Audit Opinion Prediction Before and After the Dodd-Frank Act

Xiaoyan Cheng, Wikil Kwak, Kevin Kwak
University of Nebraska at Omaha
6708 Pine Street, Mammel Hall 228AA
Omaha, NE 68182-0048

Abstract

Our paper examines whether the regulation reform enacted by the 2010 Dodd-Frank Act was successful in improving the prediction of qualified auditor opinions. Information was compiled on 47 randomly selected industries from 2006 to 2009 and from 2011 to 2012, pre- and post-Act periods. A logit model was developed with the dependent variable indicating whether the firm received a qualified opinion and with the independent variables including publicly available financial and stock return variables, and using Altman's Z-score. The findings of this project shed light on the benefits of the Dodd-Frank Act.

I. Introduction

The Dodd-Frank Wall Street Reform and Consumer Protection Act (hereafter the Dodd-Frank Act) was passed on July 21, 2010, and was intended to improve financial reporting quality and management accountability as a response to the 2008 financial crisis. The Dodd-Frank Act brought significant changes to the structure of federal financial regulation and imposed new substantive requirements to a broad range of market participants. Like the Glass-Steagall Act, the Dodd-Frank Act aimed to make another economic crisis less likely.

In this this study we investigate the economic consequences of the Dodd-Frank Act. The passage of the Act provides a natural setting to examine whether Wall Street reform would help lower risk in the financial market. Specifically, we use financial and market variables to predict the likelihood of qualified audit opinions in the pre- and post-Dodd-Frank Act periods. Our results indicate that Altman's Z-score and market return are negatively associated with auditor-qualified opinions and such a negative relationship is more pronounced in the post-Act period. The findings of this study suggest that the Dodd-Frank Act intensifies the relation between auditor decision and financial and market variables. In addition, the predictive accuracy of the estimated model is improved in the post-Act period. The improved accuracy in predicting a qualified opinion would help auditors assess inherent risk during audit planning, therefore reducing potential audit risk due to auditor failure in detecting material misstatements.

Our results contribute to the literature regarding the financial reporting consequences for firms following a mandated federal regulation. These findings are important to investors, auditors, and regulators, and reveal the benefits of Wall Street reform. In sum, our results shed light on the importance of financial and market variables in predicting qualified auditor opinions, especially in the post-Dodd-Frank Act period. Thus, our study provides evidence of the

effectiveness of regulatory changes, specifically the Dodd-Frank Act, on the predictive accuracy

of qualified auditor opinions. The next section will summarize prior studies relevant to our study.

The third section describes sample selection and descriptive statistics. The fourth section

presents our models and empirical results. The last section summarizes our findings and

discusses future research avenues and limitations of our paper.

II. Prior Studies

In their seminal work, Dopuch, Holthausen, and Leftwich (1987) proposed a model in

predicting auditors' decisions to issue a qualified auditor opinion.[1] Using first time qualification

data with a time-series holdout sample, they used a probit model and found empirically that a

qualified auditor opinion is associated with a firm's financial and market variables. In addition,

Spathis (2003) documents that the qualification decision to issue a qualified opinion or an

unqualified opinion is related to financial distress and firm litigation using Greek data. Recently,

Hossain (2013) finds that abnormal auditor-provided non-audit service fees are significantly and

negatively associated with the probability of issuing a going-concern opinion for financially

distressed firms and positively associated with discretionary accruals pre-CLERP (Corporate

Law Economic Reform Program Act 2004), but such relationships are not significant post-

CLERP using Australian data. The findings of Hossain's (2013) study provide evidence on the

effectiveness of regulatory changes by suggesting an improved audit quality arising from the

implementation of the Corporate Law Economic Reform Program Act. Similarly, Hoitash,

Markeevich and Barragato (2007) found a significant and positive relationship between

---

[1] In an audit engagement, the auditor expresses his or her opinion on the financial statements disclosed by the company. Audit opinion can be qualified or unqualified. A qualified opinion is expressed when the auditor concludes that the financial statements are fairly presented except for a few issues, such as single deviation from GAAP and limitation of scope. An unqualified (clean) opinion indicates that the financial statements are fairly presented in all material aspects (AU Section 508).

abnormal non-audit service fees and accruals in the pre-Sarbanes Oxley Act (SOX) (2002) period, but not in the post-SOX period.

Using 2004-2006 U.S. data, Blay and Geiger (2013) found that higher levels of current non-audit service fees paid to auditors are negatively associated with the probability of issuing a going-concern opinion. Their study uniquely incorporated future audit fees to obtain stronger results. Habib (2013) provides a meta-analysis of determinants of modified audit opinion decisions. Using 73 published studies, Habib tested the direction and significance of the effect of financial variables and audit-related variables on auditors' decisions to issue modified audit opinions. Firm-specific financial variables include firm size, leverage, and profitability. However, most financial variables are related to financial distress of auditee firms. In addition to financial variables, audit-related variables (such as Big 4 audit firm affiliation), industry specialization, partner tenure, audit report lag, and prior qualified audit opinion factors, are incorporated to improve predictability of qualified auditor opinions.

An artificial intelligence approach was used to predict audit-firm group appointments using U.K. and Irish firms (Kirkos, Spathis, and Manolopoulos 2010). Kirkos et al.'s (2010) model correctly classified 92.82% of the big auditor cases and 92.99% of non-big auditor cases. Their result is a significant improvement compared to those results using OLS regression, probit, or logit analyses. Recently, management entrenchment, gender, and CEO age are proven to be related to internal control quality (Lin, Wang, Chiou, and Huang 2014). Internal control quality is also one of the major determinants of qualified audit opinion issuance.

III. Sample Selection and Descriptive Statistics

Our sample covers the years 2006-2012. The pre-Dodd-Frank Act period is determined using the years 2006-2007 and 2008-2009. We use two time periods because findings based on

2008 and 2009 could be explained by the aftermath of the subprime crisis. Thus, we use 2006-2007 to control for potential noise induced by the financial crisis. The post-Dodd-Frank Act period is from 2011 to 2012. Auditor opinions and firm-specific financial information were obtained from Compustat. Stock return information was gathered from CRSP. In order to exclude extreme values, we winsorized the lower and upper 1% of the predictor variables. After merging data from the two databases and deleting missing values and outliers, we had 16,072 (6,005 in 2006-2007, 6,553 in 2008-2009, and 3,514 in 2010-2012) firm-year observations for analyses.

TABLE 1 reports descriptive statistics of firm characteristics and stock returns between firms with a qualified auditor opinion and an unqualified auditor opinion. As expected, the mean *WCA_ TA* (Working capital divided by total assets) in qualified auditor opinion group is much lower (*WCA_TA* = 0.218) than that in unqualified auditor opinion group (*WCA_TA* = 0.283). Means of retained earnings divided by total assets (*RE_TA*), income before interest and tax (*EBIT_TA*), market value of equity divided by total liabilities (*MKV_TL*), and sales divided by total assets (*SALE_TA*) in the qualified auditor opinion group are significantly lower than those in the unqualified auditor opinion group. Next, we compare Altman's Z-score between firms with qualified auditor opinions and unqualified auditor opinions. The Altman's Z-score is a combination of five weighted financial ratios that are used to predict the company's likelihood of bankruptcy (Altman 1968).[2] As shown in TABLE 1, Altman's Z-score is much lower in the

---

[2] The Z-score is calculated as follows:
$$ZSCORE = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 0.999X5,$$
where
    ZSCORE: Altman's Z-score;
    X1: Working capital divided by total assets;
    X2: Retained earnings divided by total assets;
    X3: Earnings before interest and taxes divided by total assets;
    X4: Market value of equity divided by total liabilities;
    X5: Sales divided by total assets.

qualified auditor opinion group (mean Z-score: 1.355) than the unqualified auditor opinion group

(Z-score: 3.305), and is significant at the 1% level. In sum, the results suggest that firms with

qualified auditor opinions have poorer liquidity and worse accounting performance than firms

with unqualified auditor opinions.

IV. Testing Model and Results

We use the following regression models to test the impact of the Dodd-Frank Act on the

prediction of qualified auditor opinion in the pre- versus post-Dodd-Frank Act period.

$$
\begin{aligned}
\textit{Qualified Opinion} = \ & \textit{Intercept} + \beta_1 LOG\_AT + \beta_2 RETX + \beta_3 WCA\_TA + \beta_4 RE\_TA + \beta_5 EBIT\_TA \\
& + \beta_6 MKV\_TL + \beta_7 SALE\_TA + \beta_8 POST + \beta_9 POST\_RETX + \\
& \beta_{10} POST\_WCA\_TA + \beta_{11} POST\_RE\_TA + \beta_{12} POST\_EBIT\_TA + \\
& \beta_{13} POST\_MKV\_TL + \beta_{14} POST\_SALE\_TA + \textit{Industry Dummies} \\
& + \textit{error term} \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad (1)
\end{aligned}
$$

$$
\begin{aligned}
\textit{Qualified Opinion} = \ & \textit{Intercept} + \lambda_1 LOG\_AT + \lambda_2 RETX + \lambda_3 ZSCORE + \lambda_4 POST + \\
& \lambda_5 POST\_RETX + \lambda_6 POST\_ZSCORE + \textit{Industry Dummies} + \textit{error term} \quad (2)
\end{aligned}
$$

Model 1 (2) is constructed based on Altman's financial (Altman's Z-score) and market return

variables. Industry dummies are included to control for firm-fixed effects. All variables are

measured for the year of the qualification decision. We introduce an indicator variable, *Post*,

equal to one if the observation is from the post-Dodd-Frank Act period, and zero otherwise. The

coefficients β_9 - β_{14} on the interaction terms in model 1 and λ_5 - λ_6 on the interaction terms in

model 2 indicate the change in the relation between the predictor and qualified auditor opinion.

TABLE 2 panel A presents the results of financial and market variables in predicting

auditor decisions in the pre- versus post-Dodd-Frank Act periods. We run the regression

separately for pre-periods 2008-2009 and 2006-2007, respectively. First, turning to pre-period

2008-2009 and post-period 2011-2012, we find that the coefficient on *RETX* is insignificant,

suggesting market return in the pre-period is not a contributing factor in predicting auditor

decisions. However, the coefficient on *POST_RETX* is significantly negative (p value = 0.001)

and the sum of the coefficients on *RETX* and *POST_RETX* is significantly negative ($\beta_4 + \beta_9 = -0.45$), suggesting that auditors are more likely to issue a qualified opinion for firms with lower stock returns in the post-Dodd-Frank Act period. In addition, we find that the coefficient on *POST_EBIT_TA* is negative, significant at the 0.001 level. A negative coefficient indicates that lower earnings before interest and tax increase the chance of a qualified auditor opinion. Our findings remain unchanged when we use 2006-2007 as the pre-period and 2011-2012 as the post-period. TABLE 2 panel B presents the results of logistic regression using Altman's Z-score and market return variables. Consistent with our expectations, we find that the coefficients on *POST_RETX* and *POST_ZSCORE* are significantly negative, suggesting firms with poorer financial and market performance are more likely to have a qualified auditor opinion in the post-Dodd-Frank Act period. In sum, the results in TABLE 2 suggest that the Dodd-Frank Act intensifies the relation between an auditor decision and financial and market variables.

TABLE 3 presents evidence of prediction rate in pre- versus post-Dodd-Frank Act periods. As shown in TABLE 3 panel A, there are 3,294 unqualified opinions and 2,711 qualified opinions for the pre-period 2006-2007. Using logistic model 1, we find the correct rate in predicting an unqualified opinion is 88.89% (2,928 out of 3,294 unqualified opinions) and the correct rate in predicting a qualified opinion is 31.09% (843 out of 2,711 qualified opinions). The overall prediction rate for the pre-period 2006-2007 is 62.80%. We also perform such analysis for periods 2008-2009 and 2011-2012. We find the overall prediction rate increased from 62.80% in 2006-2007 and 68.79% in 2008-2009 (pre-period) to 89.41% in 2011-2012 (post-period) when we run regressions using financial and market variables. We obtain qualitatively similar findings when we use Altman's Z-score and market return variables in predicting qualified auditor opinions (TABLE 3 panel B).

V. Summary and Conclusion

In this study we empirically investigated how the Dodd-Frank Act affected the relationship between a qualified auditor opinion and financial and market variables. We found that the negative relation between an auditor-qualified opinion and Altman's Z-score and market return is more pronounced in the post-Act period. These results also indicate that the predictive accuracy of an auditor-qualified opinion is improved in the post-Act period. Our results should be of interest to auditors, investors, and regulators who are interested in the justification of regulatory changes. However, our paper has limitations. A previous study (Lin, Wang, Chiou, and Huang 2014) suggests that internal control quality, such as management entrenchment, gender, and CEO age, affects auditor decisions to issue a qualified opinion. Due to data limitations we are unable to include these variables in our testing model. Future research may incorporate auditor fees and internal control quality variables as the determinants of a qualified auditor opinion.

TABLE 1: Descriptive Statistics of Predictor Variables for Qualified Auditor Opinions and

Unqualified Auditor Opinions

Panel A: Qualified Auditor Opinions

Variable	N	Mean	Std Dev	25th Pctl	Median	75th Pctl	t-diff
LOG_AT	5166	6.711	2.172	5.229	6.706	8.203	14.658***
WCA_TA	5166	0.218	0.333	0.045	0.193	0.386	-12.124***
RE_TA	5166	-1.009	7.578	-0.302	0.098	0.313	-4.205***
EBIT_TA	5166	-0.019	0.594	0.003	0.068	0.118	-4.288***
MKV_TL	5166	27.584	249.794	0.998	3.014	10.780	-8.018***
SALE_TA	5166	0.953	0.804	0.441	0.766	1.238	-5.053***
RETX	5166	-0.089	0.518	-0.344	-0.051	0.199	-1.615
ZSCORE	5166	1.355	12.537	1.073	2.272	3.649	-10.181***

Panel B: Unqualified Auditor Opinions

Variable	N	Mean	Std Dev	25th Pctl	Median	75th Pctl
LOG_AT	10906	6.180	2.087	4.662	6.037	7.578
WCA_TA	10906	0.283	0.273	0.087	0.255	0.459
RE_TA	10906	-0.540	3.757	-0.297	0.106	0.351
EBIT_TA	10906	0.020	0.400	0.003	0.069	0.123
MKV_TL	10906	55.458	9.410	0.896	1.789	4.044
SALE_TA	10906	1.023	0.831	0.481	0.845	1.350
RETX	10906	-0.075	0.554	-0.322	-0.017	0.243
ZSCORE	10906	3.305	8.244	1.434	2.804	4.494

*** indicates significance at the 1 percent level, according to a two-tailed test.

LOG_AT: Logarithm of total assets;
WCA_TA: Working capital divided by total assets;
RE_TA: Retained earnings divided by total assets;
EBIT_TA: Earnings before interest and taxes divided by total assets;
MKV_TL: Market value of equity divided by total liabilities;
SALE TA: Sales divided by total assets;
RETX: Stock returns minus an equally weighted industry index;
ZSCORE: Altman's Z-score;

TABLE 2: Results of Logistic Regressions

Panel A: Results of Logistic Regressions Using Financial and Market Return Variables

Parameter	Pre-2008-2009/Post-2011-2012		Pre-2006-2007/Post-2011-2012	
	Estimate	p value	Estimate	p value
Intercept	-2.280	<.0001	-0.792	<.0001
LOG_AT	0.153	<.0001	0.139	<.0001
RETX	-0.051	0.266	-0.082	0.351
WCA_TA	-0.604	<.0001	-0.450	<.0001
RE_TA	-0.024	0.009	-0.089	<.0001
EBIT_TA	-0.031	0.734	-0.094	0.005
MKV_TL	-0.012	0.005	-0.083	<.0001
SALE_TA	-0.043	0.317	-0.019	0.581
POST	-1.476	<.0001	-2.119	<.0001
POST_RETX_TA	-0.399	0.001	-0.712	<.0001
POST_WCA_TA	0.113	0.671	0.231	0.381
POST_RE_TA	-0.002	0.929	-0.003	0.012
POST_EBIT_TA	-1.023	<.0001	-0.542	0.056
POST_MKV_TL	0.010	0.220	0.077	0.425
POST_SALE_TA	-0.002	0.978	-0.007	0.397
Industry Dummies	Yes		Yes	
n	10067		9519	
Max-rescaled R-Square	0.1507		0.1565	

TABLE 2 (Continued):

Panel B: Results of Logistic Regressions Using ZSCORE and Market Return Variables

	Pre-2008-2009/Post-2011-2012		Pre-2006-2007/Post-2011-2012	
Parameter	Estimate	p value	Estimate	p value
Intercept	-1.647	<.0001	-0.967	<.0001
LOG_AT	0.145	<.0001	0.147	<.0001
RETX	-0.043	0.338	-0.054	0.284
ZSCORE	-0.027	<.0001	-0.039	<.0001
POST	-1.358	<.0001	-2.054	<.0001
POST_RETX	-0.479	<.0001	-0.664	<.0001
POST_ZSCORE	-0.019	0.016	-0.034	0.004
Industry Dummies	Yes		Yes	
n	10067		9519	
Max-rescaled R-Square	0.1403		0.1342	

LOG_AT: Logarithm of total assets;
WCA_TA: Working capital divided by total assets;
RE_TA: Retained earnings divided by total assets;
EBIT_TA: Earnings before interest and taxes divided by total assets;
MKV_TL: Market value of equity divided by total liabilities;
SALE TA: Sales divided by total assets;
RETX: Stock returns minus an equally weighted industry index;
ZSCORE: Altman's Z-score;
POST: A dummy variable equal to 1 if the observation is from the post-Dodd-Frank Act period; otherwise 0.

TABLE 3: Qualified Auditor Opinion Prediction Results

Panel A: Predictions Based on Logistic Regression Using Financial and Market Return Variables

Pre-Dodd-Frank Act period (2006-2007)

	Predicted Opinion		
	Predicted Qualified Opinion	Predicted Unqualified Opinion	Total
Qualified Opinion =0	366	2928	3294
Percentage	11.11%	88.89%	100%
Qualified Opinion =1	843	1868	2711
Percentage	31.09%	68.91%	100%
Overall Prediction Rate	62.80%		

Pre-Dodd-Frank Act period (2008-2009)

	Predicted Opinion		
	Predicted Qualified Opinion	Predicted Unqualified Opinion	Total
Qualified Opinion =0	254	4243	4497
Percentage	5.65%	94.35%	100%
Qualified Opinion =1	265	1791	2056
Percentage	12.89%	87.11%	100%
Overall Prediction Rate	68.79%		

Post-Dodd-Frank Act period (2011-2012)

	Predicted Opinion		
	Predicted Qualified Opinion	Predicted Unqualified Opinion	Total
Qualified Opinion =0	6	3109	3115
Percentage	0.19%	99.81%	100%
Qualified Opinion =1	33	366	399
Percentage	8.27%	91.73%	100%
Overall Prediction Rate	89.41%		

TABLE 3 (Continued):

Panel B: Predictions Based on Logistic Regression Using ZSCORE and Market Return Variables

Pre-Dodd-Frank Act period (2006-2007)

	Predicted Opinion		
	Predicted Qualified Opinion	Predicted Unqualified Opinion	Total
Qualified Opinion =0	378	2916	3294
Percentage	11.47%	88.53%	100%
Qualified Opinion =1	830	1881	2711
Percentage	30.62%	69.38%	100%
Overall Prediction Rate	62.38%		

Pre-Dodd-Frank Act period (2008-2009)

	Predicted Opinion		
	Predicted Qualified Opinion	Predicted Unqualified Opinion	Total
Qualified Opinion =0	264	4233	4497
Percentage	5.87%	94.13%	100%
Qualified Opinion =1	253	1803	2056
Percentage	12.31%	87.69%	100%
Overall Prediction Rate	68.46%		

Post-Dodd-Frank Act period (2012-2013)

	Predicted Opinion		
	Predicted Qualified Opinion	Predicted Unqualified Opinion	Total
Qualified Opinion =0	7	3108	3115
Percentage	0.22%	99.78%	100%
Qualified Opinion =1	35	364	399
Percentage	8.77%	91.23%	100%
Overall Prediction Rate	89.44%		

References

Altman, E. 1968. Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance* 23(3): 589-609.

Blay, A.D., and M.A. Geiger. 2013. Auditor fees and auditor independence: Evidence from going concern reporting decisions. *Contemporary Accounting Research* 30(2): 579-606.

Corporate Law Economic Reform Program Act. 2004. Audit Reform and Corporate Disclosure Act. Commonwealth of Australia

Dodd-Frank Wall Street Reform and Consumer Protection Act. 2010. Brief Summary of the Dodd-Frank Wall Street Reform and Consumer Protection Act: 1-16.

Dopuch, N., R.W. Holthausen, and R.W. Leftwich. 1987. Predicting audit qualifications with financial and market variables. *The Accounting Review* LXII (3): 431-454.

Habib, A. 2013. A meta-analysis of the determinants of modified audit opinion decisions. *Managerial Auditing Journal* 28(3): 184-216.

Hoitash, R., A. Markeevich and C.A. Barragato. 2007. Auditor fees, abnormal fees and audit quality before and after the Sarbanes-Oxley Act. *Managerial Auditing Journal* 22(8): 761-82.

Hossain, S. 2013. Effect of regulatory changes on auditor independence and audit quality. *International Journal of Auditing* 17: 246-264.

Kirkos, E., C. Spathis, and Y. Manolopoulos. 2010. Audit-firm group appointment: An artificial intelligence approach. *Intelligent Systems in Accounting, Finance and Management* 17(1): 1-17.

Lin, Y., Y. Wang, J. Chiou, and H. Huang. 2014. CEO characteristic and internal control quality. *Corporate Governance: An International Review* 22(1): 24-42.

Sarbanes Oxley (2002) Act. The Public Company Accounting Reform and Investor Protection Act. Pub. L.107-204, 116 stat. 745. Washington, DC: Government Printing Office.

Spathis, C.T. 2003. Audit qualification, firm litigation and financial information. *International Journal of Auditing* 7(1): 71-85.