Determinants of the deficiency of XBRL mandatory filings

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Abstract

The purpose of this paper is to look at the XBRL mandatory filings, use a third party ratings of the quality of XBRL filings (XBRL CLOUD Inc.), and report any progress as well as deficiency. Although this is an empirical study, it is also considered an exploratory study to observe deficiency in the XBRL filings that can be identified with some characteristics of the filer such as operational complexity, prior experience with XBRL filings, etc.

We examine determinants of the deficiency of XBRL mandatory filings for all the SEC filings from July 2009 to December 2010. We find that XBRL deficient filings tend to have higher percentage of extensions; are filed by bigger and more complex firms; and are from earlier years. Finally, we find that firms that have done many XBRL filings are less likely to have major errors; but more likely to have minor errors. The results of this study have several important implications for SEC, XBRL US, auditors and filers.

Key Words: XBRL, XBRL mandatory filing, reporting quality, SEC (Securities and Exchange Commission).

Data Availability: Data are publicly available from sources identified in the paper.

1. Introduction

After several years of joint efforts of accounting profession, regulators, software makers, and companies eXtensible Business Reporting Language (XBRL) was developed and ready to go live at the Securities and Exchange Commission (SEC) in 2009. Because it took a relatively long period time to be finally adopted by securities regulators around the globe, XBRL also created high expectations. A number of researchers were anxiously waiting and preparing for the first stage of mandatory XBRL filings at the SEC.

Prior to its mandate, the SEC created XBRL volunteer filing program (VFP), often refer to as a sandbox to test the filing process for further improvement, filers had little or no set of rules for XBRL filings except for using current XBRL Specifications and U.S. GAAP taxonomy. It should be noted that there was little or no formal feedback process on such filings. Obviously, there was no penalty for any error or deficiency. The research using VFP data should be treated with caution because the VFP was basically a sandbox concept and any conclusion would be tentative. Nevertheless, some research with VFP data suggest the XBRL filings did not meet the expectations

After XBRL filings became mandatory by the SEC, XBRL filings started to arrive at the SEC in June 2009 and mostly in 10-Q From. In the mean time, the SEC staff began to encourage research to examine XBRL filings and report the extent to which such filings are in compliance. This time the SEC provided companies with guides and instructions and also expectations. In addition, the new U.S. GAAP XBRL taxonomy was employed for mandatory filings. So far, the evidence suggests that this is a significant improvement over VFP, though not totally error free.

The purpose of this paper is to look at the XBRL mandatory filings, use a third party ratings of the quality of XBRL filings (XBRL CLOUD Inc.), and report any progress as well as deficiency. Although this is an empirical study, it is also considered an exploratory study to observe deficiency in the XBRL filings that can be identified with some characteristics of the filer such as operational complexity, prior experience with XBRL filings, etc.

We examine determinants of the deficiency of XBRL mandatory filings for all the SEC filings from July 2009 to December 2010. Our final sample includes 4,532 filings from 1,430 unique companies. We find that XBRL deficient filings tend to have higher percentage of extensions; are filed by bigger and more complex firms; and are from earlier years. Finally, we find that firms that have done many XBRL filings are less likely to have major errors; but more likely to have minor errors. The findings of this paper should be of interest to the regulators as well as companies to improve the quality of XBRL filings.

The remainder of the paper proceeds as follows. Section 2 reviews the relevant literature and formulates the research hypotheses. Section 3 describes the research design including sample selection and estimation models. Section 4 presents empirical results and robustness checks. Section 5 concludes.

2. Background of XBRL mandatory filing, prior research, and hypotheses

2.1 Background and prior research

Over the last decade, XBRL (Extensible Business Reporting Language) has become increasingly important in improving the transparency of firms' financial statement information (Stantial, 2007; Hodge et al. 2004). The advances in XBRL also make continuous reporting (CR) feasible (Roohani et al. 2003). In January 2009, following experience with the VFP (voluntary filing program), the SEC mandated that all public companies must submit their filings in XBRL by October 31, 2014 (SEC, 2009). The rule includes a 3-year phase-in plan with large accelerated filers starting the XBRL filing from June 15, 2009.

Considering the complexities of XBRL tagging , the success of this mandatory XBRL filing process requires high level of XBRL reporting quality (Debreceny et al. 2010). However, there is limited research on XBRL reporting quality due to the very limited number of filings under the voluntary filing program. Bartley et al. (2010) evaluate the accuracy of XBRL filings for 22 companies participating in the SEC‟s voluntary filing program in 2006 and found that the reporting quality is not satisfying. With the first stage of XBRL mandatory filing rolling out, the large scale empirical analysis on XBRL reporting quality becomes achievable. Based on one quarter filings by the initial 400 large corporations, Debreceny et al. (2010) find that the primary cause of the errors was inappropriate treatment in the instance documents of underlying debit/credit assumptions in the taxonomy. However, to our knowledge, there is no prior research which examines the determinants of XBRL reporting quality from the perspective of filer's characteristics or filing characteristics.

2.2 Hypotheses

As mentioned above, there is limited guidance from prior research regarding the determinants of XBRL reporting quality. As such, our study should be viewed as exploratory in

nature, and a first step in examining the determinants of XBRL reporting quality. Considering that XBRL reporting is a part of internal control system, in the formulation of our hypotheses, we will borrow some theories on the determinants of internal control quality.

We classify all the possible determinants into two categories: firm (filer) characteristics related factors and filing characteristics related factors.

The first determinant under that firm characteristic category is whether or not a filer participated in the VFP. Presumably, VFP participants[1] are more likely to have higher quality of XBRL mandatory reporting quality because of the learning curve.

Another factor related to firm characteristic is the complexity of a firm. Doyle et al. (2007) find that the complexly of a firm is a drive of internal control weakness. Consistent with Falaye (2007), we use FIRM SIZE and FOREIGN TRANSACTIONS to proxy the complex of a firm. We expect that firms with FOREIGN TRANSACTIONS and larger size are more likely to have errors in XBRL reporting.

A third determinant of XBRL reporting quality is a firm's financial health. Poorly performing firms may not be able to provide adequate resource to implement controls. Consistent with Doyle et al. (2007), we use LOSS (whether or not the earnings before extraordinary items is negative) as the measure of financial health.

The last but not the least determinant of XBRL reporting deficiency under firm characteristics category might be the stability of a firm's business. Doyle et al. (2007) find that firms under restructuring or with high growth are more likely to have weak internal control. As such, we expect firms with higher EXTERME SALES GROWTH or more RESTRUCTURING CHAEGE will be more likely to have XBRL reporting errors.

[1] We obtain VFP participant data from Callaghan and Nehmer (2009) paper.

The second category of the determinants of XBRL reporting quality is about filing characteristics. The first factor we use is the percentage of extensions (XBRL EXTENSIONS) in a filing. Intuitively, the higher percentage of extensions is expected to be associated with the higher likelihood of errors. The second factor we use is the filing form. A firm usually spends less time on a 10-Q filing than on a 10-K filing. Thus, we expect that a 10-Q related XBRL filing (10-Q FORM) is more likely to have errors. The other two factors in this category are related to time effects. Because of learning curve, a firm might keep improving its XBRL filings quality as time goes by. In addition, because the regulator keeps revising the taxonomy based on the feedback from filers, the average XBRL filing quality in certain year is supposed to be better that that in the previous year.

Based on above discussion, we summarize each of our directional predictions and variable measurements in Table 1.

[Insert Table 1 about here]

3. Data, sample selection, error classifications and research design

3.1 Data and sample selection

As mentioned above, the large scale of XBRL filings have only been available since June of 2009 when the mandatory XBRL filings took effective for some large companies. Since then, XBRL Cloud Inc. has been collecting and publishing their report (called XBRL Cloud EDGAR Dashboard) on all XBRL filings on a daily basis. We obtain the XBRL filings data for the period from June 2009 to December 2010 from this company's website.

Table 2 panel A describes how our final sample is determined. We delete filings before June 15th, 2009 because they are not mandatory filings. We also exclude 38 duplicate filings.

Another 104 flings are deleted because of missing data in in Compustat. Based on these data restrictions, our final sample consists of 4,532 filings from 1,430 unique companies.

Table 2 panel B and C present the sample distribution by creation software, year and industry. Top five creation software accounts for approximately 93% market share. The number of filings of year 2010 is about four times of year 2009. In addition, more than one third of our sample filings are manufacturing firms.

[Insert Table 2 about here]

3.2 Error classifications

Based on the definition of each type of error from XBRL Cloud EDGAR Dashboard (see appendix 1), we classify different types of errors into two categories: major error and minor error.

3.3 Research design

We model the probability of having an error in XBRL mandatory filing as a function of the above-mentioned firm characteristics and filing characteristics using a logistic regression with the following constructs:

$$\text{Prob(ERROR/ERROR-DESCRIPTOR)}=f(\beta_0 + \beta_1\text{XBRL EXTENSIONS}+ \beta_2\text{10-Q FORM} + \beta_3\text{VFP PARTICIPANT}+ \beta_4\text{FIRM SIZE}+ \beta_5\text{EXTREME SALES GROWTH} + \beta_6\text{FOREIGN TRANSACTIONS}+ \beta_7\text{LOSS}+ \beta_8\text{RESTRCTURING CHARGE} + \beta_9\text{NUMBER OF TIMES FILING}+ \beta_{10}\text{FILING YEAR} + \sum \gamma_j INDUSTRY_j + \sum \varsigma_t CREATION \quad SOFTWARE_t). \tag{1}$$

ERROR is an indicator variable that is equal to one if a XBRL filing has an error, and zero otherwise. ERROR_DESCRIPTOR (MAJOR/MINOR) is an indicator variable that is equal to one if a XBRL filing has a major /minor error and zero if the filing does not have any error. All other variables are defined in Table 1. In above equation, we also include industry

dummies and creation software dummies to control the clustering effects of industry and creation software.

4. Empirical results

4.1 Univariate analysis and descriptive statistics

Table 3 presents descriptive statistics on the firm/filing characteristics of XBRL deficiency filings and non-deficiency filings. Panel A is the comparison between XBRL deficiency filings and non-deficiency filings. Panel B is the comparison between XBRL major deficiency filings and non-deficiency filings. Panel C is the comparison between XBRL minor deficiency filings and non-deficiency filings. According to Table 3, the percentage of deficiency filings (filings with errors), the percentage of major deficiency filings (filings with major errors) and the percentage of minor deficiency filings (filings with minor errors) are around 42% (1, 924 out of 4,532); 11%(492 out of 4,532); 37%(1690 out of 4,532) respectively. Table 3 also shows the univariate results from t-test of mean difference and Wilcoxon rank-sum test of median difference across different groups. In general, most of our univariate results are consistent with our hypotheses outlined in section 2.2. The only exceptions are VFP PARTICIPANT and NUMBER OF TIMES FILINGS. For VFP PARTICIPANT, we find that it is consistent across three panels. While for NUMBER OF TIMES FILINGS, it has mixed results in panel A, panel B and panel C. However, as illustrated in Table 4, many of our variables are correlated with one another. For example, VFP PARTICIPANT is significantly correlated with most of variables except LOSS. As such, we examine all the determinants further by using multivariate analysis as follows.

[Insert Table 3 & Table 4 about here]

4.2 Multivariate analysis

Table 5 presents our multivariate tests results from the logistic regression equation one in 3.3 with ERROR as the dependent variable. According to Table 5, all of the significant coefficients are in the predicted direction. The coefficient of XBRL EXTENSIONS is significant (p-value<0.01) and positive, suggesting that the deficiency XBRL filings is associated with higher percentage of extensions. FIRM SIZE (one of two proxies for the complexity of a firm) is significantly associated with the probability of errors, suggesting that relatively more complex firms are more likely to have errors in their XBRL filings. One explanation is that larger firms still emphasize on accuracy of traditional filing method, as long as there is a limited liability.

Finally, the coefficient of FILING YEAR is significant (p-value<0.01) and negative, suggesting that XBRL filings quality keeps improving over time and this improvement might be because of the SEC staff guidance and assistance. There is no evidence of self-learning (NUMBER OF TIMES FILING variable is not significant). Further, XBRL US Inc. active role in clarifying and improving the taxonomy could be a factor in the quality improvement.

Overall, the results in Tables 5 indicate that: compared to non-deficiency XBRL filings, the deficiency XBRL filings have higher percentage of extensions; are filed by relatively more complex firms; and are more likely filed in earlier years.

[Insert Table 5 about here]

For additional analysis of findings, we also looked at the level or severity of the deficiency of XBRL filings. Table 6 presents our multivariate tests results from the logistic

regression equation one in 3.3 with ERROR_DESCRIPTOR (MAJOR/MINOR)[2] as the dependent variable.

Referring to the first column (with ERROR_MAJOR as the dependent variable) of results in Table 6, all of the significant coefficients are in the predicted direction. The coefficient of XBRL EXTENSIONS is significant (p-value<0.01) and positive, suggesting that the major error deficiency XBRL filings have higher percentage of extensions. The coefficient of FIRM SIZE is significant (p-value<0.01) and positive, suggesting that bigger firms are more likely to have major errors in XBRL filings. Finally, the coefficients of both NUMBER OF TIMES FILING and FILING YEAR are significant (p-value<0.01) and negative, suggesting that XBRL filings quality keeps improving over time for firms with major errors in filings and this improvement might be attributed to both the learning curve effects and the ongoing revision/improvments of the XBRL taxonomy.

Referring to the second column (with ERROR_MINOR as dependent variable) of results in Table 6, all but one of the significant coefficients are in the predicted direction. The coefficient of XBRL EXTENSIONS is significant (p-value<0.01) and positive, suggesting that the minor error deficiency XBRL filings have higher percentage of extensions. Over all, both minor and major errors of deficiency in XBRL filings are associated with XBRL EXTENSION. The coefficient of FIRM SIZE is significant (p-value<0.01) and positive, suggesting that bigger firms are more likely to have minor errors in XBRL filing. Similarly, when it comes the FIRM SIZE bigger firms commit MAJOR and MINOR deficiency(error) Finally, inconsistent with our prediction (more number of filings more learning experience), the coefficients of NUMBER OF TIMES FILING is significant (p-value<0.01) but positive. The possible explanation might be

[2] Note that the benchmark group is still non-deficiency filings group.

that firms that have done many XBRL filings get more complacent over time, and perhaps overlook any changes in the taxonomy or instructions.

Overall, the results in Tables 6 indicate that: (1) compared to non-deficiency XBRL filings, XBRL filings with major errors are more likely for firms that are bigger and that have not done many XBRL filings; have higher percentage of extensions and for the earlier years, (2) compared to non-deficiency XBRL filings, XBRL filings with minor errors are more likely for firms that are bigger and that have already done many XBRL filings; and are more likely 10-Q related filings.

[Insert Table 6 about here]

5. Summary and conclusions

Results of this study should be of interest to the SEC staff and also XBRL filers. It should be noted that majority of filings are now done by professional SEC filing companies and the level of knowledge of XBRL filing is on the rise. Also, XBRL filing tools are becoming more sophisticated and smarter to detect common errors and suggest alternatives.

There is also a process in place to establish a dialogue for filers if they wish to apply XBRL EXTENSION when appropriate. Commitment of the SEC and XBRL US Inc. to revise and update the XBRL US GAAP taxonomy will also help to reduce the number of extensions. The results may also suggest that in the next phase of XBRL filings where financial foot notes are also tagged and submitted, we might initially expect a rise in the number of extensions and eventually deficiencies (errors). Tagging notes seem to be more challenging that tagging financial statements, particularly for complex companies with various product lines and/or multi jurisdictions, these companies tend to be large. Based on the results of this study, the SEC staff may establish a dialogue/hotline process where such companies get timely feedback on avoiding XBRL EXTENSIONS; this study shows this to be a major deficiency.

Future study may be to compare EXTENSIONS observed in the XBRL filing documents with traditional filing documents (e.g. PDF) to reveal the necessity of creating extension(s), other than for connivance. If and when the standards setters and regulators in the U.S. adopt principle-based reporting concept, then we expect adoption of "comply or explain" policy, where XBRL filers are expected to explain/document why an EXTENSION was adopted. Such information will be useful in future update of the taxonomy, storage and retrieval of XBRL data for public use.

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Table 1
Variable definitions and expected relation with the probability of XBRL reporting deficiency

Variable	Predicted direction	Definition
XBRL EXTENSIONS	+	The percentage of XBRL taxonomy extension in a filing
10-Q FORM	+	An indicator variable that is equal to one if a XBRL filing is about 10-Q, and zero if it is a 10-K filing
VFP PARTICIPANT	-	An indicator variable that is equal to one if a firm participated XBRL
FIRM SIZE	+	Log of a firm's total assets at the end of year 2009
EXTREME SALES GROWTH	+	An indicator variable that is equal to one if year-over-year sales growth falls into the top quintile, and zero otherwise
FOREIGN TRANSACTIONS	+	An indicator variable equal to one if the firm has a non-zero foreign currency translation [data item #150] in year t, and zero otherwise
LOSS	+	An indicator variable equal to one if earnings before extraordinary items in year 2009 less than zero, and zero otherwise
RESTRUCTURING CHARGE	+	The restructuring charge in year 2009 scaled by the firm's year 2009 end market capitalization
NUMBER OF TIMES FILING	-	Measured based on the number of XBRL filings a firm has done as of the current filing. For example, if a XBRL filing was a seond filing filed by a firm, this variable would be coded as two
FILING YEAR	-	An indicator variable that is equal to one if a XBRL filing was filed in year 2010, and zero if it was in year 2009

Table 2
Sample selection

Panel A: Sample selection process

	Firm-Years
Initial XBRL mandatory filings from June 2009 to December 2010	4699
Less: Filings before June 15th, 2009	(25)
Less: Duplicate filings	(38)
Less: Missing data in Compustat	(104)
Final sample	4532

Panel B: Sample distribution by creation software

Creation Software	PERCENT
Bowne Tagger	23.74
EDGAR Online I-Metrix Xcelerate	22.46
Rivet Software	20.52
Fujitsu XWand	13.59
EDGARizerX	12.95
Clarity FSR	4.37
Others	2.37
	100.00

Panel C: Sample distribution by year and industry

Year	Agriculture	Construction	Finance & Real Estate	Manufacturing	Mineral	Retail	Service	Transportation & Communication	Wholesale	Total	%
2009	0	10	151	330	93	60	87	138	15	884	20%
2010	4	40	709	1319	248	256	450	533	89	3648	80%
Total	4	50	860	1649	341	316	537	671	104	4532	100%
%	0%	1%	19%	36%	8%	7%	12%	15%	2%	100%	

Table 3
Descriptive statistics

Panel A: Descriptive statistics of XBRL *deficiency filings* vs. *non-deficiency filings*

	Deficiency Filings						Nondeficiency Filings				
Variable	Mean	Median	Std. Dev.	25%	75%	Predicted difference	Mean	Median	Std. Dev.	25%	75%
XBRL EXTENSIONS	0.163***	0.13***	0.124	0.070	0.240	>	0.094	0.080	0.073	0.040	0.130
10-Q FORM	0.883	1.000	0.322	1.000	1.000	>	0.870	1.000	0.336	1.000	1.000
VFP PARTICIPANT	0.063***	0***	0.243	0.000	0.000	<	0.039	0.000	0.195	0.000	0.000
FIRM SIZE	9.283***	9.15***	1.531	8.270	10.166	>	8.553	8.477	1.523	7.493	9.528
EXTREME SALES GROWTH	0.187	0.000	0.390	0.000	0.000	>	0.212	0.000	0.409	0.000	0.000
FOREIGN TRANSACTIONS	0.320	0.000	0.467	0.000	1.000	>	0.346	0.000	0.476	0.000	1.000
LOSS	0.182	0.000	0.386	0.000	0.000	>	0.176	0.000	0.381	0.000	0.000
RESTRUCTURING CHARGE	0.003	0.000	0.007	0.000	0.004	>	0.004	0.000	0.007	0.000	0.004
NUMBER OF TIMES FILING	2.966***	2***	1.863	1.000	5.000	<	2.385	2.000	1.400	1.000	3.000
FILING YEAR	0.758***	1***	0.428	1.000	1.000	<	0.839	1.000	0.367	1.000	1.000
Number of observations		1924						2608			

Panel B: Descriptive statistics of XBRL *major deficiency filings* vs. *non-deficiency filings*

Variable	Mean	Median	Std. Dev.	25%	75%	Predicted difference	Mean	Median	Std. Dev.	25%	75%
XBRL EXTENSIONS	0.133***	0.1***	0.115	0.060	0.160	>	0.094	0.080	0.073	0.040	0.130
10-Q FORM	0.933***	1***	0.250	1.000	1.000	>	0.870	1.000	0.336	1.000	1.000
VFP PARTICIPANT	0.089***	0***	0.286	0.000	0.000	<	0.039	0.000	0.195	0.000	0.000
FIRM SIZE	9.48***	9.423***	1.526	8.485	10.311	>	8.553	8.477	1.523	7.493	9.528
EXTREME SALES GROWTH	0.167	0.000	0.373	0.000	0.000	>	0.212	0.000	0.409	0.000	0.000
FOREIGN TRANSACTIONS	0.348	0.000	0.477	0.000	1.000	>	0.346	0.000	0.476	0.000	1.000
LOSS	0.177	0.000	0.382	0.000	0.000	>	0.176	0.000	0.381	0.000	0.000
RESTRUCTURING CHARGE	0.004	0.000	0.007	0.000	0.004	>	0.004	0.000	0.007	0.000	0.004
NUMBER OF TIMES FILING	1.86***	1***	1.484	1.000	2.000	<	2.385	2.000	1.400	1.000	3.000
FILING YEAR	0.329***	0***	0.470	0.000	1.000	<	0.839	1.000	0.367	1.000	1.000
Number of observations		492						2608			

Panel C: Descriptive statistics of XBRL *minor deficiency filings* vs. *non-deficiency filings*

	Minor Deficiency Filings						Nondeficiency Filings				
Variable	Mean	Median	Std. Dev.	25%	75%	Predicted difference	Mean	Median	Std. Dev.	25%	75%
XBRL EXTENSIONS	0.172***	0.14***	0.127	0.070	0.250	>	0.094	0.080	0.073	0.040	0.130
10-Q FORM	0.872	1.000	0.334	1.000	1.000	>	0.870	1.000	0.336	1.000	1.000
VFP PARTICIPANT	0.059***	0***	0.235	0.000	0.000	<	0.039	0.000	0.195	0.000	0.000
FIRM SIZE	9.268***	9.124***	1.529	8.243	10.164	>	8.553	8.477	1.523	7.493	9.528
EXTREME SALES GROWTH	0.186	0.000	0.389	0.000	0.000	>	0.212	0.000	0.409	0.000	0.000
FOREIGN TRANSACTIONS	0.312	0.000	0.464	0.000	1.000	>	0.346	0.000	0.476	0.000	1.000
LOSS	0.188	0.000	0.390	0.000	0.000	>	0.176	0.000	0.381	0.000	0.000
RESTRUCTURING CHARGE	0.003	0.000	0.007	0.000	0.003	>	0.004	0.000	0.007	0.000	0.004
NUMBER OF TIMES FILING	3.182***	3***	1.855	1.000	5.000	<	2.385	2.000	1.400	1.000	3.000
FILING YEAR	0.831	1.000	0.375	1.000	1.000	<	0.839	1.000	0.367	1.000	1.000
Number of observations		1690						2608			

All variables are described in Table 1. The t-test of means uses the pooled method when the underlying variances are equal and the Satterthwaite method when they are unequal. (*), (**), (***) indicates significance at the 0.10, 0.05, and 0.01 levels, respectively for the t-test (shown on mean value above) or Wilcoxon rank-sum test (shown on median value above).

Table 4
Spearman correlation among key variables

	XBRL EXTEN.	10-Q FORM	VFP PART.	FIRM SIZE	EXTR. SL GRO	FORE.	LOSS	RESTR. CHG	#TIMES FILING	FILING YEAR
ERROR	0.29***	0.02	0.05***	0.23***	-0.03**	-0.03*	0.01	0.02	0.12***	-0.1***
XBRL EXTENSIONS		-0.04**	0.07***	0.45***	0.01	-0.07***	0.05***	-0.09***	0.39***	0.07***
10-Q FORM			-0.03*	-0.11***	0.03*	-0.02	0.01	-0.04***	-0.19***	-0.13***
VFP PARTICIPANT				0.14***	-0.08***	0.04***	-0.01	0.07***	0.09***	-0.07***
FIRM SIZE					-0.09***	-0.05***	-0.02*	0.01	0.35***	-0.25***
EXTREME SALES GROWTH						-0.02	-0.13***	-0.14***	-0.05***	0.03**
FOREIGN TRANSACTIONS							0.04**	0.24***	0.03*	-0.02
LOSS								0.11***	-0.04***	0.03*
RESTRUCTURING CHARGE									0.05***	-0.03*
NUMBER OF TIMES FILING										0.35***

Variable ERROR is an indicator variable that is equal to one if a XBRL filing has an error, and zero otherwise. All other variables are defined in Table 1.
(*), (**), (***) indicates significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 5
Logistic regression of the probability of XBRL filing deficiency

Independent Variables	Predicted Sign	Dependent variable=ERROR Logit estimate (X^2)
INTERCEPT		1.427
		(45.271)***
XBRL EXTENSIONS	+	7.452
		(229.046)***
10-Q FORM	+	0.092
		(0.755)
VFP PARTICIPANT	-	0.036
		(0.048)
FIRM SIZE	+	0.146
		(20.662)***
EXTREME SALES GROWTH	+	-0.059
		(0.396)
FOREIGN TRANSACTIONS	+	-0.051
		(0.397)
LOSS	+	0.026
		(0.069)
RESTRUCTURING CHARGE	+	9.858
		(3.076)*
NUMBER OF TIMES FILING	-	0.05
		(1.94)
FILING YEAR	-	-0.711
		(46.192)***
Industry indicator variables		Included
Software indicator variables		Included
Number of total observations		4532
Likelihood-Ratio-Pr>Chi-Sq		<0.0001
Pseudo R-Sq		0.2047

Dependent variable ERROR is an indicator variable that is equal to one if a XBRL filing has an error, and zero otherwise. All other variables are defined in Table 1.
(*), (**), (***) indicates significance ($P \geq X^2$) at the 0.10, 0.05, and 0.01 levels, respectively.

Table 6
Logistic regression of the probability of XBRL filing deficiency *by severity of deficiency*

Independent Variables	Predicted Sign	Dependent variable= ERROR_MAJOR Logit estimate (X^2)	Dependent variable= ERROR_MINOR Logit estimate (X^2)
INTERCEPT		5.028	0.512
		(169.079)***	(5.026)
XBRL EXTENSIONS	+	10.038	7.384
		(99.273)***	(213.568)***
10-Q FORM	+	-0.102	0.035
		(0.179)	(0.104)
VFP PARTICIPANT	-	0.125	-0.001
		(0.221)	(0)
FIRM SIZE	+	0.228	0.143
		(13.673)***	(17.745)***
EXTREME SALES GROWTH	+	-0.1	-0.083
		(0.289)	(0.711)
FOREIGN TRANSACTIONS	+	-0.009	-0.086
		(0.003)	(1.037)
LOSS	+	-0.137	0.064
		(0.509)	(0.395)
RESTRUCTURING CHARGE	+	16.646	10.081
		(2.284)	(2.941)*
NUMBER OF TIMES FILING	-	-0.348	0.096
		(25.166)***	(10.223)***
FILING YEAR	-	-2.505	-0.256
		(169.950)***	(5.162)**
Industry indicator variables		Included	Included
Software indicator variables		Included	Included
Number of total observations		3100	4298
Likelihood-Ratio-Pr>Chi-Sq		<0.0001	<0.0001
Pseudo R-Sq		0.3008	0.2122

Dependent variable ERROR_DESCRIPTOR (MAJOR/MINOR) is an indicator variable that is equal to one if a XBRL filing has a major /minor error and zero if the filing does not have any error. All other variables are defined in Table 1.
(*), (**), (***) indicates significance ($P \geq X^2$) at the 0.10, 0.05, and 0.01 levels, respectively.

Appendix 1: The definition of each type of error from XBRL Cloud EDGAR Dashboard

	Validation Code	Definition	EDGAR Filing Manual
Major Error	E	Error	SEC will not (or should not) accept the document according to the EDGAR Filing Manual
Minor Error	W	Warning	SEC will provide a warning upon submission. Also, might be an underlying XBRL 2.1 problem
	C	Inconsistency	Rollups do not add up according to calculation linkbase.
	P	Best Practice	Misleading precision on submitted numeric values