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Workload stress and conservatism: An audit perspective

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Abstract: Current literature on audit workload stress suggests that the pressure may adversely affect audit quality. However, compromised audit quality would attract regulatory enforcement and costly reputation loss. Therefore, it is crucial to explore the association between audit workload and audit conservatism as a mechanism to mitigate audit risks. Using a new audit engagement database provided by PCAOB to measure the workload at the partner level, this study argues that the probability of issuing modified audit opinion and going concern opinion is predicted to increase as the audit workload escalates conditional on the ability to manage the workload. The findings show that audit workload induces over-conservatism as it increases the probability of modifying audit opinion and committing a type I error by reducing the accuracy of going concern opinion. This study also demonstrates that the workload effect is less severe for audit firms with sufficient resources and industry-specific knowledge that necessary to manage the workload effectively. This study examines the determinants of audit conservatism from the auditor side, while current literature focuses more on the client's characteristics. This study sheds light on the importance of the audit resources to mitigate the stress effect. However, this study is unable to observe the number of non-listed audit clients of audit firms due to the limitations of audit engagement database.

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PUBLIC INTEREST STATEMENT

The effect of workload stress on performance has been examined for a long time. This study uses an audit perspective in evaluating the consequences of workload stress. When handling a high audit workload, auditors tend to encounter a cognitive problem due to limited attention. As a result, auditors face higher audit risk, a probability of issuing a clean audit opinion to the client with financial report misstatements. To mitigate this risk, auditors may increase their conservatism in evaluating audit evidence. The findings of this study show that auditors tend to issue conservative audit opinions when handling high audit workload. Moreover, this study also demonstrates that auditors that have sufficient resources in managing workload have a lower probability of issuing conservative audit opinions. The findings suggest that the ability to manage workload will moderate the effect of workload stress.

Subjects: Multidisciplinary Psychology; Cognitive Psychology; Business, Management and Accounting

Keywords: audit conservatism; auditor workload stress; modified audit opinion; going concern opinion

1. Introduction

Audit industry has been growing gradually in recent years, and auditor workload stress has intensified because of increasing clients' demands and tougher regulators' requirements (IOSCO, I. O. o. S. ca. 2009; Janie et al., 2017). For instance, audit industry grows 4.5% per annum¹ indicating that auditors have been facing high audit demands. Moreover, US auditors have been handling higher workload in one audit engagement because US audit standards require auditors to conduct audit on internal control over financial reporting as an integral part of audit on financial statements (PCAOB, P. C. A. O. B, 2017). Meanwhile, the PCAOB (Public Company Accounting Oversight Board) has been concerned with the increasing audit workload as it may encourage the engagement team to complete audit assignments too quickly (PCAOB, P. C. A. O. B, 2012). As a result, the PCAOB has proposed a workload metrics as an important operation input of a good quality audit (PCAOB, P. C. A. O. B, 2013, 2014). Moreover, auditors have been facing higher litigation risks recently as pointed out by Anantharaman et al. (2016).

Audit literature indicates that audit workload stress would adversely affect audit quality as auditors have limited attention to appropriately implement audit procedures to many audit clients in the same time (Gul et al., 2017; López & Peters, 2012). This limited cognitive ability due to the busyness may inflate the probability of committing type II error² (Coram et al., 2004; Kelley & Margheim, 1990; Margheim et al., 2005). Since the costs of committing type II error involve litigation risks and reputation damage (Berglund et al., 2018), auditors are incentivized to protect their career when they are overloaded. Current literature on audit workload, to our knowledge, does not examine the workload effect from auditors' tendency to mitigate the potential litigation. Therefore, this study aims to examine the effect of audit workload on audit conservatism to mitigate litigation risks.

To investigate the effect of audit workload on audit conservatism, this study uses the United States of America data. The audit clients' financial data are from COMPUSTAT and Audit Analytics database. The observation year span from 2013 to 2017 due to the limited audit workload data retrieved from PCAOB recent database. Audit conservatism is measured as the propensity of issuing conservative audit opinions while audit workload is measured as the number of audit client at the partner level.

The findings of this study indicate that auditors tend to be more conservative by modifying audit opinions when they are overloaded. Further, this study demonstrates that busy auditors are likely to commit type I error by issuing going concern opinion (**GCO**) for clients that subsequently survive. One plausible reason is the costs of type I error that include client dismissal may be less severe than the cost of type II error especially for big audit firm (Berglund et al., 2018). Consistent with Lennox and Kausar (2017) and Kim et al. (2003), this study also shows that the workload effect is more severe when overloaded auditors work for clients with financial distress and high probability to commit fraud.

Lastly, the effect of audit workload stress could be conditional on auditor's ability to handle the workload (Goodwin & Wu, 2016; Yan & Xie, 2016). One way to mitigate audit workload stress is by devoting more resources into audit although this strategy is limited to the availability of resources during audit busy season (López & Peters, 2011). Literature suggests that audit resources such as network and expertise are useful to boost audit performance (Bills et al., 2016a; DeAngelo, 1981; Sirois & Simunic, 2016). This study finds that workload stress effect is less severe in big four firms

and specialists. Hence, this study demonstrates that industry specific knowledge is significant to effectively manage audit works (Low, 2004; O'Keefe et al., 1994; Reichelt & Wang, 2010).

This study is different from previous studies in some aspects. This study focuses on audit conservatism as a means to mitigate audit risk while prior studies examine audit quality as an outcome of audit process. The relation between audit conservatism and audit quality is not monotonic as audit conservatism may increase audit quality to a certain level but over-conservatism leads to lower audit quality (DeFond & Zhang, 2014). Further, Goodwin and Wu (2016) show that Australian audit workload does not affect audit quality when it is in equilibrium. Meanwhile, this study uses US setting that has the highest litigation risk in the world (Ramseyer & Rasmusen, 2010) and December audit busiest season and these may push the workload from its equilibrium. As a result, this study observes the effect of audit workload as Goodwin and Wu (2016) that also observe the effect of audit workload during disequilibrium period in Australia.

This study contributes to the audit literature in several ways. First, the current research on audit conservatism mainly focuses on client's characteristics (demand side) and this study examines auditor characteristics (supply side) as the determinants of audit conservatism. It is reasonable to expect that auditors tend to become more conservative when a client's misstatement risk is high due to high accrual uncertainty (Francis & Krishnan, 1999), engaging with an auditor subject to litigation (Cahan & Wei, 2006; Fafatas, 2010; Feldmann & Read, 2010), high bankruptcy risk (Lennox & Kausar, 2017), and high business risk (Lu & Sapra, 2009). Nonetheless, the implications for audit conservatism are unclear when auditors' ability to implement audit procedures effectively is compromised by workload stress. This study finds that auditors increase their audit conservatism level to cope with the increased workload stress. The findings are consistent with neuroscience study by Innes and Kitto (1989) that suggests persons who realize that they are becoming stressed will change their behavior to ameliorate the psychological reactions to the stressor.

Second, this study sheds light on a better understanding of how the ability to manage workload such as audit resources and knowledge affect the likelihood of increasing audit conservatism to combat workload stress. Lennox and Wu (2018) suggest that current literature shows mixed results related to the outcome of auditor workload stress and it is possibly due to the variability of auditor's ability in managing workload stress. This study provides a better understanding of under what circumstances auditors with workload stress are more inclined to increase their audit conservatism. The findings suggest that auditors of big audit firms experience less stress effects and are less likely to issue an MAO/GCO as they have sufficient resources to manage workload stress. This study also reveals that the workload stress effects are lower for industry specialist auditors.

Finally, the results of this study are beneficial to the audit profession, regulators, and investors by showing the determinants of audit conservatism. Understanding the determinants of audit conservatism is useful because receiving MAO may incentivize the client to engage in opinion shopping (Lennox, 2000), to avoid the negative consequences of the MAO such as negative stock return (Dopuch et al., 1986), lower earnings response coefficient (Choi & Jeter, 1992), higher interest loans (Chen et al., 2016), and over-investment (Lu & Sapra, 2009). This study lends evidence to the importance of monitoring auditor workload as proposed by PCAOB, P. C. A. O. B (2013). The results also contribute to the debate about stress management in audit firms for maintaining a good audit performance.

2. Literature review and hypothesis development

Stress is a construct of individuals' response in internalizing and representing pressure within their cognitive processes (DeZoort & Lord, 1997). A workload stress refers to a stress due to heavy workload or having too much audit work to perform and could be induced by lack of resources to manage the workload (DeZoort & Lord, 1997; Lennox & Wu, 2018). Literature indicates that occupational stress affects decision-making (Ganster, 2005) and audit outcome (DeZoort & Lord,

1997) as individuals change their behavior to ameliorate the psychological reactions to the stressors (Innes & Kitto, 1989). To deal with audit workload, a survey by CPA Firm Management Association, C (2016) shows that auditors may improve audit efficiency through devoting more resources to the audit work such as develop a better planning, use advanced technology to manage the workload, and improve auditors' capabilities through training during low season.³

Workload stress may reduce auditors' cognitive ability to implement audit procedures (Margheim et al., 2005) and increase the audit risk. As a result, busy auditors may compromise the quality of audit work, for example, by accepting the words of a client's employee as an audit evidence (Coram et al., 2004). Gul et al. (2017) show that the overloaded Chinese auditors tend to lose control of clients' earnings management although their findings may be subject to limitations as China has lower litigation risks than most developed countries. López and Peters (2012) also demonstrate that financial year-end audit workload associates with high client's abnormal accruals though the workload measure is indirectly assess the auditors' workload.

However, auditors are not without adjustment ability (Bills et al., 2016b). As intensifying audit procedures need more resources such as time, budget, and staff which are usually not immediately available especially in the busy season (López & Peters, 2011), overloaded auditors may set the audit conservatism level higher to maintain the audit risk at an acceptable level. Increasing conservatism when coping with the workload stress is necessary to anticipate committing type II error, i.e., granting unmodified opinion for financial reports that contain undetected material misstatements. Committing type II error will be detrimental and costly to auditor's reputation as it may trigger litigation and jeopardize future business. However, increasing conservatism may induce type I error by issuing conservative opinion for financial reports that do not contain material misstatements. Berglund et al. (2018) suggest that type II error costs include reputation damage and litigation that may be larger than client dismissal due to type I error. Furthermore, as busy auditors have many clients to handle, auditors should be more independent to report any misstatement found in the client's financial reports because they are less likely to be dependent on a certain client (DeAngelo, 1981). Therefore, given high audit risk and litigation risk from handling many clients, busy auditors are incentivized to be more independent to apply conservative audit judgment in order to mitigate potential litigation risks.

H1: Audit workload stress increases audit conservatism.

However, Goodwin and Wu (2016) argue that auditors would optimally set the workload by balancing the marginal benefits and the marginal cost of having an additional audit. As a result, audit workload may not have any impact on audit outcome. Nevertheless, Goodwin and Wu (2016) observe the effect of audit workload during disequilibrium period in Australia characterized by high litigation and high workload as the common feature of US audit market.

Auditing literature shows that audit firm resources may affect the audit outcome. Prior studies show that audit firms with more resources are able to effectively handle audit work (DeAngelo, 1981; Ocaik, 2018; Sirois & Simunic, 2016). With the networks, expertise, and technology, larger audit firms will be more efficient and effective in managing workload. Although small in size, a firm with more resources such as networks and expertise has better performance (Bills et al., 2016a; 2016b). From the resources point of view, one may expect that the impact of an auditor's workload stress would be less severe on big audit firms. This study argues that a firm's resources moderate the effect of auditor workload stress because the audit firm has direct control over its resources to cope with the pressure.

H2: The workload stress effect is moderated by audit firms resources.

3. Research design

3.1. Audit conservatism model

This study defines audit conservatism as the probability that an auditor will issue a modified audit opinion (**MAO**) that takes the value of 1 if the client i 's audit opinion is not an unqualified opinion in year t and zero otherwise (Firth et al., 2012; Francis & Krishnan, 1999; Krishnan & Stephens, 1995). This study also uses going concern opinion (**GCO**) as a second proxy of audit conservatism that takes the value of 1 if client i receives a going concern opinion in year t and zero otherwise (Anantharaman et al., 2016; Fafatas, 2010; Krishnan et al., 2007).

To examine whether auditor workload stress affects the likelihood of issuing **MAO** and **GCO**, this study uses this following probit model to test the conjectures:

$$\text{Prob}(\text{MAO/GCO})_{i,t} = \beta_0 + \beta_1 \text{NCLIENT}_{i,t} + \beta_2 \text{AUDFEES}_{i,t} + \beta_3 \text{DUM_TENURE}_{i,t} + \beta_4 \text{ACCRUAL}_{i,t} + \beta_5 \text{COMPLEX}_{i,t} + \beta_6 \text{LNMV}_{i,t} + \beta_7 \text{ROA}_{i,t} + \beta_8 \text{LEV}_{i,t} + \beta_9 \text{BM}_{i,t} + \gamma_t + \delta_j + \varepsilon_{i,t} \quad (1)$$

The model also includes year (γ_t) and auditor (δ_j) fixed effects to control for unobservable time-invariant factors. The coefficient β_1 is expected to be significantly positive implying that the workload stress increases audit conservatism.

This study uses the number of audit clients per partner to measure audit workload stress. The PCAOB AuditorSearch database reports audit engagement information such as audit firms, audit partners, listed clients' identity, audit report dates, and other engagement details that can be used to count the number of audit clients at the partner level. **NCLIENT** is defined as the natural logarithm of audit client numbers per partner, based on the audit report year t . In addition, the size of client may increase audit workload as the bigger the client the more complex the client's operation and financial reports and it may introduce higher litigation risks (Carcello et al., 2000; Carson et al., 2004; Reynolds & Francis, 2001). Therefore, this study constructs a workload measure, **WLSIZE**, by combining the **NCLIENT** and client size through principle component analysis. These measures will differentiate this study from previous US studies such as López and Peters (2011) and López and Peters (2012) that used busyness in December financial year-end.

3.2. Control variables

Some control variables are involved in the analysis. Auditor's incentives to modify audit opinion such as the extent of the audit effort and the length of auditor-client relationship could influence auditor's judgment (Blankley et al., 2012; Li, 2010). The extent of audit effort is measured by the natural logarithm of 1 plus the audit fee received from client i in year t (**AUDFEE**) as proposed by Hogan and Wilkins (2008) and DeFond and Zhang (2014). Audit tenure is calculated based on auditor data available on Compustat since 1974. The audit tenure (**DUM_TENURE**) is then classified into three groups as short if the tenure is less than or equal to 3 years, medium if the tenure is four to 8 years, and long if the tenure is longer than 9 years following Bell et al. (2015), Carey and Simnett (2006), and Johnson et al. (2002).

Client's characteristics may also influence audit outcome. Discretionary accruals (**ACCRUAL**) by Dechow et al. (1995) is used to control for the misstatement risk as abnormal accruals reflect the level of managerial judgment and intention to misstate the financial report (Armstrong et al., 2013; Cahan & Wei, 2006; Feldmann & Read, 2010; Lie et al., 2016; Widyaningsih et al., 2019). Moreover, a client's business complexity (**COMPLEX**) is related to financial report complexity that may inflate the client's misstatement risk. This study uses the natural logarithm of 1 plus the client's total assets at the end of year t to measure the client's financial report complexity. Further, the more extensive the audit procedures, the higher the likelihood that auditor will modify the audit opinion. Client size, measured as client's market value of equity at the end of fiscal year t (**LNMV**), is controlled as client's litigation risk may inflate audit conservatism (Latham & Linville, 1998; Reynolds & Francis, 2001; Watts & Zimmerman, 1978). Other control variables are adopted

from previous literature such as the client's profitability (**ROA**), leverage (**LEV**), and book to the market (**BM**) ratio (Goodwin & Wu, 2016; Gul et al., 2017; López & Peters, 2012).

3.3. Sample and descriptive statistics

This study uses US firms available on COMPUSTAT and AuditAnalytics database. The audit workload measures at the partner level retrieved from PCAOB auditor database. This study has 7,091 observations comprise 4,256 audit clients that listed in the US capital market and 216 audit firms registered with PCAOB that has all the variables necessary for analysis from the year of 2013 to 2017. These data are analyzed as they are under the regulation of most litigious country (Ramseyer & Rasmusen, 2010) to minimize the incentive of manipulating financial statement.

Table 1 reports the descriptive statistics of the variables used in this study. All variables are winsorized at the top and bottom 1% to minimize the effect of outliers. The average number of client is three companies per year and the maximum is 87, indicating that US auditors usually have high audit workload. The average audit tenure is eleven years, and as shown in panel C almost 50% of the sample has been audited by the same firms for more than 9 years. Panel B shows that samples with an **MAO** are 21% and about 13% of the sample received a **GCO**. Big four audit firms have audited about 65.2% of sample, and this is comparable to the findings of Francis et al. (2013).

Correlation analysis is presented in Table 2 to examine the relationship between the variables involved in the model. The correlation matrix shows that **GCO** and **MAO** are highly correlated (0.711) which indicating that both may represent the same concept of audit conservatism. Similarly, the correlation between **NCLIEN** and **WLSIZE** is 0.754 suggesting that both denote audit workload measure. Further, **MAO** and **GCO** have positive and significant correlation with **NCLIEN** and **WLSIZE**, implying that auditor busyness may increase audit conservatism.

4. Empirical results

The first probit analysis is to predict the likelihood of issuing an **MAO** and **GCO** using **NCLIEN** (**WLSIZE**) as the variable of interest. The results of equation (1) analysis are presented in Table 3. The positive and statistically significant coefficient estimate of **NCLIEN** indicates that workload stress increases the audit conservatism. The marginal effects of **NCLIEN** on **MAO** (**GCO**) presented in Panel B imply that the audit workload increases the probability of issuing an **MAO** (**GCO**) by 3% (2.3%), holding other variables constant. Meanwhile, the effect of **WLSIZE** in increasing the probability of issuing an **MAO** (**GCO**) is 2.5% (1.2%).

The finding is thus consistent with H_1 which posits that workload stress increases audit conservatism. The results show that overloaded auditors are likely to increase their conservatism although it may increase the probability to commit audit error due to over-conservative. If auditors are over-conservative due to the workload, auditors are more likely to commit type I audit error when handling high audit workload.

4.1. Audit workload and over-conservatism

Audit literature introduces two types of audit error related to audit conservatism. An auditor commits a type I error when the auditor releases an **MAO** for financial reports without material misstatements. Type I error may be induced by audit conservatism as the auditor underestimates the state of the client's financial report (DeFond et al., 2016) to maintain the audit risk at an acceptable level and anticipate any future litigation risk. Meanwhile, type II error occurs when auditors fail to modify audit opinions for financial reports with material misstatements (Berglund et al., 2018; DeFond et al., 2016). If workload stress inflates audit conservatism, this study expects to observe a significant association between workload stress and the likelihood of committing a type I error. To examine this conjecture, this study focuses on clients that receive a **GCO** and checks whether those clients file for bankruptcy under US Bankruptcy Code Chapter 7 (liquidation) or Chapter 11 (reorganization) during the subsequent 12 months.

Table 1. Descriptive statistics

Panel A quantitative variables

Variable	N	Mean	S.D.	Quantiles					
				Min	0.25	Mdn	0.75	Max	
CLIENT NUMBER	7,091	3.58	5.55	1.00	1.00	2.00	4.00	87.00	
WLSIZE	7,091	0.00	1.00	-0.47	-0.47	-0.28	0.08	15.04	
TENURE	7,091	11.28	8.93	1.00	4.00	8.00	16.00	38.00	
AUDFEES	7,091	13.63	1.55	9.80	12.59	13.79	14.71	16.81	
ACCRUAL	7,091	-0.50	2.23	-14.56	-0.19	-0.02	0.06	3.36	
COMPLEX	7,091	6.06	2.71	0.04	4.20	6.25	8.01	11.27	
LNMV	7,091	6.24	2.51	0.63	4.36	6.42	8.05	11.29	
ROA	7,091	-0.43	1.96	-15.65	-0.17	0.03	0.09	0.39	
LEV	7,091	0.62	2.66	-9.86	0.00	0.31	0.97	13.21	
BM	7,091	0.36	1.11	-6.42	0.14	0.34	0.63	4.43	

Panel B dichotomous variables

	0		1	
	N	(%)	N	(%)
MAO	5,540	78.13	1,551	21.87
GCO	6,101	86.04	990	13.96
BIG4	2,462	34.72	4,629	65.28
SPECIALIZATION	6,036	85.12	1,055	14.88

Panel C audit tenure categories

	N	(%)
Short	1,245	17.56
Medium	2,304	32.49
Long	3,542	49.95
Total	7,091	

This table shows the distribution of the categorical variables. Panel A presents the distribution of the dichotomous variables and Panel B displays the distribution of the audit tenure categories.

Table 2. Correlation analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) MAO	1.000													
(2) GCO	0.711*	1.000												
(3) NCLIENT	0.225*	0.335*	1.000											
(4) WLSIZE	0.233*	0.326*	0.754*	1.000										
(5) BIG4	-0.275*	-0.396*	-0.343*	-0.294*	1.000									
(6) DUM_TENURE	-0.102*	-0.131*	-0.112*	-0.088*	0.209*	1.000								
(7) SPECIALIZATION	0.009	0.021	0.041*	-0.011	0.099*	-0.053*	1.000							
(8) ACCRUAL	-0.059*	-0.063*	-0.010	-0.001	0.025*	-0.002	-0.080*	1.000						
(9) COMPLEX	-0.361*	-0.553*	-0.431*	-0.355*	0.652*	0.259*	-0.049*	-0.005	1.000					
(10) AUDFEES	-0.316*	-0.498*	-0.450*	-0.377*	0.662*	0.225*	-0.014	0.004	0.898*	1.000				
(11) LNMV	-0.348*	-0.518*	-0.380*	-0.309*	0.639*	0.237*	0.003	-0.003	0.903*	0.836*	1.000			
(12) ROA	-0.323*	-0.456*	-0.298*	-0.314*	0.271*	0.108*	-0.021	0.078*	0.435*	0.402*	0.331*	1.000		
(13) LEV	-0.056*	-0.104*	-0.070*	-0.059*	0.118*	0.032*	-0.018	-0.012	0.186*	0.161*	0.144*	0.081*	1.000	
(14) BM	-0.206*	-0.300*	-0.119*	-0.125*	0.116*	0.018	-0.026*	0.055*	0.225*	0.126*	0.133*	0.245*	0.145*	1.000

This table displays the Pearson correlation of all variables in this study. The sample is non-financial public companies listed on Compustat for the years 2013 to 2017. *** p < 0.01, ** p < 0.05, * p < 0.1.

Table 3. The effect of audit workload stress on audit conservatism

VARIABLES	(1) MAO	(2) MAO	(3) GCO	(4) GCO
Panel A probit analysis				
NCLIENT	0.13*** (0.04)		0.20*** (0.05)	
WLSIZE		0.11*** (0.02)		0.11*** (0.03)
AUDFEES	0.12*** (0.03)	0.12*** (0.03)	0.07 (0.05)	0.07 (0.05)
DUM_TENURE	-0.05* (0.03)	-0.05 (0.03)	-0.13*** (0.04)	-0.13*** (0.04)
ACCRUAL	-0.03*** (0.01)	-0.03*** (0.01)	-0.04** (0.02)	-0.04** (0.02)
COMPLEX	-0.05* (0.03)	-0.05* (0.03)	-0.21*** (0.04)	-0.21*** (0.04)
LNMV	-0.14*** (0.02)	-0.14*** (0.02)	-0.32*** (0.03)	-0.32*** (0.03)
ROA	-0.14*** (0.02)	-0.14*** (0.02)	-0.15*** (0.03)	-0.15*** (0.03)
LEV	0.01* (0.01)	0.01* (0.01)	0.01 (0.01)	0.01 (0.01)
BM	-0.13*** (0.02)	-0.13*** (0.02)	-0.16*** (0.03)	-0.16*** (0.03)
Constant	-1.76*** (0.42)	-1.62*** (0.41)	-0.24 (0.64)	0.07 (0.62)
Pseudo R2	0.19	0.20	0.50	0.50
Observations	7,083	7,083	7,079	7,079
Year and auditor fixed effects	Yes	Yes	Yes	Yes
Panel B marginal effect				
NCLIENT	3.0%		2.3%	
WLSIZE		2.5%		1.2%
AUDFEES	2.8%	2.9%	0.7%	0.8%
DUM_TENURE	-1.1%	-1.1%	-1.4%	-1.4%
ACCRUAL	-0.7%	-0.8%	-0.4%	-0.4%
COMPLEX	-1.1%	-1.2%	-2.3%	-2.4%
LNMV	-3.4%	-3.4%	-3.6%	-3.6%
ROA	-3.4%	-3.4%	-1.6%	-1.6%
LEV	0.3%	0.3%	0.2%	0.2%
BM	-3.0%	-3.0%	-1.8%	-1.8%

This table shows the results of probit analysis of equation (1). Panel A shows the probit analysis results while Panel B reports the marginal effect. Robust standard errors are in parentheses. ***, **, and * show significance at 1%, 5%, and 10%, respectively.

US firms' bankruptcy data are collected from the UCLA-LoPucki Bankruptcy Research Database (BRD) that provides 1,128 bankruptcy cases from 1980 to 2018. After cleaning the data, 1,118 observations are merged with the sample. This study creates **ERROR1** variable that takes the value of 1 if the client *i* receives GCO in year *t* and does not file for bankruptcy in year *t* + 1 and **ERROR2** that takes the value of 1 if client *i* does not receive a GCO in year *t* but files for bankruptcy in year

$t + 1$. To examine the effect of workload stress on type I error, this study runs probit analysis of equation (1) and changes *MAO/GCO* to *ERROR1/ERROR2*.

Table 4, column (1) and (2), shows that workload stress (*NCLIENT* and *WLSIZE*) positively affects the propensity for committing type 1 error. The marginal effect of *NCLIENT* (*WLSIZE*) in

Table 4. The effect of audit workload stress on the likelihood of Type I/II error

VARIABLES	(1) ERROR1	(2) ERROR1	(3) ERROR2	(4) ERROR2
Panel A probit analysis				
<i>NCLIENT</i>	0.21*** (0.05)		-0.10 (0.12)	
<i>WLSIZE</i>		0.11*** (0.03)		-0.23 (0.15)
<i>AUDFEES</i>	0.07 (0.05)	0.07 (0.05)	-0.03 (0.15)	-0.04 (0.15)
<i>DUM_TENURE</i>	-0.12*** (0.04)	-0.13*** (0.04)	-0.04 (0.12)	-0.04 (0.12)
<i>ACCRUAL</i>	-0.04** (0.02)	-0.04** (0.01)	0.05 (0.03)	0.05 (0.04)
<i>COMPLEX</i>	-0.22*** (0.04)	-0.23*** (0.04)	0.13 (0.09)	0.13 (0.09)
<i>LNMV</i>	-0.31*** (0.03)	-0.31*** (0.03)	-0.09 (0.07)	-0.08 (0.08)
<i>ROA</i>	-0.14*** (0.03)	-0.14*** (0.03)	0.97** (0.45)	0.96** (0.45)
<i>LEV</i>	0.01 (0.01)	0.01 (0.01)	-0.03 (0.03)	-0.03 (0.03)
<i>BM</i>	-0.16*** (0.03)	-0.16*** (0.03)	-0.12*** (0.05)	-0.13** (0.05)
Constant	-0.31 (0.64)	0.00 (0.62)	-1.86 (1.70)	-1.95 (1.69)
Pseudo R2	0.50	0.50	0.11	0.11
Observations	7,079	7,079	6,116	6,116
Year and auditor fixed effects	Yes	Yes	Yes	Yes
Panel B marginal effect				
<i>NCLIENT</i>	2.3%		-0.1%	
<i>WLSIZE</i>		1.2%		-0.2%
<i>AUDFEES</i>	0.8%	0.8%	0.0%	0.0%
<i>DUM_TENURE</i>	-1.4%	-1.4%	0.0%	0.0%
<i>ACCRUAL</i>	-0.4%	-0.4%	0.0%	0.0%
<i>COMPLEX</i>	-2.5%	-2.5%	0.1%	0.1%
<i>LNMV</i>	-3.4%	-3.4%	-0.1%	-0.1%
<i>ROA</i>	-1.6%	-1.6%	0.8%	0.8%
<i>LEV</i>	0.1%	0.1%	0.0%	0.0%
<i>BM</i>	-1.8%	-1.8%	-0.1%	-0.1%

This table shows the results of a probit analysis of equation (1) with Error1/Error2 as the dependent variable. Robust standard errors are in parentheses. ***, **, and * show significance at 1%, 5%, and 10%, respectively.

increasing audit error type I probability suggests that increasing audit workload will increase the probability to mistakenly issue GCOs by 2.3% (1.2%). If the workload stress is positively associated with type I error, one may suggest that stressed auditors are less likely to commit type II error. As expected, results in column (3) and (4) indicate that workload stress is not associated with the propensity for committing type II error. Therefore, this study shows that auditors are more likely to increase audit conservatism rather than to lose control over many audit works.

This study suggests that overloaded auditors tend to not lose control over their audit works and commit type II error by to issuing clean opinion for clients with material misstatement. Berglund et al. (2018) argue that auditors are likely to be conservative to avoid costly reputation and litigation risks due to committing type II error. The results echo the findings of Hermanson et al. (2016) that interview some auditors and find that auditors recognize their workload pressure but they would not compromised their reputation by committing type II error. This study also shows that the workload stress effect is more pronounced when the clients experience financial difficulties and have high probability to commit fraud. The results, therefore, are consistent with Eutsler et al. (2016) that suggests that auditors modify audit opinion to mitigate regulatory litigation.

4.2. Audit workload, conservatism, and client risk

If auditors are likely to protect their reputation by becoming more conservative when handling high audit workload, auditors should be more conservative when working for clients with financial statements risks. Specifically, this study supposes that the effect of workload stress on audit conservatism will be more pronounced if auditors examine financial reports of risky clients. This study defines risky clients as clients with financial distress and clients with high probability to commit fraud.

Berglund et al. (2018) show that clients with financial distress are more likely to receive GCO. Lennox and Kausar (2017) also suggest that higher uncertainty in bankruptcy risk will induce auditor to issue GCO. Therefore, this study posits that the effect of audit workload on audit conservatism will be more pronounced in financially distressed clients. This study identifies a client as being financially distressed if it has a negative net income and negative operating cash flow at year t , as proposed by Brown and Knechel (2016) and Berglund et al. (2018). To examine this argument, this study runs equation (1) in sub-samples of clients with and without financial distress and the results are presented in Table 5 panel A.

Consistent with previous studies (Berglund et al., 2018; Lennox & Kausar, 2017), these results report that workload from audit clients with financial distress inflates the probability of issuing **MOA (GCO)**. Higher audit workload (**NCLIENT**) with financially distressed clients increases the probability of issuing **MOA (GCO)** by 6.5% (5.7%), holding other variables constant. The marginal effects of **NCLIENT (WLSIZE)** reported in Table 5 column (1) to (4) are higher than those reported in Table 3 suggesting that client's financial distress induces higher conservatism on busy auditors.

Furthermore, auditors tend to modify audit opinion when the clients have a higher probability to engage in misreporting. Prior literature, such as Carcello and Nagy (2004) and Francis and Krishnan (1999), demonstrates that client's misstatement risk leads to higher probability of GCO issuance. Consequently, the effect of workload stress on audit conservatism will be more noticeable when the clients are more likely to commit fraud. To identify the client's fraud likelihood, this study uses fraud probability score (**F-SCORE**) resulted from the fraud prediction Model I developed by Dechow et al. (2011). This study classifies audit clients with **F-SCORE** that is above the median as clients with high propensity to engage in accounting misstatement. To investigate this argument, this study runs equation (1) in two sub-samples of clients with high **F-SCORE** and low **F-SCORE**.

The results in Table 5 panel B indicate that workload stress from auditing clients with high fraud likelihood induces higher probability to become conservative. For instance, increasing the number of client (**NCLIENT**) with high likelihood to commit fraud will increase the probability of issuing **MAO**

Table 5. The marginal effect of audit workload stress on audit conservatism by controlling client' risks

VARIABLES	(1) MAO	(2) GCO	(3) MAO	(4) GCO	(5) MAO	(6) GCO	(7) MAO	(8) GCO
Panel A client's financial distressed								
	Distressed	Distressed	Distressed	Distressed	Non-Distressed	Non-Distressed	Non-Distressed	Non-Distressed
NClient	6.5%*** (0.06)	5.7%*** (0.06)			0.1% (0.06)	0.4% (0.10)		
WLSIZE			3.7%*** (0.03)	3.3%*** (0.04)			1.3%*** (0.03)	0.2% (0.04)
Control	Included	Included	Included	Included	Included	Included	Included	Included
Pseudo R2	0.27	0.36	0.27	0.36	0.07	0.45	0.07	0.45
Observations	2,160	2,160	2,160	2,160	4,912	4,903	4,912	4,903
Year & auditor fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B client's fraud probability								
	High F-SCORE	High F-SCORE	High F-SCORE	High F-SCORE	Low F-SCORE	Low F-SCORE	Low F-SCORE	Low F-SCORE
NClient	5.5%*** (0.07)	3.9%*** (0.08)			1.6% (0.05)	1.6%*** (0.07)		
WLSIZE			2.6%*** (0.03)	1.4%*** (0.04)			2.3%*** (0.03)	1.0%*** (0.04)
Control	Included	Included	Included	Included	Included	Included	Included	Included
Pseudo R2	0.30	0.55	0.30	0.55	0.16	0.48	0.16	0.49
Observations	1,768	1,766	1,768	1,766	5,313	5,303	5,313	5,303
Year & auditor fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table shows the results of a probit analysis of equation (1) run in sub-samples. To simplify the interpretation, the marginal effects are reported in lieu of estimated coefficients. Control variables are included but not reported to abbreviate the table. Robust standard errors are in parentheses. ***, **, and * show significance at 1%, 5%, and 10%, respectively.

(**GCO**) by 5.5% (3.9%), holding other variables constant. These marginal effects are larger than those reported in Table 3 signifying that the client's fraud probability exacerbates the effect of workload stress on audit conservatism. Thus, the findings are consistent with the notion that overloaded auditors tend to be more conservative in performing audit for clients with high propensity to commit fraud (Agoglia et al., 2010; Allen et al., 2006; Gold et al., 2012).

4.3. The moderating effect of auditor's resources

The previous findings demonstrate that workload stress induces audit conservatism and the effect is getting severe when auditors are preoccupied by audit clients with financial difficulties or high likelihood to commit fraud. However, this study argues that auditors have resources that can be used to manage the workload and reduce the stress level. For example, Bills et al. (2016a) report that small audit firms that connected to expert network perform better audit than their counterparts without the network. By possessing the networks, expertise, and technology, an audit firm may handle the audit work effectively and mitigate the stress effect. Therefore, this study conjectures that the workload stress effect is more severe in audit firms with fewer resources necessary to handle the workload properly.

To proxy for auditor's resources and examine its moderating effect, this study uses auditor's firm size and auditor's industry specialization. DeAngelo (1981) and Sirois and Simunic (2016) suggest that big size auditors possess networks, expertise, and technology that can be used to manage the workload effectively. This study uses big four and non-big four dichotomous variables (**BIG4**) to measure audit firm size. It takes the value of 1 if the audit firm i is Ernst & Young (EY), PricewaterhouseCoopers (PWC), KPMG, or Deloitte Touche Tohmatsu (Deloitte) and zero otherwise.

Further, Low (2004) shows that auditor's specialization improves audit risk assessment and it may alleviate the audit workload. Specialization in the client's industry may provide a better knowledge of the industry's business processes and risks that would improve the auditor's technical skill in implementing audit procedures (O'Keefe et al., 1994). This study measures audit specialization as a dichotomous variable that takes the value of 1 if auditor is specialized in client's industry and zero otherwise. To define auditor industry specialization, this study uses the highest auditor's industry market share in a given year.

To examine the moderating effect of firm size, equation (1) is run in two sub-sample of big four and non-big four. The results presented in Table 6 panel A show that the effect of workload stress is more pronounced in non-big four firms. For instance, increasing one unit of client number (**NCLIENT**) will increase the probability of issuing **MAO (GCO)** by 5.7 (5) percent, holding other variables constant. However, big four firms do not experience severe stress effect as shown in column (1) to (4). Therefore, the findings suggest that firms with resources of expertise, technology, and network may handle the workload effectively then the workload stress effect is minimized.

In addition to firm size, auditor may benefit from special knowledge earned during engagement with particular industry. This industry specialization may help auditor to moderate the stress effect. Table 6 panel B shows that auditors with industry specialization do not experience severe stress effect as they have special knowledge that relevant to use in auditing clients from certain industry. As shown in column (5) to (8), the workload stress is significantly increasing audit conservatism of non-specialists. The evidence, thus, supports the supposition that auditors' knowledge helps auditor in managing the workload and minimizing its effect (Gul et al., 2009; Habib, 2013).

5. Conclusion

This study examines the effect of audit workload stress on audit conservatism. This study conjectures that workload stress increases audit conservatism in order to protect their reputation by maintaining audit risk at an acceptably low level and to avoid future litigation risk. This study uses companies listed on the US stock market and audit firms registered with US PCAOB as US is one of the most litigious countries to control for the client's financial reporting quality. The findings of this research show that audit workload, as measured by partners' audit client number (**NCLIENT**) and

Table 6. The moderating effect of auditors' resources

VARIABLES	(1) MAO	(2) MAO	(3) GCO	(4) GCO	(5) MAO	(6) MAO	(7) GCO	(8) GCO
Panel A audit firm size								
	Big4	Big4	Big4	Big4	Non-Big4	Non-Big4	Non-Big4	Non-Big4
NClient	-1.3% (0.07)		0.0% (0.13)		5.7%*** (0.05)		5.0%*** (0.06)	
WLSize		-0.9% (0.10)		0.3% (0.18)		2.6%*** (0.03)		1.9%*** (0.03)
Control	Included	Included	Included	Included	Included	Included	Included	Included
Pseudo R2	0.06	0.06	0.36	0.36	0.26	0.26	0.43	0.42
Observations	4,623	4,623	4,623	4,623	2,447	2,447	2,443	2,443
Year & auditor fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B audit specialization								
	Specialist	Specialist	Specialist	Specialist	Non-Specialist	Non-Specialist	Non-Specialist	Non-Specialist
NClient	0.7% (0.12)		-2.7% (0.15)		3.0%*** (0.04)		2.6%*** (0.06)	
WLSize		1.3% (0.09)		-1.5%* (0.07)		2.5%*** (0.02)		1.2%*** (0.03)
Control	Included	Included	Included	Included	Included	Included	Included	Included
Pseudo R2	0.21	0.21	0.49	0.49	0.20	0.20	0.52	0.52
Observations	1,049	1,049	1,049	1,049	6,012	6,012	6,026	6,026
Year & auditor fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table shows the results of a probit analysis of equation (1) run in sub-samples. To simplify the interpretation, the marginal effects are reported in lieu of estimated coefficients. Control variables are included but not reported to abbreviate the table. Robust standard errors are in parentheses. ***, **, and * show significance at 1%, 5%, and 10%, respectively.

client number factored by client's size (**WLSIZE**), increases audit conservatism, proxied by the probability of issuing MAOs and GCOs. Audit workload stress also increases the likelihood of making type I error as stressed auditors are more likely to be over-conservative and issue GCOs mistakenly for clients that subsequently do not file for bankruptcy. This study suggests that overloaded auditors tend to not lose control over their audit works and commit type II error by to issuing clean opinion for clients with material misstatement. The findings are robust to several workload stress alternative measures and specifications.⁴

With regard to the moderating effect of firm size, this study finds that the workload stress effect is more pronounced in non-big four firms. Therefore, the results suggest that when audit firms are industry specialist, busy audit firms are less likely to modify the audit opinion. Again, this evidence supports the notion that audit resources including knowledge are essential for managing audit workload and minimizing the workload stress effect.

The findings of this study are subject to some limitations. First, due to the limitations of audit engagement database, the study is unable to observe the number of non-listed audit clients of audit firms. Second, this study is unable to observe the interim audit procedure performed by the auditor that could reduce the December's workload and affect the estimation of audit workload measure. Third, audit firms may assign its clients to audit partners based on some factors that not observable and controllable for this study. This study also suggests expanding audit workload research by investigating factors affecting the variability of audit workload among the partners in a firm. The current development of audit regulations may introduce more pressure on auditors and interact with workload stress; hence, literature would benefit from research aimed at investigating the interaction of workload stress with new occupational stress introduced by regulations such as PCAOB inspections.

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Notes

- <https://www.ibisworld.com/industry-trends/market-research-reports/professional-scientific-technical-services/professional-scientific-technical-services/accounting-services.html>
- Type II audit error occurs when auditors fail to modify audit opinion for financial reports that contain material misstatements. Meanwhile, type I audit error occurs when auditors issue modified audit opinion for financial reports that does not contain any material misstatements.
- <https://cpafma.org/media/uploads/Workload%20Compression%20Survey.pdf>
- The results do not change when non-US firms are excluded from the sample or audit office fixed effects are included in all equations to replace audit firm fixed effects.

Data availability

Data are available from the public sources cited in the text.

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Appendix 1 Variable definition

Variable	Definition
Dependent variables	
GCO	1 if client <i>i</i> 's audit opinion is a going concern opinion in year <i>t</i> , zero otherwise
MAO	1 if client <i>i</i> 's audit opinion is not unqualified opinion in year <i>t</i> , zero otherwise
Independent variables	
NCLIENT	Natural logarithm of audit client number per partner, count based on audit report date.
WLSIZE	Principal component analysis output of the number of audit clients at firm level and the total assets of the firm's clients.
Control variables	
ACCRUAL	Discretionary accruals of the modified Jones model by Dechow et al. (1995)
AUDFEES	Natural logarithm of 1 plus audit fees of audit firm <i>i</i> in year <i>t</i>
BIG4	1 if the audit firm <i>i</i> is Ernst & Young (EY), PricewaterhouseCoopers (PWC), KPMG, or Deloitte Touche Tohmatsu (Deloitte), zero otherwise
BM	Book value divided market value equity of client <i>i</i> in year <i>t</i> .
CLIENT NUMBER	The total client number of audit firm <i>i</i> at year <i>t</i>
COMPLEX	Natural logarithm of total assets of client <i>i</i> in year <i>t</i> .
DISTRESSED	1 if the client <i>i</i> has negative net income and negative operating cash flow at year <i>t</i> , zero otherwise (Non-Distressed)
ERROR1	1 if client <i>i</i> receives a GCO in year <i>t</i> but does not file for bankruptcy in year <i>t</i> + 1, zero otherwise
ERROR2	1 if client <i>i</i> does not receive a GCO in year <i>t</i> and files for bankruptcy in year <i>t</i> + 1, zero otherwise
F_SCORE	Fraud probability score based fraud prediction Model I in Dechow et al. (2011, p. 61)
High F_SCORE	F_SCORE is high when it is higher than the median
Low F_SCORE	F_SCORE is low when it is lower than the median
LEVERAGE	Total debt divided by total equity of client <i>i</i> in year <i>t</i> .
LNMV	Natural logarithm of market value equity of client <i>i</i> in year <i>t</i> .
ROA	Net income divided by total assets of client <i>i</i> in year <i>t</i> .
SPECIALIZATION	1 if the client's industry is within the auditor's industry specialization, zero otherwise. To define auditor industry specialization, I used the highest auditor's industry market share in a given year.
TENURE	The length of audit firm–client relationship in years
DUM_TENURE	1 (short) if audit tenure is less than or equal to three years, 2 (medium) if audit tenure is longer than four years but less than eight years, and 3 (long) if audit tenure is longer than eight years



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