Inherent risks and ARL (H10A–H10C)

We use magnitude of inventory and receivables (*INVREC*), earnings volatility (*NEWS*), and litigious industries (*LITIGATION*) as our proxies for inherent risks. The Stouffer weighted *Z*-statistic is positive and significant for *INVREC* (*Z*-statistic 4.48, significant at $p < 0.01$), and the reported *FSN* of 1056.05 is greater than the *CN* drawer of 70.00. The positive association suggests that substantial amounts of receivables and inventories require more audit effort, as these areas require special audit procedures. The weighted *Z*-statistic is insignificant for the *NEWS* variable, although the unweighted Z-statistic is negative and significant (Z-statistic −2.35, significant at $p < 0.05$). Out of the 14 results, eight reported negative and significant coefficients. Finally, the weighted *Z*-statistic for *LITIGATION* is significantly negative (*Z*-statistic −5.75, significant at $p < 0.01$). An almost equal number of results reported significantly positive (14 results) and negative (13 results) coefficients. Intuitively, the ARL is expected to be longer for firms in the litigious industries, because auditors exert additional audit efforts to mitigate the risk of misstatements and the risk of subsequent litigation. The most commonly adopted measure of *LITIGATION* is the Francis et al. (1994) industry-based classification. However, a more refined measure was proposed by Rogers and Stocken (2005), who developed a probit model to estimate the probability of litigation. Future research may use that as a better proxy for litigation propensity in the ARL research.

4.3.3 | Profitability and ARL (H11A and H11B)

We find strong support for the hypothesized positive association between firms reporting negative earnings (*LOSS*) and ARL. Of the 62 results reported, 45 were significantly positive coefficients. The weighted *Z*-statistic is 11.87 (significant at $p < 0.01$). The *FSN* is 200,088.66, which is much greater than the *CN* drawer of 320, thus raising very little concern of publication bias. For *PROFIT*, the unweighted *Z*-statistic is negative and highly significant. We find mixed results for the association between *BTM* and ARL. Out of the eight results, an equal number of studies reported positive and negative coefficients which are significant (four in total). The weighted Z-statistic is −2.43 (significant at $p < 0.05$).

4.3.4 | Organizational risk and ARL (H12)

Researchers typically expect that ARL is associated positively with organizational risk, because a firm with higher risk requires more scrutiny and specialized audit procedures (Simunic, 1980). Firm leverage

(*LEV*) and bankruptcy risk (*BANKRUPT*) are the commonly used risk measures in the ARL literature. The Stouffer *Z*-statistic is significantly positive for *LEV* (weighted *Z*-statistic is 11.39, significant at $p < 0.01$). However, that on *BANKRUPT* is positive but insignificant, although the unweighted *Z*-statistic is significantly positive.

4.4 | Meta-regression results

We now turn our attention to meta-regression techniques to determine whether the reported results suffer from publication bias and, if so, what the sources of such bias might be. We present the mean, median, and standard deviation *SD* of the coefficients, *t*-statistic, standard errors *Se* and precision 1/*Se* of the respective determinants of the ARL in Table 4. As is apparent from Table 4, the mean values show a markedly skewed distribution compared with their median values. This suggests that some of the meta-analyzed studies report some extreme values for the coefficients. This is also supported by large standard deviation values. Such variation in coefficients unduly affects *Se*, our main independent variable in the meta-regression, since *Se* values are calculated as *coefficient*/*t*.

We report the meta-regression results in Tables 5–7. Consistent with Table 3, the results are presented for three categories of the determinants of ARL. Table 5 presents meta-regression results for audit and auditor engagement characteristics, Table 6 for corporate governance characteristics, and Table 7 for firm-specific characteristics. A caveat is in order, however. Hay and Knechel (2017) investigated through a meta-regression technique whether Big 4 auditors earn fee premiums. Hence, they included only studies that reported the coefficients and related *t*-statistics on *BIG4* dummy variables, with audit fees as the independent variable. Our setting is different from that of Hay and Knechel (2017), in that we consider a total of 27 separate determinants of ARL. Many of the variables have a very small sample size for running a regression (e.g., seven studies for *ACFE* and *ACSIZE*, in contrast to 78 studies for the *SIZE* variable). Results from regressions using a very small sample size compromise the power of the tests, and the results should be interpreted cautiously.

TABLE 4 Descriptive statistics of the meta-regression constructs

	Mean				Median				SD			
Variable	Coeff.	t	*Se*	1/*Se*	Coeff.	t	*Se*	1/*Se*	Coeff.	t	Se	1/*Se*
BIG4	−0.32	−0.64	1.33	20.99	−0.07	−0.54	0.61	1.65	4.48	4.82	2.55	49.83
SPEC	−0.17	−1.79	0.44	370.65	0.02	−0.23	0.16	29.94	1.18	5.74	0.72	800.62
AF	9.39	4.93	5.49	36.15	0.12	3.56	0.74	1.34	54.60	9.81	16.37	83.51
NAF	−1.08	−2.76	2.12	242.17	−0.16	−1.75	0.14	6.23	6.33	3.52	4.44	589.43
AUDIT_OPIN	2.76	2.37	1.07	19.74	0.16	2.12	0.24	4.63	5.80	3.40	1.92	38.83
AUDIT_TENURE	−0.95	−1.21	0.57	207.99	−0.32	−1.43	0.45	2.27	1.46	1.86	0.56	589.57
AUDITOR_CHANGE	1.47	1.84	0.81	18.30	1.47	2.10	1.07	0.93	2.26	2.02	0.72	28.84
BUSY	0.67	1.00	0.74	32.67	0.02	0.56	0.06	16.69	3.18	3.18	1.35	52.29
ICW	17.83	4.83	3.12	23.65	8.46	3.47	2.58	0.51	26.65	4.14	3.57	36.70
ACFE	−3.47	−1.43	1.75	9.16	−0.15	−1.63	1.56	4.50	5.11	1.70	1.82	11.32
ACSIZE	−2.57	−2.20	1.01	8.48	−0.99	−2.71	0.55	1.81	4.78	1.21	1.21	11.44
ACMEET	1.36	0.27	1.19	9.93	0.05	0.75	0.33	3.01	4.13	2.20	1.82	12.14
BSIZE	−0.73	−0.52	0.70	16.83	−0.16	−0.82	0.13	7.56	1.33	2.59	0.81	22.81
BMEET	0.08	−0.16	0.02	387.07	0.00	−0.83	0.00	452.47	0.15	4.11	0.03	342.02
BIND	−8.33	−2.19	2.63	10.96	−0.21	−0.71	1.41	0.71	19.23	3.18	3.68	14.88
CEO_DUAL	0.43	0.97	1.64	20.91	0.10	1.50	0.71	1.42	3.78	1.67	2.24	48.54
OWN_CON	1.72	−1.47	1.09	743.38	−0.03	−0.87	0.05	19.77	8.19	4.63	3.18	3263.34
SIZE	−0.77	−4.43	0.42	50.45	−0.06	−2.81	0.06	13.40	1.83	6.93	0.77	127.12
SEGMENT	0.05	1.23	0.36	197.25	0.10	1.35	0.18	5.41	1.27	1.75	0.74	694.24
FOREIGN	−0.61	0.23	0.69	43.43	−0.01	−0.30	0.19	4.86	2.43	2.11	1.03	62.98
MERGER	0.30	0.59	0.41	27.12	0.34	0.65	0.43	2.23	0.31	0.86	0.36	45.72
RESTATE	3.19	2.21	1.47	17.03	2.73	2.48	1.01	0.99	4.18	2.79	1.67	35.16
EI	0.27	1.72	0.64	34.50	0.18	1.83	0.17	6.05	1.48	1.94	1.15	128.77
INVREC	0.15	2.36	1.62	17.21	0.17	1.00	1.12	0.89	3.73	3.72	1.87	28.79
NEWS	0.19	0.86	0.15	36.10	−0.04	−1.21	0.13	7.64	1.21	4.19	0.18	54.86
LITIGATION	−1.77	−0.28	0.60	15.68	−0.03	−0.52	0.08	12.21	6.59	2.99	1.18	29.13
LOSS	2.34	3.00	0.92	24.26	0.54	2.58	0.66	1.56	3.66	2.56	1.28	48.02
PROFIT	−5.73	−0.91	2.39	50.98	−0.09	−0.40	0.60	1.66	21.62	4.73	4.36	166.21
BTM	−0.11	0.02	0.11	46.24	0.00	0.25	0.02	6.05	0.68	4.59	0.14	68.46
LEV	2.47	2.63	1.15	47.44	0.35	2.15	0.61	1.40	4.40	3.47	1.44	181.10
BANKRUPT	1.44	1.59	0.66	51.78	0.64	1.98	0.21	4.67	3.19	2.69	1.46	119.71

See Table 2 for variable definitions.

TABLE 5 Meta-regression results: audit and auditor engagement characteristics

	BIG4	AF	NAF	AUDIT_OPIN	AUDIT_TENURE	AUDITOR_CHANGE	BUSY	ICW
Existence of bias								
Se	−0.23	1.44**	−0.68***	2.61***	−1.67***	1.80***	0.91**	5.67***
	[−0.62]	[2.47]	[−2.23]	[8.73]	[−5.14]	[5.16]	[2.32]	[4.79]
Intercept	−0.02	0.10	0.35	−0.015	0.002	0.002	0.002	−0.04
	[−0.21]	[0.44]	[0.24]	[−0.23]	[0.13]	[0.03]	[0.03]	[−0.11]
Adj. R^2	0.00	0.15	0.18	0.53	0.60	0.56	0.07	0.63
F -stat	0.39	6.11**	4.97**	76.20***	26.46***	26.59***	5.38**	22.99***
Sources of bias								
Se	−0.91	0.38	−0.78**	2.73***	−1.54**	1.49	0.27	3.26
	[−1.46]	[0.22]	[−2.45]	[8.98]	[−2.66]	[1.56]	[0.57]	[1.45]
High × *Se*	1.07	1.23	−25.11	−1.38***	−0.45	0.99	1.16**	3.65
	[1.39]	[0.66]	[−1.29]	[−2.98]	[−0.59]	[1.08]	[2.23]	[1.51]
USA	0.09	0.06	−54.11**	−0.38	−0.31	−1.82	2.34**	−6.88
	[0.38]	[0.09]	[−2.13]	[−0.34]	[−0.43]	[−1.68]	[2.35]	[−0.32]
Time	−0.04	–	−7.57	−0.68	1.50	3.04**	−3.16**	−8.36
	[−0.13]		[−0.47]	[−0.50]	[0.95]	[2.53]	[−2.65]	[−0.37]
Ln_sample	0.01	0.06	−0.27*	0.73	−0.44*	0.21	0.52	2.11
	0.12]	[0.22]	[−1.87]	[1.87]	[−1.77]	[0.61]	[1.59]	[0.58]
Intercept	−0.10	−.48	134.07	−3.90	2.35	−3.23	−2.98	−3.33
	[−0.18]	[−0.22]	[1.36]	[−1.58]	[1.53]	[−1.50]	[−1.52]	[−0.12]
Adj. R^2	0.00	0.07	0.42	0.60	0.41	0.56	0.32	0.55
F -stat	0.52	1.54	4.41**	20.70***	3.39**	6.13***	6.37***	4.69**
N	55	31	19	68	18	21	57	16

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

See Table 2 for variable definitions.

We follow Hay and Knechel (2017) in developing the test equations, which are derived from Stanley et al. (2008). Whether there is publication bias can be tested by examining whether the standard error in a set of studies is related to their results according to Equation (5). In executing the regression, we use the weighted least squares method. We then decompose the publication bias into four components using Equation (6). *High* is an indicator variable coded 1 for journals ranked A and A* as per the ABDC journal ranking system; *USA* is a dummy coded 1 for studies using US data, and 0 otherwise; *Time* is a dummy variable coded 1 if the sample period is post-2000, and 0 otherwise; and *Ln_sample* is the natural logarithm of the sample size reported in the respective studies.

The *t*-statistics are reported in parentheses.

The meta-regression results are reported in two categories, with the first category showing the base model, whereby respective coefficients are regressed on their standard errors to carry out the funnel asymmetry test for publication bias. The second category reports the results after additional explanatory variables are included in the meta equation, to identify the sources of bias, if any. Sources of potential publication bias can come from one or a combination of (a) journal quality, (b) country setting, (c) time period, and (d) variation in sample size. The source of publication bias emanating from journal quality is captured by the coefficient on the interactive variable *High* × *Se*, where *High* is an indicator variable coded 1 for journals ranked A and A* as per the ABDC journal ranking system. The coefficient on *USA* (indicator variable coded 1 for studies using US data, and 0 otherwise), *Time* (an indicator variable coded 1 for studies with a sample period of 2000 and onwards, and 0 otherwise) and *Ln_sample* (natural logarithm of the sample size reported in the respective studies) are the three contextual variables used to explain publication bias, besides journal quality. Tables 5–7 report standard errors that are robust for heteroscedasticity. We find that some, but not all, of the determinants are plagued with publication bias, as is evident from significant nonzero coefficients on *Se* for 20 of the 27 determinants being meta-analyzed.

4.4.1 | Audit and auditor engagement characteristics: Publication bias and the sources of bias

Of the audit-related variables, we find that the coefficients on *Se* for all but the *BIG4* variable are significant. The coefficients ranged from a low of −1.67 to a high of 5.67. The reported coefficients have both positive and negative signs, suggesting that publication bias inflates as well as attenuates the true magnitude of the coefficients. With respect to the sources of the publication bias, we find the coefficients on the interactive variable *High* × *Se* to be significant for *AUDIT_OPIN* (coefficient − 1.38, p < 0.01) and *BUSY* (coefficient 1.16, p < 0.05) variables. The findings, therefore, do not provide robust evidence that publication bias can be solely due to bias arising from journal quality, as is evident in Table 5. The coefficient on the *USA* dummy is negative and significant for NAF. Table 3, panel A, provides robust evidence that the provision of NASs reduces ARL. The negative coefficient on the *USA* dummy, therefore, may suggest a more pronounced effect of NAFs on ARL in the USA. It is intuitive

TABLE 6 Meta-regression results: corporate governance variables

	ACFE	ACSIZE	ACMEET	BIND	CEO_DUAL	OWN_CON
Existence of bias						
Se	−1.56	−2.60***	1.24	−3.19***	0.25	1.55***
	[−1.43]	[−3.58]	[1.34]	[−3.62]	[0.45]	[4.51]
Intercept	−0.84	0.05	−0.10	0.10	0.03	−0.004
	[−0.29]	[0.19]	[−0.32]	[0.22]	[0.22]	[−0.33]
Adj. R^2	0.15	0.66	0.12	0.60	−0.00	0.42
F -stat	2.03	12.85***	1.81	13.13**	0.20	20.33***
Sources of bias						
Se	−0.26	−1.52	−1.20	−4.75***	0.54	1.69***
	[−0.51]	[−1.25]	[−0.06]	[−5.13]	[0.56]	[4.74]
High × *Se*	0.27	1.30	1.46	3.82**	−0.59	−2.80
	[0.21]	[1.17]	[0.08]	[2.55]	[−0.44]	[−1.30]
USA	−2.93	−11.28*	1.37	0.25	−0.20	−0.02
	[−0.23]	[−1.81]	[0.13]	[0.17]	[−0.34]	[−0.40]
Time	–	–	–	–	–	−0.01
						[−0.04]
Ln_sample	1.18	3.57*	−4.52	−0.35	0.08	0.012
	[0.14]	[1.81]	[−0.37]	[−0.49]	[0.36]	[0.54]
Intercept	−8.30	−23.26*	29.67	2.59	−0.45	−0.10
	[−0.15]	[−1.81]	[0.39]	[0.54]	[−0.29]	[−0.31]
Adj. R^2	0.00	0.82	0.00	0.75	0.00	0.40
F -stat	0.23	7.97	0.09	6.92**	0.11	4.65**
N	7	7	7	9	10	28

***$p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

See Table 2 for variable definitions.

We follow Hay and Knechel (2017) in developing the test equations, which are derived from Stanley et al. (2008). Whether there is publication bias can be tested by examining whether the standard error in a set of studies is related to their results according to Equation (5). In executing the regression, we use the weighted least squares method. We then decompose the publication bias into four components using Equation (6). *High* is an indicator variable coded 1 for journals ranked A and A* as per the ABDC journal ranking system; *USA* is a dummy coded 1 for studies using US data, and 0 otherwise; *Time* is a dummy variable coded 1 if the sample period is post-2000, and 0 otherwise; and *Ln_sample* is the natural logarithm of the sample size reported in the respective studies.

The *t*-statistics are reported in parentheses.

to expect a negative and significant coefficient on *TIME* in the regression models, to support the fact that average ARL likely decreases in the post-2000 regime because of SEC-mandated filings regulations in the USA. However, this is not the case, as only three of the coefficients on *TIME* (two are negative) are significant. The bulk of the sample observations (94%) in our meta-analyzed studies represent the post-2000 regime. The number of non-USA studies during this period also proliferated, which may have dampened the expected negative relation assuming that many of those countries did not experience the dramatic reduction in filing deadlines as did some US companies.

4.4.2 | Corporate governance characteristics: Publication bias and the sources of bias

Table 6 presents the meta-regression results for the corporate governance variables. The coefficients of *SE* for *ACSIZE* and *BIND* variables are significant, as is the coefficient on *OWN*, thus confirming the presence of publication bias. The interactive coefficient *High* × *Se*, however, is significant for *BIND* alone (coefficient 3.82, *t*-statistic 2.55, significant at $p < 0.05$). In terms of sources of the publication bias, the coefficient on *USA* is negative and marginally significant for *ACSIZE*. None of the other coefficients on the *USA* dummy is significant. We could not include *Time* in the regression specification, because, except for *OWN_CON*, all the other studies on the association between governance characteristics and ARL use samples from the post-2000 period. The coefficient on *Ln_sample* is positive and marginally significant for *ACSIZE* alone (coefficient 3.57, t-statistic 1.81, significant at $p < 0.10$).

4.4.3 | Firm characteristics: Publication bias and the sources of bias

Finally, Table 7 reports the meta-regression results for publication bias and the possible sources of such bias for firm-specific variables. Ten out of the 13 coefficients on *Se* are statistically significant, implying the strong presence of publication bias. The coefficients range from a low of −3.23 (for *LITIGATION*) to a high of 2.52 (for *LOSS*). For most of the variables, the publication bias can be attributed to journal quality bias, as the interactive coefficients *High* × *Se* is significant for seven of the 13 firm-specific variables. Among the contextual variables, some of the coefficients on the interactive variables are significant

TABLE 7 Meta-regression results: firm-specific variables

	SIZE	SEGMENT	FOREIGN	MERGER	RESTATE	EI	INVREC	NEWS	LITIGATION	LOSS	PROFIT	BTM	LEV	BANKRUPT
Existence of bias														
Se	−1.76***	−1.28***	−0.93**	0.73***	2.16***	0.34	−0.00	4.45	−3.23***	2.52***	−2.45***	0.073	2.15***	2.20***
	[−3.45]	[−8.09]	[−2.21]	[3.61]	[3.59]	[1.67]	[−0.01]	[0.93]	[−6.55]	[10.44]	[−3.97]	[0.34]	[6.57]	[6.65]
Intercept	−0.04	0.51	0.02	−0.004	0.00	0.04	0.14	−0.02	0.19*	0.02	0.03	−0.19	0.01	−0.007
	[−1.04]	[3.91]	[0.46]	[−0.14]	[0.00]	[1.48]	[0.93]	[−0.20]	[1.99]	[0.41]	[0.19]	[−0.52]	[0.23]	[−0.19]
Adj R^2	0.12	0.56	0.16	0.54	0.41	0.03	0.00	0.00	0.53	0.63	0.29	0.00	0.49	0.66
F-stat	11.87***	65.53***	4.90**	13.04**	12.87**	2.78	0.00	0.87	42.89***	108.89***	15.75***	0.12	43.10***	44.22***
Sources of bias														
Se	−1.48***	−0.20	−0.08	0.76**	3.32	0.08	−1.32**	9.26***	−7.87***	2.04***	−5.51***	2.09	1.79***	1.54
	[−3.20]	[−0.67]	[−0.14]	[2.04]	[1.42]	[0.09]	[−2.29]	[12.25]	[−20.20]	[6.42]	[−6.58]	[0.44]	[3.55]	[0.39]
High × *Se*	1.24**	−1.35***	−1.88***	−0.06	−0.51	−0.85	2.35***	−10.82***	5.97***	0.53	5.03***	32.29	0.66	0.21
	[2.50]	[−3.90]	[−3.08]	[−0.16]	[−0.23]	[−1.00]	[3.12]	[−11.76]	[13.31]	[1.07]	[4.45]	[0.60]	[0.98]	[0.05]
USA	−1.36***	0.32	2.33**	0.29	—	1.59**	−0.11	0.09	−0.15	0.23	3.32	0.06	0.07	1.61***
	[−3.00]	[1.21]	[2.29]	[1.25]		[2.67]	[−0.47]	[1.16]	[−1.24]	[0.28]	[0.60]	[0.04]	[0.51]	[3.97]
Time	0.21	0.45	−1.84	−0.33	13.40	−0.37	—	0.007	0.03	−1.33	7.60	—	−0.02	−1.27**
	[0.40]	[1.43]	[−1.55]	[−1.20]	[1.67]	[−0.69]		[0.05]	[0.27]	[−1.41]	[0.75]		[−0.09]	[−2.40]
Ln_sample	−0.04	−0.11	0.23	0.08	−0.23	−0.32**	0.05	−0.01	−0.05*	0.43	−2.39	−0.29	0.02	−0.06
	[−0.28]	[−1.46]	[1.01]	[1.35]	[−0.33]	[−2.10]	[0.34]	[−0.19]	[−1.74]	[1.72]	[−1.26]	[−0.60]	[0.50]	[−0.50]
Intercept	0.27	0.64	−1.76	−0.57	−11.94	2.18**	−0.29	0.07	0.58***	−2.16	10.27	1.98	−0.20	0.56
	[0.32]	[1.28]	[−0.70]	[−1.28]	[−1.25]	[2.37]	[−0.21]	[0.20]	[3.03]	[−1.30]	[0.86]	[0.66]	[−0.58]	[0.65]
Adj. R^2	0.15	0.69	0.67	0.44	0.20	0.20	0.33	0.93	0.93	0.50	0.56	0.00	0.47	0.94
F-stat	3.84**	24.20***	9.61***	2.75	2.08	3.82**	2.46	33.51***	96.26***	13.82***	10.14***	0.48	8.55***	78.35***
N	77	52	21	12	19	58	12	14	37	62	37	8	45	25

***$p < 0.01$, **$p < 0.05$, *$p < 0.10$.

See Table 2 for variable definitions.

We follow Hay and Knechel (2017) in developing the test equations, which are derived from Stanley et al. (2008). Whether there is publication bias can be tested by examining whether the standard error in a set of studies is related to their results according to Equation (5). In executing the regression, we use the weighted least squares method. We then decompose the publication bias into four components using Equation (6). *High* is an indicator variable coded 1 for journals ranked A and A* as per the ABDC journal ranking system; *USA* is a dummy coded 1 for studies using US data, and 0 otherwise; *Time* is a dummy variable coded 1 if the sample period is post-2000, and 0 otherwise; and *Ln_sample* is the natural logarithm of the sample size reported in the respective studies.

The *t*-statistics are reported in parentheses.

for studies that used US samples; for example, the interactive coefficients are significant for *SIZE*, *FOREIGN*, *BANKRUPT*, and *EI*. The coefficients on *Ln_sample* are negative and significant for the *EI* and *LITIGATION* variables (coefficients −0.32 and − 0.05 respectively, significant at $p < 0.05$ and $p < 0.1$ respectively).

Taken together, the meta-regression results provide some support that publication bias affects reported results. In terms of the sources of such bias, journal quality appears to account for a large portion of the bias. The country effect in the form of the USA versus non-USA countries also accounts for some of the publication bias. However, choices of sample period, as well as the variation in the sample sizes, do not appear to account for the bias in any measurable way.

It is important to note that some of the meta-analyzed studies, while investigating the effects of a main variable on the ARL, used the variables listed so far as the control variables. For example, L. H. Chan et al. (2012) investigated the association between firm-initiated clawback provision and ARL while controlling many of the audit, governance, and firm-specific characteristics. We list those studies in the Appendix.

5 | CONCLUSION

This paper uses a standard meta-analysis technique to identify the explanatory variables for audit report timeliness. Both the accounting and auditing research suggests that audit report timeliness conveys important information regarding audit efficiency to a host of corporate stakeholders. Audit report timeliness is a fundamental component of reporting quality. Empirical research has shown that audit report timeliness reduces information asymmetry (Givoly & Palmon, 1982) and enhances the quality of information that affects firm value (Beaver, Lambert, & Morse, 1980). More conclusive evidence of factors that affect audit report timeliness will assist the process of providing relevant information in a timely fashion, which is the primary objective of auditor reporting.

We aggregate results statistically across 88 published results and a sufficiently large number of explanatory variables. We categorize the potential determinants of audit report timeliness into (a) auditor or engagement characteristics, (b) corporate governance characteristics, and (c) firm-specific characteristics. We provide statistical evidence that audit-related variables that increase the ARL include audit fees, audit opinion, auditor change, auditing season, and ICW variables, whereas NAFs reduce ARL. With respect to corporate governance characteristics, we find that firms with a high proportion of independent board members and firms with ownership concentration have short ARLs. On the other hand, firms where a CEO also serves as the chairman of the board experience relatively longer ARLs. Finally, firm-level characteristics across a number of studies provide generally consistent evidence that firm complexity and risk increase the ARL, whereas profitability reduces it.

We contribute to the auditing literature by applying a meta-analysis technique to an important audit output variable, ARL. We offer a quantitative generalization of the determinants of ARL from a sample of empirical studies across many jurisdictions and for different time periods. We further enrich the meta-analysis in the auditing literature by applying a meta-regression technique to determine the presence or absence of publication bias and decomposing the bias into journal quality bias and bias due to some contextual settings.

This research suggests a number of future research opportunities. First, the number of studies investigating the association between auditor industry specialization and ARL is small. Gul, Wu, and Yang (2013) show that individual auditors affect the quality of the audit. We encourage more research on the association between office- or partner-level specialization and ARL. Second, although the policymakers emphasize strengthening corporate governance regulation to improve the audit quality, we found very few studies on this important issue. We propose further research on different facets of audit committee governance; for example, the role of the audit committee chair on ARL. Third, SOX (2002) mandates that publicly listed firms should appoint at least one audit committee member with financial expertise. The definition indicates that an audit committee member can be designated a financial expert if he or she has accounting expertise or certain types of nonaccounting expertise, such as investment banking, financial analysis, CEO status, or company president status. Further research could focus on understanding the effectiveness of this flexible audit committee expertise. Fourth, we suggest additional research to understand the ARL for family-controlled firms. The study of ARL in different structures of ownership concentration is also encouraged.

ACKNOWLEDGEMENTS

We appreciate many helpful comments provided by two anonymous reviewers.

ENDNOTES

[1] "Accelerated" filers are defined as those firms that (a) have a common equity public float of $75 million or more as of the firm's most recently completed second fiscal quarter, (b) have been subject to the Securities Exchange Act of 1934 reporting requirements for at least 12 calendar months, (c) have previously filed a 10-K, and (d) are not a "small business" as defined in Rule 12b-2 of the 1934 Act (SEC, 2005).

[2] The SEC further reduced the filing deadline from 75 days to 60 days for the largest filers (those with a public float in excess of $700 million) in December 2006 (SEC, 2005).

[3] Academic studies on industry specialization, however, suffer from the inappropriately defined measurement of "specialization." Furthermore, it is not clear whether national, city-level, or office-level specializations matter for audit quality. Some recent evidence also questions the maintained assumption that Big 4 and industry-specialist auditors provide superior audit services compared with non-Big 4 and nonspecialist auditors. Lawrence, Minutti-Meza, and Zhang (2011) argue that quality of audit does not depend on Big 4 vs. non-Big 4 affiliations because of their similar regulatory environment and auditing standards. Louis (2005) argues that non-Big 4 firms have superior knowledge of the local market and better relations with their clients. Aligning with this argument, Fung, Gul, and Krishnan (2012) provide evidence of auditor economies of scale at city level, as well as evidence that firms audited by city-specialist auditors have lower information risk (Li, Xie, & Zhou, 2010)

[4] http://www.abdc.edu.au/pages/abdc-journal-quality-list-2013.html

[5] The remaining three results used "%ΔNumber of days from the FYE to ARD," "ΔNumber of days from the FYE to ARD," and "Sqrt_of the number of days from the FYE to ARD." We did not include these studies in our meta-analysis as the very different nature of the dependent variable may bias the results.

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How to cite this article: Habib A, Bhuiyan MBU, Huang HJ, Miah MS. Determinants of audit report lag: A meta-analysis. *Int J Audit*. 2018;1–25. https://doi.org/10.1111/ijau.12136

APPENDIX A
EXAMAPLE OF META-ANALYSIS STUDIES INVESTIGATING THE EFFECTS OF A MAIN VARIABLE ON THE ARL BUT CONTROLLING FOR THE META-ANALYZED VARIABLES

Reference	Variables	Findings
Newton and Ashton (1989)	Structured or unstructured audit approaches	Newton and Ashton (1989) argued that efficiency on structured or unstructured audit approaches affects audit report lag (ARL). They use a survey technique to measure a categorical variable for audit structure and assign values of 1 if unstructured audit technology, 2 if intermediate, and 3 is assigned when audit technology is structured. Wan-Hussin and Bamahros (2013) examined the association between investment in the internal audit functions (IAFs) and audit report delay.
Masli, Peters, Richardson, and Sanchez (2010)	Internal control monitoring (ICM) technology	Implementation of internal control monitoring technology is associated with smaller increases in audit delays during the post-SOX time period. *SOX ICM* is an indicator variable specified as 1 if the firm announced implementation of SOX-related ICM technology in year *t*, and 0 otherwise. The authors also decomposed SOX ICM into two separate indicator variables: *SOX ICM Transform* and *SOX ICM Comply*.

(Continued)

Reference	Variables	Findings
Habib and Bhuiyan (2011)	International Financial Reporting Standards (IFRS)	Habib and Bhuiyan (2011) argued that firms reporting under IFRS for the first time are expected to increase the ARL because new financial reporting requirements increase the amount of work auditors have to do to ensure compliance with the new standards.
Abbott et al. (2012)	Internal audit environment	Abbott et al. (2012) suggested that difference characteristics on internal audit environment, such as the extent of internal control reliance, coordination with the external auditor, and the investment in internal audit quality, affect external audit reporting timeliness. They examined and give evidence for a negative association between internal audit assistance and ARL.
L. H. Chan et al. (2012)	Clawback provision	Chan et al. (2012) argued that clawback initiation helps auditors distinguish clients with a lower likelihood of financial misstatement and, in turn, lower audit risk, resulting in lower audit effort and audit reporting lag. They evidenced a shorter ARL for firms adopting clawback provision.
Kim et al. (2013)	Enterprise resource planning (ERP)	Kim et al. (2013) argued that ERP enables a company to manage resources more efficiently and effectively and provides an integrated solution for the organization's information-processing needs, which helps more effective external audit results in lower audit report delay. However, Kim et al. (2013) found that the benefit of ERP is not immediate, occurring, rather, in the fourth or fifth year following the initial ERP installation.
Walker and Hay (2013)	IFRS	Positive but insignificant association between IFRS and ARL.
Fang et al. (2014)	Analyst coverage	Fang et al. (2014) argued that audit risk is lower when analyst coverage is more and evidence a negative association between analyst coverage and ARL.
Habib (2015)	New Chinese Accounting Standards (CAS)	China's Ministry of Finance formally issued the new CAS on February 15, 2006. With the exception of a few modifications made to reflect the country's unique environment, the new standards are substantially in line with IFRS, and cover most of the topics therein. They came into effect for listed firms on January 1, 2007. Habib (2015) found that ARL increases following the implementation of ARL.
Mitra et al. (2015)	Auditing Standard No. 5 (AS-5)	Mitra et al. (2015) investigated the impact of AS-5 on ARL both for the firms with material internal control weakness and firms with a clean Sarbanes–Oxley 404 opinion and evidence that ARL is less following the implementation of AS-5. This standard allows auditors to focus on critical risks and related internal control issues and increase efficiency of public company audits with less time and cost.
Harjoto et al. (2015)	Chief executive officer (CEO) demographic characteristics	Harjoto et al. (2015) use CEO demographic characteristics to examine its impact on ARL and argues that CEO could lose their jobs and face potential legal and reputational cost in the event of delayed audit reporting.
Pizzini et al. (2015)	Internal audit function Quality and contribution	The authors developed a comprehensive proxy for IAF quality, including different aspects of IAF quality (e.g., competence, objectivity, fieldwork rigor), and the nature of the IAF's contribution to financial statement audits (independently performed work and direct assistance). Results indicate that IAF quality reduces ARL and that this is primarily driven by IAF competence and fieldwork quality.
Mohammad Rezaei & Mohd-Saleh (2017)	Private versus state audit firms	Mohammad Rezaei & Mohd-Saleh (2017) found a shorter ARL for private audit firms compared with state auditors. They also emphasized that audit market competition improves the quality auditor's results in lower ARL.
Huang et al. (2017)	Workplace environment	Huang et al. (2017) examined the workplace environment and auditing outcome and find that auditor takes longer time to complete auditing procedures when firm exhibits more negative workplace environment.
Meckfessel and Sellers (2017)	Big 4 consulting services	Consulting practice size has a positive and statistically significant influence on ARL and restatement rate.