The determinants of audit report lag: a meta-analysis

Giselle Durand
Lazaridis School of Business and Economics, Wilfrid Laurier University, Waterloo, Canada

Abstract

Purpose – The purpose of this paper is to further the understanding of the determinants of audit report lag, which is the number of days from a company's fiscal year-end to the date of its auditor's report, by synthesizing extant literature. Audit report lag has been a variable of interest in many studies due to its use as a proxy for the occurrence of auditor-client management negotiations and audit efficiency and because long audit report lags delay the release of earnings information to the market.

Design/methodology/approach – The author uses meta-analysis to examine commonly identified predictors of audit report lag to determine if the prior research provides a consistent portrayal of audit report lag drivers.

Findings – The author finds that a number of variables relating to client profitability and financial condition, client complexity and audit opinion modifications increase audit report lag. In addition, audit report lag decreases with client size, when clients have positive earnings news to report and when the auditor has long tenure and provides non-audit services. Several variables, such as those relating to corporate governance and various auditor characteristics, have been little explored and would benefit from future research.

Originality/value – These results will be useful to researchers when selecting control variables for future audit report lag studies and provide insights into the key factors that contribute to the delay in audit reporting.

Keywords Meta-analysis, Audit report lag, Audit delay

Paper type Literature review

1. Introduction

The purpose of this paper is to further our understanding of the determinants of audit report lag (ARL), which is the number of days from a company's fiscal year-end to the date of its auditor's report (Ashton *et al.*, 1987; Knechel and Payne, 2001), by synthesizing extant literature. ARL has been a variable of interest in many studies because the length of time to complete a financial statement audit significantly influences the timing of the release of corporate financial reports (Givoly and Palmon, 1982; Pizzini *et al.*, 2015), and the delayed release of financial reports can increase information asymmetry in the market (Bamber *et al.*, 1993) and can reduce the relevance of the financial statements (Whitworth and Lambert, 2014). In fact, ARLs have been increasing since the implementation of the Sarbanes-Oxley 404 requirements, resulting in many companies choosing to release financial information prior to the audit report date (Krishnan and Yang, 2009). This impacts the reliability of the information that investors use to make investment decisions. Additionally, ARL has been

JEL classification – M4

The author gratefully acknowledges Efrim Boritz and Bradley Pomeroy for their assistance in identifying an appropriate scope for this paper and possible moderating variables. The author also thanks Carolyn MacTavish for assisting with the classification of variables and to two anonymous reviewers for valuable feedback on the structure and content of the paper.

Managerial Auditing Journal
Vol. 34 No. 1, 2019
pp. 44-75

0268-6902
DOI 10.1108/MAJ-06-2017-1572

used in prior research as an indication that auditor-client management (ACM) negotiations over financial reporting issues occurred (Salterio, 2012) and as a proxy for audit efficiency and/or audit effort (Bamber *et al.*, 1993; Knechel and Payne, 2001; Mitra *et al.*, 2015). Given the variety of uses of ARL in auditing and accounting research, it is important to understand the drivers of ARL to determine if this measure is indeed a good proxy for the occurrence of ACM negotiations and audit efficiency and to provide insights that might help researchers and practitioners work toward solutions to reduce these lags.

Research on the determinants of ARL began in the 1970s and has evolved significantly since that time. I use meta-analysis to examine commonly identified predictors of ARL to determine if the prior research provides a consistent portrayal of ARL drivers. I find consistent results across studies for many predictors. However, I also find that several frequently used independent variables do not have significant relationships with ARL once combined, such as audit firm size and several variables that remain inconclusive. For example, I show that auditor business risk, as proxied by measures of client profitability and financial condition, increases audit delay. I also find that client complexity, as measured by business segments and client industry, increases audit delay. These findings are consistent with the argument that auditor business risk is positively related to audit risk (Johnstone, 2000), and each of these factors is likely to increase audit risk, resulting in more audit work and greater ARLs. I also find an increase in ARLs for companies that received modified audit opinions. Given that modifications to the auditor's report are likely to come after lengthy ACM negotiations, this finding supports the use of ARL as a proxy for the occurrence of such negotiations. My meta-analysis results also confirm that ARLs are shorter for large companies, for companies that have good earnings news to report and for companies with long auditor tenure and knowledgeable auditors (as proxied by non-audit fees). I also find, however, that the relationship between corporate governance and ARL is difficult to conclude on from the existing literature, and that more research is needed in this and other areas relating to client industry and auditor characteristics.

The remainder of this paper is organized as follows. Section 2 outlines prior research on ARL, describes my literature search and sample selection techniques and provides a comprehensive list of variables that have been examined in prior studies. Section 3 discusses my approach to performing the meta-analysis. Section 4 presents a discussion of results for the various determinants of ARL, and Section 5 concludes and suggests areas for future research.

2. Prior research

ARL is the number of days from a company's fiscal year-end to the date of its auditor's report (Ashton *et al.*, 1987; Knechel and Payne, 2001). Knechel and Payne (2001) identify that overall ARL is the sum of three components: scheduling lag, fieldwork lag and reporting lag. Scheduling lag is the time from the company's year-end date to the start of audit fieldwork, fieldwork lag is the time spent completing the fieldwork and reporting lag is the time between the end of fieldwork and the audit report date. For public companies registered with the Securities and Exchange Commission (SEC) in the US, the audit report is dated "no earlier than the date on which the auditor has obtained sufficient appropriate evidence to support the auditor's opinion" (PCAOB, 2002). As the audit report date for US public companies coincides with the end of fieldwork lag, this suggests that the reporting lag component of ARL is minimal for these companies. In addition, proprietary audit engagement data suggest that the fieldwork lag component of ARL is negatively related to the proportion of audit work that is performed before year-end (Knechel and Payne, 2001; Ashton *et al.*, 1987).

Accounting researchers have taken great interest in studying ARL for several reasons. First, the length of time to complete a financial statement audit significantly influences the timing of the release of corporate financial reports (Givoly and Palmon, 1982; Pizzini *et al.*, 2015). In the US, companies cannot file their financial statements with the SEC before the date of the auditor's report (Lambert *et al.*, 2011), so ARL impacts the timeliness of 10-K filings. Longer ARLs, and therefore delays in the release of financial reports, have several implications. First, untimely release of financial reports can reduce investor confidence (Ettredge *et al.*, 2006) because unexpectedly late earnings releases signal bad news to the markets (Chambers and Penman, 1984). For example, Givoly and Palmon (1982) provide evidence that earnings information is released later when earnings are below expectation than when they exceed expectation, and Chambers and Penman (1984) show that unexpectedly late earnings releases are associated with negative abnormal returns. Second, delayed release of financial reports can increase information asymmetry in the market (Bamber *et al.*, 1993) and "affect the level of uncertainty associated with decisions based on the reported information" (Ashton *et al.*, 1987, p. 275). Finally, delayed release of financial information influences the relevance of the information contained in the annual financial statements (Whitworth and Lambert, 2014). It used to be that most companies waited until on or after the audit report date to release any earnings information (Bamber *et al.*, 1993), and Givoly and Palmon (1982) show less pronounced stock price movements for late earnings releases. However, ARLs have been increasing since the implementation of Sarbanes-Oxley (SOX) 404 requirements, which seems to have compelled most companies to release unaudited earnings announcements prior to the audit report date (Krishnan and Yang, 2009). This trend further reduces the relevance of the audited financial statements.

The second reason that accounting researchers have taken an interest in ARL is because the ACM negotiations literature provides evidence that ACM negotiations about the contents of the financial statements and/or the audit report can be a substantive source of audit delay (Salterio, 2012). For example, Habib (2013) finds a strong positive association between ARL and modified audit opinions, suggesting that longer audit delays imply increased audit work and/or lengthy ACM negotiations[1]. In addition, Hay *et al.* (2006, p. 177) note that "a longer [audit] delay is likely to indicate problems during the course of the audit, difficulties in resolving sensitive audit issues, or more complex financial reports to prepare" and thus find a consistent positive association between audit fees and ARL. These findings suggest that ARL is a reasonable "proxy for the probability of ACM negotiations occurring" (Salterio, 2012, p. 274).

Finally, ARL has been used in prior research as a proxy for audit efficiency and/or audit effort (Bamber *et al.*, 1993; Knechel and Payne, 2001; Mitra *et al.*, 2015). Knechel *et al.* (2009) develop a theoretical model of audit production and use this to calculate an efficiency score for a sample of audits, using proprietary audit engagement data from an accounting firm. Using this score, they find that ARL could be considered a reasonable proxy for unusual audit effort, which supports the argument that ARL serves as an indicator of the occurrence of ACM negotiations. Their analysis also shows that ARL is not a strong proxy for audit efficiency. However, given that ARL is considered to be one of the only externally observable indications of audit efficiency (Bamber *et al.*, 1993), a large volume of research examining the determinants of ARL has evolved. These studies typically use linear regression techniques, regressing ARL on a number of factors hypothesized to either increase or decrease audit delay. A typical model resembles the following:

$$\mathrm{ARL}_i = \alpha_0 + \alpha_1 \mathrm{Size}_i + \Sigma \alpha_k \mathrm{Control}_{ik} + \Sigma \alpha_e \mathrm{Test}_{ie} + e_i$$

where ARL_i is either the raw measure of ARL or the natural logarithm of ARL for company i. Size of company i is most typically measured using the natural logarithm of total assets,

and $Control_i$ and $Test_i$ are vectors of control and test variables, respectively[2]. The hypothesized relationships between the test variables and ARL are deemed supported when α_e are significant in the predicted direction. While researchers began examining ARL during the 1970s (Dyer and McHugh, 1975; Courtis, 1976; Gilling, 1977), studies modeling the relationship between ARL and its determinants in the manner explained above began in the 1980s (Givoly and Palmon, 1982; Ashton *et al.*, 1987), and the the population of possible ARL determinants has grown from there.

To perform this meta-analysis, I searched ABI/Inform for published studies on ARL using key words related to ARL[3]. I then read the bibliographies of each study that I found through this search to identify any additional studies. This entire search process yielded 68 published studies, spanning the period from 1975 to 2017, that examine the determinants of ARL. These studies include companies from 14 different countries, including the US, Canada, Australia and New Zealand, to name a few. For the purposes of this meta-analysis, I eliminate studies that do not use regression analysis of the form outlined above to test ARL determinants and studies that focus on non-public companies (such as municipalities and not-for-profit entities)[4]. This process resulted in 46 studies being included in this meta-analysis. Panel A of Table I summarizes the papers included in this meta-analysis, and Panel B lists the journals where these papers have been published. Some papers published separate analyses for various subsamples, without reporting combined results. For these studies, I included each subsample as a separate analysis, resulting in a total of 68 analyses being included in this study.

Table II lists the ARL determinants that have been tested in the 46 studies included in this meta-analysis. There are many variables that have been used in a large number of studies, and these are the variables that I have included in my analysis. I excluded variables that have been used in less than four analyses, as these variables tended to be found within a single study with multiple analyses. I also excluded a very small number of results where the same underlying data were used more than once in a study for a given variable. For example, Blankley *et al.* (2014) include both the natural logarithm of total assets and the quadratic effect of this variable as measures of client size in their study, which would result in using the same set of data twice when analyzing client size. Therefore, I included only the non-quadratic term as this is consistent with all of the other published studies.

There are 126 independent variables that have been used in these studies as determinants of ARL. Using my own judgment, which I developed from reading the studies subject to this meta-analysis, I have grouped them into eight categories falling under three themes that were adapted from the framework proposed by Bamber *et al.* (1993)[5]. In this framework, ARL is hypothesized to be a function of the extent of audit work to be performed; incentives for timely reporting; and audit technology. This third component of Bamber *et al.*'s (1993) framework captures "the degree to which the auditor employs a structured audit approach" (p. 3). Variables related to audit firm technology were used in several early ARL studies but have not been used in many years. However, many ARL studies identify auditor-specific variables that can influence ARL. Therefore, I have adapted this final component into the theme "auditor characteristics".

2.1 The extent of audit work to be performed

Bamber *et al.*'s (1993) framework suggests that the extent of audit work to be performed is impacted by auditor business risk, complexity and other work-related factors, such as corporate governance, audit opinion type and miscellaneous factors relating to the client's financial statements. Therefore, I have grouped the variables from the extant ARL literature relating to the extent of audit work to be performed into the following five categories:

Authors	Date	Journal*	Subsample	Period	Sample size
Panel A: Studies using ARL as a dependent variable					
Abbott, L J., S. Parker, and G. F. Peters	2012	*AJPT*		2005	134
Afify, H. A. E.	2009	*JAAR*		2007	85
Al-Ajmi, J.	2008	*AAIAIA*		1992-2006	231
Al-Ghanem, W., and M. Hegazy***	2011	*EBR*	Year	2006	149
Al-Ghanem, W., and M. Hegazy***	2011	*EBR*	Year	2007	177
Apadore, K., and M. M. Noor	2013	*IJBM*		2009-2010	134
Ashton, R. H., J. J. Willingham, and R. K. Elliott***	1987	*JAR*		1982	488
Ashton, R. H., J. J. Willingham, and R. K. Elliott***	1989	*CAR*	Year	1977	465
Ashton, R. H., J. J. Willingham, and R. K. Elliott***	1989	*CAR*	Year	1978	465
Ashton, R. H., J. J. Willingham, and R. K. Elliott***	1989	*CAR*	Year	1979	465
Ashton, R. H., J. J. Willingham, and R. K. Elliott***	1989	*CAR*	Year	1980	465
Ashton, R. H., J. J. Willingham, and R. K. Elliott***	1989	*CAR*	Year	1981	465
Ashton, R. H., J. J. Willingham, and R. K. Elliott***	1989	*CAR*	Year	1982	465
Bamber, M. E., L. S. Bamber, and M. P. Schoderbek	1993	*AJPT*		1983-1985	2,916
Blankley, A. I., D. N. Hurtt, D. N., and J. E. MacGregor***	2014	*AJPT*		2004-2007	7,034
Bonson-Ponte, E., T. Escobar-Rodriguez, and C. Borrero-Dominguez	2008	*IJA*		2002-2005	403
Carslaw, C. A. P. N., and S. E. Kaplan***	1991	*ABR*	Year	1987	245
Carslaw, C. A. P. N., and S. E. Kaplan***	1991	*ABR*	Year	1988	206
Chan, K. H., V. W. Luo, and P. L. L. Mo***	2016	*ABR*		2004-2010	4,025
Dao, M., and T. Pham	2014	*MAJ*		2008-2010	7,291
Daoud, K. A. A., K. N. I. K. Ismail, and N. A. Lode	2014	*ASoS*		2012	114
Ettredge, M. L., C. Li, and L. Sun	2006	*AJPT*		2003-2004	4,688
Givoly, D., and D. Palmon***	1982	*TAR*	Year	1973	142
Givoly, D., and D. Palmon***	1982	*TAR*	Year	1974	149
Habib, A.	2015	*IJA*		2003-2011	9,781
Habib, A., and B. U. Bhuiyan	2011	*JIAAT*		2004-2008	502
Harjoto, M. A., I. Laksmana, and R. Lee***	2015	*MAJ*		2000-2010	12,153
Henderson, B. C., and S. E. Kaplan	2000	*AJPT*		1988-1993	558
Hitz, J-M., P. Low, and M. Solka	2013	*DB*		2009	269
Jaggi, B, and J. Tsui***	1999	*ABR*		1991-1993	393
Knechel, W. R., and D. S. Sharma***	2012	*AJPT*		2000-2003	5,004
Knechel, W. R., and J. L. Payne	2001	*AJPT*		1991	226
Krishnan, J., and J. S. Yang***	2009	*AH*		2001-2006	8,358
Lee, H-Y., V. Mande, and M. Son	2008	*JIFMA*		2000-2004	9,555
Lee, H-Y., V. Mande, and M. Son	2009	*IJA*	Year	2000	1,704
Lee, H-Y., V. Mande, and M. Son	2009	*IJA*	Year	2001	2,661
Lee, H-Y., V. Mande, and M. Son	2009	*IJA*	Year	2002	3,172
Lee, H-Y., V. Mande, and M. Son	2009	*IJA*	Year	2003	3,547
Lee, H-Y., V. Mande, and M. Son	2009	*IJA*	Year	2004	3,681
Lee, H-Y., V. Mande, and M. Son	2009	*IJA*	Year	2005	3,708
Lee, L., J. Whitworth, and S. Hermanson***	2015	*RBIS*		2004-2006	580
Leventis, S., P. Weetman, and C. Caramanis	2005	*IJA*		2000	171
Mao, M. Q., and Y. Yu***	2015	*JBFA*		2000-2010	5,371

(*continued*)

Table I.
Overview of studies included in this meta-analysis

Authors	Date	Journal*	Subsample	Period	Sample size
Masli, A., G. F. Peters, V. J. Richardson, and J. M. Sanchez1	2010	*TAR*		2003-2006	14,793
Mitra, S., H. Song, and J. S. Yang	2015	*AH*		2006-2011	11,262
Mohamad-Nor, M. N., Shafie, R. and Wan-Hussin, W.N.	2010	*AAMJAF*		2002	628
Munsif, V., K. Raghunandan, and D. V. Rama	2012	*AJPT*	Accelerated Filers	2008	2,003
Munsif, V., K. Raghunandan, and D. V. Rama	2012	*AJPT*	Non-Accelerated Filers	2008	836
Munsif, V., K. Raghunandan, and D. V. Rama	2012	*AJPT*	Accelerated Filers	2009	1,973
Munsif, V., K. Raghunandan, and D. V. Rama	2012	*AJPT*	Non-Accelerated Filers	2009	866
Newton, J. D., and R. H. Ashton***	1989	*AJPT*	Year	1978	307
Newton, J. D., and R. H. Ashton***	1989	*AJPT*	Year	1979	311
Newton, J. D., and R. H. Ashton***	1989	*AJPT*	Year	1980	322
Newton, J. D., and R. H. Ashton***	1989	*AJPT*	Year	1981	333
Newton, J. D., and R. H. Ashton***	1989	*AJPT*	Year	1982	333
Newton, J. D., and R. H. Ashton***	1989	*AJPT*	Year	1979	311
Newton, J. D., and R. H. Ashton***	1989	*AJPT*	Year	1980	322
Newton, J. D., and R. H. Ashton***	1989	*AJPT*	Year	1981	333
Newton, J. D., and R. H. Ashton***	1989	*AJPT*	Year	1982	333
Ng, P. P. H., and B. Y. K. Tai***	1994	*BAR*	Year	1990	260
Ng, P. P. H., and B. Y. K. Tai***	1994	*BAR*	Year	1991	292
Pizzini, M., S. Lin, S., and D. E. Ziegenfuss	2015	*AJPT*		2000-2004	293
Schwartz, K. B., and B. S. Soo	1996	*CAR*		1988-1993	1,800
Sharma, D. S., P. N. Tanyi, and B. A. Litt2	2017	*AJPT*		2004-2011	2,456
Sultana, N., H. Sing, and J-L. W. M. Van der Zahn	2015	*IJA*		2004-2008	494
Tanyi, P., K. Raghunandan, and A. Barua2	2010	*AH*	Year	2002	318
Tanyi, P., K. Raghunandan, and A. Barua2	2010	*AH*	Year	2003	309
Walker, A., and D. Hay	2013	*MEDAR*		2004-2005	260
Wan-Hussin, W. N., and H. M. Bamahros	2013	*JCAE*		2009	432
Whitworth, J. D., and T. A. Lambert***	2014	*AJPT*		2003-2008	14,948
Xu, Y., E. Carson, N. Fargher, and L. Jiang	2013	*AF*		2005-2009	5,491
Yaacob, N. M., and A. Che-Ahmad***	2012	*IJEF*		2005-2008	2,440

Panel B: Journals publishing articles included in this meta-analysis

Abbreviation	Journal**	No. of publications
AAIAIA	Advances in Accounting, Incorporating Advances in International Accounting	1
AAMJAF	Asian Academy of Management Journal of Accounting and Finance	1
ABR	Accounting and Business Research	3
AF	Accounting and Finance	1
AH	Accounting Horizons	3
AJPT	**Auditing: A Journal of Practice and Theory**	**12**
AsoS	Asian Social Science	1
BAR	British Accounting Review	1
CAR	**Contemporary Accounting Research**	**2**
DB	Die Betriebswirtschaft	1
EBR	Eurasian Business Review	1
IJA	The International Journal of Auditing	5
IJBM	International Journal of Business and Management	1
IJEF	International Journal of Economics and Finance	1

(*continued*)

Table I.

JAAR	Journal of Applied Accounting Research	1
JAR	**Journal of Accounting Research**	**1**
JBFA	Journal of Business Finance and Accounting	1
JCAE	Journal of Contemporary Accounting and Economics	1
JIAAT	Journal of International Accounting, Auditing and Taxation	1
JIFMA	Journal of International Financial Management and Accounting	1
MAJ	Managerial Auditing Journal	2
MEDAR	Meditari Accountancy Research	1
RBIS	Review of Business Information Systems	1
TAR	**The Accounting Review**	**2**

Notes: *Journal names are defined in Panel B; **Journals in bold are either American Accounting Association (AAA) section journals or top five journals from the Google Scholar journal rankings; ***dependent variable: natural log of ARL; [1]dependent variable: percentage change in ARL from year t to year $t + 1$; [2]dependent variable: square root of ARL

Table I.

(1) auditor business risk;
(2) complexity;
(3) corporate governance;
(4) audit opinion; and
(5) other work-related factors.

2.1.1 Auditor business risk. Auditor business risk is "the risk that the audit firm will suffer a loss resulting from the engagement (e.g. as proxied by engagement profitability and potential litigation)" (Johnstone, 2000, p. 4). Johnstone (2000) finds that auditors' assessment of audit risk (the risk of issuing a clean opinion on materially misstated financial statements) is positively associated with their assessment of auditor business risk, and that increased audit risk results in more audit work. This supports the link between auditor business risk and ARL proposed by Bamber *et al.* (1993), as more audit work should lengthen fieldwork lag. Bamber *et al.* (1993) argue that auditor business risk is influenced primarily by 1) the client's financial condition, which is consistent with the positive association that Johnstone (2000) identified between client business risk and auditor business risk, and the ownership concentration of the client. They argue that widely held corporations are more subject to litigation as more investors rely on the audited financial statements. Therefore, I have included variables relating to the client's financial condition and ownership structure in the category "auditor business risk". I have also included variables relating to audit fees in this category, as Hay *et al.* (2006) find associations between audit fees and variables relating to client business risk and ownership structure.

2.1.2 Complexity. Complexity is influenced by the number of business segments and the industry in which the client operates (Bamber *et al.*, 1993, p. 3) and is likely to impact audit risk and therefore the extent of work to be performed. Hay *et al.* (2006) find client complexity to be positively associated with audit fees, which are in turn positively associated with ARL. As a result of these relationships, many studies have included various measures of complexity as ARL determinants. Therefore, I have included variables relating to business segments and client industry in the category "audit complexity".

2.1.3 Corporate governance, audit opinion and other work-related factors. The strength of the client's corporate governance can influence auditors' control risk assessments and planned audit procedures (Cohen and Hanno, 2000), both of which can impact ARL. Therefore, variables relating to the audit committee and board of directors of the clients have been grouped into the category "corporate governance". In addition, ARL has been

Category	Variable*	Total no. of analyses	Results excluded due to lack of independence
Variables relating to the extent of audit work to be performed			
Auditor business risk	Loss avoidance	1	
	Loss	*46*	1
	Total asset turnover	2	
	ROA	*21*	
	Negative ROA	1	
	Return on equity	1	
	Leverage	*30*	
	Financial condition index	*15*	
	Bankruptcy	1	
	Zscore	3	
	Contingencies	*12*	5
	Uncertainty	2	
	Book to market value of equity	3	
	Market to book value of equity	2	
	Dividend change	1	
	Dividend yield	1	
	Cash flow forecast	1	
	Receivables and inventory to total assets	*4*	
	Inventory to total assets	2	
	Receivables	1	
	Current assets	1	
	Current ratio	3	
	Quick ratio	2	
	Liquidity risk	1	
	Discretionary accruals	2	
	Total accruals	1	
	Goodwill	1	
	Age of company	3	
	Institutional ownership	*6*	
	Shareholders owning > 5% of outstanding shares	1	
	Inside ownership	1	
	Family ownership	1	
	Government ownership	2	
	Single owner	2	
	Ownership concentration	*11*	
	Tradeable shares	1	
	Total audit fees	*19*	
	Abnormal audit fees	*7*	
	Hourly audit fees	1	
	Restatement	*16*	1
Audit complexity	*Reportable segments*	*25*	
	Cross-listed	2	
	Defined benefit pension plan	1	
	Financial complexity	1	
	Financing raised	1	
	Foreign activity[1]	1	
	Foreign listing	1	
	Foreign operations	*11*	
	Subsidiaries	*10*	
	Geographic segments	*4*	
	Mergers and acquisitions	*8*	

(*continued*)

Table II. Summary of independent variables used in ARL research (68 analyses in total)

Category	Variable*	Total no. of analyses	Results excluded due to lack of independence
	Operational complexity	1	
	Reporting complexity	1	
	Voluntary IFRS adoption	1	
	High growth industries	*4*	
	High IT capabilities	1	
	High litigation industries	*4*	
	High-tech industries	*10*	
	Financial industry	*31*	5
	Miscellaneous other industries	12	
Governance	*Audit committee financial reporting experience*	*4*	
	Audit committee independence	*4*	
	Audit committee meetings	*4*	
	Audit committee size	*4*	
	Other audit committee characteristics[2]	11	
	Board independence	*8*	
	Board meetings	2	
	Board size	*5*	
	Board tenure	1	
	CEO Duality	*6*	
	Other CEO characteristics[3]	6	
Opinion	Consistency exception	1	
	Emphasis of matter or disclaimer of opinion	1	
	Going concern opinion	*19*	
	Qualified opinion	*42*	5
	Unqualified opinion	2	
	Material internal control weakness	*13*	
	Type of material internal control weakness[4]	5	
Other	*Busy season (December-March year ends)*	*35*	5
	March-June year ends	*6*	
	Not busy season	2	
	Client delays	1	
	Discontinued operations	1	
	Extraordinary item	*44*	5
	Sales growth	*4*	
	Electronic data processing complexity	1	
	Internal audit involvement[5]	11	
	Internal control quality	2	
	Restructuring charges	2	
	Special items	3	
Variables relating to incentives for timely reporting			
Size	*Total assets*	*59*	5
	Total sales	*4*	
	Accelerated filer	*6*	
	Large accelerated filer	*4*	
	Market capitalization	1	
	Price to earnings ratio	1	
	Regulatory status	1	
	Relative size	1	
	Trading volume	1	

(*continued*)

Table II.

Category	Variable*	Total no. of analyses	Results excluded due to lack of independence
Earnings news	Bad earnings news	3	
	Good earnings news	3	
	Earnings surprise	1	
	Change in earnings	*21*	
	Decrease in earnings per share	1	
	Change in ROA	1	
Variables relating to auditor characteristics			
Auditor characteristics	*Audit firm size*	*40*	
	Auditor office size	2	
	Long auditor tenure	*8*	
	Short auditor tenure	*8*	
	Auditor tenure	*7*	1
	Changed auditor	*16*	
	Changed auditor early in the year	1	
	Changed auditor late in the year	1	
	Changed to auditor with unstructured approach	1	
	Non-audit fees[6]	*12*	
	Auditor industry specialist	*6*	1
	Auditor provides advisory services	1	
	Auditor provides tax services	1	
	Auditor independence	2	
	Former Arthur Andersen client	4	
	Client importance	1	
	Interim work performed	4	2
	Partner hours on engagement	1	
	Partner rotated during the year	1	
	Reliance on other auditors	2	
	Structured audit approach	9	

Notes: *Variables in italic are included in the meta-analysis in Table III. [1]Foreign activity is a continuous variable measured based on the number of foreign offices. It is measured differently than the foreign operations variable, which is an indicator variable and has thus been considered separately from 'foreign operations'. [2]Other audit committee characteristics includes variables relating to the composition of the committee (such as female and ethnic minority members or chair), various types of experience of board members (auditing, consulting, etc.) and qualitative assessments of audit committee effectiveness. At most, two studies used these variables; therefore, they are excluded from the meta-analysis. [3]Other CEO characteristics include CEO gender, ethnicity, turnover, tenure and financial expertise. At most, one study used any of these variables, so they are excluded from the meta-analysis. [4]Some studies included the type of material internal control weakness (e.g. general or specific controls), whether there was an adverse internal control opinion or the specific number of such weaknesses. At most, one study used any of these variables, so they are excluded from the meta-analysis. [5]Several studies included variables related to the use of internal auditors, such as internal audit costs, involvement, contribution, etc., but there was no consistency between studies in how internal audit was measured. Therefore, these variables have been excluded from the meta-analysis. [6]Non-audit fees is a proxy for auditor knowledge due to anticipated knowledge spillover from non-audit services

Table II.

used in prior research as an indication that ACM negotiations have occurred (Salterio, 2012), and modifications to the auditors' report are suggestive of potential ACM negotiations and increased audit work. Therefore, variables relating to the audit opinion have been grouped into the category "opinion". Finally, other miscellaneous factors can influence ARL; therefore, I have included variables relating to other financial statement items, such as the existence of extraordinary items and the timing of the performance of audit fieldwork, to the category "other work-related factors".

2.2 Incentives for timely reporting and auditor characteristics

Bamber *et al.* (1993) suggest that the size of the client and the type of earnings news that the client has to release are both factors creating incentives for timely reporting. This is consistent with Givoly and Palmon's (1982) finding that earnings releases are delayed when earnings are below expectation. Therefore, I have grouped some variables into the theme "incentives for timely reporting," which includes variables relating to two categories:

(1) client size; and

(2) earnings news.

Finally, many studies find associations between ARL and various auditor characteristics such as audit firm size, auditor tenure and auditor knowledge. Therefore, variables relating to these constructs have been grouped into the theme "auditor characteristics".

3. Meta-analysis

A meta-analysis provides the opportunity to integrate the findings of various studies in a way that accounts for differences in sample sizes, enabling me to make conclusions on the overall effect proposed by the extant research. I chose to use the Stouffer's combined test to perform this meta-analysis, which is consistent with most other meta-analyses performed in the auditing literature (Khlif and Chalmers, 2015). First, I collected the test statistics from each study and converted them to *p*-values. I then converted these *p*-values to Z-scores, which is the measure of effect size for each analysis. Using these Z-scores and the degrees of freedom (df) from each analysis, I then calculated the weighted Stouffer Z_c, using the following equation (Khlif and Chalmers, 2015):

$$Z_c = \frac{\sum(df \cdot Z)}{\sqrt{\sum df^2}}$$

I use this weighted Z_c to test the direction and significance of each variable of interest.

I include only published studies in my analysis as unpublished studies may not have been through extensive peer-review and may "exhibit inconsistent research quality" (Pomeroy and Thornton, 2008, p. 312). The weakness of including only published studies is that there exists a publication bias, whereby a study is more likely to be published if it contains positive results, as compared with studies showing negative or inconclusive results (Bamber *et al.*, 2000; Pomeroy and Thornton, 2008). Thus, published studies are likely to have larger effects than unpublished studies (Hay *et al.*, 2006) and are unlikely to be representative of all existing research (Pomeroy and Thornton, 2008). To address this concern, I perform a file drawer test, which accounts for the fact that there may be legitimate unpublished studies not included in the meta-analysis (Hay *et al.*, 2006). To perform this test, I calculate the fail-safe number, *N*, "to determine the number of studies with insignificant results needed to reverse conclusions about a significant association" (Khlif and Chalmers, 2015, p. 8)[6]. The fail-safe number is given by:

$$N = \frac{K\left(K \cdot Z_c^2 - 2.706\right)}{2.706}$$

Where K is the number of analyses. If N is larger than a number of critical studies (N_c) as determined by the equation below, the results are considered robust (Khlif and Chalmers, 2015):

$$N_C = (5 \cdot K) + 10$$

I also consider possible differences that might exist in the findings of articles published in different types of journals. Articles in top-tier journals may be of higher quality than articles in other journals, but these journals may also show a greater propensity to publish only significant results. Alternatively, it might be that only the first article on a given topic is published in a top-tier journal, with subsequent articles on that topic published in other journals. I find that five of the studies included in this meta-analysis were published in one of the top five journals from the Google Scholar accounting journal rankings, and 12 were published in an American Accounting Association (AAA) Section journal (Auditing: A Journal of Practice and Theory). Therefore, I include separate results for articles published in these journals in this meta-analysis.

I also explore the effect of several other possible moderating variables. First, the securities regulators in each country provide different filing deadlines. For example, the SEC requires annual reports to be filed within 60-90 days of year-end, depending on the size of the filer (SEC, 2016), whereas the Ontario Securities Commission requires annual reports to be filed within 90 days of year-end in Canada (OSC, 2018). As more than half of the studies included in this meta-analysis use data from US companies (25 studies), I perform a separate analysis on listed entities in the US. In addition, I perform a separate analysis on studies whose sample period falls entirely in 2003 or later, due to the major changes to securities regulations and filing deadlines that resulted from the SOX reform. Finally, 29 of the studies included in this meta-analysis use ARL as the dependent variable, while the remaining 17 use a mathematical transformation of ARL as the dependent variable. Of these 17 studies, 15 use the natural logarithm of ARL, while the remaining two use the square root of ARL. Therefore, I perform a separate analysis on the studies using the untransformed dependent variable to explore any possible effects of the mathematical transformation.

4. Results

The results of my meta-analysis are contained in Tables III, IV and V and are discussed in the sections that follow. Presentation of meta-analysis results follows Hay *et al.* (2006). Each table contains the results from my full sample and each of the subsamples discussed above. For each category, I discuss the most common variables that have been used as proxies in the extant literature and the results of the meta-analysis. In many instances, I find consistent results between the full sample and subsamples subject to separate analyses. Exceptions are discussed in the following sections.

4.1 Variables relating to the extent of audit work to be performed

Table III summarizes the results of my meta-analysis on the 34 variables that were included in the "extent of audit work to be performed" theme. These variables were further split into five categories, with each category being presented separately in Table III, Panels A-E. Grouping all 34 variables together to compute a single weighted Z-score demonstrates that the extent of audit work to be performed is positively related to ARL ($z = 25.41$, $p < 0.001$), suggesting that ARL increases with the extent of audit work. Within this theme, auditor business risk, complexity, audit opinion and other work-related factors are all positively related to ARL (all p's < 0.001), while the quality of corporate governance is negatively related to ARL ($p = 0.004$). These findings suggest that auditor business risk, complexity, modifications to the audit opinion and other work-related factors (strong corporate governance) increase (decreases) the extent of work to be performed, which in turn increases

Table III.
Summary of results of Meta-analysis of selected independent variables relating to the extent of audit work to be performed

Independent variable	Sub-sample[2]	No. of sets of results	Number of significant results: Positive	Negative	Not significant	Stouffer test: Sig.	Sign*	File drawer studies at $p = 0.05$	File drawer critical number
Panel A – Variables relating to auditor business risk[1]									
Loss		*45*	*34*	*0*	*11*	*0.000*	*pos.*	*1,67,806*	*235*
	Top tier and AAA Journals	22	16	0	6	0.000	pos.	10,954	120
	US Companies	29	23	0	6	0.000	pos.	54,096	155
	Post-SOX	23	18	0	5	0.000	pos.	21,665	125
	Untransformed DV	25	20	0	5	0.000	pos.	33,064	135
ROA		*21*	*4*	*4*	*13*	*0.042*	*neg.*	*464*	*115*
	Top tier and AAA Journals	10	3	0	7	0.178	N.S.	21	60
	US Companies	15	4	1	10	0.081	N.S.	147	85
	Post-SOX	16	4	3	9	0.322	N.S.	4	90
	Untransformed DV	14	4	2	8	0.276	N.S.	12	80
Leverage		*30*	*14*	*0*	*16*	*0.000*	*pos.*	*29,981*	*160*
	Top tier and AAA Journals	12	7	0	5	0.000	pos.	1,201	70
	US Companies	18	11	0	7	0.000	pos.	10,607	100
	Post-SOX	21	8	0	13	0.000	pos.	5,056	115
	Untransformed DV	17	10	0	7	0.000	pos.	4,507	95
Financial condition index		*15*	*12*	*0*	*3*	*0.000*	*pos.*	*5,410*	*85*
	US Companies	13	11	0	2	0.000	pos.	3,971	75
	Post-SOX	6	4	0	2	0.000	pos.	477	40
	Untransformed DV	10	9	0	1	0.000	pos.	3,454	60
Contingencies		*7*	*2*	*0*	*5*	*0.028*	*pos.*	*59*	*45*
	Top tier and AAA Journals	6	2	0	4	0.008	pos.	71	40
(A/R+Inv)/Total Assets		*4*	*1*	*0*	*3*	*0.003*	*pos.*	*41*	*30*
	Post-SOX	4	2	0	2	0.003	pos.	41	30
Institutional ownership		*6*	*0*	*6*	*0*	*0.000*	*neg.*	*5,410*	*40*
	US Companies	6	0	6	0	0.000	neg.	5,410	40
	Untransformed DV	6	0	6	0	0.000	neg.	5,410	40

(*continued*)

Independent variable	Sub-sample[2]	No. of sets of results	Number of significant results: Positive	Negative	Not significant	Stouffer test: Sig.	Sign*	File drawer studies at $p = 0.05$	File drawer critical number
Ownership concentration		*11*	*0*	*1*	*10*	*0.493*	*N.S.*	*(11)*	*65*
	Post-SOX	7	0	0	7	0.277	N.S.	(1)	45
	Untransformed DV	9	0	1	8	0.334	N.S.	(4)	55
Audit fees		*19*	*13*	*1*	*5*	*0.000*	*pos.*	*21,178*	*105*
	Top tier and AAA Journals	11	7	1	3	0.000	pos.	3,969	65
	US Companies	15	11	1	3	0.000	pos.	11,034	85
	Post-SOX	15	9	1	5	0.000	pos.	9,537	85
	Untransformed DV	12	6	1	5	0.000	pos.	2,340	70
Abnormal audit fees		*7*	*6*	*0*	*1*	*0.000*	*pos.*	*1,379*	*45*
	US Companies	7	6	0	1	0.000	pos.	1,379	45
	Post-SOX	4	3	0	1	0.000	pos.	214	30
	Untransformed DV	7	6	0	1	0.000	pos.	1,379	45
Restatement		*15*	*8*	*0*	*7*	*0.000*	*pos.*	*7,523*	*85*
	Top tier and AAA Journals	11	5	0	6	0.000	pos.	1,444	65
	US Companies	15	8	0	7	0.000	pos.	7,523	85
	Post-SOX	11	6	0	5	0.000	pos.	3,036	65
	Untransformed DV	10	5	0	5	0.000	pos.	1,420	60
Panel B – Variables relating to audit complexity[1]									
Reportable segments		*25*	*9*	*1*	*15*	*0.000*	*pos.*	*9,077*	*135*
	Top tier and AAA Journals	9	3	0	6	0.002	pos.	247	55
	US Companies	23	9	0	14	0.000	pos.	7,834	125
	Post-SOX	15	4	1	10	0.008	pos.	467	85
	Untransformed DV	17	7	1	9	0.000	pos.	4,044	95

(*continued*)

Table III.

Table III.

Independent variable	Sub-sample[2]	No. of sets of results	Number of significant results			Stouffer test		File drawer studies at $p = 0.05$	File drawer critical number
			Positive	Negative	Not significant	Sig.	Sign*		
Foreign operations		*11*	*2*	*2*	*7*	*0.003*	*pos.*	*337*	*65*
	Top tier and AAA Journals	4	1	2	1	0.001	pos.	50	30
	US Companies	11	2	2	7	0.003	pos.	337	65
	Post-SOX	6	1	1	4	0.003	pos.	99	40
Subsidiaries		*10*	*7*	*0*	*3*	*0.000*	*pos.*	*947*	*60*
	Post-SOX	5	3	0	2	0.000	pos.	179	35
	Untransformed DV	5	3	0	2	0.000	pos.	139	35
Geographic segments		*4*	*1*	*0*	*3*	*0.337*	*N.S.*	*(3)*	*30*
Mergers and acquisitions		*8*	*0*	*0*	*8*	*0.285*	*N.S.*	*(0)*	*50*
	Top tier and AAA Journals	4	0	0	4	0.499	N.S.	(4)	30
	US Companies	7	0	0	7	0.284	N.S.	(1)	45
	Post-SOX	5	0	0	5	0.117	N.S.	8	35
High growth industries		*4*	*1*	*1*	*2*	*0.000*	*pos.*	*82*	*30*
	US Companies	4	1	1	2	0.000	pos.	82	30
High-litigation industries		*4*	*0*	*2*	*2*	*0.000*	*neg.*	*185*	*30*
	US Companies	4	0	2	2	0.000	neg.	185	30
High-tech industries		*10*	*0*	*3*	*7*	*0.032*	*neg.*	*117*	*60*
	Top tier and AAA Journals	6	0	3	3	0.000	neg.	270	40
	US Companies	10	0	3	7	0.032	neg.	117	60
	Post-SOX	8	0	3	5	0.131	N.S.	22	50
	Untransformed DV	7	0	3	4	0.135	N.S.	15	45
Financial industry		*26*	*2*	*12*	*12*	*0.000*	*neg.*	*5,619*	*140*
	Top tier and AAA Journals	13	1	8	4	0.000	neg.	781	75
	US Companies	8	1	3	4	0.000	neg.	343	50
	Post-SOX	7	2	1	4	0.000	pos.	324	45
	Untransformed DV	11	2	4	5	0.013	neg.	212	65

(*continued*)

Independent variable	Sub-sample[2]	No. of sets of results	Number of significant results: Positive	Negative	Not significant	Stouffer test: Sig.	Sign*	File drawer studies at $p = 0.05$	File drawer critical number
Panel C – Variables relating to corporate governance[1]									
AC financial experience		*4*	*0*	*1*	*3*	*0.298*	*N.S.*	*(2)*	*30*
AC independence		*4*	*0*	*1*	*3*	*0.021*	*neg.*	*21*	*30*
	Untransformed DV	4	0	1	3	0.021	neg.	21	30
AC meetings		*4*	*1*	*1*	*2*	*0.367*	*N.S.*	*(3)*	*30*
	Untransformed DV	4	1	1	2	0.367	N.S.	(3)	30
Audit committee size		*4*	*0*	*1*	*3*	*0.002*	*neg.*	*45*	*30*
	Untransformed DV	4	0	1	3	0.002	neg.	45	30
Board size		*5*	*0*	*0*	*5*	*0.084*	*N.S.*	*12*	*35*
	Untransformed DV	4	0	0	4	0.120	N.S.	4	30
Board independence		*8*	*2*	*2*	*4*	*0.000*	*neg.*	*864*	*50*
	Post-SOX	6	1	1	4	0.499	N.S.	(6)	40
	Untransformed DV	5	1	1	3	0.290	N.S.	(2)	35
CEO duality		*6*	*0*	*1*	*5*	*0.009*	*pos.*	*68*	*40*
	Post-SOX	4	0	1	3	0.036	pos.	15	30
	Untransformed DV	4	0	1	3	0.032	pos.	16	30
Panel D – Variables related to the audit opinion[1]									
Going concern opinion		*19*	*15*	*0*	*4*	*0.000*	*pos.*	*11,116*	*105*
	Top tier and AAA Journals	9	7	0	2	0.000	pos.	463	55
	US Companies	16	12	0	4	0.000	pos.	5,387	90
	Post-SOX	14	11	0	3	0.000	pos.	3,394	80
	Untransformed DV	11	10	0	1	0.000	pos.	2,064	65
Qualified opinion		*37*	*20*	*6*	*11*	*0.000*	*pos.*	*1,13,621*	*195*
	Top tier and AAA Journals	16	5	5	6	0.000	pos.	4,415	90
	US Companies	20	15	2	3	0.000	pos.	28,742	110
	Post-SOX	15	10	2	3	0.000	pos.	7,506	85
	Untransformed DV	20	14	2	4	0.000	pos.	23,752	110

(*continued*)

Table III.

Table III.

Independent variable	Sub-sample[2]	No. of sets of results	Number of significant results: Positive	Negative	Not significant	Stouffer test: Sig.	Sign*	File drawer studies at $p = 0.05$	File drawer critical number
Material IC weakness		*13*	*10*	*1*	*2*	*0.000*	*pos.*	*4,234*	*75*
	Top tier and AAA Journals	10	9	0	1	0.000	pos.	1,307	60
	US Companies	13	10	1	2	0.000	pos.	4,234	75
	Post-SOX	12	10	0	2	0.000	pos.	2,479	70
	Untransformed DV	8	8	0	0	0.000	pos.	767	50
Panel E - Variables related to other work-related factors[1]									
Busy season		*30*	*10*	*2*	*18*	*0.000*	*pos.*	*16,958*	*160*
	Top tier and AAA Journals	14	3	2	9	0.005	pos.	466	80
	US Companies	20	9	0	11	0.000	pos.	7,126	110
	Post-SOX	10	5	0	5	0.000	pos.	823	60
	Untransformed DV	13	5	0	8	0.000	pos.	2,298	75
March-June year ends		*6*	*0*	*0*	*6*	*0.145*	*N.S.*	*9*	*40*
	Post-SOX	4	0	0	4	0.168	N.S.	1	30
	Untransformed DV	4	0	0	4	0.168	N.S.	1	30
Extraordinary item		*39*	*18*	*0*	*21*	*0.000*	*pos.*	*18,089*	*205*
	Top tier and AAA Journals	20	11	0	9	0.000	pos.	2,805	110
	US Companies	27	9	0	18	0.000	pos.	7,330	145
	Post-SOX	14	3	0	11	0.108	N.S.	97	80
	Untransformed DV	19	5	0	14	0.367	N.S.	(4)	105
Sales growth		*4*	*1*	*1*	*2*	*0.010*	*neg.*	*28*	*30*

Notes: [1]Lines in boldface italics represent results from the full sample. The rows below these represent results from subsamples. [2]Subsamples analyzed are studies published in Top-Tier and AAA Section Journals (Top tier and AAA Journals); studies based on data from US Companies; studies based on data from 2003 onward (Post-SOX); and studies where the dependent variable, ARL, was not mathematically transformed (Untransformed DV). To remain consistent with the full sample results, results were only presented for those subsamples with a minimum of four analyses. *N.S. = not significant

Table IV. Summary of results of Meta-analysis of selected independent variables relating to incentives for timely reporting

Independent variable	Sub-sample[2]	No. of sets of results	Number of significant results: Positive	Negative	Not significant	Stouffer test: Sig.	Sign*	File drawer studies at $p = 0.05$	File drawer critical number
Panel A – Variables relating to client size[1]									
Total assets		*54*	*2*	*33*	*19*	*0.000*	*neg.*	*9,30,650*	*280*
	Top tier and AAA Journals	21	1	15	5	0.000	neg.	29,046	115
	US Companies	30	1	19	10	0.000	neg.	2,90,659	160
	Post-SOX	29	2	17	10	0.000	neg.	73,104	155
	Untransformed DV	31	1	20	10	0.000	neg.	1,44,198	165
Total sales		*4*	*1*	*0*	*3*	*0.032*	*pos.*	*16*	*30*
Accelerated filer		*6*	*0*	*3*	*3*	*0.000*	*neg.*	*497*	*40*
	US Companies	6	0	3	3	0.000	neg.	497	40
	Post-SOX	5	0	2	3	0.000	neg.	249	35
Large accelerated filer		*4*	*0*	*3*	*1*	*0.000*	*neg.*	*801*	*30*
	US Companies	4	0	3	1	0.000	neg.	801	30
Panel B – Variables relating to earnings news[1]									
Change in earnings		*21*	*0*	*8*	*13*	*0.000*	*neg.*	*4,362*	*115*
	Top tier and AAA Journals	9	0	4	5	0.000	neg.	426	55
	US Companies	10	0	5	5	0.000	neg.	885	60
	Post-SOX	7	0	3	4	0.000	neg.	276	45
	Untransformed DV	9	0	4	5	0.000	neg.	363	55

Notes: [1]Lines in boldface italics represent results from the full sample. The rows below these represent results from subsamples. [2]-Subsamples analyzed are studies published in Top-Tier and AAA Section Journals (top tier and AAA journals); studies based on data from US Companies; studies based on data from 2003 onward (Post-SOX); and studies where the dependent variable, ARL, was not mathematically transformed (Untransformed DV). To remain consistent with the full sample results, results were only presented for those subsamples with a minimum of four analyses. *N.S. = not significant

Table V. Summary of results of Meta-analysis of selected independent variables relating to auditor characteristics[1]

Independent variable	Sub-sample[2]	No. of sets of results	Number of significant results: Positive	Negative	Not significant	Stouffer test: Sig.	Sign*	File drawer studies at $p = 0.05$	File drawer critical number
Audit firm size		*40*	*2*	*9*	*29*	*0.298*	*N.S.*	*127*	*210*
	Top tier and AAA Journals	8	0	2	6	0.001	neg.	236	50
	US Companies	14	2	3	9	0.448	N.S.	(13)	80
	Post-SOX	19	2	5	12	0.420	N.S.	(14)	105
	Untransformed DV	22	2	6	14	0.341	N.S.	8	120
Auditor tenure - long		*8*	*0*	*4*	*4*	*0.002*	*neg.*	*191*	*50*
	US Companies	7	0	4	3	0.002	neg.	146	45
	Post-SOX	5	0	2	3	0.009	neg.	46	35
	Untransformed DV	8	0	4	4	0.002	neg.	191	50
Auditor tenure - short		*8*	*5*	*0*	*3*	*0.000*	*pos.*	*711*	*50*
	US Companies	7	4	0	3	0.000	pos.	517	45
	Post-SOX	5	3	0	2	0.000	pos.	146	35
	Untransformed DV	8	5	0	3	0.000	pos.	711	50
Auditor tenure		*6*	*0*	*2*	*4*	*0.001*	*neg.*	*123*	*40*
	Top tier and AAA Journals	4	0	2	2	0.004	neg.	38	30
	US Companies	4	0	2	2	0.004	neg.	38	30
Changed auditor		*16*	*7*	*1*	*8*	*0.000*	*pos.*	*4,324*	*90*
	Top tier and AAA Journals	8	5	0	3	0.000	pos.	752	50
	US Companies	11	6	1	4	0.000	pos.	1,640	65
	Post-SOX	10	6	0	4	0.000	pos.	1,582	60
	Untransformed DV	10	4	0	6	0.016	pos.	160	60
Non-audit fees		*12*	*2*	*6*	*4*	*0.000*	*neg.*	*1,993*	*70*
	US Companies	10	1	6	3	0.000	neg.	1,396	60
	Post-SOX	7	2	3	2	0.000	neg.	214	45
	Untransformed DV	8	1	4	3	0.000	neg.	1,089	50
Industry specialist		*5*	*1*	*1*	*3*	*0.420*	*N.S.*	*(5)*	*35*
	US Companies	4	1	0	3	0.451	N.S.	(4)	30
	Post-SOX	4	1	1	2	0.481	N.S.	(4)	30

Notes: [1]Lines in boldface italics represent results from the full sample. The rows below these represent results from subsamples. [2]Subsamples analyzed are studies published in top-tier and AAA section journals (top tier and AAA journals); studies based on data from US Companies; studies based on data from 2003 onward (Post-SOX); and studies where the dependent variable, ARL, was not mathematically transformed (Untransformed DV). To remain consistent with the full sample results, results were only presented for those subsamples with a minimum of four analyses. *N.S. = not significant

(decreases) ARL. I discuss each of the individual variables falling into this theme in the sections that follow.

4.1.1 Auditor business risk. Much of the extant research uses measures of the client's financial condition and/or profitability to proxy for auditor business risk. Four common measures of financial condition are loss, which is most often an indicator variable equaling 1 if the audit client has negative earnings and zero otherwise (45 analyses); return on assets (ROA), which is typically calculated as the ratio of net income to total assets (21 analyses); leverage, which is total or long-term debt to total assets (30 analyses); and Zmijewski's (1984) financial condition index (15 analyses). The existence of a loss, high leverage and a high score on the financial condition index imply higher auditor business risk and hypothesized longer audit delay, as does a low ROA.

Of the 45 analyses that include loss as an independent variable, 34 show significant positive results, while the rest are not significant (Table III, Panel A). Meta-analysis results are consistent with the majority of the studies, as the combined Z-score is positive and significant. The file drawer test indicates that 167,806 non-significant analyses would be needed to overturn this result, and this result is consistent across all subsamples. Results from the 21 analyses that include ROA as a predictor of ARL are mixed, with (4) significant positive (negative) and 13 non-significant results. The meta-analysis results in Table III, Panel A, show a significant negative relationship between ARL and ROA, consistent with expectation ($p = 0.042$). Despite this, meta-analysis results on all of the subsamples do not show a significant relationship between ARL and ROA. Therefore, it seems as though the overall negative relationship may only exist in certain geographic regions, time periods or be sensitive to the dependent variable chosen. ROA is a continuous variable that can take on positive or negative values depending on whether the audit client records a profit or a loss, whereas the loss variable reflects only negative earnings. Therefore, taken together, these results imply that client profitability is a significant predictor of ARL, but much more so for audits of clients recording losses. In total, 30 analyses report leverage as an independent variable, with 14 significant positive results and 16 non-significant results. Of the 15 analyses that include the financial condition index as a predictor of ARL, 12 of them demonstrate a positive association. My meta-analysis results suggest that both high leverage and poor financial condition are positively associated with ARL, and that the association is significant (Table III, Panel A).

Two other proxies for financial condition came up in several studies:

(1) whether the client's financial statements contain contingencies; and

(2) the ratio of receivables and inventory to total assets.

Seven studies include contingencies (receivables and inventory to total assets) as a determinant of ARL, with 2 showing a significant positive association and the other five showing non-significant results. My meta-analysis results suggest that both of these variables are positively associated with ARL, and that the association is significant (Table III, Panel A).

Another proxy for auditor business risk that is used in ARL research relates to the client's ownership structure. Two variables in particular, institutional ownership and ownership concentration, have been included in this meta-analysis. Institutional ownership is typically measured as the ranked value of institutional ownership (Lee *et al.*, 2009), and ownership concentration is often measured based on the holdings of substantial shareholders. In more widely held corporations, the information asymmetry between corporate insiders and outside shareholders is higher, resulting in higher auditor business risk via high reliance by many users on the auditor's report (Leventis and Caramanis, 2005).

Institutional owners can serve as a source of external pressure to report on a timely basis due to their large stakes in companies' performance (Lee *et al.*, 2009). Thus, many studies predict a negative relationship between institutional ownership and ARL. The combined Z-score reported in Table III, Panel A, for institutional ownership is negative and significant, supporting this hypothesis; however, the ownership concentration variable is not significant ($p = 0.493$). It is important to keep in mind when interpreting this result that all six analyses that include institutional ownership as an independent variable are from the same study. Therefore, this may or may not be representative of the population of ARL research.

Audit fees have been used in prior research as a proxy for audit effort, and as ARL is also a proxy for audit effort, several of the analyses include audit fees (or abnormal audit fees – measured as the residual in an audit fee model) as a predictor of ARL. In total, 19 analyses include audit fees and 7 include abnormal audit fees, with combined results of both variables being positive and significant (see Table III, Panel A). In their meta-analysis of the determinants of audit fees, Hay *et al.* (2006) find that ARL is a significant predictor of audit fees. Therefore, my results, taken together with those of Hay *et al.* (2006), show a strong correlation between audit fees and ARL.

The final variable included in the auditor business risk category is financial statement restatements. The existence of financial statement restatements implies misstatements in the financial statements, which could increase litigation risk against the auditor and hence, auditor business risk. This variable is generally captured as an indicator variable equal to 1 if a financial statement restatement has been reported in the current year and 0 otherwise. Results of the meta-analysis from the full sample demonstrate a significant positive relationship between ARL and the existence of restatements (Table III Panel A).

The full sample results for the auditor business risk variables are generally consistent with the separate analyses performed. The top-tier and AAA section journals have few studies published using institutional ownership and ownership concentration as independent variables; therefore, separate analyses were not performed on these studies. Few studies based solely on US company data contain the financial condition index, receivables and inventory to total assets and contingencies as ARL determinants but otherwise demonstrate consistent results, except for ROA, which was only marginally significant ($p = 0.081$). The data from the post-SOX period are consistent with the whole sample as well, except for ROA ($p = 0.322$). Finally, these results are robust to using ARL without any mathematical transformation as the dependent variable.

Overall, results from this meta-analysis support a positive relationship between ARL and auditor business risk, as proxied by various measures of financial condition and profitability. Specifically, the variables that are most commonly used to proxy for these constructs and which are consistently positively related to ARL across the full sample and all subsamples are the existence of a loss, high leverage and Zmijewski's financial condition index. In addition, ARL demonstrates a significant positive relationship with both audit fees and the existence of financial restatements, both of which are used frequently in ARL studies and show consistent results across all subsamples. Therefore, these appear to be the variables that best capture the relationship between ARL and auditor business risk. While institutional ownership is negatively related to ARL, all six analyses included in this meta-analysis were from the same study, and this variable was not present in two of the four subsamples. Further research is needed to confirm if the ownership dispersion of the client influences ARL.

4.1.2 Complexity. Many variables have been used in the extant ARL literature to measure client complexity, under the presumption that audit risk is higher when the client's business is more complex, which in turn increases ARL. Bamber *et al.* (1993) suggest that audit

complexity is a function of the number of business segments and the industry in which the client operates. Extant ARL research has measured business segments in multiple ways. The more popular measures included in this meta-analysis are the number of reportable segments (25 analyses), the existence of foreign operations (11 analyses), the number of subsidiaries (10 analyses), the number of geographic segments (4 analyses) and the existence of mergers and acquisitions (8 analyses).

Based on the full sample, meta-analysis results in Table III, Panel B, demonstrate a significant positive relationship between ARL and client complexity when complexity is measured by number of reportable segments, the existence of foreign operations and the number of subsidiaries but not when measured by the number of geographic segments (p = 0.337) or the existence of mergers and acquisitions (p = 0.285). These results are generally consistent across all subsamples, except that the existence of foreign operations and the number of subsidiaries are rarely used as an ARL determinant in studies published in top-tier and AAA section journals. The number of subsidiaries is also not used in the US subsample. Of the 11 analyses that use foreign operations as a predictor of ARL, (2) show a significant positive (negative) relationship between the variables, while the other 7 demonstrate non-significant results. One of the two positive studies has a much larger sample size than the others, and when this study is eliminated, meta-analysis results show that foreign operations are not significantly related to ARL (p = 0.245). Therefore, further work is needed to fully understand the relationship between the existence of foreign operations and ARL.

Several analyses include indicator variables representing different industries. For example, Tanyi *et al.* (2010) hypothesize that companies in high growth industries will have "more changes, leading to more new things to audit" (p. 678) and therefore expect longer audit delays in these industries. Results among the four analyses that controlled for high-growth industries are mixed, but the meta-analysis shows that the relationship between high-growth industries and ARL is indeed positive and significant ($p < 0.001$). However, this result is driven by only one of the four studies that showed a positive result, as this study has a large sample size. Removing this study from the meta-analysis results in a non-significant relationship between ARL and high-growth industries (p = 0.142), making this result difficult to interpret. In addition, all four of the studies included in this meta-analysis use data from US companies; therefore, it is unclear whether these results generalize to companies operating in other countries. This variable was rarely included in any of the studies published in top-tier or AAA section journals, in the post-SOX period or when the dependent variable is untransformed.

Four analyses control for companies in high-litigation industries, and meta-analysis results in Table III, Panel B, suggest a significant negative relationship between high-litigation industries and ARL. Mitra *et al.* (2015) conjecture that this result suggests that companies in high-litigation industries "possibly have reacted to the SOX requirements more proactively and have developed a better accounting system to minimize the potential *ex post* litigation risk" (p. 521). My combined result, while based on a small number of studies, is robust to the file drawer test but includes few studies published in top-tier or AAA section journals, in the post-SOX period sample and when the dependent variable is untransformed. The relationship between high litigation industries and ARL is also negative and significant for the US subsample.

Ten analyses control for companies in high-tech industries, with mixed results. Ettredge *et al.* (2006) find a negative association between ARL and high-tech companies and conjecture that this may be because "high-technology companies have more sophisticated accounting information systems which allow them to accomplish new reporting tasks

faster" (p. 15). Two other studies find a significant negative relationship for this variable, but many show non-significant results. The meta-analysis results in Table III, Panel B, show that the relationship between ARL and high-tech industries is negative and significant for the full sample ($p = 0.032$), for those studies published in top-tier journals and AAA section journals and for the US subsample. It is not significant in the other two subsamples, and the non-significant result in the post-SOX subsample is driven by one study with a very large sample size, that, if eliminated, makes the meta-analytic results consistent with the full sample ($p < 0.001$). In total, 26 analyses in my meta-analysis control for companies operating in financial industries, and the result is negative and significant for the full sample and all subsamples, except for the post-SOX subsample, which is positive and significant.

Overall meta-analysis results suggest that ARL increases with client complexity, when client complexity is measured by business segments and industry. Specifically, clients with more reportable segments, and more subsidiaries tend to have longer ARLs, and these variables are used frequently in ARL studies. In addition, results for these variables tend to be consistent across all subsamples. Further, companies operating in high-litigation, high-tech and financial industries tend to have shorter ARLs, while those operating in high-growth industries tend to have longer ARLs. However, results for clients in high-tech and financial industries depend on the subsample to which the analysis is being applied, and results for high-growth and high-litigation industries are based on a small number of studies. Therefore, researchers should keep their sample in mind when selecting industry control variables to use in ARL models.

4.1.3 Corporate governance. While corporate governance was not specifically identified in Bamber *et al.*'s (1993) model of ARL, I find four studies that use various measures of audit committee quality (such as financial reporting experience, independence, frequency of meetings and committee size) as determinants of ARL. Meta-analysis results from the overall sample suggest a significant negative relationship between ARL and both audit committee independence and audit committee size, but the results for audit committee independence are not robust to the file drawer test (Table III, Panel C). Furthermore, neither the financial reporting experience nor the frequency of audit committee meetings is significantly related to ARL ($p = 0.298$ and $p = 0.367$, respectively). These results are consistent with the subsample of studies that use the untransformed dependent variable, but few were published in top-tier or AAA section journals, the US subsample or the post-SOX period. Therefore, overall, these results do not suggest a strong relationship between various audit committee attributes and ARL.

Several studies use various measures of the quality of the board of directors as a whole as determinants of ARL. Variables included in this meta-analysis are the size of the board of directors (five analyses), the proportion of independent directors (eight analyses) and an indicator variable capturing whether the chief executive officer (CEO) is also the chair of the board (six analyses). Meta-analysis results from the whole sample (Table III, Panel C) suggest that the relationship between ARL and the size of the board is negative but only marginally significant ($p = 0.084$). They also suggest that ARL is longer when the board is less independent, as evidenced by a significant negative relationship between ARL and the proportion of independent directors. However, the result for this variable is driven by one of the studies that shows a significant negative relationship with ARL, as this study has a much larger sample size than all the others. If this study is removed from the meta-analysis, this variable becomes non-significant ($p = 0.460$); therefore, care must be taken when interpreting the results for this variable. Board independence is also hypothesized to be lower when the CEO is the chair of the board, and six analyses include CEO duality as a predictor of ARL. Meta-analysis results support this hypothesis, as Table III, Panel C, shows

that this variable is positively associated with ARL ($p = 0.009$), despite the fact that one of the studies showed a negative relationship between ARL and CEO duality and the other five studies' results were not significant. One of these five studies has a large sample size and a marginally significant positive result ($p = 0.056$), and if this study is removed, the overall meta-analysis results become marginally significant in the positive direction ($p = 0.067$). Therefore, care must once again be taken when interpreting the results for this variable.

As with the audit committee variables, few of the studies examining board size and independence are published in top-tier or AAA section journals or in the US subsample; therefore, it appears as though the effect of corporate governance on ARL has been little studied in the US. In addition, board independence does not have a significant relationship with ARL in the post-SOX period subsample and when the dependent variable is untransformed. Overall, the relationship between the quality of the corporate governance offered by the audit committee and the board of directors and ARL remains unclear and would benefit from further research.

4.1.4 Audit opinion. Many studies have included the existence of a going concern opinion (19 analyses) and the existence of a qualified/modified opinion (37 analyses) as proxies for difficulties encountered during the audit. It is argued that these types of opinions signal increased audit effort, future uncertainties (Blankley *et al.*, 2014) and/or longer auditor-client negotiation time (Mitra *et al.*, 2015), all of which are expected to increase ARL. Consistent with these predictions, my meta-analysis results show a positive and significant relationship between ARL and both going concern opinions and qualified/modified opinions for the full sample and all subsamples.

In total, 13 analyses also include the existence of a material internal control weakness as a signal of increased audit effort due to the implied increase in control risk, as this is one of the very few publicly observable indications of internal control quality within organizations. I find that ten of these analyses report significant positive results. The combined Z-score from Table III, Panel D, is positive and significant, implying that a weaker internal control environment is associated with longer ARL.

4.1.5 Other work-related variables. Prior research has included a variety of other variables that may impact the extent of audit work to be performed. For example, several analyses include a busy season indicator variable as another work-related determinant of ARL. As many US public companies have December year-ends, audit firms tend to face a busy season, whereby many of their audits are on-going simultaneously during the months early in the calendar year. This can cause resource constraints during this time period, potentially resulting in longer audit delays (Lee *et al.*, 2009). As a result, 30 analyses include an indicator variable for clients with fiscal year-ends falling between December and March. In the full sample and all subsamples, results of the meta-analysis show a significant positive relationship between busy season and ARL, supporting the hypothesis that resource constraints during busy season increase audit delay. Six studies, all from the non-US sample, include an indicator variable for March through June year-ends to capture common year-ends in other countries, but the combined Z-score is not significant for this variable ($p = 0.145$).

The remaining two variables that have been included as indications of the extent of audit work to be performed are the existence of extraordinary items and sales growth. Results of the meta-analysis from the full sample demonstrate a significant positive (negative) relationship between ARL and the existence of extraordinary items (sales growth) (Table III, Panel E). The combined Z-score for extraordinary items is not significant in the post-SOX subsample ($p = 0.108$) and when ARL is not mathematically transformed ($p = 0.367$). In addition, the overall results for sales growth are not robust to the file drawer test. Overall,

these results suggest that ARL is higher in the presence of extraordinary items and when the audit is performed during busy season.

4.2 Variables relating to the incentives for timely reporting

4.2.1 Client size. Bamber *et al.* (1993) suggest that the size of the client creates incentives to report on a timely basis. ARL is expected to be negatively related to client size, as large companies face external pressure from investors and regulators to release audited financial results in a timely manner (Mitra *et al.*, 2015). These large companies in turn place pressure on their auditors to complete the audit quickly (Dao and Pham, 2014). Within this theme, four different measures of client size have been used in extant ARL research (Table IV). Grouping all four variables together to compute a single weighted Z-score demonstrates that client size is negatively related to ARL ($z = 31.50$, $p < 0.001$), suggesting that ARL is lower for larger clients.

The measure of client size used most often in the ARL studies included in this meta-analysis is the natural logarithm of total assets. Of the 68 analyses included in this meta-analysis, 54 use total assets as an independent variable, 33 report a significant negative relationship with ARL, 19 report non-significant results and only 2 report a positive relationship. Results of the meta-analysis reported in Table IV, Panel A, strongly support the hypothesized negative relationship, as the combined Z-statistic for total assets is negative and significant. In addition, 930,650 non-significant studies would be needed to overturn this result, and this result holds across all subsamples. These results suggest that client size, as proxied by total assets, is an important explanatory variable in ARL models.

Four studies have also used total sales to measure client size. Meta-analysis results from the full sample show a significant positive relationship between sales and ARL ($p = 0.032$; Table IV, Panel A). This suggests that when sales are used to measure client size, larger clients have longer ARL, which is opposite the conclusion reached when total assets are used to measure client size. However, the meta-analysis results for this variable are not robust to the file drawer test; therefore, it does not appear that sales is a significant predictor of ARL.

In addition to financial measures of client size, some studies have used the company's filing status. Accelerated filers (large accelerated filers) in the US are required to file their 10-K within 75 (60) days of their fiscal year-end, compared with 90 days for non-accelerated filers (SEC, 2016)[7]. This suggests a negative relationship between accelerated filers and ARL for reasons consistent with those given for total assets above. Six (four) analyses include accelerated filer (large accelerated filer) as an indicator variable equal to 1 if the client is an accelerated filer (large accelerated filer) and 0 otherwise. Of these, three (three) report significant negative results and three (one) report non-significant results. None of the studies report significant positive results. Results of the meta-analysis in Table IV, Panel A, show a significant negative relationship between filing status and ARL for both levels of accelerated filers, with file drawer studies exceeding the critical number in both cases. These results are, not surprisingly, consistent with the findings on the size variable previously discussed. Therefore, it seems as though there is a strong negative relationship between client size and ARL when client size is measured using total assets and filing status.

4.2.2 Earnings news. Lee *et al.* (2009) argue that as prior research shows that companies tend to release good (bad) news earlier (later), companies with good news to report (such as beating prior year earnings per share (EPS)) may put pressure on their auditors to complete their audit more quickly. Therefore, when there is a year-over-year change in earnings, this could provide an incentive to report in a timely manner, depending on the nature of the news. In total, 21 analyses include the change in earnings over the prior year as a predictor

variable, and the meta-analysis shows a significant negative relationship between this variable and ARL, suggesting that ARL is shorter when there is good earnings news to report. This result is robust to the file drawer test, is consistent across all subsamples and is consistent with the argument proposed by Lee *et al.* (2009).

4.3 Variables relating to auditor characteristics

Many studies have included various auditor characteristics as predictors of ARL. These variables typically relate to the size of the audit firm, the length of time for which the audit firm has been auditing the company and the industry specialization and other knowledge of the auditor. Each of these is hypothesized to influence ARL for different reasons. I have included seven of these variables in my meta-analysis (Table V).

Of the 68 analyses included in this meta-analysis, 40 of them control for the size of the audit firm, proxied by Big 4 (or Big 5, Big 8, etc. when going back to prior periods) auditors. Despite the significant proportion of studies including this variable, 29 of them do not find significant results, and overall meta-analysis results demonstrate a non-significant relationship between the large audit firms and ARL ($p = 0.298$, Table V). Interestingly, while this result holds for most of the subsamples in this analysis, the studies published in top-tier and AAA section journals that included this variable as a predictor show a significant negative association between ARL and audit firm size ($p = 0.001$). This could be suggestive of the previously documented bias to publish only those studies that reject the null hypothesis (Bamber *et al.*, 2000). Overall results suggest that, despite its frequent inclusion as a control variable in ARL studies, audit firm size is not a significant predictor of ARL.

Another auditor characteristic that has been included in several analyses is auditor tenure on the audit engagement. Eight analyses include measures of auditor tenure as predictor variables in their ARL models. Dichotomous variables were included for long (short) auditor tenure, where the variable equals 1 if the client has had the same auditor for nine (three) consecutive years or more (less) and 0 otherwise. Lee *et al.* (2009) expect audit delay to be negatively related to auditor tenure, as newer auditors require more time to understand the client's business. Meta-analysis results show a significant negative (positive) relationship between ARL and long (short) auditor tenure, consistent with this hypothesis. None of the studies containing these two auditor tenure measures were published in top-tier or AAA Section journals; however, these results hold in all other subsamples.

Auditor tenure has also been measured as a continuous variable (the number of consecutive years that the audit firm has been auditing the company), and meta-analysis results from the six analyses using this measure are negative and significant ($p = 0.001$, Table V). A final measure of auditor tenure that has been included as an independent variable in ARL models is auditor change. This is typically expressed as an indicator variable that equals 1 if the client changed auditor during the current year and 0 otherwise. Consistent with the meta-analysis results for the short auditor tenure variable discussed above, the combined Z-score for the auditor change variable (based on 16 analyses) is positive and significant, indicating longer audit delays for new audit clients. Taken together, these measures support a negative relationship between auditor tenure and ARL.

The final two auditor characteristics variables included in this meta-analysis relate to the auditor's knowledge. Lee *et al.* (2009) hypothesize that when auditors provide non-audit services to their audit clients, this will result in knowledge spillovers that help to reduce audit delay. I find 12 analyses that include the natural logarithm of non-audit fees as an independent variable, and my meta-analysis results support this hypothesis. In the full sample and all subsamples, there is a significant negative relationship between ARL and non-audit fees ($p < 0.001$, Table V). Several ARL studies have also included a measure of

auditor knowledge that is based on whether the auditor is a specialist in the client's industry. This variable is generally measured using the audit firm's market share in that industry, based on audit fees. Five analyses include an auditor industry specialist variable, but the combined Z-score from the analyses is not significant ($p = 0.420$, Table V). Therefore, industry specialization does not seem to decrease ARL.

Taken together, the variables relating to auditor characteristics suggest that both longer auditor tenure and knowledge spillover from non-audit services can serve to reduce ARL.

5. Conclusion

Through this meta-analysis, I have synthesized the body of knowledge on the determinants of ARL since the early 1980s. While more exploration into the determinants of ARL is still needed, I have confirmed that ARL is related to various measures of auditor business risk, audit complexity, audit opinion type and other audit work-related factors, to client size and the type of earnings news that the client has to report and to various auditor characteristics such as auditor tenure and the auditor's provision of non-audit services. I also find that several frequently included variables, such as audit firm size and ownership concentration, do not have a significant relationship with ARL. Finally, several variables remain inconclusive, such as the relationship between corporate governance and ARL. There are also several inconsistencies between the full sample and various subsamples that require resolution, and I find that some of my meta-analysis results depend on whether the ARL dependent variable is mathematically transformed using the natural logarithm or square root functions.

These results help to highlight several areas that would benefit from future research. First, various measures of ownership structure have been used in ARL studies to proxy for auditor business risk. My meta-analysis results do not support a link between ARL and ownership structure when it is measured by ownership concentration. While my meta-analysis results indicate a significant negative relationship between ARL and institutional ownership, all of the analyses for this variable included in this meta-analysis come from the same study. It is therefore unclear whether these analyses are representative of the body of ARL research as a whole. As such, the link between ARL and ownership structure is inconclusive, and more studies exploring the effect of institutional ownership on ARL would help to confirm the results of the study included in this meta-analysis.

Second, the ARL literature would benefit from further investigation into the effect of client industry type on audit delay. My meta-analysis results show a significant positive (negative) relationship between ARL and clients in high-growth (high-litigation) industries. However, these results are based on only four studies, all of which use data from the US. In addition, the meta-analysis result for high-growth industries is driven by one study with a large sample size. More studies using these variables are needed to confirm the meta-analytic results, and future research could explore the effect of these industries on ARL in other countries to see if these results generalize to companies operating in countries outside of the US. Another variable that would benefit from future research is the influence of high-tech industry clients on ARL in the post-SOX period. Meta-analysis results for the full sample show that ARL is lower for clients in high-tech industries; however, the result is not significant in the post-SOX sample. Future research could explore whether high-tech companies adapted to the SOX 404 requirements differently than did companies in other industries and whether this has any influence on ARL. Meta-analytic results also demonstrate a negative relationship between ARL and clients operating in the financial industry in the full sample and all subsamples, except the post-SOX subsample, where the relationship is positive and significant. It is unclear why the direction of the relationship

between ARL and financial industry clients reversed, so further work is needed to clarify this relationship. Future research is also needed to clarify whether clients with foreign operations have longer audit delays, as the positive meta-analytic result for this variable is driven by a single study with a very large sample size.

Third, further research is needed to explore the relationship between ARL and corporate governance. Few studies have examined the impact of audit committee quality on ARL, and meta-analysis results for those that have are inconclusive. My meta-analysis results indicate that ARL is lower when the audit committee is more independent and larger, but the result for audit committee independence is not robust to the file drawer test. In addition, none of the studies included in this meta-analysis use data from US companies, who would be subject to the audit committee regulations outlined in the SOX Act of 2002. Therefore, future research could continue to explore the relationship between various audit committee characteristics and ARL in the US, particularly in the post-SOX period. More work is also needed on the influence of the board of directors on ARL. Research has found no significant relationship between board size and ARL, and longer ARL for less independent boards. However, the negative relationship between ARL and the proportion of independent directors is driven by a single study with a large sample size, and this is also the only study in the meta-analysis sample conducted with US data. Therefore, it is possible that board independence only influences ARL in some countries but not others. Future research could explore this variable in different countries and attempt to understand why there are cross-country differences. Perhaps this relates to different regulatory requirements for the role of the board of directors in different jurisdictions.

Finally, future research could continue to examine the impact of various auditor characteristics on ARL. For example, little research has been conducted on the influence of audit partner characteristics, such as partner tenure and specialization, on ARL. In addition, research has used non-audit fees as a proxy for auditor knowledge, but future research could explore if there are specific types of non-audit services that influence ARL more than others. For example, does the provision of tax services by the auditor reduce ARL due to the synergies created while auditing the tax provision? Research is also needed to determine whether ARL is influenced by auditor independence, the amount of interim audit work performed and whether the auditor relied on other auditors, internal auditors and/or an auditor's specialist.

I believe that the results of my analysis will be helpful to researchers in selecting control variables when studying new hypothesized determinants of ARL. I also believe that the increased understanding of the determinants of ARL provided by my meta-analysis will help researchers who wish to use ARL as an independent variable in their studies.

Notes

1. I will use the terminology "audit report lag" and "audit delay" interchangeably throughout the paper.
2. I will use the terminology "company," "issuer" and "client" interchangeably throughout the paper to refer to the company being audited. Use of the word "firm" refers to the auditing firm.
3. Key words used during the literature search included audit report lag, audit reporting lag, audit delay, audit report delay, audit effort, audit efficiency, audit timeliness and audit workload compression.
4. Earlier studies used descriptive statistics, correlations and/or non-parametric hypotheses tests, such as the Mann–Whitney U test, to identify the determinants of audit report lag. Studies such

as these that do not use regression analysis to test audit report lag determinants were excluded from this meta-analysis.

5. A second researcher, blind to my coding and familiar with the Bamber *et al.* (1993) framework, independently coded the 126 variables into the eight categories used in this meta-analysis. The inter-coder agreement rate was 78 per cent. Of the variables with discrepancies, only 32 per cent (nine variables) are included in the meta-analysis (i.e. refer to the variables in italic in Table II). Discrepancies for these nine variables were resolved through discussion with the other researcher and by referring back to the adapted Bamber *et al.* (1993) framework.

6. There are mixed opinions on the utility of the fail-safe N statistic in meta-analysis. For example, in Persaud and Evans (1996), Evans argues that the fail-safe N is a crude measure and does not account for file-drawer studies with results in the opposite direction of observed meta-analytic results. On the other hand, Carson, Schriesheim and Kinicki (1990) test the utility of the fail-safe N statistic in meta-analyses that did not use it, and find that this statistic would have possibly caused the authors of these meta-analyses to recognized that their results were not conclusive. They therefore conclude that the fail-safe N provides valuable information about the stability of meta-analytic results. To be consistent with other meta-analyses using Stouffer's method in the auditing literature, I have computed the fail-safe N for each variable subject to my analysis and have discussed instances where this statistic suggests that results may be inconclusive.

7. Foreign filers are required to file a 20-F rather than a 10-K, and their filing deadline is four months from their fiscal-year end. Thus, some accelerated filers and large accelerated filers have longer deadlines than the 75 (60) days outlined above. Some of the studies that include filing status as an independent variable specifically exclude foreign-filers form their sample, but many do not. Therefore, it is likely that some of the accelerated filers being captured by these variables include 20-F filers, who may take longer to file than 10-K filers. However, inclusion of 20-F filers with longer filing deadlines biases against finding results, and therefore would not change the conclusion.

References

(Papers included in the meta-analysis are indicated with an asterisk *)

*Ashton, R.H., Willingham, J.J. and Elliott, R.K. (1987), "An empirical analysis of audit delay", *Journal of Accounting Research*, Vol. 25 No. 2, pp. 275-292.

*Bamber, M.E., Bamber, L.S. and Schoderbek, M.P. (1993), "Audit structure and other determinants of audit report lag: an empirical analysis", *Auditing: A Journal of Practice and Theory*, Vol. 12 No. 1, pp. 1-23.

Bamber, L.S., Christensen, T.E. and Gaver, K.M. (2000), "Do we really 'know' what we know? A case study of seminal research and its subsequent overgeneralization", *Accounting, Organizations and Society*, Vol. 25 No. 2, pp. 103-129.

Blankley, A.I., Hurtt, D.N. and MacGregor, J.E. (2014), "The relationship between audit report lags and future restatements", *Auditing: A Journal of Practice and Theory*, Vol. 33 No. 2, pp. 27-57.

Carson, K.P., Schriesheim, C.A. and Kinicki, A.J. (1990), "The usefulness of the "fail-safe" statistic in Meta-analysis", *Educational and Psychological Measurement*, Vol. 50 No. 2, pp. 233-243.

Chambers, A.E. and Penman, S.H. (1984), "Timeliness of reporting and the stock price reaction to earnings announcements", *Journal of Accounting Research*, Vol. 22 No. 1, pp. 21-47.

Cohen, J.R. and Hanno, D.M. (2000), "Auditors' consideration of corporate governance and management control philosophy in preplanning and planning judgments", *Auditing: A Journal of Practice and Theory*, Vol. 19 No. 2, pp. 133-146.

Courtis, J.K. (1976), "Relationships between timeliness in corporate reporting and corporate attributes", *Accounting and Business Research*, Vol. 7 No. 25, pp. 45-56.

*Dao, M. and Pham, T. (2014), "Audit tenure, auditor specialization and audit report lag", *Managerial Auditing Journal*, Vol. 29 No. 6, pp. 490-512.

Dyer, J.C. and McHugh, A.J. (1975), "The timeliness of the australian annual report", *Journal of Accounting Research*, Vol. 13 No. 2, pp. 204-219.

*Ettredge, M.L., Li, C. and Sun, L. (2006), "The impact of SOX section 404 internal quality control assessment on audit delay in the SOX era", *Auditing: A Journal of Practice and Theory*, Vol. 25 No. 2, pp. 1-23.

Gilling, D.M. (1977), "Timeliness in corporate reporting: some further comment", *Accounting and Business Research*, Vol. 8 No. 29, pp. 34-36.

*Givoly, D. and Palmon, D. (1982), "Timeliness of annual earnings announcements: some empirical evidence", *The Accounting Review*, Vol. 19 No. 2, pp. 486-508.

Habib, A. (2013), "A Meta-analysis of the determinants of modified audit decisions", *Managerial Auditing Journal*, Vol. 28 No. 3, pp. 184-216.

Hay, D.C., Knechel, W.R. and Wong, N. (2006), "Audit fees: a meta-analysis of the effect of supply and demand attributes", *Contemporary Accounting Research*, Vol. 23 No. 1, pp. 141-191.

Johnstone, K.M. (2000), "Client-acceptance decisions: simultaneous effects of client business risk, audit risk, auditor business risk, and risk adaptation", *Auditing: A Journal of Practice and Theory*, Vol. 19 No. 1, pp. 1-25.

Khlif, H. and Chalmers, K. (2015), "A review of meta-analytic research in accounting", *Journal of Accounting Literature*, Vol. 35, pp. 1-27.

Knechel, W.R. and Payne, J.L. (2001), "Research notes: additional evidence on audit report lag", *Auditing: A Journal of Practice and Theory*, Vol. 20 No. 1, pp. 137-146.

Knechel, W.R., Rouse, P. and Schelleman, C. (2009), "A modified audit production framework: evaluating the relative efficiency of audit engagements", *The Accounting Review*, Vol. 84 No. 5, pp. 1607-1638.

*Krishnan, J. and Yang, J.S. (2009), "Recent trends in audit report and earnings announcement lags", *Accounting Horizons*, Vol. 23 No. 3, pp. 265-288.

Lambert, T.A., Jones, K.L. and Brazel, J.F. (2011), "Unintended consequences of accelerated filings: are mandatory reductions in audit delay associated with reductions in earnings quality?", Working paper.

*Lee, H.Y., Mande, V. and Son, M. (2009), "Do lengthy auditor tenure and the provision of non-audit services by the external auditor reduce audit report lags?", *International Journal of Auditing*, Vol. 13 No. 2, pp. 87-104.

Leventis, S. and Caramanis, C. (2005), "Determinants of audit time as a proxy of audit quality", *Managerial Auditing Journal*, Vol. 20 No. 5, pp. 460-478.

*Mitra, S., Song, H. and Yang, J.S. (2015), "The effect of auditing standard no. 5 on audit report lags", *Accounting Horizons*, Vol. 29 No. 3, pp. 507-527.

Ontario Securities Commission (OSC) website (2018), "Filing due dates calendar for annual and interim filings by reporting issuers", available at: www.osc.gov.on.ca/en/Companies_filing-calendar_index.htm (accessed 8 February 2018).

Persaud, R. and Evans, S. (1996), "Misleading Meta-analysis", *BMJ (Clinical Research ed.)*, Vol. 312 No. 7023, p. 125.

*Pizzini, M., Lin, S. and Ziegenfuss, D.E. (2015), "The impact of internal audit function quality and contribution on audit delay", *Auditing: A Journal of Practice and Theory*, Vol. 34 No. 1, pp. 25-58.

Pomeroy, B. and Thornton, D.B. (2008), "Meta-analysis and the accounting literature: the case of audit committee independence and financial reporting quality", *European Accounting Review*, Vol. 17 No. 2, pp. 305-330.

Public Company Accountability and Oversight Board (PCAOB) (2002), AS3110: dating of the independent auditor's report, American Institute of Certified Public Accountants, New York, NY.

Salterio, S.E. (2012), "Fifteen years in the trenches: auditor-client negotiations exposed and explored", *Accounting and Finance*, Vol. 52 Supplement, pp. 233-286.,

*Tanyi, P., Raghunandan, K. and Barua, A. (2010), "Audit report lags after voluntary and involuntary auditor changes", *Accounting Horizons*, Vol. 24 No. 4, pp. 671-688.

Securities and Exchange Commission (SEC) website (2016), "Fast answers: form 10K", available at: www.sec.gov/answers/form10k.htm (accessed 31, March 2016).

*Whitworth, J.D. and Lambert, T.A. (2014), "Office-level characteristics of the big 4 and audit report timeliness", *Auditing: A Journal of Practice and Theory*, Vol. 33 No. 3, pp. 129-152.

Zmijewski, M.E. (1984), "Methodological issues related to the estimation of financial distress prediction models", *Journal of Accounting Research*, Vol. 22 Supplement, pp. 59-82.

Further reading

*Abbott, L.J., Parker, S. and Peters, G.F. (2012), "Internal audit assistance and external audit timeliness", *Auditing: A Journal of Practice and Theory*, Vol. 31 No. 4, pp. 3-20.

*Afify, H.A.E. (2009), "Determinants of audit report lag: does implementation of corporate governance have any impact? Empirical evidence from Egypt", *Journal of Applied Accounting Research*, Vol. 10 No. 1, pp. 56-86.

*Al-Ajmi, J. (2008), "Audit and reporting delays: evidence from an emerging market", *Advances in Accounting, Incorporating Advances in International Accounting*, Vol. 24 No. 2, pp. 217-226.

*Al-Ghanem, W.H.M. (2011), "An empirical analysis of audit delays and timeliness of corporate financial reporting in Kuwait", *Eurasian Business Review*, Vol. 1, pp. 73-90.

*Apadore, K. and Noor, M.M. (2013), "Determinants of audit report lag and corporate governance in Malaysia", *International Journal of Business and Management*, Vol. 8 No. 15, pp. 151-163.

Ashton, R.H., Graul, P.R. and Newton, J.D. (1989), "Audit delay and the timeliness of corporate reporting", *Contemporary Accounting Research*, Vol. 5 No. 2, pp. 657-673.

*Bonsón-Ponte, E., Escobar-Rodríguez, T. and Borrero-Domínguez, C. (2008), "Empirical analysis of delays in the signing of audit reports in Spain", *International Journal of Auditing*, Vol. 12 No. 2, pp. 129-140.

*Carslaw, C.A.P.N. and Kaplan, S.E. (1991), "An examination of audit delay: further evidence from New Zealand", *Accounting and Business Research*, Vol. 22 No. 85, pp. 21-32.

*Chan, K.H., Luo, V.W. and Mo, P.L.L. (2016), "Determinants and implications of long audit reporting lags: Evidence from China", *Accounting and Business Research*, Vol. 46 No. 2, pp. 145-166.

*Daoud, K.A.A., Ismail, K.N.I.K. and Lode, N.A. (2014), "The timeliness of financial reporting among jordanian companies: Do company and board characteristics, and audit opinion matter?", *Asian Social Science*, Vol. 10 No. 13, pp. 191-201.

*Habib, A. (2015), "The new chinese accounting standards and audit report lag", *International Journal of Auditing*, Vol. 19 No. 1, pp. 1-14.

*Habib, A. and Bhuiyan, M.B.U. (2011), "Audit firm industry specialization and the audit report lag", *Journal of International Accounting, Auditing and Taxation*, Vol. 20 No. 1, pp. 32-44.

*Harjoto, M.A., Laksmana, I. and Lee, R. (2015), "The impact of demographic characteristics of CEOs and directors on audit fees and audit delay", *Academy of Management Proceedings*, Vol. 2015Nos No. 1, pp. 953-997.

*Henderson, B.C. and Kaplan, S.E. (2000), "An examination of audit report lag for banks: a panel data approach", *Auditing: A Journal of Practice and Theory*, Vol. 19 No. 2, pp. 159-174.

*Hitz, J.-M., Low, P. and Solka, M. (2013), "Determinants of audit delay in a mandatory IFRS setting", *Die Betriebswirtschaft*, Vol. 73 No. 4, pp. 293-305.

*Jaggi, B. and Tsui, J. (1999), "Determinants of audit report lag: further evidence from Hong Kong", *Accounting and Business Research*, Vol. 30 No. 1, pp. 17-28.

*Knechel, R. and Sharma, D.S. (2012), "Auditor-provided nonaudit services and audit effectiveness and efficiency: evidence from pre- and post-SOX audit report lags", *Auditing: A Journal of Practice and Theory*, Vol. 31 No. 4, pp. 85-114.

Lee, H.-Y., Mande, V. and Son, M. (2008), "A comparison of reporting lags of multinational and domestic firms", *Journal of International Financial Management and Accounting*, Vol. 19 No. 1, pp. 28-56.

*Lee, L., Whitworth, J. and Hermanson, S. (2015), "The effects of information technology innovativeness on audit efficiencies", *Review of Business Information Systems (Rbis)*, Vol. 19 No. 1, pp. 25-38.

*Leventis, S., Weetman, P. and Caramanis, C. (2005), "Determinants of audit report lag: some evidence from the athens stock exchange", *International Journal of Auditing*, Vol. 9 No. 1, pp. 45-58.

*Mao, M.Q. and Yu, Y. (2015), "Analysts' cash flow forecasts, audit effort, and audit opinions on internal control", *Journal of Business Finance and Accounting*, Vol. 42 Nos 5/6, pp. 635-664.

*Masli, A., Peters, G.F., Richardson, V.J. and Sanchez, J.M. (2010), "Examining the potential benefits of internal control monitoring technology", *The Accounting Review*, Vol. 85 No. 3, pp. 1001-1034.

*Nor, M., Rohami, S., Naimi, M. and Wan-Hussin, W.N. (2010), "Corporate governance and audit report lag in Malaysia", *Asian Academy of Management Journal of Accounting and Finance*, Vol. 6 No. 2, pp. 57-84.

*Munsif, V., Raghunandan, K. and Rama, D.V. (2012), "Internal control reporting and audit report lags: further evidence", *Auditing: A Journal of Practice and Theory*, Vol. 31 No. 3, pp. 203-218.

*Newton, J.D. and Ashton, R.H. (1989), "The association between audit technology and audit delay", *Auditing: A Journal of Practice and Theory*, Vol. 8 Supplement, pp. 22-37.

*Ng, P.P.H. and Tai, B.Y.K. (1994), "An empirical examination of the determinants of audit delay in Hong Kong", *British Accounting Review*, Vol. 26 No. 1, pp. 43-59.

*Schwartz, K.B. and Soo, B.S. (1996), "The association between auditor changes and reporting lags", *Contemporary Accounting Research*, Vol. 13 No. 1, pp. 353-370.

*Sharma, D.S., Tanyi, P.N. and Litt, B.A. (2017), "Costs of mandatory periodic audit partner rotation: Evidence from audit fees and audit timeliness", *Auditing: A Journal of Practice and Theory*, Vol. 36 No. 1, pp. 129-149.

*Sultana, N., Singh, H. and Van der Zahn, J.-L.W.M. (2015), "Audit committee characteristics and audit report lag", *International Journal of Auditing*, Vol. 19 No. 2, pp. 72-87.

*Walker, A. and Hay, D. (2013), "Non-audit services and knowledge spillovers", *Meditari Accountancy Research*, Vol. 21 No. 1, pp. 32-51.

*Wan-Hussin, W.N. and Bamahros, H.M. (2013), "Do investment in and the sourcing arrangement of the internal audit function affect audit delay?", *Journal of Contemporary Accounting and Economics*, Vol. 9 No. 1, pp. 19-32.

*Xu, Y., Carson, E., Fargher, N. and Jiang, L. (2013), "Responses by australian auditors to the global financial crisis", *Accounting and Finance*, Vol. 53 No. 1, pp. 301-338.

*Yaacob, N.M. and Che-Ahmad, A. (2012), "Adoption of FRS 138 and audit delay in Malaysia", *International Journal of Economics and Finance*, Vol. 4 No. 1, p. 167.

Corresponding author
Giselle Durand can be contacted at: gdurand@wlu.ca