The Impact of Stock Liquidity on Audit Pricing

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This paper investigates whether firms' stock liquidity is associated with audit fees. Stock liquidity can increase institutional monitoring by either helping investors overcome free-rider problems to intervene in management decisions, or disciplining management through the threat of exit. Given that stock liquidity can enhance institutional monitoring, firms with higher stock liquidity may have incentives to utilize high quality audits which always result in higher audit fees to satisfy the demand of institutional investors. Consistent with these arguments, I find that firms with liquid stocks are more likely to pay significantly higher audit fees.

Keywords: stock liquidity, audit fees, institutional monitoring

INTRODUCTION

The management of many public companies do not pay much attention to the liquidity of firms' securities, since most of CEOs and CFOs feel powerless to affect what goes on in financial markets, and think that the liquidity is the concern of some authorities, like the Securities and Exchange Commission. However, in the academic area, more and more research findings indicate that firms should have more interest in the market liquidity of their securities, because stock liquidity can impact firms through more than one aspect. For example, Jayaraman & Milbourn (2012) find out the role of stock liquidity in influencing the composition of CEO annual pay; Fang, Tian & Tice (2014) indicate that an increase in liquidity causes a reduction in future innovation. In addition, there is a stream of studies relate liquidity to firms' cost which is one of primary concerns of management, and they show that stock liquidity is an important determinant of the cost of raising external capital (e.g., Butler, Grullon & Weston 2005). This paper takes a different angle and investigate the influence of stock liquidity on audit fees, which is also one of firms' measurable costs.

My argument is based on the theory that stock liquidity is likely to facilitate incentives of institutional monitoring, either by enhancing blockholders' voice (Maug1998) or by amplifying blockholders' threat of exit (Edmans 2009; Edmans & Manso 2011). On one hand, the strengthened institutional monitoring may mitigate the information asymmetry between owners and managers, decrease the extent to which managers succeed in manipulation (Fang 2012), and thus reduce the demand for more stringent audit processes leading to less audit fees. On the other hand, the enhanced institutional monitoring may appeal to high quality audits to mitigate agency costs and the likelihood of fraudulent financial reporting. In response to such demand, auditors increase their engagement efforts and charge higher audit fees. Based on the controversial arguments above, the relationship between stock liquidity and audit fees become a matter of empirical interest.

To test the relationship between stock liquidity and audit fees, I adopt three measures of stock liquidity. The sample period is from 2007 to 2014. Since audit fees charged by Big4 are obviously different from Non-Big4, I partition the full sample into Big4 and Non-Big4 subsamples to do the tests. The overall results from the empirical tests indicate that firms with higher stock liquidity pay more audit fees. The finding is consistent when the impact of internal control weakness is ruled out. In addition, although the primary tests are suggestive of the role for stock liquidity in influencing audit fees, they are cross-sectional results, and thus suffer from endogeneity concerns. I address this concern by implementing a two-stage least squares analysis.

This paper contributes to literature in several ways. First, it closes a gap and extends stock liquidity study into accounting, and it is also a complement to the studies on the effect of stock liquidity under financial research. Second, although extensive empirical research documents the determinants of external audit fees in the audit market, this study links capital market microstructure to accounting and is the first to investigate the relation between stock liquidity and audit fees. Third, the study also contributes to the practice, since the finding has implications to the participants who concern about the increasing audit fees and encourage management to pay more attention to the market liquidity of their firms' security.

The remainder of this paper proceeds as follows. The second section provides reviews of the literature on stock liquidity, the determinants of audit fees and thus gives the basis for our hypotheses. The third section describes the measures used for the dependent and control variables, the research design and the sample section procedure. The fourth section presents our empirical results. The fifth section provides the conclusion.

HYPOTHESIS DEVELOPMENT

Stock Liquidity and Institutional Monitoring

Papers that support stock liquidity reinforces institutional monitoring incentives are generally based on one of two arguments. The first theory is from Maug (1998), Kahn & Winton (1998), and Noe (2002), which hold that institutions can acquire shares in the open market to recoup the costs of monitoring. To be detail, buying shares at a cost that does not fully reflect the value impact of their intervention enables investors to overcome the free-riding problem. Trading profits are increasing in stock liquidity because liquidity makes informed trades to hide their purchases by pooling with noise traders, and hence the probability of monitoring by large shareholders is increasing in stock liquidity. Another causal mechanism through which stock liquidity may discipline management is identified in Palmiter (2002), Edmans (2009), and Admati & Pfleiderer (2009). They suggest that if management's compensation is tied to current stock prices, then the stock liquidity increases the cost of opportunism to managers by facilitating the informed selling which drives down the price of the targeted firms. The higher liquidity makes this threat of exit more credible, since higher stock liquidity lowers transactions costs, and then even minor negative signals suffice to induce blockholders to exit.

Stock Liquidity and Audit Fees

Stock liquidity may be positively associated to audit fees. Some studies (e.g., Carcello et al., 2002; Abbott et al., 2003) provide evidence to support that institutional monitoring require high quality audit to mitigate agency costs and reduce the possibility of fraudulent financial reporting, and the engagement of high quality audits lead to higher audit fees. Giving that stock liquidity facilities the formation of blockholders, who are not only always sophisticated shareholders, but also either as individual or as groups have sufficient stock to be influential, they would apply sufficient force, either implicitly or explicitly, to require managers to utilize high quality audit as a safeguard for the reliable financial reporting (Kane & Velury, 2004). In response to such clients' demand, auditors increase their engagement efforts and charge higher audit fees.

On the other hand, there are studies (e.g., Gul & Tsui, 1998) documenting that institutional monitoring mitigates agency conflicts in financial reporting and reduce the perceived risk of irregularities or accounting misstatements. The lower perceived risk is likely to cut down the scope of audit work and decrease audit

fees. As I mentioned, stock liquidity can enhance the incentive of institutional monitoring over management, which may reduce managers' flexibility to produce distorted financial statement information to benefit themselves. For instance, Fang (2012) find that firms with relative higher stock liquidity have less positive accrual earning, lower accruals-based earnings management than firms with relative lower stock liquidity. Therefore, for clients with high liquid stock, the perceived audit risk is to be lower, resulting in lower audit efforts and less risk premiums, and the relationship between stock liquidity and audit fees could be negative.

In the light of the discussion above, stock liquidity may either positively or negatively related to audit fees, and which force dominates the relationship between stock liquidity and audit fees cannot be concluded before empirical tests. Therefore, my hypothesis is a null hypothesis and stated in the following:

H1: Ceteris paribus, stock liquidity has no significant impact on firms' audit fees.

RESEARCH DESIGN

Measures of Stock Liquidity

I use three measures for stock liquidity. The first one is *Turnover*, which is defined as the log of the ratio of total shares traded annually divided by share outstanding. The higher turnover means the higher liquidity. Jayaraman & Milbourn (2012) argue that *Turnover* involves scaling shares traded by shares outstanding, and implicitly controls for firm size and enables comparison across firms and over time, so it is a more feasible measure of stock liquidity.

I also adopt other two measures: the illiquidity measure from Amihud (2002) and the percentage of zero-returns first used by Lesmond et al. (1999). Amihud (2002) develops a price impact measure to capture the "daily price response associated with one dollar of trading volume." The *Illiquidity* measure is computed as following:

$$Illiquidity = Average \ (|r_t|/Volume_t) \tag{1}$$

where r_t is the stock return on day t, and Volume is the dollar volume on day t. The average is calculated over all positive-volume days, since the ratio is undefined for zero-volume days. Log-transforms is calculated to account for skewness in the distribution. Since a higher value of this measure corresponds to a lower level of liquidity, I multiply it by -1 to facilitate interpretation as a measure of stock liquidity.

In addition, Lesmond et al. (1999) introduce the proportion of days with zero returns as a proxy for liquidity. It bases on the argument that stocks with lower liquidity are more likely to have zero-volume days and thus are more likely to have zero-return days. It is calculated for each stock year the percentage of zero daily returns as the number of trading days, with zero daily returns and positive trading volume divided by the number of trading days over the firm's fiscal year. The formula of the measure is as following:

$$Zeros = (\# \ of \ positive\text{-}volume \ days \ with \ zero \ return)/T \tag{2}$$

where T is the number of trading days over the fiscal year. Again, since a higher value of this measure corresponds to a lower level of liquidity, I multiply it by -1 to facilitate interpretation as a measure of liquidity.

Empirical Models

Based on the extant research (e.g., Francis et al. 2005; Hogan & Wilkins 2008), I use the following model to test the role that stock liquidity plays in audit fees.

$$LAUDF_{it} = b_0 + b_1*LiqN_{it} + b_2*SIZE_{it}+b_3*RECINV_{it} + b_4*LEV_{it}+ b_5*ROA_{it}$$
$$+ b_6*GC_{it}+ b_7*MERGER_{it}+b_8*RESTRUC_{it} + b_9*SPECIAL_{it}+ b_{10}*MB_{it}$$
$$+ b_{11}*SEG_{it} + b_{12}*ROANEGit + b_{13}*FOREIGN + Industry\ Fixed\ Effect$$
$$+Year\ Fixed\ Effect + e \quad\quad\quad (3)$$

where *LAUDF* is the dependent variable and calculated as the natural logarithm of audit fees. *LiqN* stands for three measures of stock liquidity and *Liq1* is *Turnover*, *Liq2* is *Zeros* multiplied by -1, and *Liq3* is *Illiquidity* multiplied by -1 respectively. In line with the argument for Hypothesis 1, the coefficient for LiqN is uncertain, and the association between stock liquidity and audit fees is under test.

To isolate the effect of stock liquidity, Equation (3) controls a branch of variables known to affect audit fees. Specifically, it includes firm size (*SIZE*), computing as the natural logarithm of total assets, financial leverage (*LEV*), calculating as book value of total debt divided by the total assets, profitability (*ROA*), being the return on assets ratio, segment (SEG), being the number of business segments based on two-digit SIC codes, and foreign operations (*FOREIGN*), equaling to 1 if firms have foreign operations. In addition, Equation (3) also includes some other variables, which are *RECINV*, being the sum of receivables and inventories scaled by assets, GC, coded 1 if firms receive a going concern opinion, MERGER, coded 1 if firms are engaged in a merger or acquisition, *RESTRUC*, equaling to 1 if firms have a restructuring charge, SPECIAL, a dummy variable and coded to 1 if firms have special items, MB, defined as total asset minus book value plus the market value of equity, then divided by total asset, and *ROANEG*, equal to 1 if the firm's *ROA* is negative; and 0 otherwise. Finally, industry and year fixed effect are controlled. The definitions of the variables are provided in Appendix.

EMPIRICAL RESULTS

Data and Descriptive Statistics

The data for the primary empirical tests comes from three sources. Firms' financial information is from Compustat, data to compute the measure of stock liquidity is from CRSP, and date related to audit is obtained from Audit Analytics. The sample period is from 2007 to 2014. After excluding financial firms and utility firms, it includes 22,250 firm-year observations. Furthermore, based on the extant literature, the audit fees charged by Big4 is obviously different from Non-Big4, so I partition the sample into two subsamples of Big4 and Non-Big4 to do the regression tests.

Table 1 presents the descriptive statistics of variables for the full sample of firm-year observations used in Equation (3). The mean of *LAUDF* is 13.892. *Liq1*, *Liq2* and *Liq3* are the measures of stock liquidity used in Equation (3), and their mean values for the observations are -5.066, -0.024 and -0.646, respectively. Other variables incorporated in Equation (3), like *SIZE*, *ROA*, *LEV*, *SEG* and *FOREIGN*, are qualitatively similar to them in the previous studies. Finally, to avoid outliers, all continuous variables are winsorized at the 1 percent and 99 percent levels.

TABLE 1
STATISTIC DESCRIPTION FOR REGRESSION VARIABLES

Variables	N	Mean	Median	S.D.	P25	P75
LAUDF	22250	13.892	13.881	1.243	13.071	14.691
Liq1	22250	(5.066)	(4.968)	1.002	(5.588)	(4.430)
Liq2	22250	(0.024)	(0.012)	0.028	(0.032)	(0.004)
Liq3	22250	(0.686)	(0.008)	4.171	(0.041)	(0.002)
SIZE	22250	6.766	6.705	2.165	5.236	8.264
RECINV	22250	0.232	0.200	0.178	0.083	0.335
LEV	22250	0.217	0.177	0.231	0.012	0.336
ROA	22250	(0.023)	0.036	0.304	(0.019)	0.077
GC	22250	0.019	0.000	0.137	0.000	0.000

MERGER	22250	0.247	0.000	0.431	0.000	0.000
RESTRUC	22250	0.311	0.000	0.463	0.000	1.000
SPECIAL	22250	0.988	1.000	0.110	1.000	1.000
MB	22250	2.032	1.483	2.793	1.118	2.224
SEG	22250	1.973	2.000	0.784	1.414	2.449
ROANEG	22250	0.301	0.000	0.459	0.000	1.000
FOREIGN	22250	0.420	0.000	0.494	0.000	1.000

All variables are defined in Appendix.

Table 2 presents correlations among all the variables. The result indicates that the correlations among *Liq1*, *Liq2* and *Liq3* are positive and significant and this finding is consistent with my expectation. It also shows that the measure of audit fees *LAUDF* positively correlates to *Liq1*, *Liq2* and *Liq3*, providing the preliminary analysis and evidence to the association between stock liquidity and audit fees.

Multivariate Results for Auditor Fees

Table 3 gives the regression results for Equation (3) to test the relationship between stock liquidity and audit fees when full sample is spilt between Big4 and Non-Big4. The t-values are clustered by firms (Rogers 1994). Table 3 Panel A reports the result when firms are audited by Big4. The coefficient of Liq1 is 0.050 and significant at t-value of 4.86, and the coefficient of *Liq2* (*Liq3*) is 0.369 (0.017), and the t-value is 1.10 (4.89).

The result indicates that stock liquidity is significantly positively related to audit fees when the measure of stock liquidity is *Liq1* or *Liq3*. In Panel B, firms are audited by *Non-Big4*. The coefficients with t-values of *Liq1*, *Liq2* and *Liq3* are 0.062 (4.61), 1.142(3.03) and 0.005(3.06), respectively. It supports that there is a positive relationship between stock liquidity and audit fees regardless of measures of stock liquidity. In general, the regression tests deny the null hypothesis and I find that audit fees are relatively higher in firms with more liquid stock. For the control variables, the sign of their coefficients is consistent with prior studies. For example, larger firms pay higher audit fees, and firms have more merger and acquisition activities, more foreign operations, and more business segments pay more audit fees, and auditors charge lower fees for firms with greater ROA.

TABLE 2
PEARSON CORRELATION

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(12)	(14)	(15)	(16)
(1)LAUDF	1.00															
(2)Liq1	0.02	1.00														
(3)Liq2	0.19	0.32	1.00													
(4)Liq3	0.11	0.33	0.13	1.00												
(5)Size	0.89	0.32	0.49	0.22	1.00											
(6)RECINV	0.03	(0.11)	(0.06)	(0.11)	0.01	1.00										
(7)LEV	(0.24)	0.02	0.03	0.01	(0.31)	(0.01)	1.00									
(8)ROA	0.36	0.03	0.17	0.03	0.47	0.07	(0.60)	1.00								
(9)GC	(0.61)	0.12	0.04	0.02	(0.40)	(0.05)	0.30	(0.36)	1.00							
(10)MERGER	0.29	0.00	0.11	0.06	0.23	0.01	(0.05)	0.08	(0.11)	1.00						
(11)RESTRUCR	0.43	0.03	0.10	0.06	0.33	0.10	(0.05)	0.10	(0.13)	0.27	1.00					
(12)SPECIAL	0.59	(0.08)	0.13	0.06	0.00	0.02	0.01	(0.02)	(0.23)	0.26	0.32	1.00				
(13)MB	(0.31)	0.02	0.03	0.02	(0.37)	(0.07)	0.54	(0.69)	0.30	(0.06)	(0.08)	0.00	1.00			
(14)SEG	0.55	0.08	0.18	0.07	0.50	0.17	(0.13)	0.19	(0.23)	0.20	0.36	0.00	(0.16)	1.00		
(15)ROANEG	0.06	(0.08)	(0.14)	(0.02)	(0.49)	(0.16)	0.16	(0.26)	0.00	0.06	0.11	0.54	0.15	(0.21)	1.00	
(16)FOREIGN	0.38	(0.01)	0.10	0.06	0.14	0.02	(0.08)	0.07	(0.16)	0.17	0.26	0.46	(0.07)	0.35	0.25	1.00

Coefficients in bold indicate significance at P<0.10

TABLE 3
STOCK LIQUIDITY AND AUDIT FEES

Panel A: Firms are audited by Big4

Variable	Liq1		Liq2		Liq3	
	Coef.	t-value	Coef.	t-value	Coef.	t-value
LiqN	0.050	4.86***	0.369	1.10	0.017	4.89***
SIZE	0.470	47.63***	0.476	48.91***	0.475	40.91***
RECINV	0.696	9.09***	0.669	8.69***	0.681	8.94***
LEV	0.036	1.01	0.033	0.93	0.032	0.91
ROA	(0.195)	(6.55)***	(0.197)	(6.50)***	(0.195)	(6.47)***
GC	0.147	3.54***	0.160	3.70***	0.153	3.55***
MERGER	0.071	4.95***	0.069	4.83***	0.070	4.86***
RESTRUC	0.198	12.57***	0.200	12.58***	0.197	12.50***
SPECIAL	(0.056)	(1.10)	(0.054)	(1.08)	(0.051)	(1.02)
MB	0.005	1.44	0.006	1.41	0.006	1.41
SEG	0.136	9.79***	0.132	9.49***	0.134	9.65***
ROANEG	0.113	7.15***	0.120	7.42***	0.118	7.38***
FOREIGN	0.028	1.51	0.025	1.33	0.024	1.27
INTERCEPT	11.010	62.52***	10.736	62.64***	10.739	65.35***
Industry Fixed Effects	Yes		Yes		Yes	
Year Fixed Effects	Yes		Yes		Yes	
No. of Observations	17172		17172		17172	
Adj. R^2	79.12%		78.97%		79.05%	

Panel B: Firms are audited by Non-Big4

Variables	Liq1		Liq2		Liq3	
	Coef.	t-value	Coef.	t-value	Coef.	t-value
LiqN	0.062	4.61***	1.142	3.03***	0.005	3.06***
SIZE	0.465	33.08***	0.468	32.86***	0.475	34.26
RECINV	0.185	2.12**	0.158	1.81*	0.163	1.87*
LEV	0.017	0.31	0.000	0.01	(0.003)	(0.05)
ROA	(0.176)	(5.36)***	(0.184)	(5.74)***	(0.185)	(5.65)***
GC	0.113	1.98*	0.132	2.31*	0.129	2.24**
MERGER	0.066	2.36***	0.072	2.53**	0.070	2.46***
RESTRUC	0.159	5.48***	0.160	5.48***	0.159	5.41***
SPECIAL	0.104	1.17	0.124	1.36	0.115	1.26
MB	(0.010)	(4.52)	(0.010)	(4.90)***	(0.010)	(4.48)***
SEG	0.165	6.37***	0.161	6.24***	0.162	6.22***
ROANEG	0.110	4.14***	0.123	4.57***	0.114	4.24***
FOREIGN	0.127	3.50***	0.131	3.57***	0.130	3.53***
INTERCEPT	9.820	42.81***	9.487	48.87***	9.419	48.08***
Industry Fixed Effects	Yes		Yes		Yes	
Year Fixed Effects	Yes		Yes		Yes	
No. of Observations	5078		5078		5078	
Adj. R^2	71.12%		70.83%		70.77%	

The t-statistics are in parentheses. *, **, *** denote the statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively (two-tailed test). T-statistics based on standard errors clustered by a firm are shown in parentheses.

Effect of Internal Control Weakness on Audit Fees

Hogan & Wilkins (2008) find that audit fees are abnormally high for firms with an internal control weakness (ICW) in the year preceding ICW disclosure, since auditors is likely to exert more effort for the substantive tests to reduce the impact of poor internal controls. However, the earlier research design in this study does not exclude the effect of ICW on audit fees. To make sure that the preceding regression results is persistent after isolating the effect of ICW, I create samples that only includes observations without occurrence of ICW and apply these samples to Equation (3). The results reported in Table 4 provide further evidence on the positive relation between stock liquidity and audit fees.

TABLE 4
STOCK LIQUIDITY AND AUDIT FEES AFTER RULING OUT THE EFFECT OF ICW

Panel A: Firms are audited by Big 4						
Variables	Liq1		Liq2		Liq3	
	Coef.	t-value	Coef.	t-value	Coef.	t-value
LiqN	0.049	4.86***	0.304	0.90	0.017	4.82***
SIZE	0.472	47.63***	0.478	48.83***	0.477	40.79***
RECINV	0.688	8.94***	0.661	8.55***	0.674	8.81***
LEV	0.040	1.12	0.037	1.05	0.036	1.02
ROA	(0.200)	(6.43)***	(0.201)	(6.38)***	(0.200)	(6.36)***
GC	0.122	2.93**	0.133	3.09***	0.126	2.94**
MERGER	0.069	4.80***	0.067	4.68***	0.068	4.70***
RESTRUC	0.194	12.45***	0.196	12.46***	0.193	12.39***
SPECIAL	(0.047)	(0.93)	(0.044)	(0.90)	(0.042)	(0.84)
MB	0.006	1.45	0.007	1.41	0.007	1.42
SEG	0.134	9.59***	0.130	9.29***	0.132	9.44***
ROANEG	0.108	6.73***	0.114	6.95***	0.113	6.94***
FOREIGN	0.024	1.29	0.021	1.10	0.020	1.05
INTERCEPT	10.978	56.83***	10.699	55.01***	10.706	57.67***
Industry Fixed Effects	Yes		Yes		Yes	
Year Fixed Effects	Yes		Yes		Yes	
No. of Observations	16630		16630		16630	
Adj. R²	79.70%		79.56%		79.63%	

Panel B: Firms are audited by Non-Big 4						
Variables	Liq1		Liq2		Liq3	
	Coef.	t-value	Coef.	t-value	Coef.	t-value
LiqN	0.063	4.76***	1.106	2.95**	0.004	2.87**
SIZE	0.465	32.94***	0.468	32.73***	0.475	34.13***
RECINV	0.185	2.09**	0.153	1.75*	0.158	1.81*
LEV	0.016	0.29	(0.001)	(0.02)	(0.005)	(0.09)
ROA	(0.192)	(6.46)***	(0.199)	(6.72)***	(0.201)	(6.84)***
GC	0.099	1.72*	0.120	2.06**	0.116	1.99*
MERGER	0.065	2.28**	0.071	2.45***	0.069	2.38**
RESTRUC	0.155	5.38***	0.156	5.37***	0.155	5.32***
SPECIAL	0.107	1.19	0.125	1.36	0.117	1.27
MB	(0.011)	(5.59)***	(0.011)	(5.89)***	(0.011)	(5.57)***
SEG	0.164	6.32***	0.160	6.17***	0.160	6.15***
ROANEG	0.107	4.09***	0.119	4.49***	0.111	4.17***
FOREIGN	0.124	3.46***	0.128	3.54***	0.127	3.51***

INTERCEPT	9.831	42.76***	9.488	48.65***	9.421	47.95***
Industry Fixed Effects	Yes		Yes		Yes
Year Fixed Effects	Yes		Yes		Yes
No. of Observations	4920		4920		4920
Adj. R^2	71.41%		71.08%		71.03%

The t-statistics are in parentheses. *, **, *** denote the statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively (two-tailed test). T-statistics based on standard errors clustered by a firm are shown in parentheses.

Endogeneity Concerns

While the above tests are suggestive of the role for stock liquidity in audit fees, they are cross-sectional in nature, and thus the reverse causality problem due to simultaneity between stock liquidity and audit fees could not excluded. In other words, liquidity may affect audit fees, and audit fees could also affect stock liquidity. For example, Ascioglu et al. (2005) indicate that auditors' compensation lowers market liquidity of firms with weak corporate governance mechanisms. Therefore, it is possible that the prior results could be an artifact of reverse causality. To address such endogeneity concerns, I use a two-stage-least square regression to conduct the analysis.

Following Fang et al. (2009), two instruments that are correlated with stock liquidity, but are unlikely to be correlated with the error term are applied. The first one is the lagged value of liquidity (*LagLiq*), and the second one is the median of stock liquidity for firms in the industry (*IndLiq*). The use of lagged liquidity as an exogenous variable helps mitigate concerns that an unobservable factor in fiscal year t is correlated with stock liquidity and audit fees at time *t*. For the median of industry stock liquidity, Fang et al. (2009) point out that the portion of a firm's liquidity that is correlated with the liquidity of its industry is less likely to be correlated with unobservable factors that affect the outcome variable, which are firms' audit fees in this study.

Table 5 presents the results from two-stage-least square regression analysis. The coefficients on *LagLiq* and *IndLiq* in the first stage in all panels are positive and highly significant, suggesting that the instruments are highly correlated with stock liquidity. In the second stage of regression, I regress audit fees on the predicted component of liquidity from the first stage *PrLiq*. Consistent with our primary prior results, the coefficients on *PrLiq* are positive and significant in the regressions in all samples. Therefore, the relation between stock liquidity and audit fees is robust after controlling endogeneity.

TABLE 5
STOCK LIQUIDITY AND AUDIT FEES AFTER CONTROLLING ENDOGENEITY

Panel A: Stock liquidity's measure is Liq1 and firms are audited by Big4

	1 stage		2 stage	
Variables	Coef.	t-value	Coef.	t-value
PrLiq			0.060	4.25***
LagLiq	0.804	62.83***		
InLiq	0.330	11.21***		
SIZE	0.031	8.55***	0.472	45.44***
RECINV	(0.102)	(2.82)***	0.743	9.49***
LEV	0.011	0.56	0.027	0.73
ROA	(0.047)	(1.13)	(0.173)	(5.47)***
GC	0.068	1.41	0.152	3.37***
MERGER	0.011	1.26	0.074	5.21***
RESTRUC	0.002	0.26	0.202	13.02***
SPECIAL	0.029	0.90	(0.051)	(1.06)
MB	0.008	1.05	0.004	1.54

	Coef.	t-value	Coef.	t-value
SEG	(0.011)	(1.77)*	0.140	9.98***
ROANEG	(0.008)	(0.53)	0.117	7.19***
FOREIGN	(0.027)	(3.00)***	0.032	1.72
INTERCEPT	0.500	2.59***	11.000	54.57***
Industry Fixed Effects	yes		yes	
Year Fixed Effects	yes		yes	
No. of Observations	15032		15092	
Adj. R²	71.92%		80.21%	

Panel B: Stock liquidity's measure is Liq2 and firms are audited by Big4

	1 stage		2 stage	
Variables	Coef.	t-value	Coef.	t-value
PrLiq			0.568	1.02
LagLiq	0.604	29.88***		
InLiq	0.297	6.75***		
SIZE	(0.002)	(15.17)***	0.479	46.33***
RECINV	0.001	0.71	0.709	9.04***
LEV	0.001	1.72*	0.021	0.56
ROA	(0.005)	(4.37)***	(0.177)	(5.55)***
GC	0.005	2.19**	0.176	3.77***
MERGER	(0.001)	(4.01)***	0.074	5.21***
RESTRUC	0.001	3.45***	0.203	12.98***
SPECIAL	(0.002)	(1.51)	(0.048)	(1.00)
MB	(0.001)	(1.95)*	0.004	1.41
SEG	(0.000)	(0.51)	0.136	9.70***
ROANEG	0.005	9.58***	0.125	7.51***
FOREIGN	0.001	4.19***	0.031	1.66
INTERCEPT	0.010	2.12**	10.646	67.66***
Industry Fixed Effects	yes		yes	
Year Fixed Effects	yes		yes	
No. of Observations	15032		15092	
Adj. R²	56.65%		80.11%	

Panel C: Stock liquidity's measure is Liq3 and firms are audited by Big4

	1 stage		2 stage	
Variables	Coef.	t-value	Coef.	t-value
PrLiq			0.037	4.32***
LagLiq	0.473	13.41***		
InLiq	0.858	2.21**		
SIZE	(0.081)	(5.86)***	0.476	49.84***
RECINV	0.396	2.98***	0.735	9.49***
LEV	0.019	0.36	0.020	0.55
ROA	0.084	1.37	(0.172)	(5.45)***
GC	(0.149)	(2.13)**	0.162	3.52***
MERGER	(0.006)	(0.20)	0.074	5.25***
RESTRUC	(0.075)	(2.60)**	0.197	12.77***
SPECIAL	0.076	2.08**	(0.044)	(0.92)
MB	(0.013)	(1.56)	0.004	1.35
SEG	0.046	2.16**	0.139	9.96***
ROANEG	0.106	2.56***	0.123	7.52***

Variables	Coef.	t-value	Coef.	t-value
FOREIGN	(0.002)	(0.08)	0.029	1.57
INTERCEPT	0.694	3.09***	10.671	20.85***
Industry Fixed Effects	yes		yes	
Year Fixed Effects	yes		yes	
No. of Observations	15032		15092	
Adj. R^2	27.06%		80.18%	

Panel D: Stock liquidity's measure is Liq1 and firms are audited by Non-Big4

Variables	1 stage		2 stage	
	Coef.	t-value	Coef.	t-value
PrLiq			0.080	4.32***
LagLiq	0.709	32.42***		
InLiq	0.501	6.62***		
SIZE	0.061	5.67***	0.455	29.62***
RECINV	(0.201)	(2.93)***	0.203	2.25**
LEV	(0.095)	(2.11)**	0.076	1.33
ROA	(0.048)	(1.36)	(0.108)	(3.53)***
GC	0.172	2.53**	0.168	2.95***
MERGER	0.026	1.06	0.059	2.11**
RESTRUC	(0.019)	(0.71)	0.170	6.10***
SPECIAL	0.070	0.63	0.005	0.06
MB	0.001	0.33	(0.006)	(3.30)***
SEG	(0.028)	(1.59)	0.158	6.11***
ROANEG	(0.022)	(0.86)	0.111	4.16***
FOREIGN	0.021	0.87	0.119	3.33***
INTERCEPT	0.514	1.04	10.030	16.77 ***
Industry Fixed Effects	yes		yes	
Year Fixed Effects	yes		yes	
No. of Observations	4416		4486	
Adj. R^2	61.90%		71.81%	

Panel E: Stock liquidity's measure is Liq2 and firms are audited by Non-Big4

Variables	1 stage		2 stage	
	Coef.	t-value	Coef.	t-value
PrLiq			1.915	2.75***
LagLiq	0.535	27.75***		
InLiq	0.285	2.31**		
SIZE	(0.005)	(11.15)***	0.454	17.03***
RECINV	0.005	2.09**	0.172	1.93*
LEV	0.003	1.03	0.057	1.02
ROA	(0.002)	(0.98)	(0.122)	(3.94)***
GC	(0.001)	(0.39)	0.198	3.42***
MERGER	0.001	0.81	0.066	2.37**
RESTRUC	0.000	0.31	0.171	6.11***
SPECIAL	0.006	1.51	0.031	0.41
MB	(0.000)	(2.59)***	(0.007)	(3.80)***
SEG	0.001	1.64*	0.156	6.01***
ROANEG	0.006	6.03***	0.132	4.97***
FOREIGN	(0.000)	(0.49)	0.123	3.43***
INTERCEPT	0.017	1.36	9.626	21.39***

	yes		yes	
Industry Fixed Effects	yes		yes	
Year Fixed Effects	yes		yes	
No. of Observations	4416		4486	
Adj. R^2	53.10%		71.54%	

Panel F: Stock liquidity's measure is Liq3 and firms are audited by Non-Big4

	1 stage		2 stage	
Variables	Coef.	t-value	Coef.	t-value
PrLiq			0.012	2.92***
LagLiq	0.386	14.64***		
InLiq	26.028	1.13		
SIZE	(0.694)	(8.23)***	0.461	19.56***
RECINV	2.654	4.08***	0.198	2.20**
LEV	1.094	2.35**	0.065	1.12
ROA	0.159	0.64	(0.118)	(3.67)***
GC	(0.531)	(1.06)	0.183	3.14***
MERGER	0.086	0.47	0.062	2.22**
RESTRUC	(0.036)	(0.15)	0.169	6.04***
SPECIAL	(0.455)	(0.59)	0.015	0.19
MB	(0.014)	(0.94)	(0.007)	(3.17)***
SEG	0.173	1.15	0.157	6.03***
ROANEG	0.175	0.85	0.118	4.42***
FOREIGN	(0.231)	(1.26)	0.119	3.30***
INTERCEPT	2.226	1.35	9.537	21.31***
Industry Fixed Effects	yes		yes	
Year Fixed Effects	yes		yes	
No. of Observations	4416		4486	
Adj. R^2	27.73%		71.52%	

The t-statistics are in parentheses. *, **, *** denote the statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively (two-tailed test). T-statistics based on standard errors clustered by a firm are shown in parentheses.

CONCLUSION

In this paper, we examine the role of stock liquidity in influencing firms by analyzing its effect on audit fees. It is obviously that the overall market stock liquidity has increased because of factors, such as the development of capital market, the technological innovations, and the relevant regulations. However, whether all firms have benefited equally from the increased stock liquidity or whether the increased stock liquidity always bring in positive impact on firms are sill the problems worth of consideration. In this study, I find that firms with more liquid stock are charged more audit fees which may increase the total operation cost for those firms. The result holds after considering other factors that impact audit fees and the concern of endogeneity. It may provide some implications to the participants who are interested in the study of stock liquidity or have concern on the increasing of audit fees.

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APPENDIX
VARIABLE DEFINITIONS

Variables	Description
Liq1	The logarithm of the ratio of total shares traded annually divided by share outstanding;
Liq2	The percentage of zero daily returns with positive trading volume divided by the number of trading days over the firm's fiscal year, and then multiply it by -1;
Liq3	The logarithm of the average over the ratio of absolute value of stock return on day t divided by dollar volume on day t, and then multiply it by -1;
SIZE	Nature logarithm of total assets at the end of the fiscal year;
LEV	Book value of total debt divided by the total assets at the end of the fiscal year;
ROA	Net income divided by total assets;
SEG	Square root of the number of segments disclosed;
FOREIGN	1 if the firm has foreign operations, and 0 otherwise;
LAUDF	Natural logarithm of audit fees;
ICW	1 if the firm received an adverse opinion for material weaknesses in internal control, and 0 otherwise;
BIG 4	1 if the firm is audited by Deloitte, Ernst & Young, KPMG, or PricewaterhouseCoopers, and 0 otherwise;
MERGER	1 if the firm is engaged in a merger or acquisition, and 0 otherwise;
MB	Market-to-book ratio, defined as its total asset minus book value, plus the market value of equity, then divided by total asset;
GC	1 if the firm received a going concern opinion, and 0 otherwise;
RECINV	Sum of the firm's receivables and inventory divided by its total assets;
SPECIAL	1 if the firm reports special items, and 0 otherwise;
RESTRUC	1 if the firm takes a restructuring charge, and 0 otherwise;
ROANEG	1 if the firm's ROA is negative; and 0 otherwise.